U.S. Department of the Interior
Bureau of Land Management
California Desert District
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553

December 2004

Final Environmental Impact Report and Statement for the

West Mojave Plan

A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment
Vol 2

The Bureau of Land Management Today

Our Vision

To enhance the quality of life for all citizens through the balanced stewardship of America's public lands and resources.

Our Mission

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

Our Values

To serve with honesty, integrity, accountability, respect, courage, and commitment to make a difference.

Our Priorities

To improve the health and productivity of the land to support the BLM multiple-use mission.

To cultivate community-based conservation, citizen-centered stewardship, and partnership through consultation, cooperation, and communication.

To respect, value, and support our employees, giving them resources and opportunities to succeed.

To pursue excellence in business practices, improve accountability to our stakeholders, and deliver better service to our customers.

BLM/CA/ES-2004-005 + 1790 - 1600

APPENDICES

List of Appendices

APPENDIX A

1992 MEMORANDUM OF UNDERSTANDING

Appendices

MEMORANDUM OF UNDERSTANDING
BY AND BETWEEN THE

U.S. BUREAU OF LAND MANAGEMENT

AND THE

UNDERSIGNED PARTICIPATING AGENCIES

FOR THE PURPOSE OF PLANNING AND IMPLEMENTING A PROGRAM TO CONSERVE WILDLIFE AND PLANT SPECIES OF CONCERN IN THE WESTERN MOJAVE DESERT.

This Memorandum of Understanding (Memorandum) is made and entered into as of the date of signature by and among the U.S. Bureau of Land Management (BLM) and the undersigned local, state, and Federal agencies. The signatories collectively are referred to as the "Participating Agencies."

WHEREAS, the Participating Agencies are among the Federal, State, and local agencies that have administrative responsibility or regulatory authority under certain Federal and State statutes including the Endangered Species Act of 1973, as amended (ESA), the California Endangered Species Act of 1984 (CESA), the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), the Sikes Act, the Federal Land Policy and Management Act of 1976, as amended (FLPMA), State planning and zoning laws, and local planning ordinances, and,

WHEREAS, these statutes direct the Participating Agencies to protect certain species of concern and their habitats from adverse effects resulting from public and private development and actions, and,

WHEREAS, the various statutes and sources of authority under which the Participating Agencies operate do not empower any individual agency to implement a comprehensive, multi-agency program for long-term viability of the species of concern, and,

WHEREAS, because of the overlap of jurisdictions and lack of comprehensive authority, the private sector cannot now be assured that project review will be timely or that mitigation, compensation, and other requirements will be consistent among Participating Agencies, and,

WHEREAS, the Participating Agencies recognize the need for comprehensive and coordinated protection of the species of concern, and they desire to integrate their responsibilities and authorities in a coordinated manner to ensure successful, timely, and mutually beneficial resolution of issues involving the species of concern, and,

WHEREAS, the State and Federal agencies participating in this Memorandum desire that their regulatory practices and land use decisions will comply with State and Federal environmental and endangered species statutes and regulations and that their management actions will promote appropriate use and protection of the desert land under their jurisdictions, and, WHEREAS, the cities, counties, and other local agencies participating in this Memorandum desire that their land use regulations and decisions comply with State and Federal environmental and endangered species statutes and regulations and that their planning decisions will promote continued economic growth and development for their citizens, and,

WHEREAS, a Preparation Guide (also serving as a scope-of-work) has been prepared by the U.S. Bureau of Land Management (BLM), the U.S. Fish and Wildlife Service (FWS), and the California Department of Fish and Game (CDFG) which defines the approach to the preparation of a coordinated, multi-species management plan focused on certain species of concern,

THEREFORE, it is mutually agreed and understood that:

1.0 PURPOSE OF MEMORANDUM

The Participating Agencies have administrative and/or regulatory responsibilities over species of concern in the western Mojave Desert. They have voluntarily entered into this memorandum to define their relationship in the development and implementation of a West Mojave Coordinated Management Plan and to ensure mutual compliance with applicable statutes in the protection of the species of concern.

It is agreed that the Plan will be a coordinated multi-agency, multi-species management plan focusing on certain species of concern enumerated as "Target Species" in the Preparation Guide.

2.0 PURPOSES OF THE PLAN

The purposes of the Plan are:

2.1 Protection of Species of Concern. To conserve and protect species of concern and the ecosystems on which they depend within the western Mojave Desert.

2.2 Provide Equity in Regulation. To provide a comprehensive means to coordinate and standardize mitigation and compensation requirements so that public and private actions will be regulated equally and consistently, reducing delays, expenses, and regulatory duplication. It is intended that the Plan will eliminate uncertainty in developing private projects and will prescribe a system to ensure that the costs of compensation/mitigation are applied equitably to all agencies and parties.

2.3 Reduce Cumulative Effects. To prescribe mitigation measures for private development and agency actions to lessen or avoid cumulative impacts to the species of concern and eliminate, whenever possible, case-by-case review of impacts of projects when consistent with the mitigation and compensation requirements prescribed by the Plan.

3.0 PLANNING PROJECT COMPONENTS

3.1 The Plan. The principal component of this effort is the preparation of the Plan. The Plan will include the analysis of appropriate data, the delineation of management zones of habitat, and the definition of management prescriptions (both mitigating and compensating) by habitat category for the species of concern. The Plan will implement the guidance provided by, and be consistent with, the Recovery Plan for the desert tortoise.

3.2 Section 10(a) and 2081 Permit Applications. A number of applications for permits under Section 10(a) of the ESA and Section 2081 of the CESA will be submitted to the FWS and the CDFG, respectively, for the target species when the draft Plan is issued. The Plan will function as the Habitat Conservation Plan (HCP) for the permit applications.

3.3 EIS/EIR. Concurrent with preparation and release of the draft and final plans, a joint draft and final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) will be prepared and released which will satisfy Federal and State requirements, respectively.

3.4 Decision. The review of the Plan and the EIS/EIR by the FWS will result in a formal consultation and issuance of biological opinions for the target species, pursuant to Section 7 of the ESA, to the Federal agencies that are participants in the planning effort for the Federal lands involved. A concurrent review of the Plan, the EIS/EIR, and the Section 10(a) permit applications by the FWS will result in the issuance of Section 10(a) permits, pursuant to Section 10(a) of the ESA, to the local agencies that are participants in the planning effort for the private lands involved.

A review of the Plan and the EIS/EIR by the CDFG will result in the issuance of 2081 permits for the target species, pursuant to Section 2080 of the CESA, to local agencies that are participants in the Plan effort for the private lands involved. Other appropriate decision documents will be issued by the Participating Agencies.

3.5 Implementation. Following receipt of the biological opinion, approval of the Plan, and receipt of the 10(a) and 2081 permits, the signatories will revise their existing plans and policies to conform with the Plan and the 10(a) and 2081 permits. The signatories will also ensure that future plans, policies, and actions will be in conformance with the Plan and the Section 10(a) and 2081 permits. Future actions outside the terms of the original permit(s) and biological opinion(s) will need further permits or consultations.

It is intended that the Plan will be the standard for dealing with the species of concern in the western Mojave Desert. Any future 10(a) or 2081 permit applications related to the target species submitted by local agencies, will be reviewed for conformance with the Plan.

Should the need arise to amend the Plan due to new information or the development of more effective management prescriptions or techniques, such amendment will occur through a cooperative effort involving the agencies in the western Mojave Desert that are subject to the biological opinions and 10(a) and 2081 permits already issued.

4.0 ROLE OF THE PARTICIPATING AGENCIES

Each Participating Agency agrees to provide to the BLM, without cost to the BLM, the following information and assistance:

4.1 Data. All relevant information it possesses for the lands within its jurisdiction.

4.2 Technical Assistance. Staff and support to assist with the following planning tasks:

a. Developing management prescriptions relevant to the land within its jurisdiction.
b. Providing effective liaison with adjacent jurisdictions.
c. Developing and implementing a comprehensive public participation program to ensure adequate public participation within its area of jurisdiction, as required by State law or local ordinance.

d. Preparing 10(a) and 2081 permit applications for the land within its jurisdiction, if applicable.

e. Providing any other assistance and/or support as might be mutually agreed upon with the BLM.

4.3 Point of Contact. Designate, in writing, the name of the individual official(s) who will function as the primary agency contact for coordination with the BLM.

4.4 Plan Conformance. Ensure that existing agency plans and policies are revised to conform with the approved Plan and the 10(a) and 2081 permits.

4.5 Funding. Funding in accordance with the attached funding schedule. These funds will offset costs of the planning effort not funded by the BLM.

5.0 ROLE OF THE BLM

The BLM agrees to provide the following resources and to perform the following functions consistent with the general and specific guidance found in the Preparation Guide:

5.1 Lead Agency. Act as lead agency for the Plan. As lead agency, the BLM will provide overall leadership and coordination among the Participating Agencies in the development of the Plan. This includes functioning as Lead Federal Agency in complying with the NEPA in preparation of the combined EIS/EIR.

5.2 Planning Team Personnel. Provide the primary members of the planning team.

5.3 Facilities, Equipment, and Support. Provide office facilities to house the planning team and provide necessary support such as office machines, supplies, etc. The BLM also agrees to provide automated support, such as word processing and geographic information system products.

5.4 Data. Provide any relevant data in its possession for the use of the planning team and the Participating Agencies and secure additional data on public lands as needed to allow completion of the plan. The BLM also agrees to participate in the analysis of the data and formulation of management prescriptions.

5.5 Public Participation. Assume lead responsibilities for ensuring adequate public participation by public land users and interests and for overall public participation in the planning effort.

5.6 Point of Contact. Designate, in writing, the name of the person designated as the primary BLM contact for the planning effort.

5.7 Endangered Species Acts. Submit the draft Plan and draft EIS/EIR to the FWS for formal consultation and biological opinions under Section 7 of the ESA. The BLM will consolidate the applications from local Participating Agencies for permits under Section 10(a) of the ESA and Section 2081 of the CESA. The BLM will then submit those applications to the FWS and the CDFG for review and processing.

5.8 Plan Conformance. Ensure that existing BLM plans, including the California Desert Conservation Area Plan, are conformed to the final Plan.

5.9 Funding. Fund the salaries of BLM personnel working on the Plan and to provide funding for other support and facilities listed elsewhere in Section 5.0.

6.0 ADDITIONAL PROVISIONS

6.1 Good Faith. This agreement is entered into freely and in good faith by the signatory agencies. Each agency affirms that execution of this agreement is within its legal purview and agrees to fulfill the role stated herein and any other tasks and responsibilities incumbent upon Participating Agencies as set forth in the Preparation Guide.

6.2 Limits of Authority and Funding. The signatory agencies agree and understand that performance under this agreement by any party is dependent upon the lawful appropriation, availability, and allocation of funds by proper authorities and that this agreement does not constitute a commitment of funds, which must be made by separate action of the appropriate officials of each party.

6.3 Effective Date of Agreement. This agreement shall take effect upon the dates of signature.

6.4 Amendment of This Agreement. This agreement may be amended at any time with the concurrence of all parties. Approved amendments must be in writing.

6.5 Termination of Agreement. This agreement shall automatically terminate upon approval and adoption of the Plan or on December 31, 1993, whichever occurs first, unless renewed as provided in Paragraph 6.6 below. An individual party may terminate its participation unilaterally by serving notice directly to the other signatory agencies in writing.

6.6 Renewal of Agreement. This agreement may be renewed with the concurrence of all parties under the same terms as set forth in Paragraph 6.4, above.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this memorandum.

4/20/92
(Signature)

Gerald E. Hillier
(Name)
District Manager, California Desert District
U.S. Bureau of Land Management

(Signature)

Rick W. Cockrum
(Name)
President, Board of Directors
Indian Wells Valley Water District

(Signature)

Florence S. Condos
(Name)
Mayor
City of Ridgecrest

(Signature)

George Nokes
(Name)
Regional Manager, Region 4
California Department of Fish and Game

(Signature)

Craig Faanes
(Name)
Field Supervisor, Southern California Field Station
U.S. Fish and Wildlife Service

(Signature)

Eric G. Ziegler
(Name)
City Manager
City of Barstow

Fred Worthley
(Signature)

Fred Worthley
(Name)
Regional Manager, Region 5
California Department of Fish and Game

4/20/92
(Signature)

Gerald E. Hillier
(Name)
District Manager, California Desert District
U.S. Bureau of Land Management

(Signature)

George Nokes

(Name)

Regional Manager, Region 4
California Department of Fish and Game

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Fred Worthley

(Name)

Regional Manager, Region 5
California Department of Fish and Game

(Signature) APR 13 1992

Larry Walker

(Name) 92-260

Chairman, Board of Supervisors
San Bernardino County

(Signature)

(Name)

Chairman, Board of Supervisors
Los Angeles County

(Signature)

(Name)

Chairman, Board of Supervisors
Kern County

(Signature)

Paul E. Payne

(Name)

Chairman, Board of Supervisors
Inyo County

(Signature)

Mary L. Scarpa

(Name)

Mayor
City of Adelanto

(Signature)

Robert Turner

(Name)

Mayor
Town of Apple Valley

(Signature)

Eric G. Ziegler
(Name)
City Manager
City of Barstow

(Signature)

Steve West
(Name)
City Manager
California City

(Signature)

Percy Bakker
(Name)
Mayor
City of Hesperia

(Signature)

James C. Gilley
(Name)
City Manager
City of Lancaster

(Signature)

James C. Ledford Jr.
(Name)
Mayor
City of Palmdale

(Signature)

Florence S. Condos
(Name)
Mayor
City of Ridgecrest

(Signature)

(Name)
(Mayor or City Manager)
City of Twentynine Palms

(Signature)

Terry E. Caldwell
(Name)
Mayor
City of Victorville

(Signature)

Rick W. Cockrum
(Name)
President, Board of Directors
Indian Wells Valley Water District

1-12-93
(Signature)

Sue Tsuda
(Name)
Town Manager
Town of Yucca Valley

Appendices

APPENDIX B

MEASURES APPLICABLE TO EACH JURISDICTION

Appendices

APPENDIX B

MEASURES APPLICABLE TO EACH JURISDICTION UNDER ALTERNATIVE A

Cities and Towns

Adelanto

SPECIES	RESPONSIBILITY
Burrowing owl	(Rap-6)Require abbreviated surveys at sites where tortoise clearance surveys are required. (Rap-10) Require eviction or relocation if owls are found. (Rap-9)Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1, 14) Require raptor-safe electrical distribution lines. (M-23, AM-22, AM-105) Retrofit problem poles based on monitoring results
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.

Apple Valley

SPECIES	RESPONSIBILITY
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Mojave River Bioregion (10 species: Brown-crested flycatcher, Least Bell's vireo, Lucy's warbler, Southwestern willow flycatcher, Summer tanager, Vermilion flycatcher, Yellow breasted flycatcher, Yellow warbler, Mojave River vole,	Cooperate with water management agencies to maintain ground water levels in the Mojave River.

Southwestern pond turtle)	
Prairie Falcon	(MR-1, AM-14) Cooperate with water management agencies to maintain ground water levels in the Mojave River. Prairie Falcon (RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.

Barstow

SPECIES	RESPONSIBILITY
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.

California City

SPECIES	RESPONSIBILITY
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Desert cymopterus	(P-21) Require land disturbing projects within identified suitable habitat to perform botanical surveys for this species, and if the plant is located, to avoid all occurrences to the maximum extant practicable. (M-2) If not avoided, report incidental take.
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.

Hesperia

SPECIES	RESPONSIBILITY
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually

Ferruginous Hawk	(Rap-1, 14) Require raptor-safe electrical distribution lines. (M-23, AM-22, AM-105) Retrofit problem poles based on monitoring results
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Mojave River vole	(AM-14,MR-1) Cooperate with water management agencies to maintain ground water levels.
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.
Short-Joint beavertail Cactus	Maintain the integrity of the existing drainages on the north base of the San Gabriel Mountains. No structural flood control improvements would be built for these waterways south of Highway 138. A setback of 100 feet for projects on undeveloped private lands along the drainage would be required, with an easement dedicated to the Flood Control District. The District would recognize a conservation easement over these lands. (P-52) Review land division and development proposals in the Oak Hills area to insure minimization of impacts to short-joint beavertail cactus habitat.

Lancaster

SPECIES	RESPONSIBILITY
Alkali Mariposa Lily	Follow conservation strategy as outlined in EIS Section 2.2.4.10.4
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.

Palmdale

SPECIES	RESPONSIBILITY
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.
Short-Joint beavertail Cactus	(M-2) Report incidental take on private lands within the Palmdale city limits.
Southwestern pond turtle	Protect water source and provide open space at Barrel Springs and Amargosa Creek.

Ridgecrest

SPECIES	RESPONSIBILITY
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.
Summer tanager	Report incidental take if known sites change land use.
Vermilion flycatcher	Report incidental take if known sites change land use.

Twentynine Palms

SPECIES	RESPONSIBILITY
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Mojave fringe-toed lizard	(M-2) Report incidental take
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.

Yucca Valley

SPECIES	RESPONSIBILITY
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Parish's daisy	Report incidental take if known sites change land use.
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting

	restrictions on new mines.
Summer tanager	Report incidental take if known sites change land use.
Vermilion flycatcher	Report incidental take if known sites change land use.

Victorville

SPECIES	RESPONSIBILITY
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Mojave River Bioregion (10 species: Brown-crested flycatcher, Least Bell's vireo, Lucy's warbler, Southwestern willow flycatcher, Summer tanager, Vermilion flycatcher, Yellow breasted flycatcher, Yellow warbler, Mojave River vole, Southwestern pond turtle)	AM-14,MR-1) Cooperate with water management agencies to maintain ground water levels in the Mojave River.
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.

Counties

Inyo County

SPECIES	RESPONSIBILITY
Bats	(BAT-6) Require surveys of natural caves, cliff faces, mine shafts, abandoned buildings or bridges. Protect significant roosts by avoidance if found. (BAT-7) Provide for safe exit of bats from non-significant roosts
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Inyo California Towhee	Report incidental take if known sites change land use.
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Ninemile Canyon phacelia	Track incidental take.
Panamint alligator	(M-2) Report incidental take

lizard	
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.

Kern County

SPECIES	RESPONSIBILITY
Alkali Mariposa Lily	Follow conservation strategy as outlined in EIS Section 2.2.4.10.4
Barstow woolly sunflower	(P-15) Establish the North Edwards Conservation Area. (M-5,HCA-27,29) Require botanical surveys, limit ground disturbance to 1% and apply 5:1 mitigation within Conservation Area. Adjust boundaries over time to reflect survey results
Bats (6 species)	(BAT-6) Require surveys of natural caves, cliff faces, mine shafts, abandoned buildings or bridges. Protect significant roosts by avoidance if found. (BAT-7) Provide for safe exit of bats from non-significant roosts.
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Charlotte's phacelia	(M-2) Report incidental take of suitable occupied habitat on private land.
Desert cymopterus	(HCA-3) Establish the North Edwards Conservation Area. (HCA-27,29) Require botanical surveys, limit new ground disturbance to 1% and apply 5:1 mitigation within Conservation Area. Adjust boundary over time to reflect survey results.
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Flax-like monardella	(HCA-3) Require surveys and avoidance of this species within Middle Knob Conservation Area.
Kelso creek monkeyflower	(M-2) Report incidental take of occupied and suitable habitat. Apply mitigation funds to acquisition of multispecies areas in Kelso Valley where monkeyflower is present.
Kern buckwheat	(HCA-3) Require avoidance within Middle Knob Conservation Area.
LeConte's Thrasher	(HCA-1,27,29) Establish DWMAs and follow conservation measures (1% limitation on allowable new ground disturbance, 5:1 mitigation)
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Mojave tarplant	(M-2) Report incidental take (applies to new populations).
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.
Red Rock poppy	(M-2) Report incidental take (applies to new populations)
Red Rock tarplant	(M-2) Report incidental take (applies to new populations)
Reveal's buckwheat	(P-51) Require avoidance at known location.
Southwestern Pond Turtle	(AM-74) Require riparian protection of Kelso Creek if turtles are detected through new surveys and monitoring.
Western Snowy Plover	(B-16) Prohibit disturbance within 1/8 mile of nest sites on playas during nesting season. (Applies to newly-detected nest locations.)
Yellow-eared pocket mouse	(MAM-11) Limit incidental take to 100 acres. (MAM-9) Apply mitigation funds to acquisition of multispecies areas in Kelso Valley where pocket mouse is present.

Los Angeles County

SPECIES	RESPONSIBILITY
Alkali Mariposa Lily	Follow conservation strategy as outlined in EIS Section 2.2.4.10.4
Bats	(BAT-6) Require surveys of natural caves, cliff faces, mine shafts, abandoned buildings or bridges. Protect significant roosts by avoidance if found. (BAT-7) Provide for safe exit of bats from non-significant roosts.
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Gray Vireo	Two options are proposed: (B-6) 1. Establish Big Rock Creek Conservation Area, (HCA-27,29) apply the 1% cap on new ground disturbance and adopt the West Mojave Plan mitigation ratios. (B-9) 2. Adopt new boundaries for the Antelope Valley Significant Ecological Area. Zone the SEA for ten acre minimum parcel size and impose development reviews.
LeConte's Thrasher	(HCA-1,27,29) Establish DWMAs and follow conservation measures (1% limitation on allowable new ground disturbance, 5:1 mitigation) .
Long-eared owl	(RAP-2) Require development projects to be ¼ mile from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance within 1/4 mile of nest sites during the nesting season. (HCA-3) Establish the Big Rock Creek Conservation Area or adopt new boundaries for the Antelope Valley SEA.
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Mojave Fringe-Toed Lizard	Follow conservation strategy as outlined in EIS Section 2.2.4.9.1
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.
San Diego Horned Lizard	Two options are proposed: (HCA-3,27,29) 1. Establish the Big Rock Creek Conservation Area, apply the 1% cap on new ground disturbance and adopt the West Mojave Plan mitigation ratios. (B-9) 2. Adopt new boundaries for the Antelope Valley Significant Ecological Area. Zone the SEA for ten acre minimum parcel size and impose development reviews.
Short-Joint beavertail Cactus	Two options are proposed: (HCA-3,27,29) 1. Establish the Big Rock Creek Conservation Area, apply the 1% cap on new ground disturbance and adopt the West Mojave Plan mitigation ratios. (B-9) 2. Adopt new boundaries for the Antelope Valley Significant Ecological Area. Zone the SEA for ten acre minimum parcel size and impose development reviews.
Southwestern Pond Turtle	Maintain water sources and provide adjacent open space at occupied habitat on Amargosa Creek and Lake Elilzabeth.

San Bernardino County

SPECIES	RESPONSIBILITY
Alkali Mariposa Lily	(P-9) Review any proposals for discretionary permits and require avoidance of the rare plant habitat and protection of the water sources supplying the wetland habitat (Paradise Springs and Rabbit Springs) . Review proposals for development, mining, or water extraction near the springs along the Helendale Fault (Box S Springs, Cushenbury Springs and Rabbit Springs) for compatibility with protection of the mariposa lilies and the surface water supply. Require botanical surveys in these areas.
Barstow Woolly Sunflower	Follow conservation strategy as outlined in EIS Section 2.2.4.10.5
Bats	(BAT-6) Require surveys of natural caves, cliff faces, mine shafts, abandoned buildings or bridges. Protect significant roosts by avoidance if found. (BAT-7) Provide for safe exit of bats from non-significant roosts.
Big horn Sheep	(MAM-1) Protect natural water sources in permanent habitat and prohibit diversions at bighorn springs. (MAM-2) Minimize helicopter overflights near lambing areas, at least seasonally (January 1 to June 30) . (MAM-6) Provide methods for crossing new freeways, aqueducts and canals that otherwise would impede movement of bighorn between seasonal and permanent occupied habitat. (MAM-7) Require fencing of proposed heap leach pads if in occupied bighorn habitat or proven linkages. (MAM-5) Include funds to monitor potentially impacted sheep herds or to provide additional water sources as mitigation measures for mining proposals within occupied bighorn habitat in the San Bernardino Mountains.
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-8) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Carbonate endemics	Follow Carbonate endemic conservation strategy as outlined in EIS Section 2.2.4.10.2
Crucifixion thorn	(M-2) Report incidental take.
Desert cymopterus	(P-21) Require botanical surveys, and if the plant is located, avoid all occurrences to the maximum extent practicable within the Fremont–Kramer and Superior–Cronese DWMAs (regions of windblown sand on the east side of larger playas, including Harper Dry Lake, Superior Lake, and Cuddeback Lake) . (M-2) Report incidental take
Desert Tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Gray Vireo	Maintain the integrity of the existing drainages on the north base of the San Gabriel Mountains. No structural flood control improvements would be built for these waterways south of Highway 138. Require a setback of 100 feet for projects on undeveloped private lands along the drainage, with an easement dedicated to the Flood Control District. The District would recognize a conservation easement over these lands. (B-8) Review land division and development proposals in the Oak Hills area to insure minimization of impacts to gray vireo habitat.
Lane Mountain Milk Vetch	(P-29) Acquire all private lands within the Lane Mountain Milkvetch Conservation Area, to the extent feasible and from willing sellers only.
LeConte's Thrasher	(HCA-1) Establish DWMAs and follow conservation measures (HCA-27,29) (1% limitation on allowable new ground disturbance, 5:1 mitigation) .
Little San Bernardino	(P-33) Require development within 100' of existing stream channels to protect the

Mountains Gilia	integrity of the stream channels. Maintain the existing hydrology within 1/4 mile of Highway 62. Road crossings of washes should be at grade (Arizona crossings) instead of fill and culverts. Require setbacks of 100' from the outer banks of washes within the species habitat and seek to avoid take of existing known populations. Establish flood control and conservation easements on private lands containing this species. Utilize floodplain management rather than structural alternatives for flood control in washes supporting this species. Report incidental take, which would generally be limited to areas greater than 100' from washes occupied by the species and not exceeding 10% of the acreage now supporting known occurrences on private land. (P-34) Channelization of upper Big Morongo Creek, Little Morongo Creek, and Dry Morongo Creek northwest of Highway 62 would be prohibited in order to maintain fluvial processes supporting occurrences in the Coachella Valley. Improvements (e.g. culverts) within 1/4 mile of Highway 62 in these washes would be allowed.
Lucy's warbler	Remove tamarisk from several areas of the Mojave River between Helendale and Hinkley
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Mojave River Bioregion (Brown-crested flycatcher, Least Bell's vireo, Southwestern willow flycatcher, Summer tanager, Vermilion flycatcher, Yellow breasted flycatcher, Yellow warbler, Mojave River vole)	(MR-1,AM-14) Cooperate with water management agencies to maintain ground water levels in the Mojave River.
Mojave Monkeyflower	(M-48) Require botanical survey within eastern Conservation Area. Conform to provisions of the Plan in the Brisbane Valley (Section 3.5.10.13)
Mojave Fringe-Toed Lizard	Follow conservation strategy as outlined in EIS Section 2.2.4.9.1
Parish's Alkali Grass	(P-9) Review any proposals for discretionary permits and require avoidance of the rare plant habitat and protection of the water sources supplying the wetland habitat Rabbit Springs) . (M-3) Require botanical surveys at specified alkali springs and avoid populations to the maximum extent practicable if Parish's alkali grass is found.
Parish's Phacelia	(P-48) Require that projects proposed on the dry lakes with occupied habitat for this species avoid and minimize take of this species to the maximum extent practicable.
Parish's popcorn flower	(P-9) Review any proposals for discretionary permits and require avoidance of the rare plant habitat and protection of the water sources supplying the wetland habitat (Rabbit Springs) . (M-3) Require botanical surveys at specified alkali springs and avoid populations to the maximum extent practicable if popcorn flower is found.
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season. (RAP-3) Impose blasting restrictions on new mines.
Salt Springs checkerbloom	(P-9) Review any proposals for discretionary permits and require avoidance of the rare plant habitat and protection of the water sources supplying the wetland habitat (Rabbit Springs) . (M-3) Require botanical surveys at specified alkali springs and avoid populations to the maximum extent practicable if checkerbloom is found.
San Diego Horned Lizard	(B-9) Maintain the integrity of the existing drainages on the north base of the San Gabriel Mountains. No structural flood control improvements would be built for these waterways south of Highway 138. Require a setback of 100 feet for projects

	on undeveloped private lands along the drainage, with an easement dedicated to the Flood Control District. The District would recognize a conservation easement over these lands.
Shockley's rockcress	Follow Carbonate endemic conservation strategy as outlined in EIS Section 2.2.4.10.2
Short-Joint beavertail Cactus	(B-9) Maintain the integrity of the existing drainages on the north base of the San Gabriel Mountains. No structural flood control improvements would be built for these waterways south of Highway 138. A setback of 100 feet for projects on undeveloped private lands along the drainage would be required, with an easement dedicated to the Flood Control District. The District would recognize a conservation easement over these lands. (P-52) Review land division and development proposals in the Oak Hills area to insure minimization of impacts to short-joint beavertail cactus habitat.
Triple-ribbed milkvetch	(P-53) Limit improvements to Big Morongo Creek and Dry Morongo Creek to areas within ¼ mile of Highway 62. (P-54) Require botanical surveys for ground-disturbing projects on private lands located within five miles of existing known locations for this species. Proposed projects on private land where this plant is detected would be required to avoid the occupied habitat. These parcels would be identified as priorities for acquisition.
Western Snowy Plover	(B-16) Restrict human and vehicle disturbance for a distance of 1/8 mile from nest sites during the nesting season (April 1 - August 1) . (B-17) Allow birds to complete the nesting season before construction begins. (Applies to Searles Lake and newly-detected nest sites)
Western yellow-billed cuckoo	(AM-14) Cooperate with water management agencies to maintain ground water levels in the Mojave River.
White-Margined Beardtongue	Require botanical surveys in identified suitable habitat and require avoidance to the maximum extent practicable.

Agencies

California State Parks

SPECIES	RESPONSIBILITY
Alkali Mariposa Lily	Continue current management.
Bats	(BAT-6) Require surveys of natural caves, cliff faces, mine shafts, abandoned buildings or bridges. Protect significant roosts by avoidance if found. (BAT-7) Provide for safe exit of bats from non-significant roosts.
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-8,10) Require relocation if owls are found. (RAP-11,HCA-4) Acquire linkage lands from Poppy Preserve to Liebre Ridge.
Charlotte's phacelia	Monitor populations
Desert tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
LeConte's Thrasher	Continue current management.
Long-Eared Owl	(Rap-2) Require development projects to be located 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance within 1/4 mile of nest sites during the nesting season.
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Mojave Fringe-Toed Lizard	Follow conservation strategy as outlined in EIS Section 2.2.4.9.1. (R-4) Acquire land adjacent to Saddleback Buttes State Park.
Mojave tarplant	Maintain current management
Prairie Falcon	(Rap-2) Require development projects to stay 1/4 mile away from occupied nests,

	unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season.
Red Rock poppy	Maintain current management
Red Rock tarplant	Maintain current management
San Diego Horned Lizard	Maintain current management. Report sightings at Poppy Preserve to CNDDB. (HCA-4) Acquire linkage lands to Liebre Ridge.

California Department of Fish and Game

SPECIES	RESPONSIBILITY
Barstow woolly sunflower	(P-11, 12) Consolidate lands within the Conservation Area and manage as an Ecological Reserve.
Bats	(BAT-6) Require surveys of natural caves, cliff faces, mine shafts, abandoned buildings or bridges. Protect significant roosts by avoidance if found. (BAT-7) Provide for safe exit of bats from non-significant roosts. Assist landowners with roost protection and safe exit of bats. (BAT-3,4) Review riparian and wash habitat protection for Townsend's big-eared bat and California leaf-nosed bat (applies to newly-detected significant roosts)
Burrowing owl	(Rap-10) Respond to landowner requests for assistance with evictions and relocations.
Desert tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	Require raptor-safe electrical distribution lines. Retrofit problem poles based on monitoring results
Inyo California Towhee	(B-11) Enhance habitat at Indian Joe Canyon Ecological Reserve. Monitor populations.
LeConte's Thrasher	(HCA-1) Establish DWMAs and follow conservation measures (HCA-27,29) (1% limitation on allowable new ground disturbance, 5:1 mitigation)
Long-Eared Owl	(RAP-2) Require development projects to be located 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance within 1/4 mile of nest sites during the nesting season. (HCA-3) Assist in acquisition within the Big Rock Creek Conservation Area.
Lucy's warbler	Maintain surface and groundwater at Camp Cady. Assist with purchase of farmland and discontinuing the agricultural operations so that more water becomes available to to maintain the groundwater criteria at Well H3-2 in the Harvard/Eastern Baja subregion of the Mojave groundwater basin. Remove tamarisk.
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Panamint alligator lizard	(B-11) Maintain and enhance habitat at Indian Joe Canyon Ecological Reserve.
Prairie Falcon	(Rap-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance near nest sites during the nesting season.
Southwestern Pond Turtle	(MR-1,AM-14) Cooperate with water management agencies to maintain ground water levels in the Mojave River. (M-78) Monitor population at Camp Cady
Summer tanager	(MR-1,AM-14) Cooperate with water management agencies to maintain ground water levels in the Mojave River.
Western snowy plover	Continue with agreement between IMC Chemical Corporation, BLM, Lahontan Regional Water Quality Control Board and CDFG protecting known important nesting sites on Searles Lake
Yellow warbler	(MR-1,AM-14) Cooperate with water management agencies to maintain ground water levels in the Mojave River.
Yellow-breasted chat	(MR-1,AM-14) Cooperate with water management agencies to maintain ground water levels in the Mojave River.

California State Lands Commission

SPECIES	RESPONSIBILITY
Bats	(BAT-6) Require surveys of natural caves, cliff faces, mine shafts, abandoned buildings or bridges. Protect significant roosts by avoidance if found. (BAT-7) Provide for safe exit of bats from non-significant roosts.
Burrowing owl	(RAP6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP-8,10) Require eviction or relocation if owls are found. (M-15) Report incidental take and relocations annually
Desert tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous Hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
LeConte's Thrasher	(HCA-1) Establish DWMAs and follow conservation measures (HCA-29) (1% limitation on allowable new ground disturbance, 5:1 mitigation)
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Prairie Falcon	(RAP-2) Require development projects to stay 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. (RAP-3) Prohibit construction or disturbance near nest sites during the nesting season. Impose blasting restrictions on new mines.

Bureau of Land Management

SPECIES	RESPONSIBILITY
Alkali Mariposa Lily	Follow conservation strategy as outlined in EIS Section 2.2.4.10.4
Barstow Woolly Sunflower	Follow conservation strategy as outlined in EIS Section 2.2.4.10.5. (p-11) Exchange lands with CDFG.
Bats	Follow conservation strategy as outlined in EIS Section 2.2.4.5
Bendire's Thrasher	(B-1,HCA-3) Establish Bendire's Thrasher Conservation Areas. (B-2) The first is the Kelso Valley Conservation Area within the existing Jawbone-Butterbredt ACEC. Amend the ACEC management plan to include the Bendire's thrasher. Consolidate public lands in the Kelso Valley through land exchanges, if the private landowners are willing. (B-3) In the North Lucerne Valley portion of the Bendire's Thrasher Conservation Area, retain lands within the Town of Apple Valley sphere of influence. Route designate will integrate protection for the Bendire's thrasher. (B-4) The conservation area on Coolgardie Mesa is entirely within the Superior-Cronese DWMA and the Mohave Ground Squirrel Conservation Area. It also overlaps almost completely the Lane Mountain milkvetch Conservation Area. Purchase private lands on Coolgardie Mesa from willing sellers, and because this region contains several protected species, these lands would receive a high priority for acquisition. Route designation will reduce the number of open routes to benefit this vehicle-sensitive species.
Bighorn sheep	(MAM-1) Protect natural water sources in permanent habitat and prohibit diversions at bighorn springs. (MAM-2) Minimize helicopter overflights near lambing areas, at least seasonally (January 1 to June 30) . (MAM-4) Remove burros in the Argus Mountains because of damage to springs. (MAM-6) Provide methods for crossing new freeways, aqueducts and canals that otherwise would impede movement of bighorn between seasonal and permanent occupied habitat. (MAM-7) Require fencing of proposed heap leach pads if in occupied bighorn habitat or proven linkages. (MAM-5) Include funds to monitor potentially impacted sheep herds or to provide additional water sources as mitigation measures for mining proposals within occupied bighorn habitat in the San Bernardino Mountains. (MAM-3) Manage sheep grazing allotments to comply with the "nine-mile rule", which is the standard for separation of domestic sheep and bighorn.

Brown-crested flycatcher	(M-13) Monitor numbers at Big Morongo Canyon ACEC.
Burrowing owl	(RAP-6) Require abbreviated surveys at sites where tortoise clearance surveys are required. (RAP8,10) Require eviction or relocation if owls are found. (RAP-9) Provide educational brochures to landowners. (M-15) Report incidental take and relocations annually
Charlotte's phacelia	(M-19) Monitor populations
Crucifixion thorn	(HCA-3) Establish the Pisgah Crater area as an Area of Critical Environmental Concern. (P-20) Sign larger populations to notify campers that firewood harvesting is prohibited.
Cushenbury buckwheat	Follow Carbonate endemic conservation strategy as outlined in EIS Section 2.2.4.10.2
Cushenbury milkvetch	Follow Carbonate endemic conservation strategy as outlined in EIS Section 2.2.4.10.2
Cushenbury oxytheca	Follow Carbonate endemic conservation strategy as outlined in EIS Section 2.2.4.10.2
Desert cymopterus	(P-21) Require land disturbing projects within identified suitable habitat to perform botanical surveys for this species, and if the plant is located, to avoid all occurrences to the maximum extant practicable.
Desert tortoise	Follow tortoise conservation strategy as outlined in EIS Section 2.2.4.2
Ferruginous hawk	(Rap-1,14) Require raptor-safe electrical distribution lines. (M-23,AM-22,AM-105) Retrofit problem poles based on monitoring results
Flax-like monardella	(HCA-3) Require surveys and avoidance of this species within Middle Knob Conservation Area.
Gray vireo	(B-5) Amend the management plan for the Juniper Flats ACEC to incorporate protection of the gray vireo as a goal of the plan. Add monitoring and adaptive management provisions of the West Mojave Plan to the management plan for Juniper Flats. (HCA-3) Establish a new ACEC for protection of the carbonate endemic plants.
Inyo California towhee	(B-10)Enhance habitat by excluding burros at Peach Spring. (B-11) Remove salt cedar and Phragmites at designated springs and replant with native willows. (B-12) Continue removal of feral burros from the Argus Mountains with a goal of zero. (B-13) Install signs indicating the China Lake NAWS boundary at Benko Spring and Ruby Spring (in cooperation with China Lake NAWS) . (B-14) Determine legality and effect of water diversions at Alpha Spring and Bainter Spring and cease diversion if necessary, subject to valid existing rights. Secure water rights at all other springs in Argus Mountains
Kelso creek monkeyflower	(HCA-3) Establish public land Conservation Areas. Monitor to determine potential impacts of OHV use and grazing.
Kern Buckwheat	(P-24) Construct vehicle barriers along the main access road where it adjoins occupied habitat. (P-25) Fence on both sides of the road near the Sweet Ridge population. Restore a vehicle turnaround and parking area so that traffic passes by, rather than on, the buckwheat habitat. (HCA-3) Establish the Middle Knob Conservation Area and ACEC
Lane Mountain Milk Vetch	(HCA-3) Designate a Lane Mountain Milkvetch Conservation Area. (P-26) Require botanical surveys prior to issuing any use permits. Issue no permits that allow take of this species (projects would have to be relocated) . (P-27) Prohibit grazing within the conservation area. (P-28) Designate acceptable open routes of travel. Fence approved routes as necessary, with signs advising the public that the area is closed to vehicle travel because of endangered species conservation. (P-29) Acquire, to the extent feasible and from willing sellers only all private lands within the Lane Mountain Milkvetch Conservation Area. (P-30) Withdraw all lands within the Conservation Area from mineral entry. Claimholders with valid existing rights will be compensated. (P-31) Revise the Management Plan for the Rainbow Basin Natural Area to

	incorporate specific measures that protect the Lane Mountain milkvetch. (P-32) Notify claimholders of the presence of endangered plants. Restrict casual use that involves ground disturbance within the Conservation Area as necessary.
Least Bell's vireo	(M-13) Continue monitoring at Big Morongo Canyon ACEC.
LeConte's Thrasher	(HCA-1) Establish DWMAs and follow conservation measures (HCA-29) (1% limitation on allowable new ground disturbance, 5:1 mitigation)
Little San Bernardino Mountains Gilia	(P-35) Pursue land exchanges to acquire known sites near JTNP. Retain scattered public lands south of Joshua Tree bordering Joshua Tree National Park.
Long-Eared Owl	(RAP-2) Require development projects to be located 1/4 mile away from occupied nests, unless the line-of-sight from the edge of development is obscured. Prohibit construction or disturbance within 1/4 mile of nest sites during the nesting season. (RAP-4) Establish a new Key Raptor Area encompassing the Argus Mountains for the long-eared owl.
Mohave Ground Squirrel	Follow conservation strategy as outlined in EIS Section 2.2.4.3
Mojave Monkeyflower	Follow conservation strategy as outlined in EIS Section 2.2.4.10.13
Mojave Fringe-toed lizard	Follow conservation strategy as outlined in EIS Section 2.2.4.9.1
Mojave Tarplant	(P-45,M-56) Monitor the population numbers and extent at the Short Canyon and Cross Mountain sites. Maintain the cattle guards and fencing at Short Canyon. (P-45) Revise the ACEC Plan for Short Canyon to specify protection of Mohave tarplant as a goal of the plan. (P-46) Perform an initial (within two years of Plan adoption) census estimating numbers and acreage of occupied habitat at Short Canyon and Cross Mountain to provide a baseline. (AM-104) Monitor the numbers and acreage of occupied habitat very five years.
Ninemile Canyon phacelia	BLM rangeland health assessments
Panamint alligator lizard	(B-10) Continue removal of feral burros from the Argus Mountains with a goal of zero. Enhance habitat by excluding burros at Peach Spring (B-11) Remove salt cedar and Phragmites at designated springs and replant with native willows. (R-10) Amend the Great Falls Basin ACEC management plan to incorporate protection of the Panamint alligator lizard as a goal of the Plan. Include the monitoring and adaptive management provisions of the West Mojave Plan in the ACEC management plan.
Parish's daisy	Follow Carbonate endemic conservation strategy as outlined in EIS Section 2.2.4.10.2
Parish's Phacelia	(HCA-3) Designate a Parish's Phacelia Conservation Area.
Prairie Falcon	Follow Prairie falcon conservation strategy as outlined in EIS Section 2.2.4.7.5.
Red rock poppy	Designate a network of open routes of travel that minimize parallel routes, hill climbs, and straying off established paths.
Red rock tarplant	Designate a network of open routes of travel that minimize parallel routes, hill climbs, and straying off established paths.
Reveal's buckwheat	(P-51) Avoid impacts at the known location, followed by adaptive management. If additional botanical surveys better define the distribution of this species in the Jawbone Canyon area, a site-specific conservation plan would be developed. This could include posting signs to discourage off-road vehicle travel or placement of fences to keep out livestock.
San Diego Horned Lizard	(R-11) Amend the management plan for the Juniper Flats Area of Critical Environmental Concern to incorporate protection of the San Diego horned lizard as a goal of the plan. Add monitoring and adaptive management provisions of the West Mojave Plan to the management plan for Juniper Flats. (HCA-3) Establish a new ACEC for protection of the carbonate endemic plants. This area also serves to protect suitable habitat for the San Diego horned lizard.
Shockley's rockcress	Follow Carbonate endemic conservation strategy as outlined in EIS Section 2.2.4.10.2
Southwestern pond turtle	(M-78) Monitor populations at Afton Canyon. Protect sites in Kelso Creek if pond turtles are detected.

Southwestern willow flycatcher	Maintain migratory habitat in east Sierra canyons. (M-13) Monitor numbers at Big Morongo Canyon ACEC.
	Monitor numbers at Big Morongo Canyon ACEC.
Triple-ribbed milkvetch	(P-53) Require avoidance of all known locations on public lands. (P-54) Require surveys within five miles of known locations.
Vermilion flycatcher	(M-13) Monitor numbers at Big Morongo Canyon ACEC.
Western snowy plover	Continue protection of the known important nesting sites on Searles Lake through an agreement between IMC Chemical Corporation, BLM, Lahontan Regional Water Quality Control Board and CDFG. (B-16) Restrict human and vehicle disturbance for a distance of 1/8 mile from nest sites during the nesting season (April 1 - August 1) . (B-17) Projects in nesting habitat should allow the birds to complete the nesting season before construction begins. (Applies to Harper Dry Lake and any newly detected nesting areas) . (B-18) Continue working towards provision of a permanent water supply to the marshes at Harper Dry Lake ACEC.
Western yellow-billed cuckoo	(MR-1) Maintain riparian habitat in east Sierra canyons.
White-Margined Beardtongue	(HCA-3)Change the BLM multiple use class designation on public lands with occupied habitat from moderate to limited. Adjust the existing 1985-1987 route designations as necessary to protect this species. (P-55) Acquire one private parcel where this plant occurs within the proposed Pisgah Crater ACEC if feasible. (HCA-3) Designate the Pisgah Crater area as an ACEC. Designate routes within the ACEC as open or closed and restore or block routes to be closed.
Yellow-eared pocket mouse	(MAM-8) Amend the management plans for the Jawbone-Butterbredt and Sand Canyon ACECs to incorporate protection of the yellow-eared pocket mouse as a goal of each plan. Add monitoring, adaptive management, and acquisition priorities into the plans. (MAM-10) Monitor grazing by cattle. (MAM-9) Acquire or exchange lands in Kelso Valley.

Appendices

APPENDIX C

IMPLEMENTATION TASKS

Appendices

APPENDIX C
IMPLEMENTATION TASKS

West Mojave Plan Funding and Costs

Cost to Implement the West Mojave Plan: Exhibit C.1 of Appendix C lists the management prescriptions proposed by Alternative A, identifies costs to implement each of the prescriptions, and assigns priorities for implementation. The table assumes that implementation of the plan would occur over a 30-year period, and that costs would "ramp up" over the first five years of plan implementation as available funding gradually increases. Total projected costs to implement the West Mojave Plan would be approximately $68,000,000.

Funding Assumptions: Three primary sources of funding area assumed for this analysis. These include funds appropriated by Congress to the BLM for public land management, compensation fees paid to BLM, and mitigation fees collected by local jurisdictions and administered by the Implementing Authority. Assumptions follow:

- Because the large majority of lands within the Habitat Conservation Area are already public lands held by the BLM, CDFG, and other entities, mitigation fees would be used primarily for habitat enhancement rather than land acquisition (e.g. disease and raven management, fencing, headstarting, disturbed land rehabilitation, enforcement and maintenance).

- BLM appropriated funding and compensation fees would remain at 1994-2004 levels. Substantial increases or decreases are not anticipated.

Projected Funding: During the 30-year tern of the West Mojave Plan (2006 to 2035), approximately $79,000,000 would be available from BLM appropriated funds and compensation fees, and mitigation fees administered by the Implementing Authority. Of this, approximately $19,000,000 would be contributed by the BLM, and $60,000,000 by the Implementing Authority.

Bureau of Land Management: Annual funds appropriated to BLM that are available for plan implementation are anticipated to be approximately $640,000. This figure corresponds to the funds currently applied by BLM for proactive species management in the planning area. In addition, BLM has received an average of $140,000 in project impact compensation funds, which are used for land acquisition. The typical usage of these funds typically breaks out as follows:

- $40,000 for land acquisition (appropriated funds)
- $140,000 for land acquisition (compensation fees)
- $100,000 for monitoring and research
- $40,000 for physical improvements

- $70,000 for restoration
- $50,000 for other proactive programs
- $200,000 for enforcement and outreach

BLM has received substantial grant moneys in the past that have been applied to these actions, such as "green sticker" grants from the State of California for rehabilitation of closed vehicle routes and implementation of the route network, and special congressional appropriations. Grants may amount to many hundreds of thousands of dollars annually, and it is anticipated that they will continue to be obtained in the future. They would play an important role in accelerating plan implementation. Grants, however, are not assured, and have NOT been included in the BLM revenue assumptions discussed above.

Local Jurisdictions: Annual mitigation fee projections associated with local jurisdictions are set forth in the following table. These figures are based upon projections in the EIR/S economic analysis (see, especially, Table 4-38)

Year	Housing Unit Forecast	Calculate Residential Acreage				Calculate Commercial & Industrial Acreage				Mining Acreage				Total Acreage	Fee Estimate
		5 to 1	0.5 to 1	1 to 1	Subtotal	5 to 1	0.5 to 1	1 to 1	Subtotal	5 to 1	0.5 to 1	1 to 1	Subtotal		
2000	52,440	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
2005	62,009	14	565	83	662	0	22	10	32	50	25	50	125	819	$592,643
2010	65,469	62	7,709	1,820	9,591	1	2,156	505	2,661	300	100	200	600	12,852	$7,176,631
2015	69,589	102	8,612	2,691	11,405	1	2,384	725	3,110	300	100	200	600	15,115	$8,608,090
2020	74,714	176	8,747	3,392	12,315	2	2,384	869	3,254	300	100	200	600	16,169	$9,598,184
2025	77,920	120	7,818	2,827	10,765	1	2,004	672	2,678	300	100	200	600	14,043	$8,290,113
2030	82,274	158	8,544	3,575	12,277	2	2,090	788	2,880	300	100	200	600	15,757	$9,415,384
2035	86,871	168	8,324	4,001	12,493	2	1,955	887	2,844	300	100	200	600	15,937	$9,721,891
Totals		800	50,319	18,389	68,708	8	12,994	4,456	17,459	1,850	625	1,250	3,725	90,692	$53,402,936

The preceding table is based upon data submitted by cities and counties and/or estimates derived from the EIR/S economic analysis. A breakout by jurisdiction follows:

San Bernardino County	$18,532,331
Kern County	$1,492,260
Inyo County	$100,000
Los Angeles County	$4,400,550
Adelanto	$1,062,600
Apple Valley	$1,062,600
Barstow	$860,475
California City	$300,000
Hesperia	$4,158,000
Lancaster	$11,842,600
Palmdale	$6,606,600
Ridgecrest	$264,495
Twentynine Palms	$300,000
Victorville	$3,218,600
Yucca Valley	$500,000
TOTAL	$53,402,936

As an example of how these acreage and growth projections were developed, the following describes the methodology used to estimate San Bernardino County fees. In order to allocate the housing growth projections for the plan area, a determination had to be made of the existing distribution of housing within each of the three fee areas (5 to 1, 1 to 1 and 0.5 to 1). To estimate the amount of commercial/industrial acres developed, a correlation between the residential and commercial/industrial acreage was made. The following analyses were performed:

1. Based on the 2000 Census block data, the three fee areas were overlaid on the blocks using GIS based tools and a total count of housing units by fee area was established.

2. The same type of analysis was completed on the SCAG 2000 Land Use coverage. The three fee area boundaries were overlaid on the land use coverage and a summary of land uses were developed for each area. Then, a ratio of commercial/industrial vs. residential acreage was developed that reflects the County's experience with the relative proportion of commercial/industrial development to residential development.

   The acreage estimates were made as follows:

1. The change in housing units was calculated for each five-year increment in the forecast period. Then, the total number of units was allocated to each of the three fee areas based on the analysis of the census block housing data.

2. The number of housing units was multiplied times an acreage factor for each fee area to calculate the total number of residential acres for each fee area.

3. Then, the number of residential acres is multiplied times the commercial/industrial acreage factor developed for each fee area.

4. Mining acreage was estimated for each fee area based on historical trends, independent of the residential and commercial/industrial acreage.

   Fees were then calculated on each acreage sub-category and totaled for the plan area.

CalTrans: The West Mojave Plan allocates 1,833 acres of new ground disturbance to CalTrans. Approximately 1,700 acres would be located within the HCA, while the remainder would be split between the 1:1 and 0.5:1 fee compensation areas. The following fee estimate assumes all 1,833 acres would be developed during the 30-year term of the West Mojave Plan.

	Calculate CalTrans Acreage				Fee Estimate
	5 to 1	0.5 to 1	1 to 1	Total	
Totals	1,700	76	77	1,833	$6,633,550

Draft Tortoise and MGS Implementation Plan

Exhibit C.2 of Appendix C presents a draft Implementation Plan for the Desert Tortoise and Mohave Ground Squirrel conservation strategies.

Exhibit C.1

Implementation Tasks
Priorities and Costs

Tasks, Priorities and Funding Sources

Costs

Task	Priority Code	Task Description	Estimated Cost	Possible Funding Source	2010	2015	2020	2025	2030	2035	TOTAL
1		TOTAL COST			$10,626,520	$12,309,370	$11,602,610	$10,265,650	$10,878,450	$10,128,250	$65,810,850
DT-28	1	Assign a minimum of six Law Enforcement officers and six maintenance workers to the Tortoise DWMAs.	Per officer: $100,000 for first year, $75,000/year thereafter. Officers: 2006 (0), 2007 (1), 2008 (2), 2009 (3), 2010 (4), 2011 (5), 2012 (6)	IA	$850,000	$2,225,000	$2,250,000	$2,250,000	$2,250,000	$2,250,000	$12,075,000
MV-9	1	Implementation of BLM's motorized vehicle access network	Each subregion will be addressed in two phases: Phase I will focus on critical restoration issues and problem areas, and will be addressed in the first few years of Plan implementation; Phase II (a decade or more out) will involve continued resolution of minor problems and new circumstances. Estimated cost of Phase I: $350,000 per complex subregion (10), $250,000 for other areas (14). Total Phase I cost: $7,000,000. By 2010, complete Phase I for following, in priority order: Ord, Juniper, Superior, Red Mountain, Fremont, Kramer, El Paso, Newberry-Rodman, Ridgecrest, El Mirage, Coyote ($3.75 million). Address most critical issues elsewhere pending Phase I completion ($0.5 million per year)	BLM, IA	$3,750,000	$2,500,000	$1,125,000	$750,000	$750,000	$750,000	$9,625,000
DT-28	1	Assign a minimum of six maintenance workers to the Tortoise DWMAs.	Per maintenance worker: $50,000/year. Workers: 2006 (0), 2007 (1), 2008 (2), 2009 (3), 2010 (4), 2011 (5), 2012 (6)	IA	$500,000	$1,450,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$7,950,000
DT-28	1	Assign a minimum of two Law Enforcement Rangers and two maintenance workers to the Tortoise DWMAs.	Per Ranger: $100,000 for first year, $75,000/year thereafter. Rangers: 2006 (0), 2007 (1), 2008 (1), 2009 (2), 2010 (2).	BLM	$500,000	$750,000	$750,000	$750,000	$750,000	$750,000	$4,250,000
DT-30+	1	Implement a raven management program	Assume $150,000/year, ramping up as follows: 2006 ($30,000), 2007 ($60,000), 2008 ($90,000), 2009 ($120,000) and 2010 ($150,000)	IA	$450,000	$750,000	$750,000	$750,000	$750,000	$750,000	$4,200,000
M-98	1	Desert tortoise: (Population monitoring)-Line distance sampling (M-98) line distance sampling program in the DWMAs. (#1)	$150,000 per survey year over the 30 year period of the plan. Every year for first five years; every other years for the next five years; then every year for the next five years and so on for the 30 years of the plan.	BLM, IA	$750,000	$300,000	$750,000	$300,000	$750,000	$300,000	$3,150,000
DT-28	1	Assign a minimum of two maintenance workers to the Tortoise DWMAs.	Per maintenance worker: $50,000/year. Workers: 2006 (0), 2007 (1), 2008 (1), 2009 (2), 2010 (2).	BLM	$300,000	$500,000	$500,000	$500,000	$500,000	$500,000	$2,800,000
DT-17	4	Implement "Suggested Tortoise Disease Management Strategy."	Assume $100,000/year, ramping up as follows: 2006 ($20,000), 2007 ($40,000), 2008 ($60,000), 2009 ($80,000) and 2010 ($100,000)	IA	$300,000	$500,000	$500,000	$500,000	$500,000	$500,000	$2,800,000
HCA-36	1	Establish land acquisition priorities and acquire private land and/or conservation easements on private lands within the HCA	Acquisition budget: Assume $100,000/year (ramp up:$30,000 in 2006 and 2007, $70,000 in 2008, 2009 and 2010). All acquisitions mentioned in this table would draw from this fund.	IA	$270,000	$500,000	$500,000	$500,000	$500,000	$500,000	$2,770,000
HCA-28	1	Staff and operating expenses for Implementing Authority.	In-house staff or contractor(s), reimbursement for hours involved in following roles: Plan Administrator ($30,000/year); contract biologist ($30,000/year); clerical support ($20,000/year); overhead & supplies ($10,000/year), a total of $100,000/year. Assume $75,000/year in 2006 and 2007, $90,000/year thereafter.	IA	$420,000	$450,000	$450,000	$450,000	$450,000	$450,000	$2,670,000
DT-26	1	Headstarting program.	Implement a pilot program on one site within 5 years. "Fast track" approach costs estimated at $250,000 and $300,000 per site for two years. The "slow track" would include these plus $100,000 to $120,000 for years three to five." If successful, establish up to two additional slow track sites.	IA, BLM	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$1,800,000
E-7	2	Education Program: The education program should include the preparation, distribution and/or installation of signs, interpretive kiosks, displays, maps, videos, education packets and brochures.	Estimate $50,000/year for education programs, with $5,000/year for maintenance of existing facilities. Ramp-up: 2006 ($20,000), 2007 ($30,000), 2008 ($40,000), 2009 ($40,000) and 2010 ($50,000).	IA, PA, BLM	$160,000	$250,000	$250,000	$250,000	$250,000	$250,000	$1,410,000

HCA-28	1	GIS database support for plan implementation and monitoring.	Estimate $40,000/year, beginning in 2006.	IA	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$1,200,000
DT-18	1	Fence both sides of Highway 395 between Kramer Junction and Shadow Mountain Road (18 mi)	Estimated cost of $5.00 per foot or $26,400 per mile on one side or $52,800 on both sides. Assume installed by following percentages for each 5-year block: 30, 30, 40, 0, 0, 0.	CT, IA	$285,120	$285,120	$380,160	$0	$0	$0	$950,400
M-98	1	Desert tortoise: Desert tortoise: Conduct continued studies at specified intervals on pertinent BLM permanent study plots including Kramer, Lucerne, DTNA, Fremont Valley, and Fremont Peak. (#1)	Survey each plot every four years. Past costs were approx $25,000 per survey plot.	BLM, IA	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$900,000
M-241	1	Mohave ground squirrel: Establish long-term study plots throughout the range and annually monitor their MGS populations. (#1) Mohave ground squirrel:Fund continued monitoring in the Coso Range to provide baseline population data. (#1)	Assume 3 sites (including Coso), $30,000/year ($20,000 in 2006 and 2007).		$130,000	$150,000	$150,000	$150,000	$150,000	$150,000	$880,000
DT-15	1	Develop telephone tech support for the general public to deal with free-roaming tortoises in the No Survey Areas	$18,000 per year (Assumes 2 hours per business day at $35 per hour)	IA	$90,000	$90,000	$90,000	$90,000	$90,000	$90,000	$540,000
	3	Fence both sides of the remaining unfenced portions of Highway 58 between Kramer Junction and Hinkley (10 mi).	Estimated cost of $5.00 per foot or $26,400 per mile on one side or $52,800 on both sides. Assume installed by following percentages for each 5-year block: 0, 0, 30, 30, 40, 0.	CT, IA	$0	$0	$158,400	$158,400	$211,200	$0	$528,000
HCA-29	1	Mitigation fee fund management	Estimate $15,000/year	IA	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$450,000
HCA-27	ongoing	Track acreage of new ground disturbance in HCA for each participating jurisdiction.	$12,800 per year (Based on 16 hours per jurisdiction at $50 per hour).	IA, PA	$64,000	$64,000	$64,000	$64,000	$64,000	$64,000	$384,000
MGS-4	1	Design and implement a MGS monitoring strategy.	Assume $20,000 to design, and $10,000 per year to implement. Design in 2006.	IA, BLM	$60,000	$50,000	$50,000	$50,000	$50,000	$50,000	$310,000
E-3	ongoing	Work with non-government organizations with an interest in the western Mojave Desert to better reach group members. The coordinator should work with off-highway vehicle groups to help fund existing programs and create new ones as needed to increase sensitivity to desert ecology.	$10,200 annually (Assumes 120 hours of outreach at $85 per hour).	IA	$51,000	$51,000	$51,000	$51,000	$51,000	$51,000	$306,000
HCA-27	1	Establish a base line aerial photo data set to identify those properties that were developed prior to the adoption of the HCP.	$300,000	PA	$300,000	$0	$0	$0	$0	$0	$300,000
A-48		Mojave fringe-toed lizard: Prohibit vehicle traffic on conserved habitat.	Estimated at $3,000 per incident. Assuming 3 incidents per year, total cost would be $9,000 per year. (Weeks)		$45,000	$45,000	$45,000	$45,000	$45,000	$45,000	$270,000
DT-23	1	Sign or otherwise designate DWMA boundaries	Estimated $50,000 for the initial installation. Estimated maintenance costs of about $5,000 per year for the life of project.	IA, BLM	$75,000	$25,000	$25,000	$25,000	$25,000	$25,000	$200,000
MV-3	4	If monitoring or studies show that certain unimproved roads are causing increased tortoise mortality, the Implementation Team should coordinate with BLM, county road departments, and others to consider ways, including speed regulators, to reduce or avoid that mortality.	Speed regulation equipment at $3,000 each at 10 sites equates to $30,000 one time cost. Yearly maintenance costs would equate to $10,000 per year. Assume installed at years 3,5,7,9,11,13,16,19,22,26	BLM	$8,000	$20,000	$32,000	$40,000	$46,000	$51,000	$197,000
M-98	1	Desert tortoise: To monitor OHV impacts, reinitiate studies at the Johnson Valley study plot. (#1)	Every 4 years, $25,000 each.	BLM, IA	$25,000	$25,000	$25,000	$50,000	$25,000	$25,000	$175,000
M-2	ongoing	Keep records of newly permitted activities issued within the conservation areas.	$5,000 per year. Included within IA operating budget.	IA	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$150,000
M-239	3	Mohave ground squirrel:Perform trapping studies in Kern County Study Area to see if MGS occurs west of Highway 14 and south of Highway 58.(#3)	Estimated total cost: $150,000	BLM, IA	$0	$75,000	$75,000	$0	$0	$0	$150,000
DT-3	ongoing	Cities and counties would report take of tortoises annually to the Implementation Team.	$8,800 per jurisdiction. (assumes 80 hours of Planner III time at $110 per hour). Assumes 15 jurisdictions.	PA	$22,000	$22,000	$22,000	$22,000	$22,000	$22,000	$132,000
DT-25	2	Place a standard fence along identified portions of the western boundary of the Johnson Valley Open Area to prevent OHV use in the Ord-Rodman DWMA.	$5,000 per mile including material and labor. Annual maintenance and replacement estimated at 5 to 10% of cost to install. There are approx. 10 miles to be fenced, so initial fencing costs are approx. $50,000. Annual maintenance and replacement costs are about $2,500 to $5,000.	BLM	$0	$0	$66,000	$20,000	$20,000	$20,000	$126,000
M-1	ongoing	Maintain database of new occurrences and share annually with NDDB.	$4,000 per year (Assumes 80 hours annually at $50 per hour)	NA (cost included in funding of IA)	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$120,000

HCA-27		Rate of new ground disturbance and the success of restoration programs should be assessed on a periodic basis and the Plan amended as necessary.	$3,400 per year if performed annually. (Based on 40 hours at $85 per hour)	NA (cost included in funding of IA)	$17,000	$17,000	$17,000	$17,000	$17,000	$17,000	$102,000
A-7		If newly-detected significant roosts for Townsend's big-eared bat and California leaf-nosed bats are near open routes then provide case-by-case review of open routes within riparian and desert wash habitat. If the new roosts are impacted by open routes then take corrective action within the foraging habitat or establish a new route avoiding the habitat.	$2,000 per project year cost (40 hours at $50 per hour). $5,000 per average relocation costs, estimating three relocations per project year. Total of $17,000 per project year. To be done once every fiver years.	BLM, IA	$17,000	$17,000	$17,000	$17,000	$17,000	$17,000	$102,000
MGS-5	3	Mohave ground squirrel: Conduct presence/absence surveys in the northern portion of the Antelope Valley in Kern County.	$100,000	BLM, IA	$0	$0	$0	$0	$100,000	$0	$100,000
E-6	ongoing	Provide support to the efforts of museums, zoos, and other public institutions to develop pertinent desert tortoise exhibits.	$2,000 annually from 2006-2010, $3000 annually thereafter.	IA	$10,000	$15,000	$15,000	$15,000	$15,000	$15,000	$85,000
M-3	1	Alkali Mariposa Lily: (M-3) Conduct presence absence surveys at other alkaline springs, seeps, and playas within one year of plan adoption. (#1)	$80,000	IA	$10,000	$15,000	$10,000	$15,000	$15,000	$15,000	$80,000
M-208	2	Bendire's thrasher: Monitor periodically population numbers and habitat disturbance in conservation areas. (#2)	$80,000	PA, FS, D, G	$0	$80,000	$0	$0	$0	$0	$80,000
MV-XX	2	Route designation on newly acquired lands would occur every five years (or sooner, if judged to be prudent by the Implementation Team), would comply with applicable federal regulations (i.e., NEPA), and be incorporated into the overall route implementation process.	Estimate based on adding 5 new sections of land per year with an average of five miles per section. Estimate 125 miles of new routes over 5 years. Estimate cost of $125 per mile to survey, which equates to $15,625 every 5 years.	BLM	$0	$15,625	$15,625	$15,625	$15,625	$15,625	$78,125
HCA-3	ongoing	Acquire occupied habitat within the conservation area (149 acres) assuming a willing seller.(Parish's phacelia)	Undetermined, but estimated at $500/acre plus administrative fees	IA	$0	$0	$0	$0	$35,000	$40,000	$75,000
MV-8	1	El Paso CAPA: Route designations in the El Paso Mountains and Ridgecrest subregions would be performed after completion of the West Mojave Plan through a community-based collaborative process utilizing the designation methodology developed for the West Mojave Plan.	These two subregions have a relatively large number of routes. Cost including designations, meetings, ACCESS and GIS data base creation and QA/QC would include 3 technical staff in addition to Resource Staff time for 2 months. ($75/hr X 150 hrs/mo X 2 months X 3 = $67,500).	BLM	$67,500	$0	$0	$0	$0	$0	$67,500
HCA-33	ongoing	Maintain a record of all HRCs awarded by the Implementing Authority	$2,000 per year (40 hrs at $50 per hour)	IA	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$60,000
M-98, A-206	ongoing	Desert tortoise: Review information regarding plan authorized take of tortoises to determine whether adjustments are needed to the Survey/No-Survey Areas.	$2,000 per year (assumes 40 hrs at $50 per hour)	NA (cost included in funding of IA)	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$60,000
Rap-11	2	Target identified remnant grassland areas where burrowing owls are known for acquisition.	Survey and analysis by consultant estimated at $50,000.	IA	$0	$50,000	$0	$0	$0	$0	$50,000
Rap-12	1	Burrowing owl: Complete baseline inventory of conserved habitat.	$50,000	IA	$50,000	$0	$0	$0	$0	$0	$50,000
M-26	1	Prairie falcon: (M-26) Conduct surveys to determine occupancy and threats at all nests present in 1979 (#1).	$50,000	IA	$50,000	$0	$0	$0	$0	$0	$50,000
M-6	3	Townsend's big-eared bat: (M-6) Determine bat numbers in all significant roosts, using CDFG approved methods.(#3)	Estimated at $8,000 per roost	IA	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$48,000
P-1	1	Fence the eastern boundary of the proposed Carbonate ACEC to prevent cattle from trampling the listed plants on small portions of the Rattlesnake allotment and to prevent cattle from entering forest lands near Terrace Springs (along the east side of Arrastre Canyon). (Carbonate endemic plants)	Cost per mile to install smooth four-strand wire on five foot metal posts including material and labor is approximately $5,000 per mile. Annual maintenance and replacement estimated at 5 to 10% of cost to install.	IA	$20,000	$5,500	$5,500	$5,500	$5,500	$5,500	$47,500
Bat-1	3	Protect all significant roosts by installing gates over mine entrances and restricting human access.	$5,000 per gate; assume 9 to be installed	IA, BLM	$0	$5,000	$10,000	$10,000	$10,000	$10,000	$45,000
(M-56)	2	Mojave tarplant : (M-56) Census population at Short Canyon and Cross Mountain every five years. (#2)	20000. Survey during third and fifth blocks.	BLM, IA	$0	$0	$20,000	$0	$20,000	$0	$40,000
A-54		Mojave tarplant: If existing or new populations are threatened by vehicles or grazing, then protect them by providing barriers to vehicles or livestock.	$1000 study (20 hours at $50 per hour); expected two route relocations per year, $3,000 per incident. This totals to $7,000 per year at five year increments.		$0	$7,000	$7,000	$7,000	$7,000	$7,000	$35,000

E-5		Develop displays, programs, and materials that can be provided to school districts in the West Mojave planning area. Fund and/or cooperate with existing programs to provide for enhanced outreach to schools in desert communities.	$30,000 (Estimate)	IA	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$30,000
DT-11	2	Develop a standardized revegetation plan (for utilities).	$30,000 if done by consultant. Currently done case-by-case. Reduced costs to utilities when standardized plan takes effect.	IA	$0	$30,000	$0	$0	$0	$0	$30,000
P-28		Fence and sign approved open routes as necessary within the Coolgardie and West Paradise CA.	1,000 feet to cover a site on two sides at $10 a foot. 3 sites per year; totals $30,000 (this is a one time cost).	BLM	$0	$30,000	$0	$0	$0	$0	$30,000
E-12	2	Develop local television outreach that talks about the plight of the tortoise and implementation of the West Mojave Plan.	$30,000 (Estimate)	IA	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$30,000
M-7	ongoing	Bats: (M-7) Approved projects that impact bats under the take limit would be reported annually to the CDFG and the USFWS. (Ongoing)	No additional cost.	BLM	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$30,000
M-8	2	Townsend's big-eared bat: (M-8) Conduct periodic surveys in the northern part of planning area with high potential for containing significant roosts. (#2)	$500 per site.	BLM	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$30,000
M-6	3	California leaf-nosed bat: (M-6) Determine bat numbers in all significant roosts, using CDFG approved methods.(#3)		IA	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$30,000
M-207	1	California leaf-nosed bat:Monitor population numbers using bat houses if installed. (#1)		IA	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$30,000
M-16	3	Burrowing owl: (M-16) Survey sites in Antelope Valley and along Mojave River (#3).	$30,000	IA	$30,000	$0	$0	$0	$0	$0	$30,000
DT-19	3	Desert tortoise:(DT-19) IT monitor mortality along roads and identify measures such as fencing, culverts, signs, or speed regulators to be used to reduce or avoid unacceptable mortality levels.(#3)	$10,000 per survey to be done every ten years.	BLM, IA	$0	$10,000	$0	$10,000	$0	$10,000	$30,000
M-26	1	Golden eagle: (M-26) Conduct surveys to determine occupancy and threats at all nests present in 1979 (#1).	One-time survey, $30,000	IA	$30,000	$0	$0	$0	$0	$0	$30,000
M-27	ongoing	Golden eagle: Compile record of electrocutions from incidental observations and reports from the public and utilities.	$1,000 per year (Assumes 20 hours at $50 per hour)	NA (cost included in funding of IA)	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$30,000
A-33		Kelso Creek monkeyflower: If open routes threaten occupied habitat, then change route designation in area.	$1,000 per year for monitoring (Assumes 20 hours at $50 per hour); $3,000 per incident for sign installation and materials, estimate three incidents per year ($9,000). One year cost will include $1,000 for monitoring and $9,000 for sign implememntation totaly $10,000 per year. Fund monitoring only. Rest absorbed in route implementation task.		$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$30,000
HCA-3	1	Place signs at edge of playas closed to motor vehicle traffic within the Parish's Phacelia CA.	$25 per sign; 5 signs per incident; 5 sites per year equals about $625 per year. $500 per year for maintenance and relocation of signs.	IA, BLM	$0	$5,625	$5,625	$5,625	$5,625	$5,625	$28,125
Bat-5	ongoing	Fence around (but not over) open abandoned mine shafts to provide bats access to roosts and to reduce public hazards	$500 per adit; assume 1/year, then 2/year beginning in 2011.	IA	$2,500	$5,000	$5,000	$5,000	$5,000	$5,000	$27,500
A-84		Western snowy plover: If nest sites are disturbed, then close playa edges to vehicular traffic in spring and provide temporary fencing of nest sites if warranted.	Closure and detail signs; cost of $300 per route; average of three routes. Total of $900 per year for each site.		$4,500	$4,500	$4,500	$4,500	$4,500	$4,500	$27,000
A-230		LeConte's thrasher: If there are OHV conflicts then more intensive management is needed (signing, seasonal restrictions, law enforcement)	$1000 per year (20 hours at $50 per hour), starting with second budget block.		$0	$5,000	$5,000	$5,000	$5,000	$5,000	$25,000
E-8	ongoing	Provide annual training for consultants and others working at construction sites to ensure that they have a foundation in training for monitoring.	One day seminar, costing $750 plus facilities cost.	IA	$3,750	$3,750	$3,750	$3,750	$3,750	$3,750	$22,500
E-11	2	Develop specific outreach plans to 1) maximize the effectiveness of fences constructed along the interface between urbanizing communities and the HCA. 2) to discourage poaching. 3) To reduce raven/tortoise conflicts.	$20,000 (Estimate)	IA	$0	$20,000	$0	$0	$0	$0	$20,000
M-252	2	Yellow-eared pocket mouse: A trapping survey would be conducted in Kelso Valley as part of the Monitoring Plan	One-time survey, $20,000.		$0	$0	$20,000	$0	$0	$0	$20,000
P-25	2	Fence both sides of the road near the Sweet Ridge population. A vehicle turnaround and parking area will be restored so that traffic passes by, rather than on, the buckwheat habitat. (Kern buckwheat)	Two-sides of roads at 300 feet (equals 600 feet) at $10 per foot equals $6,000. If barrier is rebuilt once every 10 years, total estimated cost over 30 years would be $18,000.	IA,	$0	$6,000	$0	$6,000	$0	$6,000	$18,000

HCA-33	ongoing	Identify degraded habitat within the HCA suitable for rehabilitation.	Three work months - $15,000	IA	$0	$0	$15,000	$0	$0	$0	$15,000
M-8	2	California leaf-nosed bat: (M-8) Conduct periodic surveys of mine openings in Pinto Mountains for Leaf-nosed bats in areas with high potential for containing significant roosts. (#2)		IA	$0	$5,000	$0	$5,000	$0	$5,000	$15,000
M-34	2	Kelso Creek monkeyflower: (M-34) Conduct presence absence surveys on public land identified as potential habitat (#2).	One-time survey, $15,000.	BLM, IA	$0	$15,000	$0	$0	$0	$0	$15,000
E-2	2	Develop an education program consistent with the goals identified in Section 3.8.1 and that "fills the gaps" of existing education programs.	$13,600 (Assumes 160 hours at $85 per hour)	IA	$6,800	$0	$6,800	$0	$0	$0	$13,600
M-98	ongoing	Desert tortoise:-Monitor integrity of new and old fences between BLM open areas and adjacent DWMAs (e.g., El Mirage's existing fence, Camp Rock Road's new fence).(ongoing)	$2,000 (40 hours at $50 per hour) at 5 year increments.	BLM, IA	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$12,000
M-98, DT-22	1	Desert tortoise:(DT-22) Monitor efficacy of solution worked out with Silver Lakes Association to address impacts on the Fremont-Kramer DWMA.(#1)	$2,000 (40 hours at $50) at 5 year increments.	BLM, IA	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$12,000
M-67	ongoing	Red rock poppy: Conduct periodic review of potential effects of OHV use on known populations.	$2,000 (40 hours at $50 per hour) at 5 year increments.	BLM, IA	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$12,000
M-67	ongoing	Red rock tarplant: Conduct periodic review of potential effects of OHV use on known populations.	$2,000 (40 hours at$50 per hour) at 5 year increments.	BLM, IA	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$12,000
Rap-5	1	In areas where no desert tortoise clearance survey is required, provide applicants for discretionary permits with an educational brochure. (Burrowing owl)	$10,000 to prepare brochure (assumes approx 3 weeks at $85 per hour)	IA	$10,000	$0	$0	$0	$0	$0	$10,000
M-75	2	Short-joint beavertail cactus: (M-75) Establish baseline population numbers for Big Rock Creek and Mescal Creek areas. (#2)	One-time survey, $10,000.	IA	$0	$10,000	$0	$0	$0	$0	$10,000
M-84	3	Western snowy plover: (M-84) Conduct periodic censuses to determine number of nesting pairs at Harper Dry Lake, and Dale, Koehn, and Searles lakes. (#3)	$10,000 for census.	BLM, IA	$0	$0	$10,000	$0	$0	$0	$10,000
E-4	2	Prepare a single, programmatic education program to be given to construction workers. Review files maintained by USFWS and CDFG to see the range of education materials that have been used since the listing of the tortoise.	$8,500 (Assumes 100 hours at $85 per hour)	IA	$8,500	$0	$0	$0	$0	$0	$8,500
DT-13, E-1	1	Establish a "Hotline" number to contact the Implementation Team in the event a tortoise is found within a Non Survey area at the time of ground disturbance.	Approx. $250 per year (minimal installation costs plus 3.5 cents per minute. Assumes 30 min. per business day for 260 days)	IA	$1,250	$1,250	$1,250	$1,250	$1,250	$1,250	$7,500
E-2	2	Determine environmental education programs that already exist, and determine "gaps" in the program.	$6800 (Assumes 80 hours at $85 per hour)	IA	$6,800	$0	$0	$0	$0	$0	$6,800
DT-2	2	Filming: 1)Develop a brochure, to be provided to the proponent (likely location manager), showing DWMAs and higher density areas within DWMAs that filming activities should avoid. 2) Where filming activities may occur equally well on alternatives sites, direct proponents to lands outside DWMAs or to lower density DWMA areas. 3)BLM biologist's expertise to help the location manager choose sites where the fewest and least significant impacts exist.	1) $6800 (based on 80 hours at $85 per hour) 2) No new cost. 3) No new cost.	IA, BLM	$6,800	$0	$0	$0	$0	$0	$6,800
DT-4	1	Develop a Feral Dog Management Plan.	$6,000 for plan. Implementation cost to be determined by plan.	IA	$6,000	$0	$0	$0	$0	$0	$6,000
M-88	2	White-margined beardtongue: Monitor vehicle use of Argos Wash. (#2)	$1,000 (assumes 20 hours at $50 per hour), to be done once every 5 years.	RA, FS, D, G	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$6,000
P-24	1	Construct vehicle barriers along the main access road where it adjoins occupied habitat. (Kern buckwheat)	Estimated at $5,000 plus minimal maintenance	BLM	$5,000	$0	$0	$0	$0	$0	$5,000
Rap-9		Provide all applicants for discretionary permits with an informational brochure with an illustration of a burrowing owl, a description of its burrows and how they can be recognized, and a summary of the bird's life history. Provide a phone number to reach member of Implementation Team if owl sighted.	Cost of educational brochure estimated at $5,000 including printing; to be used by all jurisdictions.	IA	$5,000	$0	$0	$0	$0	$0	$5,000
M-76	3	Short-joint beavertail cactus: (M-76) Determine numbers and identity of beavertail cacti in eastern part of the range. (#3)	One-time survey, $5,000.	IA	$0	$0	$0	$5,000	$0	$0	$5,000
DT-200	1	Desert tortoise: Establish a feed-back loop between law enforcement and the Implementation Team to identify problem areas and to identify issue specific solutions.	$4,000 (Assumes 80 hours at $50 per hour)	NA (cost included in funding of IA)	$0	$4,000	$0	$0	$0	$0	$4,000

M-98	ongoing	Desert tortoise: The efficacy of route closures to minimize impacts to tortoises must be monitored to determine if new roads are being created, closed routes are being used, route proliferation is resulting, etc.(ongoing)	40 hours at $50 per hour; 2 surveys, to occur 5 years apart;total estimated cost $4,000.	BLM, IA	$0	$2,000	$2,000	$0	$0	$0	$4,000
DT-22	1	Initiate a working group with the Silver Lakes Association to determine if fencing or public education is the best means to eliminate impacts for OHV use in the Fremont-Kramer DWMA.	$3,300 (Based on 10 meetings - 3 hours each at $110 per hour plus meeting arrangement time)	BLM	$3,300	$0	$0	$0	$0	$0	$3,300
E-1	1	Identify a coordinator of educational programs.	$1700 (Assumes 20 hours at $85 per hour)	IA	$1,700	$0	$0	$0	$0	$0	$1,700
DT-13	1	Develop a standard data sheet to record how many, if any, tortoises are moved from harm's way during clearance surveys.	$1,000	IA	$1,000	$0	$0	$0	$0	$0	$1,000
M-47	1	Mojave monkeyflower: (M-47) Monitor vehicle tracks to assess spillover effects, if any, from OHV open areas (#1)	$1,000 (Assumes 20 hours at $50 per hour)	BLM, IA	$0	$1,000	$0	$0	$0	$0	$1,000
M-53	1	Mojave fringe-toed lizard: Monitor disturbance of occupied habitat by OHVs. (#1)	$1,000 (Assumes 20 hours at $50 per hour)	COVHC	$0	$0	$1,000	$0	$0	$0	$1,000
DT-201		Complete assessment of public land health. Identify and implement corrective measures to ensure compliance.	Covered by BLM livestock grazing budget.	BLM	$0	$0	$0	$0	$0	$0	$0
	ongoing	San Diego horned lizard: Acquire lands within Antelope Valley Significant Ecological Area.		IA							$0
DT-14	ongoing	Implement the Plan's standardized set of BMPs for Survey Areas outside of DWMAs.	No new cost, already developed, just need to be implemented.	IA	$0	$0	$0	$0	$0	$0	$0
HCA-6		Clearance surveys within SRAs (and possible protective fencing in absence of biological monitor).	$500 (approximate cost for a 40 acre-parcel)	PP							$0
HCA-2	ongoing	Project review within Sierra Foothills Habitat Connector.	Undetermined. Potential additional costs to BLM and local jurisditions to review project proposals, and to project proponent if redesign is required.	PA, BLM							$0
HCA-2	ongoing	Project review within SEAs	No new cost. L.A. County already conducting review.	PA							$0
HCA-33	ongoing	Determine whether a property constitutes "degraded habitat" eligible for an award of HRCs.	No extra cost.	NA (cost included in funding of IA)							$0
HCA-33	ongoing	Review rehabilitation projects to determine whether identified success criteria have been met prior to awarding HRCs and/or whether partial credit will be awarded.	$200 per project	NA (cost included in funding of IA)							$0
HCA-36	ongoing	Acquisition of private lands within the HCA must be followed immediately by meaningful land management actions.	Dependent on management action, e.g. fencing, route rehabilitation, signing.	BLM							$0
DT-3	ongoing	On private lands, CEQA Lead would continue to ensure that filming activities do not constitute a significant impact to species covered by the Plan.	No new cost	PA, PP							$0
DT-3	ongoing	Special filming activities that require pyrotechnics, cross-country travel, and habitat loss will be referred by the lead agency to the Implementation Team for review and recommendation prior to permit issuance.	Undetermined. Cost to IA for reviewing proposals. Potential costs to applicant if review requires revision to proposal.	NA (cost included in funding of IA)							$0
DT-7	ongoing	1) Highway maintenance operators must be aware of tortoises and avoid them. 2) If the Implementation Team judges that these or other measures are not avoiding take of tortoises, a biological monitor may be necessary.	1) No new cost 2) $330 - $750 per day.	1) NA 2) PP							$0
DT-8	ongoing	Roadbeds should not be lowered and berms should not exceed 12 inches or a slope of 30 degrees. Helendale Road, Fossil Bed Road, Camp Rock Road, and Copper City toad were identified as particular problems.	Undetermined. Potential additional costs to BLM and local jurisditions to maintain roads to this standard.	RA							$0
DT-11	ongoing	Review new linear utility projects within the HCA at the time they are proposed for consistency with guidelines contained within the HCP.	No new cost	NA (cost included in funding of IA)							$0
DT-11	1	Facilitate issuance of applicable salvage permits to participating utility companies to enable them to remove raven nests from transmission lines and other facilities	No additional cost	NA							$0
DT-12	ongoing	Clearance and presence-absence surveys within Tortoise DWMAs.	Approx. cost for 40 acre parcel: Clearance survey = $500 (4 acres per hour at rate of $50 per hour) presence/absence survey = $1530 (4 acres per hour ar rate of $85 per hour, plus 8 hours report prep time)	PP							$0
DT-13	ongoing	Clearance surveys outside of DWMAs and No Survey Areas	$500 (approximate cost for a 40 acre-parcel)	PP							$0

DT-14	ongoing	Require implementation of BMPs for specified construction projects.	No new cost (Standardization of current management)	PP	$0
DT-14	ongoing	Ensure project compliance with BMPs and Handling Guidelines	Undetermined. Potential additional costs to BLM and local jurisditions to review project proposals, and to project proponent if redesign is required.	BLM	$0
DT-15	2	Consider establishing translocation sites for wild tortoises removed from impact zones if determined that other alternatives are unable to accommodate all displaced tortoises		IA	$0
DT-18	ongoing	Coordinate placement of fences along paved roadways to ensure that access is provided to those routes identified as "open" that intersect with roads to be fenced. Ensure that the latest, state-of the art gate designs are used at designated portals	Undetermined. Potential additional costs to BLM, Caltrans, and local jurisdictions in meeting and coordination time.	BLM	$0
DT-20	ongoing	Install culverts of appropriate design and spacing to allow desert tortoises to pass under the road within DWMAS when roads are fenced to preclude entry by desert tortoises.		RA, FS, D, G	$0
DT-24	1	Use additional law enforcement and education to inform the public of appropriate and inappropriate activities in conservation areas.	See DT-28 and E-2	RA, FS, D, G	$0
DT-27	ongoing	Counties and cities shall ensure that no new landfills are constructed inside DWMAs or within five miles of them (except Barstow Landfill).	Undetermined. Potential costs to counties and cities to review and amend Integrated Waste Management Plans as necessary.	RA	$0
DT-26	1	Ensure that predation by ravens and other predators does not compromise the headstarting program.	Included in overall cost of headstarting program	IA	$0
DT-30	1	Reduce availability of anthropogenic sources of food and water to ravens and coyotes by modifying landfill operation practices in the desert.	Undetermined. Varies by jurisdiction	IA	$0
DT-31	1	Take steps to reduce the availability of organic wastes to ravens outside of landfills.	Undetermined	IA	$0
DT-32		Reduce the availability of carcasses of road-killed animals along highways in tortoise habitat.	the only way to reduce carcasses is with fencing along roads.	IA	$0
DT-33	1	Reduce the population density of ravens and number of birds that may take tortoises by reducing the availability of water while being mindful of the needs of other species.	Undetermined. Primarily education for jurisdiction project review, agriculture, etc.	IA	$0
DT-34	1	Remove active raven nests from specific areas)		IA	$0
DT-35	ongoing	Avoid constructing new nesting structures and reduce the number of existing nesting structures in areas where natural or anthropogenic substrates are lacking.		IA	$0
DT-36	1	Remove ravens from specific areas where tortoise mortality from several sources is high, raven predation is known to occur, and the tortoise population has a chance of benefiting from raven removal.		IA	$0
DT-37	3	Implement raven research measures		IA	$0
DT-38	1	Establish two work groups to oversee raven management direction, review information, coordinate with other agencies/groups, solicit funding for implementation of specific management measures and distribute information/data.		IA	$0
DT-40	ongoing	Cooperate with known weed abatement specialists and organizations and facilitate weed abatement/management programs that contribute to the conservation of plant or animal species covered by the plan.	Undetermined. Costs involve Implementation Team staff time to contact and coordinate with others.	NA (cost included in funding of IA)	$0
MGS-200	ongoing	Mohave ground squirrel: ·Cooperate with military installations by sharing scientific information and reviewing management plans.	Undetermined. Costs involve Implementation Team staff time to contact and coordinate with others.	NA (cost included in funding of IA)	$0
MR-1	ongoing	Determine whether groundwater criterion are met in order to obtain coverage for riparian habitat dependant species.	No cost.	NA (cost included in funding of IA)	$0
Bat-3	ongoing	Protect riparian habitat within five miles of known or newly discovered maternity roosts for Townsend's big-eared bat, including monitoring of grazing, if present.	Undetermined. Potential additional costs to agencies to monitor and identify/implement projects.	IA, BLM	$0

Bat-4	ongoing	Protect desert wash vegetation within three miles of known or newly discovered maternity and hibernation roosts of California leaf-nosed bats. Assess motorized vehicle use of washes in these locations on a case-by-case basis. Develop alternative access routes if problem is determined.	Undetermined. Potential additional costs to agencies to assess vehicle use of washes and identify/implement projects. Involve OHV user groups.	IA, BLM	$0
Bat-6	ongoing	Project surveys for discretionary permits where potential for significant bat roosts exists.	$500	PP	$0
Bat-7	ongoing	Prior to disturbance or removal of a non-significant roost, a project sponsor would provide for safe eviction of any bats present by a qualified biologist in consultation with CDFG.	$2,000	PP	$0
Rap-1	ongoing	All construction of new electric utility lines throughout the planning area must be raptor-safe.	No new costs. Included within design.		$0
Rap-3	ongoing	Ensure controls on blasting for new mines where raptor are potentially affected.	Application of this standard involves no new costs.	pp	$0
Rap-6	ongoing	In areas where a desert tortoise clearance survey is required, discretionary projects will be required to conduct a concurrent abbreviated survey for the burrowing owl.	Cost included within tortoise clearance survey cost (see DT-12 & 13)	PP	$0
Rap-7	ongoing	Discretionary projects within DWMAs will conduct a survey utilizing the four-visit CDFG protocol for burrowing owl.	$2,000	PP	$0
Rap-8	ongoing	If survey shows burrowing owl to be present, applicant is required to institute the minimization measures of eviction and burrow closure.	$6,000	PP	$0
Rap-12	ongoing	Track all new sightings and new nest locations of burrowing owls as they are detected in the future.	Included within IA staff budget.	IA	$0
Rap-14	3	Retrofit existing electrical transmission and distribution lines identified as "'problem poles" (or as part of voluntary proactive programs by utilities) located near regular ferruginous hawk wintering areas to meet current design standards to prevent electrocution.	Cost dependent on pole configuration.	PP	$0
Rap-19	ongoing	Enforce seasonal road closures where practical and necessary to protect nesting prairie falcons.	No additional cost. Included in BLM operating budget.	BLM	$0
Rap-19	ongoing	Conduct a site-specific evaluation to determine if prairie falcon nest locations are within the line-of-sight of vehicles and if seasonal closures are necessary.	No additional cost. Included in BLM operating budget.	BLM	$0
B-2	4	Consolidate public land in the Kelso Valley through land exchanges with willing sellers (Bendire's thrasher)	Include with HCA acquisition priorities. Cost included in IA staff budget.	IA	$0
B-8	ongoing	Review land division and other development proposals in the Oak Hills area to insure minimization of impacts to gray vireo habitat	Undetermined. Potential additional costs to San Bernardino County and the city of Hesperia to review project proposals, and to project proponent if redesign is required.	PP	$0
B-11	2	Remove salt cedar and Phragmites at designated springs and replant with native willows. (Inyo California towhee)	Undetermined. Cost is site specific.	IA, BLM	$0
B-12	ongoing	Continue removal of feral burros from the Argus Mountains with a goal of zero. (Inyo California towhee)	No additional cost. Part of ongoinf BLM program.	BLM	$0
B-13	1	Install signs indicating the China Lake NAWC boundary at Benko Spring and Ruby Spring (in cooperation with China Lake NAWS). (Inyo California towhee)	Minimal cost for signs. Boundary surveys are underway.	BLM	$0
B-15	ongoing	Remove invasive riparian plants from the Mojave River.	Undetermined and variable depending on implementing agency.	BLM	$0
B-17	ongoing	LeConte's thrasher: Prevent disturbance of nest sites during nesting season.	No additional cost.	PP	$0
R-1	ongoing	Prohibit flood control structures that will impede sand transport at Big Rock Creek, Sheep Creek, and the Mojave River. (Mojave fringe-toed lizard)	No new cost.	NA	$0
R-2	ongoing	Regulate aggregate mining in Big Rock Creek, Sheep Creek, and the Mojave River to assure continued passage of sand downstream during flood flows. (Mojave fringe-toed lizard)	Undetermined. Potential additional costs to local jurisditions to review project proposals, and to project proponent if redesign is required.	PP	$0
R-3	3	Widen the bridge over Big Rock Creek when Highway 138 is improved to allow better sand and water flow and enhance the wildlife corridor between the desert and the San Gabriel Mountains. Convert the existing double channel into a single long and high span. (Mojave fringe-toed lizard)	Cost included within bridge design. Potentially higher construction costs.	PP	$0

P-202	ongoing	Continue BLM program of education of trail maintenance volunteers. (Southern Sierra plants)	No new cost.	BLM	$0
P-203	ongoing	Acquire lands and relinquish mining claims consistent with the options contained in the Carbonate Habitat Management Strategy.	Included with acquisition priorities.	BLM	$0
P-3	ongoing	Retain the flood discharge capability of Amargosa Creek to the extend feasible and retain the capacity for sheet flow over the alkali flood plain north of Lancaster and west of EAFB. (Alkali mariposa lily)	No new cost.	NA	$0
P-2, P-3	1	Acquire or otherwise ensure the conservation of Paradise Spring and Rabbit Springs. (Alkali mariposa lily)	Include in acquisition priorities	IA	$0
P-9	ongoing	Review proposals for development, mining or water extraction near springs located along the Helendale Fault for compatibility with protection of the mariposa lilies and the surface water supply. Require botanical surveys in these areas. (alkali mariposa lily)	Undetermined. Potential additional costs to San Bernardino County to review project proposals, and to project proponent if redesign is required. Cost of botanical survey is approximately $2,000 per site.	IA	$0
P-11	2	BLM will exchange lands with CDFG so that a contiguous state ownership of occupied Barstow woolly sunflower habitat is achieved.	No new cost; included within BLM operating budget.	BLM	$0
P-14	4	Secure a conservation easement from U.S. Borax and other landowners (between Highway 58 and EAFB, and adjacent to the solar facility north of Highway 58) as a secondary reserve for the Barstow woolly sunflower.	Dependent on final configuation of conservation area.	IA	$0
P-15	ongoing	Require botanical surveys in the North Edwards Conservation Area until such time as a permanent boundary is established. (Barstow woolly sunflower)	Estimated at $2000 per 40 acres for spring surveys.	PP	$0
P-15	3	Establish permanent boundary for the North Edwards Conservation Area once additional information is known. (Barstow woolly sunflower)	No additional cost. Part of adaptive management.	RA	$0
P-17	ongoing	Prior to new construction within the utility corridors located in the Barstow woolly sunflower CA and NECA, botanical surveys shall be conducted and existing populations avoided to the maximum extent practicable.	Cost dependent on project scope.	BLM	$0
P-18	ongoing	Review Plans of Operation for proposed mines to achieve compatibility between mining and conservation of existing Barstow woolly sunflower sites. Existing populations will be avoided to the maximum extent practicable.	Undetermined. Potential additional costs to San Bernardino County and BLM to review project proposals, and to project proponent if redesign is required.	PP	$0
P-18	2	Initiate mineral withdrawals for occupied habitat of Lane Mountain Milkvetch .	Undetermined.	Army	$0
P-19	1	Charlotte's phacelia : Designate routes of travel in the El Paso Mountains.	No new cost; included within BLM and State Parks operating budget.	BLM	$0
P-20	2	Sign the larger populations of crucifixion thorn to notify campers that firewood harvesting is prohibited.	Minimal costs for signs.	BLM	$0
P-21	ongoing	Require botanical surveys for new projects within identified suitable habitat for desert cymopterus.	Estimated at $2,000 for 40 acres for spring surveys.	PP	$0
HCA-3	3	Avoidance of this species would be required for any public or private land ground-disturbing projects in the proposed Middle Knob Conservation Area. (Flax-like monardella)	Undetermined. Potential additional costs to Kern County and BLM to review project proposals, and to project proponent if redesign is required.		$0
P-30	3	Compensate claimholders within Coolgardie and West Paradise CA mineral withdrawal areas.	Undetermined. Dependent on claim validity.	Army	$0
P-32	1	Notify claimholders of the presence of endangered plants. Restrictions on casual use that involves ground disturbance within the Lane Mountain Milkvetch CA will be developed as necessary.	Undetermined mailing costs to claimholders.	BLM	$0
P-33	ongoing	Require applicants for discretionary permits within 100' of existing stream channels within the SRA established for the Little San Bernardino Mountains gilia to protect the integrity of the stream channels. Require setbacks of 100' from the outer banks of washes, and establish flood control and conservation easements on private lands containing this species.	Undetermined. Potential additional costs to San Bernardino County and BLM to review project proposals, and to project proponent if redesign is required.	PP	$0
P-34	ongoing	Prohibit channelization of upper Big Morongo Creek, Little Morongo Creek, and Dry Morongo Creek northwest of Highway 62 in order to maintain fluvial processes supporting occurrences of the Little San Bernardino Mountains Gilia in the Coachella Valley. Upstream improvements (e.g. culverts) within 1/4 mile of Highway 62 in these washes will be allowed.	No new costs.	NA	$0

P-37	ongoing	Botanical surveys for Mojave monkeyflower in the Brisbane Valley Unit (optional).	Estimated at $3,000 per 40 acres for spring surveys.	PP	$0
P-38	ongoing	Assign credits to any mitigation or conservation bank established for the Mojave monkeyflower, and track incidental take and credits. (optional)	Cost part of IA operating budget.	NA (cost included in funding of IA)	$0
P-38	ongoing	Review any mining industry proposal for conservation of the Mojave monkeyflower in the mining area as a whole. (optional)	Cost part of IA operating budget.	NA (cost included in funding of IA)	$0
P-40	ongoing	Acquire additional private lands west of the Newberry Mountains.	Include in acquisition priorities.	IA	$0
P-41	ongoing	Proponents for development within one mile of the Waterman Hills occurrences of the Mojave monkeyflower will be required to conduct surveys.	Estimated at $3,000 per 40 acres for spring surveys.	PP	$0
P-42	ongoing	New Utility projects, including proposals for wind energy development or communications sites, within the Mojave Monkeyflower CA will perform botanical surveys and avoid existing populations.	Estimated at $3,000 per 40 acres for spring surveys.	PP	$0
P-42	ongoing	Determine if construction monitoring is necessary for new utility projects and prescribe monitoring requirements within Mojave Monkeyflower CA.	Cost part of IA operating budget.	PP	$0
P-44	ongoing	Maintain cattle guards and fencing at Short Canyon (Mojave tarplant).	No new cost.	BLM	$0
P-48	ongoing	Insure that projects proposed on the dry lakes with occupied habitat of Parish's phacelia avoid and minimize take of this species to the maximum extent practicable.	Undetermined. Potential additional costs to San Bernardino County and BLM to review project proposals, and to project proponent if redesign is required.	PP	$0
P-50	ongoing	Ensure that utilities using portion of Corridors D and Q within Parish's Phacelia CA avoid known populations or require restoration of the playa habitat.	No cost for avoidance. Topsoil salvage and replacement cost undetermined.	PP	$0
P-52	ongoing	Review land division and development proposals in the Oak Hills area to insure minimization of impact to short-joint bevertail cactus habitat.	Undetermined. Potential additional costs to San Bernardino County to review project proposals, and to project proponent if redesign is required.	PP	$0
P-53	ongoing	Review projects to ensure avoidance of all known locations on public lands. (Triple-ribbed milkvetch)	Undetermined. Potential additional costs to San Bernardino County to review project proposals, and to project proponent if redesign is required.	PP	$0
P-54	ongoing	Require botanical surveys for ground-disturbing projects on private lands located within five miles of existing known locations for this species. Require projects to avoid occurrences. (Triple-ribbed milkvetch)	Estimated at $3,000 per 40 acres for spring surveys.	PP	$0
P-55	4	Acquire one private parcel where this plant occurs within the proposed Pisgah Crater ACEC if feasible.	Dependent on property value.	IA	$0
LG-XX	ongoing	Ensure that all cattle and sheep grazing prescriptions identified by the plan (not listed below) are met.		BLM	$0
LG-1	ongoing	Ensure utilization consistent with Hoechek's (et al., 1998) or the best scientific information available.		BLM	$0
LG-2	2	Complete assessment of public land health for Double Mountain, Oak Creek, and Round Mountain Allotments.		BLM	$0
LG-4	ongoing	Modify the Lacey-Cactus-McCloud allotment boundary to exclude those portions that occur on China Lake NAWS.	No additional cost.	BLM	$0
LG-5	ongoing	Remove and dispose of all cattle carcasses in an appropriate manner (I.e., not buried). Cross-country vehicle travel to remove cattle carcasses must have prior approval from the BLM.		BLM	$0
LG-7	2	Modify all existing tortoise cattle guards in desert tortoise habitat to prevent entrapment of desert tortoises.		BLM	$0
LG-8	ongoing	Eliminate any hazards to desert tortoises that may be created, such as auger holes and trenches, before the rancher, contractor, or work crew leaves the site.		BLM	$0
LG-9	1	Complete health assessments for the following cattle allotments: Cady Mountain, Hansen Common, Lacey-Cactus-McCloud, Olancha Common, Rattlesnake Canyon, Rudnick Common, Tunawee Common, and Walker Pass Common.		BLM	$0

LG-13	ongoing	For a grazing allotment partially within a DWMA, when ephemeral forage production is less than 230 pounds per acre, cattle would be substantially removed form "Exclusion Areas" from March 15 to June 15.		BLM	$0
LG-14	ongoing	Cattle may remain past March 15 in expectation of ephemeral forage production over 230 pounds per acre. If this level of forage is not attained when weather conditions are appropriate, cattle must leave Exclusion Areas until such time as 230 pounds per acre ephemeral forage is achieved or June 15, whichever is earlier. This determination would be made based on the evaluation and judgment of the BLM authorized officer. If cattle must be removed, the operator would be given two weeks to remove them from the DWMA.		B;LM	$0
LG-15	ongoing	Cattle must be substantially removed from the Exclusion Areas by March 15 and remain out until such time as 230 pounds per acre ephemeral forage is achieved or June 15, whichever is earlier.		BLM	$0
LG-17	1	The grazing strategy would be developed within a year and implemented within two years of plan adoption . The strategy would be a written plan detailing the area of removal, natural cattle movements, existing and potential improvements, and other constraints of cattle management.		BLM	$0
LG-18	1	Complete health assessments for the following allotments: Cronese Lake, Harper Lake, and Ord Mountain allotments.		BLM	$0
LG-19	1	Conduct a study of tortoise nutritional ecology in relation to livestock grazing, compatible to studies performed in the Ivanpah Valley during the later 1990s. If appropriate modify grazing program in response to study findings.		BLM	$0
LG-20	ongoing	Turnout of sheep in all allotments would not occur until 230 pounds (air-dry-weight) per acre of ephemeral forage is available. The lessee would be required to remove sheep from the are or the entire allotment if production falls below 230 pounds per acre.		BLM	$0
LG-22	ongoing	All sheep carcasses would be removed and disposed of in an appropriate manner (I.e. not buried) within two days of being found. Cross-country vehicle travel to gather sheep carcasses) must have prior approval from the BLM.		BLM	$0
LG-23	2	Health assessments would be performed within four years of plan adoption for all sheep allotments, or portions thereof, available for grazing (e.g., areas of allotments outside DWMAs). Health assessments would not be required for allotments that would no longer be available for grazing (e.g., areas of allotments inside DWMAs).		BLM	$0
LG-24	ongoing	To avoid competition between sheep and the Mohave ground squirrel once the ephemeral forage is no longer available and both species rely on perennial forage, all sheep would be removed from the Mohave Ground Squirrel Conservation Area when ephemeral plants are no longer the primary forage being utilized by sheep.	Undetermined. Potential additional costs to BLM and grazing lessee.	BLM	$0
LG-24	ongoing	To facilitate adaptive management, if future research shows that key species different from those listed in Table 2-XXX are important to the Mohave ground squirrel, those additional species would be added to the monitoring program. Similarly, if a key species identified above is not considered important to the Mohave ground squirrel in another part of its range (i.e., outside the Coso region), that species may be dropped from the list.		BLM	$0
LG-25	1	Sheep grazing would be prohibited from the Middle Stoddard Mountain Allotment where it coincides with the Mojave Monkeyflower CA. The BLM would work with the lessee to clearly identify monkeyflower habitat to be avoided.	Minimal cost.	BLM	$0
LG-28	ongoing	Following plan adoption, the lessees would be given two years notification pursuant to 43 CFR 4110.4-2(b) before measure identified in Section 2.2.5.8 are implemented.		BLM	$0

LG-29	ongoing	Grazing use would continue until the lessee voluntarily relinquishes their grazing preference and lease. Upon relinquishment, BLM would, without further analysis or notice; not reissue the lease; remove the allotment designation; assume any and all private interest in range improvement located on public land; and, designate the land as no longer available for livestock grazing. (from 2.2.5.9)		BLM	$0
MV-XX	ongoing	Enforce regulations relating to designated motorized vehicle access network.	See DT-28.	BLM	$0
E-9	ongoing	Provide education programs on a case-by-case basis to train utility and Caltrans maintenance staff, personnel at mines, government employees, and others to conduct rescue actions at isolated sites.	One day seminar, costing $750 plus facilities cost.	IA	$0
M-9	ongoing	Bats: (M-9) Effectiveness of mitigation measures providing for safe exit of bats should be reported. (Ongoing)	No additional cost	RA	$0
M-13	1	Brown-crested flycatcher: (M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon and in Mojave River to determine number of nesting pairs. (#1)	Undetermined	IA	$0
LG-9	1	Brown-crested flycatcher: (LG-9) BLM will conduct a regional rangeland health assessment of the riparian area in the east Sierra Canyons within two years of Plan approval. (#1)		BLM	$0
M-15	ongoing	Burrowing owl: (M-15) Compile annually record of take and conservation by acquisition and relocation. (Ongoing)	Included within IA operating budget	IA	$0
M-18	2	Carbonate endemic plants: (M-18) Monitor disturbance within ACEC. (#2)	Undetermined	PP	$0
LG-9	1	Charlotte's phacelia: (LG-9) BLM would make a regional rangeland health assessment on public lands in the east Sierra Canyons within two years of Plan approval. (#1)		BLM	$0
DT-41	3	Desert tortoise:(Guzzler)Conduct monitoring to see if tortoise mortality is an issue. Also attempt to ascertain use of guzzlers by known tortoise predators.(#3)	No cost or minimal mapping costs w/ volunteers doing the work.	BLM, IA	$0
M-98	1	Desert tortoise: Continue studies on the permanent study plots at the Goldstone Deep Space Tracking Station, and in the Alvord Mountains and elsewhere in the Superior-Cronese DWMA.(#1)		BLM, IA	$0
M-98	4	Desert tortoise: Conduct studies to determine the effects of the removal of sheep grazing from the Fremont-Kramer DWMA on tortoise populations.(#4)		BLM, IA	$0
M-98	1	Desert tortoise: (DT-39) Monitor both raven status and effectiveness of management actions at reducing predation rates on juvenile tortoises.(#1)		BLM, IA	$0
M-23	ongoing	Ferruginous hawk: (M-23) Compile records of electrocutions from incidental sightings, reports from the public and reports from utilities to identify “problem poles”. (Ongoing)		IA	$0
M-24	2	Ferruginous hawk: (M-24) utilize results of winter surveys to update the BLM's Key Raptor Area database (#2).		BLM	$0
M-24	2	Golden eagle: (M-24) Update Key Raptor Area database. (#2)	No new cost	IA	$0
M-227	3	Gray vireo: Identify and monitor threats to occupied habitat. (#3)	Included within IA operating budget	BLM	$0
M-32	2	Inyo California towhee: (M-32) Monitor spread of tamarisk and Phragmites at springs(#2)		BLM	$0
M-35	1	Kelso Creek monkeyflower: (LG-9) BLM would make an assessment of regional rangeland health on public lands in the Rudnick common allotment within two years of Plan approval. (#1)		BLM	$0
M-36	ongoing	Kern buckwheat: (M-36) Perform annual review of compliance with HCP protection measures, with an objective of detecting new disturbance in occupied habitat. (Ongoing)		NA (cost included in funding of IA)	$0
M-36	ongoing	Lane Mountain milkvetch: (M-36) Perform annual review of compliance with HCP protection measures, with an objective of detecting new disturbance in occupied habitat. (Ongoing)		NA (cost included in funding of IA)	$0
M-38	ongoing	Lane Mountain milkvetch: (M-38) Report annually on progress of acquisitions. (Ongoing)	Included within IA operating budget	NA (cost included in funding of IA)	$0

M-13	1	Least Bell's vireo: (M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, Mojave River, and other known nest sites to determine number of nesting pairs. (#1)		IA							$0
M-41	3	Little San Bernardino Mountains gilia: (M-41) Conduct presence absence surveys on BLM parcels near Joshua Tree, and north of Yucca Valley near Rattlesnake Canyon. (#3)		IA							$0
M-13	1	Long-eared owl: (M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, Mojave River, Argus Mountains and other known nest sites, to determine number of nesting pairs. Report results to the BLM National Raptor Database. (#1)		RA, PA, FS, D, G							$0
M-46, LG-18	1	Mojave monkeyflower: LG-18) Range land health assessments would be completed within one year of plan adoption for Ord Mountain allotment. (#1)		BLM							$0
M-48	1	Mojave monkeyflower: (M-48) Determine acres of occupied habitat in rainy years on public land in Brisbane Valley portion of conservation area between I-15 and Mojave River (#1). .		BLM, IA							$0
M-49	3	Mojave monkeyflower: (M-49) Continue presence absence surveys of remainder of core reserves and adjacent areas (#3).		BLM, IA							$0
M-50	2	Mojave fringe-toed lizard: M-50) Delineate blowsand habitat at Alvord Mountain, Pisgah, Cronese Lakes, and northeast of Harper Dry Lake. (#2)		BLM, IA							$0
M-51		Mojave fringe-toed lizard: Measure dune movement.		BLM, IA							$0
M-52	2	Mojave fringe-toed lizard: (M-52) Construction of windbreaks and exotic plants potentially affecting occupied habitat should be monitored. (#2)		BLM, IA							$0
M-209	1	Mojave River vole: Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1)	Included within IA operating budget	IA							$0
M-55	2	Mojave River vole: Perform Proper Functioning Condition assessments every five years (#2)		BLM							$0
M-56	2	Mojave tarplant: (M-56) Determine acres of occupied habitat at Short Canyon and Cross Mountain every five years. (#2)		BLM, IA							$0
M-200	3	Parish's phacelia: (See P-43 & P-46)Census populations every five years, with an estimate of acreage of occupied habitat (#3)	No additional cost.	BLM							$0
M-60	2	Parish's alkali grass: (M-60) Establish baseline population numbers and acreage of occupied habitat at Rabbit Springs. (#2)		IA							$0
M-3	1	Parish's alkali grass: (M-3, 95) Conduct surveys of other alkaline springs and seeps to determine if other populations are present in the planning area. (#1)	$80,000 (same survey for several species; see above)	IA							$0
M-60	2	Parish's popcorn flower: (M-60) Establish baseline population size and area of occupied habitat at Rabbit Springs. (#2)		IA							$0
M-3	1	Parish's popcorn flower: (M-3) Conduct surveys of other alkaline springs and seeps to determine if other populations are present in the Planning area. (#1)	$80,000 (same survey for several species; see above)	IA							$0
M-24	ongoing	Prairie falcon: (M-24) Update Key Raptor Area databases at five-year intervals. (Ongoing)	Included within BLM operating budget	BLM							$0
M-66	ongoing	Prairie falcon: (M-66) Report on falconry take permits. (Ongoing)	Included within CDFG operating budget	BLM, IA							$0
M-97	ongoing	Prairie Falcon: Maintain a database of survey reports and new records of occurrence of the prairie falcon in cooperation with the CDFG's NDDB and raptor nest card records program. Also, keep records of newly permitted activities issued within the Key Raptor Areas for prairie falcon and for other areas within one mile of a known prairie falcon nest	Included within IA operating budget	IA							$0
M-68	2	Red rock poppy: (M-68) Coordinate population surveys with Red Rock Canyon State Park. Perform population census every five years. (#2)		BLM, IA							$0
M-68	2	Red rock tarplant: (M-68) Coordinate population surveys with Red Rock Canyon State Park. Perform population census every five years. (#2)		BLM, IA							$0
M-3	1	Salt Springs checkerbloom: Conduct surveys of other alkaline springs and seeps to determine if other populations are present in the planning area.	$80,000 (same survey for several species)	IA	$0	$0	$0	$0	$0	$0	$0

M-60	2	Salt Springs checkerbloom: (M-60) Establish baseline population numbers and area of occupied habitat at Rabbit Springs. (#2)		IA	$0
M-74	3	San Diego horned lizard: (M-74) Monitor surface disturbance at Big Rock Creek and Mescal Creek. (#3)		IA	$0
M-79	2	Southwestern pond turtle: (M-79) Conduct presence absence surveys of Kelso Creek and Jawbone-Butterbredt ACEC in suitable habitat. (#2)		BLM	$0
M-13	1	Southwestern willow flycatcher: (M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon and in Mojave River to determine number of nesting pairs. (#1)		IA	$0
LG-9	1	Southwestern willow flycatcher: Initiate first riparian assessment in Kelso Valley and east Sierra Canyons within two years of Plan approval. (#1)	See M-14	BLM, IA	$0
M-13	1	Summer tanager: M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, other known nest sites and in Mojave River, to determine number of nesting pairs. (#1)		IA	$0
M-13	1	Vermilion Flycatcher: (M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, other known nest sites and in Mojave River, to determine number of nesting pairs. (#1)		IA	$0
M-13	1	Western Yellow-billed cuckoo: (M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, Mojave River, and other known nest sites to determine number of nesting pairs. (#1)		IA	$0
M-248	2	Western yellow-billed cuckoo: Perform Proper Functioning Condition assessments in riparian areas every five years (#2)		BLM, IA	$0
M-87	2	White-margined beardtongue: (M-87) Census plant populations at known locations (#2)		PA, FS, D, G	$0
M-13	1	Yellow-breasted chat: (M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, other known nest sites and in Mojave River, to determine number of nesting pairs. (#1)		IA	$0
M-13	1	Yellow warbler: (M-13) Cooperate with local bird clubs on annual censuses at Big Morongo Canyon, other known nest sites and in Mojave River, to determine number of nesting pairs. (#1)		IA	$0
LG-9	2	Yellow warbler: Perform Proper Functioning Condition assessments in riparian areas every five years (#2)	See M-14	BLM	$0
M-93	4	Yellow-eared pocket mouse: Conduct presence absence survey in east Sierra Canyons and public land in Kelso Valley (#4).		BLM, IA	$0
M-94	2	Yellow-eared pocket mouse: (LG-9, M-94) BLM would conduct rangeland health assessments for allotments within the range of the yellow-eared pocket mouse within five years of Plan approval. (#2)	See M-14	BLM, IA	$0
A-1		Alkali mariposa lily: (AM-1) If surveys show substantial occurrences at isolated sites then the Implementing Authority will provide additional protection, which could include: acquisition, fencing or conservation area boundary modification.	Undetermined (Costs to be determined as need for action is identified.)	IA	$0
A-3		Barstow woolly sunflower: (AM-3) If new populations are identified through new survey information then adjust boundaries of Kramer and North Edwards Conservation areas to include those populations.	No new cost; within operating budget of IA.	IA	$0
A-4		Barstow woolly sunflower: Adjust boundaries of Coolgardie Mesa Conservation Area based on new occurrences if appropriate.	Undetermined (Costs to be determined as need for action is identified.)	IA	$0
A-5		Bats: Gate mine entrances if new significant roosts are found.	Undetermined (Costs to be determined as need for action is identified.)	BLM, IA	$0
A-6		Bats: If populations decline or are threatened then install bat houses in locations where appropriate.	$3,000 per location	IA	$0
A-8		Bendire's thrasher: If new populations are discovered then adjust conservation area boundaries.	No new cost; within operating budget of IA.	IA	$0
A-9		Bendire's thrasher: If surveys show presence of significant numbers of birds and undisturbed habitat, then consider addition of a conservation area near Yucca Valley	Undetermined (Costs to be determined as need for action is identified.)	IA	$0

A-202	Brown-crested flycatcher: If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use.		BLM, IA	$0
A-13	Brown-crested flycatcher:(AM-13) If rangeland health assessments in riparian areas of the east Sierra canyons do not meet Proper Functioning Conditions, then adjust grazing practices or eradicate invasive riparian plants.	Undetermined (Costs to be determined as need for action is identified.)	BLM, IA	$0
A-14	Brown-crested flycatcher: If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage.	No new cost.	IA	$0
A-15	Burrowing owl: If new owl nesting sites are discovered, then designate new conservation areas or adjust acquisition priorities.	Undetermined (Costs to be determined as need for action is identified.)	IA	$0
A-16	Carbonate endemic plants: (AM-16) If the revegetation and restoration of mined properties is not successful, then adjust revegatation, per Carbonate Management strategy	Undetermined (Costs to be determined as need for action is identified.)	BLM, IA	$0
A-17	Carbonate endemic plants: If specific occurrences of Parish's daisy need to be protected from grazing, then fence.	Undetermined (Costs to be determined as need for action is identified.)	BLM, IA	$0
A-18	Charlotte's phacelia: (AM-18) If monitoring shows damage from OHV use in the El Paso Mountains and elsewhere fence occurrences as necessary.	Undetermined (Costs to be determined as need for action is identified.)	BLM, IA	$0
AM-13	Charlotte's phacelia: (AM-13) If rangeland health assessments in the east Sierra canyons do not meet requirements, then adjust grazing practices.	No new cost; within operating budget of BLM.	BLM	$0
A-20	Crucifixion thorn: If new locations of occupied habitat are found, then review route designation and prohibit firewood cutting.	Undetermined (Costs to be determined as need for action is identified.)	RA, FS, D, G	$0
A-21	Crucifixion thorn: If monitoring of “woodland” site indicates damage, then construct fencing at strategic locations.	Undetermined (Costs to be determined as need for action is identified.)	RA, FS, D, G	$0
A-22	Ferruginous hawk: If electrical towers are identified in wintering areas as causing electrocutions then retrofit the problem electrical towers or create safe perches.	Undetermined, dependent on tower configuration.		$0
A-24	Golden eagle: If new threats to nest sites are identified then take corrective actions.	Undetermined (Costs to be determined as need for action is identified.)		$0
A-25	Golden eagle: If electrocutions are occurring then retrofit problem electrical towers.	Undetermined (Costs to be determined as need for action is identified.)		$0
A-26	Golden eagle: If electrocutions are occurring then construct nest platforms on transmission line sites.	$3,000 per platform.		$0
A-27	Gray vireo: If cowbirds are found to be a threat, then initiate cowbird control.	Undetermined (Costs to be determined as need for action is identified.)		$0
A-28	Inyo California towhee: If Recovery Plan goals are met then initiate delisting.	Undetermined (Costs to be determined as need for action is identified.)		$0
A-30	Inyo California towhee: (AM-30) If monitoring indicates spread of invasive plants (Phragmites and tamarisk) over baseline conditions, then remove the invasives from the springs. The Bruce Canyon sites are within Wilderness and work would be performed by hand.	Undetermined (Costs to be determined as need for action is identified.)		$0
A-31	Inyo California towhee: If monitoring at Peach Springs indicates continuing burro damage, then install an exclosure fence. Because this site is within the Argus Mountains Wilderness, work must be performed by hand.	Cost dependent on monitoring. Can be performed by BLM interns and volunteers.		$0
A-32	Kelso Creek monkeyflower: (AM-32) If new populations are discovered then BLM will adjust boundaries of conservation area.	No new cost; within operating budget of IA.		$0
A-34	Kelso Creek monkeyflower: (AM-34) If results of the rangeland health assessments in Kelso Valley indicate consumption or trampling of the flower, then adjust grazing practices.	Undetermined (Costs to be determined as need for action is identified.)		$0
A-35	Kelso Creek monkeyflower: If newly discovered populations on private land are found, then pursue land purchase or exchange on a high priority.			$0
A-36	Lane Mountain milkvetch: If significant populations are found, then adjust boundaries of ACEC and withdraw from mineral entry.	Undetermined (Costs to be determined as need for action is identified.)		$0
A-202	Least Bell's vireo: If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use.	Undetermined (Costs to be determined as need for action is identified.)		$0

AM-14	Least Bell's vireo: Cooperate with water agencies to provide additional water to Mojave River.	No new cost.	$0
A-39 (AM-27)	Least Bell's vireo: If Proper Functioning Condition requirements are not met, then adjust management in the riparian areas such as eradication of invasive riparian plants.(AM-27) If cowbirds prove to be a threat, then initiate cowbird control.		$0
A-41	Little San Bernardino Mountain's gilia: If new occupied habitat is identified then adjust boundaries of Conservation Area.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-42	Little San Bernardino Mountain's gilia: Remove the 50 acre limitation on take on private land if: 1) New populations are found and are protected, or 2) the dry wash conservation measures are in place (conservation easements, setbacks, prohibitions on vehicle travel in occupied washes.)	Undetermined (Costs to be determined as need for action is identified.)	$0
A-43	Long-eared owl: If new nest and communal roost sites are discovered then protect them.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-44	Mojave monkeyflower: If grazing proves to be a threat, then adjust grazing prescriptions in eastern conservation area with seasonal or area-specific restrictions.	No additional cost	$0
A-46	Mojave monkeyflower: (AM-46) If OHV use proves to be impacting occupied habitat, then sign or fence habitat adjacent to Stoddard Valley Open Area. Fence as necessary in Brisbane Valley	Undetermined (Costs to be determined as need for action is identified.)	$0
A-45	Mojave monkeyflower: (AM-45) If significant new occurrences are found on public lands or if opportunity arises on two sections designated as “potential additions” or with Catellus land exchanges, then add to Brisbane Valley conservation area. If surveys prove flowers are absent, then delete lands from eastern conservation area.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-47	Mojave monkeyflower: If mining company surveys detect flowers within mining area then establish boundaries of mitigation bank.		$0
A-49	Mojave fringe-toed lizard: If important new blowsand processes are identified then adjust boundaries as necessary to protect drainages and wind transport area and extend conservation downwind if warranted.	No new cost; within operating budget of IA.	$0
A-241	Mojave River vole: If excessive damage is detected to occupied habitat, then manage visitor use by fencing areas.	Undetermined (Costs to be determined as need for action is identified.)	$0
AM-14	Mojave River vole: Cooperate with water agencies to provide additional water to Mojave River. If groundwater levels at monitoring wells are not maintained, drop permit coverage.	No new cost.	$0
A-242	Mojave River vole: If PFC assessments identify invasive plants as a threat, then eradicate them.		$0
A-53	Mojave tarplant: (AM-53) If Mojave tarplant are consumed or trampled in Short Canyon and on Cross Mountain, then adjust grazing practices with seasonal closures or fencing.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-54	Mojave tarplant: (AM-54) If existing or new populations are threatened by vehicles or grazing, then protect them by providing barriers to vehicles or livestock.		$0
A-104	Mojave tarplant: (AM-104) If significant new populations are found on public lands, then manage as an ACEC.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-104	Mojave tarplant: If private land conservation is judged to be necessary at new locations, the sites will be given a high rating on the acquisition priority list maintained by the Implementation Team.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-58	Parish's phacelia: If new locations are found, then protect with fencing or signing at edge of playas.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-59	Parish's alkali grass: If new locations are found, then acquire, secure water rights or protect from grazing.	Undetermined (Costs to be determined as need for action is identified.)	$0
AM-59	Parish's popcorn flower: If new locations are found, formulate protection plans. Measures could include acquisition, securing water rights, or protection from grazing.	Undetermined (Costs to be determined as need for action is identified.)	$0
(AM-24)	Prairie falcon: (AM-24) If new threats to nest sites are identified then take corrective actions.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-62	Red Rock poppy: If monitoring shows damage to occupied habitat, then provide barriers to vehicles.	Undetermined (Costs to be determined as need for action is identified.)	$0

A-63	Red Rock poppy: If significant population is discovered on public land then amend the desert plan to establish an ACEC that encompasses new populations.	Undetermined (Costs to be determined as need for action is identified.)	$0
AM-62	Red Rock tarplant: If monitoring shows damage to occupied habitat, then provide barriers to vehicles.	Undetermined (Costs to be determined as need for action is identified.)	$0
AM-63	Red Rock tarplant: If significant population is discovered on public land then amend the desert plan to establish an ACEC that encompasses new populations.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-59	Salt Springs checkerbloom: If new locations are found, then formulate protection plans. Measures could include acquisition, securing water rights, or protection from grazing.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-69	San Diego horned lizard: If conserved habitat is disturbed in an edge effect, then fence and post signs.		$0
A-71	Short-joint beavertail cactus: (AM-71) If beavertail cactus are disturbed during a project, then salvage and relocate plants within urban development areas.		$0
A-72	Short-joint beavertail cactus: (AM-72) if development pressure increases, then create mitigation banks in the western part of the range. If the populations in the eastern part of the range prove to be distinct, then create smaller reserves as mitigation banks.		$0
A-62	Southwestern pond turtle: (AM-62) If monitoring shows damage to occupied habitat, then provide barriers to vehicles or livestock.		$0
A-202	Southwestern willow flycatcher: If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-76	Southwestern willow flycatcher: If Proper Functioning Condition requirements are not met, then adjust management including eradication of invasive riparian plants	Undetermined (Costs to be determined as need for action is identified.)	$0
A-14	Southwestern willow flycatcher: If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage.		$0
A-202	Summer tanager: If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-14	Summer tanager: If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage.	No new cost.	$0
A-227	Summer tanager: If Proper Functioning Condition requirements are not met, then adjust management including eradication of invasive riparian plants		$0
A-202	Vermilion flycatcher: If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-14	Vermilion flycatcher: If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage.	No new cost.	$0
A-202	Western yellow-billed cuckoo: If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-227	Western yellow-billed cuckoo: If Proper Functioning Condition requirements are not met, then adjust management including eradication of invasive riparian plants	Undetermined (Costs to be determined as need for action is identified.)	$0

A-14	Western yellow-billed cuckoo: If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage.	No new cost.	$0
A-89	White-margined beardtongue: If monitoring shows damage along utility corridors or in Argos Wash, then fence populations.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-202	Yellow-breasted chat: If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-227	Yellow-breasted chat: If Proper Functioning Condition requirements are not met, then adjust management including eradication of invasive riparian plants	Undetermined (Costs to be determined as need for action is identified.)	$0
A-14	Yellow-breasted chat: If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage.	No new cost.	$0
A-27	Yellow-breasted chat: If cowbirds are found to be a threat, then initiate cowbird control	Undetermined (Costs to be determined as need for action is identified.)	$0
(AM-13, AM-34)	Yellow-eared pocket mouse: (AM-13, AM-34) If rangeland health assessments in the east Sierra canyons and Kelso Valley indicate damage to occupied habitat, then adjust grazing practices.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-96	Yellow-eared pocket mouse: If new location data identifies populations on private land, then prioritize acquisition lands.	No new cost; within operating budget of IA.	$0
A-202	Yellow warbler: If nesting pairs decline by 25% then identify and manage disturbance to habitat with fencing or restrictions on visitor use.		$0
A-227	Yellow warbler: If Proper Functioning Condition requirements are not met, then adjust management.	Undetermined (Costs to be determined as need for action is identified.)	$0
A-14	Yellow warbler: If cooperating with water agencies to provide additional water to the Mojave River is not successful and groundwater levels at monitoring wells are not maintained, then drop permit coverage.	No new cost.	$0
AM-39(AM-27)	Yellow warbler: If invasive riparian plants in occupied habitat prove to be a threat, then eradicate them. If cowbirds are found to be a threat, then initiate cowbird control		$0
A-105	Raptors: If monitoring reveals "problem poles", existing electrical transmission and distribution lines can be retrofitted to meet current design standards that prevent electrocution. Identified regular perch poles adjacent to important wintering areas for ferruginous hawk in the Mojave Valley and Antelope Valley can be retrofitted to provide safe sites even if no electrocution problem is evident. Established perches of golden eagles on unsafe poles can be retrofitted. (See also, A-24)	Undetermined (Costs to be determined as need for action is identified.)	$0
A-105	Raptors: Mines that cannot avoid occupied eagle and falcon nest sites will provide relocated nests in cooperation with the wildlife agencies. (See also A-24)		$0
A-105	Raptors: The adaptive management conservation program will apply to any new nest sites located over time and to communal roosts of long-eared owl and communal migratory roosts of Swainson's hawk. Potential sources of disturbance will be evaluated on a site-specific basis and management measures formulated to reduce or eliminate the disturbance during the nesting and roosting seasons.		$0
A-59	Alkali wetland plants: (AM-59) If new locations are found, formulate protection plans. Measures could include acquisition, securing water rights, or protection from grazing.	Undetermined (Costs to be determined as need for action is identified.)	$0

A-103		Alkali wetland plants: The privately owned portions of the palm oasis and alkali wetland at the Oasis of Mara adjacent to the Joshua Tree National Park headquarters buildings could be considered for acquisition, depending on the feasibility and results of botanical surveys of target species.		$0
R-200	ongoing	Southwestern pond turtle: Continue restoration at Camp Cady and Afton Canyon.		
M-200	ongoing	Monitoring of reference populations of rare plants, especially annuals, will be conducted at reference sites in Conservation Areas on public land.	IA, BLM	
M-201	1	Alkali Mariposa Lily: Monitor population numbers and measure groundwater levels in Conservation Area adjacent to LA County treatment ponds. (#1)		
M-202	2	Alkali mariposa lily: Measure ground water levels at existing nearby wells inside or within one mile of the Alkali Mariposa lily conservation area. If no wells exist in close proximity, the surface water level may be measured. (#2)		
M-203	3	Alkali mariposa lily: Determine plant numbers and area of occupied habitat at new sites identified since plan adoption every five years. (#3)		
M-204	2	Barstow woolly sunflower: Establish baseline population numbers and occupied acreage in conservation areas. (#2)		
M-205	2	Barstow woolly sunflower: BLM and CDFG will monitor OHV disturbance off designated open routes within the ACEC and Ecological Reserve area. (#2)		
M-207	1	Townsend's big-eared bat: Monitor population numbers using bat houses if installed. (#1)	IA	
M-209	1	Brown-crested flycatcher: Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1)	IA	
M-210	ongoing	Parish's daisy: Report new populations of Parish's daisy within grazing allotments. (Ongoing)	BLM	
M-211	2	Cushenbury buckwheat, Cushenbury milkvetch, Cushenbury oxytheca, Parish's daisy, Shockley's rockcress: Evaluate revegetation and restoration of mined properties.	BLM, IA	
M-212	1	Charlotte's phacelia: Monitor disturbance to occupied habitat in El Paso Mountains. (#1)	BLM	
M-19	2	Charlotte's phacelia: (M-19) Monitor populations in the Short Canyon and Sand Canyon ACEC's and at Red Rock Canyon State Park. (#2)	BLM, IA	
M-200	1	Desert cymopterus:Monitor population numbers in occupied habitat every three years. (#1)	BLM, IA	
M-213	1	Desert cymopterus:(LG-18) Assess rangeland health on Harper Lake allotment. (#1)	BLM	
DT-21	ongoing	Desert tortoise:(DT21) Monitor fences and culverts to ensure fence integrity and unobstructed culverts.(ongoing)	BLM, IA	
M-214	1	Desert tortoise:(Headstarting)·Longitudinal monitoring for a minimum of 15 years to determine efficacy of program. (#1)		
M-215	1	Desert tortoise:Must monitor and minimize raven impacts on hatchling tortoises at nurseries.(#1)		
DT-17	1	Desert tortoise:(DT-17) Monitor for disease outbreaks concurrently with line-distance sampling and plot studies. (#1).		
M-216	4	Desert tortoise:Monitor dust emissions from mining sites, agricultural fields, road edges, disturbed playas for toxic elements. (#4)		
M-98	1	Desert tortoise:·Monitor tortoise health status concurrently with line-distance sampling and plot studies. (#1)		
M-217	ongoing	Desert tortoise:Necropsy all ill, dying and recently deceased tortoises as per salvage protocols.(ongoing)		
M-218	1	Desert tortoise:Use data from line distance and other surveys to see if new die-off areas have extended further south of Highway 58 than what is reported in the Draft (#1).		

M-219	1	Desert tortoise:Identify feral dog problem areas within DWMAs (concurrently done with tortoise population studies). (#1)		
M-219	3	Desert tortoise:Feral dog Management Plan should have a monitoring component that specifically looks at the distribution and intensity of feral dog problems. (#3)		
M-220	ongoing	Desert tortoise:(Grazing)·Conduct health assessments as scheduled.(ongoing)		
M-221	ongoing	Desert tortoise:·Monitor integrity and function of fences to maintain Exclusion Areas and minimize cattle use outside the allotment (ongoing)		
M-222	1	Desert tortoise:·Allotment-specific studies should be performed to determine the threshold at which there would be sufficient ephemeral forage quantity and quality to promote healthy tortoises and habitat.(#1)		
M-223	ongoing	Desert tortoise:Presence-absence surveys will be used to (a) report level of authorized incidental take to regulatory agencies; (b) report level of 1% AGD attributed to each jurisdiction; (c) provide results of surveys to ensure appropriate boundaries for Survey and No Survey Areas (ongoing)		
M-224	1	Desert tortoise:The BLM will provide for DWMA-directed law enforcement and other public outreach through recreational technicians to help minimize incidences of poaching, vandalism, pet collection, etc.(#1)		
M-225	ongoing	Desert tortoise: Monitor filming activities on private land within DWMAs to avoid or minimize impacts to tortoises and burrows. (ongoing)		
M-22	2	Ferruginous hawk: (M-22) Coordinate with local bird clubs and electrical utilities to conduct winter population surveys. (#2).		IA
M-28	ongoing	Golden eagle: Coordinate with utilities to monitor nests on transmission lines (ongoing).	5000, starting with second budget block.Note, utilities currently doing THIS. No new associated cost.	NA (cost included in funding of IA)
M-226	3	Gray vireo: Conduct surveys of nesting pairs in Conservation Area every five years. (#3)		IA
M-228	2	Inyo California towhee: Perform Proper Functioning Condition assessments every five years in conjunction with species surveys. (#2)		BLM
M-229	2	Inyo California towhee: Identify threats or disturbance to occupied habitat, including parasitism by brown-headed cowbirds. (#2)		BLM
M-230	ongoing	LeConte's thrasher: Use the new sightings and records compiled over time to define the densest populations, and define specific areas where more intensive vehicle management is needed and where vehicle restrictions could be relaxed.		
M-231	2	Little San Bernardino Mountains gilia: Monitor occupied habitat for: weed invasion, OHV disturbance, and other human-caused ground disturbance.		
M-232	2	Long-eared owl: Perform Proper Functioning Condition assessments every five years (#2)		
M-233	2	Long-eared owl:Monitor disturbance of nest and communal roost sites.		
M-234	4	Long-eared owl: Determine if great-horned owls are displacing or preying upon long-eared owls. (#4)		
M-235	ongoing	Mojave monkey-flower: Incorporate results of monitoring by OHV commission into database (ongoing)		IA
M-236	1	Mojave monkey-flower: Mining companies will conduct surveys on mining lands. (#1)		PP
M-237	2	Mojave fringe-toed lizard: Conduct periodic presence/absence surveys for the Mojave fringe-toed lizard at conserved sites.		
M-238	1	Mohave ground squirrel:A monitoring strategy would be designed and implemented by the IT, in coordination with the MGS Technical Advisory Group. (#1)		

M-240	ongoing	Mohave ground squirrel:On a yearly basis, track the loss of MGS habitat compared to the conservation of MGS habitat resulting from Plan implementation (ongoing)		
LG-9	1	Mojave tarplant: (LG-9) BLM will make a regional rangeland health assessment on public lands in the Rudnick common allotment within two years of Plan approval. (#1)		
LG-9	1	Ninemile Canyon phacelia: (LG-9) BLM will make a regional rangeland health assessment on public lands in the east Sierra Canyons within two years of Plan approval. (#1)		BLM
M-59		Parish's phacellia: Perform annual report describing vehicle traffic, if any, on specified playas.	No additional cost.	BLM
M-242	2	South-western pond turtle: Perform Proper Functioning Condition assessments every five years. (#2)		
M-209	1	South-western pond turtle: Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1)		
M-243	2	South-western willow flycatcher: Perform Proper Functioning Condition assessments every five years. (#2)		
M-209	1	South-western willow flycatcher: Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1)		
M-244	2	Summer tanager: Perform Proper Functioning Condition assessments of the occupied habitat in the Mojave River every five years. (#2)		IA
M-209	1	Summer tanager: Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1)		IA
M-245	2	Vermilion flycatcher: Perform Proper Functioning Condition assessments every five years (#2)		BLM, IA
M-209	1	Vermilion flycatcher: Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1)		IA
M-246	ongoing	Western snowy plover: Monitor disturbance at known nest sites. (Ongoing)		BLM, IA
M-247	2	Western yellow-billed cuckoo: Perform Proper Functioning Condition assessments every five years (#2)		BLM
M-209	1	Western yellow-billed cuckoo: Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1)		IA
M-249	ongoing	White-margined beardtongue: Monitor the Johnson Valley to Parker race.		
M-250	2	Yellow-breasted chat: Perform Proper Functioning Condition assessments every five years (#2)		BLM, IA
M-209	1	Yellow-breasted chat: Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1)		IA
M-251	2	Yellow warbler: Perform Proper Functioning Condition assessments every five years (#2)		BLM, IA
M-209	1	Yellow warbler: Obtain and analyze groundwater monitoring well records from Mojave Water Agency on an annual basis. (#1)		IA
A-200		Alkali mariposa lily: If population numbers are dependent upon groundwater levels at LA County treatment ponds, then acquire water rights to maintain groundwater levels.		
A-201		Barstow woolly sunflower: If adverse impacts to species are detected then revise road network or install fencing based on disturbance surveys within ACEC and Ecological Reserve Area.		BLM, IA
A-203		Burrowing owl: If research shows that active translocation is successful, then utilize this method to establish colonies in protected areas.		IA

A-204	Carbonate endemic plants: If monitoring reveals OHV disturbance then sign and gate access routes.
A-205	Desert cymopterus:If rangeland health assessments indicate that more than half desert cymopturus flowering stalks are consumed, then adjust grazing practices, including fencing.
A-207	Desert tortoise: If habitat continues to be degraded and tortoises continue to die at elevated numbers without any evidence of sustained recruitment, then IT, BLM, regulatory agencies, etc. should consider establishing new regions to be fenced that are at least 50 square miles in size, and managed similar to the DTNA.
A-208	Desert tortoise:If results of pilot studies are successful, then headstarting could be used in these fenced areas to bolster the fenced population.
A-209	Desert tortoise:If the MOG, DMG, etc. recommend the use of the latest population census methods, then ensure that they are used.
A-210	Desert tortoise: If the results of population studies indicate that recovery is not occurring, then adjust management practices as needed
A-211	Desert tortoise: If the headstarting program proves effective in bolstering population, then implement it in other places within DWMAs where tortoises have been extirpated.
A-212	Desert tortoise:If the impermeable barriers between some DWMAs prove a hindrance to genetic connectivity and research shows that there is truly enough genetic difference among DWMAs, then translocation of individual tortoises should be considered. Actions could include manual transfer of tortoises and/or eggs from one place to another, as dictated by then-available information on translocation and other factors.
A-213	Desert tortoise:If genetic difference between DWMAs is established then a headstarting program will be followed with collection of gravid females and the laying of pathogen-free eggs in established nurseries.
A-214, DT-16	Desert tortoise:· (DT-16) If the Implementation Team, MOG, etc. identify any breakthrough in disease management, then it should be incorporated into the plan.
A-215	Desert tortoise:If scientific studies show that the spread of disease can be curtailed through the closure of culverts, then consider closing culverts along fenced roads.
A-216, DT-22	Desert tortoise:DT-22) If impacts to the Fremont-Kramer DWMA by OHV originating in the Silver Lakes community are not curtailed following the working group suggestions, then fencing may be necessary.
A-217	Desert tortoise:If monitoring or other information shows that feral dog impacts are adversely affecting tortoises within DWMAs, then elevate the priority of this program.
A-218	Desert tortoise:If guzzlers are determined to be a problem, then take appropriate steps to modify guzzlers while retaining their function to prevent further tortoise entrapment. Install predator prohibitive devices as needed.
A-219	Desert tortoise:If the boundary lines for Survey versus No Survey Areas are not accurately portraying where tortoise are found, then modify the boundary lines using the data collected on where there is take.
A-220	Desert tortoise:Tracking of law enforcement activities:If there are problem areas identified (increased poaching, illegal target shooting), then identify issue-specific solutions (increased law enforcement presence).

A-221, DT-32	Desert tortoise:·(DT-32) If the reduction of road kill is not reducing raven numbers and tortoise mortality, then modify recommendations based on information available.
A-222, DT-38	Desert tortoise:(DT-38) If the two interagency work groups established to oversee management direction and implementation of the raven management plan in the California desert recommend a change in policy, then ensure that future phases are developed and implemented in accordance with results of research and monitoring.
A-223	Desert tortoise:If monitoring data indicates a problem with routes of travel (e.g. route proliferation, habitat degradation or increased tortoise mortality), then consider corrective measures as needed (increased law enforcement, fencing, modified route network).
A-224	Desert tortoise:If range land health assessments identify areas of noncompliance, then implement corrective measures such as fencing, seasonal closures or pasture rotation.
A-225, DT-2	Desert tortoise:DT-2: If biological monitoring shows that filming is adversely affecting tortoises inside DWMAs, the Implementation Team will consider remedial actions, which if deemed necessary, could include the prohibition of all filming activities from DWMAs.
A-226	Gray vireo: If threats are identified for new nest sites then manage that area to minimize threats
A-227	Inyo California towhee: If requirements of Proper Functioning Condition are not met, then adjust management
A-228	Kern buckwheat: If new disturbance proves to be a threat to occupied habitat then prevent disturbance, including fencing and route designation
A-229	Kern buckwheat:If monitoring shows that the habitat is damaged by wet weather off-road travel, the access road will be closed during wet periods or during the rainy season, at the discretion of BLM's Ridgecrest Field Office.
A-231	Little San Bernardino Mountain's gilia: If occupied habitat is threatened, then take appropriate protective actions, which may include fencing, barriers to vehicle access or weed eradication.
A-232	Little San Bernardino Mountain's gilia: If new populations are discovered and the need for an increase in the take limit becomes apparent, the Plan will be amended for this species.
A-227	Long-eared owl: If Proper Functioning Condition requirements are not met, then adjust management
A-233	Long-eared owl:If disturbance is causing abandonment of nest or roost sites, then provide for seasonal or permanent closure of routes that may cause disturbance and or fencing
A-234	Long-eared owl: If great-horned owls are impacting long-eared owls, then potential solutions might involve destruction of great-horned owl nests.
A-235	If scientific study shows that the MGS CA is too small to conserve the MGS, then IT and others should consider means of acquiring private lands (or easements thereon) to ensure the conservation area is sufficiently robust.
A-236	Mohave ground squirrel:··If trapping in Kern County Study Area identifies significant populations, then, consider adding it to the conservation area. The conservation strategy should continue to evolve as new scientific information becomes available.
A-237	Mohave ground squirrel:··If current missions at either Edwards Air Force Base or China Lake Naval Air Weapons Station change substantially so that the current levels of protection are substantially reduced, then IT and regulatory agencies should reconsider the conservation strategy.
A-238	Mohave ground squirrel:·If so-called "core areas" are identified, then IT and regulatory agencies should consider additional means of protecting and conserving that habitat.

A-239	Mohave ground squirrel:·Use the biological and population data from Goal 2, Objectives 2.2 to modify the management prescriptions, as necessary, to ensure the long-term viability of the species.
A-240	Mojave fringe-toed lizard: If occupied habitat is impacted by increased disturbance then increase law enforcement and/or signs.
A-243	Ninemile canyon phacelia: If Ninemile canyon phacelia are consumed or trampled then adjust grazing practices with seasonal closures or fencing.
A-244	Prairie falcon: Prairie falcon If newly discovered nest sites are disturbed by vehicular traffic then implement seasonal closures.
A-227	South-western pond turtle: If Proper Functioning Condition requirements are not met, then adjust management.
A-27	Summer tanager: (AM-27) If cowbirds prove to be a threat, then initiate cowbird control.
A-227	Vermilion flycatcher: If Proper Functioning Condition requirements are not met, then adjust management including eradication of invasive riparian plants
A-27	Vermilion flycatcher:(AM-27) If cowbirds prove to be a threat, then initiate cowbird control.
A-24	(AM-24) If new threats to nest sites are identified then take corrective actions.

Exhibit C.2

Draft Implementation Plan
For the
Desert Tortoise and
Mohave Ground Squirrel

DRAFT IMPLEMENTATION PLAN

For Desert Tortoise and Mojave Ground Squirrel

Each measure identified in the Final EIR/S is included within this document. Measures include those that (a) reiterate "Current Management," (b) "New Measures In Effect Upon Plan Adoption," and (c) "New Measures To Be Implemented Following Plan Adoption." For this later section, schedules and milestones are given for each prescription.

CURRENT MANAGEMENT

The following management prescriptions reiterate current management, and do not require any additional regulatory action.

CURRENT MANAGEMENT: PRIVATE JURISDICTIONS

Conservation Areas: Mohave Ground Squirrel

Los Angeles County has identified a Significant Ecological Area (SEA) for northeastern Los Angeles County that should prove beneficial to protection of the MGS in those areas. Within SEAs, the County performs a heightened environmental review for new projects, and has zoned the area for a minimum lot size of 10 acres. (HCA-2)

Management Prescriptions

Commercial Filming
On private lands, the CEQA Lead Agency shall continue to ensure that filming activities do not constitute a significant impact to species covered by the Plan. (DT-3)

Grazing, Sheep
Sheep grazing on private land would not be authorized by the West Mojave Plan. Under current management to avoid violation of section 9 of FESA, wool growers are required to consult independently with the USFWS under section 10(a)(1)(B) for incidental take of tortoises during otherwise lawful activities. Applicable State permits are also required. The West Mojave Plan is not considered the appropriate vehicle to enforce this existing requirement. (No #)

Tortoise: Disposition
It is suggested that tortoises continue to be handled by authorized biologists as given in the Desert Tortoise Council's (1999) protocol, Guidelines for Handling Tortoises During Construction Projects. (DT-14)

Utilities: Maintenance
Maintenance operators must be aware of tortoises and avoid them. (DT-7)

Vehicle-Based Recreation
Hunting shall be allowed in all areas as regulated by current legislation.

With respect to speed limits on unimproved roads, current law will apply. Basic Speed Law (38305) of the 2001 Vehicle Code, Traffic Laws states: "No person shall drive an off-highway motor vehicle at a speed limit greater than is reasonable or prudent and in no event at a speed which endangers the safety of other persons and property." (MV-1)

CURRENT MANAGEMENT: BUREAU OF LAND MANAGEMENT

Conservation Area: Desert Tortoise

BLM Multiple Use Classes
MUC The current BLM multiple use class designations for these lands will be retained, unless specifically changed by other provisions of this Plan. (HCA-1)

Areas of Critical Environmental Concern
Existing ACECs that lie within the boundary of the Tortoise DWMAs (included ACECs) will be maintained, unless specifically deleted by this Plan. The provisions of the Tortoise DWMAs will augment, rather than replace, current ACEC protections. (HCA-1)

Special Review Areas
Public lands managed by the BLM that occur in SRAs shall be managed as Category III Tortoise Habitat. (HCA-6)

Management Prescriptions

Commercial Filming
Commercial activities, such as commercial filming that result in ground disturbance or adverse effects are allowed in DWMAs, so long as protective measures identified herein for private lands and existing protections for public lands are applied. (DT-1)

Tortoise: Disposition
It is suggested that tortoises continue to be handled by authorized biologists as given in the Desert Tortoise Council's (1999) protocol, *Guidelines for Handling Tortoises During Construction Projects*. (No #)

Tortoise: Monitoring
If the BLM desires to monitor the effects of OHV activities on tortoises, it would be appropriate to reinitiate studies at the Johnson Valley study plot, the Stoddard Valley study plot should be relocated (i.e., it occurs on private lands), and new study plots should be established in other open areas (i.e., El Mirage, Jawbone, Spangler Hills, and Rasor open areas). (No #)

Tortoise: Surveys
All environmental contractors must be approved by the Implementation Team or pertinent

regulatory agencies prior to performing the activities listed below [see Best Management Practices]. (DT-14)

Utilities: Maintenance Activities
Maintenance operators must be aware of tortoises and avoid them. (DT-7)

Utilities: Planning
The CDCA Plan's network of designated utility corridors and use restrictions is consistent with the West Mojave Plan's tortoise conservation strategy. (DT-11)

Insofar as possible, new utility right-of-ways in BLM-designated, Active and Contingent corridors shall be situated as closely together as practical given engineering specifications, human safety, and other limiting factors. (DT-11)

Vehicle-Based Recreation
Hunting shall be allowed in all areas as regulated by current legislation. (DT-10)

The shooting or discharge of firearms shall generally be permitted on public lands except in specified areas (e.g. off highway vehicle open areas), as long as State and local laws permit such activity. On public lands within DWMAs, the only firearms discharges allowed would be during hunting season in pursuit of game, and target practice using retrievable targets only (such as paper targets). (DT-10)

With respect to speed limits on unimproved roads, current law will apply. Basic Speed Law (38305) of the 2001 Vehicle Code, Traffic Laws states: "No person shall drive an off-highway motor vehicle at a speed limit greater than is reasonable or prudent and in no event at a speed which endangers the safety of other persons and property." (MV-1)

NEW MEASURES IN EFFECT UPON PLAN ADOPTION

The following management prescriptions identify new measures that would (a) for Private Jurisdictions, be implemented through signing the Implementation Agreement, future general plan amendments, etc. and (b) for the BLM, result in amendments to the CDCA Plan.

NEW MEASURES: PRIVATE JURISDICTIONS

<u>Conservation Areas: Desert Tortoise</u>
Biological Transition Areas
The following wording was provided when Biological Transition Areas (BTAs) were eliminated from the Draft. "In the absence of BTAs, the following measures are intended to help alleviate indirect impacts of adjacent human development on tortoises and habitat in proximate DWMAs. These measures include (a) Increase signing and/or fencing along boundary so adjacent residents are aware of the conservation area. (b) On BLM lands within the DWMAs, increase law enforcement or other BLM presence in the area to minimize illegal activities such as dumping, shooting, and cross-country vehicle use on public lands outside designated open areas. (c)

Specifically consider and discuss DWMAs associated with these six areas when formulating the Feral Dog Management Plan. (d) Depending on monitoring results, there may need to be subsequent conservation (adaptive) management along the DWMA boundary to minimize impacts from authorized development in adjacent Incidental Take Areas." (No #)

Conservation Areas: Mohave Ground Squirrel

Habitat Conservation Area

A conservation area would be established for the long-term survival and protection of the MGS. (HCA-2)

Sierra Habitat Connector

Although this area [Sierra Habitat Connector] is already part of the MGS HCA, special review of projects should occur in this area to ensure that the narrow corridor is not completely severed. (HCA-2)

Management Prescriptions

Best Management Practices

Ground disturbing construction projects authorized by the West Mojave Plan must be conducted in accordance with the "Best Management Practices" (see Appendix I). BMPs shall be implemented in DWMAs and in Survey Areas outside DWMAs when: (a) Tortoise sign is found during the clearance survey (DT-12); or (b) The Authorized Biologist determines that there is a reasonable likelihood that a tortoise may enter into the construction site, use area, or other zone of impact. (DT-14)

Projects subject to BMPs may include, but are not limited to, the following: construction of pipelines, utility lines, fiber optic cables, wind energy development, solar energy development, flood control facilities, new mine sites, expansion of existing mine sites into tortoise habitat, cross-country mineral exploration, discretionary commercial, industrial, or residential development (excluding single-family residences outside of DWMAs), new road construction, widening or realignment of existing roads, etc. BMPs normally would not apply to authorized recreation events (e.g., Dual Sport), most maintenance activities along existing linear corridors (unless such activities result in additional loss or degradation of tortoise habitat), and filming activities on lands administered by the BLM (which are covered by a separate set of take avoidance measures). (DT-14)

In Survey Areas outside DWMAs, a standardized set of BMPs have been developed, and will be distributed by counties, cities, etc. over the counter when the discretionary permit is issued. (DT-14)

Commercial Filming

If the Authorized Biologist determines that tortoises would not be affected, the hotline number identified relative to tortoise No Survey Areas shall be given to the pertinent production crew members. If a tortoise is observed in the filming area, in spite of the determination of no likely affect, the measures given below shall still be implemented. (E-10)

If the Authorized Biologist determines that tortoises may be affected, the following measures shall be implemented:

The Authorized Biologist or Environmental Monitor shall provide the following tortoise information to the entire production crew whose activities may affect tortoises (DT-2):

Tortoises are known to occur in the area, and must be avoided at all times. Tortoises are not to be handled by any crew members, and only handled by the Authorized Biologist when necessary (as given above). (DT-2)

Present pertinent life history information that will facilitate avoidance of impacts. Examples include seasonal and daily activity patterns of juvenile and adult tortoises; characteristics of burrows, including the terminus of burrows that may be as many as 30-feet distant from the burrow opening; deposition of eggs in nests, which may be in burrows or under shrubs; etc. (DT-2)

Pertinent protection afforded by State and endangered species acts, including fines for unauthorized take of tortoises; and outline forms of take that are covered by the WMP (i.e., take that occurs in spite of the measures given herein) and not covered by the WMP (i.e., unauthorized handling of tortoises by crew members, tortoise mortality caused by unauthorized cross-country travel, etc.). (DT-2)

The Authorized Biologist or Environmental Monitor shall provide the following take avoidance measures to the entire production crew whose activities may affect tortoises (DT-2):

The Authorized Biologist or Environmental Monitor shall work with the Location Manager to visit each film site ahead of the film crew arriving there to locate any burrows or tortoises that need to be avoided; burrows shall be flagged and avoided during filming activities; etc. To avoid all impacts to tortoises and burrows, known locations and other pertinent findings shall be shared with the crew when they arrive at the filming site. (DT-2)

There shall be no cross-country vehicle travel by the film crew; all vehicles must be restricted to existing roads. If filming requires cross-country travel, the Authorized Biologist or Environmental Monitor shall survey the area immediately prior to filming to avoid all tortoises and burrows, as given in the previous point. Vehicle tracks shall be eliminated by hand, insofar as possible, by pertinent production crew members after filming is complete and before the crew leaves the site. (DT-3)

All vehicles shall be restricted to a speed limit of no more than 20 miles per hour. (MV)

A litter-free workplace shall be maintained at all times to avoid attraction of common ravens and other tortoise predators. (DT-31)

All pets must be completely controlled by their owners, either on leash or otherwise retained (i.e., maintained in kennels, fenced areas, mobile homes, etc.), and never allowed to run free in the absence of the owner. (DT-4)

All local, State, and federal ordinances, regulations, and laws governing the release of hazardous materials and wastes shall be implemented. Additionally, any and all reportable releases shall be reported to the CEQA Lead Agency or Implementation Team within 24 hours of discovering the release. (No #)

Authorized Biologists and Environmental Monitors shall maintain records of all desert tortoises and other "covered species" encountered during filming activities, including the following information: (a) the locations (narrative and maps) and dates of observations; (b) general condition and health, including injuries and state of healing and whether animals voided their bladders; (c) locations from which and to which any animals are moved (UTM coordinates derived from a global positioning system - GPS - are preferable); (d) diagnostic markings (i.e., identification numbers or marked lateral scutes); (e) the amount of habitat lost (i.e., cleared of vegetation) or temporarily affected by the activity; and (f) remedial actions taken to restore lost or damaged habitat prior to the crew leaving the site. This report shall be submitted to the Implementation Team and pertinent CEQA Lead Agency (i.e., City or County Filming Commissions) within 30 days of the Authorized Biologist leaving the site.

The following measure shall be implemented in tortoise No Survey Areas and in tortoise Survey Areas where the Authorized Biologist determines there would be no impacts to tortoises (E-10):

A hotline number shall be provided to pertinent production crew members (e.g., Location Manager) so that the Implementation Team can be contacted if a tortoise is found on the site at the time of ground disturbance. In general, the measures given above for DWMAs and occupied tortoise Survey Areas shall be implemented in tortoise No Survey Areas where tortoises are found. (E-10)

Landfills
With the exception of the Barstow Landfill expansion, the planning of which has already been initiated, counties and cities shall ensure that no new landfills are constructed inside DWMAs or within five miles of them. (DT-27)

Mohave Ground Squirrel
The following take-avoidance measures discussed above for application within the DWMAs would also be applied within the MGS Conservation Area: Agriculture, Camping, Commercial Activities, Fire Management, Hunting and Shooting, Native Plant Harvesting, and Utility Construction and Maintenance. (MGS-1)

Measures identified for DWMAs and tortoise Survey Areas and No Survey Areas apply where those areas overlap the Mohave Ground Squirrel Conservation Area. (MGS-2)

CDFG would not require Cumulative Human Impact Evaluation Forms (CHIEFs) to be completed, nor would trapping be required. (MGS-3)

Tortoise: Disposition
Within DWMAs, tortoises should be moved from the immediate area of impact to adjacent suitable habitat (or burrow). In general, tortoises should be moved no further than 1,000 feet from the impact area. The potential for these animals to wander back into harm's way should be taken into account, and the distance given above modified by the Authorized Biologist, as necessary. Temporary or permanent fences may be needed to prevent tortoise immigration into the impact area. (DT-15)

Within designated tortoise Survey Areas, (a) If only a small portion of a given site is to be developed then tortoises should be moved to portions of the site that are not to be developed; (b) Tortoises may be moved onto BLM lands if such lands are within (1/2) mile of the impact area; (c) If options (a) and (b) are not available, then tortoises can be moved into the edge of a DWMA that occur within one mile of the site; and (d) If options (a), (b) and (c) are not available then tortoises should be made available for research, educational purposes, captive breeding, zoo placement, adoption through recognized organizations (e.g. California Turtle and Tortoise Club), moved to areas within SRAs referred to above or, if clinically ill, dealt with in a manner consistent with the Berry Salvage Protocol. (DT-15)

The following handling guidelines apply as indicated: In all areas, (a) injured, recently dead, ill and dying tortoises should be collected and disposed of as per a recent (June 2001) disposition protocol [Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-roaming Desert Tortoises (*Gopherus agassizii*)] developed by Dr. Kristin Berry ("Berry Salvage Protocol"). (DT-15)

Tortoise: Surveys
In DWMAs, except where No Survey Areas are identified, both presence-absence and clearance surveys must be conducted prior to the commencement of any new ground disturbing activities for which a discretionary permit must be obtained from a local jurisdiction or agency. (DT-12)

Within Survey Areas, tortoise clearance surveys will be conducted prior to any new ground disturbance for which a discretionary permit was required. Surveys should follow USFWS protocol (1992) as modified herein. (DT-13)

It would still be appropriate to perform reconnaissance surveys for projects in Survey Areas located outside DWMAs where there may be several alternative sites or alignments. (DT-13)

Neither presence-absence nor clearance surveys will be required in tortoise No Survey Areas. A hotline number will be provided by the local jurisdiction so that the Implementation Team can be contacted if a tortoise is found on the site at the time of ground disturbance. (DT-13)

Utilities: Maintenance Activities
Maintenance of existing utilities is allowed, and impacts to tortoises and their habitats must be avoided. Maintenance crews must remain on existing access roads except for the point location of maintenance-related disturbance. Take of tortoises during maintenance activities is not authorized under this Plan. Such take must be authorized on a case-by-case basis. (DT-11)

In DWMAs, non-emergency maintenance of utility right-of-ways resulting in ground disturbance should occur between November 1 and March 1. Juvenile tortoises may be active during this time and must be avoided. If maintenance during this period is infeasible and is required between March 2 and October 31 in DWMAs, a biological monitor must be present, or, the proponent must provide an assessment that clearly shows that tortoises will not be affected. (DT-11)

As far as possible, road beds should not be lowered and berms should not exceed 12 inches or a slope of 30 degrees. Consider alternatives to grading, such as chain drag. Berms are likely barriers to vehicle straying into adjacent habitats, and should not necessarily be identified for complete removal. (DT-8)

Weeds
Invasive weeds should not be used in landscaping within or adjacent to DWMAs (e.g., Non-native species should not be used in re-seeding programs). (DT-9)

NEW MEASURES: BUREAU OF LAND MANAGEMENT

Conservation Areas: Desert Tortoise

Desert Wildlife Management Areas
Establish four tortoise DWMAs. Tortoise DWMAs shall be managed for tortoise conservation and recovery until which time the tortoise may be delisted as per criteria given in the Recovery Plan or revisions thereof. (HCA-1)

Areas of Critical Environmental Concern
Public lands administered by the BLM within Tortoise DWMAs will be designated as Areas of Critical Environmental Concern. The West Mojave Plan shall serve as the ACEC management plan so that future ACEC plans for the four Tortoise DWMAs will not be required. (HCA-1)

The ACEC designation will require the BLM to manage these lands in accordance with the goals, objectives, management prescriptions, and binding requirements set forth in this CDCA Plan amendment, as these parameters comprise the core components of the ACEC Management Plan for these four DWMAs. (HCA-1)

If a provision of an included ACEC management plan conflicts with any of the measures described herein for the Tortoise DWMA, the measures identified by the West Mojave Plan will take precedence and the included ACEC's Management Plan will be amended. Necessary amendments will be set forth in an appendix to the West Mojave Plan. (HCA-1)

BLM Habitat Categories
All BLM-managed lands outside Tortoise DWMAs that are within the range of the tortoise shall be managed as BLM Category III Tortoise Habitat. (HCA-1)

Conservation Areas: Mohave Ground Squirrel
Public lands within the MGS Conservation Area would also be designated as a BLM Wildlife

Habitat Management Area in the BLM's CDCA Plan. The public lands immediately south of Owens Lake that are currently classified by the CDCA Plan as Multiple Use Class M should be reclassified as Multiple Use Class L. (HCA-2)

Management Prescriptions

Best Management Practices

Ground disturbing construction projects authorized by the West Mojave Plan must be conducted in accordance with the "Best Management Practices" (see Appendix I). BMPs shall be implemented in DWMAs and in Survey Areas outside DWMAs when (DT-14):

Tortoise sign is found during the clearance survey; or (DT-14)

The Authorized Biologist determines that there is a reasonable likelihood that a tortoise may enter into the construction site, use area, or other zone of impact. (DT-14)

Projects subject to BMPs may include, but are not limited to, the following: construction of pipelines, utility lines, fiber optic cables, wind energy development, solar energy development, flood control facilities, new mine sites, expansion of existing mine sites into tortoise habitat, cross country mineral exploration, discretionary commercial, industrial, or residential development (excluding single-family residences outside of DWMAs), new road construction, widening or realignment of existing roads, etc. BMPs normally would not apply to authorized recreation events (e.g., Dual Sport), most maintenance activities along existing linear corridors (unless such activities result in additional loss or degradation of tortoise habitat), and filming activities on lands administered by the BLM (which are covered by a separate set of take avoidance measures). (DT-14)

Grazing, Cattle

The following measures shall be implemented for all cattle allotments managed by the BLM in the West Mojave Plan area. Affected cattle allotments include: Cady Mountain, Cronese Lake, Double Mountain, Hansen Common, Harper Lake, Lacey-Cactus-McCloud, Oak Creek, Olancha, Ord Mountain, Pilot Knob, Rattlesnake Canyon, Round Mountain, Rudnick Common, Tunawee Common, Walker Pass, and Whitewater Canyon. (No #)

The lessee may voluntarily relinquish their grazing preference and lease. At which time, the allotment(s) would become unavailable for grazing. Upon relinquishment, BLM will, without further analysis or notice: not reissue the lease; remove the allotment designation; assume any and all private interest in range improvement located on public land; and, designate the land as no longer available for livestock grazing. (LG-29)

All cattle carcasses shall be removed and disposed of in an appropriate manner (i.e., not buried) within two days of being found. Cross-country vehicle travel to remove cattle carcasses must have prior approval from the BLM. (LG-5)

In cattle allotments outside of DWMAs, ephemeral authorization would only be granted when ephemeral production exceeds 230 pounds per acre. (LG-6)

Utilization of perennial plants on all cattle allotments shall not exceed the values given in EIS/R Chapter 2. (LG-1)

Unless otherwise noted, all protective measures identified in the Draft (Section 2.2.19.1) shall also be implemented in desert tortoise habitat and the Mohave Ground Squirrel Conservation Area. Affected cattle allotments include: Cady Mountain, Cronese Lake, Hansen Common, Harper Lake, Lacey-Cactus-McCloud, Olancha, Ord Mountain, Pilot Knob, Rattlesnake Canyon, Rudnick Common, Tunawee Common, and Walker Pass. (No #)

Any hazards to desert tortoises that may be created, such as auger holes and trenches, shall be eliminated before the rancher, contractor, or work crew leaves the site. (LG-8)

Unless otherwise noted, all protective measures identified in Sections 2.2.9.1 and 2.2.9.2 of the Draft shall also be implemented in DWMAs. Affected cattle allotments include Cronese Lake, Harper Lake, and Ord Mountain. (No #)

The Pilot Knob Allotment shall be unavailable for livestock grazing. (LG-10)

Issuance of temporary non-renewable (TNR) grazing permits shall be prohibited in DWMAs. (LG-11)

No ephemeral authorizations shall occur in DWMAs. (LG-10)

For a grazing allotment partially within a DWMA, when ephemeral forage production is less than 230 pounds per acre, cattle shall be substantially removed from the DWMA from March 15 to June 15. (LG-13)

In years of good winter precipitation and soil moisture presence, cattle may remain past March 15 in expectation of ephemeral forage production over 230 pounds per acre. If this level of forage is not attained when weather conditions (e.g., warming of the soil) are appropriate, cattle must leave the DWMA until such time as 230 pounds per acre ephemeral forage is achieved or June 15, whichever is earlier. This determination will be made based on the evaluation and judgment of the BLM authorized officer. If cattle must be removed, the operator will be given two weeks to remove them from the DWMA. (LG-14)

In years of poor winter precipitation or absence of soil moisture, cattle must be removed from the DWMA by March 15 and remain out until such time as 230 pounds per acre ephemeral forage is achieved or June 15, whichever is earlier. (LG-15)

The term “substantially removed” recognized that a few individual cattle may wander into the area of seasonal closure despite the operator’s best efforts and regardless of management facilities (e.g., fences, water sources) that are in place. (LG-16)

Grazing, Sheep

The following measures shall be implemented for all sheep allotments managed by the BLM in the West Mojave Plan area. Affected sheep allotments include: Antelope Valley, Bissell, Boron, Buckhorn Canyon, Cantil Common, Gravel Hills, Hansen Common, Johnson Valley, Lava Mountains, Monolith Cantil, Rudnick Common, Shadow Mountains, Spangler Hills, Stoddard Mountain, Superior Valley, Tunawee Common, and Warren. (No #)

The lessee may voluntarily relinquish their grazing preference and lease. At which time, the allotment(s) would become unavailable for grazing. Upon relinquishment, BLM will, without further analysis or notice: not reissue the lease; remove the allotment designation; assume any and all private interest in range improvement located on public land; and, designate the land as no longer available for livestock grazing. (LG-29)

Turnout of sheep in all allotments shall not occur until 230 pounds (air-dry-weight) per acre of ephemeral forage is available. The lessee shall be required to remove sheep from the area or the entire allotment if production falls below 230 pounds per acre. (LG-20)

Following the removal of lambs, when multiple sheep bands are typically combined, there shall be no more than 1,500 adult sheep in a combined band. (LG-21)

All sheep carcasses shall be removed and disposed of in an appropriate manner (i.e., not buried) within two days of being found. Cross-country vehicle travel to gather carcass(es) must have prior approval from the BLM. (LG-22)

Unless otherwise noted, all protective measures given in Section 2.2.19.4 of the Draft shall also be implemented in the Mohave Ground Squirrel Conservation Area and the Mohave Monkeyflower Conservation Area. Affected sheep allotments include: Buckhorn Canyon, Cantil Common, Gravel Hills, Hansen Common, Lava Mountains, Monolith Cantil, Rudnick Common, Spangler Hills, Stoddard Mountain, Superior Valley, and Tunawee Common. (No #)

In order to avoid competition between sheep and the Mohave ground squirrel once the ephemeral forage is no longer available and both species rely on perennial forage, all sheep shall be removed from the Mohave Ground Squirrel Conservation Area when ephemeral plants are no longer the primary forage being utilized by sheep. (LG-24)

The following allotments, found entirely within DWMAs, shall no longer be available for sheep grazing: Buckhorn Canyon, Goldstone, Gravel Hills, and Superior Valley. (LG-26)

Mohave Ground Squirrel

The following take-avoidance measures discussed above for application within the DWMAs would also be applied within the MGS Conservation Area: Agriculture, Camping, Commercial Activities, Fire Management, Hunting and Shooting, Native Plant Harvesting, and Utility Construction and Maintenance. (MGS-1)

Measures identified for DWMAs and tortoise Survey Areas and No Survey Areas apply where those areas overlap the Mohave Ground Squirrel Conservation Area. (MGS-2)

CDFG would not require Cumulative Human Impact Evaluation Forms (CHIEFs) to be completed, nor would trapping be required. (MGS-3)

Tortoise: Disposition
Within DWMAs, Tortoises should be moved from the immediate area of impact to adjacent suitable habitat (or burrow). In general, tortoises should be moved no further than 1,000 feet from the impact area. The potential for these animals to wander back into harm's way should be taken into account, and the distance given above modified by the Authorized Biologist, as necessary. Temporary or permanent fences may be needed to prevent tortoise immigration into the impact area. (DT-15)

Within designated tortoise Survey Areas, (a) If only a small portion of a given site is to be developed then tortoises should be moved to portions of the site that are not to be developed; (b) Tortoises may be moved onto BLM lands if such lands are within (1/2) mile of the impact area; (c) If options (a) and (b) are not available, then tortoises can be moved into the edge of a DWMA that occur within one mile of the site; and (d) If options (a), (b) and (c) are not available then tortoises should be made available for research, educational purposes, captive breeding, zoo placement, adoption through recognized organizations (e.g. California Turtle and Tortoise Club), moved to areas within SRAs referred to above or, if clinically ill, dealt with in a manner consistent with the Berry Salvage Protocol. (DT-15)

The following handling guidelines apply as indicated: In all areas, (a) injured, recently dead, ill and dying tortoises should be collected and disposed of as per a recent (June 2001) disposition protocol [Salvaging Injured, Recently Dead, Ill, And Dying Wild, Free-roaming Desert Tortoises (*Gopherus agassizii*)] developed by Dr. Kristin Berry ("Berry Salvage Protocol"). (DT-15)

Tortoise: Surveys
In DWMAs, except where No Survey Areas are identified, both presence-absence and clearance surveys must be conducted prior to the commencement of any new ground disturbing activities for which a discretionary permit must be obtained from a local jurisdiction or agency. (DT-12)

Within Survey Areas, tortoise clearance surveys will be conducted prior to any new ground disturbance for which a discretionary permit was required. Surveys should follow USFWS protocol (1992) as modified herein. (DT-13)

It would still be appropriate to perform reconnaissance surveys for projects in Survey Areas located outside DWMAs where there may be several alternative sites or alignments. (DT-13)

Neither presence-absence nor clearance surveys will be required in tortoise No Survey Areas. A hotline number will be provided by the local jurisdiction so that the Implementation Team can be contacted if a tortoise is found on the site at the time of ground disturbance. (DT-13)

Utilities: Maintenance Activities
Maintenance of existing utilities is allowed, and impacts to tortoises and their habitats must be

avoided. Maintenance crews must remain on existing access roads except for the point location of maintenance-related disturbance. Take of tortoises during maintenance activities is not authorized under this Plan. Such take must be authorized on a case-by-case basis. (DT-11)

In DWMAs, non-emergency maintenance of utility right-of-ways resulting in ground disturbance should occur between November 1 and March 1. Juvenile tortoises may be active during this time and must be avoided. If maintenance during this period is infeasible and is required between March 2 and October 31 in DWMAs, a biological monitor must be present, or, the proponent must provide an assessment that clearly shows that tortoises will not be affected. (DT-11)

As far as possible, roadbeds should not be lowered and berms should not exceed 12 inches or a slope of 30 degrees. Consider alternatives to grading, such as chain drag. Berms are likely barriers to vehicle straying into adjacent habitats, and should not necessarily be identified for complete removal. (DT-14)

Utilities: Planning
If there is an option to use one or the other corridor, Corridor W is preferred over Corridor H in the Ord-Rodman DWMA. (DT-11)

If at all possible, future utilities should be located in an alternative corridor rather than Corridor Q, or as given above, be situated to minimize the width of impact between existing and new utilities. (DT-11)

Within existing corridors, areas that are already disturbed should be used rather than disturb new areas within the two- to three-mile wide corridor. (DT-11)

Pipelines within DWMAs should be revegetated. Narrowing the construction right of way is suggested in all management areas. (DT-11)

Vehicle-Based Recreation
Within DWMAs, on public lands administered by the BLM, motorized-vehicle-based camping shall be allowed in previously existing disturbed camping areas adjacent to vehicle routes designated as open. (MV-5)

Within DWMAs, motorized vehicle stopping and parking are allowed 50 feet from centerline of the designated route. (MV-5)

Weeds
Invasive weeds should not be used in landscaping within or adjacent to DWMAs (e.g., Non-native species should not be used in re-seeding programs). (DT-9)

NEW MEASURES: IMPLEMENTATION TEAM

Management Prescriptions
Best Management Practices

The Implementation Team should determine the best application of the BMPs, consider them as guidelines, and modify them as necessary. In DWMAs, application of the BMPs should be determined by the Implementation Team on a case-by-case basis, and rely on the results of the newly completed presence-absence survey. (DT-14)

All environmental contractors must be approved by the Implementation Team or pertinent regulatory agencies prior to performing the activities listed below. (DT-14)

Commercial Filming
A report shall be submitted to the Implementation Team and pertinent CEQA Lead Agency (i.e., City or County Filming Commissions) within 30 days of the Authorized Biologist leaving the site.

A hotline number shall be provided to pertinent production crew members (e.g., Location Manager) so that the Implementation Team can be contacted if a tortoise is found on the site at the time of ground disturbance. (E-10)

If the Implementation Team judges that these or other measures are not avoiding take of tortoises, a biological monitor may be necessary.

Hazardous Spills
All reportable releases of hazardous materials shall be reported to the CEQA Lead Agency or Implementation Team within 24 hours of discovering the release.

Tortoise: Disease
Issues relative to desert tortoise diseases (e.g., upper respiratory tract disease, cutaneous dyskeratosis, herpes virus, etc.) should be considered at the level of the interagency desert tortoise Management Oversight Group (MOG). (DT-16)

Utilities: Planning
New linear utility projects within the Habitat Conservation Area will be reviewed by the Implementation Team at the time they are proposed. (DT-11)

NEW MEASURES TO BE IMPLEMENTED FOLLOWING PLAN ADOPTION

The following management prescriptions would be implemented at the specified time given in order to achieve milestones and avoid the need to have the incidental take permits (Private Jurisdictions) and authorization (BLM) withdrawn.

NEW MEASURES TO BE IMPLEMENTED: PRIVATE JURISDICTIONS

Outreach & Tracking

Within Year 1

Implementation Milestone**:** Within one year of incidental take authorization, the Implementation Team shall setup the hotline number (E-10), and shall design and implement the jurisdictional tracking system. (M-1, 2)

Within No Survey Areas, (a) Develop telephone tech support for the general public to deal with free-roaming tortoises; and (b) Free roaming tortoises should be made available for research, education, captive breeding, zoo placement, adoption through recognized organizations (e.g. California Turtle and Tortoise Club); or, if clinically ill, dealt with in a manner consistent with the Berry Salvage Protocol. (E-10)

Incidental take authorized by the Plan is necessarily attached to existing political infrastructure. For example, the Plan would authorize projects subject to discretionary permits but would not track projects subject to ministerial permits. It is important that authorized and unauthorized ground disturbance is tracked by the Plan to determine actual loss of habitat relative to the 1% Allowable Ground Disturbance. Agricultural development in DWMAs, which is not currently covered by the Plan, must be tracked to determine its relative impact, if any. It is generally understood that aerial photographs would be used, in conjunction with reports from participating jurisdictions, to track these forms of ground disturbance. (No #)

Feral Dog Management Plan

Within Year 2

Implementation Milestone**:** Within two years of the record of decision, the Implementation Team, BLM, county animal control, and other applicable entities shall develop a Feral Dog Management Plan (FDMP). (DT-5)

Within Year 3

Implementation Milestone**:** Within three years of the record of decision, if feral dogs are shown to be a significant threat to tortoises and other covered species, the earliest phase(s) of the FDMP shall be implemented. (DT-5)

NEW MEASURES TO BE IMPLEMENTED: BUREAU OF LAND MANAGEMENT

Fencing: Open Areas

Within Year 2

Implementation Milestone**:** Within two years of the record of decision, the BLM shall work with the Implementation Team to determine the specific location along Camp Rock Road to install the fence, determine educational outreach needs, and develop a monitoring protocol. (E-7)

A standard fence will be placed along pertinent portions of the western boundary of the Johnson Valley Open Area to prevent OHV use in the Ord-Rodman DWMA to the west and to minimize use in the Cinnamon Hills. (DT-23)

The Plan proposes installation of new fences to counteract the effects of Johnson Valley and Stoddard Valley on tortoise populations in the Ord-Rodman DWMA. As with the recently installed fences around the El Mirage Open Area and along the Mojave-Randsburg Road, monitoring will be needed to cure intentional vandalism of the fences. Educational outreach will be a high priority at the time of fencing and thereafter. The desired effects are to reduce tortoise mortality and begin to repair degraded habitats (i.e., in the Cinnamon Hills and southern portions of the Ord-Rodman DWMA coinciding with northern Lucerne Valley), which should be monitored and adaptive management applied, as needed. (DT-23)

Feral Dog Management Plan

Within Year 2

Implementation Milestone**:** Within two years of the record of decision, the Implementation Team, BLM, county animal control, and other applicable entities shall develop a Feral Dog Management Plan (FDMP). (DT-5)

Within Year 3

Implementation Milestone**:** Within three years of the record of decision, if feral dogs are shown to be a significant threat to tortoises and other covered species, the earliest phase(s) of the FDMP shall be implemented. (DT-5)

Grazing, Cattle

Within Year 1

Implementation Milestone**:** Within one year of the record of decision, the BLM shall modify boundaries as necessary relative to cattle allotments.

Within Year 1

Implementation Milestone**:** The grazing strategy shall be developed within a year of the record of decision. The strategy shall be a written plan detailing the area of removal, natural cattle movements, existing and potential improvements, and other constraints of cattle management. (LG-17)

Within Year 1
Implementation Milestone**:** Health Assessments shall be completed within one year of the record of decision for the Cronese Lake, Harper Lake, and Ord Mountain allotments. (LG-18)

Within Year 2
Implementation Milestone**:** The grazing strategy shall be implemented within two years of the record of decision. (LG-17)

Within Year 2
Implementation Milestone**:** Health Assessments shall be completed within two years of the record of decision for the following cattle allotments: Cady Mountain, Hansen Common, Lacey-Cactus-McCloud, Olancha, Rattlesnake Canyon, Rudnick Common, Tunawee Common, and Walker Pass. (LG-9)

Within Year 2
Implementation Milestone**:** Within two years of the record of decision, range fences shall be installed in two places to exclude cattle from high concentration tortoise areas found adjacent to the Ord Mountain Allotment: (a) along the southern boundary of the allotment, west of the Cinnamon Hills, in northern Lucerne Valley; and (b) along the eastern boundary of the allotment, in the vicinity of Box Canyon. (No #)

Within Year 3
Implementation Milestone**:** Within three years of the record of decision (assuming that the grazing strategy given in LG-17 has been implemented), the Implementation Team shall work with the BLM to determine if studies are needed to assess cattle impacts and determine any adaptive management prescriptions that may be required. (No #)

Additionally, new management prescriptions would require modified grazing practices in the Ord Mountain, Harper Lake, and Cronese Lakes allotments. These include the exclusion of cattle from specific areas when dry ephemeral forage is below a threshold of 230 pounds/acre. This practice would require rest of certain pastures under these conditions, and would concurrently result in herding cattle onto other portions of the allotment. (LG-13)

Another proposal is to strategically place waters so that cattle are concentrated in areas where the fewest tortoise-cattle impacts will occur. The effects of these and other management practices must be monitored to determine if the desired effects (i.e., decreased tortoise mortality and decreased habitat degradation) are being achieved. (No #)

Within Year 3
Implementation Milestone**:** All existing cattle guards in desert tortoise habitat shall be modified within three years of the record of decision to prevent entrapment of desert tortoises. New cattle guards shall be designed and installed to prevent entrapment of desert tortoises. (LG-7)

Within Year 3
Implementation Milestone**:** For cattle allotments outside desert tortoise habitat, DWMAs, and

the Mohave Ground Squirrel Conservation Area (Lacey-Cactus-McCloud, Olancha, Round Mountain, and Whitewater allotments), Health Assessments shall be completed within three years of the record of decision. (LG-2)

Within Year 3 ½
Implementation Milestone**:** Within six months [3 ½ years] after the completion of a Health Assessment for a specific area (i.e., grazing allotment, watershed, etc.), the BLM shall use the information to make a determination and evaluation, which shall serve as baseline information to develop corrective management strategies. Where Health Assessments show that standards and guidelines are not being achieved, new measures shall be identified to achieve standards and conform with guidelines. The need for specific Allotment Management Plans to be modified or, where none exists, newly drafted, shall be considered. (LG-3)

Within Year 10
Implementation Milestone**:** Grazing will be discontinued on the Whitewater Canyon allotment, pending completion of a study within the next 10 years that assesses livestock grazing compatibility with conservation of the desert tortoise, arroyo toad, riparian values, and with use of, and access to, intermingled private lands. Following study completion, conduct National Environmental Policy Act analysis of management alternatives intended to conserve and provide for these resources and values consistent with the study, and subsequently issue a grazing decision that implements compatible management provisions. (No #)

Grazing, Sheep
Within Year 1
Implementation Milestone**:** Within one year of the record of decision, the BLM shall modify boundaries as necessary relative to sheep allotments. (No #)

In the following allotments, boundaries shall be modified so that areas within DWMAs shall no longer be available for sheep grazing: Cantil Common, Lava Mountains, Monolith Cantil, Shadow Mountains, and Stoddard Mountain (east of Highway 247 and west of National Trails Highway). (LG-23)

Within Year 1
Implementation Milestone**:** Within one year of the record of decision, the BLM shall work with affected wool growers to avoid impacts to the Mohave Monkeyflower Conservation Area. (LG-24)

Sheep grazing shall be prohibited from those portions of the Stoddard Mountain Allotment that occur within the Mohave Monkeyflower Conservation Area. The BLM shall work with the lessee to clearly identify monkeyflower habitat that shall be avoided. (LG-24, 25)

Within Year 2
Implementation Milestone**:** Following the record of decision, the lessees shall be given two years notification pursuant to 43 CFR 4110.4-2(b) before the actions in section 2.2.19.6 of the Draft are implemented. (No #)

Within Year 3
Implementation Milestone**:** Within three years of the record of decision, the Implementation Team shall work with the BLM to determine if studies are needed to assess the impacts of sheep and determine any adaptive management prescriptions that may be required. (No #)

The Plan proposes to remove sheep grazing from all DWMAs, which would affect areas south of Shadow Mountain Road in the southern portions of the Fremont-Kramer DWMA. Areas north of Shadow Mountain Road have not been grazed since 1991. The removal of sheep from this area should be followed by studies to determine the efficacy of this measure. (LG-23)

There are also opportunities to study the effects of sheep removal on lands north of Kramer Junction, where sheep continue to graze west of Highway 395 but were removed in 1991 east of Highway 395. (No #)

Guzzlers
Within Year 3
Implementation Milestone**:** Within three years of the record of decision, the Implementation Team, with input from the CDFG, shall institute a study to determine the impacts of guzzlers on tortoises (if any) inside DWMAs. The results of the study shall be used by the CDFG to implement appropriate actions. (DT-41)

Law Enforcement
Within Year 1
Implementation Milestone**:** Within one year of the record of decision, the Implementation Team shall initiate coordination meetings with BLM and other applicable law enforcement agencies to discuss law enforcement needs relative to plan implementation. (No #)

Additional law enforcement (ranger patrols) and educational outreach (recreation technicians) shall be used in concert with fencing and signs to inform the public of appropriate and inappropriate activities in conservation areas. (E-7)

A minimum of eight (8) Law Enforcement Rangers and eight (8) maintenance workers shall be assigned to the DWMAs. (DT-28)

Law Enforcement Rangers should work closely with the Implementation Team to facilitate Plan implementation, enforcement, and adaptive management. (DT-8)

It is important that a feedback loop exist between law enforcement and the Implementation Team to identify problem areas, and in the spirit of adaptive management, to identify issue-specific solutions. (DT-28)

It is important that anyone designing and implementing an education program work with law enforcement personnel (including BLM, county animal control, USFWS enforcement agents and CDFG rangers) to identify problems and develop solutions. (E-4)

<u>Signing</u>
Within Year 1
<u>Implementation Milestone</u>**:** Within one year of the record of decision, the BLM shall work with the Implementation Team to schedule signing of DWMA boundaries and open areas. (E-7)

DWMA boundaries should be signed or otherwise designated to identify boundaries and facilitate enforcement. An appropriate number of signs (to be determined) should be strategically placed between the two OHV open areas (Stoddard Valley and Johnson Valley) and the adjacent, Ord-Rodman DWMA. A quick field check should determine if boundary is adequately signed. (E-7)

Proper signing on the ground is essential. (E-7)

NEW MEASURES TO BE IMPLEMENTED: IMPLEMENTATION TEAM

<u>Core Components</u>
Within Year 1
<u>Implementation Milestone</u>: Within one year of the record of decision, Core Components shall be designed and implemented by the Implementation Team. (No #)

The list of Authorized Biologists and Environmental Monitors maintained by the Implementation Team should be available to the County, City, Filming Commissions, and others to facilitate this requirement. (DT-14)

The Implementation Team shall prepare a standard data sheet to record how many, if any, tortoises are moved from harm's way. The Implementation Team should use these data to determine the actual harassment and mortality take of tortoises authorized by the Plan. The Implementation Team will also reassess these data annually, and modify Survey and No Survey Areas accordingly. (M-1)

A hotline number will be provided by the local jurisdiction so that the Implementation Team can be contacted if a tortoise is found on the site at the time of ground disturbance. (E-10)

A monitoring strategy will be designed and implemented to ensure that the management program for species is accomplishing its objectives. (M-1, 2)

The Implementation Team is tasked with producing a standard data sheet and developing a tracking system to determine how many tortoises are accidentally killed or incidentally harassed as a result of Plan implementation. It is expected that an annual review of this information will enable the Implementation Team, in conjunction with participating jurisdictions, to modify these boundary lines as needed. (M-2)

Education

Within Year 1

Implementation Milestone**:** Within one year of incidental take authorization, the Implementation Team shall identify the Education Contractor. (E-1)

A coordinator of educational programs should be identified. The "education coordinator" should work closely with the Implementation Team and/or appropriate regulatory agencies to approve the final education program, judge its efficacy, and ensure appropriate implementation. (E-1)

Within Year 1

Implementation Milestone**:** Upon selection, the education contractor shall meet with the Implementation Team to begin to design the education program. Within one year of incidental take authorization, a "substantially complete" outline of the education program shall be submitted by the contractor to the Implementation Team. (No #)

Distribute information and education materials (E-5, 6):

- through schools, museums, private contractors and organizations
- at recreation vehicle shows, off highway vehicle events (e.g., dual sport), and dealer associations (Harley-Davidson, Honda, Suzuki, etc.)
- at convenience stores and other walk-in commercial interests
- consider using restaurant
- place settings and napkins as part of public outreach
- through existing portals, such as Friends of El Mirage and Friends of Jawbone
- at the Planning Departments of each participating jurisdiction

Consider targeting users through green-sticker money, by distributing materials at the time the sticker is purchased through Division of Motor Vehicles. (No #)

The first effort of the education coordinator should be to determine environmental education programs that already exist, and to determine gaps in the program. The coordinator should produce and implement the program to, in part, fill in these gaps. The education coordinator should take into consideration the experiences of successful desert education programs, such as the Sand Canyon Environmental Education Program, and the *Hands Off Pardner* program. (E-2)

The education coordinator should work with non-government organizations with an interest in the western Mojave Desert to better reach group members. The coordinator should work with off-highway vehicle groups to help fund existing programs and create new ones as needed to increase sensitivity to desert ecology. (E-3)

In drawing up a single, programmatic education program to be given to construction workers, the coordinator should review files maintained by the USFWS and CDFG to see the range of education materials that have been used since the listing of the tortoise, for example. Between 1990 and 1995, for example, such an approach resulted in rescuing 1,455 tortoises out of harm's way during construction of 171 federally-authorized projects in tortoise-occupied habitats (LaRue and Dougherty 1997). (E-4)

Develop displays, programs, and materials that can be provided to school districts in the West Mojave planning area. Fund and/or cooperate with existing programs (San Bernardino County ecological study kits, etc.) to provide for enhanced outreach to schools in desert communities. (E-5)

Schools should be targeted at the district level. Although schools in the West Mojave area should be targeted first, it is important to reach the larger area, including the Inland Empire and LA County school districts. (E-5)

Provide support to the efforts of museums, zoos, and other public institutions to develop pertinent desert tortoise exhibits, including (E-6):

The San Bernardino County museum's program to develop a desert tortoise exhibit. (E-6)

The Mojave Narrows Regional Park's development of an outdoor interpretive program involving a live-tortoise exhibit. (E-6)

Ongoing environmental education at the Lewis Center, other programs supported by Edwards Air Force Base, the BLM's community outreach program, etc. (E-6)

The education program should include the preparation, distribution and/or installation of signs, interpretive kiosks, displays, maps, videos, education packets and brochures. (E-7)

Design and erect a new sign at the Desert Tortoise Natural Area; include in the sign appropriate behavior messages and offer an "800" telephone number for information on tortoise adoption. (E-7)

Place information kiosks in pertinent parts of the desert. (E-7)

Work with Caltrans to design and install separate, free-standing, interpretive kiosks with desert tortoise protection information at highway rest areas. (E-7)

Target off highway vehicle use areas, such as El Mirage and Jawbone; distribute materials through volunteer groups associated with those areas. (E-7)

Portable displays should be developed and produced, including a portable desert tortoise exhibit, for use at county fairs, shows, agency offices, shopping malls, museums, and the BLM's California Desert Information Center in Barstow. User-friendly maps should be prepared which show approved routes of travel. Work with university, media and corporate sponsor(s) to develop a quality video on desert tortoises for release to network, local, and cable television stations. Develop educational packets for use in classrooms. Produce a brochure to be distributed by jurisdictions that outlines the farmer's responsibilities under the endangered species act when developing habitat for target species. Produce a brochure to be distributed by jurisdictions describing the burrowing owl and its habitat features in urban areas. (E-7)

<u>Fencing: Highways</u>

Within Year 1

<u>Implementation Milestone</u>**:** Within one year of incidental take authorization, the Implementation Team shall convene a meeting with pertinent jurisdictions to discuss the intent of highway fencing, coordination, priorities, and monitoring needs; eventual culvert placement shall also be discussed. (No #)

Intent

Proponents wishing to construct new roads or railroads are encouraged to locate them outside of DWMAs. Proponents should implement designs and maintenance procedures that are consistent with the existing terms and conditions identified in various biological opinions for roads; locations of such roads should consider reserve design relative to the DWMAs and other factors. (DT-6)

Reduce the availability of carcasses of road-killed animals along highways in tortoise habitat. As some ravens derive most of their food from road kills, erect barrier fences (1/2 to 1/4 inch mesh hardware cloth; Boarman and Sazaki 1996) along roads and highways specified in the fencing table to prevent animals from getting killed on roads. Recommendations may be modified as more information and evaluation becomes available. (H3)

Some of the desired effects of fencing highways that require monitoring include: (a) reduction of tortoise mortality; (b) tortoise recolonization of unoccupied habitats immediately adjacent to the highways or interstates; (c) reduction of other vertebrate mortality and its effects on raven predation, scavenging, and nesting within a mile of the fenced highway; (d) tortoise use of culverts to offset the fragmentation of the fenced highway; and (e) reduction of human impacts associated with the highway (such as decreased poaching, pet collection and dumping). (No #)

Coordination

Placement of fences along paved roadways shall be coordinated among the Implementation Team, the California Department of Transportation, the BLM, county road departments and others to ensure that access is provided to those routes identified as "open" that intersect with roads to be fenced. (DT-18)

Immediate fencing is preferable, and will have demonstrable results. The Implementation Team will coordinate with the California Department of Transportation and others to fence identified easements as soon as possible. If an opportunity exists to fence a road but culverts cannot be installed at the time of fencing, the fencing should proceed because reducing mortality of desert tortoises is a more immediate need than promoting genetic interchange. Culverts would be constructed at the time of widening. (DT-21)

Priorities

Unless new information reveals a better order of priority, the following roads, which are all bounded by proposed DWMAs, will be fenced on both sides in the following order: (i) Highway 395 between Kramer Junction and Shadow Mountain Road; (ii) Highway 395 between Kramer

Junction and 20 Mule Team Road; and (iii) the remaining portions of Highway 58 between Kramer Junction and Hinkley. (DT-18)

Monitoring
The Implementation Team, working with the California Department of Transportation, the BLM, county road departments and others shall ensure that fences and culverts are appropriately monitored, and that fence integrity and unobstructed culverts are maintained throughout the life of this Plan. (DT-21)

Additionally, the fences must be monitored to cure breaches and ensure fence integrity. (No #)

Culvert Placement
Within DWMAs, when roads are fenced to preclude entry by desert tortoises, culverts of appropriate design and spacing to allow desert tortoises to pass under the road shall be installed to avoid habitat fragmentation and to allow continued gene transfer from one side of the road to the other. (DT-21)

It is important that the USFWS and other entities (i.e., new Recovery Team members) discuss the closure of culverts as a mechanism to prevent spread of disease. The Draft concluded that the pattern of older and newer die-off regions might suggest spread of disease from the northwest to the south. Newer die-off regions found in two places south of Highway 58 could be an indicator that culverts facilitated spread of disease. These hypotheses merit consideration by experts.

Feral Dog Management Plan
Within Year 2
Implementation Milestone**:** Within two years of incidental take authorization, the Implementation Team, BLM, county animal control, and other applicable entities shall develop a Feral Dog Management Plan (FDMP). (DT-5)

Within Year 3
Implementation Milestone**:** Within three years of the record of decision, if feral dogs continue to be a significant threat to tortoises and other covered species, the earliest phase(s) of the FDMP shall be implemented. (DT-5)

Headstarting
Within Year 1
Implementation Milestone**:** Within one year of incidental take authorization, the Implementation Team shall meet with BLM, pertinent experts in headstarting, and others to formulate a strategy for implementing headstarting. (No #)

Implement a headstarting program in areas where tortoises have apparently been extirpated or numbers significantly reduced. These could include but are not limited to areas west and south of Fremont Peak, Fremont Valley, and the Desert Tortoise Research Natural Area. (DT-26)

The following action items shall be implemented throughout the western Mojave Desert. Where headstarting is implemented, ensure that predation by ravens and other predators does not compromise the integrity, function, and success of the program. (DT-26)

Law Enforcement
Within Year 1
Implementation Milestone**:** Within one year of the record of decision, the Implementation Team shall initiate coordination meetings with BLM and other applicable law enforcement agencies to discuss law enforcement needs relative to plan implementation. (No #)

Additional law enforcement (ranger patrols) and educational outreach (recreation technicians) shall be used in concert with fencing and signs to inform the public of appropriate and inappropriate activities in conservation areas. (E-7)

A minimum of eight (8) Law Enforcement Rangers and eight (8) maintenance workers shall be assigned to the DWMAs. (DT-28)

Law Enforcement Rangers should work closely with the Implementation Team to facilitate Plan implementation, enforcement, and adaptive management. (DT-28)

It is important that a feedback loop exist between law enforcement and the Implementation Team to identify problem areas, and in the spirit of adaptive management, to identify issue-specific solutions. (DT-28)

It is important that anyone designing and implementing an education program work with law enforcement personnel (including BLM, county animal control, USFWS enforcement agents and CDFG rangers) to identify problems and develop solutions. (E-4)

Mohave Ground Squirrel
Within Year 1
Implementation Milestone**:** Within one year of incidental take authorization, and at least annually thereafter, the Implementation Team shall meet with representatives of military installations (PACIDERM) and the Mohave Ground Squirrel Technical Advisory Committee to discuss management needs for MGS conservation (MGS-6).

A group should be established to coordinate with, and assist if requested, staff of the China Lakes Naval Air Weapons Station, the National Training Center at Fort Irwin, and Edwards Air Force Base in devising and implementing MGS conservation programs on those installations. The Implementation Team should meet annually with representatives of these installations and the Mohave Ground Squirrel Technical Advisory Committee to discuss management needs for MGS conservation. (MGS-6)

Monitoring: Distance Sampling
Within Year 1
Implementation Milestone**:** Within the first year of incidental take authorization, the

Implementation Team shall ensure that distance sampling is funded and implemented.

The Plan shall ensure that line distance sampling (or other scientifically credible method, if distance sampling proves ineffective) is implemented in the Fremont-Kramer, Superior-Cronese, Ord-Rodman, and Pinto Mountain DWMAs. (M-98)

Within Years 2 to 30
Implementation Milestone: Within the second year of incidental take authorization, and thereafter as scheduled (M-98), the Implementation Team shall ensure that distance sampling is funded and implemented. (No #)

Distance sampling would occur in the West Mojave during the following years: 2003, 2004, 2005, 2007, 2009, 2011, 2012, 2013, 2014, 2015, 2017, 2019, 2021, 2022, 2023, 2024, 2025, 2027, 2029, 2031, and 2033. (M-98)

Monitoring: Efficacy of Route Network
Within Year 3
Implementation Milestone**:** Within three years of the record of decision, the Implementation Team, with input from pertinent regulatory personnel (e.g., BLM, CDFG, Fort Irwin, USGS, USFWS, among others), shall design a monitoring study to determine the efficacy of the designated route network. (No #)

Within Years 4 to 30
Implementation Milestone**:** Between Year 4 and Year 30 of the record of decision, route network monitoring studies shall be implemented as identified in the schedule associated with preceding Implementation Milestone. (No #)

In DWMAs, there is no current proposal to install speed regulators. However, if monitoring or studies show that certain unimproved roads are causing increased tortoise mortality, the Implementation Team should coordinate with BLM, county road departments, and others to consider ways, including speed regulators, to reduce or avoid that mortality. (MV-3)

The Plan proposes the closure of a number of unpaved motorized vehicle routes, with the intent of reducing tortoise mortality and habitat degradation. There is widespread concern that reducing routes will lead to more habitat degradation along routes that are designated as "open." Data should be collected to address the following: (a) Is there more or less cross-country travel before or after reductions? (b) Is there more use (and vandalism) on private lands where route reductions are not occurring? (c) Are new routes being created to replace old ones? (d) Are visitors using closed routes? (e) Given these and other data, where are the best places to focus limited law enforcement resources? (f) Has poaching, illegal target shooting, intentional vandalism, etc. been curtailed or facilitated? (g) Are new concentrated human-use areas (i.e., camp sites, staging areas, dump sites, etc.) forming along "open" routes? And ultimately, (h) Has the route network resulted in more or less tortoise mortality and/or habitat degradation? (No #)

The efficacy of this plan [designated route network] needs to be monitored to determine which, if any, management actions have resulted in fewer tortoise mortalities. The monitoring effort may be linked with others: Are ravens predating more heavily on tortoises after highway fences are installed and road-killed vertebrates are less available to ravens? (No #)

Monitoring: Specific Tortoise Population Studies

Within Year 1

Implementation Milestone**:** Within one year of incidental take authorization, the Implementation Team shall meet with pertinent agency personnel (e.g., BLM, CDFG, Fort Irwin, USGS, USFWS, among others) to discuss specific population monitoring needs (other than distance sampling), coordination, and implementation. (No #)

Within Years 2 to 30

Implementation Milestone**:** Between Year 2 and Year 30 of incidental take authorization, population monitoring studies shall be implemented as identified in the schedule associated with preceding Implementation Milestone. (No #)

It is important to fund continued studies at specified intervals on pertinent BLM permanent study plots, including Kramer, Lucerne, Desert Tortoise Research Natural Area (DTNA) (2 plots), Fremont Valley, and Fremont Peak. In the past, a total of 60 person days was spent on each plot, conducting a capture (first 30 days) recapture (last 30 days) study that was intended, among other things, to determine the density of tortoises on that square mile (i.e., with the exception of one of the plots at the DTNA, the other plots are one square mile in size). Since distance sampling is intended to determine regional densities, it would be appropriate to modify the methodology for the study plots away from a density estimate, and rather focus on demographic, disease, human threats, and other associated data that have traditionally been collected. (No #)

It is important to replicate the study plots, perhaps on nearby, square kilometer plots (i.e., Appendix A in the Recovery Plan presents one approach), so that statistical inferences can be drawn for a given region. Thus, additional, new study plots would be randomly situated throughout the region of interest. In the past, these plots have been surveyed at four-year intervals, although a new schedule needs to be considered. Each of the existing study plots is uniquely situated to gauge continued threats and efficacy of conservation measures implemented as part of the Plan, as described in the following sections. (No #)

This plot is located several miles west of the community of Silver Lakes, in the southern portion of the Fremont-Kramer DWMA, which is bounded to the north by Highway 58, to the east by the Mojave River, to the south by Shadow Mountain Road (actually several miles south of this road), and to the west by Highway 395. Unlike the northern and northwestern portions of this DWMA, there still appear to be relatively high numbers of tortoises in this area. The Kramer plot, and surrounding areas, are characterized by above-average tortoise sign counts collected since 1998. Known threats include ravens, poaching, off highway vehicle traffic (some of it likely from the Silver Lakes community), dumping, and dirt roads. Monitoring at this and adjacent plots should be structured to see if positive benefits are associated with the following conservation programs: raven management, increased law enforcement, route reductions, urban interface fencing or other control measures at Silver Lakes and fencing Highway 395. (No #)

This plot is uniquely situated on the urbanizing interface with Lucerne Valley to the south and the Johnson Valley Open Area to the east; the Stoddard Valley Open Area is not too distant to the west. It occurs in one of three tortoise aggregations found in the Ord-Rodman DWMA. Documented threats include OHV impacts, cattle trespass, bisection by a major transmission line inside a BLM-designated utility corridor, raven predation, tortoise collection and vandalism, and feral dogs. Proactive management prescriptions given elsewhere in this Plan call for signing boundaries in this area, fencing portions of the cattle allotment to prevent cattle trespass, monitoring Camp Rock Road, raven management, route reductions, restrictions to development of new utilities, increased law enforcement, and education of Lucerne Valley residents. The monitoring program on this and replicated plots in the region should focus on the efficacy of these and other conservation programs implemented by the Plan. (No #)

Several BLM permanent study plots are found at the DTNA, although like other plots, they have not been regularly funded since the early 1990's. These plots are unique in that they occur in a relatively protected, fenced area in which densities of more than 300 tortoises per square mile were documented in the 1970's and mid-1980's, but where present densities are substantially lower. Monitoring of this plot provides a unique opportunity to see if tortoises can naturally recolonize protected habitats. The fenced DTNA is surrounded by existing impacts that likely serve as "sinks" for tortoises that are relatively protected until they venture into adjacent, unfenced areas. Some of these uses include sheep grazing, intensive OHV use, agriculture and wind-blown dust from the west, indirect impacts associated with mining to the north, feral dog problems both inside and outside the DTNA, release of captive tortoises, raven predation, intentional vandalism of tortoises, and pet collection. Monitoring efforts should consider the efficacy of route reduction, enforcing California City's sheep grazing policy, increased law enforcement, feral dog management plan, raven management, and education of visitors to the area. (No #)

This study plot is located in the Fremont Valley, which is bounded to the north by the El Paso Mountains, to the south by the Rand Mountains, to the east by Red Mountain, and to the west by Koehn Lake. It is very similar to the DTNA plots in terms of observable disturbances, except it does not occur within the relative protection of a fenced area. All the programs mentioned above for the DTNA are also intended to recover tortoises in the Fremont Valley. Unique threats include road kill along Garlock Road, the direct and indirect effects of spreading biosolids in the desert, noise, vibration, and mortality effects of the nearby railroad. Monitoring of the study plot and replicated plots in the Fremont Valley should test the efficacy of conservation measures in bolstering tortoise populations in the northwestern portion of the Fremont-Kramer DWMA.

Like DTNA and Fremont Valley, the Fremont Peak study plot has experienced recent declines in tortoise numbers, although fewer tortoises occurred when the BLM's study plots were first surveyed in the 1970's. Unlike all other study plots mentioned above, the Fremont Peak plot is characterized as a salt bush scrub community (creosote bush scrub characterizes the other plots). Sheep grazing was removed from the area in 1991, although threats persist: natural recolonization of a population that has nearly been extirpated, raven and canid predation, effects of roads (several bisect the plot), and the indirect effects of Highway 395, which is located several miles to the west. Conservation measures are recommended by this Plan that would minimize impacts associated with these and other impacts. Additionally, it is recommended that the pilot headstarting program occur in the vicinity of this plot, so that the beneficial effects of that program may be indirectly gauged by reviving studies on this and replicated plots within the region. (No #)

The spatial location of the plots given above fairly well covers the Fremont-Kramer DWMA and southern portion of the Ord-Rodman DWMA, but does not adequately represent the Superior-Cronese or Pinto Mountain DWMAs. The Army's National Training Center at Fort Irwin, in conjunction with USGS, has established permanent study plots at the Goldstone Deep Space Communications Complex, in the Alvord Mountains, and elsewhere in the Superior-Cronese DWMA. Valuable information may be collected by continuing studies on these or other plots to be established. (No #)

There are no permanent plots in the Pinto Mountains, although Joshua Tree National Park has such plots nearby. (No #)

Many proactive conservation measures have been recommended that can be tracked at the study plots given above, however it will be necessary to gauge the success and failures of specific conservation programs for their efficacy and modification through adaptive management. Some of these follow (No #):

<u>Raven Management Working Group</u>
Within Year 1
<u>Implementation Milestone</u>**:** At which time it is formulated, the BLM shall ensure that it has appropriate personnel committed to serve on the raven management working group. (No #)

Establish two work groups to oversee management direction, review information, coordinate with other agencies/groups, solicit funding for implementation of specific management measures, and distribute information/data. The work groups shall meet annually or as needed to discuss raven management actions. One work group would be an Interagency Task Force to coordinate implementation of the program. This group would identify specific areas where lethal removal would be implemented using the criteria outlined above. The other would be a technical and policy oversight team to evaluate the progress of the Plan, interpretation of data, and recommend changes in the overall program based on scientific data. This group would help to determine what thresholds of predation and recruitment are necessary to trigger implementation of a cessation of lethal actions. There shall be data sharing between adjacent bio-regional plans and resource management plans. The goals of the work groups would be to (i) increase efficiency, effectiveness, and scientific validity of raven management in the California deserts, and (ii) ensure that future phases are developed and implemented in accordance with results of research and monitoring outlined above. (DT-38)

The Implementation Team shall facilitate issuance of applicable salvage permits, of as long a duration as possible, to participating utility companies to enable them to remove raven nests from transmission lines and other facilities. (No #)

Reduce the population density of ravens and number of birds that may take tortoises by reducing the availability to ravens of solid wastes at sanitary landfills. Reduce raven access to organic wastes at landfills: (i) ensure effective cover of waste multiple times each day (either ≤ six (6) inches cover or complete cover of garbage with tarps temporarily), (ii) erect coyote-proof fencing, (iii) render raven-proof all sources of standing water at the landfill, and (iv) keep truck cleaning areas and temporary storage facilities clean and free from organic wastes and standing water. (DT-30)

Reduce the availability to ravens of organic wastes outside of landfills. Take the following steps: (i) Encourage the use of self-closing trash bins at transfer stations and roadside rest stops, and behind restaurants, gas stations, and grocery stores; use raven-proof garbage drums at houses and other facilities; and avoid use of plastic bags for street-side pick up in residential areas; (ii) Encourage livestock operators to reduce availability of cattle feed, carcasses, afterbirths, and insects at feedlots and dairy farms; (iii) Use public education and other means to reduce the number of citizens who purposely feed ravens or who inadvertently do so by leaving pet food out where ravens can easily access it; and (iv) clean up illegal dump sites that contain organic wastes. These educational efforts should include, but not be limited to, business and agriculture. (DT-31)

Reduce the population density of ravens and number of birds that may take tortoises by reducing the availability of water to ravens while being mindful of the needs of other species. (DT-33)

Reduce the impact ravens have on tortoise populations at specific locations by removing raven nests. Remove raven nests (i) in specific areas where raven predation is high and tortoise populations are targeted for special management, and (ii) do so during the egg-laying phase of the raven's breeding cycle. Any nestlings found should be euthanized using standard humane measures. (DT-34)

Avoid constructing new nesting structures and reduce the number of existing nesting structures in areas where natural or anthropogenic substrates are lacking. Reduce availability of nesting sites by observing the following. (i) Within and adjacent to DWMAs, prevent the construction of new structures (e.g., power towers, telephones, billboards, cell phone towers, open warehouses or shade towers, etc.) where alternative natural nesting substrates (e.g., Joshua trees, cliffs) do not already exist within approximately 2 miles. (ii) If they must be built, design such structures in such a way as to prevent ravens from building nests on them. (DT-35)

Remove unnecessary towers, abandoned buildings, vehicles, etc., within tortoise management areas that may serve as nesting substrates unless natural structures are in abundance. (DT-35)

Remove ravens that are known to prey on tortoises. Selectively shoot individual ravens in areas of high tortoise predation. Ravens will be shot by rifle or shotgun if they show a likelihood of preying on tortoises (e.g., tortoise shells showing evidence consistent with raven predation found beneath or within approximately 1 mile a nest or perch). Ravens will be trapped and humanely euthanized where shooting is not possible (e.g., on powerlines or in residential areas) or unsuccessful. Young ravens found in nests of removed adults will be euthanized humanely if they can be captured safely. Poisoning with DRC-1339 or other appropriate agent may be used against targeted ravens in these limited areas if it is shown by results of the research proposals discussed below to be safe for other animals. Poisoned carcasses will be removed if they can be located. (L-1)

Facilitate recovery of critically threatened tortoise populations by removing ravens from specific areas where tortoise mortality from several sources is high, raven predation is known to occur, and the tortoise population has a chance of benefitting from raven removal. Remove all ravens foraging within specific areas (e.g., Desert Tortoise Research Natural Area, DWMAs, pilot headstarting sites, etc.) of historically high tortoise mortality and raven predation, particularly where demographic analyses indicate that juvenile survivorship has been unusually low. Ravens will be shot by rifle or shotgun if they are found foraging, hunting, roosting, or nesting within 0.5 miles of the specific targeted area. Where shooting is not possible (e.g., on powerlines or in recreation and residential areas), ravens will be poisoned (if shown by the research programs recommended below to be safe) or trapped and humanely euthanized. Young ravens found in nests of removed adults will be euthanized humanely if they can be captured safely. (L-2)

Determine behavior and ecology of ravens as they pertain to predation on tortoises. Data will be collected by direct observations, radio tracking, diet analysis, wing tagging, and non-invasive behavioral manipulations. (R1)

Conduct regional surveys of the California deserts to locate and map ravens and their nests and communal roosts. Inventories would include private and public lands. Project proponents and other interested parties would contribute funds to a coordinated surveying program that would concentrate both on specific sites and broad regional patterns. (R2)

Methods will be developed, tested, and implemented to determine effectiveness of and need for raven removal efforts for enhancing recruitment rates of juvenile desert tortoises into adult age-classes. (R-3)

Determine efficacy and cost of shooting as a method of eliminating raven predation and increasing tortoise survival. Data have already been collected and partially analyzed. (R-4)

Determine if eating hard-boiled eggs may adversely impact animals other than ravens laced with the avicide DRC-1339. (R-5)

An experiment should be conducted concerning methyl anthranilate (a non-toxic, grape-flavored food additive, but it is disliked by several species of birds) to determine if: (i) ravens are repelled by the chemical; (ii) it can be applied efficiently at landfills and other raven concentration sites, and on sources of water used by ravens (e.g., septage ponds, stock tanks, etc.); (iii) its repeated application prevents ravens from using the resource (e.g., garbage, water, etc.), and (iv) if methiocarb (Avery et al. 1993, Conover 1984), carbachol (Avery and Decker 1994, Nicolaus et al. 1989) or other compounds work better than methyl anthranilate. (R-6)

Determine if: (i) raven dependence on human-provided perches and nest sites aids hunting, nesting, and overall survival; (ii) modifying raven perches, roost sites, and nest sites on a localized basis is an effective way of reducing raven predation on tortoises; and (iii) removal of raven nests early in the breeding cycle will prevent ravens from renesting in that season. (R-7)

Determine: (i) if live trapping is a cost effective means of catching ravens, (ii) the relative effectiveness of different live trapping techniques, (iii) where ravens can be relocated practically and legally, and (iv) if relocated ravens will return to the capture site or other desert tortoise habitat. (R-8)

Develop a demographic model of raven populations to predict the effect various management alternatives might have on raven populations. (R-9)

Determine the extent ravens use commercial and municipal compost piles, then develop and test modifications to composting practices to make them inaccessible to ravens if a problem exists. Develop and test other methods to prevent ravens from accessing food and waste items. (R-10)

Determine whether availability to ravens of anthropogenic sources of water could be reduced by modifying sewage and septage containment practices in three possible ways: (i) covering the water, (ii) altering the edge of the pond with vertical walls, (iii) placing monofilament line or screening over the entire pond or (iv) adding methyl anthranilate, or other harmless taste aversive chemicals to standing water sources. Emphasis should be placed on the reduction of water availability during the spring, when ravens are nesting, and summer, when water demands for ravens are high but natural sources are low. (R-11)

Monitor both raven status and effectiveness of management actions at reducing predation rates on juvenile tortoises. (DT-39)

Revegetation

Within Year 2

Implementation Milestone**:** Within two years of incidental take authorization, the Implementation Team shall see that a standard, programmatic revegetation plan is developed and available to project proponents who are required to revegetate pipelines and other areas as a result of other plan prescriptions. (No #)

The following guidelines are recommended for revegetation in DWMAs: Revegetation is the means by which (a) soil surfaces are stabilized (wind and water erosion control); (b) future vehicle use is minimized or eliminated in areas to be revegetated; (c) future vehicle use is minimized or eliminated for travel from the right-of-way into adjacent, undisturbed areas (minimize impacts associated with increased or new access); (d) the spread of exotic weeds is curtailed; and ultimately (e) habitat for the target species (desert tortoise in this case) is restored (see success criteria discussion given in Section 3.3.4). (DT-11)

A standardized revegetation plan should be developed by the Implementation Team or its appointee and applied equitably throughout DWMAs.A technical advisory team of regulatory personnel, restoration experts, knowledgeable utilities personnel, and others should be assembled to devise and write the revegetation plan. (DT-11)

<u>Silver Lakes Association</u>
Within Year 1
<u>Implementation Milestone</u>**:** Within one year of incidental take authorization, the Implementation Team shall initiate a meeting with the Silver Lakes Association to determine the best way to minimize impacts of that community to the adjacent DWMA. (DT-22)

Within Year 2
<u>Implementation Milestone</u>**:** Within two years of incidental take authorization, following discussions with the Silver Lakes Association, the Implementation Team shall implement protective measures identified during those discussions. Follow-up studies and/or monitoring will be implemented as per the schedule identified during discussions. (DT-22)

The Plan proposes that a working group be established by the Implementation Team to work with the Silver Lakes Association and others to minimize the OHV impacts associated with that community on the Fremont-Kramer DWMA, which occurs immediately to the west. Potential solutions include installing a fence line along the western boundary of the community or developing an intensive educational program to minimize and eventually eliminate the impact. The efficacy of either of these approaches must be monitored and adaptive management applied. (DT-22)

<u>Tortoise: Disease</u>
Within Year 1
<u>Implementation Milestone</u>**:** Within one year of incidental take authorization, the Implementation Team shall designate one or more of its members to interface with the Management Oversight Group, most likely in the capacity of MOG Techincal Advisory Committee (MOG TAC) member, and continue to be involved, particularly with regards to disease research. (DT-16)

Disease research is encouraged, and coordination between the Implementation Team and the appropriate MOG contact should be maintained. Any breakthrough relative to disease management should be incorporated into the West Mojave Plan through adaptive management provisions. (DT-16)

At this time, the Plan relies on the Implementation Team adopting disease monitoring protocols as they are identified and endorsed by pertinent experts and, likely, the Management Oversight Group. (DT-17)

<u>Tortoise: Disposition</u>
During the Life of the Plan
<u>Implementation Milestone</u>**:** The Implementation Team shall consider the need to establish tortoise translocation areas if tortoises displaced as a result of plan implementation are not accommodated through identified translocation guidelines. (No #)

If the Implementation Team determines that the above [tortoise disposition] scenarios are not accommodating all wild tortoises removed from impact zones where there is permanent loss of habitat, then it should consider establishing translocation sites into which animals can be placed. (No #)

Weeds

Within Year 2

Implementation Milestone**:** Within two years of incidental take authorization, the Implementation Team shall meet with appropriate weed management groups to begin discussions of funding, coordinating, encouraging, implementing, and facilitating weed abatement/management programs that contribute to the conservation of plant or animal species covered by the Plan. (DT-40)

The Implementation Team will cooperate with known weed abatement specialists and organizations (including the Kern County Weed Management Agency, the Mono/Inyo Weed Management Area, the Mojave Weed Management Area, and the California Exotic Pest Plant Council) to fund, coordinate, encourage, implement, and facilitate weed abatement/management programs that contribute to the conservation of plant or animal species covered by the Plan. (DT-40)

APPENDIX D

NEW AND REVISED
ACEC MANAGEMENT PLANS

Appendices

APPENDIX D
NEW AND REVISED
ACEC MANAGEMENT PLANS

Of the 30 ACECs within the West Mojave designated by the California Desert Conservation Area Plan, several were established for the purpose of protecting important botanical or wildlife resources. Others were established to conserve cultural sites, geological or paleontological resources, or outstanding scenic and recreational values. Some of the specific management plans were prepared in cooperation with the CDFG as Wildlife Habitat Management Plans under the Sikes Act. The Proposed West Mojave Plan would amend twenty-five ACEC plans to incorporate provisions to conserve covered species. In addition, it would establish new ACECs in some areas as part of the conservation strategy.

The following discussion identifies the new measures proposed by the Proposed Plan. These include the following: (a) Modifications of existing ACEC Plans and (b) Management actions proposed for each of the proposed new ACECs. The West Mojave Plan is intended to serve as the ACEC management plan for each of the new ACECs; no further planning would be required.

Many of the existing ACEC management plans identified a motorized vehicle access network. These networks have been incorporated into the proposed regional access networks addressed by the alternatives analyzed by this EIR/S. The networks, or a modified version thereof, would be incorporated into the CDCA Plan through the West Mojave planning process.

D. 1 MODIFICATIONS OF EXISTING ACEC PLANS

D.1.1 Afton Canyon (ACEC 43) (4,726 acres)

The Afton Canyon Natural Area Management Plan (1989) was prepared in cooperation with the CDFG under the Sikes Act and covers a larger area than the ACEC. The plan protects the riparian community of the Mojave River, the scenic values of the canyon, and the adjacent desert habitat in the Cady Mountains, which is occupied habitat for bighorn sheep and contains nest sites for prairie falcon and golden eagle.

Afton Canyon is a BLM showcase for riparian restoration. For over ten years, invasive tamarisk plants have been removed and replaced with native willows and cottonwoods. The riparian area is fenced to exclude cattle. The canyon supports a relictual population of Western pond turtles and is a potential site for re-introduction of the Mojave tui chub.

Visitor facilities include two campgrounds, an equestrian campground, the Mojave Road, and interpretative signs and kiosks.

Under the Proposed Plan, the CDCA Plan would be amended as necessary to implement these recommendations of the 1989 management plan:

- Expansion of the boundary of the ACEC by 3,840 acres, and deletion of 480 acres , making the expanded ACEC 8,160 acres in size.

- Withdrawal of all lands within the expanded ACEC boundary from mineral entry.

- Changing the CDCA Plan multiple use class designations M to L on certain lands within the expanded ACEC.

The Proposed Plan would amend the Afton Canyon management plan by adding the following text on page 1, Section "B. Purpose", following the second paragraph:

> This management plan adopts the provisions of the West Mojave Plan for protection of the following species and their habitat:
>
> All species of bats
> Bighorn sheep
> Prairie falcon
> Golden eagle
> Vermilion flycatcher
> Yellow-breasted chat
> Yellow warbler
> Summer tanager
> Least Bell's vireo (potential habitat)
> Western pond turtle
> Desert tortoise
> Mojave fringe-toed lizard
>
> In addition, the management plan allows for the re-introduction of the Mojave tui chub into the Mojave River at such time as CDFG and USFWS deem appropriate. Activities of the wildlife agencies to restore habitat for the Mojave tui chub, including the removal of non-native fish, would be allowed.

All provisions of the West Mojave Plan pertaining to surveys and minimization, mitigation, and compensation for adverse impacts to biological resources within a Conservation Area would apply within the Afton Canyon Natural Area boundary.

D.1.2 Barstow Woolly Sunflower (ACEC 36) (314 acres)

BLM designated 400 acres as the North Harper Dry Lake ACEC in the CDCA Plan to protect the rare Barstow woolly sunflower. The 1982 CDCA Plan Amendment number 16 relocated the ACEC to 314 acres northeast of Kramer Junction and renamed it the Eriophyllum ACEC. It has become generally known as the Barstow woolly sunflower ACEC since that time.

Although the existing ACEC protects a relatively large population of this species, it represents only a small proportion of the overall range, which is limited to the western Mojave Desert. The desert tortoise and Mohave ground squirrel are also found within the ACEC. The

State of California owns nine sections of land to the east and west, which CDFG manages for protection of desert plants and animals.

The Proposed Plan would enlarge the ACEC to encompass additional public lands northwest of Kramer Junction. Its name would be changed to adopt the more commonly used title, the Barstow Woolly Sunflower ACEC. Adjacent CDFG lands would become a CDFG Ecological Reserve, pending the completion of a land exchange between the BLM and CDFG. These lands, together with some intermixed private parcels, would constitute the West Mojave Plan's 36,211 acre Barstow Woolly Sunflower Conservation Area. Public lands within the conservation are entirely within the Fremont-Kramer tortoise DWMA.

The primary management measures would be the acquisition of private lands from willing sellers and designation of vehicle routes. The route designations approved in the West Mojave Plan would be adopted for public lands within the ACEC.

The CDFG will prepare a management plan for state-owned lands after the land exchange is completed and the Ecological Reserve is designated.

The following language will be added to the ACEC management plan: "ACEC #36 is renamed the Barstow woolly sunflower ACEC."

All provisions of the Proposed Plan pertaining to surveys and minimization, mitigation, and compensation for adverse impacts to biological resources within the Barstow woolly sunflower Conservation Area will apply within the ACEC.

D.1.3 Bedrock Springs (ACEC 24) (785 acres)

Bedrock Spring was designated as an ACEC to protect prehistoric cultural resources: middens, petroglyphs, pictographs, rock shelters and milling features.

The Proposed Plan would adopt the route designations specified in the 1987 ACEC management plan. The ACEC would be included in the Mohave ground squirrel Conservation Area, and all conservation measures applicable to public lands within the conservation area would apply to the ACEC.

D.1.4 Black Mountain Cultural Area (ACEC 35) (61,806 acres)

The Black Mountain ACEC is one of the largest ACECs in the western Mojave Desert. The original 5,120-acre designation was expanded to the current size with approval of the 1989/1990 CDCA Plan Amendment Number 2. A management plan was approved in 1988 to protect the prehistoric and Native American values of this area northwest of Barstow. The southeastern half is within the Black Mountain Wilderness.

This ACEC includes critical habitat for the desert tortoise, as well as known occupied habitat for the Mojave ground squirrel, LeConte's thrasher, desert cymopterus and Barstow woolly sunflower. Nest sites are present for golden eagle and prairie falcon. The ACEC lies entirely within the proposed Superior-Cronese and Fremont-Kramer DWMAs.

The route designation for the Superior subregion included an inventory of all routes within the Black Mountain ACEC outside designated Wilderness. The West Mojave Plan will amend the ACEC plan to include route designations and protection of covered species as a goal. The DWMAs, if established by the Record of Decision, will be incorporated into the Black Mountain ACEC management plan.

D.1.5 Calico Early Man Site (ACEC 40) (898 acres)

This National Register Property was designated as an ACEC by the 1980 CDCA Plan. A management plan was prepared in 1984. The plan designated a network of vehicle access routes, a network designed to protect the evidence of ancient human occupation. This ACEC is located within the Superior-Cronese tortoise DWMA

The ACEC management plan would be modified as follows. All provisions of the West Mojave Plan pertaining to surveys and minimization, mitigation, and compensation for adverse impacts to biological resources within the Superior Cronese DWMA would apply within the ACEC.

D.1.6 Christmas Canyon (ACEC 23) (3,444 acres)

The Christmas Canyon ACEC protects prehistoric values. Most of the ACEC lies within the Spangler Hills Open Area in San Bernardino County. The 1988 ACEC management plan prescribed ways that the archaeological resources could be protected within an area open to recreational vehicle use.

A small portion of the southern edge of the ACEC outside the Open Area will be included in the Mohave ground squirrel Conservation Area, and all conservation measures applicable to public lands within the CA will apply to the ACEC. This portion of the ACEC will adopt the 1985-87 route designations for public lands, as specified in the June 2003 Record of Decision on the West Mojave Desert Off Road Vehicle Designation Project.

D.1.7 Cronese Basin (ACEC 74) (10,226 acres)

The BLM designated the Cronese Lakes, north of Interstate 15 between Barstow and Baker, as an ACEC in the 1980 CDCA Plan. A management plan was published in 1985.

The purpose of this ACEC is to protect valuable cultural and natural resources, including the ephemeral wetlands present on the lakes, which serve as stopover points for migratory waterbirds and nesting sites for many species during very wet years. Mesquite hummocks and desert willow washes add to the biological importance, and the dunes and sand sheets are occupied habitat for the Mojave fringe-toed lizard. The desert tortoise is found in low densities. The southwest portion of the ACEC is within the Superior-Cronese tortoise DWMA.

The Proposed Plan would revise the ACEC management plan to incorporate protection of blowsand areas for fringe-toed lizard. All conservation measures applicable to public lands within the tortoise DWMA will apply to portions of the ACEC that are included.

D.1.8 Darwin Falls

Lands in the former Darwin Falls/Canyon ACEC were added to Death Valley National Park with passage of the California Desert Protection Act in 1994, and are no longer part of the California Desert Conservation Area or the West Mojave planning area. The West Mojave Plan proposes the deletion of the Darwin Falls ACEC.

D.1.9 Desert Tortoise Research Natural Area (ACEC 22) (25,695 acres)

The CDCA Plan of 1980 designated lands north of California City in Kern County as an ACEC and a Research Natural Area. A management plan for the ACEC, prepared under authority of the Sikes Act, was approved in 1988. The ACEC is jointly managed by the BLM, CDFG and the Desert Tortoise Preserve Committee, a non–profit group established to acquire and manage lands for protection of the desert tortoise.

The ACEC for the Desert Tortoise Natural Area would be expanded to include lands acquired by the Desert Tortoise Preserve Committee outside the existing boundaries. The ACEC would also be included in the Mohave ground squirrel Conservation Area and the Fremont-Kramer tortoise DWMA, and all conservation measures applicable to public lands within the conservation area and the tortoise DWMA would apply to the ACEC.

D.1.10 Fossil Falls (ACEC 10) (1,667 acres)

The Fossil Falls ACEC was established in 1980 to protect prehistoric values. A management plan was approved in 1986. The Proposed Plan would amend the ACEC management plan by recognizing the provisions applicable to the Mohave ground squirrel Conservation Area.

D.1.11 Great Falls Basin (ACEC 12) (9,726 acres)

The Great Falls Basin ACEC management plan was prepared in 1987 in cooperation with the CDFG under the Sikes Act. The ACEC adjoins the Indian Joe Canyon Ecological Reserve and the northern portion is within the Argus Range Wilderness. The southern portion is within a Wilderness Study Area. The entire western boundary is contiguous with the China Lake Naval Air Weapons Station.

The ACEC protects unique and valuable wildlife and scenic resources. Foremost among these are the dozens of seeps and springs that serve as habitat for the threatened Inyo California towhee. Designated Critical Habitat is present within the ACEC. In addition, large populations of quail and chuckar are present, as is a remnant population of bighorn sheep. Raptors nesting within the ACEC include golden eagle, prairie falcon, and long-eared owl. Potential habitat exists for the Panamint alligator lizard.

The ACEC management plan would be amended to prohibit travel on roads previously designated as open but now part of Wilderness as directed by Congress, and to recognize the provisions applicable to the Mohave Ground Squirrel Conservation Area. In addition, all of the ACEC would fall within the proposed Argus Range Key Raptor Area.

D.1.12 Harper Dry Lake (ACEC 37) (475 acres)

The Harper Dry Lake ACEC was established to protect the remnant marshes at the southwestern edge of Harper Dry Lake. The marsh and alkali wetland habitat hold potential for discovery of several rare plant species. The playa bordering the marshes supported nesting Western snowy plovers in the past and these birds were present and probably nesting in 2001 and 2004.

The 1982 management plan for the Harper Dry Lake ACEC would be amended to incorporate provisions of the West Mojave Plan concerning conservation of the Western snowy plover and rare alkali wetland plant species.

Recent improvements to the Harper Dry Lake ACEC include provision of surface water to the remnant marsh, and establishment of a parking area, kiosks, and restrooms. In order to accommodate these facilities, BLM would change the existing ACEC boundary by including 110 acres of public lands on the south boundary and deleting 110 acres on the northern boundary (Map 2-5). The southern expansion includes the Watchable Wildlife Site improvements and the northern deletion contains barren lakebed.

Specific changes to the management plan are provided below:

On page 1, Section A. Purpose. Add as a new second paragraph:

> Management of the Harper Dry Lake ACEC will implement provisions of the West Mojave Plan regarding conservation of plant and animal species.

On page 1, Section B. Management Objective: Add a new second and third paragraph:

> The West Mojave Plan has identified Harper Dry Lake as an area important for conservation of nesting habitat for the Western snowy plover. Management of the marsh and adjacent playa will include measures to protect Western snowy plover nesting areas and to reduce human disturbance to nest sites during the breeding season.
>
> The West Mojave Plan also recognizes Harper Dry Lake as an area where several restricted-range alkali wetland species may be discovered. Management of the ACEC will include botanical surveys for alkali wetland plants and incorporation of conservation measures for the plants and their habitat if new occurrences are located.

On page 9, under Section C. Resource Summary: Add the following new fourth paragraph:

Harper Dry Lake is recognized as a Key Raptor Area by the BLM, which designated 223 such areas nationwide. Key Raptor Areas are places known to be significant habitats for selected species of birds of prey, and Harper Dry Lake is one of seven Key Raptor Areas in the California desert. The species known to utilize the habitat at Harper Dry Lake are northern harrier, short-eared owl, ferruginous hawk and long-eared owl.

On page 9, under Section C. Resource Summary: Add the following new sixth paragraph:

The alkali wetland community bordering Harper Dry Lake holds potential for discovery of several rare and restricted-range plant species, including, but not limited to:

Alkali mariposa lily (*Calochortus striatus*)
Black sedge (*Schoenus nigricans*)
Cooper rush (*Juncus cooperi*)
Hot springs fimbristylis (*Fimbristylis thermalis*)
Lancaster milkvetch (*Astragalus preussii* var. *laxiflorus*)
Parish's alkali grass (*Puccinellia parishii*)
Parish's phacelia (*Phacelia parishii*)
Parish's popcorn flower (*Plagiobothrys parishii*)
Parry's saltbush (*Atriplex parishii*)
Salt Springs checkerbloom (*Sidalcea neomexicana*)

On page 11, under the Section on Planned Actions, part A. Physical Actions, add new numbers 6 and 7 as follows:

6. Goal: Protect Western snowy plover nest sites during the breeding season.

Action: Post signs and restrict human access to all areas within a 1/8 mile radius of known or presumed nest sites during the period April 1- August 1 of each year that the Western snowy plover is observed to establish nesting territories.

7. Goal: Protect newly detected occurrences of rare and restricted range alkali wetland plant species.

Action: Post signs restricting human and vehicle intrusion onto occupied habitat.

On page 15, Section A (Monitoring), add the following new final paragraph:

A raptor census will be conducted of the Harper Dry Lake Key Raptor Area every five years, subject to available funds. Information will be stored in the BLM nationwide database of Key Raptor Areas.

D.1.13 Jawbone/Butterbredt (ACEC 20) (187,486 acres)

The 1982 Sikes Act Plan for the Jawbone/Butterbredt ACEC addressed the Sierra/ Mojave/ Tehachapi ecotone Wildlife Habitat Management Area, established as a "Special Area" by the CDCA Plan. The ACEC plan incorporated all of the Rudnick Common Grazing Allotment and the vehicle management boundary agreement between the BLM and the Rudnick Estate Trust. Routes of travel were designated for the ACEC, which includes both designated Wilderness and the Dove Springs and Jawbone Canyon Open Areas. The Pacific Crest Trail crosses the ACEC as well.

The ACEC was established to manage and protect significant cultural and wildlife values of this transition zone between the mountains and the northern portion of the West Mojave planning. Among the wildlife habitats present are Butterbredt Springs, an important migratory bird stopover site, habitat for the yellow-eared pocket mouse in Kelso Valley, and the raptor and vulture migratory corridor between the Kern River Valley and the Mojave River. The West Mojave endemic plant, Kelso Creek monkeyflower, has nearly its entire range located within the ACEC. Protection of the Bendire's thrasher, Mohave ground squirrel, yellow-eared pocket mouse and Kelso Creek monkeyflower would be added as specific objectives of the ACEC management plan.

The Proposed Plan would establish three new conservation areas within the ACEC boundaries: the Mohave ground squirrel, Kelso Creek monkeyflower, and Bendire's thrasher conservation areas. All provisions of the West Mojave Plan applicable to these conservation areas will be applicable to the ACEC, including the 1% limitation on allowable ground disturbance and the requirement for a 5:1 mitigation fee ratio.

Bendire's Thrasher: The Bendire's Thrasher Conservation Area would consist of 7,678 acres of public land within the identified habitat of 16,273 acres. Public lands would be consolidated through land exchanges, if the private landowners were willing. The existing route designation for the Jawbone-Butterbredt ACEC would remain in place. Vegetation harvesting would be prohibited within the conservation area.

Monitoring provisions (M-10) would establish baseline numbers of Bendire's thrashers, utilizing the methodology established in 1985–86 and employed in 2001, within three years for the conservation area. Future monitoring would be habitat-based, with the objective of detecting substantial changes in vegetation and ground disturbance.

Adaptive management (A-8) would include adjustments to the conservation area boundaries based on thee results of botanical and wildlife monitoring studies.

Kelso Creek Monkeyflower: BLM would establish a conservation area for the Kelso Creek monkeyflower, a western Mojave Desert endemic, on public lands within the range of this species. A total of 1,870 acres of public land in several parcels with occupied and potential habitat would be designated. Conservation prescriptions are:

1. Maintain regional rangeland health standards. Direct grazing away from occupied habitat.
2. Designate vehicle routes of travel. The existing routes designated for the Jawbone-Butterbredt ACEC will be used unless monitoring reveals the need for change in

areas of occupied habitat.
3. Require botanical surveys for projects on public lands. Require avoidance of Kelso Creek monkeyflower occurrences.

Monitoring of the habitat will play a key role in the conservation strategy for Kelso Creek monkeyflower. Monitoring prescriptions are:

- (M-34) Continue surveys on public land identified as potential habitat. Document any spillover impacts to public lands from private lands.
- (M-35) BLM will make a determination of regional rangeland health standards on public lands in the Rudnick common allotment within five years of Plan approval.

Adaptive management prescriptions are:

- (A-32) Adjust boundaries of conservation area based on survey results.
- (A-33) Change route designation as necessary to protect occupied habitat.
- (A-34) Adjustments grazing practices and Allotment Management Plans in Kelso Valley will be made as necessary based on the results of the rangeland health determinations.
- (A-35) Pursue land purchase or exchange.
- Fence BLM/private property boundaries if spillover impacts are evident.

D.1.14 Juniper Flats (ACEC 45) (2,528 acres)

The CDCA Plan designated an ACEC for the Juniper Flats Cultural Area in 1980. A management plan was prepared in 1988. The foothill area south of Apple Valley containing springs and riparian habitat in a dense stand of junipers was an important Native American habitation and special use site.

Juniper Flats also provides important habitat for the San Diego horned lizard and the gray vireo, two unlisted species proposed for protection in the West Mojave Plan. Conservation of these species will be added as a goal of the ACEC management plan. The Willow fire in 2000 burned over the entire ACEC, leading to a temporary closure of the area until vegetative recovery had begun. Juniper Flats is an important equestrian riding area and provides access to the hot springs along Deep Creek on the San Bernardino National Forest.

The Proposed Plan would allow construction of a multi-use trailhead within the ACEC, sufficient to allow parking and staging facilities for equestrian users of all recreation lands in the area. As a result of public comment on the Draft EIR/S, the route network for the Juniper subregion, including the ACEC has been modified. The ACEC Plan will adopt the route network changes incorporated in the Approved Plan and Record of Decision for the West Mojave Plan.

D.1.15 Last Chance Canyon (ACEC 21) (5,913 acres)

The CDCA Plan designated Last Chance Canyon in the El Paso Mountains in 1980. A Plan Amendment in 1984 adjusted the boundaries to include additional prehistoric sites. This amendment implemented a recommendation of the ACEC management plan, which was completed in 1982. The archaeological sites are part of a larger archaeological district placed on the National Register of Historic Places in 1971.

The Proposed Plan would adopt the 1985-87 route designations for this area, except for the east access to Mesa Springs, which was recommended for closure by the 1982 ACEC management plan. A Record of Decision for the Western Mojave Desert Off Road Vehicle Designation Project approved this network in June 2003. This network would be effective on an interim basis, until the completion of a collaborative and community-based program to develop a revised motorized vehicle access network for the El Paso Mountains, including all of the Last Chance Canyon ACEC outside wilderness. Participants in this effort would include the City of Ridgecrest, Kern County, BLM and interested stakeholders. When it is completed, the revised network for the El Paso Mountains would be incorporated into the CDCA and West Mojave Plans through a plan amendment.

The ACEC would be included in the Mohave ground squirrel Conservation Area, and all conservation measures applicable to public lands within the CA will apply to the ACEC.

D.1.16 Manix (ACEC 85) (2,897 acres)

The Manix ACEC, located about 20 miles northeast of Barstow along the Mojave River, was established in 1990 by the BLM to protect paleontological and cultural resources. This site also contains blowsand habitat for the Mojave fringe-toed lizard and the terminus of the Mojave Road. No management plan has been prepared for this ACEC.

The Proposed Plan would designate public lands along the Mojave River within the ACEC as a conservation area for the Mojave fringe-toed lizard, and all provisions of the West Mojave Plan applicable to conservation areas would apply. The 1985-1987 route designations for this area, as approved in June 2003, apply to this ACEC.

D.1.17 Mojave Fishhook Cactus (ACEC 77) (628 acres)

A 1984 CDCA Plan Amendment established the Mojave fishhook cactus ACEC, and a management plan was completed in 1990. The ACEC is in two separate parcels in the Brisbane Valley. The purpose of the ACEC is to protect the yellow-spined form of the Mojave fishhook cactus. Subsequent studies have shown that this area may be important to the Mohave monkeyflower as well.

The 1990 management plan designated routes for the ACEC but deferred a Plan Amendment on the route designation. The Proposed Plan would incorporate this route network into the CDCA Plan. The network closes the ACEC to motorized travel except for the road in Section 4 formerly numbered SV 2120. In addition, protection of the Mohave monkeyflower and its habitat would be added as a goal of the ACEC management plan.

The multiple use classification for the ACEC would change from Unclassified to L for the northern parcel and from M to L for the southern parcel.

The Proposed Plan proposes the designation of Brisbane Valley as a tortoise Special Review Area, where additional take-avoidance measures would be implemented to prevent injury or deaths of desert tortoises. The entire Mojave fishhook cactus ACEC would be subject to these provisions.

D.1.18 Rainbow Basin – Owl Canyon (ACEC 39) (4,087 acres)

The 1991 management plan for the Rainbow Basin – Owl Canyon ACEC addressed both the ACEC and certain surrounding lands, collectively the Rainbow Basin planning area (RBPA). The management plan designated motorized vehicle routes within the RBPA as open or closed and made recommendations for campground and trail improvements and closure of the natural area to target shooting. Hunting is allowed.

Within the ACEC are two campgrounds, a scenic loop drive, hiking trails and an interpretive trail. The area is popular with visitors who come to see the colored geological formations.

The June 2003 Western Mojave Desert Off Road Vehicle Designation Project did not propose any route changes within the ACEC, but proposed changes on lands north of the ACEC but within the RBPA. This area is part of the Coolgardie Mesa conservation area and ACEC. Routes within the Coolgardie Mesa ACEC would be limited to graded/ drained/ natural surface streets and roads and rough bladed or two-track surface routes shown on BLM's Cuddeback Lake (1997) and Soda Mountains (2000) Desert Access Guides. This action would close about ten links between regional routes in order to reduce disturbance to the federally endangered Lane Mountain milkvetch. In addition, parts of the RBPA outside the ACEC would be withdrawn from mineral entry (P-31). Protection of the Lane Mountain milkvetch would be added as a primary goal of the Natural Area Management Plan on page 4, Section B.

The ACEC would protect two nest sites for the prairie falcon. Continued protection of the nesting areas would be added as a goal for the management plan.

The ACEC would be included in the Mohave ground squirrel Conservation Area and the Superior-Cronese DWMA, and all conservation measures applicable to public lands within the conservation area and DWMA will apply to the ACEC.

D.1.19 Red Mountain Spring (ACEC 26) (717 acres)

The Red Mountain Spring ACEC was designated by the CDCA Plan to protect prehistoric values. It was formerly called Squaw Spring.

A 1982 Plan Amendment listed this area as closed to vehicle travel. A management plan was completed in 1987. The Proposed Plan would adopt the route designations specified in the ACEC management plan.

The West Mojave CDCA Plan Amendment would also formally rename this ACEC Red Mountain Spring.

The ACEC would be included in the Mohave ground squirrel Conservation Area and the Fremont-Kramer tortoise DWMA, and all conservation measures applicable to public lands within the conservation area and DWMA will apply to the ACEC.

D.1.20 Rodman Mountains Cultural Area (ACEC 84) (6,204 acres)

The CDCA Plan Amendment for 1988 designated parts of the Rodman Mountains as an ACEC to protect cultural resources. Most of this area is within the Rodman Mountains Wilderness. Portions outside the wilderness are part of the Ord-Rodman route designation subregion. The ACEC also contains raptor nests and limited desert tortoise habitat. No management plan has been prepared.

Most of the ACEC would be included in the Ord-Rodman tortoise DWMA, and all conservation measures applicable to public lands within the DWMA would apply to the ACEC.

D.1.21 Rose Springs (ACEC 7) (859 acres)

An area surrounding Rose Springs in Inyo County was designated as an ACEC by the CDCA Plan to protect prehistoric values. Access is limited by a gate, which has been vandalized in the past.

A management plan was prepared in 1985. It recommended closure of the ACEC to motorized vehicles. Access is via a transmission line road and the Los Angeles Aqueduct road.

The ACEC will be included in the Mohave ground squirrel Conservation Area, and all conservation measures applicable to public lands within the conservation area would apply to the ACEC.

D.1.22 Sand Canyon (ACEC 11) (2,609 acres)

The Sand Canyon ACEC was established to protect riparian habitat and wildlife. Inventories have shown it to be one of the most diverse areas in all the West Mojave for species of small mammals and to support a wide variety of reptiles and birds. Two species nearly endemic to the West Mojave are found within the ACEC: the Ninemile Canyon phacelia and the yellow-eared pocket mouse. The riparian habitat is an important stopover site for migratory birds, including the willow flycatcher.

The 1989 Sand Canyon ACEC management plan would be amended to incorporate provisions of the Proposed Plan for conservation of specific plants and animals. Specific wording changes follow.

On page 1, Introduction, Section A (Purpose and Objectives), add the following language as a new second paragraph:

> Management of the Sand Canyon ACEC will implement provisions of the West Mojave Plan regarding conservation of plant and animal species.

On page 2, Section B (Management Framework), add a new paragraph after the paragraph numbered 8:

> 9. The Sand Canyon ACEC is part of the system of conservation areas designated in the West Mojave Plan for protection of plant and animal species. The West Mojave Plan is an interagency Habitat Conservation Plan allowing incidental take permits to be issued to local jurisdictions for projects on private land under the state and federal endangered species acts. The West Mojave Plan is dependent on resource management within the ACEC for issuance of permits for certain species.

On page 20, Section H (Wildlife), under 2, other species of special concern, add the following paragraph:

> The yellow-eared pocket mouse was detected in Sand Canyon in 1990. This rodent is a West Mojave endemic with a very restricted range in Kern and Inyo counties. It is a BLM sensitive species and is subject to the management prescriptions of the West Mojave Plan.

On page 31, Section E, the goal describing protection and enhancement of wildlife resources, add a new paragraph:

> 23. Action: Conduct a small mammal trapping survey, subject to available funds, to determine the acreage of occupied habitat of the yellow-eared pocket mouse (*Perognathus xanthonotus*).
>
> Discussion: The yellow-eared pocket mouse is a West Mojave endemic discovered in Sand Canyon in 1990. Information is needed on its distribution and relative abundance within the ACEC in order to insure proper management of its habitat.

D.1.23 Short Canyon (ACEC 81) (754 acres)

The Short Canyon ACEC was established by an amendment to the CDCA Plan in 1988. A management plan was prepared in 1990. The purpose of the ACEC is to protect the unusual vegetation and diverse flora. The primary management action was to exclude grazing from the ACEC. This measure has been implemented through fencing and placement of cattle guards. Most of the ACEC lies within the Owens Peak Wilderness.

Under the Proposed Plan, the Short Canyon ACEC management plan would be amended to incorporate provisions of the West Mojave Plan for conservation of specific plants and animals. These changes are presented below.

On page 2, Introduction, Section A (Purpose and Objectives), add the following language as a new second paragraph:

> Management of the Short Canyon ACEC will implement provisions of the West Mojave Plan regarding conservation of plant and animal species.

On page 6, under section F (Vegetation), replace the third paragraph with the following text:

> Short Canyon is known to support occurrences of Charlotte's phacelia (*Phacelia nashiana*), a limited-range plant whose distribution falls almost entirely within the boundaries of the West Mojave Plan. In addition, a significant population of the state-listed Mojave tarplant (*Deinandra* [*Hemizonia*] *mohavensis*) was detected in the canyon in 1998.

On page 15, under Section J, the goal describing the monitoring plan, add a new paragraph:

> 17. Action: Monitoring of the Mojave tarplant numbers and acreage will be conducted every five years. The baseline numbers and acreage should be established in the first year of implementation of the West Mojave Plan.

D.1.24 Steam Well (ACEC 25) (41 acres)

The Steam Well ACEC protects historic and prehistoric values, primarily petroglyphs. The ACEC lies within the Golden Valley Wilderness in San Bernardino County.

The ACEC would be included in the Mohave ground squirrel Conservation Area, and all conservation measures applicable to public lands within the conservation area would apply to the ACEC.

D.1.25 Trona Pinnacles (ACEC 16) (4,055 acres)

The 1989 management plan for the Trona Pinnacles ACEC focused on protection of the outstanding scenery and geological features of this area ten miles south of Trona. The site is used for commercial filming and sightseeing. At least one prairie falcon nest site was reported within the ACEC, but falcons have not been recorded there for the past ten years.

The Proposed Plan would adopt the 1985-1987 route designations for the Trona Pinnacles ACEC, as approved in June 2003 by the Western Mojave Desert Off Highway Vehicle Designaation Project. No other changes to the ACEC plan are proposed.

D.1.26 Western Rand Mountains (ACEC 2) (17,877 acres)

A management plan for the Western Rand Mountains ACEC was completed in 1993. This plan, called the Rand Mountains Fremont Valley Management Plan, included surrounding lands, such as Koehn Lake and lands to the northeast. The Western Rand Mountains ACEC formerly supported high densities of desert tortoises, though tortoise numbers have declined substantially from historical levels. The ACEC is believed to support the Mohave ground squirrel, and is known to harbor the burrowing owl and the LeConte's thrasher.

The ACEC plan was prepared in cooperation with the CDFG under authority of the Sikes Act. It received a "no jeopardy" Biological Opinion from the USFWS.

The plan recommended five amendments to the CDCA Plan:

1. Expand the West Rand ACEC by 13,120 acres.
2. Change Class M lands in the ACEC expansion and adjacent alluvial fan areas to Class L.
3. Designate 32,590 acres as withdrawn from mineral location and entry.
4. Designate open routes of travel.
5. Designate lands southeast of Red Mountain on both sides of the Randsburg-Mojave Road as Category 1 desert tortoise habitat.

The Rand Mountains Fremont Valley Management Plan reduced the number of open routes by 90%, although compliance has been a problem. Within the ACEC, open and closed routes of travel were identified on the ground with open and closed signs. All open routes were signed and many, but not all, closed routes were signed as closed. In selected areas, hay bails and plastic safety fencing have been used to stop motorcycle use on closed routes or to stop cross-country travel. Hay bails and fencing have been more effective in reducing non-compliance that signs alone.

The plan also established a goal of ranger patrols eight hours per week plus eight hours each weekend from March 1 to June 30, September 1 to November 1, and holiday weekends. Ranger staffing levels have not increased sufficiently to fully achieve this goal over the entire period since the plan was approved in 1993. Over the past year, one Ranger was assigned primary patrol responsibilities for the Rand Mountains, Fremont Valley and the Desert Tortoise Natural Area. Patrol effort for the region is now meeting the management goal.

The Proposed Plan includes these recommendations to implement the management plan. In addition, all of the study area except Koehn Lake and disturbed areas near Red Mountain would become part of the Fremont-Kramer DWMA and the Mohave Ground Squirrel Conservation Area. All conservation measures applicable to public lands within the conservation area and DWMA will apply to the ACEC.

D.2 MANAGEMENT ACTIONS PROPOSED FOR EACH NEW ACEC

A detailed description of the management program to be applied within each of the four proposed tortoise DWMAs can be found in Chapter 2. Management actions proposed for other newly proposed ACECs follow.

D.2.1 Bendire's Thrasher Conservation Area (25,129 Acres)

The conservation strategy for Bendire's thrasher is based on conservation of habitat on public lands where thrashers were seen in 2001 or were abundant in the mid 1980s and conditions appear unchanged. Four public lands conservation areas would be established. These are within Joshua Tree National Park (106,710 acres), the Jawbone-Butterbredt ACEC (7,678 acres), northern Lucerne Valley (9,805 acres) and Coolgardie Mesa (7,646 acres). Prescriptions for management of the conservation areas are given below for northern Lucerne Valley and Coolgardie Mesa. Prescriptions for Jawbone-Butterbredt are provided above in changes of existing ACEC management. No change in management is needed within Joshua Tree National Park.

Designate 9,805 acres of public land as an ACEC within the 11,440-acre polygon of occupied habitat (B-3). BLM would retain lands within the Town of Apple Valley sphere of influence. Motorized vehicle routes would follow the June 30, 2003 designations for this area within the Granite subregion. Vegetation harvesting would be prohibited. New allowable ground disturbance would be limited to 1% and the 5:1 mitigation fee ration would apply to projects on public lands.

Monitoring provisions (M-10) would establish baseline numbers of Bendire's thrashers, utilizing the methodology established in 1985–86 and employed in 2001, within three years for the conservation area. Future monitoring would be habitat-based, with the objective of detecting substantial changes in vegetation and ground disturbance.

Adaptive management (A-8) would include adjustments to the conservation area boundaries based on survey results.

D.2.2 Carbonate Endemic Plants Research Natural Area ACEC (5,155 acres)

BLM would designate public lands within an area east of Highway 18 in the foothills of the San Bernardino Mountains as a Research Natural Area and manage the land as an ACEC to protect four federally listed and one unlisted species of plants, as well as the San Diego horned lizard, gray vireo, and bighorn sheep. Lands within the proposed ACEC would be subject to a standard of no surface occupancy, in order to prevent undue and unnecessary degradation of lands under the surface mining regulations (43CFR 3809). Private lands within the proposed ACEC may be acquired or exchanged for other BLM lands in Lucerne Valley. The acquired lands would be withdrawn from mineral entry. BLM would change the CDCA Plan multiple use class from M to L.

(P-1) The West Mojave Plan will implement provisions of the Carbonate Habitat Management Strategy (CHMS). The CHMS is a cooperative plan developed by the Forest Service, BLM, and mining and environmental stakeholders. It includes very specific criteria for conservation, land acquisition, and mining.

(HCA-3) Conserved federal lands (4,393 acres) within the carbonate habitat management zone described in the CHMS would be designated as the Carbonate Endemic Plants Research Natural Area ACEC (see Map 2-9). The boundaries would adjoin a complementary Research Natural Area proposed for the San Bernardino National Forest.

A Research Natural Area means an area that is established and maintained for the primary purpose of research and education because the land has one or more of the following characteristics (43 CFR 8223):

- A typical representation of a common plant or animal association;
- An unusual plant or animal association;
- A threatened or endangered plant or animal species;
- A typical representation of common geologic, soil, or water features; or
- Outstanding or unusual geologic, soil, or water features.

The proposed RNA meets the characteristics above because it supports an unusual geologic, soil and plant association and because it contains habitat for threatened and endangered species. Considerable research has been conducted in this area, including botanical surveys, geologic studies, genetic studies of the carbonate endemic plants, and use of the area by bighorn.

No other carbonate or limestone geologic deposits are conserved within the West Mojave Desert. All of the commercial grade carbonate deposits are mined, and most of the secondary deposits are planned for mining in the future. Some limestone deposits are protected within the Mojave National Preserve, but these do not support threatened and endemic plant species.

The range of the carbonate endemic plants is limited and fragmented, both from natural patterns of occurrence and past impacts from mining. A RNA on BLM or Forest Service lands alone is not large enough to provide researchers with the ability to study a relatively intact habitat block covering the range of elevations, soil types, geologic substrates and plant communities. The BLM portion of the RNA includes the lowest elevation occurrences of all four listed plants, as well as the desert plant communities and lower grade limestone substrates where the plants occur. The Forest Service lands provide the high-quality limestone, upper elevations and montane plant communities.

The ACEC would consist of the area north of Monarch Flat, the Blackhawk slide and the area surrounding Round Mountain. Activities within the ACEC would be required to be compatible with protection of the listed carbonate endemic plants.

Management prescriptions for the proposed ACEC are:

1. All existing routes of travel on public land within the proposed ACEC would be designated as open, limited or closed. The boundary road defining the perimeter of the ACEC is an open route. Most other existing routes within the ACEC are limited or closed. These internal routes cross designated critical habitat for the listed plants, but are open for limited use to allow access to claimholders, researchers and other permitted

events or activities. Permitted events, such as dual sport rides, can occur but would require monitoring and stipulations to avoid areas of botanical sensitivity adjacent to roads. Route designation Maps 70 and 73 illustrate the proposed network accessing the ACEC and within the ACEC.

2. The multiple use class for lands within the ACEC would change M to L (HCA-9).

3. Acquisition of private lands (762 acres) is an objective of the ACEC. Three options are presented for acquisition of private land and relinquishment of claims. All three methods may be implemented to achieve the objective. Acquired lands would be withdrawn from mineral entry.

- Option 1. The BLM would initiate or participate in a land exchange for the highest priority private lands. Public lands bordering the rail spur south of Lucerne Valley would be exchanged for private lands east of Highway 18. The lands along the railway would then be available to mining interests or industrial uses, and the acquired lands east of Highway 18 would be withdrawn from mineral entry.

- Option 2. Mining companies may acquire lands within the ACEC as mitigation for use of lands west of Highway 18. "Acquisition" can include purchase of mining claims on public lands as well as purchase of fee title to private lands. The claims or title would be conveyed to the BLM, and the acquired lands would be withdrawn from mineral entry.

- Option 3. BLM and Forest Service would prepare an application for Congressional funding through the Land and Water Conservation Fund. Any funds appropriated through this process would be used to purchase private fee lands within the proposed ACEC and the National Forest. Acquisition funding would also be sought from the Fish and Wildlife Service Section 6 grants to states. Acquired lands would be unavailable for mineral entry.

4. Fire suppression and prescribed fires would not be allowed unless they are used to sustain natural communities.

5. Pest control would not be allowed unless it can be shown to be necessary to sustain natural communities.

6. Fencing along the eastern boundary of the proposed ACEC would be installed to prevent cattle from trampling the listed plants on small portions of the Rattlesnake allotment and to prevent cattle from entering Forest lands near Terrace Springs. The fencing would be constructed along the east side of Arrastre Canyon.

7. Under provisions of the mining law and regulations (43CFR 3809), all plans of operation must comply with standards set in the applicable agency land use plan. Within the ACEC, no surface occupancy would be allowed because of the potential for undue degradation to occupied habitat and designated critical habitat. Surface mining would

not be consistent with the objectives of a Research Natural Area.

8. Reclamation and revegetation standards specified in the CHMS (Appendix S) would be required for reclamation or restoration projects within the ACEC.

D.2.3 Coolgardie Mesa ACEC

The Coolgardie Mesa ACEC would lie within the Superior-Cronese DWMA and contain conservation areas for the desert tortoise, Mohave ground squirrel, Bendire's thrasher and Lane Mountain milkvetch. It would serve as a multispecies reserve for these four species as well as the Barstow woolly sunflower.

Applicable management within the Coolgardie Mesa ACEC would include the 1% limitation on allowable ground disturbance and 5:1 mitigation fee ratio found in all conservation areas as well as:

1. All provisions for conservation and management of the desert tortoise.
2. All provisions for conservation and management of the Mohave ground squirrel.
3. Prohibition of vegetative harvesting.
4. (P-28) Designated routes of travel. Fencing of the approved routes would be installed as necessary, with signs advising the public that the area is closed to vehicle travel because of endangered species conservation.
5. (P-30) All lands within the Conservation Area will be withdrawn from mineral entry. Claimholders with valid existing rights will be compensated.
6. (P-32) Claimholders should be notified of the presence of endangered plants. Restrictions on casual use that involves ground disturbance within the Conservation Area would be developed as necessary.
7. (P-26) BLM would require botanical surveys prior to issuing any use permits. No permits would be issued which allow take of Lane Mountain milkvetch (projects would have to be relocated).
8. (P-27) No grazing would be permitted within the conservation area.
9. (P-29) All private lands would be acquired, to the extent feasible and from willing sellers only.

Monitoring provisions (M-10) would establish baseline numbers of Bendire's thrashers, utilizing the methodology established in 1985–86 and employed in 2001, within three years for the conservation area. Future monitoring would be habitat-based, with the objective of detecting substantial changes in vegetation and ground disturbance.

Monitoring for Lane Mountain milkvetch (M-37) would consist of an annual review of compliance with HCP protection measures, with an objective of detecting new disturbance in occupied habitat. An annual report on the progress of acquisitions would be submitted to USFWS (M-38).

Adaptive management (A-8, A-36)) would include adjustments to the conservation area boundaries based on new surveys. A new conservation area would be established for Lane Mountain milkvetch if a significant population were located outside the existing conservation areas. New conservation areas or additions to existing conservation areas would be withdrawn from mineral entry.

D.2.4 Kelso Creek Monkeyflower ACEC (1,870 acres)

Prescriptions for this new conservation area are found under the changes proposed for the Jawbone-Butterbredt ACEC.

D.2.5 Middle Knob ACEC

The BLM will designate the Middle Knob area as a new Area of Critical Environmental Concern. Management of this area will include requirements for avoidance of all covered species of plants and animals, designation of vehicle routes of travel to ensure compatibility with the purposes of the ACEC and with the Pacific Crest Trail, and a prohibition on new wind energy development on public lands. Private land restrictions will include a requirement for avoidance of any occurrence of the Kern buckwheat by any development proposed for the area.

Surveys for flax-like monardella in suitable habitat would be required for any public ground-disturbing projects in the Middle Knob Conservation Area.

Within the ACEC, BLM will initiate a restoration project to reduce impacts and enhance habitat for the Kern buckwheat. This work will include:

1. (P-24) Barriers to vehicles along the road adjoining occupied habitat.
2. (P-25) Fencing on both sides of the road near the Sweet Ridge population. A vehicle turnaround and parking area would be restored so that traffic passes by, rather than on, the buckwheat habitat.

Monitoring for the ACEC will consist of:

(M-26) Conduct raptor surveys within three years of Plan adoption to determine current activity at all nests present in 1979 and confirm the baseline numbers.

(M-29) Update Key Raptor Area database at five year intervals.

(M-36) For Kern buckwheat, perform an annual review of compliance with HCP protection measures, with an objective of detecting new disturbance in occupied habitat.

D.2.6 Mojave Fringe-toed Lizard ACEC (28,193 acres and Dale Lake)

Two separate regions would be designated as conservation areas for the Mojave fringe-toed lizard and managed as ACECs. These are found along the Mojave River east of Barstow and in and adjacent to the Sheephole Wilderness east of Twentynine Palms. Three other ACECs (proposed at Pisgah and existing at Manix and Cronese Lakes) will serve to protect this species as well.

BLM would initiate the following conservation actions for the Mojave fringe-toed lizard:

1. Retain public lands within the Mojave River wash.
2. Designate a new conservation area for scattered parcels along the Mojave River. These lands total 28,193 acres.
3. Change the CDCA MUC from Class M to L.
4. Designate a new conservation area near Dale Lake consisting of public lands within the Sheephole Wilderness, and BLM managed lands adjacent to the wilderness and Joshua Tree National Park.

D.2.7 Mojave Monkeyflower ACEC (47,057 acres)

Conservation of Mojave monkeyflower is based on establishment of two areas that include the majority of the known populations. These reserves will become Areas of Critical Environmental Concern on BLM-managed lands in the southern Brisbane Valley and near Daggett Ridge.

Brisbane Valley: BLM would retain 16.5 sections of public land, comprising approximately 10,633 acres, between the Mojave River and Interstate 15. Prescriptions would include:

1. Designation of routes of travel.
2. Retention of public lands for conservation. The conservation area will be deleted from the lands available for exchange in the Land Tenure Adjustment program.
3. Changing the CDCA MUC from Class M to L.
4. Sheep grazing will be discontinued.

Daggett Ridge: A second part of the Mohave Monkeyflower Conservation Area will include known occurrences west of the Newberry Mountains Wilderness near Daggett Ridge. This area of 36,424 acres is within the Ord-Rodman DWMA established for the protection of the desert tortoise. BLM will designate the conservation area as an ACEC.

Within the Daggett Ridge portion of the conservation area, BLM will designate routes of travel with the goal of eliminating routes within washes, unnecessary parallel routes, and routes bisecting populations of Mohave monkeyflower. This network is contained within the Newberry-Rodman and Ord Mountains route designation subregions. New utilities locating within the existing corridor will be required to avoid monkeyflower occurrences to the maximum extent practicable and provide mitigation fees for compensation lands where avoidance is infeasible.

D.2.8 Parish's Phacelia ACEC (898 acres)

BLM will establish a new ACEC for conservation of Parish's phacelia northeast of

Barstow along the Manix Trail. The plan would designate 898 acres as a conservation area for this species. Within the Parish's Phacelia Conservation Area are 386 acres (43%) of private and 512 acres (57%) of public land. Within the conservation area, vehicle travel on the dry lakes will be prohibited and acquisition of occupied habitat on private land will be pursued. Signs will be placed to indicate the boundaries of the ACEC.

D.2.9 Pisgah ACEC (14,224 acres)

A new BLM ACEC will be designated for a portion of the Pisgah Crater and surrounding area (Map 2-11). This crater and lava flow, an uncommon landform in the western Mojave Desert, is currently designated as a Research Natural Area. It contains lava tubes of several types, some of which are used as bat roosts. The mix of dark lava and white sand has resulted in interesting color adaptations in the reptiles and small mammal fauna, called cryptic coloration or background color matching. These white and dark forms occurring together represent a location of high genetic biodiversity within species. The ACEC would include areas where populations of crucifixion thorn, white-margined beardtongue, sand linanthus, and Mojave fringe-toed lizard occur. Desert tortoise also occurs in the area.

The Pisgah Crater was designated as a Research Natural Area by the 1980 CDCA Plan (page 127 and Map 17). The boundaries of the RNA extended into the Marine Corps base, following the lava flow.

This ACEC would differ from others because of the existing land uses, which include mining, utility easements, rockhounding and competitive recreation events. Existing mineral extraction operations will continue, and the Johnson Valley to Parker vehicle race will be allowed on a specified route within the ACEC. New mining would be allowed, subject to the 1% limitation on new allowable ground disturbance and payment of the 5:1 mitigation fee amount ratio.

Management prescriptions include:

- Designate routes within the ACEC as open or closed and restore or block routes to be closed.
- Change the CDCA multiple use class from M to L.
- Acquire private parcels where white-margined beardtongue occurs within the proposed Pisgah ACEC if feasible.
- Allow the Johnson Valley to Parker race with stipulations to protect biological resources.
- Mining or other permitted uses would not be allowed to destroy or degrade the lava tubes.7
- The existing mining operations at Pisgah Crater will not be restricted by these proposals.

Monitoring would include (M-50) delineation of the blowsand habitat at Pisgah to better define occupied habitat for the fringe-toed lizard. For the white-margined beardtongue, (M-87) BLM or the Implementation Team would census known locations every three years.

Adaptive management measures include a prohibition of vehicle traffic on conserved occupied habitat (A-48) for the fringe-toed lizard and adjustments based on the habitat delineation. Occurrences of the white-margined beardtongue would be fenced along the utility corridors if monitoring shows damage (A-89).

D.2.10 West Paradise ACEC

The West Paradise ACEC would lie within the Superior-Cronese DWMA and contain conservation areas for the desert tortoise, Mohave ground squirrel, and Lane Mountain milkvetch. It would serve as a multispecies reserve for these three species.

Applicable management within the West Paradise ACEC would include the 1% limitation on allowable ground disturbance and 5:1 mitigation fee ratio found in all conservation areas as well as:

1. All provisions for conservation and management of the desert tortoise.
2. All provisions for conservation and management of the Mohave ground squirrel.
3. (P-28) Designated routes of travel. Fencing of the approved routes would be installed as necessary, with signs advising the public that the area is closed to vehicle travel because of endangered species conservation.
4. (P-30) All lands within the Conservation Area will be withdrawn from mineral entry. Claimholders with valid existing rights will be compensated.
5. (P-29) All private lands would be acquired, to the extent feasible and from willing sellers only.
6. (P-32) Claimholders should be notified of the presence of endangered plants. Restrictions on casual use that involves ground disturbance within the Conservation Area would be developed as necessary.
7. (P-26) BLM would require botanical surveys prior to issuing any use permits. No permits would be issued which allow take of Lane Mountain milkvetch (projects would have to be relocated).
8. (P-27) No grazing would be permitted within the conservation area.

Monitoring for Lane Mountain milkvetch (M-37) would consist of an annual review of compliance with HCP protection measures, with an objective of detecting new disturbance in occupied habitat. An annual report on the progress of acquisitions would be submitted to USFWS (M-38).

Adaptive management (A-36)) would include establishment of a new conservation area or adjustments to the two proposed conservation area boundaries based on new surveys. A new conservation area would be established for Lane Mountain milkvetch if a significant population were located outside the existing conservation areas. New conservation areas or additions to existing conservation areas would be withdrawn from mineral entry.

D. 3 EXISTING ACEC PLANS WHICH WOULD NOT BE CHANGED BY THE WEST MOJAVE PLAN

D.3.1 Amboy Crater National Natural Landmark (ACEC 87) (679 acres)

An ACEC was designated at Amboy Crater by an amendment to the CDCA Plan in 1989. This area is managed by the Needles Field Office, and contains an access road, parking area and rest rooms.

D.3.2 Big Morongo Canyon (ACEC 50) (28,274 acres)

The Big Morongo Canyon ACEC is managed as a wildlife reserve, with emphasis on strict protection of the flora and fauna. This desert oasis is known internationally for its bird diversity, and opportunities are provided for wildlife viewing and photography, including boardwalk trails, interpretive displays and brochures. Expansion of the ACEC in 1996 created a habitat linkage between the Little San Bernardino Mountains and the San Bernardino Mountains, though several private parcels remain to be acquired. The ACEC is one of the West Mojave hotspots, and provides conservation for 14 covered species.

The BLM's Palm Springs/South Coast Field Office manages the Big Morongo Canyon ACEC. An amendment to the CDCA Plan covering public lands within the Coachella Valley, including Big Morongo Canyon ACEC, was completed in December 2002. This amendment did not change the boundaries of the ACEC, but it designated routes of travel for public lands. The Proposed Plan proposes no changes to the Big Morongo Canyon ACEC.

D.3.3 Soggy Dry Lake Creosote Rings (ACEC 47) (186 acres)

The Soggy Dry Lake Creosote Rings Preserve was established to protect ancient vegetation in the Fry Valley, where creosote bushes have developed as clonal rings, attaining an age of up to 11,700 years. A management plan for this ACEC was approved in 1982. The CDFG owns 488 acres adjacent to the ACEC, managed as the King Clone Ecological Reserve.

D.3.4 Upper Johnson Valley Yucca Rings (ACEC 46) (353 acres)

The CDCA Plan of 1980 established an ACEC for the unique clonal yucca rings found near the Fry Mountains within the Johnson Valley Open Area. The yucca plants are believed to have grown in a manner similar to the ancient creosote rings near Soggy Dry Lake and represent a stable, old plant community. A management plan was completed in 1982, and a Plan Amendment in 1984 adjusted the boundary along parcel lines to make it legally defensible.

D.3.5 Whitewater Canyon (ACEC 49) (16,381 acres)

The Whitewater Canyon ACEC straddles the West Mojave Plan boundary, with the upper elevations lying within the planning area. All of the ACEC within the West Mojave Plan lies within the San Gorgonio Wilderness. Wildlife protection is a goal of the ACEC Plan, and the ACEC protects a substantial herd of bighorn sheep and harbors nests of golden eagle and prairie falcon. Significant riparian areas are found in lower Whitewater Canyon (out of the West Mojave) and these are known to support the several covered species of riparian birds as well as the arroyo toad. Potential habitat exists for the triple-ribbed milkvetch within upper Whitewater Canyon. The Pacific Crest Trail and the California Riding and Hiking Trail cross the ACEC.

The BLM's Palm Springs/South Coast Field Office manages the Whitewater Canyon ACEC. An amendment to the CDCA Plan covering public lands within the Coachella Valley, including Whitewater Canyon ACEC, was approved in 2002. The Coachella Valley CDCA Plan Amendments did not change the boundaries of the Whitewater Canyon ACEC, but designated routes of travel for public lands.

Appendices

APPENDIX E

WILDERNESS AREAS

Appendices

APPENDIX E
WILDERNESS AREAS

Argus Range: This wilderness contains a 28-mile stretch of the Argus range, a long and narrow mountain chain along the west side of Panamint Valley. Elevations range from 2,800 feet on the east side to more than 7,500 feet on the west side of the wilderness, which is adjacent to the China Lake Naval Air Weapons Station. Steep mountain slopes and highly dissected canyons characterize the Argus Range. Several springs are located within this dry desert mountain range, providing water for a small population of desert bighorn sheep and critical habitat for the Inyo California towhee. At least three golden eagle territories, with five separate nest sites, have been identified. Remains of historic mining activity and a few prehistoric sites are scattered throughout the area. Vegetation types include creosote bush scrub on the lower slopes, scattered pinyon juniper woodland on the high slopes and relatively little vegetation on the steep mountain slopes and canyon walls.

Bighorn Mountains: The rugged Bighorn Mountains in the north-central portion of this wilderness are the foothills of the San Bernardino Mountains. Visitors can experience the rare ecological transition that occurs here, including yucca and Joshua trees on the desert floor and stands of Jeffrey pine at higher elevations, including the 7,500-foot high Granite Peak. Mule deer, mountain lion, bobcat and golden eagles make their home among the Joshua trees and yucca and stands of Jeffrey pine in the remote, higher elevations. Resident and migratory birds rest along Rattlesnake Canyon Creek, which flows northward through the wilderness to Johnson Valley. This wilderness encompasses both BLM and Forest Service administered lands.

Black Mountain Wilderness: This wilderness is a volcanic flow and mesa with a deposit of fine-grained dune sand in the southeast corner. Elevations range from 2,080 to 3,941 feet at the summit of Black Mountain. Golden eagles and prairie falcons nest and forage in this area, which is also known for its occasional display of spring flowers. The wilderness contains significant prehistoric rock art.

Bright Star: Kelso Peak and associated drainages to the north, south and east is surrounded by this wilderness. To the west, the Kelso Mountain system is contiguous with the Piute Mountain Range in the Sequoia National Forest. Vegetation varies: upper slopes of the 5,000 foot Kelso Peak are dotted with pinyon pine and juniper trees; intervening slopes are brushy with large granite rock outcroppings; and the boulder-strewn valley supports dense stands of Joshua trees. The wilderness supports small numbers of Kelso Creek monkeyflower. The varied habitats of the Mojave Desert, Sierra Nevada, San Joaquin Valley and Transverse Ranges ecoregions allow for a wide diversity of wildlife. The entire wilderness is included within the BLM Jawbone-Butterbredt ACEC, an area set aside for cultural and wildlife values.

Cleghorn Lakes: Named for the dry lakes found near its center, this wilderness contains vastly different natural resources. The east portion is mountainous while the west portion is a vast alluvial slope or bajada. Elevations range from 1,400 feet at the desert floor to the rugged

Bullion Mountains, which rise more than 4,100 feet across a 4-mile stretch. The Bullion Mountains include desert bighorn sheep habitat and desert tortoise can be found on the valley floor. Barrel cactus "gardens" and "smoke trees" inhabit some washes. The lakes offer occasional spring wildflower displays and crucifixion thorn has been found near the eastern edge of the wilderness boundary.

Coso Range: This wilderness encompasses the northern section of the Coso Mountain Range, an area of extensive erosion revealing outstanding volcanic displays and numerous valleys and washes. From high points within the wilderness, most notably Joshua Flat, one can obtain outstanding views of the Owens Valley and the eastern Sierra Nevada range. Creosote bush scrub, Mojave mixed woody scruband large stands of Jushua trees are the primary vegetation in the area. Vermillion Canyon and Joshua Flat are two especially scenic areas within this wilderness. Cactus Flat and McCloud Flat are two areas of historic mining activity.

Darwin Falls: Although named Darwin Falls Wilderness, the falls are under the administration of the adjoining Death Valley National Park. The Darwin Plateau and Darwin Hills form the landscape of this wilderness. The plateau, which is cut by numerous shallow depressions and canyons, displays a variety of volcanic rock faces and exposures. Vegetation is typical of a creosote bush scrub community with Joshua tree woodland at higher elevations. Wildlife species include nesting and foraging habitat for prairie falcon.

El Paso Mountains: Numerous reddish-colored buttes and dark, uplifted volcanic mesas dissected by narrow canyons distinguish this wilderness. Badlands topography surrounds Black Mountain, its central feature. The most spectacular attribute of this area is the abundance of cultural sites. The southern portion of the wilderness is included in the Last Chance Archaeological District and is listed on the National Register of Historic Places. Wildlife includes abundant game birds (chuckar and quail), a significant concentration of nesting raptors, and the desert tortoise. Vegetation primarily consists of creosote bush scrub with Joshua Trees on the western side of the mountain.

Golden Valley: The Golden Valley, for which this wilderness is named, is surrounded on either side by two distinct mountain ranges. The Lava Mountains stretch across the northwestern portion of the area, crowned by Dome Mountain at nearly 5,000 feet. This range is cut by several steep-walled canyons that reveal bands of multi-colored sedimentary rocks. The Almond Mountains, rising to an elevation of 4,500 feet, enclose the valley on the southeast. Golden Valley, which is known for its spectacular spring floral displays, lies between the two ranges. The ruggedness of these mountains have helped shelter the valley from human intrusion. The wilderness provides nesting and foraging habitat for raptors and habitat for the desert tortoise and Mohave ground squirrel. Vegetation consists primarily of creosote bush scrub community with Joshua Trees and numerous annuals.

Grass Valley: Nearly three-quarters of this area consists of Grass Valley itself. This valley is the main topographic feature of the wilderness. A series of scattered hills, reddish-brown to yellow in appearance and gently rising to elevations from 200 to 600 feet above the desert valley floor, lie across the western portion of the area. Vegetation is typical of a creosote bush scrub community with a scattering of Joshua trees. Wildlife values include raptor foraging and desert tortoise and Mohave ground squirrel habitat.

Kiavah: This wilderness encompasses the eroded hills, canyons and bajadas of the Scodie Mountains Unit within the Sequoia National Forest -- the southern extremity of the Sierra Nevada Mountains. A unique mixing of several different species of plants and animals occurs within the transition zone between the Mojave Desert and Sierra Nevada Mountains. Desert plants such as creosote bush, Joshua tree, burro bush and shadscale may be found in close association with pinyon pine, juniper, canyon oak and digger/grey pine. The varied vegetation provides habitat for a great diversity of wildlife over a small geographic area. Species of note include raptors, the yellow-eared pocket mouse, a variety of lizards and a number of migrant and resident bird species. This wilderness is part of a National Cooperative Land and Wildlife Management Area and the BLM Jawbone-Butterbredt ACEC.

Newberry Mountains: Noted for its rugged volcanic mountains and deep, maze-like canyons, the topography of the Newberry Mountains wilderness ranges from 2,200 feet in the north to 5,100 feet in the south. The unique desert features are the result of ancient volcanic activity. Desert bighorn sheep have historically traveled this area, and prairie falcons and golden eagles nest on the cliffs. Spring wildflower displays are likely along the west boundary. Small numbers of the Mojave monkeyflower are protected within the wilderness.

Owens Peak: The majority of this wilderness is comprised of the rugged eastern face of the Sierra Nevada Mountains. Owens Peak, the high point of the southern Sierra Nevada, rises more than 8,400 feet. The mountainous terrain has deep, winding, open and expansive canyons, many which contain springs with extensive riparian vegetation. This area is a transition zone between the Great Basin, Mojave Desert and Sierra Nevada ecoregions. Vegetation varies considerably with a creosote desert scrub community on the bajadas, scattered yuccas, cacti, annuals, cottonwood and oak trees in the canyons and valleys and a juniper-pinyon woodland with sagebrush and grey pine on the upper elevations. Wildlife includes mule deer, golden eagle, with four recorded nesting territories, and prairie falcon. The Owens Peak wilderness protects eight southern Sierra Nevada endemic plant species, and its lower elevations contain occupied habitat for Charlotte's phacelia and Ninemile Canyon phacelia. Evidence of occupation by prehistoric peoples has been found throughout the wilderness. The Pacific Crest Trail passes through the wilderness along its western boundary.

Rodman Mountains: A series of ridges and valleys climbing from 2,000 feet to almost 5,000 feet are the result of faults which cross this wilderness. A lava flow slices this area in two from northwest to southeast, forming a sloping mesa. Colorful escarpments, calico-colored mountains, maze-like canyons and broad, majestic bajadas come together here. Steep canyons and cliff-like walls form dry falls along deep drainage channels, creating cascades during heavy rain storms. More than a half dozen natural water tanks sit within the lava flow. Two of the tanks, Hidden Tank and Deep Tank, hold thousands of gallons of water. One of only seven core raptor breeding areas in the desert is within this wilderness, where prairie falcons and golden eagles areprominent. The mountains themselves are part of the historical range of the desert bighorn sheep. While sheep have not been spotted here, this wildlife species has been seen in the nearby Newberry Mountains.

Sacatar Trail: This wilderness encompasses a portion of the rugged pristine eastern face of the Sierra Nevada Mountains. Topography ranges from valley, canyons and alluvial fans to steep hills that lead into granite peaks and ridgetops reaching elevations of more than 7,800 feet. Vegetation is extremely diversified with creosote bush, Mojave mixed woody scrub and Joshua trees on the lower slopes and cacti and scattered pinyon juniper woodlands on the upper slopes. Several of the canyons are complemented by springs with riparian habitats of cottonwoods, willows and grasses. The Sacatar Trail, an old wagon road and one of the few evidences of man in this area, provides backcountry access into this wilderness. Wildlife within the area includes mule deer, nesting golden eagles, prairie falcon, quail and dove.

San Gorgonio: This wilderness is part of the eastern slope of the San Bernardino Mountains with topography rapidly changing from low, rolling foothills and canyons to steep, rugged mountains. Elevations range from 2,300 to 5,500 feet. Because of this elevation gradient, the wilderness reflects a unique transition between desert, coastal and mountain environments, including the different types of vegetation representative of each elevation. Portions of Mission Creek have been determined to be eligible for Wild River designation by Congress.

Sheephole: The Sheephole Valley, from which this wilderness takes its name, separates the Sheephole Mountains and Calumet Mountains. The Sheepholes are a steep, boulder-strewn, granitic mountain mass. The Calumets take on a similar appearance, although rising only half as high as the 4,600-foot tall Sheepholes. Bighorn sheep utilize the Sheephole range for foraging and as a dispersal corridor, while the desert tortoise occupies the valleys below. The wilderness contains significant habitat for the Mojave fringe-toed lizard. The area's lack of springs and extreme distances make wilderness travel a challenge for the most experienced desert hiker.

APPENDIX F

MOJAVE RIVER
WILD AND SCENIC RIVER
ELIGIBILITY REPORT

Appendices

MOJAVE RIVER WILD AND SCENIC RIVER ELIGIBILITY REPORT

This report presents the results of an eligibility study on potential additions to the National Wild and Scenic Rivers System for an identified riverine system in the West Mojave Planning Area. The river considered potentially eligible for designation is the Mojave River, originating near the Forest Service boundary in Hesperia and terminating in the Mojave National Preserve. This eligibility report evolved from the agency mandate to evaluate eligible waterways and the stipulation contained in a lawsuit settlement agreement. Table F-1 shows the findings of eligibility or non-eligibility for each river segment. This report concludes with a discussion of management standards and guidelines applicable to rivers designated under the National Wild and Scenic River (WSR) Act of 1986.

Background: Federal agencies such as the Bureau of Land Management (BLM) have been mandated to evaluate potential additions to the National Wild and Scenic River System (NWSRS) per Section 5(d) of the Wild and Scenic Rivers Act of 1968 (16 United States Code 1271-1287, *et seq*). Title 36 of the Code of Federal Regulations (CFR), Subpart 297, addresses management of Wild and Scenic Rivers. Title 43 CFR, Subpart 8350, specifically addresses designation of management areas. NWSRS study guidelines have also been published in Federal Register Volume 7, Number 173 (September 7, 1982) for public lands managed by the U.S. Departments of Agriculture and Interior. Additional guidance on wild and scenic rivers (WSR) is provided in BLM Manual 8351.

The NWSRS study process includes three regulatory steps:

1. Determination of what river(s) and/or river segment(s) are eligible for WSR designation;
2. Determination of eligible river(s) and/or segment(s) potential classification with respect to wild, scenic, recreational designation, or any combination thereof, and
3. Conducting a suitability study of eligible river(s) and/or segment(s) for inclusion into the NWSRS via legislative action. An environmental impact statement (EIS) is commonly prepared to document the analysis needed for suitability determination/WSR designation.

Any river or river segment on public lands found eligible for inclusion in the NWSRS is to be managed as if this river/segment were designated, until such time as a suitability determination is made. This requires management of public lands within 0.25 mile of the subject river or river segment to conform to management standards and guidelines presented in federal agency manuals for wild and scenic rivers until the suitability determination is completed.

If a river or river segment is found suitable for inclusion to the NWSRS, the U.S. Congress must then pass legislation designating this river/segment, prior to its formal addition to the NWSRS. In addition to Federal agencies, private individuals and/or groups, as well as State governments, can nominate rivers and/or segments for inclusion.

Only the determinations of eligibility and classification are documented in this report and the impacts evaluated in the attached West Mojave Desert Proposed Plan and Environmental Impact Statement. The remaining suitability determination would be completed in a separate document, and analyzed in an EIS format. The results of the suitability determination would amend CDCA Plan.

To meet eligibility criteria for wild and scenic river designation, a river or segment must be free-flowing in nature and must possess one or more outstandingly remarkable cultural, fish/wildlife, geologic, historic, recreational or scenic values within its immediate proximity. Free flowing, as defined in Section 16(b) of the WSR Act reflects water flowing in a natural condition without impoundment, diversion, straightening, or other modification of the waterway. However, the existence of low dams, diversion works, and other minor structures at the time of designation, does not necessarily bar consideration for inclusion on the NWSRS. Nor are there any minimum river or segment lengths necessary for inclusion. Congress has designated a riverine stretch as short as 4.25 miles. Considerations in defining study rivers and/or study river segments should include land ownership patterns, physical changes in the river/segments and their environs, as well as the type and amount of human modification of lands bordering identified rivers/segments.

The term "Outstandingly Remarkable" is not clearly defined in the NWSRS, necessitating professional judgment by submitting parties. In general, the term is defined as a resource that is considered more than simply ordinary, in the context of the local region. Examples include areas supporting an "A" Scenic Quality Rating (BLM Manual 8400); habitats for threatened and/or endangered plants/animals; exemplary physiographical, ecological, geological or recreational type locations; and areas where little human modification is evident or where terrain is rugged and physically challenging to traverse.

Accessibility, primitive nature, number and type of land developments, structures, water resource developments, and water quality were all considered in assigning classifications. The primary criteria for the three classifications are outlined below [*In: A Compendium of Questions & Answers Relating to Wild & Scenic Rivers* (Technical Report of the Interagency Wild and Scenic Rivers Coordinating Council 1999)]:

- **Wild River Areas**: Those rivers, or sections of rivers, that are free from impoundments, generally inaccessible except by trail (no roads), with watersheds or shorelines essentially primitive, and having unpolluted waters.

- **Scenic River Areas**: Those rivers, or sections of rivers, that are free from impoundments, having shorelines or watersheds largely primitive and undeveloped, but accessible in places by roads (i.e., roads may cross but generally not parallel [in close proximity to] the river. These rivers or segments of rivers are usually more developed than wild and less developed than recreational. This classification may or may not include scenery as an Outstandingly Remarkable Value (ORV).

Recreational River Areas: Those rivers or sections of rivers that are readily accessible by road or railroad, may have had some development of the shoreline, and may have had some impoundment or diversion in the past. This classification, does not, however, imply that recreation is an ORV.

Interim Protection: The Wild and Scenic Rivers (WSR) Act and federal guidelines require federal agencies, upon determination of WSR eligibility, to provide interim protection and management for a river's free-flowing character and any identified outstandingly remarkable values, subject to valid existing rights, until such time as a suitability study is completed. Upon study completion, the federal agency (BLM in this instance) makes a recommendation to Congress, which acts on that recommendation.

Description of River Under Consideration: The Mojave River is the focal hydrologic system of the central portion of the West Mojave Desert planning area. It is a closed groundwater basin and the free-flowing segments of the Mojave River are largely subterranean. It begins its northerly, largely underground flow near Hesperia at the boundary of the San Bernardino National Forest and the CDCA. The two primary forks of the upper watershed, Deep Creek and the West Fork of the Mojave River, converge at the Mojave Forks Dam to form the mainstem of the Mojave River. The tributaries of Horsethief Creek and Little Horsethief Creek enter the West Fork upstream from the dam. Additional tributaries are dammed upstream by Silverwood Lake, within the San Bernardino National Forest.

From the Mojave Forks Dam the Mojave River is free-flowing but without surface water until it reaches Spring Valley Lake, an adjacent residential subdivision. From Spring Valley, perennial surface flow continues through the Upper and Lower Narrows to the vicinity of Oro Grande, a distance of 8.5 miles. Surface flow between Oro Grande and Barstow is intermittent, supporting light riparian cover intermixed with areas of dense riparian vegetation, including stands of trees. Between Helendale and Camp Cady, near Harvard Road, the river is dry except during storm flows. Water surfaces at Camp Cady for a distance of 1.8 miles, though not in all years. The river is dry downstream again until Afton Canyon, where 2.9 river miles have surface flow and support riparian vegetation. Past Afton Canyon, the river widens into a broad dry wash, terminating at Soda Lake within the Mojave National Preserve. In some years, stormwater flows north into a terminus at the Cronese Basin.

The primary contributor to the surface flow of the Mojave River is bedrock forcing the underground flow to the surface at the Upper and Lower Narrows, Camp Cady, and Afton Canyon. Surface flow is augmented by discharge from Pelican Lake within Mojave Narrows Regional Park, and from the Victor Valley Wastewater Reclamation Authority and City of Barstow sewage treatment plants. Precipitation falling in the San Bernardino Mountains flows to the Mojave River in the headwaters, where dams block it. These dams release storm water at a controlled rate. Rainfall from the north side of the and San Gabriel Mountains drains to the Mojave River primarily via Oro Grande Wash in Victorville.

Most desert washes between Victorville and Mojave National Preserve do not carry stormwater all the way to the Mojave River except in very exceptional wet years. These washes drain the hills in the Brisbane Valley, Fairview Valley, Waterman Hills, and Iron Mountain. Washes draining the Newberry Mountains and Rodman Mountains terminate in the Mojave Valley prior to reaching the Mojave River. Runoff from the Cady Mountains and Cave Mountains similarly rarely reaches the river in Afton Canyon. Exceptions to this pattern are the larger drainages, particularly Bell Mountain Wash, Buckthorn Wash (named Buckhorn Wash on some maps) and Daggett Wash.

Water flow in the Mojave River is greatly reduced by groundwater pumping from pre-settlement and historical periods, and the Mojave River Basin is in severe overdraft. Water rights are allocated according to the Mojave Basin Adjudication, which requires a rampdown of groundwater use in specified sub-basins. The likelihood of a return to historical levels of surface flow in the near future is very low. Lake Silverwood and the Mojave Forks Dam capture stormwater flows at the headwaters, and the San Bernardino County Department of Public Works provides flood protection in the river in several locations. Structural improvements are limited, but regular maintenance in the channel affects the riparian habitat and some of the Outstandingly Remarkable Values on private lands in the middle reaches of the river.

The Pleistocene history of the Mojave River involved permanent flow to a series of lakes. In the last Ice Age, extending from 30,000 to 10,000 years ago, the Mojave River discharged to the south into the Mojave Valley, Lavic Lake, Dale Lake, Bristol Lake, and other playas extending nearly to the Colorado River. The river and lakes supported species of invertebrates, fish, amphibians, and pond turtles, and attracted migratory birds dependent on water. Remnant populations of these animals are still present today, and comprise many rare or disjunct species. The ancient river and lakes formed sandy beaches and prevailing winds carried the finer particles to the east, forming hummocks and dunes. These blowsand areas now support unique species of insects, plants, and reptiles, including the Mojave fringe-toed lizard, whose entire distribution can be traced to the former path of the ancient Mojave River and Amargosa River.

Lands along the river are largely in private ownership. Of the 100.5 river miles between Mojave Forks Dam and the Mojave Sink at the west boundary of the Mojave National Preserve, 23.6 miles are managed by BLM. Many of the BLM managed lands are in scattered parcels. Larger blocks of public land exist at the Manix and Afton Canyon ACECs and in the Rasor Open Area. Afton Canyon is the only part of the Mojave River with perennial water on public lands. 3.5 river miles are managed by the Department of Fish and Game at Camp Cady and 2.0 miles are owned by CDFG at Mojave Narrows Regional Park, which is managed by San Bernardino County Department of Regional Parks. Eligibility determinations are made for BLM public lands only.

Description of River Segment(s) Under Consideration: Considerations for National Wild and Scenic Rivers System eligibility are based on resource values, land ownership patterns, shoreline development, proximity of roads and previous river modifications. The eligibility determination made here is for a 2.9 mile segment of the Mojave River near Afton Canyon. The required suitability study on this segment will be deferred until after the Record of Decision for the West Mojave Plan amendment to the CDCA Plan.

Recommended NWSRS Segment Classification and Land Ownership: Once determined eligible, river segments are tentatively classified for study as wild, scenic, or recreational, based on the degree of access and amount of development along the river area. If Congress designates a river or segment, the enabling legislation generally specifies the classification.

Table F-1
Summary of River Segment Eligibility and Recommended Classifications

RIVER REACH	LENGTH	COMMENTS
Mojave Forks Dam to Spring Valley Lake	11 miles	Not eligible – no free flowing water. Public land limited to two parcels totaling 0.375 miles.
Spring Valley Lake to Interstate 15 bridge	3.5 miles	No determination. No public land.
Interstate 15 bridge to Oro Grande	4.5 miles	No determination. No public land.
Oro Grande to Helendale	10 miles	No determination. No public land.
Helendale to Barstow	19 miles	Not eligible – no free flowing water. Public land limited to 2.25 miles in three parcels.
Barstow to Harvard Road crossing	22 miles	Not eligible – no free flowing water. Public land on 8.0 miles in 5 separate parcels.
Harvard Road crossing to Basin Road	22.5 miles	Eligible in part. Free flowing water for 2.9 miles. Recommended classification of "Recreational" for this segment. Outstanding remarkable scenic, geologic, recreational, wildlife, cultural and historic values. Public land limited to 14 miles in this reach. Seven miles are within Afton Canyon ACEC and one mile is within Manix ACEC.
Basin Road to Soda Lake (Mojave National Preserve)	8 miles	Not eligible – no free flowing water. Public land covers 7 river miles within Rasor Open Area.

Table F-2
Comparison of Outstanding Remarkable Values for
Public Land River Segments of the Mojave River

RIVER SEGMENT - PUBLIC LAND	FREE FLOW	SCE-NIC	REC	GEOLO-GIC	FISH	WILD-LIFE	HISTO-RIC	CULT-URAL	ELIGIBLE WSR
Mojave Forks Dam to Spring Valley Lake 0.375 miles	No	0	0	0	0	0	0	0	No
Helendale to Barstow 2.25 miles	No	4	0	0	0	3-4	0	0	No
Barstow to Harvard Road crossing 8 miles	No	4	4	3	0	3	4	0	No
Harvard Road crossing to	Yes	1	3	1	2	2	3	3	Yes

RIVER SEGMENT - PUBLIC LAND	FREE FLOW	SCE-NIC	REC	GEOLO-GIC	FISH	WILD-LIFE	HISTO-RIC	CULT-URAL	ELIGIBLE WSR
Basin Road 14 miles									
Basin Road to Soda Lake (Mojave National Preserve) 7 miles	No	4	2	4	0	4	4	4	No

The following segment of the Mojave River has been found eligible because it is free flowing and possess at least one outstanding remarkable value: 2.9 miles within the Afton Canyon ACEC.

Key to Ratings:
0 – None
1 – Exemplary, one of the better examples of that type of resource at a national level
2 – Unique, a resource or combination of resources that are regionally one of a kind
3 – High quality at a regional and /or local level
4 – A common resource at the regional and/or local level

Outstanding Remarkable Values: The segment identified as eligible on public lands contains Outstandingly Remarkable Scenic Values (ORVs), i.e., Class “A” scenic quality, per BLM Manual guidelines. Public lands in this segment have been previously designated as an Area of Critical Environmental Concern in part because of spectacular scenery. Regionally rare plant communities such as Cottonwood-Willow Riparian Forest, Willow Riparian Scrub, Mesquite Bosque, as well as alkaline meadow, and emergent plant communities can also be found along this portion of the river. Wildlife supported by these plant communities includes a high percentage of neotropical migrant birds and local or regional disjuncts. The threatened desert tortoise occurs near this segment, as well as a host of sensitive and/or special concern species. The presence of flowing water in this segment has served to attract humans for thousands of years. The high relief, stark topography and lush riparian vegetation provided by this segment continue to offer many opportunities for non-intrusive recreation. Table F-2 documents the comparative assessment of ORVs by river segment. ORVs for the eligible portion of the Mojave River follow.

Wildlife and Plants: Vegetation in the eligible segment consists of riparian plant communities, including Cottonwood-Willow Riparian Forest, Willow Scrub and introduces tamarisk thickets. Drier portions of the river adjacent too the flowing water support Mesquite Bosque. Invasive tamarisk has been removed as part of a restoration program by BLM over the past twelve years, and large numbers of willows and cottonwoods are replacing former tamarisk thickets. Exclusion of cattle from the riparian area has assisted with the riparian restoration effort.

The riparian zone serves as a major stopover point for neotropical birds, and is utilized as nesting habitat for a variety of species. 180 bird species have been recorded from Afton Canyon, including disjunct occurrences of yellow warbler, vermilion flycatcher, summer tanager and yellow-breasted chat. The surrounding mountains support nesting golden eagles and prairie falcons and a number of other nesting and wintering raptors have been recorded.

Unusual reptiles in Afton Canyon include the easternmost occurrence of the southwestern pond turtle, desert tortoises in the adjacent creosote bush scrub and Mojave fringe-toed lizards in nearby blowsand deposits. Several species snakes and lizards are present, making Afton Canyon an area of high reptilian diversity.

Three species of fish have been recorded: black bullhead, flathead minnow and arroyo chub. These fish have displaced the native Mojave tui chub, an endangered species. The Mojave tui chub could be re-introduced at Afton Canyon, but several major problems would have to be overcome. These include removal of non-native fish and predators, prevention of hybridization with the arroyo chub, storm proofing of a refugium site, and maintenance of water levels. The Department of Fish and Game and U. S. Fish and Wildlife Service consider re-introduction of the Mojave tui chub into the Mojave River to be infeasible at this time. However, Afton Canyon appears to provide a re-introduction site with a high potential for success compared to other locations along the river.

Bighorn sheep are present in the Cady Mountains, and Afton Canyon provides a reliable water source for these animals. Other larger desert mammals, primarily predators, utilize the water as well.

Geologic: This segment of the Mojave River presents a spectacular landscape of badlands with an exposed multicolored stratigraphy. The Pleistocene drainage of Lake Manix about 19,000 years ago sent water down the river to cause downcutting and erosion through lake and pre-lake sediments as well as the fanglomerate in Afton Canyon. The Manix fault is an important structural geologic feature of the area.

A fossil assemblage of Rancholabrean age occurs in the area, and fragmentary remains have been found of dire wolf, mammoth, sabre-toothed cat, bison, antelope and horses.

Cultural: Prehistoric sites along the Afton Canyon segment indicate an intermittent or continuing occupation by indigenous peoples for over 12,000 years. These sites include quarry sites, lithic scatter, ground stone artifacts, a possible cave site and six occupation or multi-use sites. Afton Canyon was part of a prehistoric trade route across the Mojave Desert and was a significant “way station”. The canyon was part of the Serrano Indians traditional resource area, near the boundary of the Chemehuevi territory.

Historic: The Mojave Road was a major historic trade and migration route. Jedidiah Smith, Kit Carson and John C. Fremont traveled through the canyon in the early 1800s and recommended it as a route. One mining operation in the hills adjoining the riparian segment has been in operation since the 1930s.

Recreational: Afton Canyon is one of the most heavily used recreation areas of the

California desert. The area is used by OHV enthusiasts, equestrians, rockhounds, campers, picnickers, hikers, hunters and birdwatchers. BLM campgrounds facilitate use of the canyon and adjacent lands. Scientific and educational use of the area by colleges and universities is also common. The Mojave Road is an important historic and recreation feature attracting a high number of users.

Wilderness: No designated wilderness is found in the eligible river segment, but the adjacent Cady Mountains are designated as a Wilderness Study Area and have been included in current Congressional legislation for wilderness status.

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U. S. Army Corps of Engineers, 1997. Mojave River Floodplain Maintenance Plan. Corps of Engineers, Los Angeles District, Los Angeles, CA.

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Management Standards and Guidelines for National Wild and Scenic Rivers

The Wild and Scenic Rivers Act (Public Law 90-542, as amended) established a method of providing Federal protection for certain of our remaining free-flowing rivers, and preserving these locales for the use and enjoyment of present and future generations. Such designated rivers benefit from the protective management that the act provides.
Section 10(a) of the WSR Act states:

> Each component of the NWSRS shall be administered in such a manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration, primary emphasis shall be given to protecting its esthetic, scenic, historic, archaeologic, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development, based on the special attributes of the area.

This section is generally interpreted by the Secretary of the Interior as a stated non-degradation and enhancement policy for all designated river areas, regardless of classification.
The following National Standards and Guidelines are summarized from BLM Manual 8351 [Wild and Scenic Rivers-Policy and Program Direction for Identification, Evaluation and Management (1992)]. These standards/guidelines are intended to apply to formally designated rivers through incorporation into, or amendment of, resource or land use management plans. Incorporation or amendment efforts are typically completed within three years of formal WSR designation. However, these guidelines also apply, on an interim basis, as described above. For the sake of clarity, guidelines are presented for each separate river classification (wild, scenic and recreational).

Wild River Areas

The WSR Act defines wild river areas to include; "those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds and shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America."
Wild river areas are to be managed with a primary objective of providing primary emphasis to protection of identified outstandingly remarkable values, while providing consistent, river-related, outdoor recreation opportunities in a primitive setting.

Where National Management Standards/Guidelines include allowable practices such as construction of minor structures related to wildlife habitat enhancement, protection from fire, and rehabilitation or stabilization of damaged resources, provided the area will remain natural looking and the practices or structures will harmonize with the environment. Developments such as trails, bridges, occasional fencing, natural-appearing water diversions, ditches and water management devices, may be permitted if they are unobtrusive and do not have a significant, adverse impact on the natural character of the river area. The following Wild River Program Management Standards apply:

Forestry Practices

Cutting of trees not permitted except when needed in association with a primitive recreation experience (such as clearing trails, for visitor safety purposes, or for fire control). Timber outside the boundary, but within visual corridors, should where feasible, be managed and harvested in a manner designed to provide special emphasis on visual quality.

Water Quality

Conditions will be maintained or improved to meet Federal criteria or federally approved State Standards. River management plans shall prescribe a process for monitoring water quality on a scheduled basis.

Hydroelectric Power and Water Resource Development

No such development would be permitted in the channel or river corridor. All water supply dams and major diversions are prohibited. The natural appearance and essentially primitive character of the river area must be maintained. Federal agency groundwater development for range, wildlife, recreation or administrative facilities may be permitted if there are no adverse effects on ORVs.

Mining

New mining claims and mineral leases are prohibited within 0.25 mile of the river. Valid existing claims would not be abrogated and, subject to existing regulations, e.g., 43 CFR 3809, and any future regulations the Secretary of the Interior may prescribe to protect the rivers included in the NWSRS, existing mining activity would be allowed to continue. All mineral activity on federally administered land must be conducted in a manner that minimizes surface disturbance, water sedimentation, pollution and visual impairment. Reasonable mining claim and mineral lease access will be permitted. Mining claims beyond 0.25 mile of the river, but within the wild river boundary, and perfected after the effective date of designation, can be patented only as to the mineral estate and not the surface estate.

Road and Trail Construction

No new roads or other provisions for overland motorized travel would be permitted within a narrow incised river valley or, if the river valley is broad, within 0.25 mile of the river bank. A few inconspicuous roads leading to the boundary of the river area and unobtrusive trail bridges may be permitted.

Agricultural Practices and Livestock Grazing

Agricultural use is restricted to a limited amount of domestic livestock grazing and hay production to the extent currently being practiced. Row crops are prohibited.

Recreation Facilities

Major public use areas, such as campgrounds, interpretive centers, or administrative headquarters are located outside of wild river areas. Simple comfort and convenience facilities, such as toilets, tables, fireplaces, shelters and refuse containers may be provided as necessary within the river area. These should harmonize with the surroundings. Unobtrusive hiking and equestrian trail bridges could be allowed on tributaries, but would not normally cross the designated river.

Public Use and Access

Recreational use including, but not limited to, hiking, fishing, hunting and boating is encouraged in wild river areas to the extent consistent with the protection of the river environment. Public use and access may be regulated and distributed where necessary to protect and enhance wild river values.

Rights-of-Way

New transmission lines, natural gas lines, water lines, etc., are discouraged unless specifically prohibited outright by other plans, orders or laws. Where no reasonable alternative exits, additional or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are unavoidable, locations and construction techniques will be selected to minimize adverse effects on wild river area-related values and fully evaluated during the site selection process.

Motorized Travel

Although this use can be permitted, it is generally not compatible with this river classification. Normally, motorized use will be prohibited in a wild river area. Prescriptions for management of motorized use may allow for search and rescue/emergency situations.

Scenic River Areas

The WSR Act defines scenic river areas to include "those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads."

Scenic river areas are to be managed with a primary objective of maintaining and providing outdoor recreation opportunities in a near-natural setting. The basic distinctions between "wild" and "scenic" classifications, involve varying degrees of development, types of land use, and road accessibility. In general, a wide range of agricultural, water management, silvicultural and other practices could be compatible with scenic classification values, providing such practices are carried out in a manner not resulting in a substantial adverse effect on the river and its immediate environment.

National Management Standards/Guidelines include the same considerations set forth for wild rivers, except that motorized vehicle use may in some cases be appropriate and that development of larger scale public-use facilities within the river area, such as moderate-sized campgrounds, interpretive centers, or administrative headquarters would be compatible, if such facilities were screened from the river. The following Scenic River Program Management Standards apply:

Forestry Practices

Silvicultural practices, including timber harvesting could be allowed, provided that such practices are carried out in such a way that there is no substantial adverse effect on the river and its immediate environment. The river should be maintained in its near-natural condition. Timber outside the boundary, but within the visual screen area, should be managed and harvested in a manner designed to provide special emphasis on visual quality. Preferably, reestablishment of tree cover would be through natural revegetation. Cutting of dead and down materials for fuelwood will be limited. Where necessary, restrictions on the use of wood for fuel may be prescribed.

Water Quality

Conditions will be maintained or improved to meet Federal criteria or federally approved State Standards. River management plans shall prescribe a process for monitoring water quality on a scheduled basis.

Hydroelectric Power and Water Resource Development

No such development would be permitted in the channel or river corridor. Flood control dams and levees would be prohibited. All water supply dams and major diversions are prohibited. Maintenance of existing facilities and construction of some new structures would be permitted, provided that the area remains natural in appearance and the practices or structures harmonize with the surrounding environment.

Mining

Subject to existing regulations, e.g. 43 CFR 3809, and any future regulations the Secretary of the Interior may prescribe to protect the rivers included in the NWSRS, new mining claims and mineral leases can be allowed. All mineral activity on federally administered land must be conducted in a manner that minimizes surface disturbance, water sedimentation, pollution and visual impairment. Reasonable mining claim and mineral lease access will be permitted. Mining claims within the wild river boundary, and perfected after the effective date of designation, can be patented only as to the mineral estate and not the surface estate.

Road and Trail Construction

Roads may occasionally bridge the river and short stretches of conspicuous or lengthy stretches of inconspicuous and well-screened roads would be allowed. Maintenance of existing roads and any new roads will be based on the type of use for which the roads are constructed and the type of use that will occur in the river area.

Agricultural Practices and Livestock Grazing

In comparison to wild river areas, a wider range of agricultural and livestock grazing uses are permitted, to the extent currently being practiced. Row crops are not considered as much of an intrusion of the "largely primitive" nature of scenic corridors, as long as there is not a substantial adverse effect on the natural-like appearance of the river area.

Recreation Facilities

Larger-scale public use areas, such as moderate-sized campgrounds, interpretive centers, or administrative headquarters, are allowed if such facilities are screened from the river.

Public Use and Access

Recreational use including, but not limited to, hiking, fishing, hunting and boating is encouraged in scenic river areas to the extent consistent with the protection of the river environment. Public use and access may be regulated and distributed where necessary to protect and enhance scenic river values.

Rights-of-Way

New transmission lines, natural gas lines, water lines, etc., are discouraged unless specifically prohibited outright by other plans, orders or laws. Where no reasonable alternative exits, additional or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are unavoidable, locations and construction techniques will be selected to minimize adverse effects on scenic river area-related values and fully evaluated during the site selection process.

Motorized Travel

This use, on land or water, could be permitted, prohibited or restricted to protect river values. Prescriptions for management of motorized use may allow for search and rescue/emergency situations.

Recreational River Areas

The WSR Act defines recreational river areas to include "those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, that may have undergone some development along their shorelines, and that may have undergone some impoundment or diversion in the past."

Recreational river areas are to be managed with an objective of protecting and enhancing existing recreational values. The primary objective is to provide opportunities for the public to participate in recreation activities dependent on, or enhanced by, the largely free-flowing nature of the river.

National Management Standards/Guidelines include allowable practices such as construction of recreation facilities in proximity to the river, although recreational river classification does not require extensive recreational developments. Such facilities are still to be kept to a minimum, with visitor services provided outside the river area. Future construction of impoundments, diversions, straightening, riprapping and other modification of the water way or adjacent lands would not be permitted, except where such developments would not have a direct and adverse effect on the river and its immediate environment. The following Recreational River Program Management Standards apply:

Forestry Practices

Silvicultural practices, including timber harvesting could be allowed under standard restrictions to avoid adverse effects on the river environment and its associated values.

Water Quality

Conditions will be maintained or improved to meet Federal criteria or federally approved State Standards. River management plans shall prescribe a process for monitoring water quality on a scheduled basis.

Hydroelectric Power and Water Resource Development

No such development would be permitted in the channel or river corridor. Existing low dams, diversion works, riprap and other minor structures may be maintained, provided the waterway remains generally natural in appearance. New structures may be allowed, provided that the area remains natural in appearance and the practices or structures harmonize with the surrounding environment.

Mining

Subject to existing regulations, e.g. 43 CFR 3809, and any future regulations the Secretary of the Interior may prescribe to protect the rivers included in the NWSRS, new mining claims and mineral leases can be allowed. All mineral activity on federally administered land must be conducted in a manner that minimizes surface disturbance, water sedimentation, pollution and visual impairment. Reasonable mining claim and mineral lease access will be permitted. Mining claims within the wild river area boundary perfected after the effective date of designation can be patented only as to the mineral estate and not the surface estate.

Road and Trail Construction

Existing parallel roads can be maintained on one or both riverbanks. There can be several bridge crossings and numerous river access points.

Agricultural Practices and Livestock Grazing

In comparison to scenic river areas, lands may be managed for a full range of agricultural and livestock grazing uses, consistent with current practices.

Recreation Facilities

Interpretive centers, administrative headquarters, campgrounds and picnic areas may be established in proximity to the river. Recreational classification does not require extensive recreation development.

Public Use and Access

Recreation use including, but not limited to, hiking, fishing, hunting and boating is encouraged in recreational river areas to the extent consistent with the protection of the river environment. Public use and access may be regulated and distributed where necessary to protect and enhance recreational river values.

Rights-of-Way

New transmission lines, natural gas lines, water lines, etc., are discouraged unless specifically prohibited outright by other plans, orders or laws. Where no reasonable alternative exits, additional or new facilities should be restricted to existing rights-of-way. Where new rights-of-way are unavoidable, locations and construction techniques will be selected to minimize adverse effects on recreational river area-related values and fully evaluated during the site selection process.

Motorized Travel

This use, on land, will generally be permitted, on existing roads. Controls will usually be similar to that of surrounding lands. Motorized travel on water will be in accordance with existing regulations or restrictions.

Management Objectives Common to All Wild, Scenic, and Recreational Rivers

Wilderness and Wilderness Study Areas

Management of river areas that overlap designated wilderness areas or wilderness study areas will meet whichever standard is highest. If an area is released from wilderness study area status and the associated Interim Management Policy, the applicable river classification standards and guidelines would then apply.

Fire Protection and Suppression

Management and suppression of fires within a designated river area will be carried out in a manner compatible with contiguous federal lands. On wildfires, suppression methods will be utilized that minimizes the long-term impacts on the river and surrounding area. Pre-suppression and prevention activities will be conducted in a manner that reflects management objectives for the specific river segment. Prescribed fire may be utilized to maintain or restore ecological condition or meet objectives of the river plan.

Insects, Diseases and Noxious Weeds

The control of forest and rangeland pests, diseases and noxious weed infestations will be carried out in a manner compatible with the intent of the WSR Act and management objectives of contiguous federal lands.

Cultural Resources

Historic and prehistoric resource sites will be identified, evaluated and protected in a manner compatible with the objectives of the river and in accordance with applicable regulations and policies. Where appropriate, historic or prehistoric sites will be stabilized, enhanced and interpreted.

Fish and Wildlife Habitat Improvement

The construction and maintenance of minor structures for the protection, conservation, rehabilitation and enhancement of fish and wildlife habitat are acceptable, provided they do not affect the free-flowing characteristics of the river, are compatible with the classifications, that the area remains natural in appearance and the practices or structures harmonize with the surrounding environment.

APPENDIX G

INCIDENTAL TAKE PERMIT BACKGROUND DATA

Appendices

APPENDIX G
INCIDENTAL TAKE PERMIT BACKGROUND DATA

Information Sources and Comments

California City Prison – Jack Stewart, City Manager, 25 November 2002. Stewart indicated that although the impact was restricted to 70 acres, the proponent purchased 320 acres, at the cost of $5000/acre, for a total of $1,600,000. Since the ratio was 1:1, it is assumed the remaining 250 acres is in an existing mitigation bank

Cushenbury Mine Site - Paul Kielhold, Lilburn Corporation, 25 November 2002. Kielhold indicated that the write-up costs were about $7,500, although another $20,000 was likely spent in coordination and ancillary documentation. Similarly, he indicated that 115 acres were purchased at about $900 to$1,000/acre (hence the $103,500 - $115,000), but that mitigation monitoring and other services may have cost another $120,000.

High Desert Power Project – Kenny Stein, of Constellation and Anne Knowlton, of URS, on 26 November 2002. With regards to timeframe for permit issuance, Stein indicated that it took approximately two years to issue the original permit and an additional year (hence "3 years") for the permit to be amended to cover an additional acre of accidental impact (for which the proponent offered to compensate 7 acres for the 1 accidentally impacted). The compensation ration was varied, based on short- and long-term impacts, but in total included about $900/acre for the actual 100 acres that were disturbed (hence $900,000 for compensation). Although tortoises were regularly handled on the Section 7 portion of this project, Stein indicated that there was no take associated with the Section 10(a) permit part of the project.

Kern County Waste Management – Franklin Bedard, Kern County Waste Managemen, December 2002. Bedard did not know the costs for write-up or compensation, but indicated that the three landfill sites were compensated at the relatively high (inconsistent) rate of 3:1.

Miller Church Sites – Ed LaRue, November 2002. Compensation lands purchased at DTNA by the Desert Tortoise Preserve Committee, which continues to manage the land with under an MOU with the BLM. $9,000 included acquisition of 5 acres plus endowment funds.

Electrified Fence Project – No information contact was found for this project, which authorized the construction of electrified fences around numerous State prison sites, mostly located outside tortoise habitat.

Sunland Communities – Ed LaRue, November 2002. Total of 320 acres of private land purchased by project proponent and deeded to the BLM. The $220,000 was for both land acquisition and endowment funds.

U.S. Borax Mine Site – Dave Weiss, 22 November 2002 and Dennis Boyle, 25 November 2002, U.S. Borax. Boyle indicated that U.S. Borax purchased 2,274 acres (including two sections of Catellus lands) for $731,900 and provided CDFG with $238,000 in endowment funds, for a total of $969,900.

Wildwash Sand & Gravel Mine – Ed LaRue, November 2002. Compensation lands purchased by E.L. Yeager from Catellus Land Corporation and deeded to the BLM

APPENDIX H

CLIMATE AND AIR QUALITY

Appendices

APPENDIX H
CLIMATE AND AIR QUALITY

The West Mojave planning area is a desert characterized by hot summer temperatures (average daily highs above 100 degrees Fahrenheit) and low annual precipitation (approximately 5 inches). Snow can occur during the winter. Probably more important than the averages is the extreme variability in the weather. Ridgecrest has recorded temperatures as high as 118 degrees and as low as 0 degrees. Daily temperatures ranges of 40 degrees can occur. Precipitation extremes are also common. Variations of 80% in annual precipitation are common. Summer thunderstorms can drop more precipitation on a site in one event than the mean precipitation for that location. High winds can occur. Peak wind velocities above 50 miles per hour (MPH) are not uncommon and winds of 100 MPH occur every year. One site has recorded 174 MPH winds.

Climactic Influences: California lies within a zone of prevailing westerly winds. It is also located on the east side of the semi-permanent high-pressure area of the northeast Pacific Ocean. High-pressure areas exhibit clockwise wind circulation. The basic flow in the free air above the state, therefore, is from the west or northwest during most of the year. The mountain chains within the state, however, deflect these winds and, except for the immediate coast, wind direction is likely to be more a product of local terrain than it is of prevailing circulation. This is especially true in the western Mojave Desert where the Sierra Nevada Mountains form a wall on the west boundary of the planning area and the San Gabriel and San Bernardino Mountains direct winds along the southern boundary of the plan area. Elevations rise to above 10,000 feet in all of these ranges. Prevailing winds out of the southwest are the result of the blocking nature of the Sierra Nevada Mountains and the proximity of the area to coastal and central California.

During the winter, the storm tracks move further south bringing high and low pressure cells with them. Wind direction and speed are modified by these migratory pressure centers. When there is a strong high-pressure area over the Great Basin and an intense low-pressure area approaches the coast from the west, strong and sometimes damaging winds occur, usually from an easterly or southeasterly direction, especially along the coast and in the coastal mountains. As the storms move inland the winds veer to southerly and southwesterly directions, and high wind speeds may occur anywhere within the plan area. The greatest velocities generally occur adjacent to the mountains and the Walker, Tehachapi, Soledad and Cajon passes. Wind gusts in excess of 80 MPH occur regularly in Mojave and along the western edge of the Indian Wells Valley. Gusts over 100 MPH are not unusual and a gust of 174 MPH was recorded in the Indian Wells Valley (December 1996).

During the summer a Pacific Subtropical High cell influences the region. This cell, which sits off the coast, inhibits cloud formation and encourages daytime solar heating. Air masses pushed onshore in Southern California are channeled through the Mojave Desert as a result of differential heating and a thermal low-pressure area located over the Southeastern Desert areas. There is a marked diurnal pattern in the strength of the wind.

Another influence on the area air circulation is the result of the northwest wind moving alongshore the prominent headlands at Pt. Arguello. Wind speeds in the immediate vicinity of this major headland can be two or three times as great as the wind flow at nearby points. Here a strong jet of air is projected southward past San Miguel and San Nicholas Islands, driving a huge eddy as much as 200 miles in diameter. The air swings eastward near San Diego then northward and westward along the coast to rejoin the southward flowing air at the west end of the Santa Barbara Channel. This effect is called a coastal eddy and it can cause a southern airflow into the desert from the coastal basins. These various airflow mechanisms are the most influential in the western Mojave Desert. The airflows diminish toward the eastern Mojave Desert where the monsoonal air masses from the continental areas are more influential. Periodically a high-pressure area with its clockwise air circulation will settle in the four corners area (where Arizona, New Mexico, Colorado and Utah meet) resulting in an air circulation from the east to the west.

Temperature extremes are common in the planning area. Below or near freezing temperatures are common at most weather stations. Seven of thirteen stations have average low temperatures below freezing in December and January. El Mirage has the lowest average temperatures in the planning area and Twentynine Palms has the highest average temperatures. Average daily temperature variation is 29 degrees for all stations. Seasonal variations are high. Ridgecrest, for example, has recorded highs of 118 degrees and lows of 0 degrees since the middle 1980s.

Precipitation: Deserts are noted for their low rainfall and the Mojave Desert is no exception. The blocking nature of the mountains on the western and southern boundaries of the desert results in a rain shadow on the desert side of the mountains where precipitation is far less than on the coastal side. Weather patterns and their resulting precipitation follow the seasonal wind patterns and changes. This results in winter precipitation generally arriving from the southwest and spreading eastward across the desert. Winter precipitation volumes normally are the highest in the western Mojave Desert and diminish toward the east. This is illustrated in the mean precipitation for western locations such as Lancaster and Mojave (over 6 inches) and eastern cities such as Twentynine Palms (4 inches).

All of the weather stations in the planning area receive some of their precipitation as snow. The total average snowfall ranges from under one inch in Trona to over three inches at Haiwee reservoir and Lancaster.

A cyclic weather phenomenon called the El Nino brings increased precipitation to portions of the eastern Pacific Rim. This is especially true in the western Mojave Desert. Weather Bureau records indicate that there have been 23 El Nino years since 1931. These 23 years represent approximately 1/3 of the years, but on the western edge of the desert, those years account for 65% of the precipitation.

During the summer the western edge of the Mojave Desert is heavily influenced by the dry southwest airflows resulting in typically very dry weather. The influence of the southwest winds diminishes toward the eastern Mojave Desert. This results in a more continental influence and its resulting monsoonal weather patterns. This east to west variability is also reflected in the pronounced east to west difference in average monthly precipitation (Table H-1) and in the influence of the El Nino years. In Twentynine Palms, for example, only 44% of the precipitation falls in El Nino years as opposed to 65% along the western edge of the desert.

The consistent occurrence of two wet seasons in the eastern portion of the planning area is reflected in the vegetation. There is a distinction between plants having most of their photosynthetic activity during the late spring and summer (warm season plants) and plants having most photosynthetic activity during the winter (cool season plants). The vegetation in the eastern Mojave Desert includes warm season plants such as Mojave yucca (*Yucca schidigrea*), galleta grass species (*Pleuraphis spp.*) and others in addition to the cool season plants. The warm season plants are absent from the western edge of the desert. The break between the warm season area and the cool season area follows a north south line along the Mojave River and just west of Harper Dry Lake.

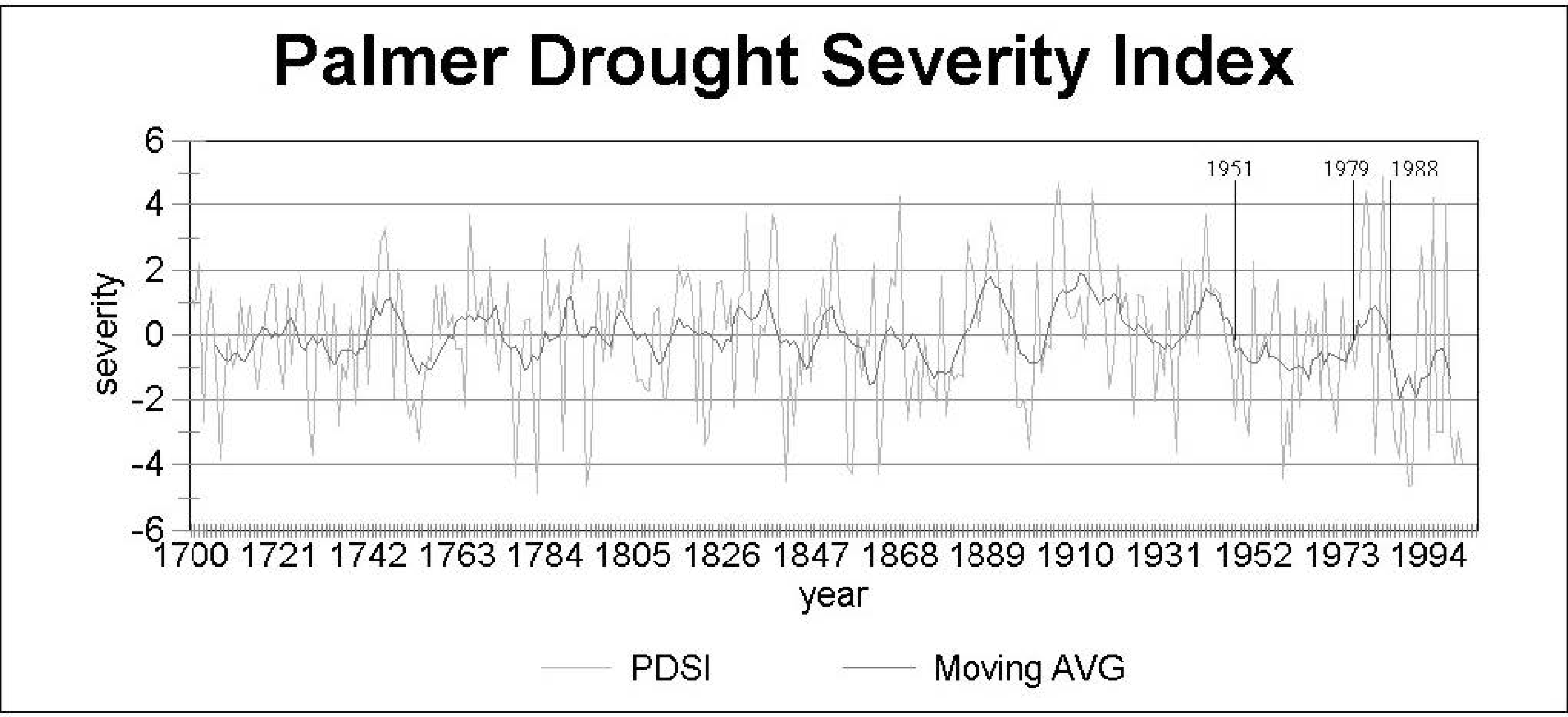
Extreme variability is another characteristic of the precipitation. Some locations such as Mojave have a mean precipitation of 6.06 inches and a standard deviation of 4.04 inches. This means that the normal precipitation ranges from a low of 2.02 inches to 10.10 inches. This is an 80 % variation in precipitation volumes.

Table H-1

Precipitation Data

LOCATION	MEAN PRECIPITATION (INCHES)	STANDARD DEVIATION	RANGE H / L	LENGTH OF OBSERVATIONS (YEARS THROUGH 2000)	% OF YEARS RAINFALL >1"		% RAIN FALLING IN EL NINO YEARS	NUMBER OF EL NINO YEARS SINCE 1931
					JULY	AUGUST		
Barstow Fire	4.25	2.43	10.62 / 0.24	62	8	16	47	23
China Lake	3.39	2.48	9.82 / 0.75	53	5	3	65	23
Daggett Airport	3.68	1.28	5.50 / 1.20	48			58	23
El Mirage Field	5.74	3.30	12.62 / 1.92	29	3	17	63	23
Goldstone Echo	4.84	2.58	10.51 / 1.74	23			59	23
Haiwee Reservoir	6.69	3.77	17.27 / 1.50	71	6	18	42	23
Inyokern	4.12	2.94	11.70 / 0.59	55	5	9	50	23
Lancaster	6.56	4.60	16.85 / 1.85	16			66	23
Mojave	6.06	4.04	15.77 / 0.85	60	3	7	48	23
Palmdale	6.56	4.13	14.44 / 1.35	16			65	23
Randsburg	6.46	3.81	16.44 / 1.29	63	2	6	48	23
Trona	3.94	2.41	8.66 / 0.42	49	6	9	46	23
Twentynine Palms	4.22	2.42	12.32 / 0.27	66	21	18	44	23
Victorville	5.61	3.02	13.42 / 1.27	62	3	6	48	23
Needles				63	16	27		

Notes: Rainfall based upon calendar year
Data from NOAA and China Lake NAWS



Palmer Drought Severity Index
6
4
2
0
-2
-4
-6
severity
1951
1979
1988
1700 1721 1742 1763 1784 1805 1826 1847 1868 1889 1910 1931 1952 1973 1994
year
PDSI
Moving AVG

Appendices

APPENDIX I

BEST MANAGEMENT PRACTICES FOR NEW CONSTRUCTION IN TORTOISE HABITAT

Appendices

APPENDIX I

BEST MANAGEMENT PRACTICES FOR NEW CONSTRUCTION IN TORTOISE HABITAT

I.1 BEST MANAGEMENT PRACTICES FOR DWMAs

I.1.1 Awareness Program

1. The Implementation Team will develop and make available a standard education program, and maintain a list of Authorized Biologists and Environmental Monitors who can administer the program and implement the protective measures given below.

2. At a minimum, the awareness program shall emphasize the following information relative to the desert tortoise: (a) distribution on the job site; (b) general behavior and ecology; (c) sensitivity to human activities; (d) legal protection; (e) penalties for violating State or federal laws; (f) reporting requirements; and (g) project protective mitigation measures. The Authorized Biologist and/or Environmental Monitor shall work with the project proponent to ensure that all workers have received the awareness program and understand the various components. Interpretation shall be provided for non-English speaking construction workers.

3. All employees, subcontractors, and others who work on-site shall participate in a desert tortoise awareness program prior to initiation of field activities. The project proponent is responsible for ensuring that the awareness program is presented prior to conducting activities. Hard hat stickers to identify personnel who have attended the training and wallet-sized cards listing key BMPs are encouraged.

4. Educational materials produced by the West Mojave Implementation Team may be accompanied by a video, and the program administered by the Authorized Biologist or Environmental Monitor in a classroom setting, if available. In other cases, the program would be given in the field prior to initiation of construction activities, and shall include truck drivers, delivery personnel, and other project-related personnel occasionally entering the work site.

I.1.2 Preconstruction Planning

5. Whenever possible, the project proponent shall work with the Implementation Team to plan for and conduct construction activities (particularly linear projects through Tortoise Survey Areas) when tortoises are least likely to be active, which generally occurs between November 15 and February 15.

6. Where more than one site or alignment could satisfy the project proponent's needs, it is suggested that a presence-absence survey be conducted on the alternative sites to determine which site or alignment will result in the fewest impacts to tortoises and occupied habitat during project development.

I.1.3 Enforcement Capabilities

7. The Authorized Biologist shall serve as the field contact representative (FCR), and be responsible for implementing the following measures: (a) be responsible for overseeing compliance with protective stipulations for the desert tortoise; (b) coordinate compliance with the Lead Federal Agency; (c) have the authority to halt all activities that are in violation of the stipulations; and (d) maintain a copy of all appropriate stipulations (including pertinent BMPs) when work is being conducted at the site.

8. Monitors shall document all non-compliance activities. Repeated violations shall be resolved at the workplace between appropriate individuals. If problems persist, the Authorized Biologist or Environmental Monitor shall report infractions back to the Lead Federal Agency for public projects or Implementation Team for private projects within three to five days of the repeated violation. Such repeated violations, if not promptly rectified, may serve as the basis for stopping the project until the non-compliance issue is resolved.

9. If the project proponent fails to comply with any of the protective measures, the Lead Federal Agency shall suspend the pertinent authorization until such time that the project proponent is in compliance with those measures and conditions.

I.1.4 On-site Minimization Measures

I.1.4.1 Travel

10. Except when required by the project and explicitly stated in the project permit, cross-country vehicle use by project-related personnel shall be prohibited during work hours.

11. Except on paved roads with posted speed limits, vehicle speeds shall not exceed 20 miles per hour through desert tortoise habitat during travel associated with the authorized activity.

I.1.4.2 Minimize Habitat Disturbance

12. To the extent possible, previously disturbed areas within the project site shall be used for stockpiling excavated materials, storing equipment, locating office trailers, parking vehicles, and other surface-disturbing activities. The Authorized Biologist or Environmental Monitor shall assist the project foreman in locating such areas to avoid desert tortoise mortality, minimize impacts to habitat, and ensure compliance with this measure and other pertinent regulatory documents (e.g., Streambed Alteration Agreement from CDFG).

13. The area of disturbance shall be confined to the smallest practical area, considering

topography, placement of facilities, location of desert tortoise burrows, public health and safety, and other limiting factors. Work area boundaries shall be delineated with flagging or other marking to minimize surface disturbance outside of the approved work area. Special habitat features, such as burrows, identified by the Authorized Biologist shall be avoided to the extent possible.

I.1.4.3 Survey

14. The Authorized Biologist(s), which have been previously approved by the Implementation Team and/or Federal Lead Agency, shall perform clearance surveys and remove desert tortoises from harm's way. Environmental Monitors, who also must be approved by the Implementation Team, may assist but must be accompanied by the Authorized Biologist in removing desert tortoises during clearance surveys.

15. Only those animals in the construction area or otherwise in harm's way shall be moved. All potential habitat areas to be lost or otherwise impacted by construction activities shall be surveyed for tortoises and burrows immediately prior to the disturbance, using the following guidelines, which take into consideration when adult tortoises are most likely (February 15 - November 15) and least likely (November 16 - February 14) to be active aboveground:

(a) Between February 15 and November 15, the survey shall occur within 48 hours prior to ground disturbance and the surveyor shall remain on-site until all vegetation has been cleared.

(b) Between November 16 and February 14~~)~~, the survey may be performed several days or several weeks prior to ground disturbance. However, the Authorized Biologist must be on-site at the time of ground disturbance to rescue any injured animals or collect animals accidentally killed.

16. In general, the clearance survey would be conducted along transects spaced at 30-foot intervals on flat, open terrain or at shorter intervals (e.g., 15-20 feet apart) in dense vegetation, rocky hillsides, or in other situations where substrates are not easily observed. Environmental Monitors may assist the Authorized Biologist in the clearance survey, but shall not perform the clearance survey in the absence of the Authorized Biologist.

17. If no tortoise sign is found in the Impact Area, the Authorized Biologist must judge the likelihood of tortoises occurring in adjacent areas.

18. If the Authorized Biologist judges that tortoises are absent from the site AND that there is no likelihood of a tortoise immigrating into the Impact Area, the Authorized Biologist shall convey that information to personnel directly responsible for ground-disturbing activities, and leave an educational brochure outlining measures to be taken if a tortoise is encountered.

19. If tortoises or intact (i.e., active) tortoise burrows are found in the Impact Area OR if the Authorized Biologist is reasonably sure that a tortoise may enter into the construction site, take

avoidance measures shall be implemented. Any tortoises within the Impact Area shall be removed and relocated by the Authorized Biologist as per guidelines given in Attachment I-1. Tortoises outside the Impact Area shall not be handled or otherwise disturbed.

20. All burrows in the Impact Area, including those not recently used, shall be excavated by the Authorized Biologist at the time of the survey. Eggs shall be relocated by the Authorized Biologist as they are found (see Desert Tortoise Council, 1999).

21. Once the initial tortoises are removed and burrows excavated, the site would then be surveyed an additional time to located any tortoises or burrows missed by the first survey. The site would then be considered clear and ground-disturbing activities may proceed.

22. The Authorized Biologist shall remain on-site until it is completely brushed.

23. Upon locating a recently dead or injured desert tortoise, the Authorized Biologist shall immediately notify the Lead Federal Agency (for federal projects) or Implementation Team (for non-federal projects). Where appropriate, it is recommended that tortoise remains be collected and stored as given in Dr. Kristin Berry's June 2001 protocol for salvaging dead and sick tortoises. Written notification shall be made within five days of the finding to the Implementation Team and the Service's Division of Law Enforcement in Torrance. The information provided shall include the date of the finding or incident (if known), location of the carcass or injured animal, a photograph, cause of death (if known), and other pertinent information. Injured animals shall be transported to a qualified veterinarian for treatment at the expense of the project proponent. If injured animals recover, the project proponent shall contact the Implementation Team for final disposition of the animal(s).

24. Authorized Biologists and Environmental Monitors are advised to follow the appropriate guidelines outlined in *Guidelines for Handling Desert Tortoises during Construction Projects*, Appendix 2 (Desert Tortoise Council 1999).

I.1.4.4 Monitor and Construction Worker Responsibilities

25. The Authorized Biologist(s) shall be present during all activities where habitat is lost or substantially affected. Once the construction area has been cleared of all desert tortoises, an Environmental Monitor may be used instead of an Authorized Biologist. Environmental Monitors are only allowed to handle desert tortoises in emergency situations when the Authorized Biologist is not available.

26. Desert tortoises shall not be handled by construction workers. Monitors shall work cooperatively with construction personnel, and encourage all workers to inform them if a desert tortoise is found within or near project areas. All work in the vicinity of a desert tortoise that could injure or kill the animal shall cease and the desert tortoise shall be observed until it is moved from harm's way by the biologist or, in an emergency, by the monitor.

27. Workers shall look for desert tortoises under vehicles and equipment before they are moved.

If a desert tortoise is present, the worker shall wait for the desert tortoise to move from under the vehicle and out of harm's way. Alternatively, the Authorized Biologist shall be contacted to remove and relocate the desert tortoise.

28. In general, there shall be one Authorized Biologist or Environmental Monitor assigned to each ground disturbing activity that may take tortoises (i.e., especially vegetation removal). Relatively mobile, often wide-spread construction activities (i.e., installing fiber optic cables and some water lines) will likely require multiple monitors, whereas many different stationary activities (i.e., drill rigs, gravel sifters) may either be fenced or observed by a single monitor.

29. Construction-related activities in desert tortoise habitat may be conducted after dark only in areas in which clearance surveys for desert tortoises have been conducted during daylight hours, as described in these BMPs. Areas in which work will occur after dark shall be clearly and specifically marked with reflective flagging or by some other means to indicate the boundaries within which night-time activities are to be limited.

30. All open holes shall be covered, fenced, OR inspected for trapped desert tortoises by an Authorized Biologist or Environmental Monitor at the beginning, middle, and end of each day. If desert tortoises are trapped, the Authorized Biologist or Environmental Monitor shall be notified immediately. Ramps shall be constructed at the ends of trenches, and, where feasible, at about 100-foot intervals along the trench to allow entrapped tortoises to escape. The desert tortoise shall be allowed to escape or shall be carefully removed and relocated by the biologist/monitor before work continues at that location.

31.All local, State, and federal ordinances, regulations, and laws governing the release of hazardous materials and wastes shall be implemented. Additionally, any and all reportable releases shall be reported to the Lead Federal Agency or Implementation Team (for Section 7 and Section 10(a)(1)(B) projects, respectively) within 24 hours of discovering the release.

32. Trash and food items shall be contained in closed containers and regularly removed to reduce the attractiveness or the area to opportunistic predators such as common ravens (*Corvus corax*), coyotes (*Canis latrans*), and feral dogs.

33. Pets shall be prohibited from the construction site. If guard dogs are to be used, the project proponent shall ensure that such animals do not adversely affect tortoises or other covered species.

34. Firearms, except as otherwise authorized, shall be prohibited from the construction site.

I.1.4.5 Monitor Versus Fencing

35. In DWMAs, if construction lasts for more than a week OR occurs between February 15 and November 15 OR there is a reasonable likelihood that tortoises may wander onto the construction site, the Implementation Team shall require the project proponent to either (i) fence the site to preclude tortoises from the construction area (see Attachment I-2 for general

guidelines) or (ii) employ an Authorized Biologist or Environmental Monitor to remain on-site until all activities likely to harm tortoises are completed.

36. In DWMAs, if construction lasts less than a week OR occurs between November 16 and February 14 OR there is little likelihood that tortoises may wander onto the construction site as determined by the Authorized Biologist, the project proponent is not required to fence the site or monitor. Instead, a tortoise placement hotline number shall be provided in case a tortoise enters the construction area, so that the tortoise may be rescued from harm's way and placed into adjacent areas as otherwise stipulated (see Attachment I-1).

I.1.5 Reporting

37. Authorized Biologists and Environmental Monitors shall maintain records of all desert tortoises and other covered species encountered during project activities, including the following information: (a) the locations (narrative and maps) and dates of observations; (b) general condition and health, including injuries and state of healing and whether animals voided their bladders; (c) locations from which and to which any animals are moved (UTM coordinates derived from a global positioning system - GPS - are preferable); and (d) diagnostic markings (i.e., identification numbers or marked lateral scutes).

38. A written status report shall be submitted to the Implementation Team every 30 days until which time the project is completed OR the potential to take tortoises no longer exists (i.e., if the site is fenced and the Authorized Biologist has already removed all tortoises from the fenced, impact area).

39. No later than 90 days after completion of construction or termination of activities, the Authorized Biologist, serving as the FCR, shall prepare a report for the Implementation Team. The report shall document (a) the effectiveness and practicality of the mitigation measures; (b) the number of desert tortoises excavated from burrows, moved from the site, and accidentally killed or injured; and (c) the specific information for each tortoise as described previously. The report may make recommendations to the Implementation Team and Lead Federal Agency, if appropriate, for modifying the stipulations to enhance protection of the desert tortoise or to make it more workable. The report shall provide an estimate of the actual acreage disturbed by various aspects of the operation.

Attachment I-1. Guidelines for Relocating Tortoises During Authorized Construction Projects in All Occupied Tortoise Habitats

AREA	RECOMMENDED ACTIONS
Desert Wildlife Management Area	Tortoises shall be moved from the immediate area of impact to adjacent suitable habitat (or burrow). In general, adult tortoises (>180 mm) shall be moved no further than 1,000 feet from the impact area; subadults (<180 mm) shall not be moved further than 300 feet. Fencing or monitoring may be required, as described in BMPs 35 and 36.
Incidental Take Area: Special Review Areas	(a) If only a small portion of a given site is to be developed then tortoises shall be moved to portions of the site that are not going to be developed. (b) Tortoises may be moved onto BLM lands if such lands are within (one-half mile of the

	impact area. (c) If the number of tortoises moved to avoid take exceeds a reasonable threshold identified by the Implementation Team, then an area of BLM land in the SRA should be fenced and animals moved there. The southern portion of Brisbane Valley, which may be dedicated to Mojave monkeyflower conservation, may serve this purpose (i.e, as a translocation site). A second area needs to be identified in the southeast (e.g., Little San Bernardino Mountains Gilia Special Review Area) to receive animals from Yucca Valley east to Twentynine Palms.
ITA: Designated Survey Area	(a) If only a small portion of a given site is to be developed then tortoises shall be moved to portions of the site that are not to be developed. (b) Tortoises may be moved onto BLM lands if such lands are within one-half mile of the impact area. (c) If neither option (a) nor (b) is available then tortoises should be made available for research, educational purposes, zoo placement, adoption through recognized organizations (e.g. California Turtle and Tortoise Club), or if clinically ill, euthanized.
ITA: Designated Non-Survey Area	(a) Free roaming pet tortoises and other animals should be made available for research, education, zoo placement, adoption through recognized organizations (e.g. California Turtle and Tortoise Club), or if clinically ill, euthanized. (b) Develop telephone tech support for general public to deal with these "incidental" animals.
All Areas	(a) Sick tortoises and those recently dead, where appropriate, should be collected and disposed of as per a recent (Oct 2001) disposition protocol developed by Kristin Berry. (b) It is suggested that tortoises be handled as given in Desert Tortoise Council's (1999) protocol, Handling Tortoises During Construction Projects

Attachment I-2. General Guidelines for Tortoise-Proof Fencing in DWMAs.

The BMPs identify several scenarios where a tortoise-proof fence may be used in lieu of prolonged environmental monitoring to avoid take of tortoises, subsequent to the Authorized Biologist or Environmental Monitor leaving the site. Specifically:

> 35. In DWMAs, if construction lasts for more than a week OR occurs between February 15 and November 15 OR there is a reasonable likelihood that tortoises may wander onto the construction site, the Implementation Team shall require the project proponent to either (i) fence the site to preclude tortoises from the construction area (see Attachment I-2 for general guidelines) or (ii) employ an Authorized Biologist or Environmental Monitor to remain on-site until all activities likely to harm tortoises are completed.
>
> 36. In DWMAs, if construction lasts less than a week OR occurs between November 16 and February 14 OR there is little likelihood that tortoises may wander onto the construction site as determined by the Authorized Biologist, the project proponent is not required to fence the site or monitor. Instead, a tortoise placement hotline number will be provided in case a tortoise enters the construction area, so that the tortoise may be rescued from harm□s way and placed into adjacent areas as otherwise stipulated (see Attachment I-2).

Herein, we provide general guidelines for fencing materials, installation, monitoring, and maintenance of these fences. There are two basic types of fences: (1) non-tortoise-proof fences that preclude human use or other activities from a given area, and (2) tortoise-proof fences that exclude tortoises from the fenced area. The first type of fence supports either barbed wire or barbless wire, but in all cases, does not have tortoise-proof, meshed hardware cloth attached to the bottom and usually buried in the ground. This fence type allows tortoises to moved in an unrestricted manner into or out of the fenced area. The barbless fences along the northern boundary of the El Mirage Open Area, along the Mojave-Randsburg Road, and on many cattle allotments are examples. This memo concerns tortoise-proof fences, which have a hardware cloth component and are intended to preclude tortoises from a given area (i.e., usually an impact area at a construction or mine site).

In general, there are at least three types of tortoise-proof fences: (1) temporary fences to preclude tortoises from a given area (i.e., usually active construction sites) for a short amount of time (i.e., usually weeks or months, in some cases, days); (2) permanent fences to preclude tortoises from a given area and minimize human impacts to tortoises in perpetuity; and (3) special-condition fences, which are usually permanent, and tailored to meet specific needs. Guidelines for using each fence type are described below. The Implementation Team may modify these guidelines as new information becomes available or where the particular project type calls for modification of these guidelines.

1. Temporary Tortoise-Proof Fences.

1.a. Intended Function. This fence type is intended to preclude tortoises from an active construction site, where said activities (a) are likely to adversely affect tortoises; (b) are of short duration, usually a matter of weeks or months; and (c) fencing is less expensive and equally effective compared to having an environmental monitor remain on-site for a prolonged period of time. In this case, tortoises are known to occur in or adjacent to the impact area, which would be determined at the time of the clearance survey. This type of fence is best used on a fixed construction site [i.e., new or expanding mine area, residential development on a relatively small parcel (i.e., less than about 100 acres), etc.]. Pipelines and other long, linear projects are not well suited for temporary tortoise-proof fences, although fences have been effectively used during construction of pump houses, booster stations, stationary excavations, etc. along the right-of-way. In general, installing the temporary tortoise-proof fence is less expensive than employing an environmental monitor for the duration of the ground-disturbing activity.

1.b. Timing. The West Mojave Plan requires that all areas within Tortoise DWMAs and additional areas within a Tortoise Survey Area are to be surveyed for tortoises prior to ground disturbance. If during this clearance survey, the Authorized Biologist or Environmental Monitor (accompanied by the biologist) finds tortoise(s) on the site or in adjacent areas, a set of Best Management Practices, which may include fence installation, would be implemented to avoid take of tortoises. If a temporary tortoise-proof fence is to be erected, it should be placed around the perimeter of the area to be impacted, allowing sufficient room for construction activities to occur inside the fence without harm to construction personnel. The Authorized Biologist or Environmental Monitor would remain on-site and assist construction personnel or the fencing contractor in the placement of the fence to keep as many tortoise burrows as possible outside the fence. Once the fence is erected, the fenced area would be surveyed for tortoises and burrows, as described in the BMPs. All burrows would be excavated, and all tortoises and tortoise eggs would be moved out of harm's way, outside the fenced area, as described in Attachment I-1 (Guidelines for Relocating Tortoises During Authorized Construction Projects in All Occupied Tortoise Habitats). Once the site is cleared of tortoises, the biologist or monitor need not remain on-site, so long as all construction activities are restricted to and contained within the temporary fence.

1.c. Materials and Installation. In general, the temporary tortoise-proof fence would consist of 24-inch wide, 2-inch mesh, galvanized hardware cloth attached to 36-inch tall rebar or other post material. It may be advisable to clear a narrow (3- to 4-foot wide) path in which the fence would be installed, although the fence may be installed without removing any vegetation. The mesh is then folded in half, creating a 12-inch vertical portion and a 12-inch horizontal portion, at more-or-less right angles to each other. When installing the fence, it is important that the horizontal portion of the fence lie evenly on the ground surface and face "outward" from the fenced area. In so doing, when a tortoise excluded from the fenced area encounters the vertical portion of the fence, it would be standing on the horizontal portion of the fence, which will restrict its ability to burrow beneath the fence and enter the impact area. Rebar or other post material should be spaced at about 10-foot intervals, although the specific situation may require closer intervals (i.e., as in extremely rocky areas) or allow for wider intervals. In any case, post placement should ensure that no gaps exist in the fencing material between the posts. The fencing material is then attached to the rebar with hog rings, fence clamps, or other fasteners. Once attached, the horizontal portion of the fence (which is effectively outside the fenced area) should be covered with soil or rocks, or otherwise secured to the ground surface, so that no gaps allow for tortoise immigration into the impact area. Finally, it may be appropriate to tie surveyor's flagging or other highly visible material to the tops of the posts to increase the visibility of the fence, so that construction personnel avoid tripping on the fence and vehicles avoid damaging it.

There is no evidence that hurricane fencing, plastic mesh, or similar materials will preclude tortoises from an area; tortoises, and lizards in particular, often get their heads or appendages stuck in chicken wire and fencing materials with a mesh size larger than 2 inch; until new information shows otherwise, these materials should not be used as alternate fencing material.

1.d. Gates. One or more gates will be necessary to allow entry and exit of construction vehicles onto the site. There are no specific gate designs associated with the temporary fence, although it must function to preclude tortoises from the area. The gate may be an extension of the fence line, and opened inwards or outwards to allow for vehicle passage. As with the fence, the horizontal portion of the gate should face out from the fenced area. Keeping the gate closed when vehicles are not actively entering or leaving the site has been a major problem in the past, and undermines the effectiveness of the fence. As a guideline, if construction is occurring during the tortoise inactivity period, generally from November 15 to February 15, there is probably no need to close the gate. However, it should be closed at all times when not in use between February 15 and November 15, or if tortoises are known to be active in the area.

1.e. Monitoring and Maintenance. It is essential that someone be assigned the responsibility of periodically walking (or driving, if conditions warrant) the fence line to ensure its integrity and effectiveness in precluding tortoises from the impact area. Whereas this may be accomplished with weekly or monthly inspections, it is important to check the fence after each rain storm to ensure no gaps in the material. Most breaches are remedied by replacing soil or rocks on the horizontal portion of the fence to close the gap.

2. Permanent Tortoise-Proof Fences.

2.a. Intended Function. This fence type is intended to exclude tortoises, including hatchlings, from a given area in perpetuity. It may also function to minimize human impacts on tortoises occurring in adjacent areas. A permanent tortoise-proof fence is generally recommended for facilities in tortoise habitat where there are regular visits to the facility (e.g., pump stations, tank sites, vehicle storage yards, etc.) for the foreseeable future. The need for such a fence should be determined on a case-by-case basis by the Implementation Team, and be based as much as possible on the known occurrence of tortoises in the area. A permanent tortoise-proof fence in downtown Victorville is a waste of money, as no tortoises occur in the interior, urban portions of this and many other desert communities.

2.b. Timing. As with the temporary tortoise-proof fence, the permanent fence should be installed as early as possible, preferably before ground-disturbing activities. If that is not feasible and a temporary fence is used, the permanent fence should be installed inside the temporary fence as part of the contained construction activities. As its name implies, the permanent fence would remain in place in perpetuity, or for as long as the facility is in operation.

2.c. Materials and Installation. The description given above for the temporary fence is also applicable to the permanent fence, with two important exceptions: the hardware cloth is attached to a more substantial fence (i.e., usually chain-link or range fencing) and it is buried. The same 24-inch wide, 2-inch mesh, galvanized hardware cloth should be buried to a depth of about 6 to 8 inches, with the remaining portion securely attached to the more substantial fence. If a temporary fence is installed first, followed later by the permanent fence, the same hardware cloth may be used for both. Ditch witches, backhoes, and other heavy equipment are often used to excavate a trench in which the bottom portion of the hardware cloth is buried. If the ground is too rocky and precludes burying the fence, the contractor must still ensure that the fence excludes tortoises from the area. Three-to-four-inch galvanized posts are often used with chain-link, and t-posts are often used with range fencing, but in any case, the permanent fence should be sturdy enough to remain in place in perpetuity. Installation of these fences should be monitored, unless the fence can be installed alongside existing roads, and even then, the biologist still needs to survey the fenced area to excavate all tortoise burrows and move all tortoises/eggs out of harm's way, to outside the fenced area.

2.d. Gates. Whereas the temporary gate may be as rudimentary as a fold in the extended fence line, the gate on a permanent tortoise-proof fence must be more substantial and sufficiently sturdy to withstand years of use and still function to preclude tortoises. Cement foundations and permanent footings have been used effectively in blocking the gap at the bottom of gates that are frequently used. In cases where there are infrequent visits, hardware cloth may be attached to the bottom of the gate, and closely fit the ground surface to preclude tortoises from entering the site. Often, this type of tortoise-proof gate material drags across the ground as the gate is opened and closed. Keeping the gates closed to frequently used facilities is a persisting problem. Maintaining a closed-gate policy from February 15 to November 15 is advisable.

2.e. Monitoring and Maintenance. Monitoring and maintaining permanent tortoise-proof fences is important. Given that the bottom of the fence is buried, it may not be necessary to check the fence as often as the temporary fence. However, maintaining the integrity of a permanent fence is equally or more important than the temporary fence, and will require an extended monitoring program for as long as the fence remains in place. Curing breaches in a permanent fence may require heavy equipment and is likely to be more time consuming than fixing a gap in a temporary fence. A single storm event may erode away soil from the buried fence, and should be considered in the monitoring and maintenance procedures for the permanent fence.

3. Special Condition Fences.

Finally, in about 1996 (revised 29 January 2002), Dr. Bill Boarman assisted Caltrans in designing a tortoise-proof fence and culverts for the Highway 58 widening project. The following narrative and diagram were provided by Dr. Boarman as one example of how such a fence would be installed and function:

> **Specifications for Culverts and Tortoise-proof Fence along Highway 58, San Bernardino County, California.**
>
> These comments are not to be considered a recommendation; they only serve to explain the current design of the culverts and tortoise-proof fence in place along a fifteen-mile stretch of State Highway 58 between Barstow and Kramer Junction, San Bernardino County, California. The fence consists of 6-strand highway right-of-way fencing with 1/2-inch mesh galvanized hardware cloth sunk part-way into the ground (Figure 1). The fence is connected to several storm-drain culverts that span the entire width of the highway, thus permitting access by tortoises to the culverts.
>
> The basic fence right-of-way consists of 7-foot long metal posts (t-bars) sunk 2 feet 6 inches into the ground and spaced approximately ten feet apart. There are six strands of wire placed about 10 inches apart. The top three strands are barbed, the bottom three are unbarbed strands of 10-gage galvanized wire; this allows medium-sized mammals to climb over without injury. The tortoise-proof feature is made of 24-inch wide, 1/2-inch mesh, clear galvanized steel hardware cloth that is attached to each metal post with steel rings. The cloth is sunk 6 inches into the ground, leaving 18 inches of exposed cloth.
>
> An additional feature of the fence is a specially designed tortoise-proof gate placed at varied intervals along the fence. The gate is a standard 12-foot wide gate with a central vertical stay and attached to a 7-foot metal gate post which is sunk 3 feet into the ground. The 24-inch wide, 1/2-inch mesh, clear galvanized steel hardware cloth is attached to the lower 2 feet of the gate, flush with the bottom of the gate. Beneath the gate, parallel to the gate in a closed position, is an 8 inch by 8 inch by 12 foot Douglas Fir beam sunk completely into the ground with its top edge flush with the ground surface. The gate is hung with a 1/2-inch clearance above the Douglas Fir post.
>
> The culverts are located in washes since they were placed to facilitate water runoff, not tortoise movements. The 156 to 206 foot-long culverts are made of 36 to 60 inch, corrugated steel pipe, 54 inch, reinforced concrete pipe, and 10 ft to 12 ft by 6 ft to 10 ft, reinforced concrete boxes. The culverts cross beneath the entire width of the highway and connect directly to the fence, thus providing an unobstructed pathway between both sides of the fenced highway. The entrance to each culvert is to be maintained to prevent erosion exposing the edge of the culvert or creating gullies, both of which may prohibit tortoise use of the culverts.

I.2 BEST MANAGEMENT PRACTICES FOR DESERT TORTOISE SURVEY AREAS (OUTSIDE DWMAs)

The measures given below comprise a subset of the BMPs developed for construction projects in Tortoise DWMAs, and are modified as necessary for applicability to Incidental Take Areas outside DWMAs where focused desert tortoise surveys would be required (i.e., specifically within Tortoise Survey Areas).

Although DWMAs represent essential habitats required for the conservation and recovery of the desert tortoise, the California Department of Fish and Game (Department) and U.S. Fish and Wildlife Service (Service) require that the take of tortoises be minimized insofar as possible *in all areas supporting tortoises*, not just in DWMAs. The West Mojave Plan (Plan) has used the best available data to delineate areas where clearance surveys would (Tortoise Survey Area) and would not (Tortoise Non-Survey Areas) be required for projects covered by the Plan.

In the Tortoise Non-Survey Areas, a clearance survey would not be required, rather, at the time of discretionary permit issuance, the pertinent lead agency (i.e., mostly counties and cities) would distribute a brochure that, among other things, includes a hotline number to be called in the unlikely event a wild tortoise would be encountered.

The following BMPs are recommended for Tortoise Survey Areas:

I.2.1 Surveys

1. The Implementation Team would maintain a list of Authorized Biologists who are qualified to perform desert tortoise clearance surveys. Environmental Monitors, who also must be approved by the Implementation Team, may assist the Authorized Biologist but are not authorized to perform clearance surveys by themselves.

2. The following guidelines are given to direct the timing of clearance surveys prior to ground-disturbing activities based on the assumption that most tortoises (with the exception of juveniles) are in hibernation from November 15 through February 15:

   (a) Between February 15 and November 15, the clearance survey shall occur within 48 hours prior to ground disturbance.

   (b) Between November 16 and February 14, the survey may be performed several days or several weeks prior to ground disturbance.

3. In general, the clearance survey shall include 100% of the area to be developed (Impact Area) and be conducted along transects spaced at 30-foot intervals on flat, open terrain or at shorter intervals (e.g., 15-20 feet apart) in dense vegetation, rocky hillsides, or in other situations where substrates are not easily observed.

4. If no tortoise sign is found on the site, the Authorized Biologist shall judge the likelihood of tortoise occurrence in the adjacent area.

5. If the Authorized Biologist judges that tortoises are absent from the area AND would not be directly affected by construction activities (i.e., are not likely to immigrate onto the site), the Authorized Biologist shall convey that information to personnel directly responsible for ground-disturbing activities, and leave an educational brochure outlining measures to be taken if a tortoise is encountered.

6. If tortoises or intact (i.e., active) tortoise burrows are found in the Impact Area OR if the Authorized Biologist is reasonably sure that a tortoise may enter into the construction site, take avoidance measures shall be implemented. Any tortoises within the Impact Area shall be removed and relocated as per guidelines given in Attachment I-1. Tortoises outside the Impact Area shall not be handled or otherwise disturbed.

7. All burrows in the Impact Area, including those not recently used, shall be excavated at the time of the survey. Eggs shall be relocated as they are found (see Desert Tortoise Council, 1999).

8. Once the initial tortoises are removed and burrows excavated, the site shall then be surveyed an additional time to located any tortoises or burrows missed by the first survey. The site would then be considered clear, and ground-disturbing activities may proceed.

9. The Authorized Biologist shall remain on-site until it is completely brushed.

10. Upon locating a recently dead or injured desert tortoise, the Authorized Biologist shall immediately notify the Lead Federal Agency (for federal projects) or Implementation Team (for non-federal projects). Where appropriate, it is recommended that tortoise remains be collected and stored as given in Dr. Kristin Berry's protocol for salvaging dead and sick tortoises. Written notification shall be made within five days of the finding to the Implementation Team and the Service's Division of Law Enforcement in Torrance. The information provided shall include the date of the finding or incident (if known), location of the carcass or injured animal, a photograph, cause of death (if known), and other pertinent information. Injured animals shall be transported to a qualified veterinarian for treatment at the expense of the project proponent. If injured animals recover, the project proponent shall contact the Implementation Team for final disposition of the animals.

11. Authorized Biologists and Environmental Monitors are advised to follow the appropriate guidelines outlined in *Guidelines for Handling Desert Tortoises during Construction Projects*, Appendix 2 (Desert Tortoise Council 1994, revised 1999).

I.2.2 Educational Brochure

12. The Implementation Team will develop and make available a standard education brochure, and maintain a list of Authorized Biologists and Environmental Monitors who are authorized to

distribute the brochure. Among other things, this brochure shall outline steps to be taken if a $tortoise~~s~~ enters into the construction site once the Biologist/Monitor has left the site.

I.2.3 Preconstruction Planning

13. Whenever possible, the project proponent shall work with the Implementation Team to plan for and conduct construction activities (particularly linear projects through Tortoise Survey Areas) when tortoises are least likely to be active, which generally occurs between November 15 and February 15.

14. Where more than one site or alignment could satisfy the project proponent's needs, it is suggested that a presence-absence survey be conducted on the alternative sites to determine which site or alignment will result in the fewest impacts to tortoises and occupied habitat during project development.

I.2.4 Reporting

15. Authorized Biologists and Environmental Monitors shall maintain records of all desert tortoises and other covered species encountered during project activities, including the following information: (a) the locations (narrative and maps) and dates of observations; (b) general condition and health, including injuries and state of healing and whether animals voided their bladders; (c) locations from which and to which any animals are moved (UTM coordinates derived from a global positioning system - GPS - are preferable); (d) diagnostic markings (i.e., identification numbers or marked lateral scutes); and (e) the amount of habitat lost (i.e., cleared of vegetation) to the activity. This report shall be submitted to the Implementation Team within 30 days of the Authorized Biologist leaving the site.

APPENDIX J

THREATS TO DESERT TORTOISE POPULATIONS: A CRITICAL REVIEW OF THE LITERATURE

Appendices

Threats to Desert Tortoise Populations: A Critical Review of the Literature

Prepared for:

West Mojave Planning Team, Bureau of Land Management

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
WESTERN ECOLOGICAL RESEARCH CENTER

Threats to Desert Tortoise Populations: A Critical Review of the Literature

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U.S. GEOLOGICAL SURVEY
WESTERN ECOLOGICAL RESEARCH CENTER

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INTRODUCTION

Decisions in resource management are generally based on a combination of sociopolitical, economic, and environmental factors, and may be biased by personal values. These three components often contradict each other resulting in controversy. Controversies can usually be reduced when solid scientific evidence is used to support or refute a decision. However, it is important to recognize that data often do little to alter antagonists' positions when differences in values are the basis of the dispute. But, supporting data can make the decision more defensible, both legally and ethically, especially if the data supporting all opposing viewpoints are included in the decision-making process.

Resource management decisions must be made using the best scientific information currently available. However, scientific data vary in two important measures of quality: reliability and validity. The reliability of the data is a measure of the degree to which the observations or conclusions can be repeated. Validity of the data is a measure of the degree to which the observation or conclusion reflects what actually occurs in nature. How the data are collected strongly affects the reliability and validity of ecological conclusions that can be made. Research data potentially relevant to management come from different sources, and the source often provides clues to the reliability and, to a certain extent, validity of data. Understanding the quality of data being used to make management decisions helps to separate the philosophical or value-based aspects of arguments from the objective ones, thus helping to clarify the decisions and judgements that need to be made.

The West Mojave Plan is a multispecies, bioregional plan for the management of natural resources within a 9.4 million-acre area of the Mojave Desert in California. The plan addresses the legal requirements for the recovery of the desert tortoise (*Gopherus agassizii*), a threatened species, but also covers an additional approximately 80 species of plants and animals assigned special status by the Bureau of Land Management, U. S. Fish and Wildlife Service, and California Department of Fish and Game. Within the planning area, 28 separate jurisdictions (counties, cities, towns, military installations, etc.) seek programmatic prescriptions that will facilitate stream-lined environmental review, result in expedited authorization for development projects, and protect listed and unlisted species into the foreseeable future to avoid or minimize conflicts between proposed development and species' conservation and recovery. All of the scientific data available concerning the biology and management of these approximately 80 species and their habitats must be evaluated to develop a scientifically credible plan.

This document provides an overview and evaluation of the knowledge of the major threats to the persistence and recovery of desert tortoise populations. I was specifically asked to evaluate the scientific veracity of the data and reports available. I summarize the data presently available with particular focus on the West Mojave Desert, evaluate the scientific integrity of those data, and identify major gaps in the available knowledge. I do not attempt to provide in-depth details on each study or threat; for more details I encourage the reader to consult the individual papers or reports cited throughout this report (many of which are available at most university libraries and at the West

Mojave Plan office in Riverside, California). I also do not attempt to characterize or evaluate the past or present management actions, except where they have direct bearing on evaluation of threats, nor do I attempt, for the most part, to acquire, generate, or evaluate new or existing, but uninterpreted data.

Two Important Caveats

Lack of scientific evidence supporting a purported impact should not be confused with automatically supporting the alternative, that there is no impact, and vice versa. Or as it is sometimes said: "absence of evidence is not evidence of absence." It may just mean that credible or definitive studies testing the hypothesized effects have either not been conducted or not been reported adequately.

Additionally, when I critique a particular study I am neither criticizing the scientist's ability or intent. Often, studies have inherent weaknesses that are completely or largely out of the control of the researcher. For example, as discussed below, it is often very difficult to have a proper control for a study in nature and it is often too expensive or impossible to adequately replicate a natural study. Rather than abandoning the questions altogether, scientists forge ahead with the study in spite of its limitations and collect data that hopefully are useful for managers. I point out the weaknesses here so managers will understand the limitations of such data, not to criticize the researchers not to render the studies useless. Virtually all studies have some inherent value, but their utility falls at different points on the continuum of risk to managers depending in part on how they were conducted and reported.

USE OF DATA TO MAKE MANAGEMENT DECISIONS

Scientific investigations follow an orderly, repeatable process. Many such investigations begin with anecdotes from ranchers, recreationists, or casual observers of nature. These might include issues of concern to managers, such as "I'm seeing fewer tortoises these days" or "tortoises and cattle can coexist." Anecdotes are useful for pointing out to researchers what critical problems may need to be solved through scientific investigation. Most scientific research follows up anecdotes that seem plausible with more craftily constructed hypotheses and direct observation by experienced observers. If such observations warrant further investigation, scientifically based observational studies are initiated. Most studies pertaining to desert tortoises fall into this category. However, observational studies may have problems, such as lack of adequate controls, insufficient sample sizes, or researcher bias in study design or interpretation. In a few cases, experiments are used to objectively test hypotheses that were developed from anecdotal or observational data. Experiments or carefully designed observational studies may lead to development of conceptual or mathematical theories that can then be used to predict responses of valued resources to management actions. Theory can then be tested with further experimentation or well-designed observations. Very little theory has been applied to problems related to land-management practices in the Mojave Desert.

Types of Data

The quality of data depends on how the questions were formulated and how the data were collected. Research questions in tortoise biology and management rarely employ a standard scientific method called "strong inference" (Platt 1964). For strong inference, progress is generally made by devising clear, falsifiable alternative hypotheses and conducting experiments designed to test competing predictions of these hypotheses. The strongest support for one alternative comes from experimental results that exclude other alternatives. Studies that test only one hypothesis are weak because they fail to show that the same results cannot be explained by other hypotheses. In tortoise research we generally see studies that are designed to support a pre-determined "ruling theory" or "working hypothesis" (Chamberlin 1965) or to simply describe nature. Such studies do little to explicate the phenomenon and to truly advance the management objectives supported by the research.

There are several types of studies that vary by how the data were collected. These categories are listed below in descending order from those generally providing the strongest, most valid conclusions to those providing the weakest, least reliable information. Value specifically refers to the level of risk a manager is taking when making a decision based on the data. The lower the value, the higher the risk. The actual conclusion may be right on target, but if it is from a risky type of data collection, the manager runs a higher risk of making an unsound decision.

Experiment

The strongest scientific data, those demonstrating cause and effect relationships, are generated via well-controlled and replicated experiments (Hairston 1989, Lubchenco and Real 1991). Such experiments involve manipulating one variable (treatment, such as presence of cattle) while holding all other variables constant (such as tortoise density or soil type). Such a design must have a control (or reference site) wherein ideally the only difference is the lack of the treatment. Any resultant change in the treatment area is likely to be caused by the particular treatment. However, one of many uncontrollable factors may occur that could result in a change independent of the treatment. These uncontrollable features, called random error, can fatally compromise the results. To reduce the effects of random errors (or chance), a properly designed study must have replicates - two or more sites that serve as control and two or more sites that serve as the treatment sites (Hurlbert 1984). The more replicates there are, the lower the chance that differences observed between treatment or control sites can be caused by random error. Another source of error that is mitigated by replication is uncontrollable (or unrecognized) differences among study sites (e.g., soil type, grazing history, and slope).

Any experiment that fails to have an adequate number of replicate treatment and control sites fails to satisfy an essential requisite for strong inference. Admittedly, it is often difficult or even impossible in natural settings to establish true control sites where the only difference is the lack of a treatment, not to mention have multiple replicates of the treatment and control. But having a proper control is an important feature and conclusions drawn from studies that lack a control suffer as a result.

Furthermore, the strength of any experiment, its ability to be broadly applicable, is bolstered by sample size. However, when comparing a given treatment with a given control, the sample size is the number of replicate study sites, not the number of measurements taken within each site. It is all too common for studies, particularly non-peer reviewed ones, to artificially inflate their sample sizes thus often reporting a significant effect (i.e., difference between treatment and control caused by the treatment factor) when in fact one did not occur or when the study was inadequately designed or carried out to discern a difference if one indeed existed. For example, when studying the effect of a factor like off-road vehicle (ORV) activity on desert habitat, it is common to measure number of plants and plant species within an ORV area versus outside of the area. If the researcher measured number of plants and plant species along ten transects within a single plot inside and ten transects within a single plot outside, the sample size is not 10 (nor 20) rather it is 1, because there is only one pair of plots being compared. Any differences observed may actually be caused by other factors such as different elevation or vegetation type. To avoid the random error of non-replication, multiple plots should be studied and these should be inside and outside of several ORV areas.

Correlation

Many studies in natural environments measure how a given factor (e.g., animal density) varies at different levels of some treatment (e.g., intensity of cattle grazing). This type of experiment can only show a correlation between the two factors. It provides no evidence that one factor causes a change in the other. Any correlation may just as well be from some unmeasured feature of the environment that affects both factors measured or it may be caused by chance. A cause and effect relationship can only be demonstrated if it can be shown that varying one factor (the independent variable) causes a predictable and consistent change in the other factor (dependent variable). Unfortunately, this is often the only means we have to study phenomena in the natural environment.

Description/Observation

Many studies simply describe a particular physical state or phenomenon (e.g. amount of trash or number of tortoises in a study area). The description can be simply qualitative (e.g., “a lot” or “many”) or may be quantitative involving complex statistics (e.g., means, standard deviations, confidence intervals). Such studies may provide excellent descriptions, but cannot test for cause and effect relationships.

Anecdote

Generally, a non-quantitative description limited in scope (usually a single observation of the given phenomenon) and depth of detail is considered an anecdote. An example of an anecdote is: “in 1978 I saw a tortoise eat a balloon.” Anecdotes usually lack any formal documentation and are most often made by untrained, casual observers, but professionals often report anecdotal observations. Sample sizes are extremely limited. Anecdotes are highly risky for basing management decisions because of their lack of rigor, repeatability, and objectivity.

Anecdotes need to be properly evaluated using sound scientific methodology. They can often form the basis for more formal observations, hypothesis development, or experimentation. Occasionally, there are attempts to legitimize anecdotes by compiling many into a single report and attempting a quantified or statistical treatment. These are misguided attempts because the extreme weakness and subjectivity of the basic data limit entire analyses: the anecdote. An appropriate expression is “the plural of anecdote is not data” (Green 1995).

Speculation

People will often make guesses about possibilities for which there are no hard data. When those guesses are based on clearly stated and well-founded assumptions, the guesses are called hypotheses and can help to direct future conceptual and experimental pursuits (Resnik 1991). When assumptions are weak or unstated the guesses are speculations. An example of a speculation is that fallout from nuclear tests in Nevada in the 1950s is responsible for the prevalence of disease in tortoises today. There is no evidence that fallout from nuclear testing can cause the diseases harming tortoises and no reports detailing the amount of fallout that occurred in tortoise habitat. There are no attempts to correlate probable fallout amounts with incidence of disease. The assertion is strictly a speculation because, on the face of it, it makes some sense.

Speculations may be seductive; often they present a series of progressively dependent statements that have an internal logic of their own. The logic may appear compelling and is often bolstered by attempts to provide "proof" through analogies. Such argumentation often collapses when primary assumptions are nullified or when they are tested against real data, but too often the test is never made. Although they may sometimes form the basis for hypotheses and experiments, speculations are risky to base management decisions on because there is essentially no way to evaluate them and their predictive value is low.

Source of Data

Data sources fall into several categories with varying probabilities of adequate reliability and validity. The source of data provides some indication of its quality. However, it is possible that a particular conclusion based on data from a less reliable source is more true or accurate than one from a more reliable source, but the likelihood of this being the case is low. Thus it is less risky to base judgements on data obtained from more reliable sources. The basic sources of data follow, in order of increasing risk to management (i.e., decreasing reliability):

Peer Reviewed Open Literature

Open literature refers to articles readily available in university and public libraries and published in professional, publicly available outlets. Easy availability allows anyone to obtain and evaluate the data on which decisions are made.

Peer review is a cornerstone of the scientific process. Rigorous peer review has two essential components: 1) thorough review by two or more scientists (generally anonymous) knowledgeable on the topic and 2) the possibility of rejection if the report does not meet generally accepted scientific standards. The latter component is an important feature that is lacking in less reliable data sources. The review process helps to ensure (but does not guarantee) that: 1) only reliable data with valid conclusions are published because the reviewers make certain that data are presented in sufficient detail to allow adequate evaluation of the conclusions; 2) the collection and analysis methods followed modern scientific standards and were appropriate for making the tests reported, 3) were reported in sufficient detail to allow someone to adequately evaluate and repeat the study; 4) the conclusions follow logically from the data; and 5) relevant related data (e.g., peer-reviewed publications), whether supporting or contradicting the study's conclusions, are cited. Most professional scientific journals (e.g., Ecology, Range Management, Journal of Wildlife Management, Herpetologica, Bulletin of the Wildlife Society) are peer reviewed. The Desert Tortoise Council is now implementing an external review process for its annual symposium proceedings.

Technical Books, Theses, and Dissertations

Most technical books are peer reviewed, but often without the true possibility of rejection. They are often reviewed by an in house editor or panel of editors who may or may not be experts in the particular field. Opinions differ on whether master's theses and doctoral dissertations should be considered peer reviewed. They do not undergo the same blind review that papers in scientific journals do, but they probably receive a much higher level of scrutiny than most papers. Furthermore, there is much more at risk if the thesis or dissertation fails review: the student is not awarded the Masters or Ph.D. In this report, they are treated as technical books being reviewed by a panel (i.e., the student's graduate committee).

Non-peer Reviewed Open Literature

Articles from this source are often used to support decisions or recommendations probably because there are many of them available, the sources are widely available, and the fact that they have been published adds a perception of respectability. However, there are often risks of using this type of data source. The authors and editors may not be specialists in the field they are writing about or are not scientists. Additionally, there is often no attempt at a logical, unbiased, rationally supported presentation. Occasionally, special interest groups that are pushing a specific interest and land ethic (e.g., Audubon Society, Rangelands, Desert Tortoise Council) publish outlets cited.

By definition, non-peer reviewed sources do not follow the established methods of peer review: there is usually no independent, objective evaluation of the data presentation and no guarantee that articles will be rejected if they fail to meet accepted scientific standards. Often missing is information necessary to allow the reader to evaluate the reliability of data collection and analysis. Statements such as “many tortoises were killed by vehicles” or “tortoises depend on cow dung for nutritional needs” are made without details about how the author determined if a vehicle killed a tortoise, how often tortoises actually eat cow pies, or what are the nutritional needs of tortoises.

Most proceedings of meetings (e.g., past issues of the Proceedings of the Desert Tortoise Council Symposium -) as well as abstracts from meetings are incompletely or not peer reviewed, and contents are usually printed verbatim with little or no editing and no possibility of rejection. Proceedings papers and abstracts often contain preliminary analyses of data and conclusions may change following the final complete analysis and rigorous peer review. The same criticisms holds for many official bulletins and newsletters of professional societies (e.g., Bulletin of the Ecological Society of America, Rangelands).

Technical Reports

Technical reports are generally written by agency and contract scientists and biologists and sometimes individuals untrained in the practices of science and biology. Technical reports are probably the most commonly used source of data for basing management decisions. Many agency biologists do not have the time, opportunity, encouragement, need, or training to publish their data. Sometimes reports are generated for the purpose of providing a quick analysis for management decisions that cannot wait for the one to two years often necessary to become published in a peer reviewed outlet. Such reports may not be subjected to review by competent scientists and are rarely rejected. “Draft” reports may never be finalized and become widely used even though they may be incomplete or fatally flawed. Because they do not appear in the open literature, refutations or critiques of the reports are rarely available. Finally, they may be difficult to locate, which prevents independent evaluation of their findings.

Reports by government biologists and biological consultants are variable in quality. Many are well designed, researched, and written and draw adequately on the existing body of scientific knowledge. Others demonstrate a lack of knowledge of tortoise biology and common management practices; fail to properly cite previous studies, particularly when contrary to the conclusions or recommendations being made in the report; make recommendations that are untested or unwarranted; and have not been peer reviewed. Such reports form the basis of many management decisions that have or are being made and may result in implementation of non-standard mitigation measures and speculative conclusions that were not tested for their efficacy.

Unpublished Data

There are many data sets (e.g., raw data, tables of compiled data, GIS maps, etc.) that are cited and used even though they may not have been checked for errors, analyzed, or adequately documented (e.g., data collection methods may be unknown). Reliance on such data for making decisions is risky particularly when there is no documentation (e.g., metadata) of how the data were collected and limitations of the data are not discussed.

Professional Judgement

When the proper research has not been conducted or completed, or time or expertise is not readily available, managers often rely on the professional judgement of staff biologists or other scientists. Reliance on professional judgement requires managers to use data that are unreliable if only because they cannot necessarily be independently evaluated or examined. The judgement may involve unsupported speculation, data that have been improperly or incompletely analyzed, or may involve faulty recall of the facts. On the other hand, professional judgements may be very sound, reliable, and based on an objective evaluation of the information available. The manager may not be able to separate good from poor judgements because there is generally too little information to evaluate. Judgements solicited from several competent professionals is advisable when possible. Also, the professionals chosen to provide input should provide citations and critical analyses of the data they are using to make the judgement. They should clearly state where the strengths and weaknesses in their judgements lie. Following steps like these can help to ensure the value of professional judgement.

Science Lore

Science lore, best defined as being the collective knowledge of the scientific, resource professional, or layperson community, is often based more on observation, assumption, and speculation than on scientifically-collected and analyzed data. Facts entrenched in science lore are not necessarily incorrect. They are unreliable because the connection between the hard data and the interpretation may be unknown. Common sources of Science Lore include Television programs, hobbyist journals, newsgroups, and casual conversations with professionals and laypersons.

A common example of Science Lore is the statement that “tortoises live to be 100 years old or more.” This may be true, but in fact the oldest tortoises for which any documentation exists were two captive animals; one was at least 67 years old and maybe in its mid seventies and the other was probably at least 74 and maybe older (the former was adult-sized when first captured 52 years earlier, Jennings 1981; and the later was adult-sized when captured and grew little in the 59 years before it died, Glenn 1986). No one has followed marked animals in the field long enough to know the average or maximum longevity. In the pair of studies usually cited as evidence for long life, six marked tortoises, recorded as adults by Woodbury and Hardy (1948) in the early 1940's, were refound still living in the 1960's (Hardy 1976). They may have been over 100 or perhaps as young as 30 - 50 years when refound. Since they were of unknown (or unreported) age at the time of capture, we do not know their true age. Using scute annuli (age rings), Germano (1992) estimated that most desert tortoises live 25-35 years, but some live more than 40 years. The cohort of tortoises reported on in Turner et al. (1987a) is still being followed; these known-aged animals are now 40-41 years old (Medica pers. comm.).

The onus is on the scientific community to identify statements that fall into this category. Researches should then investigate the underlying assumptions, find or collect supporting or refuting data and publish the results. Then, fact-based science lore can be elevated to known facts, and unsound lore can be modified or dropped from our lexicon of apparent facts.

This report identifies the quality of the data available on the major threats confronting desert tortoise populations in the hope that the scientific-based components of the final decisions can be clearly separated from the value-based components.

Two Final Caveats

The citation of draft reports or completed but unpublished ones is not normal scientific practice. Because this is a critique of all data that may be relevant to decision making for the West Mojave Plan, draft and incomplete reports are cited. This was done because such documents are often relied upon heavily for making management decisions.

Second, this report includes some papers and observations that are highly speculative or made by laymen, sometimes only in casual conversation. These were included here because they are often pervasive parts of the lore of the tortoise or desert communities and deserve some evaluation even if they were not made in scientific literature.

DESERT TORTOISE BIOLOGY

Knowledge of many characteristics of the basic biology of an organism is essential for making informed decisions concerning the management of that organism. Many aspects of tortoise biology are well known. The reader is referred to the following papers for general summaries of what is known: Berry (1978), Hohman and Ohmart (1980), Bury (1982), Bury and Germano (1994), USFWS (1994), Ernst et al. (1994), Grover and DeFalco (1995), and Boarman (2002). No comprehensive critical summary of tortoise biology exists and is sorely needed. A recent summary of anthropogenic impacts to desert habitat is Lovich and Bainbridge (1999).

SPECIFIC THREATS TO TORTOISE POPULATIONS

Threats occur under two major categories, direct and indirect, although they are not necessarily mutually exclusive. Direct threats are those that affect the survival or reproduction of tortoises (e.g., road mortality, illegal collecting, disease, predation). Indirect threats affect tortoise populations through their effect on other factors, primarily habitat (e.g., drought, habitat alterations from livestock grazing, recreational activities, global warming, etc.). Direct threats are usually more easily measured and therefore more easily evaluated than indirect effects.

To determine the impact of a specific threat on tortoise populations, it is insufficient to measure the threat solely (e.g., number of cars or density of mines in an area.) One must determine the effect the threat has on some aspect of tortoise reproduction or survival. Many parameters of tortoise biology can be measured when attempting to determine impacts of threats. Sometimes, the easiest and most intuitive response is mortality. It is difficult to deny that a motorized vehicle killed a fresh, smashed tortoise found on a paved highway. When tortoises die they leave behind a shell that can last for four years or more (Woodman and Berry 1984). Often that shell bears evidence of the cause of death (e.g., tooth marks, conchoidal fractures, fracture from blunt trauma, etc.). However, interpreting these signs is subjective and little scientific work that can aid interpretation has been conducted (but see, Berry 1985, 1986a) and most assumptions made in interpreting the evidence are not reported. Reproduction is more problematical, but at least clutch size and frequency can be measured with x-rays or sonograms or by locating nests and monitoring hatching success (Gibbons and Greene 1979; Turner et al. 1986, 1987b; Rostal et al. 1994). Survival of the young is an essential component to understanding the effect of threats on tortoise populations, but is very difficult to measure (e.g., Turner et al 1987b, Morafka 1994). Growth (Medica et al. 1975, Germano 1988, Turner et al. 1981, Patterson and Brattstrom 1972), behavior (Ruby and Niblick 1994, Ruby et al. 1994), and physiology (Nagy and Medica 1986, O'Connor et al. 1994a, Christopher et al. 1994) vary with environmental conditions and may be useful parameters for measuring the effect of impacts, but their efficacy at doing so has yet to be demonstrated. Modeling population demography (i.e., age-specific survival and reproduction), when using accurate measures from the population, can be an excellent way of evaluating the effects of threats and management actions on population growth (Congdon et al. 1993, Heppell 1998).

Relative Importance of Threats

The rating of relative importance of different threat factors is a challenging undertaking for several reasons. First, it is very hard to determine the cause of death of animals and it is even harder to determine how much decline is really attributable to the various indirect causes of mortality (e.g., habitat alteration). Educated guesses can be made about causes of death (Berry 1984, 1985, 1986a, 1990 as amended), but most of the methods used have not been described or subjected to experimentation, independent evaluation, or peer review. Second, not enough is known about several potential threats to evaluate their absolute or relative impact. For example, it has been suggested that toxic chemicals may be responsible for a disease of the shell affecting some populations. However, it is not known if chemicals are the causative agent, which chemicals are the problem, or the source of chemicals. Also, little is known about neither the epidemiology of the disease nor how much mortality is actually caused by it. Third, which mortality factors are functioning is very site specific. Highway mortality is an important factor for populations along highways; it may drain populations two miles or more away (von Seckendorff Hoff and Marlow 1997). On the other hand, for populations away from highways, this may be a very low or non-existent threat. Regional differences occur, also. Urbanization and development are major factors in portions of the west Mojave, but are probably relatively unimportant in much of the east Mojave (outside of the Las Vegas and St. George areas). Finally, as discussed above, factors that caused the declines (e.g., disease) may not be the same factors that are preventing recovery (e.g., genetic or demographic consequences of small populations, fragmentation, and raven predation). For all of these reasons the controversial and subjective task of ranking impacts was avoided here.

Specific threats are easy to discuss and identify, but more pervasive problems often exist when multiple threats interact to make for larger environmental problems. The three largest of these broader impacts affecting tortoise populations are habitat loss, degradation, and fragmentation; urbanization and development; and access by humans to tortoise habitat. I will first focus on specific threats then discuss three broader, more cumulative types of threats. There are virtually no published studies looking specifically at the effect of these general factors on tortoise populations.

Agriculture

Probably the greatest affect agriculture has on tortoise populations is through loss of habitat: when tortoise habitat is converted for agricultural use it becomes mostly unusable by tortoises for foraging or burrowing. Indirect impacts could include facilitation of increases in raven population, drawdown of water table, production of fugitive dust, possible introduction of toxic chemicals, and introduction of invasive plants along corridors and when the fields go fallow.

I found no substantiated references in the literature indicating that desert tortoises use agricultural fields, although alfalfa, with its high nitrogen content, could be a healthy source of food for tortoises (Bailey, 1928, provides an anecdotal account from untrained observers of "tortoises eagerly eating alfalfa."). Berry and Nicholson (1984a) cited one anecdotal report from an individual with unreported credentials as evidence that "tortoises are known to enter...alfalfa fields" (p. 3-21). Disking, plowing, mowing, and baling would destroy burrows and kill tortoises (as they do the marginated tortoise, *T. marginata*, in the Mediterranean region; Stubbs 1989). There are no reports of desert tortoise burrows in agricultural fields.

The Common Raven, a predator on juvenile desert tortoises, makes considerable use of agricultural fields in the west Mojave Desert (Knight et al. 1993, 1999, Knowles et al. 1989). Agricultural fields probably are important sources of food (i.e., insects, rodents, and seeds) and water for ravens during times of the year when those resources are generally in low abundance elsewhere, thus resulting in more ravens surviving the summers and winters (Boarman 1993, unpubl. data). See "Predation," below, for more discussion.

Pumping of ground water for irrigation can result in a major change in vegetation or habitat type. Koehler (1977) reported that the drawing of water for irrigation from Koehn Dry Lake, near Cantil in the Western Mojave, lowered the water table by 240 ft between 1958 and 1976. Berry and Nicholson (1984a) state that this lowering of the water table has approached the Desert Tortoise Natural Area (DTNA) and imply that it may affect tortoise habitat, although no data were presented to support the implication. Closer inspection of the maps provided in Koehler (1977) show that the water-level decline is lower (30 - 180 ft) near tortoise habitat south and southeast of Koehn Dry Lake. There are no data to indicate what effect this lowering of the water table has on mesquite, other vegetation, or tortoise habitat in the area, but there are data on the effect water table lowering has on mesquite in other arid regions (Nilsen et al. 1984).

Agricultural fields cause dust storms, called fugitive dust (Wilshire 1980). Fugitive dust coats plants, which in turn may reduce photosynthesis and water-use efficiency (Sharifi et al. 1997). The end result is lower productivity of forage plants. Their study did not specifically look at agricultural dust, but the results are probably generalizable.

The finding of "hundreds of...tortoise shells" (with no indication of how long the tortoises had been dead) was reported anecdotally and second hand by Berry and Nicholson (1984a) and was correlated with application of an unspecified pesticide to kill jackrabbits in a nearby (distance unspecified) alfalfa field. Aside from this single unsupported speculation, there are no references to possible toxic effects on tortoises of pesticides, herbicides, and other chemicals used in agriculture. Pesticide use, particularly aerial applications apparently are now very limited in the desert.

Collecting by Humans

Humans collect turtles and tortoises for several reasons, and these activities are responsible for population declines in several of the threatened and endangered species throughout the world (Stubbs 1991). Collecting desert tortoises for pets was probably a major activity in the recent past (Berry and Nicholson 1984a), although most evidence is anecdotal in nature. Since 1961, it has been illegal under State law to collect tortoises in California and since 1989 collecting has been a Federal offense (USFWS 1994). The Desert Tortoise Recovery Plan (USFWS 1994) cites several documented instances of illegal collecting more recent than those in Berry and Nicholson (1984a), including the unauthorized removal of marked study animals from known study areas. It must be cautioned that some of the examples cited in the Recovery Plan are circumstantial or speculative. For instance, Stewart (1993) reported one strongly supported (tortoise found in a car in Idaho) and one speculative (transmitter and human footprints found on ground and tortoise was missing) example of poaching. Berry (1990 as amended) gives purely speculative and circumstantial evidence for poaching (namely, marked drop in estimated density on a study plot over a 5-year period with relatively few carcasses being found coupled with observations of possibly human-excavated burrows nearby and other evidence for poaching several miles away). The available evidence suggests that collecting for pets is still occurring, but perhaps at a level lower than previously, although this statement is speculative at present. Evaluating the extent of the problem is very difficult because of the cryptic nature of the activity.

A newly documented problem is the collection of wild tortoises by recent immigrants for cultural observances (USFWS 1994, Berry et al. 1996). Berry et al. (1996) reported that 7.7% of tortoise burrows found showed evidence of being excavated by humans and that the number of such burrows is greater near versus far from dirt roads. Their study suggests that poaching tends to occur near roads, even lightly maintained ones, thus the presence of roads may help to facilitate poaching. However, there was no statistically significant difference in distance from roads for disturbed versus undisturbed burrows and the method for determining if a burrow was excavated was circumstantial and subjective.

The bottom line is that there is little evidence to suggest that illegal collecting is currently a widespread problem, but there is also little evidence to the contrary.

Construction Activities

Construction activities here refer specifically to the generally short-term effects of actual construction (clearing land, movement of heavy equipment, presence of construction crews, etc.). The lasting effects of the constructed facility, once in place, are discussed in “Urbanization and Development,” “Energy and Mineral Development,” “Utility Corridors,” and “Habitat Loss, Degradation, and Fragmentation” sections below. In many ways, most construction projects have similar impacts on tortoises and their habitat, regardless of what is being constructed. Those impacts may include: loss of habitat by the project footprint; incidental destruction of habitat in a buffer area around the footprint; damage to soil and cryptogams on the periphery; incidental death of unseen tortoises along roads, beneath crushed vegetation, or in undetected burrows; destruction of burrows; handling of tortoises; entrapment of tortoises in pits or trenches dug for transmission or fiber optic lines, water, and gas pipelines and other utilities; attraction of ravens and facilitation of their survival by augmenting food or water; and fugitive dust

(Olson et al. 1992, EG&G 1993, Olson 1996). There are little data on the extent of these potential impacts. But, Olson (1996) reported that a construction of a natural gas pipeline had the greatest impact on tortoises and habitat, construction of a transmission line had intermediate impacts, and a fiber optic line was the most benign. The differences are largely related to the scale of the project, ability of crews to avoid disturbing burrows, and timing of construction to avoid peak activity periods of tortoises (e.g., spring). In an analysis of 171 Biological Opinions issued by the USFWS in California and Nevada, Circle Mountain Biological Consultants (1996, see also LaRue and Dougherty 1999) found that the majority of tortoise mortality occurred along linear construction projects (e.g., pipeline, fiber optic, and transmission lines) with the extensive Mojave-Kern Pipeline causing the greater number of deaths (38). Tortoise mortality also occurred on mining, landfill, and military projects. The total number of deaths reported on the projects was well below the level authorized by the USFWS (59/1096 = 5.4%). This study was strictly an evaluation of known tortoise mortalities occurring during projects authorized by the USFWS under Section 7 of the Endangered Species Act. It therefore likely underestimates actual tortoise mortality (e.g., tortoises buried during construction or otherwise not found, accidentally killed but not reported, etc.) that occurred.

Disease

Disease in general is a normal and natural phenomenon within wild animal populations. Diseases can weaken individuals, reduce reproductive output, and cause mortality. Epidemic outbreaks of some diseases can become catastrophic, particularly in small or declining populations (Dobson and Meagher 1996, Biggins et al. 1997, Daszek et al. 2000). Sometimes disease can be controlled by wildlife managers by attacking the pathogen; isolating diseased from non-diseased individuals, populations, or species; immunizing healthy individuals; or facilitating habitat conditions that increase individual's immune systems. Other times there may simply be nothing a manager can do. It is important to understand disease etiology and epidemiology before effective management actions, if any, can be determined.

Two diseases have been identified as possibly affecting the stability of some desert tortoise populations: Upper Respiratory Tract Disease (URTD; Jacobson et al. 1991) and cutaneous dyskeratosis affecting the shell (Jacobson et al. 1994). A third disease, a herpesvirus, was recently identified and may have population-level consequences, but very little is known about it (Berry et al. 2002, Origgi et al. 2002). URTD has been found in several populations that have experienced high mortality rates, including some in the west Mojave (Jacobson et al. 1996, Berry 1997). Much is published in peer reviewed journals about the etiology of this disease, which has been found in captive turtles of this and several other species (Jacobson et al. 1991) and in wild populations of the gopher tortoise (*Gopherus polyphemus*; Jacobson 1994). Brown et al. (1994a) showed definitively that URTD can be caused by a bacterium, *Mycoplasma agassizii*. It is likely transmitted by contact with a diseased individual or through aerosols infected with *M. agassizii*. The organism attacks the upper respiratory tract causing lesions in the nasal cavity, excessive nasal discharge, swollen eyelids, sunken eyes, and in its advanced stage, lethargy and probably death (Jacobson et al. 1991, Schumacher et al. 1997, Homer et al. 1998, Berry and Christopher 2001). It must be noted, however, that some of these clinical signs may also be characteristic of other health condition such as dehydration, allergy, or infection with herpesvirus or the bacteria *Chlamydia* or *Pasteurella* (e.g., Pettan-Brewer et al. 1996, Schumacher et al. 1997).

Malnutrition is known to result in immunosuppression in humans and turtles (Borysenko and Lewis 1979) and is associated with many disease breakouts. It is possible that nutritional deficiency in tortoises caused by human-mediated habitat change and degradation may be partly responsible for the apparent spread of URTD and its perceived impact on tortoise populations (Jacobson et al. 1991, Brown et al. 1994a). Short-term droughts may temporarily reduce immune reactions and increase susceptibility to URTD (Jacobson et al. 1991), although this is speculative. Whereas animals may become debilitated by chronic immune stimulation, no biochemical indicators of stress have been identified in diseased compared to non-diseased turtles (Borysenko 1975, Grumbles 1993, Christopher et al 1993, 1997).

Although evidence indicates a correlation between high rates of mortality and incidence of URTD within populations (Berry 1997), there is little direct evidence that URTD is the cause of the high rates of loss. In two preliminary analyses (Avery and Berry 1993, Weinstein 1993), animals exhibiting clinical signs of (both studies) or testing positively for (latter study) URTD were no more likely to die over a one year period in the west Mojave than were those not exhibiting signs or testing positive. This may be because factors other than disease caused much of the mortality or many animals not showing clinical signs of disease in the field were still infected. A serological test for presence of antibodies against *M. agassizii* has been developed and is now being used to document presence and spread of the disease (Schumacher et al. 1993). But, the test, an enzyme-linked immunosorbent assay (ELISA) does not indicate present infection, only a probability of past exposure. A polymerase chain reaction (PCR) test, which has been developed for *M. agassizii* is more effective for determining active infection (Brown et al. 1995). Lance et al. (1996) reported that infected tortoises had significantly lower testosterone and estradiol levels and that diseased females tended to lay eggs less often. Finally, there is some evidence that animals at the DTNA, where URTD breakout has been particularly intense, may recover from infection (Brown et al. 1994a, b). Interestingly, Berry (2002) reported that none of 119 wild tortoises tested at 9 locations throughout the California deserts in 2000 and 2001 tested positive for URTD. No discussion of this result was provided. A thorough epidemiological study is badly needed to identify the factors involved in the incidence, spread, and virility of the disease in wild populations (D. Brown pers. comm.).

A shell disease, cutaneous dyskeratosis (CD), has been identified in desert tortoise populations (Jacobson et al. 1994). CD consists of lesions along scute sutures of the plastron and to a lesser extent on the carapace. Over time, the lesions spread out onto the scutes. This disease may be caused by the toxic effect of chemicals in the environment, but evidence is lacking to test this hypothesis. Naturally-occurring or human-introduced toxins such as selenium, chlorinated hydrocarbons, organophosphates, nitrogenous compounds, and alkaloids have all been implicated (Homer et al. 1998), but there are no data showing a direct link. The disease may also be caused by a nutritional deficiency (Jacobson et al. 1994). It is not known whether or not CD is caused by an infectious pathogen or if secondary pathogens act to enhance the lesions (Homer et al. 1998, Homer pers. comm.). It is unclear if the disease is actually lethal or responsible for declines in infected tortoise populations (Homer et al. 1998). Only one documented case of CD from the West Mojave Desert was found in the literature (Homer et al. 1998).

If the shell diseases are toxicoses, toxic responses to environmental toxins (e.g., heavy metals, chlorinated hydrocarbons, organophosphates, and selenium), then there may be a direct link between these diseases and human activities unless the toxin is a natural component of the physical environment. Chaffee et al. (1999) found no significant correlation between elevated levels of metals in organs of ill tortoises and in the soil where the tortoises came from. If there is a link to human activities, then we can consider solutions that would reduce levels of input of the toxic chemical. However, this link is currently highly speculative.

There is some recent, albeit weak, preliminary evidence linking heavy metals to disease in tortoises. In necropsies of 31 mostly ill tortoises, Homer et al. (1994, 1996) found elevated levels of potentially toxic metals and minerals in the liver or kidney of one or more of the animals. Since most of the animals were ill to begin with, an association was made between the presence of the toxicants and presence of the disease. However, that study is strictly correlative, and fails to demonstrate a cause and effect relationship. Berry (1997) claims that "the salvaged tortoises with cutaneous dyskeratosis had elevated concentrations of toxicants in the liver, kidney, or plasma...and/or nutritional deficiencies." However, closer examination of the data presented in Homer et al. (1994, 1996) and cited in Berry (1997) reveals a remarkably low association with only 1 out of 12 tortoises with CD having at least one toxicant concentration greater than two standard deviations above the mean. Four other animals also had unusually high levels of at least one toxicant, but did not suffer from CD. Furthermore, Homer et al. (1994, 1996) identified abnormally high levels as being those concentrations that are greater than two standard deviations from the average concentration found in the 31 tortoises. In a normally distributed set of 20 randomly selected values, 1 will, by definition, fall outside of 2 standard deviations from the mean, because 2 standard deviations is defined as including only 95% of the samples. So if 100 comparisons are made, then 5 levels will be considered abnormally high or low just by chance. In the study, 689 values would be reported, thus 34 (or 95%) would be expected to be greater than twice the standard deviation from the mean just by chance. In fact, 32 were identified as falling outside this range of two standard deviations. These data are in need of a thorough statistical analysis. Homer (pers. comm.) has found significantly higher levels of iron (in liver) and cadmium (in kidneys and liver) of tortoises with URTD compared to those in a control group. It is not known if the levels identified by Homer et al. (1994, 1996, pers. comm.) as being abnormally high are biologically significant. Homer (pers. comm.) has found significantly reduced levels of calcium in the livers of tortoises with CD, which suggests a nutritional deficiency may be involved in the disease.

Several other diseases and infections have been identified in desert tortoises (Homer et al. 1998). These include a poorly known shell necrosis, which can result in sloughing of entire scutes; bacterial and fungal infections; and urolithiasis, a solid ball-like deposition of urate crystals in the bladder (i.e., bladder stones; Homer et al. 1998). There is no evidence to suggest that any of these diseases are at this time widespread, threatening population stability, or hindering population recovery.

Beyond taking precautions to avoid spreading the disease when handling many animals (Rosskopf 1991, Berry and Christopher 2001), educate the public against releasing potentially-diseased captive animals (Berry 1997), include only healthy individuals in translocation efforts (Brown 1994a), the practical management implications of the disease data are unclear. Tully (1998) states, without explanation, that URTD infections are not likely to be controlled by immunizations. Improving habitat conditions may help reduce stress-induced immunosuppression (Brown 1994a), but the link between stress from poor habitat quality and susceptibility to URTD is only speculative.

Drought

A drought is an extended period of abnormally low precipitation. Unlike kangaroo rats and some other desert vertebrates, tortoises acquire much of their water, and maintain and overall positive energy balance, from standing sources (Peterson 1996). O'Connor et al. (1994a) showed that water deprivation in a group of semi-wild tortoises caused higher levels of physiological stress (using several blood assay profiles) compared to a group of semi-wild tortoises with water supplements and a group of free-ranging tortoises. Peterson (1994a) recorded abnormally high levels of mortality in two tortoise populations (west and east Mojave) during a three-year period of an extended drought. The deaths in one population (Ivanpah Valley) were attributed to drought-induced starvation and dehydration and occurred in the third year of study. Ken Nagy (pers. comm.) has stated that tortoises can probably survive 1-2 years without drinking water but will start dying of dehydration after that. The primary source of mortality, which occurred throughout the three-year study, at the DTNA was coyote predation. The coyotes may have switched to the less desirable tortoises following hypothesized drought-induced reduction in coyotes' normal prey (black-tailed jackrabbits; see also Jarchow 1989). Alternatively, tortoises may have been in a weakened condition due to URTD, but Peterson (1994a) found little evidence of disease in his study animals. Low rainfall can also reduce reproductive output with tortoises producing fewer eggs or suspending egg-laying altogether in low-rainfall years (Turner et al. 1984, Lovich et al. 1999). Avery et al. (2002) documented higher survival and reproduction among females at higher elevation site that received more rain than a lower one in Ivanpah valley. Tortoises may survive drought periods by eating less nutritious cacti and shrubs (Turner et al. 1984, Avery 1998).

Much of the desert experienced short-term drought conditions in the late 1980s (Corn 1994a, Hereford 2002), a period when rapid declines and high mortality were reported in some tortoise populations (Berry 1990 as amended, Corn 1994a, Peterson

1994a). However, Corn (1994a) reported that, between 1977-1989 there was no correlation between winter precipitation and relative abundance of large (≤ 180 mm median carapace length [MCL]) or small (<180 mm MCL) tortoises, but there was a significant correlation between summer precipitation and relative abundance of small tortoises. Some reports exist of dehydrated and emaciated tortoises being found (Berry 1990 as amended, Peterson 1994a, Homer et al. 1996).

Drought is a normal phenomenon in the Mojave Desert (Peterson 1994a, Hereford 2002). Desert tortoises have lived in the Mojave Desert for over 10,000 years and probably have evolved under similar boom-bust conditions (Peterson 1994 a,b, 1996; Henen 1997; Nagy and Medica 1986). It is possible that drought can cause episodic mortalities punctuated by periods of low mortality during years with more abundant rainfall. It is reasonable to speculate that drought-induced stress in concert with other threats (e.g., disease, predation) resulted in significant mortality (Peterson 1994a), but there are little data to test this hypothesis. An epidemiological study is needed to evaluate the effect drought has on tortoise populations.

Energy and Mineral Developments

Energy and mineral development includes: presence of utility lines, transmission lines, and gas pipelines; development of land for oil and gas leases; geothermal and solar energy generation; and digging exploratory pits for and extraction of minerals. Impacts from energy and mining developments can include habitat destruction and direct mortality from off-road travel to explore and access sites; habitat loss to road and development construction, leachate ponds, tailings, rubbish, etc.; introduction of toxins; fugitive dust and soil erosion; and urban-type developments to support large mining operations. The extent of area directly affected by energy and mining is difficult to assess because the data are not readily available. According to Luke et al. (1991), as of 1984, 41% of high density tortoise habitat rangewide was leased or partially leased for oil or gas and 2% was directly impacted by mining operations or leased for geothermal development. However, no indication was given for how these figures were obtained. Most mining operations are point sources of disturbance with potentially little effect beyond the immediate site of development. The greatest effect may come from the cumulative impact of many relatively small mining-related disturbances combined with facilitation of rural or urban development (e.g., Randsburg) to support the mining operations in a given area. However, large-scale operations that depend on frequent haul trucks to transport excavated minerals may also present vehicle-related impacts such as increased road kills and air pollution.

There are few data on the effects of energy and mineral development on tortoise populations. Mortalities have occurred in association with mining activities (LaRue and Dougherty 1999). Hard rock mining, particularly pit mining and operations in dry lakebeds, can be a major source of fugitive dust (Wilshire 1980). Loss of habitat and soil and vegetation disturbance can be substantial and major, depending on the size of the area. Although illegal, cross-country travel to drill and access test pits, stake claims, and evaluate mineral potentials still occur (pers. obs.) and needs to be properly documented and evaluated.

Energy development has similar impacts, particularly direct and indirect loss of habitat, fragmentation of habitat and population, and effects of access roads, which are likely to be relatively light once construction has ended (Brum et al. 1983). Construction of transmission lines requires grading of new roads for construction of towers and maintenance of the lines, and clearing or terracing of habitat for tower placement. Not only is habitat lost (0.16 to 0.24 mi^2 per mile of transmission line; Robinette 1973, cited in Luke et al. 1991), but the new road may help to fragment the population and provide access to areas for other human-related impacts (see "Utility Corridors" section, below). The access roads are also an important source of windblown dust and attendant erosion (Wilshire 1980). The presence of new utility lines, necessary to distribute the electricity, may help facilitate nesting by ravens in specific areas they did not nest in before, if those areas did not have adequate nesting substrates before the new towers were erected (Boarman 1993, Knight and Kawashima 1993). For more discussion, see "Utility Corridors" section, below.

Aside from loss of habitat and other consequences associated with access roads and transmission lines, there is little evidence that energy generation negatively impacts tortoise populations. If designed and managed properly, wind generation may be compatible with tortoise populations (Lovich and Daniels 2000). Tortoises made extensive use of wind turbine pads for burrow cover and, by restricting access, the wind park served as a de facto reserve that minimized several other harmful human activities such as ORV travel, vandalism, and illegal collections. The only study found on solar energy impacts showed that here were only very small changes in air temperature, wind speed, and evaporation rates downwind from a solar power plant in the western Mojave Desert (Rundel and Gibson 1996). They did not study impacts to tortoise populations.

Fire

Fire, once considered a rare event in the Mojave Desert (Humphrey 1974), now occurs with ever-increasing frequency causing a greater threat to tortoises and their habitat (USFWS 1994, Brooks 1998). Fire frequency has increased with the proliferation of introduced plants, particularly the grasses, red brome (*Bromus rubens)* and split grass (*Schismus barbatus* and *S. arabicus*), which provide fuel for fires (Brown and Minnich 1986, Brooks 1999b). These plants help to spread fire because they are often common, tend to grow in large relatively dense mats, and fill the intershrub spaces, which are largely devoid of native vegetation (Brown and Minnich 1986, Rundel and Gibson 1996, Brooks 1999b). Fires cause direct mortality when tortoises are burned or inhale lethal amounts of smoke, which can happen both in and out of burrows. Documented cases of tortoises being burned by fires are uncommon, but do occur (e.g., Woodbury and Hardy 1948 - circumstantial, secondhand account of 14; Homer et al. 1998, reports 1; Esque et al. in press, reports 5, which is 4-13% of the study population; Lovich, pers. comm., found 1). Fires are probably most hazardous to tortoises when they occur during the active season for tortoises (e.g., spring in the West Mojave). Previously rare, frequency of spring fires are now on the increase (Brooks 1998).

There are several possible indirect impacts of fires. Fires remove dry and some living forage plants. They facilitate proliferation of non-native grasses (Brown and Minnich 1986, Brooks and Berry 1999). The effect this has on tortoises is as yet unresolved. There is some evidence that tortoises may selectively avoid exotic grasses (Jennings 1993, Avery 1998), but Esque (1994) showed that tortoises may choose to eat a majority of non-native plants, particularly in drier years. The physiological consequences of foraging on non-native grasses is also not entirely known, but, in a manipulative study with semi-captive tortoises, Nagy et al. (1998) showed that grasses, native and non-native) provided tortoises with much less nitrogen than did forbs and tortoises tended to loose water when eating them. Avery (1998) also showed that tortoises eating only split grass lost weight, assimilated less protein, and were in a negative nitrogen balance, whereas those that were fed a native forb (*Camissonia boothii*) maintained their weight and experienced a positive nitrogen balance. Those tortoises that fed on both plat types maintained their weight but experienced a net loss of protein. By removing vegetation, fires may alter the thermal environment by increasing temperature extremes experienced by seeds, plants, and burrowing tortoises (Esque and Schwalbe 2002). Soil erosion is enhanced by the loss of stabilizing vegetation, roots, and cryptogamic crusts (Ahlgren and Ahlgren 1966). Fires fragment tortoise habitat by creating patches of unusable habitat, at least over the short term. There is some evidence of an increase in availability of nitrogen and other nutrients for a short while following fires (Loftin 1987), but none demonstrating that plant growth is stimulated by this nutrient flush. Overall effects on vegetation are variable, and may depend in large part on the intensity of the fire, characteristics of the plants, and post-fire precipitation (Esque and Schwalbe 2002). Brown and Minnich (1986) found an increase in annual vegetation following a fire during an unusually rainy period. On the other hand, O'Leary and Minnich (1981) found no difference during a drier year.

The structural characteristics of vegetation in years following fires has been studied. Following burns in creosote scrub community in the Colorado Desert, Brown and Minnich (1986) found 23% higher cover by annual forbs, most of which were exotics. Cover by some native forbs, including ones preferred by tortoises, were also higher in burned vs. unburned areas. They also found that perennial plants, particularly creosote bush, were damaged and exhibited low levels of stump sprouting and germination following more intense fires. A change in dominant shrub type resulted, but the study only reported on 3-5 years post-burn; no data were presented on possible long-term successional changes or recovery. Dense cover by annuals, particularly introduced grasses, provides higher fuel loads, which results in more fires that are also hotter (Brown and Minnich 1986, USFWS 1994, Brooks 1999b).

The amount of tortoise habitat burned by recent fires is relatively low, but increasing. For example, between 1980 and 1990, 243,317 acres burned in the Mojave Desert in California, which is an average of 38 mi^2 per year (USFWS 1994). The increase in number of fires per year over the ten-year period was statistically significant. Tracy (1995) reports that fires occur much more frequently near roads and towns, but no data were presented in this abstract. Duck et al. (1995) reported that tortoises may be killed by fire-fighting activities, including by large fire trucks driving off of roads in tortoise habitat, and recommended training and fire management techniques to reduce the problem.

Through its destructive effect on woody shrubs, fire has been used to manage (i.e., improve for cattle foraging) desert grasslands. In desert grassland of southern Arizona, fire removed 9-90% of targeted shrubs (i.e., mesquite, *Prosopsis juliflora*; burro-weed, *Aplopappus tenuisectus*; prickly pear cactus, *Opuntia occidentalis*; and cholla, *Opuntia* sp.; Reynolds and Bohning 1956). This work was not conducted in tortoise habitat and the efficacy of using fire in similar ways has not been tested in the Mojave Desert nor has its effectiveness at improving habitat for tortoises been tested.

Garbage and Litter

Garbage illegally dumped in the desert is unsightly, may cause local habitat alteration, and may affect individual tortoises. Indeed, in a popular article, Burge (1989) cited an instant of a tortoise losing its leg after getting it caught in the string of a disposed balloon. She also reports finding foil and glass chips in tortoise scat. No details were provided. There are no data to suggest that litter is a widespread or major problem for tortoise populations. The relationship between organic litter and raven predation on tortoises is covered under “Predation,” below.

Illegal dumping of hazardous wastes is an increasing problem in the California deserts (John Key, pers. comm.) Toxins are known to cause a myriad of problems for wildlife (Jacobson et al. 1994), and presumably elevated levels (see “Disease” section, above) of certain metals (e.g., cadmium, copper, molybdenum, mercury, lead) have been found in the tissues of desert tortoises (Homer et al. 1994, 1996, 1998). The distribution and limited size of illegal dumps and hazardous spills suggests that this is a minor problem for tortoise populations as a whole, but they may be of concern on a localized basis. Metals and other pollutants may enter the environment from other sources including mining and air pollution, but their effects on tortoise populations remain speculative.

Handling and Deliberate Manipulation of Tortoises

Handling and deliberate manipulation of tortoises includes curious members of the public picking them up and sometimes removing them from the wild, biologists relocating and translocating them to new sites, pet owners releasing captive tortoises into the wild, and researchers manipulating tortoises for scientific experimentation. The effects can be manifold, depend on the type of handling, and remain largely unstudied.

Members of the public will sometimes pick up tortoises when they find them on roads or alongside trails. They do so out of curiosity or to remove the animal from harm’s way (Ginn 1990; picking up a tortoise to cause harm is covered in the

“Vandalism” section, below). Any such handling or even disturbance of a tortoise is illegal under the Endangered Species Act, although it is unlikely that USFWS would prosecute a person who moves a tortoise out of harm’s way (pers. obs.).

There are several possible effects of this type of well-meaning handling, but most of them fit into the realm of speculation or science lore. First, when tortoises are handled they sometimes void the contents of their bladder, which may represent loss of important fluids and it is thought this loss could be fatal (Averill-Murray 1999). Averill-Murray (1999) provided some evidence that handling-induced voiding may jeopardize survivability, although usually relatively small amounts of fluid are discharged. Smaller animals were more likely to void, but, if the animal was recaptured at a later date, its growth was not inhibited as a result of voiding previously. The statistical significance of his results may be compromised by his decision not to adjust the level of significance to account for making multiple tests (a problem similar to that noted about Homer 1994, 1996, in the “Disease” section above). Nonetheless, the results suggest there may indeed be a trend towards voiding affecting tortoise survival, particularly in drought years, and this should be followed up with more experimentation.

Other problems with handling tortoises can occur. Diseases might be transferred between tortoises if people handle more than one tortoise without sterilizing their hands or using different clean or sterilized gloves for each handling (Rosskopf 1991, Berry and Christopher 2001). It is claimed that turning over a tortoise to look at its underside will harm its internal organs, break eggs, or cause shock (Rosskopf 1991), but there is no evidence to support this contention. It may be detrimental to a handled tortoise if it is released outside of its home range, far from known burrows, or away from shade (e.g., Stewart 1993). This could be particularly hazardous during hot, dry weather or late in the afternoon, but again no data exist to support this likely speculation. Finally, the disruption of behavior by handling or just approaching the tortoise could be harmful if the disruption causes the animal to withdraw into its shell long enough to prevent it from being able to eat, drink, or retreat to a safe cover site (e.g., burrow, pallet, or shrub) for the night, thus leaving it exposed to predators or harsh environmental conditions. The probability of this disruption being hazardous to the tortoise is likely low, unless disruptions occur extremely frequently. Tortoises can go many months without eating or drinking (Peterson 1996), so a few minutes of disruption is not likely to alter their nitrogen, energy, or water balance. All of these claims need further study to substantiate their validity.

Relocation of animals to a new area is frequently recommended, and is occasionally implemented to save tortoises from construction and other ground disturbing activities. Possible problems with translocation efforts include increased risk of mortality, spread of disease, and reduced reproductive success. There have been a few studies of the effectiveness of relocation efforts, and most of the relocations generally have been marginal to unsuccessful. A study summarized in Berry (1986b) found that 22% (13/43) of the animals translated 16 to 88 km from their capture sites stayed at their relocation sites for more than several days, but only five remained for 15 months to 6 years. Few mortalities were observed, but many disappearances from unknown causes occurred; these animals may have died or wandered away. In another relocation effort, 91% (10/11) stayed within the relocation area, which was only about 450 m from where they were moved, for at least 3 months and at least 36% (4/11) were present after 16 months (Stewart and Baxter 1987). In a third effort, 56% (9/16) of relocated tortoises stayed in the area (5.6 km from their original home ranges) for at least 1.5 years (Stewart 1993). At least 25% (4/16) died within about 2.5 years. A fourth relocation effort was conducted in Nevada. Several tortoises were moved to an area immediately adjacent to a development site (Corn, 1994b, 1997). These 13 animals were moved to areas 2 km away, which was still within or very close to their pre-translocation home ranges. There was no difference in survival, but displaced animals had larger home ranges than did the residents. A preliminary analysis of a fifth study showed that mortality was significantly greater among guests (tortoises moved to a pen immediately adjacent to their capture sites) than hosts (resident tortoises; Weinstein 1993). All of these relocation studies covered short time periods and only measured movements and survival. None of them looked at reproductive success or long-term survival, two of the most important measures of success.

An ongoing project translocating tortoises many miles from their capture site apparently is showing success, but no reports or publications (other than abstracts) are available. Apparently, survivorship and reproduction are equivalent between relocated tortoises and resident tortoises (Nussear et al. 2000). Relocated tortoises did move more during their first year in the new site, but after that their movements were not significantly different than those of resident tortoises. Tortoises released in Utah also moved more than did resident tortoises there (Wilson et al. 2000). Both of these studies need further analyses and complete presentations before their results can be adequately evaluated. The success of desert tortoise relocations probably depends on distance of relocations, habitat quality, density of host population, rainfall, and health condition of the relocated and host animals.

Probably tens of thousands of desert tortoises are held in captivity throughout southern California, Nevada, and elsewhere, some were taken from the wild, others were reared in captivity. There are several documented cases of captive tortoises being released into the wild (Howland 1989, Ginn 1990), an activity that is now illegal. Release of captives may be detrimental to both captives and resident tortoises. Released captive tortoises may die (Berry et al. 1990) because they do not know how to fend for themselves in the wild; will not initially know where to find cover sites, good forage, sources of water, or essential minerals; and may not have genetic adaptations necessary to survive in the particular area. However, 25 formerly-captive tortoise were released in Nevada (Field et al. 2000). The animals were equipped with radio transmitters and followed for 14 months. The unpublished results indicate that movements and weights did not differ between released and resident tortoises. No adults died (released or resident) and 2 (out of 8) released juveniles died compared to neither of the two residents studied.

Of greater concern for the stability or recovery of tortoise populations is the possible impact of the released captives on resident (host) tortoises. The greatest likely effect is the introduction of disease to the wild population. URTD, the disease presently believed by many to have detrimental effects on several wild tortoise populations (see

"Disease" section, above), is commonly found in captive tortoises (Berry et al. 2002, Johnson 2002). Releasing into the wild tortoises that are infected with URTD may introduce the disease-causing bacterium, *Mycoplasma agassizii*, to previously uninfected individuals and populations. There is some evidence that the incidence of disease is greater in areas of known releases of captives and around urban areas where release or escape of captives is likely to be relatively frequent (Jacobson 1993, Berry pers. comm.). However, data on the rangewide incidence of disease have not been peer reviewed and are not generally available, so it is not possible to evaluate this hypothesis.

Desert tortoises have been manipulated in many ways as part of scientific studies. They have been probed, stuck with needles, affixed with transmitters, implanted with transponders, weighed, measured, pulled and sometimes dug out of burrows, tom name a few. All manipulative research involving desert tortoises must be permitted by USFWS to ensure that risk of harm to the tortoises is minimized. USFWS closely evaluates methods and qualifications of researchers before issuing a permit. There is very little written on the effects of research manipulation. In a preliminary analysis from one study, Weinstein (1993) reported that significantly fewer animals whose blood was sampled on a regular basis subsequently died compared to those whose blood was not sampled. In an evaluation of the possible effects of one research tool, Boarman et al. (1998) summarized from the literature on possible impacts to turtles of different ways of attaching radio transmitters. They concluded that there is little evidence of negative impacts of transmitters on turtles and particularly tortoises. Their concluded this partly because of paucity of published accounts of problems experienced. There are a few undocumented reports of individual animals dying from excessive bleeding following blood extraction and possible excessive mortality of animals that had blood extracted 3-4 times per year for several years, but none of this is reported in the literature and thus remains anecdotal. Kuchling (1998) hypothesized that X-rays, used to measure reproductive success, are hazardous to turtles. Using empirical data, Hinton et al. (1997) argued that x-rays are safe when extremely low dosages of radiation are employed, which can be accomplished with use of rare earth screens.

Invasive Plants

The introduction and proliferation of invasive plants is a continuing and increasing problem in the desert. The most common invasive plants found in tortoise habitat in the west Mojave Desert are cheatgrass (*Bromus tectorum*), red brome (foxtail chess, *Bromus madritensis rubens*), split grass (*Schismus barbatus*, and *S. arabicus*), redstem filaree (*Erodium cicutarium*), Russian thistle (tumbleweed, *Salsola tragus*), Sahara mustard (*Brassica tournefortii*), and fiddleneck (*Amsinckia tessellata*; Kemp and Brooks 1998). Fiddleneck is a native species to the U. S., but others are natives to Eurasia, Africa, or South America (Kemp and Brooks 1998, Esque et al. in press). By one estimate, alien annuals comprised 9-13% of all annual plant species but 3 species (red brome, split grass, and redstem filaree) comprised 66% of all annual plant biomass in one wet year (Brooks 1998, 2000). Other less common weedy species are listed in USFWS (1994, p. D21) and Kemp and Brooks (1998).

Invasive grass species (e.g., split grass) tend to have thin, filamentous roots that spread quickly and easily through shallow compacted soil where the surface crust has been broken (Adams et al. 1982a, b). The root structure allows plants with filamentous roots to quickly take advantage of small amounts of water in the soil following light rains and may allow them to outcompete native, non-weeds, which often grow slower, have thicker tap roots that are less efficient at pushing through dense, compacted soil (Adams et al. 1982a, b). There is some empirical evidence that split grass and red brome inhibit or prevent the growth of native plants, including fiddleneck (Brooks 2000), indicating that competition may be occurring and that the native plants are less available to foraging tortoises. However, in Nevada, Hunter (1989, cited in USFWS 1994, p. D22) found no correlation between native plant density and density of red brome.

In general, invasive plants tend to proliferate in areas of disturbance (Hobbs 1989), but the effect of disturbance may be weak compared to that of rainfall and soil nutrient levels. Density or biomass of weedy plants in the Mojave Desert may be higher in areas disturbed by ORVs (Davidson and Fox 1974), livestock (Webb and Stielstra 1979, Durfee 1988), paved roads (Frenkel 1970, Johnson et al. 1975), and dirt roads (Brooks 1998, 1999a). In a strictly correlative study, Brooks (1999a) found that the biomass of two annual exotic plants was weakly associated with levels of disturbance (disturbance was from ORVs and sheep grazing). Biomass of the introduced plants was also positively associated with soil nutrient levels and the proportion of total biomass and species richness (number of species in a given area) comprising exotic species was negatively associated with annual rainfall (i.e., relative proportion of exotic annuals was greater in years with low annual rainfall).

An additional factor that may facilitate proliferation of alien plants is increased nitrogen deposition from airborne pollutants (Allen et al 1998). Nitrogen, in the form of nitric acid and nitrate from automobile exhaust, deposits on plants and soil downwind from urban areas (Fenn et al. 1998) and perhaps from roads. Brooks (1998) has shown experimentally that the addition of nitrogen to west Mojave soil increases the biomass of brome and split grass thereby potentially increasing their competitive advantage over native plants (Eliason and Allen 1997). The effect ORV-based exhaust has on desert vegetation has not been established.

It is often stated that non-native plants are of lower nutritional quality than native species preferred as forage by tortoises, but this is not always the case. The difference in nutritional quality may have more to do with the type of plant (e.g., grass versus forb, Nagy et al. 1998) or annual differences in nutritional quality related to precipitation (Oftedal 2001). For example, the non-native split grass, which is often eaten and sometimes preferred by tortoises (Esque 1994), has been shown empirically to deplete tortoises of nitrogen and phosphorus and water and cause weight losses (Avery 1998, Nagy et al. 1998, Hazard et al. 2001), but so does the native Indian rice grass (*Achnatherum hymenoides*, Nagy et al. 1998). Avery (1998) also demonstrated that split grass was lower in overall quality, crude protein, essential amino acids, water, and vitamin concentrations and higher in fiber and heavy metal concentrations than three non-grass species measured (one introduced and two native forbs). The introduced forb, redstem filaree, had higher aluminum and iron concentrations, but was otherwise similar to native forbs. Where lower-quality weedy grasses can outcompete preferred higher-quality forbs (Brooks 2000), forbs may be less available to tortoises, tortoises would have to eat the lower quality invasives, and they would then suffer from a nitrogen and phosphorus (or other nutrient) deficiencies (Hazard et al. 2001). This speculation requires further testing.

Mechanical injury from invasive grasses has been observed with instances of the sharp awn of *Bromus rubens* being stuck in the nares of tortoises as well as impacting the food in the upper jaws of the tortoises (Medica, pers. comm.). The interactive effect that invasives and fires have on tortoises was discussed in the "Fire" section, above.

Landfills

There are approximately 27 authorized sanitary landfills and an unknown number of unauthorized, regularly used dumpsites in the California deserts. In the West Mojave Desert, there are 11 authorized landfills. The potential impacts landfills have on tortoise populations include: loss of habitat, spread of garbage, introduction of toxic chemicals, increased road kills from vehicles driving to or from the landfill, proliferation of predatory raven populations, and possible facilitation of increases in coyote and feral dog populations. Other than for raven predation, there are virtually no data to evaluate most of these possible threats.

Loss of habitat to landfills is relatively minor except when viewed in the context of habitat degradation and fragmentation caused by the myriad of human developments that are proliferating in the desert. Spread of garbage probably poses a very small problem for tortoise populations (see “Garbage and Litter” section, above), but there are no data available to evaluate this. The possible effect of toxic chemicals in general is treated in the “Disease” section, above, but toxins from sanitary landfills are likely to have very little effect on tortoise populations. Modern sanitary landfills are designed to prevent the seepage of toxic chemicals and present a very low level (or probability) of risk, and any seepage from these or less optimally operated landfills would probably affect a very small proportion of tortoises. Landfills do generate methane gas, but because desert landfills are so dry, the generation of methane is extremely low and not likely to affect tortoises. Fugitive dust is probably a localized problem and generally minimized through frequent sprinkling of the dirt. Increase in road kills is probably proportional to the level of traffic, speed of vehicles, density of tortoises, and length of road. For most landfills, these factors are relatively low, so the impact of road kills on tortoise populations from vehicles going to landfills is probably relatively minor, but they do happen (LaRue and Dougherty 1999). However, several landfills are slated to be closed and converted to transfer or community collection stations. The garbage would be deposited into dumpsters or large compactors at these stations, then transported to a small number of larger regional landfills. This activity could increase the amount of traffic at these fewer landfills thereby increasing the number of road kills.

The greatest potential impact landfills have on tortoise populations is through their probable role in facilitating increased predation by ravens, and perhaps coyotes.

Ravens make heavy use of landfills for food (Engel and Young 1992, Boarman et al. 1995, Kristan and Boarman 2001). The food eaten probably helps ravens to survive the summer and winter, when natural sources of food are in low abundance (Boarman 1993, in prep.). As a result, more ravens are present at the beginning of their breeding season (February - June) to move into tortoise habitat, nest, raise young, and feed on tortoises. Healthier ravens are more likely to raise chicks successfully, who in turn will move to the landfills and experience higher than normal levels of survival, and the cycle continues. Predation by ravens is probably relatively low immediately around landfills where tortoise populations are relatively low, but increase as ravens disperse to distant nest sites (Kristan and Boarman 2001). See the "Predation" section, below, for more details.

Livestock Grazing

Grazing by livestock (cattle and sheep) is hypothesized to have direct and indirect effects on tortoise populations including: mortality from crushing of animals or their burrows, destruction of vegetation, alteration of soil, augmentation of forage (e.g., presence of livestock droppings, and stimulation of vegetative growth or nutritive value of forage plants), and competition for food.

Reduce Tortoise Density

There are very few data available to determine if grazing has caused declines in tortoise populations. The Beaver Dam Slope, Utah, was grazed heavily by sheep until 1950's and cattle are still grazing there today (Oldemeyer 1994). Tortoise populations on the Beaver Dam Slope were estimated at 150 tortoises/mi^2 (Woodbury and Hardy 1948), but, using very different methods, the population apparently dropped to 34-47/mi^2 in 1986 (Coffeen and Welker 1987, cited in Bury et al. 1994). The reductions have been attributed to grazing, but another cause may include the potential spread of disease from captive tortoises released in the area (Luke et al. 1991). High mortalities and population declines in Piute Valley, Nevada, have also been attributed to grazing (Mortimer and Schneider 1983, and Luke et al. 1991), but 1981 was a drought year and a high level of recent mortalities may have occurred. Such was the case in Ivanpah Valley where 18.4% of radio-transmittered tortoises died (Turner et al. 1984). It is interesting to note that there appeared to be more tortoise mortalities in the section of the Piute Valley study area that experienced lower levels of recent cattle grazing (Mortimer and Schneider 1983), but the data are insufficient to make a definitive judgement. No population trends in California have been attributed with hard data to livestock grazing.

An alternative hypothesis, proposed by Bostick (1990), is that tortoise population declines paralleled declines in cattle grazing throughout the West that began in 1934 with the implementation of the Taylor Grazing Act. Unfortunately, there are no reliable data to test this hypothesis. But its underlying assumption, that tortoises depend on cattle dung for protein, has no empirical support (see "Cow Dung as a Food Source" section, below).

Direct Impacts

CRUSHING TORTOISES

Some observations of tortoises being crushed by livestock exist in the literature, but often with little or no data to allow in-depth evaluation. Berry (1978, p. 28) stated that "smaller tortoises can be crushed easily by cattle or sheep," but provided no data to support the statement. Berry (1978, pp. 19-21) also reported that "a small two-to-three-year old tortoise with a hole through its shell was found near a temporary watering trough near the DTNA. It appeared to have been killed by sheep within the last few days; the hole in the shell was about the size and shape of a sheep's hoof." Ravens also peck holes in the shells of young tortoises; insufficient information was provided to know if the hole was inconsistent with raven predation. Ron Marlow (pers. comm., cited in Berry 1978) described the disappearance of a marked juvenile tortoise and its small burrow by the trampling by sheep. Apparently the marked tortoise was never observed again, so Marlow determined the sheep killed it. The tortoise may have been killed when sheep trampled the burrow. However, marked juveniles are often never seen again, so the tortoise either survived or died from one of many causes. Any one of these anecdotes may be a true indicator of the nature of tortoise-cattle interactions, but the information provided is inadequate to allow for rigorous evaluation and are very susceptible to alternative explanations.

Sheep and cattle may not step on tortoises because they are very cautious of stepping on uneven ground (rocks, bushes, etc.) for fear of losing their footing. This view is supported by the paucity of documentation of tortoises being crushed by cattle and sheep. One published paper (Balph and Malecheck 1985) reported a test of a related hypothesis: cattle will avoid stepping on clumps of bunchgrass because the clumps form an uneven surface that may cause the cow to trip. Cattle significantly avoided crested wheatgrass (*Agropyron cristatum*) tussocks, avoidance was independent of cattle density, and taller tussocks were less apt to be trampled than short ones. Out of 288 hoofprints recorded, 15 (5%) were on tussocks. This well designed study lends support to the contention that cattle will try to avoid stepping on tortoises, at least large tortoises, but clearly tortoises are not grass tussocks. However, this speculation can be countered by the equally plausible contention that the study's results only shows that cattle will avoid stepping on food; they have no bearing on the propensity for sheep to step on non-food items (e.g., juvenile tortoises).

Sheep, on the other hand, may step on many juvenile tortoises, but appear to avoid stepping on subadult and adult tortoises. Tracy (1996) provides an analysis of data from an aborted BLM study. Without providing details of methods, Tracy (1996) reported that 20% of the Styrofoam model juvenile tortoises placed in natural habitat were trampled by sheep, 87% of those trampled models were crushed. Sheep damaged only about 3% of the subadult models and about 2% of the adult models.

CRUSHING BURROWS

No one has rigorously evaluated whether livestock crush a significant proportion of tortoise burrows. Few cases in the literature document livestock trampling actual burrows and a small number of studies shows increased number of collapsed burrows following grazing. Nicholson and Humphreys (1981) measured impacts of sheep grazing immediately after a band of 1000 sheep passed through their West Mojave study site for 12 days. Sheep trampled and partly collapsed a burrow with an adult female inside; apparently the tortoise was unharmed. Sheep completely destroyed the burrow of a juvenile tortoise while the animal was inside; the field workers extracted the unharmed tortoise. The burrow of an adult male was damaged probably with no tortoise inside. On re-examination of burrows found prior to grazing, 4.3% (7/164) were totally destroyed and 10% were damaged after sheep grazed in the area. Most damaged burrows (86%) were in moderate to heavily grazed areas and were relatively exposed. Most burrows placed beneath shrubs escaped damage (Nicholson and Humphreys 1981). This was an observational study. Webb and Stielstra (1979) reported observing crushed tortoise burrows on the south slope of the Rand Mountains in the western Mojave, but gave no data or additional details. In a report on grazing near the DTNA, Berry (1978) reported that sheep trampled most shallow burrows and pallets that were in the open (no numbers were given), and they also crushed and caved in those near the edges of or within shrubs. Berry (1978) also reported that “cattle and sheep frequently trample shallow tortoise burrows,” but provided no data. She further speculated that damage to burrows might be deadly to a tortoise that reaches it on a hot morning only to find it unusable. This is a reasonable expectation based on tortoise behavior and thermal ecology, but no supporting data are available. Avery (1997) found significantly more damaged burrows outside of a cattle exclosure versus inside and also found that tortoises outside the exclosure spent more nights in the open, presumably because many of their burrows were collapsed. There is one account of a tortoise burrow being collapsed by a cow in Utah (Esque pers. comm.). A tortoise was found crushed inside.

Tracy (1996) provided an analysis of data from 2 unpublished BLM studies on the effects of sheep grazing on tortoise burrows: the Tortoise and Burrow Study (TABS study) and Styrofoam model tortoise study (Goodlett unpubl.). The TABS study (cited in Tracy 1996) evaluated the condition of tortoise burrows before and after grazing inside and outside of areas grazed by domestic sheep in the Mojave Desert. They found that 2.5% (8/315) of the tortoise burrows were completely destroyed, which was significantly more than before grazing and more than were destroyed outside the grazing area. In the Goodlett study (unpubl.; cited in Tracy 1996), 3.7% (36/969) of the artificial burrows dug to look like desert tortoise burrows were destroyed after grazing. Significantly more juvenile and immature burrows were destroyed compared to adult burrows and destruction was greatest in the open spaces between shrubs. The proportion of burrows destroyed in these two studies and Nicholson and Humphreys (1981) were not significantly different (Tracy 1996).

Indirect Effects

A commonly held assertion is that the Mojave desert plant species and communities evolved in the presence of, and are probably adapted to, a rich fauna of Pleistocene herbivores (Edwards 1992a, 1992b). Therefore, the argument continues, livestock grazing is compatible with present day plant assemblages, in part because Mojave plants respond to grazing by producing more vegetative material, thus becoming more vigorous in the presence of grazing. This argument has several flaws. First, most large herbivores that coexisted in the Mojave desert region 10,000-20,000 years ago likely primarily browsed leaves from woody shrubs, they did less grazing of grasses and herbaceous annual vegetation, like cattle, sheep, and tortoises primarily do (Edwards 1992a). Second, the mammals of the Late Pleistocene and Early Holocene Mojave existed under considerably different vegetative and climatic conditions ago (Van Devender et al. 1987). A major climatic and vegetative transition occurred between 11,000 and 8,000 years ago. It was more mesic and the area was not a desert. The present vegetation assembly, dominated by creosote shrub, did not arrive in the Mojave Desert region until approximately 8000-10,000 years ago (Van Devender et al. 1987). Third, no one has any idea what density the Pleistocene grazers existed at, so grazing intensity is completely unknown. Thus, there is little justification for arguing that tortoises evolved in the presence of grazers and their survival is thus dependent on cattle, as a surrogate for their coevolved grazing species.

SOIL COMPACTION

Grazing can affect soils by increasing soil compaction and decreasing infiltration rate, the capacity of the soil to absorb water. A lower infiltration rate means less water will be available for plants and more surface erosion may occur. In a review of studies investigating the hydrologic effect of grazing on rangelands, Gifford and Hawkins (1978) concluded that grazing at any intensity reduces the infiltration rate of the soil. Heavy grazing reduced infiltration rate by 50% and light to moderate intensities reduced infiltration by 25% over ungrazed; the differences are statistically significant. Contrarily, Avery (1998) found significantly greater compaction at a livestock water source, but no difference between protected and grazed areas away from the water source.

Soil compaction affects vegetation by reducing water absorption (thereby availability to plants) and making it more difficult for plants to spread their roots, particularly tap roots (Adams et al. 1982a, b). Growth and perhaps spread of split grass (*Schismus barbatus* and *S. arabicus*) is facilitated by compaction because of root structure. This may lead to a conversion in the vegetation community type and increased fire hazard. Although, fire spreads slowly and discontinuously with split grass compared to *Bromus* grasses (Brooks 1999b).

Empirical evidence shows that infiltration is higher in grazed areas. , Rauzi and Smith (1973) conducted a comparative experiment in the central plains of Colorado. They demonstrated that infiltration rate was significantly reduced by heavy grazing (vs. moderate and light grazing). Infiltration rate was significantly correlated with total plant material on the surface (standing crop) in two of the three soil types tested. Species composition was different. Experimental water run-off tests showed moderate grazing areas had 7 times the runoff of light grazing areas and heavily grazed areas had 10 times the runoff as lightly grazed areas. In the Mojave Desert of Nevada and Arizona, signs of increased soil compaction were evident in grazed areas compared to ungrazed areas between highway and highway right-of-way fences (Durfee 1988). Avery (1998) measured soil type, bulk density, and infiltration in an exclosure that cattle were excluded from for approximately 12 years and compared them to grazed areas outside the exclosure. He demonstrated that soil in heavily trampled areas near water tanks was coarser, had higher bulk density, greater penetration resistance, and lower infiltration rates (all are measures of compaction) than in the protected area.

Although they did not measure compaction or infiltration, Nicholson and Humphreys (1981) quantified the proportion of soil disturbed after a band of 1000 sheep spent 12 days foraging and bedding within a 1.6 km^2 study plot. They estimated that 80% of the soil in bedding areas was disturbed, 67% in watering areas, 37% in grazing areas, and 5% in areas not used by sheep. Soil was considered disturbed if the surface crust was broken or missing and was independent of cause. This non-replicated observational study had a control, did not document what effect the measured disturbance had on vegetation or soil parameters, but did suggest the extent of surface disturbance caused by the grazing.

In a comparison of soil conditions following sheep grazing in the Western Mojave, Webb and Stielstra (1979) noted disruption of soil crusts in intershrub spaces and on the coppice mounds of creosote bushes. Surface strength (a measure of compaction) was significantly greater in grazed vs. ungrazed areas, particularly in the upper 10-cm of the soil. Bulk density and moisture content did not differ, perhaps because of the high gravel content of the soil or compaction in both areas from grazing activity in previous years.

CHANGES IN SOIL TEMPERATURE

Another potential indirect effect of livestock grazing on tortoise habitat is alteration of soil temperature due to change in vegetation structure or soil compaction. Steiger (1930 cited in Luke et al. 1991) measured a significant increase in soil temperature at depths of 2.5, 7.5, and 15 cm in clipped versus unclipped plots. Browsing of shrubs may also alter soil temperature, but in unexpected ways. Using models that accurately duplicated the thermal profiles of desert tortoises, Hillard and Tracy (1997), a graduate student from University of Nevada, Reno, found that soils were cooler beneath shrubs with sparse and open undercanopies and hotter when the undercanopy was entirely closed. Apparently, the open undercanopy allowed cooling by both shade and wind, whereas closed undercanopies trapped hot air. Hence, if livestock browse, graze or otherwise reduce density of the undergrowth of a shrub while leaving the canopy with intact shading properties, then soil temperatures may be reduced. Alternatively, if grazing also reduces the shrub’s canopy, then soil temperatures may increase. It is unknown what effect grazing-induced changes in soil temperature might have on tortoises. The temperature during incubation (Spotila et al. 1994) determines sex of tortoises: incubation temperatures above 89.3°F result in females, and below result in males. Although this has not been tested in the field, it is possible that significant increases in soil temperature resulting from grazing-induced vegetation changes may significantly skew the sex ratio of the tortoise population in favor of females and vice versa. Also, Spotila et al. (1994) found that hatching success was highest for eggs incubated between 78.8°F and 95.5°F.

CHANGES IN VEGETATION

Grazing by cattle can alter vegetation in several ways: damage from trampling, change in species composition perhaps resulting in type conversion (change in plant community type), and introduction of invasive plants.

TRAMPLING OF VEGETATION AND SEEDS

Livestock may cause direct damage to vegetation when they step on or push into shrubs and herbaceous annuals, and this impact was measured in a few studies. In the west Mojave Desert, none of the perennials on plant transects where sheep grazed were trampled, whereas 17% found in the bedding area were trampled (Nicholson and Humphreys 1981). Webb and Stielstra (1979) reported that sheep trample creosote bush when seeking shade to bed in. Annuals, which are prevalent on coppice mounds beneath creosote, were also trampled or eaten. As noted above, Balph and Malechick (1985) provided empirical evidence that cattle usually avoided stepping on clumps of crested wheatgrass, but still stepped on them 5% of the time.

Trampling by livestock may help to bury seeds and improve germination through their trampling action. In sagebrush scrub of northern Nevada, Eckert et al. (1986) found that light trampling increased germination of perennial grasses, but not perennial forbs, and heavy trampling decreased emergence of perennial grasses while increasing emergence of sagebrush and perennial forbs. Cattle grazing in Chihuahua Desert grassland enhanced revegetation by non-native grasses, but rain may have confounded the results (Winkel and Roundy 1991). Unfortunately, no similar studies from the Mojave Desert are available. However, biomass of seeds in the soil seed bank was significantly higher inside compared to immediately outside the DTNA, a 38 mi^2 fence enclosed preserve, where sheep grazing and ORVs had been excluded for 15 years (Brooks 1995); this in spite of there being more seed-eating rodents inside the DTNA. The biomass of annual vegetation, including the introduced species, was also greater inside the DTNA, but the total biomass of natives was proportionally higher inside than outside. Several other uses occurring outside the DTNA were absent from inside the preserve, thus the differences cannot be attributed solely to grazing. However, the changes noted are the expected effect of removal of surface disturbance from the reserve.

Near the DTNA, sheep trampled and uprooted perennial shrubs, such as burrobush (*Ambrosia dumosa*), goldenhead (*Acamptopappus sphaerocephalus*), and

Anderson thornbush (*Lycium andersoni*). "Even large creosote bushes (*Larrea tridentata*) were uprooted" (Berry 1978, p 512). "In many areas near stock tanks [in Lanfair Valley, California] the ground is devoid of vegetation for hundreds of meters. Trailing is heavy and damage extensive within 4.6 to 6.4 km of the tanks" (Berry 1978, p. 512). These reports are anecdotal; no data or additional details were provided.

Plant Community Changes

As early as 1898, range scientists observed that cattle ranges in the southwest were becoming overgrazed and urged that restorative actions were necessary (Bentley 1898). Since then, several studies have documented vegetation changes over the past century by comparing photographs or field notes taken in both centuries (Humphrey 1958, Humphrey 1987). The dominant change was a conversion from grass- to shrub-dominated communities (type conversion). Whereas livestock grazing has been implicated as an important cause for these changes, separation of the effect of grazing from the effects of fire suppression, rodents and other herbivores, competition, and climate changes is difficult (Humphrey 1958, 1987). Several studies compared grazed areas to nearby ungrazed areas particularly in southeast Arizona. They generally show a similar reduction in grass species in the grazed areas. Unfortunately, none of these studies occurred in the Mojave Desert and, because the grass-dominated ecosystem of southeast Arizona is very different from the non-grass deserts of California, there is little value in extrapolating from one to the other.

In 1980, the BLM created a 672-hectare cattle exclosure in Ivanpah Valley, eastern Mojave Desert of California, to determine the effects of cattle grazing on desert tortoises and their habitat. In the study establishing baseline data for a long-term comparison, Turner et al. (1981) found no significant differences between plots in biomass of annuals, weight or length of tortoises, proportion of reproductively active females, and tortoise home range sizes. Sex ratios and size classes of tortoises were comparable between the two plots. The lack of differences could be attributed to: (1) low use by cattle of the non-excluded area in both years of the study; 2) tortoise and vegetation recovery, if they are to happen, are likely to take much longer to be observable; and (3) sample size (n=1) too small to detect differences. Changes in tortoise weight with time, estimated clutch sizes, and concentrations of some nutrients in some plant species differed between plots, indicating that some differences existed between control and treatment at the start of the study. Over so short a time frame, differences are likely due to prior spatial differences in habitat or populations rather than grazing treatment. There was a similar level of differences between control and treatment plots one year later (Medica et al. 1982).

Avery (1998) conducted a follow up study at the Ivanpah study plot in the early 1990's. Avery (1998) compared vegetation inside and outside the exclosure. Compared to the ungrazed exclosure, the grazed area had significantly larger creosote bushes, more dormant or dead burrobush, *Ambrosia dumosa* (a perennial shrub), fewer and smaller, galleta grass, *Pleuraphis [=Hilaria] rigida* (a native, perennial grass) representing less biomass, more of the disturbance-loving shrub, *Hymenoclea salsola*, and lower diversity of winter annuals. They found significantly more desert dandelions (*Malacothrix glabrata*), a plant preferred by both cattle and tortoises, and a greater increase in basal area but not density of the native perennial galleta grass, *P. rigida*, in the protected area. *P. rigida* did increase in basal area over a 12 year period in the grazed area, indicating that level of grazing (0.31 - 2.60 animal unit months) does not cause mortality in *P. rigida*. Biomass, cover, density, and species richness of annuals did not differ. Recovery of Mojave Desert vegetation following alteration by cattle grazing could be very slow (Oldemeyer 1994), so 12 years of exclusion may be insufficient to detect a more significant effect.

A recent study compared soil characteristics, vegetation, and tortoise density within and around three exclosures in the Mojave Desert, including 2 in the west Mojave (Larsen et al. 1997). They reported finding few differences between "grazed" and "ungrazed" plots in percent canopy cover, and the differences found were relatively minor. Grazing reduced native forb density and increased soil compaction. Numbers of live tortoises, tortoise carcasses, and tortoise burrows were no different between grazed and ungrazed areas. Details provided were insufficient to adequately evaluate the methods or results and virtually no statistical analyses were provided.

Durfee (1988) compared structural features of the plant community between ungrazed areas along fenced highways and grazed areas outside of the right-of-way fences. A greater proportion of introduced plants, more bare ground, fewer perennial grasses, and lower spatial heterogeneity in species composition occurred in the grazed areas (see also Waller and Micucci 1997).

As cited above, Brooks (1995) found significantly higher annual plant and seed biomass in the DTNA, an area protected from sheep grazing, compared to an area outside the preserve. Berry (1978) characterized the qualitative effect of sheep grazing near the DTNA: "sheep removed almost all traces of annual forbs and grasses; the desert floor appeared more devoid of herbaceous growth than in drought years." No further data were provided in the latter report.

In all of these studies, spatial differences obtained in soil, weather, and vegetation may be independent of cattle grazing. Furthermore, the size of exclosures may be insufficient to allow the ecosystem to function independent of grazing activities outside the exclosure (which is probably not a big problem at the DTNA, studied by Brooks 1992). Furthermore, many of the above studies, particularly the older and observational ones, were reporting on the effects of long-term heavy grazing, whereas grazing regimes being implemented today are generally much lighter (Oldemeyer 1994).

Water for cattle is usually provided at specific points, at either springs or troughs. Because they will only wander a certain distance from the water source, affect of cattle on the environment will be greatest immediately around the water source and will decrease with distance (e.g. Avery 1998). Fusco (1993), Fusco et al. (1995), Bleecker (1988), and Soltero et al. (1989) recorded significant increases in biomass and density of grasses and other species with distance from water sources. Changing the location of water sources would have the effect of reducing the intensity of impact around each water source, but may increase the impacts at other sites. It is unknown if impacts would be below the (unknown) threshold for significant effect on the environment.

The impact of sheep grazing has been studied only once. In an observational study, Nicholson and Humphreys (1981) noted that areas not grazed by sheep had 2.3 times more cover and 1.6 times higher frequency of annual plants than in sheep bedding areas and 1.8 times more cover and 1.3 times higher frequency than grazed areas. Annual plant cover decreased by 70% in a heavy-use area compared to 50% in a light-use and 40% in a non-use area before grazing versus after grazing one month later. They also found a 96-99% reduction in annual plant cover between April and June in areas receiving heavy and light grazing by sheep. None of the perennials on plant transects where sheep did not graze showed damage after sheep left the area; 18% in the grazed area were damaged and 91 to 99% in the bedding areas were damaged. Apparently, trampling caused most of the damage in the bedding areas whereas most in the light-use area was from browsing. However, differences may be caused by other factors such as soil that may have differed between the sites independent of grazing pressure. Rather than using exclosures, the sheep and herder were allowed to select the areas they grazed. Hence, the sheep avoided ungrazed treatments for this study. This may have biased the results since there may be inherent differences in these areas that caused the sheep to avoid them.

An often cited benefit of grazing is "compensatory growth," growth of plant tissue following clipping, removal, or damage to plants resulting in increased growth or vigor (e.g., Bostick 1990, McNaughton 1985, Savory 1989). The concept is controversial, has gained little empirical support in semi-arid grasslands and ranges (Detling 1988, Bartolome 1989, Weltz et al. 1989, Wilms et al. 1990), may only be viable in wet, fertile, monocultural environments (Painter and Belsky 1993), and has not been tested in the Mojave Desert (e.g., Painter and Belsky 1993). What little evidence exists from the Mojave Desert fails to support the compensatory growth hypothesis. Avery (1998) found that *Pleuraphis [=Hilaria] rigida*, a native grass consumed by both cattle and desert tortoises, was significantly smaller in grazed versus ungrazed areas. More *Ambrosia dumosa*, which is sometimes eaten by cattle in drought years (Medica pers. comm.), was found dead or dormant in the grazed compared to ungrazed plots. Creosote (*L. tridentata*) was larger in grazed areas, but is consumed by neither cattle nor tortoises (Avery 1998).

INVASIVE PLANTS

Grazing has been implicated in the proliferation of invasive plants in the Mojave Desert (Mack 1981, Jackson 1985, Brooks 1995). Webb and Stielstra (1979) noted that *Schismus* and *Erodium* densities remained unchanged between a grazed and ungrazed area probably because they have an adaptive tolerance to environmental disruption such as soil compaction thus giving them a competitive edge over many native annuals. Berry (1978) reported that the heavily grazed Lanfair Valley "now contains a high percentage of weedy, invader, perennial species typical of overgrazed desert lands," but provided no data. Bostick (1990) argued that cattle grazing helped tortoise populations by aiding the spread of cacti. Some evidence from outside the Mojave suggests that grazing does aid in the spread of cacti, but the evidence is equivocal. Also, tortoises do eat cacti, which may be an important source of water and nutrition during drought periods (Turner et al. 1984, Avery 1998). But, the evidence in support of Bostick's hypothesis is weak.

COMPETITION

An important effect livestock grazing may have on tortoise populations is competition for food. Because of the enormous differences in size and energy requirements of the two species, the competition, if it occurs, is likely to be heavily asymmetric, with cattle affecting the tortoise populations, but probably not the converse. Three conditions must be met for asymmetric competition to occur: overlap in use of some resource (e.g., food), the resource must somehow limit or constrain one or both species in question, and use of the resource by one species must negatively affect the other species (Begon et al. 1990). Some data exist to help determine if competition for forage exists between cattle and tortoises, but less exist for sheep.

Many studies provide qualitative insights into forage species of tortoises (Woodbury and Hardy 1948, Burge and Bradley 1976, Hansen et al. 1976, Hohman and Ohmart 1980, Luckenback 1982, Nagy and Medica 1986) and three major studies quantified diet and forage selection in desert tortoises (Jennings 1993, Esque 1994, and Avery 1998). Tortoises primarily eat annual herbs in the spring and switch to grasses, perennial succulents (cacti), and dried annuals later in spring and early summer (Avery 1998). Tortoises are active again in the late spring and early fall as temperatures cool. As a result of localized late summer rains, sporadic green up of the vegetation can occur. At this time annuals germinate and bunch grasses (e.g., *Hilaria rigida*) green up and set seed. Cattle then eat the bunch grasses (Medica et al. 1992). In a drought year, tortoises in Ivanpah Valley consumed little food other than cacti during the latter part of the season (Turner et al. 1984). Thus, cacti may serve as a reserve supply of energy, more importantly as a potential source of water.

Four studies quantified plant foods eaten by cattle in the Mojave Desert (Coombs 1979, Burkhardt and Chamberlain 1982, Avery and Neibergs 1997). Avery and Neibergs (1997) followed cattle on horseback in the eastern Mojave Desert. By recording the species of plant and number of bites taken by the free-ranging cattle they found that foods chosen by cattle varied with season. In winter cattle primarily ate the perennial grass, big galleta grass (*Pleuraphis* [=*Hilaria*] *rigida*) and dried annuals from the previous spring (Medica et al. 1982, documented that cattle and tortoises eat perennial grasses in fall). Contrarily, Burkhardt and Chamberlain (1982) found perennial shrubs to predominate the diet of cattle in winter, annual grasses and green forbs did so in spring. Coombs (1979) found that cattle in the eastern Mojave of Utah particularly ate *Bromus* sp., *Ephedranevadensis*, and *Eurotia lanata* and ate perennial grasses considerably more often than expected based on their relatively uncommon presence. All of these studies illustrated that cattle in the desert eat diverse foods and that the foods eaten vary with season, locality, and availability.

Several studies provided evidence that tortoise and cattle diets overlap (Coombs 1979, Sheppard 1981, Medica et al. 1982, Avery and Neibergs 1997, Avery 1998), three of which did so quantitatively. Coombs (1979) and Sheppard (1981) used fecal samples, which are biased because they overestimate food items that contain large undigestible parts (e.g., silica-containing stems of grasses) and underestimate items that are highly digestible (e.g., moist forbs). Sheppard (1981) showed that plaintain (*Plantago insularis*), filaree, and *Schismus* experienced the highest levels of overlap , but overlap varied considerably between months and years. Coombs (1979) found that overlap existed, but neither study provided a species-by-species comparison or an explanation of how overlap was calculated. *Camassonia boothii*, *Malacothrix glabrata*, *Rafinesquia neomexicana*, *Schismus barbatus*, and *Stephanomeria exigua* were major forage items of both cattle and tortoises in Ivanpah Valley (Avery and Neibergs 1997, Avery 1998). Diet overlap between the two herbivores was greatest in early spring (38% Vs 16% in late spring, Avery and Neibergs 1997, Avery 1998).

Three studies provide data on forage overlap between sheep and tortoises. Webb and Stielstra (1979) reported that in the western Mojave Desert, sheep primarily ate herbaceous vegetation from the coppice mounds around the base of perennial shrubs. By comparing biomass of plants in a grazed area versus a nearby ungrazed area, they determined that three species were primarily removed: *Phacelia tanacetifolia*, *Thelypodium lasiophyllum*, and *Erodium cicutarium*.. Shrubs browsed by the sheep included *Ambrosia dumosa*, *Grayia spinosa*, *Haplopappus cooperi*, and *Acamptopappus sphaerocephalus*. Cover, volume, and biomass of these shrubs were significantly lower in grazed vs. ungrazed areas. However, because measurements were not taken before grazing it is possible that some differences may have existed before grazing commenced. Hansen et al. (1976) estimated that 15% of sheep diet in the western Mojave was composed of grasses and 52% of desert tortoise diets was composed of grasses. Nicholson and Humphreys (1981) reported several species of plants, particularly flowering annuals and burrobush (*Ambrosia dumosa*), that were highly used by sheep, but provided no quantitative data. Several species eaten by sheep were also eaten by tortoises including: split grass (*Schismus arabicus*), checker fiddleneck (*Amsinckia tessellata*), desert dandelion (*Malacothrix glabrata*), filaree (*Erodium cicutarium*), Fremont pincushion (*Chaenactis fremontii*), Parry rock pink (*Stephanomeria parryi*), chickory ((*Rafinesquia neomexicana*), snake's head (*Malacothrix coulteri*), red brome (*Bromus rubens*).

Only two studies directly tested for competition between tortoises and livestock. In an extensive study, Avery (1998) showed that cattle and tortoise diets overlap (38% in early spring, 16% in late spring). He also demonstrated that tortoise foraging was altered in the area where both species co-occurred. In late spring in the absence of cattle, tortoises primarily ate herbaceous perennials (91% of diet), whereas in the grazed areas, tortoises primarily ate annual grasses (59%) followed by herbaceous perennials (21%). The species of herbs also differed: in the exclosure tortoises preferred desert dandelion (*Malacothrix glabrata*), whereas in the grazed areas they ate primarily the exotic grass, splitgrass (*Schismus barbatus*). The availability of desert dandelion was significantly higher in the ungrazed area, which indicates a response to grazing, and of splitgrass was equivalent in the two areas. In one dry year, tortoises spent significantly more time (approximately three times more) foraging in the grazed than in the protected areas, presumably in search of nutritionally-adequate food to fill up on. Thus, two of the three conditions necessary to confirm that cattle compete with tortoises for food were clearly supported empirically. The final condition, that one species must negatively impact the other, was also demonstrated, but more indirectly. In a separate, independent study, tortoises eating primarily *Schismus barbatus* have been shown to be put in a negative water and nitrogen balance (Nagy et al. 1998), which could increase mortality particularly during periods of extended drought (Peterson 1994a, Avery 1998). Furthermore, Henen (1997) demonstrated that lower nitrogen intake reduces reproductive output in female tortoises. A long-term comparison of differential survival and reproductive success of tortoises within and outside an exclosure would be an excellent empirical test of the effect cattle grazing has on tortoise populations.

Tracy (1996) found that in years of very low annual productivity, tortoises lay fewer eggs. They also found that cattle foraging reduced tortoise forage abundance enough to cause tortoises to lay fewer eggs than normal. The conclusion is that, in low rain years, cattle may remove enough forage to reduce tortoise reproductive output, thus competition occurs in those years. The authors did not track hatchling success to determine if the fewer eggs still resulted in the same number of successful hatchlings.

COW DUNG AS A FOOD SOURCE

Bostick (1990) argued that declines in tortoise populations is caused by a reduction in the availability of cow dung which has declined with the reduction in numbers of cattle grazing in the southwest. He argued that cow dung is an important source of food for tortoises. However, Avery (1998) studied tortoise foraging behavior where tortoises coexisted with cattle. He observed over 30,000 bites of items and observed only 231 bites of cow dung. Esque (1994) also observed over 30,000 bites on food objects. He reported that 107 of them were of feces, but none were from livestock. Furthermore, Allen (1999) evaluated the nutritional quality of cow dung and found it to be deficient for tortoises. In fact, even when cow pies were their only choice of food for one month, most tortoises (71%) refused to eat. Those that did eat, assimilated virtually none of the nitrogen. Thus, whereas Bostick (1990) presented an intriguing alternative hypothesis for tortoise population declines, there is no empirical support for its basic assumptions.

<u>Summary</u>

Surprisingly little information is available on the effects of grazing on the Mojave Desert ecosystem (Oldemeyer 1994, Rundel and Gibson 1996, Lovich and Bainbridge 1999). Differences in rainfall patterns, nutrient cycling, and foraging behavior of herbivores and how these three factors interact make applications of research from other areas of limited value in understanding the range ecology of the Mojave Desert. The paucity of information is surprising given the controversy surrounding grazing in the

Mojave and the importance of scientific information for making resource management decisions affecting grazing. Studies mostly from other arid and semi-arid regions tells us that grazing can alter community structure, compact soil, disturb cryptogamic soils, increase fugitive dust and erosion. Some impacts to tortoises or their habitat have been demonstrated, but the evidence is not overwhelming.

Military Operations

The California deserts were used for military exercises as far back as 1859 when Fort Mojave was first built (Krzysik 1998). The most extensive use was for World War II training when 18400 mi^2 (47105 km^2) in California and Arizona were designated as the Desert Training Center and used extensively for training with tank and armored vehicles. Today, four major, active military installations occur within the West Mojave and comprise a total of 4165 mi^2 (10663 km^2): Naval Air Weapons Station ("China Lake;" 1731 mi^2, 4432 km^2), National Training Center ("Fort Irwin;" 1016 mi^2, 2600 km^2), Air Force Flight Training Center ("Edwards Air Force Base;" 476 mi^2, 1218 km^2), and Marine Corp Air Ground Combat Center ("MCAGCC" or "Twentynine Palms;" 943 mi^2, 2413 km^2).

As outlined in the Recovery Plan (USFWS 1994), impacts to tortoise populations come from four basic types of military activities:

> "(1) construction, operation, and maintenance of bases and support facilities (air strips, roads, etc.); (2) development of local support communities, including urban, industrial, and commercial facilities; (3) field maneuvers; including tank traffic, air to ground bombing, static testing of explosives, littering with unexploded ordinance, shell casings, and ration cans; and (4) distribution of chemicals." (USFWS 1994, p. D14)

A fifth potential impact is above ground nuclear weapons testing, which took place in Nevada in the 1950s and 1960s.

Construction, Operation, and Maintenance of Bases and Support Facilities

All four major military bases in the west Mojave Desert each have facilitated the growth or development of large internal support communities. The development of these communities destroyed tortoise habitat and likely brought with them all of the other impacts generally associated with large human settlements (fragmentation, ORVs, release of disease, facilitation of raven population growth, domestic predators, etc.), each of which are discussed elsewhere in this report. There is some evidence that the tortoise population around China Lake declined within four decades following development of the base at China Lake (Berry and Nicholson 1984a). However likely this conclusion probably is, the data used were based solely on anecdotal observations (Bury and Corn 1995); and the data only show a correlation, not a cause and effect. Removal (translocation) of tortoises from construction sites, runways, and other heavy use areas to other parts of the desert occurs and may affect the tortoises moved (Berry and Nicholson 1984a; see "Handling and Deliberate Manipulation" section, above). Another impact is the fragmentation of the habitat by the apparent haphazard placement of facilities throughout major portions of habitat (pers. obs.).

Development of Local Support Communities

The four major military bases in the west Mojave Desert have facilitated the growth or development of large external support communities: Ridgecrest, Barstow, Lancaster, Palmdale, and Twentynine Palms, which each have problems for tortoises typical of large suburban areas in the desert (see "Urbanization and Development" section, below).

Field Maneuvers

Tank maneuvers cause some of the most drastic and long-lasting impacts to the Mojave Desert habitats. Extensive tank training operations were conducted in the 1940's and in 1964 over 17,500 mi^2 of desert (Lathrop 1983, Prose and Metzger 1985, Krzysik 1998) and even more intensive maneuvers are currently taking place within an 819 mi^2 area on Fort Irwin (Krzysik 1998) and on MCAGCC (Baxter and Stewart 1990). Direct mortality to tortoises is relatively rare or not often reported, but does occur (Stewart and Baxter 1987, Quillman pers. comm.). Tanks damage vegetation, compact soil, cause fugitive dust, and run over tortoise burrows and tortoises. The results are largely denuded habitat, and altered vegetation composition, abundance, and distribution (Wilshire and Nakata 1976, Lathrop 1983, Baxter and Stewart 1990, Prose et al. 1987, Krzysik 1998). Natural recovery can take a long time; 55 year old tank tracks can still be seen throughout many parts of the desert (Wilshire and Nakata 1976, Krzysik 1998). Krzysik (1998) reported a significant reduction in tortoise densities (62-81% over six years) in active training areas of Fort Irwin and no change or increases in densities in areas with light and no activity. The effect of tank maneuvers was highest in valley bottoms and progressively less in high bajadas, talus slopes, and rugged mountain ranges where training activities were considerably lower.

Bombing and other explosive ordinance cause impacts in some areas, but no documentation was found of their effect on tortoise populations or habitat.

Distribution of Chemicals

It has been suggested that diseases affecting tortoise shells may be caused by residual chemical remains left over from military operations, but the evidence is highly speculative (See "Disease" section, above).

Nuclear Weapons Testing

Between 1951 and early 1963, the U. S. Atomic Energy Commission detonated 100 atomic devices above ground at the Nevada Test Site, Nevada (U. S. Department of Energy 1994). From mid 1960s to early 1990s only underground tests were conducted. Resource Concepts Inc. (1996) argued that radiation released into the atmosphere during these tests might explain tortoise declines. They cited two anecdotal accounts, one of many sheep getting sick near Cedar City, Utah, and another of high Geiger counter levels around the mouth of a cow in the same area. They suggested that nuclear fallout might explain the presence of disease in tortoise populations. Beatley (1967) found only very low levels of radiation at a plant study plot 8 km east of a below-ground test blast and attributed vegetative defoliation to dust from heavy vehicular traffic on a nearby dirt road.

The University of California, Laboratory of Nuclear Medicine and Radiation Biology conducted experimental radioecology research studies in Rock Valley located along the southern boundary of the Nevada Test Site. These irradiation studies involved the chronic exposure of plants and animals from a centrally located 137 cesium source located atop of a 50-ft tower within a 21-ac fenced plot. Rundel and Gibson (1996) provided a brief summary of the results of the Rock Valley irradiation experiment. Beyond direct mortality from the test blasts, there was very little persistent effect of radiation on the surrounding lizard populations. Little long-term effect on the pocket mouse, *Perognathus formosus*, was found (Turner 1975). On the other hand, female lizards at Rock Valley were found to be sterile several years after the experiment began (Turner 1975, Turner and Medica 1977). There were five adult tortoises present throughout most of the study and four still remained in 2001 (Medica pers. comm.).

I could find no data that bear directly on the potential effects of nuclear weapons testing on tortoise populations. The map in Gallagher (1993) suggests that fallout was nearly nonexistent in the west Mojave (which is consistent with predominant wind patterns), where URTD is rampant (Berry 1997). Therefore, if there is an effect from testing, it probably cannot be a universal explanation for rangewide declines nor can it explain the markedly high losses and levels of disease documented in the west Mojave.

Noise and Vibration

The following is largely paraphrased from my contribution to the Desert Tortoise Recovery Plan (USFWS 1994). Anthropogenic noise and vibrations may impact tortoises in several ways including: disruption of communication, and damage to the auditory system. A body of peer reviewed scientific literature exists demonstrating how background noise may mask important vocal signals in insects and amphibians (e.g., Bushcrickets, *Conocephalus brevipennis*, Bailey and Morris, 1986; Green Treefrogs, *Hyla cinerea*, Ehret and Gerhardt, 1980). Hierarchical social interactions, hearing, and vocal communication have all been identified in desert tortoises (Adrian et al. 1938, Campbell and Evans 1967, Patterson 1971, 1976, and Brattstrom 1974, Bowles et al. 1999). Patterson (1976) identified eleven different classes of vocal signals used by desert tortoises in various of social interactions, but he did not demonstrate that animals who hear the signals react or change their behavior in any way, a necessary component in identifying communication. The signals are relatively low amplitude, have fundamental frequencies 200 Hz or lower, and harmonics that reach as high as 4500 Hz (Patterson, 1976).

The portions in the following excerpt from USFWS (1994) pertaining to desert tortoises is purely speculative with no direct empirical support for desert tortoises:

> " Many anthropogenic noises, such as automobile, jet, and train noises, cover a wide frequency bandwidth. When such sounds propagate through the environment, the high frequencies rapidly attenuate, but the low frequencies may travel great distances (Lyon, 1973). The dominant frequencies that remain after propagation correspond closely to the frequency bandwidth characteristic of desert tortoise vocalizations. Therefore, masking of these signals may significantly alter an animal's ability to effectively communicate or respond in appropriate ways. The same holds true for incidental sounds made by approaching predators; masking of these sounds may reduce a tortoise's ability to avoid capture by the predator. The degree to which masking by noise affects tortoise survival and reproduction depends on the physical characteristics (i.e., frequency, amplitude, and short- and long-term timing) of the noise and the animal signal, propagation characteristics of the sounds in the particular environment, auditory acuities of the tortoises, and importance of the signal in mediating social or predator interactions. There are no studies to test the masking effect of noise on tortoise behavior, but the effect is likely to be relatively low given that vocal communication is probably not extremely important in mediating social interactions and that noises loud enough to mask sounds important to tortoises are generally uncommon and short in duration. The only place the noise would be continuous enough may be alongside heavily traveled roads, where tortoise abundance is generally quite low.
>
> "Loud noises (and associated vibrations) may damage the hearing apparatus of tortoises. Little research has been performed on tortoise ears, but it is clear that tortoises are able to hear, and the relatively complex vocal repertoires demonstrated by tortoises suggests that their hearing acuity is similarly complex. Brattstrom and Bondello (1983) experimentally demonstrated that off-highway vehicle noise can reduce the hearing thresholds of Mojave Fringe-toed Lizards (*Uma scoparia*). Relatively short, single bursts (500 sec) of loud sounds (95 dBA at 5 meters) caused hearing damage to seven test lizards (Brattstrom and Bondello, 1983). Comparable results were obtained when desert iguanas (*Dipsosaurus dorsalis*) were exposed to one to ten hours of motorcycle noise (Bondello, 1976). It is likely that repeated or continuous exposure to damaging noises will cause a greater reduction in auditory response of these lizards. It is not unreasonable to expect loud noises to similarly impact the auditory performance of desert tortoises."

A study conducted by Bowles et al. (1999) showed very little behavioral or physiological effect on tortoises of loud noises that simulated jet over flights and sonic booms. They also demonstrated that tortoise hearing is fairly sensitive (mean = 34 dB SPL) and was most sensitive to sounds between 125 and 750 Hz, well within the range of the fundamental frequency of most of their vocalizations. The authors concluded that tortoises probably could tolerate occasional exposure to sonic boom level sounds (140 dB SPL), but some may suffer permanent hearing loss from repeated long-term exposure to loud sounds such as from ORVs and construction blasts.

ORV Activities

Like most other threats, off road vehicle (ORV) activities may affect tortoise populations in multiple ways: direct mortality by crushing tortoises on the surface or in burrows, or indirect mortality through habitat alteration from soil compaction, vegetation destruction (direct or indirect via dust), or toxins from exhaust. However, different types of ORV activities will likely have different effects on tortoise populations. There are basically four categories of activity that may have very different impacts: free play where vehicles are not restricted to designated routes and cross travel or off-road and off-trail activity probably occurs regularly; non-competitive recreational uses outside of free play areas are limited to designated roads and trails with any driving off of those routes being illegal; competitive events are organized races that are restricted to designated open areas; and unauthorized cross-country travel for recreational or commercial (e.g., mining exploration) purposes. Hence in this report, ORV refers to motorized vehicle travel off of paved and graded dirt roads whether they are on ungraded dirt roads, trails, or cross country driving. ORVs can include dirt bikes, sport utility vehicles, all-terrain vehicles, sand rails, and any other type of motorized vehicle that travels such roads.

Reduce Tortoise Density

A number of reports document ORVs may directly kill tortoises (see below), however the data are insufficient to evaluate the extent of its overall impact on tortoise populations. We must rely more on other measures such as differences in tortoise densities between areas used by ORVs and those free from such activity. For example, Bury and Luckenback (1986) compared tortoise densities inside and outside of an ORV free-play area. They found 3.8 times more tortoises in a control area lacking ORV activity compared to a nearby open area and the animals were significantly heavier ($p<0.01$) in the control area. They also found 2.8 times the number of burrows, more of which were active, in the control area. Most of the burrows in the ORV area were in the section most lightly used by vehicles. The denser vegetation in the control area made searching much slower, hence 3.6 times more effort was spent searching the control area. The differences in number of tortoises are not likely to be a consequence of differences in search time because identical and consistent methods were used to sample each area (Bury and Luckenbach 1977). As this study was unreplicated (only one control, and one treatment area were surveyed), it is conceivable that the differences detected are due to causes other than ORV activity (e.g., soil or habitat differences or natural patchiness of tortoise populations).

Berry et al. (1986) compared tortoise populations inside of the DTNA and immediately outside where heavy ORV activity occurs. Using methods that are of questionable validity (Corn 1994a), they noted that significant declines occurred over a six-year period among juveniles and immatures in both areas, but that the declines were significantly greater in the adjacent area with more ORV activity.

Berry et al. (1994; for published abstract see Berry et al. 1996), compared evidence of human activity and tortoise sign (i. e., number of tracks, scat, and burrows, which is positively correlated to tortoise density; Turner et al. 1985) along 100 transects conducted in 1977-79 and 150 in 1990. They found that vehicle trails in 1990 were positively associated with areas classified as having low to medium densities of tortoises, but that numbers of vehicle trails and tracks were not directly correlated to actual number of tortoise sign. In one area, ORV activity had been stopped by BLM one year prior to the study, so vehicle tracks had been obliterated or were aged and did not accurately reflect the level of ORV activity the tortoise population had experienced over the past several years. Furthermore, the study lacked an adequate control site, but it is difficult to have good controls in a broad field study like this.

An indirect piece of evidence that ORVs reduce tortoise population density comes from Nicholson (1978). She reports on the findings of sets of transects walked at varying distances from the edges of several paved roads and highways in the Mojave desert. The study was designed to measure the effects of paved roads, not dirt roads or ORV travel on tortoise populations, thus is of little relevance to evaluating ORV impacts. She found that counts of tortoise sign increased with distance from paved roads. However, along Shadow Mountain Road, she found a reduction in tortoise sign 880 meters from the road edge, in an area with "excessive ORV use." She provided no statistical analysis of this observation, nor did she comment on the presence or absence of ORV activity along any of the 39 other transects she walked.

<u>**Direct Effects**</u>

CRUSHING TORTOISES AND BURROWS

Several accounts occur in the non-scientific literature of tortoises being crushed by ORVs, but most of these are anecdotal or unique incidents. In a popular account of ORV impacts to the desert environment, Luckenbach (1975) states: "I have personally found horned lizards, whiptails, zebra-tails, sand lizards, and tortoises crushed by ORVs;" no documentation or quantification was provided. Similar anecdotal statements were made in Berry and Nicholson (1984a) and Bury and Marlow (1973).

Berry and Nicholson (1984a) observed dead tortoises that were crushed in burrows that were apparently collapsed by ORVs, but no data or details were provided. Bury and Marlow's (1973) popular article about general impacts of ORVs on tortoises also makes the claim that burrows are crushed by ORVs, but provide no data. Fifteen burrows found in 1976 and 1977 in an ORV-use area were collapsed in 1985, their collapse being "related to ORV activity from trails through the area" (Bury and Luckenback 1986), although they gave no further indication of how they determined the cause of collapse. Woodman (1986) and Burge (1986) found no crushed burrows following the Parker 400 and Frontier 500 races, respectively.

Four studies quantified vehicle-related mortality on study sites with frequent ORV traffic. In her preliminary analysis of 1357 tortoise carcasses found on 14 permanent study plots for studying tortoise populations, Berry (1990 as amended) attributed approximately 57 (4%) to vehicles (some of the data were presented in Berry et al. 1986). It must be noted that 787 (58%) of the shells were not evaluated or were unclassifiable either because they bore no diagnostic characteristics or were too fragmented to analyze. Campbell (1985) found 2 vehicle-killed tortoises, one apparently killed by a 4-wheel vehicle on a dirt road inside the preserve and another killed outside the preserve by a sheep watering truck. In their comparative study of ORV impacts, Bury and Luckenback (1986) indicated that one immature tortoise was found crushed in a motorcycle trail. In a review of tortoise population dynamics, Marlow (1974) states that "nine recently crushed tortoises were observed in an area supposedly closed to ORVs. From tracks surrounding most of the carcasses there was little question as to the cause of their deaths."

It is the correspondence between tortoise and ORV enthusiasts' habitat preference that is likely responsible for some of the conflicts between the two. Jennings (1997) showed that tortoises spent significantly more time in washes, washlets, and on small hills. This is because their preferred food plants occurred in these habitats and they tend to burrow and travel more in washes and washlets than in other habitats. Jennings (1997) claims these habitats are also preferred disproportionately by ORV recreationists, but presented no supporting data.

Indirect Effects

Compaction of Soil

Soil becomes compacted, at least temporarily, when a motorized vehicle passes over it, and that compaction changes with the weight of the vehicle, soil type, and moisture content of the soil (Webb 1983). But, the affect this compaction has on tortoise populations depends on the lasting effect of compaction, its effect on vegetation and burrow digging abilities, how widespread the compaction is, and the respective effects on tortoise survival and reproduction.

Davidson and Fox (1974) investigated the effect a motorcycle dual sport race had on Mojave vegetation and soil. The soil, which was of similar type at both sites, was significantly denser and less porous at a pit area and alongside a trail than at a control site several hundred meters away. Significantly fewer plant species, fewer individuals, and less cover were found in impacted areas compared to the control site. However, the study was unreplicated. An increase in bulk density of the soil was measured in an evaluation of the impacts of the 1974 Barstow to Vegas Race (BLM 1975). However, many of the measurements were taken one week after a rain, so, because compaction is intensified on wet and moist soil (Webb 1983), the results may be unreliable.

Babcock and Sons (1973) found 10% or more increase in bulk density in disturbed versus undisturbed sites in alluvial wash, alluvial fan, and desert flat areas, but only a 3% increase in compaction in disturbed sand. Similarly, Wilshire and Nakata (1976) found sand dunes to be more resistant to compaction than playas or alluvial fans. Compaction was relatively light in heavily used dry washes and heavy in well used alluvial fans. Dry playas, which dry out fast after rains, resist compaction more than do wet playas (Wilshire and Nakata 1976), which are moist on or near the surface. Compaction on wet playas was measurable down to 15 cm or more.

In their manipulative experiment on the effect of vehicle type, number of passes, soil type, and soil moisture, Adams et al (1982a, b) measured soil compaction with a penetrometer. They found that compaction by a SUV was greater than that of a motorcycle. The SUV compacted wet soil significantly after only one pass on wet soil and after five passes on dry soil. The motorcycle compacted wet soil after 20 passes. Single passes by motorcycles on wet soil and SUVs on dry soils did not differ significant from the controls. The great variability in environmental conditions makes it difficult to make unambiguous generalizations.

Greater temperature extremes occurred in more compacted soils in heavy ORV use areas, probably from removal of vegetation and changes in soil characteristics from compaction (Willis and Raney 1971, Webb et al. 1978). This possible effect on soil temperature not only affects plant germination and growth, but may have interesting, if unexplored, implications for tortoise growth, development, and morphology. A further likely, but untested potential impact of soil compaction may be to make it difficult for tortoises to burrow, which would not only affect tortoises directly but would also reduce tortoises' role in reducing compaction through soil turnover (Prose et al. 1987).

Infiltration rate is a measure of the soil's ability to absorb moisture. More compacted soils have a lower infiltration rates so less water is available for plants (Webb 1983). Babcock and Sons (1973) found much lower infiltration rates on disturbed versus undisturbed desert sites, except in very sandy areas (dunes and washes). Webb (1983) measured 73% lower infiltration rate compared to a control site after 200 vehicle passes over wet sandy loam. The greatest decrease occurred after the first few passes. Infiltration rates of sands and clays are least affected by compaction, whereas loamy sands and gravelly soils are with a mixture of particle sizes are most affected.

DESTRUCTION OF CRYPTOGAMIC SOILS

Cryptogamic soils are important for reducing soil erosion, controlling water infiltration, regulating soil temperatures, fixing (catching and converting) atmospheric nitrogen, and accumulating organic matter (Cline and Rickard 1973, Pauli 1964, Rogers et al. 1966). Cryptogamic soils are collections of mostly symbiotic bacteria, algae, fungi, and lichen that live on or slightly below the soil surface and create a semi-permeable soil surface. They often occur in the open spaces between desert shrubs and help to facilitate seedling establishment and plant growth (St. Clair et al. 1984, DeFalco 1995).

ORVs, livestock, and other surface disturbances easily damage cryptogamic soils (Belnap 1996). Damage from compaction, even minor, can greatly reduce nitrogen fixation by the crust, an effect that sometimes increases rather than decreases with time since compaction (Belnap 1996). It is not certain how tortoises are affected by damage to cryptogamic soils and a 1980 review of the effects of ORVs on desert soils was inconclusive (Rowlands 1980). DeFalco (1995) found that, in the one season studied, tortoises selectively avoided foraging on plants growing on crusts. Although crusts fix nitrogen and the nitrogen can then be transferred to plants growing in close proximity to the crusts (Maryland and McIntosh 1966), concentration of nitrogen in tortoise forage plants were generally lower on cryptogamic soils (DeFalco 1995). However, many other nutrients are important to tortoises, and it is unknown if their concentrations are augmentated by cryptogams in associated tortoise forage plants. In non-tortoise habitat in southwest Utah, Belnap and Harper (1995) showed that nitrogen, phosphorus, potassium, calcium, magnesium, and iron concentrations were higher in some plant species growing on encrusted soils compared to those growing where there were no crusts. The primary importance of cryptogamic soils to tortoise populations could be in stabilizing the soils against wind and water erosion (Belnap and Gardner 1993, DeFalco 1995), but more research is clearly needed.

CHANGES IN VEGETATION

Several studies measured the effect ORVs have on vegetation; most of them evaluated damage from competitive events. Burge (1986) described how many perennial shrubs were damaged along the edge of the Frontier 500 competitive race. She counted 1170 uprooted or crushed shrubs (no species identified) after the race. Davidson and Fox (1974) measured plant diversity, number of individuals, and amount of cover in a pit area (where vehicles were parked), alongside a dual sport race trail, and "several hundred yards away" (i.e., control area). They found significantly lower values for all three parameters in the pit area, moderate values alongside the trail, and the highest values at the control site. Woodman (1986) recorded the destruction of several creosote and burrobushes around the periphery of the pit area for the 1981 Parker 400 race. A BLM report detailing damage to vegetation caused by the 1974 Barstow to Vegas Motorcycle Race (BLM 1975) showed that 0 to 76% of the plants, particularly seedlings and small shrubs, were damaged in each of 26 sites.

Berry et al. (1990) measured habitat changes over a six-year period inside and outside of the DTNA where ORV non-race activity occurred. They found a 23% increase in habitat loss around a staging/pit area and that ORV trails increased in width by 130% and 157% in area.

Vegetation is clearly degraded by heavy ORV activity. Bury and Luckenback (1986) compared vegetation inside (treatment) and outside (control) an ORV use area south of Barstow. There were 1.7 times the number of live perennials on control, and 2.4

times number of dead ones (mostly *Ambrosia dumosa*) on the treatment area. Plant cover was 3.9% higher in the treatment area. This study suffers from a lack of replication. Comparing aerial photographs taken at the same points 19 to 25 years apart in six different locations in the Mojave and Colorado Deserts, Lathrop (1983) measured an average of 49% reduction in shrub density in ORV areas. Ground-based transects in control and treatment (disturbed) sites yielded 48-97% reductions in perennial plant cover in the ORV use areas. Thirty-four to 46% reductions in density resulted from single race events at two separate locations (Lathrop 1983). Luckenbach (1975) reports, that "in one Hounds-and-Hare race, an estimated 140,000 creosote bushes (*Larrea tridentata*), 64,000 burro-weed *(Franseria dumosa*), and 15,000 Mojave yuccas (*Yucca schidigera*) were destroyed or severely damaged over a stretch of 100 miles." No additional details were provided.

Rowlands et al. (1980) and Adams et al. (1982b) conducted one of the only manipulative experiments on ORV effects on Mojave desert vegetation. They studied the effect that different numbers of passes over the same area by a motorcycle and a 4-wheel drive sports utility vehicle (SUV) had on plant growth. They also looked at the interactive effects of soil moisture and soil type. Plant density, biomass, and cover generally were reduced following any level of disturbance with motorcycles requiring a greater number of passes to equal the reduction caused by the SUV. Grama grass (*Bouteloua barbata*), appeared to respond positively to light disturbance, but less so to heavy disturbance. The introduced weed, split grass (*Schismus barbatus),* was significantly more abundant within tracks than in control areas, probably because the fibrous nature of their roots allowed them to become better established than more tap-rooted natives in compacted soil.

Vollmer et al. (1976) found annual plant density to be significantly lower within experimentally created tracks from two 4-wheel drive vehicles compared to the hump between the tracks and in an area randomly covered by the same vehicles. No difference in density occurred between the randomly driven area compared to the control site. Shrubs in the regularly driven area (42 passes by vehicles) suffered twice as much damage as those in the randomly driven area. This study lacked replication and proper controls, but data collection and analysis were well executed.

Kuhn (1974, cited in Lathrop 1983) reported a reduction in plant density of 24% and plant cover of 85% in ORV-disturbed plots compared to undisturbed controls in foredunes at Kelso Dunes. Similarly, comparing aerial photographs taken 21 years apart, Lathrop (1983) measured a 50% reduction in shrub density in the same foredunes.

EROSION AND LOSS OF SOIL

ORV activity can increase erosion, which removes soil nutrients and soil that is penetrable to roots (Adams and Endo 1980a, Wilshire 1980). ORVs modify various features that help to stabilize the soil against erosion including surface crusts, coarse particles, desert pavements, and vegetation (Hinckley 1983). They also alter the configuration of the ground surface thus affecting water runoff patterns (Hinckley 1983).

The net loss of soil at specific ORV-use areas has been documented. Wilshire and Nakata (1976) estimated 150 metric tons of dirt were lost to erosion from one 68-meter long western Mojave hillside trail with a 44-58% slope. Total estimated loss for the portion of hill used for an unspecified number of years was 11,000 metric tons. Snyder et al. (1976) estimated that 150-230 mm of soil was lost per year along transects in an ORV use area over two to five years at Dove Canyon. That amount is compared to estimates of natural erosion rates of 1.0 to 4.6 mm per year in arid areas (reported in Hinckley et al. 1983). No control or low-impact reference sites were established in this study. Webb et al. (1978) reported a loss of 0.3 to 3.0 metric tons per m^2 from an ORV trail in arid land at a heavily used ORV park in central California. They further reported that erosion was greatest on sand loam and gravelly sandy loam and least on clay and clay loam.

In artificial rain trials, Iverson (1979) found greater sediment yield (soil runoff) in vehicle-disturbed versus undisturbed slopes from loosening of soil and alteration of flow patterns. The difference was thought to be from increased water flow velocity and more channeling of the flow, not from reduced filtration. Consequently the effect would be more pronounced during intense thunderstorms than during more mild winter frontal-type storms. Also using artificial rain, Eckert et al. (1977) looked at infiltration and sedimentation rates at two Mojave desert sites in Nevada following single and multiple passes of truck and motorcycle. Single passes made no measurable difference. Multiple passes increased rates of infiltration and sedimentation, particularly in interplant spaces versus beneath plants. However, the artificial rainfall rates were similar to rare very heavy thunderstorms; they were unlike the winter cyclonic rainfall that is more typical of the western Mojave desert. Furthermore, Reicosky (1979) suggested that movement of water towards vehicle tracks compensates for decreased infiltration rates. Hinckley et al. (1983) suggested that water erosion would be the least in areas that are relatively flat, experience short, low-intensity storms, and have a coarse (gravelly) surface.

Fugitive dust, dust blown from the ground by wind and vehicle activity, can potentially be a problem for desert tortoises. Fugitive dust is related to vehicle speed, surface texture, surface moisture, and probably vehicle type (with heavy four-wheel drive vehicles causing the most dust followed by light four-wheel drive vehicles followed by motorcycles; Adams and Endo 1980b). The threshold velocity for wind erosion (TV), the lowest wind speed necessary to create dust, is highest for desert pavement and areas with hard surface crusts. Soils with a large proportion of fine particles will be more susceptible to wind erosion. Disturbances that lower the TV will increase the incidence of dust storms. Disturbance of sand dunes and sandy washes does not alter their TV. Areas protected by cryptogamic soils and desert pavement had greatest reduction in TV following disturbance, and more so with siltier versus sandy soils (Adams and Endo 1980b, Gillette and Adams 1983). Winds of 20-30 mph at 6 ft above ground caused fugitive dust in these areas. Erodibility also varies with width of disturbed area up to about five meters (Wilshire pers comm., cited in Adams and Endo 1980a)

Satellite images taken on January 1, 1973, captured dust storms from Santa Ana wind conditions (Bowden et al. 1974, Wilshire 1980). Many of the dust plumes, which were 10 to 30-km long and covered 300 km^2, originated in areas of intensive ORV activity in the western Mojave. BLM (1975) measured three to five times more suspended particulate density for fugitive dust during the 1974 Barstow to Vegas race site compared to before the race.

The main effect of wind erosion on productivity is removal and redistribution of surface nutrients, not reduction in soil depth. Loss of soil nutrients found in the top 5 to 10 cm of soil significantly reduced perennial cover in a similar arid environment in Australia (Charley and Cowling 1968). Sharifi et al. (1997, 1999) showed that photosynthesis and plant productivity are hampered by dust on the leaves of desert shrubs, but that the effect may be ameliorated by heavy summer rainfall.

LIGHT ORV USE

Most of the foregoing discussion relates specifically to competitive events and heavy use like what now occurs within open use or freeplay areas. They are of limited applicability to understanding the effect of lighter travel in areas where traffic is legally restricted to designated routes (i.e., dirt roads). Indeed, very little data are available to evaluate these impacts primarily because the focus of most research has been on the effects of heavier ORV use. There are a few studies that demonstrated that occasional vehicles riding off of roads (including for parking or camping within 100 ft of roads, which is currently permitted, Bureau of land Management 1980), can damage the soil and vegetation, the amount of damage being less than heavier off road travel. Webb (1983) found that the greatest increase in compaction occurred the first few time a motorcycle crossed an area and compaction increased with more crossings, but at a lower rate. Similarly, Adams and Endo (1980a) discovered that just a few passes by an SUV were sufficient to significantly increase compaction and a single pass did so in some wet soils. Vollmer et al. (1976) found that there was damage to plants in an area subjected to random four-wheel drive activity, but that damage was higher in areas that were repeatedly driven over. Bury and Luckenbach (1977) reported little difference in the number of creosote shrubs in moderate use versus undisturbed plots, but did find that half were broken or damaged in the moderate use area. Likewise, a “sparsely” used ORV area within the Jawbone Canyon Open Area showed 35% less perennial plant cover than an unused control area (Lathrop 1978). Finally, just stepping on cryptogamic crusts can damage and decrease nitrogen fixing activities of the crusts (Belnap 1996).

All of these studies indicate that some damage is likely to occur when vehicles stray off of established roads. Goodlett and Goodlett (1993) demonstrated that ORV enthusiasts will not always obey signs indicating routes are closed, nor do they always stay on designated routes. However, their study was conducted in an area that had recently changed from an open free play area to a limited use one. Although it is likely that number of tracks will be highest in close proximity to roads (e.g., LaRue, pers obs.), no studies have tested for this pattern. Many of the problems associated with light ORV use likely relate to increased human access the roads and trails afford (see "Human Access to Tortoise Habitat" section, below).

Summary

Although each study comparing tortoise densities inside and outside of ORV areas has limitations, they all lend evidence to reductions in tortoise population densities in heavy ORV use areas. The causes for these declines are less certain. Tortoises and their burrows are crushed by ORVs, although it is difficult to evaluate the full impact this activity currently has on tortoise populations, partly because there are probably relatively few tortoises in most open use areas. ORVs damage and destroy vegetation. Density, cover, and biomass are all reduced inside versus outside of ORV use areas, particularly following multiple passes by vehicles. Split grass (*Schismus barbatus),* a weedy introduced grass, in particular appears to benefit from ORV activity. Very light, basically non-repeated, vehicle use probably has relatively little long-term impact. Soil becomes compacted by vehicles. The compaction increases with moisture content of the soil, weight of vehicle (particularly high weight to tire surface area ratio), and soil type. Cohesionless sand, such as in sand dunes and washes, are largely immune to compaction while moist soils are much more susceptible than dry ones. Compaction, lower infiltration rates, loss of plants and cryptogamic soils all contribute to increased wind and water erosion and fugitive dust, particularly when such areas are several meters in width. More research is needed to understand the effect light ORV use has on tortoise populations and habitat.

Predation/Raven Predation/Subsidized Predators

Desert tortoises have several natural predators including: coyotes, kit foxes, feral dogs, bobcats, skunks, badgers, common ravens, and golden eagles. The dominant predator probably varies temporally, spatially, and with size of the tortoise (Berry 1990 as amended). Few studies have attempted to quantify or estimate the relative proportion of mortality attributable to the various predators at specific sites, and none attempt to characterize it regionally.

One of the earliest publications reporting that ravens are potentially important predators on desert tortoises was Campbell (1983). He found 140 shells of juvenile tortoises (36 to 103 mm MCL) at the base of fence posts along the 30.5 miles of fencing surrounding the DTNA. He attributed 136 to raven predation, but gave no indication why. Berry (1985) evaluated 403 juvenile tortoise shells found on 27 desert tortoise study plots throughout the Mojave Desert. She determined that ravens killed 35%. Her evaluation was based on circumstantial evidence because the reference collection was shells found beneath perch sites that may have been used by other predators or scavengers. Although the patterns of shell damage she used are consistent with the patterns Boarman and Hamilton (in prep.) obtained from 266 shells collected from beneath raven nests. Also, ravens are scavengers as well as predators, so some of the shells attributable to raven predation may actually have been found and eaten after death (Boarman 1993).

During the first 5 to 7 years of life, the tortoise shell is incompletely ossified; it is soft and easy to puncture and rip open. When pecked open by a raven, the soft shell will bend then dry in place leaving parts of the shell pushed in or pulled out. Carcasses found in this condition were likely pried open when the tortoise was alive or shortly after death. The shell soon dries after death. Once this happens the shell will fracture when pecked open, giving a different appearance. Although based on sound knowledge of the biology of tortoises, this scenario has not been subjected to quantification or controlled experimentation.

Woodman and Juarez (1988) reported finding 250 shells, probably killed over a four year period, dead beneath one raven nest near the Kramer Hills. Some of the carcasses found were of young animals found alive and individually marked by the same researchers several weeks earlier and apparently in healthy condition. This provided the first hard evidence that ravens almost certainly were killing some tortoises, not just scavenging them. Since that time, several observations have been made of ravens carrying away live juvenile tortoises (Boarman 1993). One researcher reported finding a tortoise eviscerated, but still alive, beneath a raven nest (R. Knight pers. comm.). These reports all remain anecdotal, but, because observing the act of predation by a predatory bird is notoriously difficult, it is unlikely we will ever be able to acquire an adequate number of good hard data on the phenomenon. One published account evaluated food of ravens in the Mojave desert by looking at pellets, indigestible portions of food that were coughed up at their nests (Camp et al 1993). They found tortoise remains in only 1.3% of the pellets. However, they did not report the 19 shells they found at several of those nests because they only reported on pellet contents (Camp pers. comm., Boarman pers. obs.); shell fragments usually are not found in pellets. They also did not establish whether all nests studied were in tortoise habitat.

The fact that ravens do kill some tortoises does not alone indicate that the losses are serious enough to warrant management action. We must understand the extent of predation and if it is having an impact on tortoise populations. Evaluating raven predation is perplexing because of the difficulties in finding small carcasses over such a large area of desert and in monitoring small, hard to find young tortoises (Berry and Turner 1986, Shields 1994). The extent of predation can be estimated by evaluating juvenile tortoise carcasses found throughout the desert. Berry (1985) and Boarman and Hamilton (in prep) analyzed the characteristics of 150 and 266, respectively, juvenile tortoise shells found in the deserts of California. Their reports indicate that primarily animals less than 100 mm MCL (less than approximately 5-7 years old) are taken throughout most portions of the desert in California. Beneath 23 transmission towers in Nevada, McCullough Ecological Systems (1995) found the remains of 78 juvenile tortoises, many showing signs consistent with raven predation.

A common argument made against raven predation being of management concern is that we must concentrate on protecting adult female tortoises (Doak et al. 1994). This is partly because adult females are the ones actually reproducing, thus contributing most to the persistence of the population and partly because juvenile animals typically experience high mortality, so losses to ravens are natural and the population can sustain the losses. This is a correct prediction from life history theory for many animal species, but not for long-lived ones that first reproduce later in life (approaching 20 years), like the desert tortoise (Congdon et al. 1993, 2002). Life history theory predicts that stable populations of such animals can sustain annual mortality of juveniles of 25%. However, when adult populations are declining, juvenile mortality must be reduced to approximately 5% to ensure recruitment of new individuals into the breeding population (Congdon et al. 1993). This finding is based on well developed life history theory. Therefore, in tortoise populations that are experiencing overall declines, additional losses of juveniles to ravens may decrease the stability or at least prevent recovery.

A survey of tortoise remains found beneath raven nests was recently completed (Boarman and Hamilton in prep.). It showed that ravens prey on tortoises throughout the Mojave Desert in California, but probably not all ravens nesting in tortoise habitat ate tortoises. The most shells found at one nest in one year between 1991 and 1997 was 28, which were found beneath each of two nests in the eastern Mojave Desert. The results are preliminary and conservative because they pertain only to remains dropped beneath or near the raven nests. Many shells are found at locations well away from nests. During the raven breeding season, however, most foraging is probably done near the nest (Sherman 1993) and most food is likely brought back to or near the nest, so the results are probably relatively accurate if conservative.

There are little data available to determine the effect other predators might have on desert tortoise populations. For example, finding shells chewed by mammals, probably canids, and tortoise remains in coyote scat, Berry (1990 as amended) reported evidence of canid or felid predation at four out of twelve study plots in California. Proportion of deaths attributable to mammalian predators over all 12 plots was 53.% (ranged = 1.8% to 45.3% among the 4 plots where mammal-related mortality determined). Turner et al. (1997b) determined that most tortoise nests that failed were dug up by coyotes or kit foxes, but no data were presented. In 1998 and 1999, 47% and 12%, respectively, of nests studied at Twentynine Palms (MCAGCC) were dug up, probably by kit foxes (Bjurlin and Bissonette 2001). Bjurlin and Bissonette (2001) also believed that feral dogs cause a significant amount of mortality among adult tortoises in the area, but presented evidence for only one such death. They did report a high incidence of canid-like shell damage to live tortoises and the presence of feral dogs and dog packs within their study site. The effect that feral dog predation has on tortoise populations appears to be an emerging problem that warrants further documentation.

Non-ORV Recreation

Non-ORV recreation in the Mojave Desert includes camping, nature study, rock collecting, sight-seeing, hunting, horseback riding, mountain biking, and target practice. There are no studies concerning their impacts on tortoise populations: hence, there may or may not be impacts. Likely impacts include handling and disturbance of tortoises; loss of habitat to campgrounds, picnic areas, scenic pull outs, vandalism, and other support facilities; increase in road kills; and support of ravens when organic garbage is left behind. There could also be soil compaction and damage of vegetation and cryptogamic crusts from off-trail travel by mountain bikes, horses, and hikers. All of these impacts are related to the problems with increased access to tortoise habitat (discussed in "Human Access to Tortoise Habitat" section, below). Given the increased interest in non-motorized recreation in the deserts, this is an important area for future research. There are no studies that directly measured the impacts of non-motorized recreation on tortoise populations or their habitats and only one that showed that hiking off of trails can significantly damage cryptogamic crusts (Belnap 1996).

Hunting and target practicing are two additional recreational activities that may impact tortoises. One of the primary anthropogenic causes for wildfire in the desert is from bullets striking rocks (R. Franklin, BLM Fire Management Officer, pers. comm.), which can occur while hunting or target practicing. The California Department of Fish and Game has constructed an array of small- and big–game guzzlers to help facilitate growth of game species populations. Not only can ravens sometimes access water at the big game guzzlers, but tortoises can get caught and die in some types of small game guzzlers. Hoover (1996) found the remains of 26 tortoises in 89 of the upland game watering devices in California. Finally, people target practicing, which is a very different activity than hunting, might also illegally use tortoises as targets (Berry 1986a, see “Vandalism,” below).

Roads, Highways, and Railroads

Roads, highways, and railroads have several impacts on desert tortoises and their habitat. Direct impacts may include mortality through road and train kills and destruction of habitat (including burrows). Possible indirect effects include degradation of habitat because they serve as corridors of dispersal for invasive plants, predators, development, recreation, and other anthropogenic sources of impact. Roads, highways, and railroads also serve to fragment the habitat and populations (see “Habitat Degradation, Fragmentation, and Destruction,” below).

Many tortoises fall victim to road kills. For instance, Boarman and Sazaki (1996) reported finding 115 tortoise carcasses along 28.8 km of highway in the west Mojave. This represents a conservative estimate of 1 tortoise killed per 3.3 km of road surveyed per year. This source of mortality primarily affects subadults and adults, although the results are partially skewed by the difficulty of finding smaller carcasses and their quicker loss to scavengers and decay. The figures cannot be extrapolated to all roads and highways to estimate total losses to road kills in the desert because mortality rate likely depends on traffic speed and volume, density and demography of surrounding tortoise population, and perhaps width and age of road. The results also cannot be applied to lightly traveled paved or dirt roads because of a four-way relationship between tortoise density, road conditions, traffic volume, and road kill rate. A tortoise depression zone exists along highway edges and extends to 0.4 km or further (Nicholson 1978, Berry and Turner 1987, Berry et al. 1990, LaRue 1993, Boarman and Sazaki 1996, von Seckendorff Hoff and Marlow 1997, cf. Baepler et al. 1994). The cause is probably primarily road kills, but illegal collections, noise, and other factors may also contribute although there are no data to evaluate their likely or relative effects.

A common mitigation for the impacts of roads and highways is a barrier fence, which has been shown to be highly effective at reducing mortality in tortoises and other vertebrates in the west Mojave (Boarman and Sazaki 1996). However, fences only increase the fragmenting effects of roads. Preliminary results of an eight-year long study indicate that culverts are used by tortoises to cross highways (Boarman et al. 1998), but it is unknown whether their use is sufficient to ameliorate the fragmenting effects of fenced highways (Boarman and Sazaki 1996).

Roads are also major attractants for common ravens, which are predators on juvenile tortoises (Knight and Kawashima 1993, Boarman 1993). Ravens, being partly scavengers, are known for cruising road edges in search of road kills (Boarman and Heinrich 1999), but risk of predation is not increased near roads (Kristan and Boarman 2001).

The flush of vegetation that grows alongside roads (Frenkel 1970, Johnson et al. 1975) as a result of rainwater runoff and collection may benefit tortoises by providing a more consistent source of food over a more extended period of time, even in relatively dry years (Boarman et al. 1997). Alternatively, the abundance of food may bring them into harms way if (1) they wander onto the road, (2) vehicles pull onto the vegetated shoulder of the road, (3) grading or mowing activities occur during times of tortoise activity, (4) herbicides are applied to control growth of weeds along the road shoulder, or (5) they are seen and caught by passers-by. Brooks (1998) found a significant positive correlation between number of alien annual plant species near roads and density of dirt roads., and the species richness and biomass of alien annuals is higher near roads than away from them (Brooks pers. comm.).

Railroads may also impact tortoise populations through train kills and perhaps by tortoises getting caught between the rails (Mount 1986). No published studies were found that looked for train-killed tortoises along extensive sections of railroad tracks. However, Ron Marlow (pers. comm.) found eight carcasses between the rails along approximately 100 km of railroad tracks in the eastern Mojave. Noise or vibration may also affect tortoises that live alongside railroads, but has not been studied (see "Noise and Vibration," above). Railroads provide a positive benefit: tortoises regularly build burrows in railroad berms that are not covered with gravel. It is not known if train noise negatively affects the behavior, audition, or reproductive success of these tortoises.

Utility Corridors

Corridors formed by utility and energy rights-of-way cause linear impacts to populations and may have levels of impacts well beyond those of many point sources of impacts. In a retrospective evaluation of results of 234 Biological Opinions issued by USFWS in California and Nevada (LaRue and Dougherty 1999), 80% (47/59) of the tortoises reportedly killed in California and Nevada were killed along utility corridors. Most of those were along the Kern-Mojave Pipeline (Olson et al. 1993, Olson 1996). Considerable habitat destruction or alteration occurs when pipelines and transmission lines are constructed and the impacts are repeated as maintenance operations or new pipelines or power lines are placed along existing corridors. Trenches opened for laying or maintaining pipes may serve as traps for tortoises and other animals (Olson et al.

1993). Dirt roads used for maintenance-related access create dust (Wilshire 1980) and provide access to less disturbed habitat (Brum et al. 1983). The habitat conversions during early stages of post-construction succession along pipeline corridors (Vasek et al. 1975) not only may suppress regular use by tortoises, but may function to reduce dispersal across the corridor thus effectively fragmenting a previously intact population (this view is speculative).

The presence of transmission towers in areas otherwise devoid of other raven nesting substrates (e.g., Joshua trees, palo verdes, cliffs), may introduce heavy predation to an area previously immune to such predation (Boarman 1993). Most raven predation on tortoises appears to occur during the raven breeding season (April - May, pers. obs.). By one estimate, ravens probably do most (75%) of their foraging within 400 m of their nest (Sherman 1993) and raven predation pressure is notably intense near their nests (Kristan and Boarman 2001). Therefore, ravens nesting on transmission towers, where no other nesting substrate exists within about 800 m, may significantly reduce juvenile tortoise populations within 400 m of the corridor, but this effect is quite localized. However, recent unpublished data on the distribution of raven depredated juvenile tortoises suggests that not all ravens nesting within tortoise habitat actually eat tortoises (at least they do not bring the shells back to the nest; Boarman and Hamilton in press).

Data collected along paved highways indicate that road kills can substantially reduce tortoise populations within at least 0.4-0.8 km of such roads (see “Roads, Highways, and Railroads” section, above), and their impact is likely lower along newer and more lightly traveled roads (Nicholson 1978). But, there are no data on the impact of lightly traveled dirt roads (e.g., utility maintenance/access roads) on tortoise population densities.

Vandalism

Vandalism is the “purposeful killing or maiming of tortoises” (Luke et al. 1991, p. 4-61). Reports of tortoises being vandalized include shooting, crushing, running over, chopping off heads, and turning them over (Berry and Nicholson 1984a, Berry 1986a, Bury and Marlow 73). Most reports of specific incidents are anecdotal, but sometimes substantial. The most quantitative accounts are for gunshot deaths (Berry 1986a, 1990 as amended), but are mostly based on postmortem forensic analysis. Berry (1986a) found 91 tortoises carcasses (14.3% of those collected at 11 sites) showing evidence of being shot. The proportion of carcasses showing evidence of gunshots was significantly higher from west Mojave sites (20.7%) than from east Mojave (1.5%) and Colorado (2%) desert sites. Eleven of the 58 (19%) tortoise found dead on the Beaver Dam Slope, Utah, showed signs of traumatic injury. This category included individuals exhibiting gunshot wounds. These ranged from pellet wounds through .22 caliber holes to one individual exhibiting a .44 caliber bullet wound.

Wild Horses and Burros

Wild burro and tortoise ranges overlap in some places, but the overlap is quite low in the West Mojave. No published studies were found that investigated the impact burros or horses (neither of which are native to North America) have on tortoise populations. The primary effect is likely to be habitat alteration through soil compaction and vegetation change. Burro populations are probably not extensive enough in most areas to pose a major threat to tortoise populations, but this is speculative.

CUMULATIVE THREATS TO TORTOISE POPULATIONS

Human Access to Tortoise Habitat

Perhaps the most important general threat to tortoise populations relates to actual human presence in tortoise habitat and thus refers primarily to access. Many of the individual threats discussed above relate to the level of access to tortoise habitat afforded to people. For instance, law enforcement officials have documented illegal collecting of tortoises for food or cultural ceremonies on a few occasions (USFWS 1994). One study supported the intuitive impression that poaching occurs close to roads (Berry et al. 1996), but the methods employed were not very precise (counting burrows that appeared to have been dug up with shovels) making the results weak at best. Since roads likely provide access to poachers, a logical conclusion of their study is that a larger proportion of the tortoise population will be under the risk of being poached where more roads intrude on tortoise habitat.

The presence of a road poses potential harm to tortoises and their habitat and the more roads there are the greater is the proportion of the tortoise population that is under the threat of illegal off-road activity. Boarman and Sazaki (1996) demonstrated that tortoises regularly die from collisions with automobiles and Nicholson (1978) showed that the rate of mortality probably increases with traffic volume. So, road kill is probably proportionally lower on lightly traveled dirt roads, but may still exist. However, because tortoise populations are probably less depressed alongside lightly traveled roads (Nicholson 1978) and if tortoises are less inhibited from crossing narrower, dirt-covered roads (for which there are no data), we may speculate that proportionally more tortoises may cross lightly traveled roads. The possibility does exist that ORVs may crush tortoises or their burrows on or off of roads (Marlow 1974, Bury and Luckenbach 1986, Berry 1990 as amended).

Mortality on roads is not the only type of vehicle-related impact; ORVs sometimes drive off of established routes, including within 100 ft to camp and park (Bureau of Land Management 1980). One study has supported the hypothesis that off-road activity is high near dirt roads even in an area that was heavily signed (Goodlett and Goodlett 1993). For example, they counted an average of one track every 31 feet along transects walked perpendicular to authorized routes. As expected, the density of tracks decreased with distance from the road from an average of 2.1 per 20 ft near the road to 0.5 per 20 feet 250 to 300 feet away. No statistical analyses were made. Goodlett and

Goodlett (1993) also demonstrated that ORV recreationists ignored BLM signs indicating trails and roads were closed to vehicles in the Rand Mountains. An average of 11.5 new tracks was counted along 17 trails 6 to 7 days after the trails were raked. An average of 10.0 tracks was found along 20 unmarked routes (again, no statistical analyses were provided), which suggests that the signs were essentially ineffective at preventing people from riding on closed trails. The motorcycle activity occurred over Thanksgiving weekend, 1991.

Furthermore, there is ample evidence that occasional driving off of roads compacts soil and damages vegetation (Vollmer et al. 1976, Webb 1983, Adams et al. 1982a, b, see also "ORV" section, above). The greatest increase in compaction can occur after a single or very few passes by a vehicle over unimpacted soil (Webb 1983), or at least soil strength (a measure of compaction) is significantly increased after a very few passes by an SUV (Adams et al. 1982a, b). Any driving or even walking over cryptogamic crusts damages the crust (Belnap 1996). As discussed in the "ORV Activities" section, above, there are very little data to indicate how these habitat alterations might affect tortoise populations.).

Other potentially harmful activities that likely occur in greater numbers near roads include: mineral exploration, illegal dumping of garbage and toxic wastes, release of ill tortoises, vandalism, anthropogenic fire, handling and harassing of tortoises, and trailing of sheep (Berry and Nicholson 1984a). Invasive plants also proliferate near roads and where road densities are higher (Brooks 1995, 1999a). The threat posed to tortoise populations by all of these factors likely increases with increased access afforded by the proliferation of roads, even very lightly traveled ones. Furthermore, some of these individual threats may be relatively low, but their cumulative impact may be great. Berry (1990 as amended, 1992), presents data that suggests a correlation between tortoise population declines and density of roads, trails, and tracks on tortoise study plots, but the results have not been treated to statistical analysis. This important association between access and tortoise wellbeing needs further study.

Habitat Loss, Degradation, and Fragmentation

One of the most pervasive problems for desert tortoise populations is also among the most difficult to evaluate: habitat loss, degradation, and fragmentation from the myriad activities that take place in the desert. This is the cumulative result of several of the individual threats discussed above.

Habitat loss is generally quite apparent (e.g., loss of useable habitat when paved for a parking lot or plowed for agriculture), but is sometimes less than obvious (e.g., a given area may be rendered unusable by tortoises after soil is heavily compressed and vegetation is destroyed after many vehicles drive over the area). Previously useful habitat may be rendered unusable, but may appear superficially similar to useable habitat.

Habitat degradation consists of human-mediated changes in habitat characteristics that render an area less valuable to, but still potentially usable by, tortoises. The degradation may be manifested in altered soil structure, increased exotic plants, lower abundance of preferred forage plants, reduced availability of effective cover sites, or a combination of these traits. The degradation may not directly cause increased mortality in tortoise populations, but may reduce reproductive output or cause some animals to leave the area in search of less degraded habitat. Although these responses have been hypothesized, there have been no studies on tortoise habitat choice or preference patterns changing as a result of habitat changes.

Many of the impacts discussed above fit easily into the category of habitat degradation that may significantly reduce habitat quality for tortoises. A single vehicle driving over a section of ground may have little impact by itself (Adams et al. 1980a, b), but when that is added to a pile of trash nearby, compaction from grazing (Avery 1998), and reduced primary productivity of plants because of dust from a nearby dirt road (Sharifi et al. 1997), the cumulative habitat degradation may significantly reduce quantity or quality of forage for tortoises. The cumulative effects of factors leading to habitat loss and habitat degradation have been implicated as causes in the extirpation and drastic reductions in tortoise populations from the Antelope, Searles, and Indian Wells valleys, and in the vicinity of several other communities in the West Mojave (e.g., Barstow, Mojave, and Victorville; Berry and Nicholson 1984a, Feldmeth and Clements 1990, Tierra Madre Consultants 1991, USFWS 1994).

Fragmentation is the process by which solid blocks of habitat and populations depending on the habitat are broken up into smaller subunits with limited dispersal between habitat blocks (Meffe and Carroll 1997). Rivers, mountain ranges, major changes in soil or habitat type all represent natural causes of fragmentation. Highways, railroad tracks, towns, and other developments, isolated and conglomerated, are examples of anthropogenic factors that fragment desert tortoise habitat in the West Mojave Desert. Smaller populations are more susceptible to local extinctions as a result of both genetic and demographic (population) processes. A smaller population has fewer individuals available for interbreeding, which may result in genetic deterioration: inbreeding depression and loss of genetic diversity within the population (Frankham 1995). Genetic deterioration can result in the inability to adapt to short- or long-term environmental changes, which makes the population more vulnerable to extinction. Small populations are also susceptible to extinctions from random fluctuations in birth rate, death rate, age distributions, and sex ratios (Opdam 1988). Small populations suffer from the Allee Effect, the fact that it is harder to find a mate when there are fewer individuals in a population (Allee et al. 1949). Finally, smaller populations are more vulnerable to catastrophic events (e.g., disease epidemics, earthquakes, and floods) and random environmental fluctuations in such things as food resources. These processes (genetic deterioration and demographic consequences of small populations) are theoretical possibilities, but have not been documented empirically in desert tortoises populations (see USFWS 1994 for a theoretical analysis).

An additional problem associated with fragmentation is that the negative effects of habitat edges are increased considerably (Murcia 1995, Meffe and Carroll 1997). Edges, or boundaries, are problems for ecosystems because the microenvironment in the edge is different than in the interior: temperature, humidity, light, chemical inputs, etc., may all differ in edge regions. The distribution and persistence of many plant and animal species are often strongly affected by these microenvironmental conditions, so the communities are usually different along edges. Furthermore, edge conditions often facilitate the introduction, establishment, and spread of exotic species that may become predators or competitors with plants or animals in the interior (Janzen 1986, Wilcove et al. 1986). For desert tortoises, the edge effect is a theoretical possibility, but it has not been well documented in tortoise populations. Furthermore, some edge effects may only function over relatively short distances (e.g., tens of yards) or not at all (Ratti and Reese 1988, Murcia 1995).

There are little data that directly test this hypothesized cumulative effect of multiple impacts on tortoise populations. Berry and Nicholson (1984a) do cite anecdotal evidence of the loss of previously-existing populations in now heavily-populated areas of Antelope, Lucerne, and Yucca valleys. Berry et al. (1994) present correlative data showing that declines in tortoise populations in the Rand Mountains and Fremont Valleys correlate with increases in a suite of human impacts. The Desert Tortoise Recovery Plan (USFWS 1994) provides data that show significant declines occurred in populations exhibiting high rates of human-caused mortality.

Urbanization and Development

Whereas construction activity (treated as an individual threat, above) has impacts specific to the activities of building new structures (e.g., temporary compaction of vegetation and soil, fugitive dust, disturbance and possible death of tortoises), these impacts largely cease once construction has been completed (although for some impacts, such as soil compaction, there is a residual effect caused by delayed recovery, Lovich and Bainbridge 1999). The result of the construction activity is the presence of new structures, which are called here "developments," and which have its attendant impacts. These impacts include long-term or permanent loss or alteration of habitat, impacts from maintenance activities, disruption of tortoise behavior, and road kills (Berry and Nicholson 1984a, Luke et al. 1991).

Developments may be relatively isolated from each other, but “Urbanization” refers to cumulative effects of multiple and nearly contiguous developments including construction of permanent residences that cover large areas. Urbanization has several impacts associated with the presence of many people in the area, not, all of which are well documented. Urbanization results in considerable fragmentation, loss of habitat, and habitat alteration to the point of being largely useless to tortoise populations (Berry and Nicholson 1984a, Feldmeth and Clements 1990, Tierra Madre Associates 1991, section titled “Habitat Loss, Degradation, and Fragmentation”). Some recreational activities may emanate directly from urban areas. Wild dogs may be more prevalent (e.g., Bjurlin and Bissonette 2001) and collecting, handling and vandalism of tortoises could increase where there are more people. Captive tortoises, potentially infected URTD (see "Disease" section, above), are more likely to escape and help spread disease to the native population (Jacobson 1993, Berry pers. comm.). Illegal dumping is prevalent (pers. obs.), raven populations are larger (Knight et al. 1993), and exotic plants predominate

(Humphrey 1987, Brooks 1998) around urban developments. Urban areas and associated flood control channels in the desert are often the source of much fugitive dust (Wilshire 1980). Many of these impacts may be relatively minor by themselves, but their cumulative effects on nearby tortoise populations may be great.

There is some evidence that tortoise populations can persist in the presence of light industrial developments. In the 1980s 460 wind turbines and 51 electrical transformers were erected in tortoise habitat at Mesa, California. Approximately 10-20 years later, there were still tortoises living and reproducing in the same area; some burrow beneath and rest upon concrete support pads for the turbines (Lovich and Daniels 2000). Reproductive output is higher than at any other site studied to date (Lovich et al. 1999). However, there are no data available to determine if the population has increased, decreased, or remained stable since construction. Tortoises may persist in this area because of the relatively low level of actual human activity in the wind park and the high productivity in the area, which is in the ecotone between creosote scrub and coastal sage scrub habitat.

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APPENDIX K

STATISTICAL ANALYSES OF DESERT TORTOISE SURVEYS

Appendices

Statistical Analysis of BLM Desert Tortoise Surveys In Support of the West Mojave Management Plan

Report I: Exploratory and Initial Data Analysis

1 May 2002

by

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Introduction

This report represents the exploratory and initial data analysis of the BLM desert tortoise surveys and calibration plots that support the West Mojave Management Plan. Ed LaRue of BLM is the primary monitor of this analysis effort and Principal Investigator of the role of desert populations in the development of this plan. Kathy Buescher, Senior Wildlife Biologist at Chambers Group, Inc., is the subcontract manager. The data used for analysis came from Emily Cohen and Ric Williams in 2002. The data was provided in Excel format. The tortoise calibration plot data was provided by Emily on 13 February. Ric's 1998 and 1999 data sets were provided 12 March, and were initially used for analyzing the tortoise survey data, because they contained UTM coordinates from BLM GIS tortoise distribution maps. After a great deal of exploratory and actual analysis, there appeared to be errors in the 1998 data set. Therefore, a close comparison was made of all individual transects for both the 1998 and 1999 data from Emily and Ric. A number of discrepancies were found between the pairs of data sets, particularly in the 1998 pair. Ed LaRue, Emily Cohen, and Ric Williams were provided with the detailed individual discrepancies between the 1998 and 1999 data files on 8 April. Everyone agreed that the two files should have been identical. Emily carefully corrected the 1998 data set and sent it to me 24 April. Ed LaRue has the original data field data sheets and noted that he will recheck the Excel data. The 1999 data set also requires further examination. Out of 1617 cases, 589 have Area codes, 980 have Areas that were coded as "unknown" and 48 had "blank" fields for Area. The 1999 data set was analyzed with 589 cases. Therefore, the 1998 and 1999 tortoise survey data that were analyzed were provided by Emily Cohen. The 2001 data set provided by Emily Cohen on 5 April was not analyzed because survey Areas were not identified. The "Transect Area" data field contained only "1s".

These initial data analyses were important in developing data analyses approaches and techniques, formatting the data, identifying problem areas in the original data, correcting minor errors in the data that analyses and data formatting revealed, and importantly, also generated some initial results. The Conclusions section discusses the results of the current analysis to provide guidance for the final data analysis phase.

Methods

Final data analyses were conducted with the SPSS statistical package (SPSS 1999a). Three tortoise sign counts were used in the analysis: burrows, scats, and TCS. The variable *burrow* is the actual observed tortoise burrow count on individual surveyed transects and was available from the provided data matrix. The variable *scat* is the corrected tortoise scat count on individual surveyed transects, and was calculated from the data matrix as TCS – burrow. The variable *TCS* (Total Corrected Sign) is the total corrected burrow + scat count on individual surveyed transects and was available from the provided data matrix. Table 1 provides the variable abbreviations used for the Calibration Plot Areas.

Tortoise sign require square root data transformation, because the data represent counts with many data cells being "0". Counts follow a Poisson distribution where the mean equals the variance, and therefore the mean and variance cannot be independent, but vary identically.

All the sign data was transformed as $x = (x+0.5)^{1/2}$, where x represents a tortoise sign variable (Sokal and Rohlf 1995).

Bivariate parametric and nonparametric correlation analyses were performed on three data sets to assess the association of tortoises, burrows, scats, TCS, and carcasses on survey transects. The parametric test was the Pearson Product Moment Correlation Coefficient. Two nonparametric rank correlations were used: Spearman's rho and Kendall's tau. The three data set used were:

Calibration Plot Areas, 1998+1999+2001
1998 tortoise survey Areas
1999 tortoise survey Areas

Guided by the results of the correlation analyses, a Step-Wise Linear Regression model was developed to assess the relative importance of the three tortoise sign parameters to "predict" tortoise transect occurrences.

Factorial Analysis of Variance (ANOVA) was used for the calibration plot surveys for comparing statistical significance of burrows, scats, and TCS among surveyors, years, and Areas. The 5 percent significance level ($P < 0.05$) was used based on experience and general acceptance in ecological research and field biology. Burrows, scats, and TCS were each used in separate analyses as dependent variables with years, Areas, and surveyors as "factors", the independent variables. Tables 2 shows all the data cells available for Years – Areas – Surveyors analyses. Tables 3, 4, and 5 summarize the data of Table 2. Various combinations of years, Areas, surveyors, and variables were used in multiple analyses to minimize "unbalanced" ANOVA designs. Unbalanced design in these analyses refers to the situation when there are empty cells in the years x Areas x surveyors matrix (e.g., some surveyors were not present in some areas in some years, see Table 2). All analyses, unless specified otherwise, used Type III calculation of Sums of Squares, because this algorithm is generally recommended, it is invariant with respect to cell frequencies, and when there are no missing cells it is equivalent to Yates' weighted-squares-of-means method (Milliken and Johnson 1984, Shaw and Mitchell-Olds 1993). Type IV calculation of Sums of Squares was used when the factorial design was unbalanced with respect to possessing empty cells among factor comparisons (Milliken and Johnson 1984, Shaw and Mitchell-Olds 1993). For example, in a three factor ANOVA (years-surveyors-Areas) when comparing three survey years all surveyors did not survey all three years in all the areas that were under investigation (e.g., there were empty cells in the factorial design).

Levene's test for equality of error variances was used for all analyses, and does not depend on the assumption of normality (Levene 1960). Bartlett's test is often used to assess homogeneity, but its practical value has been questioned (Harris 1975), and this test is not very efficient and strongly affected by non-normality (Zar 1999). Levene's test uses the average of absolute deviations instead of the mean square of deviations, making it less sensitive to skewed distributions (Snedecor and Cochran 1989). Levene's test checks to see if error variances are homogeneous among the factors being compared in an ANOVA. Homogeneous variances are a parametric assumption in ANOVA. ANOVA is a parametric statistical procedure that technically requires parametric assumptions to be met: homogeneous error variances, normally distributed data, adequate sample sizes, and independence of sampling or experimental errors (random sampling, independence of observations). Nevertheless and importantly, ANOVA is considered robust to departures from the first two of these assumptions, particularly when proper transformations are employed (Sokal and Rohlf 1995, Underwood 1997, Zar 1999). Additionally, SPSS algorithms are very robust to nonnormality (Morgan and Griego 1998). Many researchers believe that the routine use of nonparametric statistics avoids many issues of parametric assumptions, but these methods are equally affected by the last two critical assumptions – independence of sampling errors and the loss of statistical power with inadequate sample sizes (Krzysik 1998). The routine use of nonparametric analysis in ecological research is not recommended (Johnson 1995, Smith 1995, Stewart-Oaton 1995), but see Potvin and Roff (1993).

The use of factorial ANOVA designs requires the use of Post Hoc multiple comparison tests to assess the statistical significance when there are more than two levels for any factor. Five Post Hoc multiple comparison tests were used in all factorial ANOVA analyses. The **Bonferroni** test, based on the Student's *t* statistic, adjusts the significance level for multiple comparisons. This test has the widest range of applications, is conservative, and when there are few comparisons has high power (Zolman 1993, SPSS 1999b). Conservative tests were desirable in these analyses, because they minimize Type I error, the probability of rejecting a true null hypothesis (null hypothesis = no significance difference) (Krzysik 1998). In other words, reporting significance when the comparison was not statistically significant. When factor variances are heterogeneous, pooled estimates of variance cannot be used to calculate the standard error of the comparison (Day and Quinn 1989). The use of Post Hoc tests that specifically address this issue are recommended (Day and Quinn 1989, SPSS 1999b). Therefore, four additional Post Hoc tests were used for all factorial ANOVA comparisons that were made:

Tamhane's T2 – conservative pairwise comparison test based on a *t* test

Dunnett's T3 – pairwise comparison test based on the Studentized maximum modulus, highly recommended (Fry 1993)

Games-Howell – liberal pairwise comparisons test, highly recommended (Fry 1993)

Dunnett's C – pairwise comparisons test based on the Studentized range

Although all five tests were examined for significance at the 0.05 level, only the results of the conservative Tamhane's T2 test were reported. The results of all five Post Hoc tests were reasonably similar for all the factorial ANOVA analyses conducted in this study. This indicates that the data were reasonably behaved. As expected, the Games-Howell test was more liberal, while the Bonferroni test was frequently very liberal in contrast to the other four tests, particularly when Levene's test showed significant departure from homogeneous residuals.

One-Way Analysis of Variance was used to assess the statistical significance among the tortoise survey Areas. Analyses were done separately for 1998 and 1999. Analysis of the 2001 data was not conducted, because Area was not distinguished in the data matrix. A large number of cases in the 1999 data were removed from the data matrix, because the Area variable was either designated "unknown" or left as a blank field. Tamhane's T2 and Games-Howell Post Hoc tests were performed on all analyses to statistically established differences among the tortoise survey sites. The results of Tamhane's T2 test were reported in the results.

Results

Bivariate Correlation Analysis

In all analyses, very similar results were obtained with Pearson's Product Moment Correlation Coefficient (Parametric) and two Nonparametric methods Spearman's rho and Kendall's tau rank correlation. The values reported below are Pearson's Correlation Coefficient.

Tortoise Calibration Areas

Year: 1998 + 1999 + 2001

All Areas (N=8)   All Surveyors (N=13)

N = 624

	Burrows	Scats	TCS	Carcasses
Tortoises	0.39**	0.17**	0.26**	-0.004 NS
Burrows		0.35**	0.58**	-0.002 NS
Scats			0.96**	0.018 NS
TCS				0.021 NS

** Highly Significant: P < 0.01

NS Not Significant: P > 0.05

Tortoise Survey Areas

Year: 1998

All Areas (N=19) All Surveyors (N=7)

N = 876

	Burrows	Scats	TCS	Carcasses
Tortoises	0.29**	0.14**	0.23**	-0.004 NS
Burrows		0.43**	0.68**	0.13**
Scats			0.95**	0.027 NS
TCS				0.067*

** Highly Significant: P < 0.01

* Significant: P < 0.05

NS Not Significant: P > 0.05

Tortoise Survey Areas

Year: 1999

All Areas (N=9) All Surveyors (N=4)

N = 589

	Burrows	Scats	TCS	Carcasses
Tortoises	0.36**	0.18**	0.25**	0.074 NS
Burrows		0.35**	0.60**	0.15**
Scats			0.95**	0.006 NS
TCS				0.054 NS

** Highly Significant: P < 0.01

NS Not Significant: P > 0.05

Step-Wise Linear Regression

Exploratory Model:

Tortoises = a(Burrows) + b(Scats) + c(TCS) + d

Tortoise Calibration Areas

Year: 1998 + 1999 + 2001

Significance

Burrows	Scats	TCS
<0.001	0.88 NS	0.66 NS

Survey Areas

Year: 1998

Significance

Burrows	Scats	TCS
<0.001	0.82 NS	0.54 NS

Survey Areas

Year: 1999

Significance

Burrows	Scats	TCS
<0.001	0.88 NS	0.64 NS

Analysis of Calibration Plots

Statistical Comparison of Surveyors

Note: Balanced Factor ANOVA unless noted otherwise

Years:	**1998**	
Areas Used:	Alvord, Kramer, Liz, Lucerne	
Surveyors Compared:	Boland, LaRue	
Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
NS (0.971)	NS (0.307)	NS (0.389)
Statistical Significance (Type III)		
B=L (0.050)	L>B (0.005)	B=L (0.070)

Years:	**1998**	
Areas Used:	Fremont, Kramer	
Surveyors Compared:	Karl, Vaughn	
Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
(0.009)	NS (0.814)	NS (0.498)
Statistical Significance (Type III)		
K=V (0.940)	K=V (0.756)	K=V (0.595)

Years:	**1998**	
Areas Used:	Kramer, Lucerne	
Surveyors Compared:	Boland, LaRue, Vaughn	
Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
NS (0.211)	NS (0.391)	NS (0.882)

Statistical Significance (Type III), Post Hoc Comparisons Unnecessary

B=L=V (0.966)	B=L=V (0.079)	B=L=V (0.198)

Years: 1998

Areas Used: Fremont, Kramer, Lucerne

Surveyors Compared: Boland, Hoover, Karl, LaRue, Silverman, Vaughn, Woodman

Note: Unbalanced Design, each surveyor not in all Areas

Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
NS (0.057)	(0.024)	NS (0.074)
Statistical Significance (Type IV)		
NS (0.135)	(<0.001)	(0.002)
Post Hoc Comparisons (Tamhane's T2)		
NS (>0.080)	B>H (<0.001)	B>H (<0.001)
	B>K (<0.001)	B>K (0.002)
	B>S (0.046)	B>S (0.025
	L>H (<0.001)	L>H (<0.001)
	L>K (<0.001)	L>K (<0.001)
	L>S (0.003)	L>S (0.002)
	L>W (0.041)	V>H (0.009)
	V>H (0.016)	
	V>K (0.019)	

Years: 1999

Areas Used: Fremont, Kramer, Lucerne

Surveyors Compared: Boland, Karl, LaRue, Vaughn, Woodman

Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
(0.007)	(<0.001)	(0.009)

Statistical Significance (Type III)		
(<0.001)	(0.001)	NS (0.169)
Post Hoc Comparisons (Tamhane's T2)		
K>L (0.002) V>L (0.028) W>L (0.001)	NS (>0.074)	NS (>0.692)

Years: **1999**

Areas Used: Fremont, Kramer, Lucerne

Surveyors Compared: Boland, Frank, Goodlett, Karl, Laberteaux, LaRue, Vaughn, Woodman

Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
(0.015)	(<0.001)	(0.003)
Statistical Significance (Type IV)		
(<0.001)	(<0.001)	(<0.001)
Post Hoc Comparisons (Tamhane's T2)		
G>Lar (0.004) K>Lar (0.005) W>Lar (0.004)	Lar>F (0.006) Lar>G (<0.001) Lar>Lab (0.002) W>G (0.034)	Lar>G (0.029)

Years: **2001**

Areas Used: Fremont, Kramer, Lucerne

Surveyors Compared: Boland, Frank, LaRue, Vaughn

Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
(0.002)	(<0.001)	(<0.001)
Statistical Significance (Type III)		
NS (0.251)	(0.037)	NS (0.200)

Post Hoc Comparisons (Tamhane's T2)

B=F=L=V (>0.637)	B=F=L=V (>0.562)	B=F=L=V (>0.912)

Years: 2001

Areas Used: Fremont, Kramer, Lucerne

Surveyors Compared: Boland, Frank, Keaton, LaRue, Smith, Vaughn, Wood (Peggy

Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
(<0.001)	(<0.001)	(<0.001)
Statistical Significance (Type IV)		
(0.002)	(<0.001)	NS (0.100)
Post Hoc Comparisons (Tamhane's T2)		
W>B (0.032) W>L (0.006) W>S (0.034)	NS (>0.725)	NS (>0.998)

Years: 1998 and 1999

Areas Used: Alvord, Fremont, Kramer, Liz, Lucerne

Surveyors Compared: Boland, Karl, LaRue, Vaughn, Woodman

Note: Unbalanced Design, each surveyor not in all Areas

Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
NS (0.090)	NS (0.067)	NS (0.097)
Statistical Significance (Type IV)		
(0.002)	(<0.001)	(0.025)

Post Hoc Comparisons (Tamhane's T2)

B>L (0.007)	B>K (<0.001)	B>K (<0.001)
	B>W (0.006)	B>W (0.009)
	L>K (<0.001)	L>K (<0.001)
	L>V (0.041)	L>W (<0.001)
	L>W (<0.001)	V>K (0.019)
	V>K (0.002)	

Years: 1999 and 2001

Areas Used: Alvord, Fremont, Kramer, Liz, Lucerne

Surveyors Compared: Boland, Frank, LaRue, Vaughn

Note: Unbalanced Design, each surveyor not in all Areas

Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
(<0.001)	(<0.001)	(<0.001)
Statistical Significance (Type IV)		
(<0.001)	(<0.001)	(<0.001)
Post Hoc Comparisons (Tamhane's T2)		
B>L (0.037)	L>F (<0.001)	L>F (0.004)
V>L (0.017)		

Years: 1998, 1999, and 2001

Areas Used: Alvord, Fremont, Kramer, Liz, Lucerne

Surveyors Compared: Boland, LaRue, Vaughn

Note: Unbalanced Design, each surveyor not in all Areas

Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
(0.001)	(<0.001)	(<0.001)

Statistical Significance (Type IV)		
(0.002)	(<0.001)	(0.013)

Post Hoc Comparisons (Tamhane's T2)

B>L (0.001)	B=L=V	B=L=V
V>L (0.004)	(>0.094)	(>0.615)

<u>Years: 1998, 1999, and 2001</u>

Areas Used: Kramer, Lucerne

Surveyors Compared: Boland, LaRue, Vaughn

Burrows	**Scats**	**TCS (Total Corrected Sign)**
Levene's Test		
NS (0.076)	(0.010)	(0.003)
Statistical Significance (Type III)		
(0.002)	(<0.001)	(0.010)

Post Hoc Comparisons (Tamhane's T2)

B>L (0.043)	L>B (0.039)	B=L=V
V>L (0.001)		(>0.240)

Statistical Comparison of Years and Areas

Years Compared: 1998, 1999, 2001

Areas Compared: Alvord, Fremont, Kramer, Liz, Lucerne

Surveyors: Boland, LaRue, Vaughn

Data for Year – Area – Surveyor

Note that the data fields are not completely balanced. Only Kramer and Lucerne have all three surveyors for all three years, Fremont has all three surveyors for only 1999 and 2001, and Alvord and Liz have the same two surveyors for all three years. The statistical advantages of using the full Factorial ANOVA Design should outweigh the lack of complete balance in the experimental design.

	Boland	LaRue	Vaughn
1998			
Alvord	*	*	
Fremont			*
Kramer	*	*	*
Liz	*	*	
Lucerne	*	*	*
1999			
Alvord	*	*	
Fremont	*	*	*
Kramer	*	*	*
Liz	*	*	
Lucerne	*	*	*
2001			
Alvord	*	*	
Fremont	*	*	*
Kramer	*	*	*
Liz	*	*	
Lucerne	*	*	*

BURROWS

Levene's Test of Equality of Error Variances: Significant (0.001)

Difference among YEARS: Significant (0.025)

Difference among AREAS: Significant (<0.001)

Differences among SURVEYORS: Significant (<0.001)

BURROWS (cont.)

Years – Areas Interaction:	Not Significant (0.295)
Years – Surveyors Interaction:	Not Significant (0.061)
Areas – Surveyors Interaction:	Not Significant (0.233)
Years – Areas – Surveyors Interaction:	Not Significant (0.179)

Difference among Years (Tamhane's T2)

1998 > 1999 (0.003)

1998 > 2001 (0.007)

Difference among Areas (Tamhane's T2)

Alvord > Fremont (<0.001)	Kramer > Liz (0.001)
Alvord > Liz (0.003)	Lucerne > Fremont (<0.001)
Kramer > Fremont (<0.001)	Lucerne > Liz (0.003)

Summary:

Alvord – Lucerne – Kramer >
Fremont – Liz

Burrows were more abundant in 1998 than in either 1999 or 2001. Burrow counts at Alvord, Lucerne and Kramer were similar, and larger than at Fremont and Liz. The latter two were simlar. The non-significant interactions made the analysis easy to interpret.

SCATS

Levene's Test of Equality of Error Variances:	Significant (<0.001)
Difference among YEARS:	Not Significant (0.054)
Difference among AREAS:	Significant (<0.001)
Differences among SURVEYORS:	Significant (<0.001)
Years – Areas Interaction:	Significant (<0.001)

SCATS (cont.)

Years – Surveyors Interaction:	Not Significant (0.965)
Areas – Surveyors Interaction:	Not Significant (0.361)
Years – Areas – Surveyors Interaction:	Not Significant (0.859)

Difference among Years (Tamhane's T2)

1998 > 1999 (0.026)

Difference among Areas (Tamhane's T2)

Alvord > Fremont (<0.001)

Alvord > Kramer (<0.001)

Alvord > Liz (<0.001)

Kramer > Fremont (<0.001)

Kramer > Liz (<0.001)

Liz > Fremont (<0.001)

Lucerne > Fremont (<0.001)

Lucerne > Kramer (<0.001)

Lucerne > Liz (<0.001)

Summary:

Alvord – Lucerne >
Kramer >
Liz >
Fremont

Scats were more abundant in 1998 than in 1999. Scat counts were similar at Alvord and Lucerne, and higher than the other Areas, following the sequence above. There was a significant Years – Areas interaction which indicates that some of the difference in scat counts among Areas was influenced by year.

TCS (Total Corrected Sign)

Levene's Test of Equality of Error Variances:	Significant (<0.001)
Difference among YEARS:	Not Significant (0.154)
Difference among AREAS:	Significant (<0.001)

TCS (Total Corrected Sign) (cont.)

Differences among SURVEYORS:	Significant (0.009)
Years – Areas Interaction:	Significant (<0.001)
Years – Surveyors Interaction:	Not Significant (0.911)
Areas – Surveyors Interaction:	Not Significant (0.517)
Years – Areas – Surveyors Interaction:	Not Significant (0.936)

Difference among Years (Tamhane's T2)

1998 > 1999 (0.005)

Difference among Areas (Tamhane's T2)

Alvord > Fremont (<0.001)

Alvord > Kramer (<0.001)

Alvord > Liz (<0.001)

Kramer > Fremont (<0.001)

Kramer > Liz (<0.001)

Liz > Fremont (<0.001)

Lucerne > Fremont (<0.001)

Lucerne > Kramer (<0.001)

Lucerne > Liz (<0.001)

Summary:

Alvord – Lucerne >
Kramer >
Liz >
Fremont

TCS followed the identical pattern of scat counts. This is not surprising because scat counts have the predominant influence on TCS. The correlation analyses identified this characteristic. TCS were more abundant in 1998 than in 1999. TCS were similar at Alvord and Lucerne, and higher than the other Areas, following the sequence above. There was a significant Years – Areas interaction which indicates that some of the difference in TCS, as in scat counts among Areas was influenced by year.

Analysis of Tortoise Survey Areas

Numbers refer to SURVEY AREAS in data matrix

1998

Burrows

Levene's Test: <0.001 One-Way ANOVA: <0.001

Tamhane's T2 Post Hoc Comparison:

4 >

3	0.035
6	<0.001
15	0.009
17	<0.001

5 >

1	0.025
3	0.013
6	0.001
15	0.005
17	<0.001

8 >

3	0.049
6	0.004
15	0.022
17	0.002

10 >

1	0.006
3	0.003
6	<0.001
9	0.037
15	0.001
17	<0.001

11 >

1	<0.001
2	<0.001
3	<0.001
6	<0.001
7	0.004
9	<0.001
13	0.002
14	0.014
15	<0.001
17	<0.001
UNK	<0.001

12 >

1	<0.001
2	0.013

12 > (cont.)

3	<0.001
6	<0.001
7	0.046
9	0.001
15	<0.001
17	<0.001
UNK	0.003

13 >

6	0.002
17	0.001

UNK >

6	<0.001
17	0.002

Scats

Levene's Test: <0.001 One-Way ANOVA: <0.001

Tamhane's T2 Post Hoc Comparison:

1 >

6	<0.001
7	0.004
9	0.009
17	0.009
19	0.020

4 >

1	0.008
2	<0.001
3	<0.001
4	<0.001
5	<0.001
6	<0.001
7	<0.001
8	<0.001
9	<0.001
12	0.005
15	<0.001
17	<0.001
19	<0.001
UNK	<0.001

10 >

2	0.003
5	0.021
6	<0.001
7	<0.001
8	0.025
9	<0.001
15	<0.001
17	<0.001
19	<0.001
UNK	<0.001

11 >

1	<0.001
2	<0.001
3	<0.001
5	<0.001
6	<0.001
7	<0.001
8	<0.001
9	<0.001
10	0.002
12	<0.001
14	0.001
15	<0.001
17	<0.001
19	<0.001
UNK	<0.001

Scats (cont.)

12 >

6	0.001
7	0.024
9	0.040
17	0.041

13 >

2	<0.001
3	0.001
5	<0.001
6	<0.001
7	<0.001
8	0.001
9	<0.001
15	<0.001
17	<0.001
19	<0.001
UNK	<0.001

18 >

1	0.002
2	<0.001
3	<0.001
5	<0.001
6	<0.001
7	<0.001
8	<0.001
9	<0.001
12	0.001
14	0.013
15	<0.001
17	<0.001
19	<0.001
UNK	0.001

UNK >

7	0.017
17	0.046

TCS

Levene’s Test: <0.001 One-Way ANOVA: <0.001

Tamhane’s T2 Post Hoc Comparison:

1 >

6	<0.001
17	0.003

4 >

1	0.001
2	<0.001
3	<0.001
5	0.006
6	<0.001
7	<0.001
8	0.003
9	<0.001
15	<0.001
17	<0.001
19	<0.001
UNK	<0.001

5 >

6	0.007

8 >

6	<0.001
7	0.036
9	0.010
15	0.017
17	<0.001

10 >

2	0.001
3	0.002
6	<0.001
7	<0.001
9	<0.001
15	<0.001
17	<0.001
19	<0.001

11 >

1	<0.001
2	<0.001
3	<0.001
5	<0.001
6	<0.001
7	<0.001
8	<0.001
9	<0.001
10	0.001
12	<0.001
13	0.002
14	<0.001
15	<0.001
17	<0.001
19	<0.001
UNK	<0.001

TCS (cont.)

12 >

2	0.042
6	<0.001
7	<0.001
9	<0.001
15	<0.001
17	<0.001
19	0.003
UNK	0.005

13 >

1	0.033
2	<0.001
3	<0.001
6	<0.001
7	<0.001
9	<0.001
15	<0.001
17	<0.001
19	<0.001
UNK	<0.001

18 >

1	0.001
2	<0.001
3	<0.001
5	0.002
6	<0.001
7	<0.001
8	0.003
9	<0.001
14	0.015
15	<0.001
17	<0.001
19	<0.001
UNK	0.001

UNK >

6	<0.001
17	0.004

Tortoises

Levene's Test: <0.001 One-Way ANOVA: 0.033

Tamhane's T2 Post Hoc Comparison:

UNK >

7	<0.001
8	<0.001

Carcasses

Levene's Test: <0.001 One-Way ANOVA: <0.001

Tamhane's T2 Post Hoc Comparison:

6 >

17	0.001

8 >

17	0.028

11 >

17	0.010

19 >

1	0.042
3	0.031
17	0.005

UNK >

17	<0.001

1999

Burrows

Levene's Test: <0.001 One-Way ANOVA: <0.001

Tamhane's T2 Post Hoc Comparison:

1 >

5	0.009
9	0.002
10	<0.001

7 >

9	0.011
10	0.008

Scats

Levene's Test: <0.001 One-Way ANOVA: <0.001

Tamhane's T2 Post Hoc Comparison:

1 >

4	<0.001
5	<0.001
7	<0.001
9	<0.001
10	<0.001
12	<0.001

5 >

4	0.001
7	0.002
9	<0.001

6 >

4	0.013
7	0.023
9	0.010

8 >

4	<0.001
5	0.024
7	<0.001
9	<0.001

10 >

4	0.012
9	<0.001

12 >

9	0.003

TCS

Levene's Test: 0.002 One-Way ANOVA: <0.001

Tamhane's T2 Post Hoc Comparison:

1 >

4	<0.001
5	<0.001
7	<0.001
9	<0.001
10	<0.001
12	<0.001

5 >

4	0.008
9	0.003

6 >

4	0.026
9	0.009

7 >

9	0.049

8 >

4	<0.001
7	0.010
9	<0.001

10 >

9	0.007

12 >

9	0.007

Tortoises

Levene's Test: <0.001 One-Way ANOVA: 0.23 NS

Tamhane's T2 Post Hoc Comparison:

5 >

4	0.004
9	0.004

Carcasses

Levene's Test: <0.001 One-Way ANOVA: <0.001

Tamhane's T2 Post Hoc Comparison:

1 >

10	0.011

4 >

8	0.046
10	0.018

5 >

8	0.035
10	<0.001

7 >

10	0.011

Discussion

Correlation and Regression Analyses

Despite the acknowledged difficulty of observing live desert tortoises on survey transects, and the very high variability of tortoise sign (burrows and scats) among transects, there was a highly significant correlation ($P<0.01$) of live tortoises with burrows, scats, and TCS. Although in most cases the actual correlation coefficient does not appear to be particularly "high", the large sample sizes involved make the relationship highly statistically significant. These results can be interpreted in the following general way.

1) Transects associated with live tortoises are typically also associated with appreciable sign counts.

2) Live tortoises are found to a much smaller extent on transects possessing little or no tortoise sign.

3) Nevertheless, live tortoises are often not seen on transects possessing appreciable sign counts.

A number of important patterns were evident from the correlation analyses.

1) The correlation analysis results were similar for all three data sets that were examined, again possibly attributable to the high sample sizes. The data sets were:

   Calibration Areas, 1998+1999+2001
   1998 tortoise survey Areas
   1999 tortoise survey Areas

2) Burrows had the highest correlation with tortoises, while scats had the lowest correlation.

3) Tortoises were not correlated with carcasses.

4) With a few exceptions, carcasses were not correlated with tortoise sign.

5) As expected, TCS was strongly correlated with scat, because on a given transect scat counts are usually much higher than burrow counts.

Motivated by the significant correlation of tortoises with their sign, an exploratory Step-Wise Linear Regression Model was developed to assess and statistically verify the relative importance of the three sign counts to predict tortoise occurrence. This technique selects the best predictor variable that explains most of the scatter around the regression line. Inherently, it eliminates redundant variables that possess high multicollinearity. For example, TCS is a composite of the other two sign counts. Traditionally, the validity and interpretation of step-wise techniques have been questioned (Green 1979). However, there has recently been a revival in their applications. The result of this analysis clearly demonstrated that burrow counts were the only predictor variable necessary to explain the variability of tortoises on transects. Statistically, scats and TCS did not contribute significant information to the regression.

Comparison of Surveyors on Calibration Plots

1998

Surveyors possessed statistically similar sign counts for burrows, scats, and TCS when comparisons were made among balanced data sets.

The following contrasts were similar:

Bolan – LaRue
Karl – Vaughn
Bolan – LaRue – Vaughn

When all surveyors were compared together there was no difference among burrow counts, but Bolan, LaRue, and Vaughn, possessed higher scat counts than Hoover, Karl, and Silverman. However, in this analysis an unbalanced data set was used (not all surveyors were at all Areas), so this result should be interpreted with caution.

1999

In the 1999 calibration surveys there was a tendency for LaRue to have *lower* burrow counts on transects, but *higher* scat counts than some of the other surveyors.

Scat are more difficult to locate than burrows, not only because they are smaller, but importantly, their detection is related to habitat parameters. Therefore, a persistent and focused search image is mandatory. Habitat characteristics that appreciably affect scat detection include: color and texture of substrate (e.g., light-colored sands versus black volcanic basalt rocks), ground and shrub cover, topography, and sun angle (Krzysik and Woodman 1991). While burrows are much easier to detect, there are nevertheless problems associated with their counts. Non-tortoise burrows (e.g., kit fox, coyote, badger) or even predator diggings could be mistaken for tortoise burrows. Additionally, it is important to classify burrow condition, and decide before actual surveys if burrows in poor condition or collapsed should be counted. In the case of burrows, these factors may influence survey counts more than actual detections.

Surveyors were more consistent with TCS counts, because they tended to "average" the variability among individual burrow and scat counts. For example, LaRue's lower burrow counts were "balanced" by his higher scat counts.

2001

Seven surveyors demonstrated agreement and were consistent in all sign counts: burrows, scats, and TCS, with the single exception of Wood (Peggy) having higher burrow counts.

1998 – 1999

Five surveyors possessed similar burrow counts, but LaRue was less than Bolan. Similar to 1999, LaRue tended to have higher scat counts. On the other hand, Karl and Woodman had lower scat counts than some of the other surveyors. However, the data set was unbalanced, and the results should be interpreted with caution.

1999 – 2001

The four surveyors have only some differences in sign count. LaRue had lower burrow counts than Bolan and Vaughn, but higher scat counts than Frank. This data set is not balanced.

1998 – 1999 – 2001

This analysis combined all three years, and there were three surveyors: Bolan, LaRue, and Vaughn. Scat counts were very similar, but LaRue's counts were higher than Bolan (barely significant, P=0.04). LaRue had lower burrow counts than the other two surveyors. TCS counts were statistically similar for all three surveyors.

Comparison of Years and Areas on Calibration Plots

Burrows were more abundant in 1998 than in either 1999 or 2001. Burrow counts at Alvord, Lucerne and Kramer were similar, and larger than at Fremont and Liz. The latter two were simlar. The non-significant interactions made the analysis easy to interpret.

Scats were more abundant in 1998 than in 1999. Scat counts were similar at Alvord and Lucerne, and higher than the other Areas according to the following sequence:
Alvord = Lucerne >Kramer > Liz > Fremont. There was a significant Years – Areas interaction, indicating that some of the difference in scat counts among Areas was influenced by year.

TCS followed the identical pattern as scat counts. TCS is predominantly determined by scat counts as determined by the correlation analyses.

Comparison of Tortoise Survey Areas

Statistical analyses were conducted separately for 1998 and 1999 to avoid confounding effects among years, and it was not know if the numbers that identified specific "Survey Areas" were used consistently between 1998 and 1999.

1998

There were 19 Areas surveyed in 1998. It was not known if the Area designated as "unknown" consisted of one or more Areas. In the analysis it was treated as a single Area.

Areas 11 and 12 had the highest burrow counts, followed by Areas 10 then 5, then 4 and 8 which were similar. Areas 6, 15 and 17, especially 6 and 17 had the lowest burrow counts.

The pattern of the scat counts were somewhat different than the burrow counts, and Areas were more separated statistically. At this point in the analysis it is not known if this is a sensitive measure for Area separation or if the scat merely represent extraneous "noise" in the system. Areas 11, 4, 18, 13 and 10 had the highest scat counts. Areas 11and 10 therefore, closely parallel the results of the burrow counts. However, unlike burrow counts, Area 12 had a much lower scat count ranking, and was only higher than 4 other sites. Areas 6 and 17, had low scat counts, paralleling their lower burrow counts. Area 1 had a higher ranking with scat counts than burrow counts.

Area 11 with its high counts of both burrows and scats dominated all other sites in TCS. Areas 18 and 4 with high scat counts were the next highest in TCS. The next highest TCS Areas were 13, 10, and 12. Area 13 had high scat counts, Area 12 had high burrow counts, while Area10 had both. Areas 6 and 17, on the basis of low burrow and scat counts had the lowest TCS.

The statistical significance of live tortoise and carcasses among Areas is very difficult to assess because of very small sample sizes. Interestingly, the only significant comparison with tortoises was that the "unknown" Area was higher than Areas 7 and 8. Possibly no tortoises were seen in these Areas. All three of these Areas were neither among the highest nor the lowest in sign count. Small sample sizes make interpretation tenuous.

Area 17 demonstrated an unusually low carcass count. This Area was also among the lowest in both burrow and scat counts. This data suggests that the low carcass counts are paralleling a low density of tortoises.

1999

There were 9 Areas surveyed in 1999. The "unknown" category included many data cases, and therefore, may have consisted of several individual survey Areas. Additionally, a number of cases lacked an Area designation. All these cases were not included in the analysis.

Areas 1 and 7 had more burrow counts than Areas 9 and 10. Area 1 also had more burrow counts than Area 5.

Scat counts and TCS paralleled each other closely and statistically separated the nine Areas to a much greater extent than burrow counts. As in the case of the 1998 data, at this point in the analysis it is not known if this is a sensitive measure for Area separation or if the scat merely represent extraneous "noise" in the system. Area 1 also had the highest scat/TCS counts, but scat counts were not particularly high at Area 7. Area 9 demonstrated particularly lower scat/TCS counts that all the other Areas.

Tortoises were higher at Area 5 than at Areas 4 and 9. Area 5 was not particularly high in sign count, but did have significantly higher scat/TCS than 4 and 9, but not burrow counts. Small sample sizes make interpretation tenuous.

Area 10 and to a smaller degree Area 8 showed lower carcass counts. Although Area 10 also possessed low burrow counts, Areas 10 and 8 it did not have particularly reduced scat/TCS. Small sample sizes make interpretation tenuous.

Desert Tortoises and Their Sign

Desert tortoises should be closely associated with their sign – burrows and scats. Desert tortoises possess relatively small home ranges even in highly productive years (averaging < 8 ha), and this home range dramatically decreases even further in a drought year (averaging < 3 ha) (Duda et al. 1999). Within their home range they build burrows, using 2-11/tortoise in a productive and 1-6 in a drought year (Duda et al. 1999) and deposit scats at a rate that is at least an order of magnitude greater than their burrow numbers (Krzysik, in review). Based on their dedication to small home ranges, and because tortoises spend a major portion of their lives in burrows, particularly in drought years and bad weather (Duda and Krzysik 1998), it is intuitive that tortoise sign represents a surrogate for actual live tortoises. Traditional desert tortoise surveys have summed burrow counts and "independent" scat counts to produce TCS, total corrected sign.

Conclusions

The data presented here and other evidence suggests that tortoise burrows appear to be a better surrogate for comparisons of tortoise distribution and relative abundance patterns than either scats or TCS. TCS was strongly correlated with scat counts, and essentially did not provide additional statistical information. However, TCS was useful when comparing and contrasting surveyors, because at least in some cases it tended to "average" individual surveyor's variability in burrow and scat counts. The data presented here demonstrate that surveyors are more similar to each other in burrow counts than they are in scat counts. The data also show that scat counts are much more variable than burrow counts, both within and between specific statistical comparisons. Importantly, burrow counts along the standard triangular tortoise survey transects (10 yards wide) accurately represent actual burrow density estimates, because the effective survey width using Distance Sampling surveys is equal to 4.5 m on a side (Krzysik, in review). Effective survey width for scats is approximately 1 m on a side. Therefore, burrow counts on 10 yard wide transects directly represent burrow density, while scat counts are relative numbers at best, and cannot be used as density estimates. Effective survey width is equal to half the width of survey transects when all survey objects are detected (Buckland et al. 1993).

As a general statement, experienced surveyors are reasonably similar in their tortoise sign counts along transects. Individual exceptions can be found for specific years, Areas, inexperienced surveyors, and other circumstances, but the overall variability of sign counts both within and between comparisons may override innate differences among individuals for object detection. Training sessions are recommended to standardize the correct identification of tortoise burrows and the classification of their "condition". The counting of tortoise burrows that are collapsed or in poor condition should be standardized among all surveyors before actualsurveys are conducted.

The next phase of this project should include the following tasks by our team.

> Ed LaRue and I need to get together to **spatially** identify the specific survey Areas coded in all the data sets.
>
> We need to associate UTM coordinates with individual survey transects. Much of this is already accomplished, but requires checking for consistency and accuracy.
>
> Survey Areas require further delineation in the 1999 and 2001 data sets.
> All other potential analyses of the current data will be discussed with Ed LaRue.

All data sets should be rechecked for field data accuracy. Should **all** the data or only random spot-checking be done?

Distance Sampling data will be analyzed (not yet available) (AJK).

2002 data will be analyzed (not yet available) (AJK).

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Tables

Table 1. Calibration Plot Areas

Code Name for Analysis	Complete Name
Alvord	Alvord 6
DTNA1	DTNA Interior
DTNA2	DTNA Interp Inside
Freemont	Fremont Peak
Johnson	Johnson Valley
Kramer	Kramer Hills
Liz	Liz C
Lucerne	Lucerne Valley, Lucerne 2

Table 2. Data matrix for Calibration Plot Areas. X indicates survey.

Surveyor	Alvord	Fremont	Kramer	Liz	Lucerne	DTNA1	DTNA2	Johnson
1998								
Boland	X		X	X	X			
Larue	X		X	X	X			
Vaughn		X	X		X			
Frank								
Karl		X	X			X	X	
Woodman		X			X			X
Goodlett								
Hoover		X	X		X			
Keaton								
Laberteaux								
Silverman		X	X		X			
Smith								
Wood P								
1999								
Boland	X	X	X	X	X			
Larue	X	X	X	X	X			
Vaughn		X	X		X			
Frank		X	X		X			
Karl		X	X		X			
Woodman	X	X	X	X	X			
Goodlett		X	X		X			
Hoover								
Keaton								
Laberteaux		X	X		X			
Silverman								
Smith								
Wood P								
2001								
Boland	X	X	X	X	X			
Larue	X	X	X	X	X			
Vaughn		X	X		X			
Frank		X	X		X			
Karl								
Woodman								
Goodlett								
Hoover								
Keaton		X	X		X			
Laberteaux								
Silverman								
Smith		X	X		X			
Wood P		X	X		X			

Table 3. Calibration Plot Areas surveyed by YEAR.

	1998	1999	2001
ALVORD	X	X	X
DTNA1	X		
DTNA2	X		
FREMONT	X	X	X
JOHNSON	X		
KRAMER	X	X	X
LIZ	X	X	X
LUCERNE	X	X	X

Table 4. Surveyors at Calibration Plot Areas by YEAR.

	1998	1999	2001
Boland	X	X	X
Frank		X	X
Goodlett		X	
Hoover	X		
Karl	X	X	
Keaton			X
Laberteaux		X	
Larue	X	X	X
Silverman	X		
Smith			X
Vaughn	X	X	X
Wood P			X

Table 5. Surveyors used at Calibration Plot Areas in multiple years.

1998-1999	Boland, Karl, Larue, Vaughn, Woodman	N=5
1999-2001	Boland, Frank, Larue, Vaughn	N=4
1991-2001	Boland, Larue, Vaughn	N=3

Statistical Analysis of BLM Desert Tortoise Surveys In Support of the West Mojave Management Plan

Report II: Statistical Comparison of DWMAs (1999 & 2001)

19 June 2002

by

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Introduction

This report represents the Analysis of Variance (ANOVA), Correlation Analysis, and Stepwise Linear Regression Analysis of the 1999 and 2001 data sets based on BLM's "Desert Wildlife Management Areas" (DWMAs). These data and analysis support the West Mojave Management Plan. Ed LaRue of BLM is the primary monitor of this analysis effort and Principal Investigator of the role of desert populations in the development of this plan. Kathy Buescher, Senior Wildlife Biologist at Chambers Group, Inc., is the subcontract manager.

The data used for these specific analyses were developed by Ric Williams and Hubert Switalski, AMEC Earth and Environmental, Inc. and sent to me 14 June for statistical analyses. These data sets originally were sent to me by Emily Cohen, and I edited and modified them for statistical analysis. However, the tortoise transect data lacked association with DWMAs, or any other specific landscape areas of management interest, although UTM coordinates were present. I sent these data to Ric and Hubert and they developed the variable "NAME" which represented specific DWMAs. The new data sets associated individual transect data with landscape specific DWMAs (Table 1). The 1998 data set will be similarly associated with DWMAs in July.

DWMA	**Data Years**
Fremont – Kramer	1999, 2001
Ord – Rodman	1999, 2001
Pinto Mountain	1999
Superior – Cronese	1999, 2001

Table 1. DWMAs and YEARS compared in this report.

Methods

Data analyses were conducted with the SPSS statistical package (SPSS 1999a). Four tortoise sign counts were used in the analysis: burrows, scats, TCS, and carcasses. The variable *burrow* is the actual observed tortoise burrow count on individual surveyed transects and was available from the data matrix. The variable *scat* is the corrected tortoise scat count on individual surveyed transects, and was calculated from the data matrix as TCS – burrow. Raw scat counts require to be "corrected" because some scats are found in clumps, which are treated as a "single count". The variable *TCS* (Total Corrected Sign) is the total burrow + corrected scat count on individual surveyed transects and was available from the data matrix. The variable *carcass* is the observation of tortoise shells (carapace/plastron) or skeletal remains on the transect. Survey transects were further classified by two variables based on their TCS values (Table 2).

Classification A:

Designation	**TCS**
Low	< 7
High	> 6

Classification B:

Designation	**TCS**
1	0-1
2	2-3
3	4-6
4	7-9
5	> 9

Table 2. Classification of survey transects based on TCS values.

Tortoise sign require square root data transformation, because the data represent counts with many data cells being "0". Counts follow a Poisson distribution where the mean equals the variance, and therefore the mean and variance cannot be independent, but vary identically. All the sign data was transformed as $x = (x+0.5)^{1/2}$, where x represents a tortoise sign variable (Sokal and Rohlf 1995).

Bivariate parametric and nonparametric correlation analyses were performed on the data sets to assess the association of live tortoises with: burrows, scats, TCS, and carcasses on survey transects. The parametric test was the Pearson Product Moment Correlation Coefficient. Two nonparametric rank correlations were used: Spearman's rho and Kendall's tau.

Guided by the results of the correlation analyses, a Stepwise Linear Regression model was developed to assess the relative importance of burrows, scats, and TCS to "predict" tortoise transect occurrences.

Factorial Analysis of Variance (ANOVA) was used to contrast years and DWMAs with respect to burrows, scats, TCS, live tortoises, and carcasses.

Three major ANOVAs were performed to compare DWMAs:

1) The complete Factorial Analysis, using Years and DWMAs as factors
2) Analyzing Years separately
3) Analyzing High and Low TCS Classes separately
    - **Low** TCS transects possessed 0 to 6 TCS
    - **High** TCS transects possessed > 6 TCS

The 5 percent significance level ($P < 0.05$) was used based on experience and general acceptance in ecological research and field biology. Burrows, scats, TCS, tortoises, and carcasses were each used in separate analyses as dependent variables with year and DWMAs as "factors", the independent variables. The data sets are considered "unbalanced" in the complete ANOVA design, because empty cells are present in the years x DWMAs matrix (e.g., Pinto Mountain was not surveyed in 2001). The complete Factorial ANOVA analyses used Type IV calculation of Sums of Squares, because this algorithm is generally recommended for data possessing empty cells among factor comparisons (Milliken and Johnson 1984, Shaw and Mitchell-Olds 1993). The ANOVAs analyzing years and TCS classes separately used Type III calculation of Sums of Squares, because this algorithm is generally recommended, it is invariant with respect to cell frequencies, and when there are no missing cells it is equivalent to Yates' weighted-squares-of-means method (Milliken and Johnson 1984, Shaw and Mitchell-Olds 1993).

Levene's Test for equality of error variances was used for all analyses, and does not depend on the assumption of normality (Levene 1960). Bartlett's test is often used to assess homogeneity, but its practical value has been questioned (Harris 1975), and this test is not very efficient and strongly affected by non-normality (Zar 1999). Levene's Test uses the average of absolute deviations instead of the mean square of deviations, making it less sensitive to skewed distributions (Snedecor and Cochran 1989). Levene's Test checks to see if error variances are homogeneous among the factors being compared in an ANOVA. Homogeneous variances are a parametric assumption in ANOVA. ANOVA is a parametric statistical procedure that technically requires parametric assumptions to be met: homogeneous error variances, normally distributed data, adequate sample sizes, and independence of sampling or experimental errors (random sampling, independence of observations). Nevertheless and importantly, ANOVA is considered robust to departures from the first two of these assumptions, particularly when proper transformations are employed (Sokal and Rohlf 1995, Underwood 1997, Zar 1999). Additionally, SPSS algorithms are very robust to nonnormality (Morgan and Griego 1998). Many researchers believe that the routine use of nonparametric statistics avoids many issues of parametric assumptions, but these methods are equally affected by the last two critical assumptions – independence of sampling errors and the loss of statistical power with inadequate sample sizes (Krzysik 1998). The routine use of nonparametric analysis in ecological research is not recommended (Johnson 1995, Smith 1995, Stewart-Oaton 1995), but see Potvin and Roff (1993).

The use of factorial ANOVA designs requires the use of Post Hoc multiple comparison tests to assess statistical significance when there are more than two levels for any factor. Five Post Hoc multiple comparison tests were used in all factorial ANOVA analyses. The **Bonferroni** test, based on the Student's *t* statistic, adjusts the significance level for multiple comparisons. This test has the widest range of applications, is conservative, and when there are few comparisons has high power (Zolman 1993, SPSS 1999b). Conservative tests were desirable in these analyses, because they minimize Type I error, the probability of rejecting a true null hypothesis (null hypothesis = no significance difference) (Krzysik 1998). In other words, reporting significance when the comparison was not statistically significant. When factor variances are heterogeneous (i.e., Levene's Test is significant), pooled estimates of variance cannot be used to calculate the standard error of the comparison (Day and Quinn 1989). The use of Post Hoc tests that specifically address this issue are recommended (Day and Quinn 1989, SPSS 1999b). Therefore, four additional Post Hoc tests were used for all factorial ANOVA comparisons that were made:

Tamhane's T2 – conservative pairwise comparison test based on a *t* test

Dunnett's T3 – pairwise comparison test based on the Studentized maximum modulus, highly recommended (Fry 1993)

Games-Howell – liberal pairwise comparisons test, highly recommended (Fry 1993)

Dunnett's C – pairwise comparisons test based on the Studentized range

Although all five tests were examined for significance at the 0.05 level, only the results of the conservative Tamhane's T2 test were reported. The results of all five Post Hoc tests were essentially similar for all the factorial ANOVA analyses conducted in this study. This indicates that the data were reasonably behaved. As expected, the Games-Howell test was more liberal, while the Bonferroni test was frequently very liberal in contrast to the other four tests, particularly when Levene's Test showed significant departure from homogeneous residuals.

Results

Bivariate Correlation Analysis

In all analyses, very similar results were obtained with Pearson's Product Moment Correlation Coefficient (Parametric) and the two Nonparametric rank correlations: Spearman's rho and Kendall's tau. The values reported in Table 3 are Pearson's Correlation Coefficient with the two-tailed analysis. This analysis is more conservative than the one-tailed analysis, and therefore, minimizes Type I error. All DWMAs were used in the analysis.

Tortoise vs	Burrows	Scats	TCS	Carcasses	N
All	**0.37****	**0.20****	**0.29****	**0.045**	**1351**
1999	**0.35****	**0.16****	**0.26****	**0.030**	**962**
2001	**0.44****	**0.29****	**0.38****	**0.088**	**389**
Low TCS	**0.27****	**0.95****	**0.22****	**0.024**	**1197**
High TCS	**0.38****	**-0.11**	**0.062**	**0.058**	**154**
0-1 TCS	**0.13****	**0.020**	**0.12****	**-0.029**	**750**
2-3 TCS	**0.24****	**-0.20****	**0.12***	**-0.036**	**277**
4-6 TCS	**0.16***	**-0.11**	**0.020**	**0.076**	**170**
7-9 TCS	**0.34****	**-0.31****	**-0.14**	**0.16**	**88**
>9 TCS	**0.45****	**-0.063**	**0.16**	**-0.085**	**66**

Table 3. Pearson's Product Moment Correlation Coefficient of LIVE TORTOISES with four tortoise sign parameters: burrows, scats, TCS, and carcasses. N is the sample size.
 * indicates statistical significance (P < 0.05)
 ** indicates high statistical significance (P < 0.01)

Stepwise Linear Regression

Exploratory Model:

Tortoises = a(Burrows) + b(Scats) + c(TCS) + d

Tortoise DWMAs

Year: 1999 + 2001

Predictors	**All data**	**High TCS**	**Low TCS**
Burrows	**< 0.001**	**< 0.001**	**< 0.001**
Scats	**NS (0.85)**	**NS (0.94)**	**NS (0.97)**
TCS	**NS (0.54)**	**NS (0.96)**	**NS (0.58)**

Statistical Comparison of Years and DWMAs

A) Complete ANOVA

Years Compared: 1999, 2001

DWMAs Compared: see Below

Sample sizes:

Factor	**N**
1999	968
2001	389
Fremont – Kramer	412
Ord – Rodman	129
Pinto Mountain	43
Superior – Cronese	773

BURROWS

Levene's Test of Equality of Error Variances: Significant (<0.001)

Difference among YEARS: Not Significant (0.61)

Difference among DWMAs: Not Significant (0.061)

Years – DWMAs Interaction: Not Significant (0.36)

Summary:

Burrow counts were similar in both years and at all DWMAs.

SCATS

Levene's Test of Equality of Error Variances:	Significant (<0.001)
Difference among YEARS:	Not Significant (0.51)
Difference among DWMAs:	Significant (0.001)
Years – DWMAs Interaction:	Significant (0.003)

Difference among DWMAs (Tamhane's T2)

Fremont – Kramer > Pinto Mtn. (<0.001)

Ord – Rodman > Pinto Mtn. (<0.001)

Superior – Cronese > Pinto Mtn. (<0.001)

Summary:

Scat counts were significantly less abundant at Pinto Mountain than they were at the other three DWMAs, which were similar to one another. There was a significant Years – DWMAs interaction which indicates that some of the difference in scat counts among DWMAs were influenced by year. This was the logical outcome, because the DWMA possessing the lowest scat counts was only surveyed in a single year.

TCS (Total Corrected Sign)

Levene's Test of Equality of Error Variances:	Significant (<0.001)
Difference among YEARS:	Not Significant (0.41)
Difference among DWMAs:	Significant (<0.001)
Years – DWMAs Interaction:	Significant (0.009)

Difference among DWMAs (Tamhane's T2)

Fremont – Kramer > Pinto Mtn. (<0.001)

Ord – Rodman > Pinto Mtn. (<0.001)

Superior – Cronese > Pinto Mtn. (<0.001)

Summary:

TCS counts paralleled scat counts very closely. This is expected, because the largest contributor to TCS is scat counts. TCS was significantly less abundant at Pinto Mountain than at the other three DWMAs, which were similar to one another. There was a significant Years – DWMAs interaction which indicates that some of the difference in TCS among DWMAs was influenced by year. This was the logical outcome, because the DWMA possessing the lowest TCS was only surveyed in a single year.

TORTOISES

Levene's Test of Equality of Error Variances:	Significant (<0.001)
Difference among YEARS:	Not Significant (0.80)
Difference among DWMAs:	Significant (0.034)
Years – DWMAs Interaction:	Not Significant (0.22)

Difference among DWMAs (Tamhane's T2)

Not Significant (>0.42)

Summary:

Live tortoises found in both years and at all DWMAs were similar, despite a great deal of variability.

CARCASSES

Levene's Test of Equality of Error Variances:	Significant (<0.001)
Difference among YEARS:	Not Significant (0.57)
Difference among DWMAs:	Significant (<0.001)
Years – DWMAs Interaction:	Not Significant (0.26)

Difference among DWMAs (Tamhane's T2)

Fremont – Kramer > Ord – Rodman (<0.001)

Fremont – Kramer > Pinto Mtn. (<0.001)

Fremont – Kramer > Superior – Cronese (0.005)

Superior – Cronese > Ord – Rodman (0.001)

Superior – Cronese > Pinto Mtn. (0.046)

Summary:

Carcass counts were statistically ranked as follows:

Fremont – Kramer > Superior – Cronese > Ord – Rodman = Pinto Mtn.

Carcass counts were significantly more abundant at Fremont – Kramer than at the other DWMAs. Superior – Cronese counts were more abundant than Ord – Rodman and Pinto Mtn., which were similar.

B) Analysis by Year

Year: 1999

DWMAs Compared: See Below

Sample Sizes:

DWMA	N
Fremont – Kramer	220
Ord – Rodman	108
Pinto Mountain	43
Superior – Cronese	597

BURROWS

Levene's Test of Equality of Error Variances: Not Significant (0.069)

Difference among DWMAs: Not Significant (0.53)

Summary:

Burrow counts were similar at all DWMAs.

SCATS

Levene's Test of Equality of Error Variances: Significant (<0.001)

Difference among DWMAs: Significant (0.003)

Difference among DWMAs (Tamhane's T2)

Fremont – Kramer > Pinto Mtn. (<0.001)

Ord – Rodman > Pinto Mtn. (<0.001)

Superior – Cronese > Pinto Mtn. (<0.001)

Summary:

Scat counts were significantly less abundant at Pinto Mountain than they were at the other three DWMAs, which were similar to one another.

TORTOISES

Levene's Test of Equality of Error Variances: Significant (0.001)

Difference among DWMAs: Not Significant (0.20)

Summary:

Live tortoises found at all DWMAs were similar, despite a great deal of variability.

CARCASSES

Levene's Test of Equality of Error Variances: Significant (<0.001)

Difference among DWMAs: Significant (0.001)

Difference among DWMAs (Tamhane's T2)

Fremont – Kramer > Ord – Rodman (0.001)

Fremont – Kramer > Pinto Mtn. (0.002)

Superior – Cronese > Ord – Rodman (0.021)

Superior – Cronese > Pinto Mtn. (0.043)

Summary:

Carcass counts were statistically ranked as follows:

Fremont – Kramer = Superior – Cronese > Ord – Rodman = Pinto Mtn.

Carcass counts were similar at Fremont – Kramer and Superior – Cronese, and the counts were significantly more abundant at these DWMAs than at Ord – Rodman and Pinto Mtn., which were similar.

Year: 2001

DWMAs Compared: See Below

Sample Sizes:

DWMA	N
Fremont – Kramer	192
Ord – Rodman	21
Superior – Cronese	176

BURROWS

Levene's Test of Equality of Error Variances: Significant (<0.001)

Difference among DWMAs: Not Significant (0.078)

Summary:

Burrow counts were similar at all DWMAs.

SCATS

Levene's Test of Equality of Error Variances: Significant (<0.001)

Difference among DWMAs: Significant (0.002)

Difference among DWMAs (Tamhane's T2)

Superior – Cronese > Fremont – Kramer (0.002)

Summary:

Scat counts were significantly more abundant at Superior – Cronese than at Fremont – Kramer. All other paired comparisons were similar.

TORTOISES

Levene's Test of Equality of Error Variances: Significant (<0.001)

Difference among DWMAs: Significant (0.044)

Difference among DWMAs (Tamhane's T2)

Not Significant (>0.053)

Summary:

Live tortoises found at all DWMAs were similar, despite a great deal of variability.

CARCASSES

Levene's Test of Equality of Error Variances: Significant (<0.001)

Difference among DWMAs: Significant (0.001)

Difference among DWMAs (Tamhane's T2)

Fremont – Kramer > Ord – Rodman (<0.001)

Fremont – Kramer > Superior – Cronese (0.021)

Superior – Cronese > Ord – Rodman (<0.001)

Summary:

Carcass counts were statistically ranked as follows:

Fremont – Kramer > Superior – Cronese > Ord – Rodman

Carcass counts were more abundant at Fremont – Kramer and lowest at Ord – Rodman.

B) Analysis by TCS Class

TCS Class: Low (0 – 6)

DWMAs Compared: See Below

Sample Sizes:

DWMA	N
Fremont – Kramer	372
Ord – Rodman	117
Pinto Mountain	43
Superior – Cronese	671

BURROWS

Levene's Test of Equality of Error Variances: Not Significant (0.23)

Difference among DWMAs: Not Significant (0.91)

Summary:

Burrow counts were similar at all DWMAs.

SCATS

Levene's Test of Equality of Error Variances: Significant (<0.001)

Difference among DWMAs: Significant (<0.001)

Difference among DWMAs (Tamhane's T2)

Fremont – Kramer > Pinto Mtn. (0.025)

Ord – Rodman > Pinto Mtn. (<0.001)

Superior – Cronese > Pinto Mtn. (0.006)

Summary:

Scat counts were significantly less abundant at Pinto Mountain than they were at the other three DWMAs, which were similar to one another.

TORTOISES

Levene's Test of Equality of Error Variances: Significant (<0.001)

Difference among DWMAs: Significant (0.003)

Difference among DWMAs (Tamhane's T2)

Not Significant (>0.28)

Summary:

A similar number of live tortoises were found at all DWMAs.

CARCASSES

Levene's Test of Equality of Error Variances: Significant (<0.001)

Difference among DWMAs: Significant (<0.001)

Difference among DWMAs (Tamhane's T2)

Fremont – Kramer > Ord – Rodman (<0.001)

Fremont – Kramer > Pinto Mtn. (<0.001)

Superior – Cronese > Ord – Rodman (0.001)

Summary:

Carcass counts were statistically ranked as follows:

Fremont – Kramer = Superior – Cronese > Ord – Rodman

Fremont – Kramer > Pinto Mtn = Ord - Rodman

Carcass counts were similar at and significantly more abundant at Fremont – Kramer and Superior – Cronese than at Ord – Rodman and Pinto Mtn., which were similar.

TCS Class: High (> 6)

DWMAs Compared: See Below

Sample Sizes:

DWMA	**N**
Fremont – Kramer	40
Ord – Rodman	12
Superior – Cronese	102

BURROWS

Levene's Test of Equality of Error Variances: Not Significant (0.61)

Difference among DWMAs: Significant (0.018)

Difference among DWMAs (Tamhane's T2)

Superior – Cronese > Fremont – Kramer (0.023)

Summary:
Burrow counts were greater at Superior – Cronese than at Fremont – Kramer. All other contrasts were similar.

SCATS

Levene's Test of Equality of Error Variances: Not Significant (0.23)

Difference among DWMAs: Not Significant (0.55)

Summary:

Scat counts were similar at all DWMAs.

TORTOISES

Levene's Test of Equality of Error Variances: Not Significant (0.14)

Difference among DWMAs: Not Significant (0.63)

A similar number of live tortoises were found at all DWMAs.

CARCASSES

Levene's Test of Equality of Error Variances: Not Significant (0.36)

Difference among DWMAs: Not Significant (0.94

Summary:

A similar number of carcasses were found at all DWMAs.

Discussion

Desert Tortoises and Their Sign

Desert tortoises should be closely associated with their sign – burrows and scats. Desert tortoises possess relatively small home ranges even in highly productive years (averaging < 8 ha), and this home range dramatically decreases even further in a drought year (averaging < 3 ha) (Duda et al. 1999). Within their home range they build burrows, using 2-11/tortoise in a productive and 1-6 in a drought year (Duda et al. 1999) and deposit scats at a rate that is at least an order of magnitude greater than their burrow numbers (Krzysik, in review). Based on their dedication to small home ranges, and because tortoises spend a major portion of their lives in burrows, particularly in drought years and bad weather (Duda and Krzysik 1998), it is intuitive that tortoise sign represents a surrogate for actual live tortoises. Traditional desert tortoise surveys have summed burrow counts and "independent" scat counts to produce TCS, total corrected sign.

Correlation and Stepwise Regression Analyses

Despite the acknowledged difficulty of observing live desert tortoises on survey transects, and the very high variability of tortoise sign (burrows and scats) among transects, there was a highly significant correlation ($P<0.01$) of live tortoises with burrows, scats, and TCS for the total DWMA data set and in each of the two years (Table 3). However, when the data were classified by the abundance of TCS, the results of the correlation analysis became interesting (Table 3). On transects with high (>6) TCS, only burrows were significantly correlated with live tortoises. When the TCS counts were further delineated into five classes (Table 3), burrows consistently for all five classes were significantly correlated with tortoise counts, while scat counts and TCS were inconsistent and unreliable. TCS were only correlated with tortoises at the two lowest TCS classes, undoubtedly reflecting the large sample sizes in these classes, and the positive influence of burrows being included with TCS. Scat counts were very unreliable, and even demonstrated **NEGATIVE** significant correlations with tortoises with TCS classes of 2-3 and 7-9. These results are very critical and interesting, because the majority of transects in any tortoise survey data set contain low sign counts, and high sample sizes may mask interesting details among gradients of sign densities. As demonstrated in the ANOVA analyses, scat counts being more abundant than burrows dominate TCS, and parallel results are achieved with these two variables. However, in the correlation analysis inconsistent scat correlations across the TCS gradient, resulted in inconsistent TCS correlations. These data provide compelling evidence that burrows are a more consistent and reliable surrogate for tortoise counts than scats or the combination of burrows + scats (TCS). The current analysis extends and reinforces the similar conclusions reached in the last report (Krzysik 2002). Additional transect data, as well as, additional analyses are required and will be conducted for the next report to further elucidate this interesting pattern.

Carcass counts were not correlated with transect live tortoise counts. A priori, everything else being equal, one would expect that DWMAs with higher tortoises densities would also possess higher carcass densities (a significant positive correlation), assuming mortality rates are similar. DWMAs that suffered higher tortoise mortality should show a negative correlation between live tortoises and carcasses. The carcass data suggest that **BOTH** tortoise densities and tortoise mortality rates are similar at the DWMAs.

Motivated by the significant correlation of tortoises with their sign, an exploratory Stepwise Linear Regression Model was developed to assess and statistically verify the relative importance of the three sign counts to predict tortoise occurrence. This technique selects the best predictor variable that explains most of the scatter around the regression line. Inherently, it eliminates redundant variables that possess high multicollinearity. For example, TCS is a composite of the other two sign counts. Traditionally, the validity and interpretation of stepwise techniques have been questioned (Green 1979). However, there has recently been a revival in their applications. The result of this analysis clearly demonstrated that **burrow counts were the only predictor variable** necessary to explain the variability of tortoises on transects. Statistically, scats and TCS did not contribute significant information to the regression. As in the correlation analysis, Stepwise Linear Regression reinforces the validity in using burrow counts as a surrogate for tortoise counts.

The data presented here and other evidence suggest that tortoise burrows appear to be a better surrogate for comparisons of tortoise distribution and relative abundance patterns than either scats or TCS. TCS was strongly correlated with scat counts, and essentially did not provide additional statistical information. The data also show that scat counts are much more variable than burrow counts, both within and between specific statistical comparisons. Importantly, burrow counts along the standard triangular tortoise survey transects (10 yards wide) accurately represent **actual burrow density estimates**, because the effective survey width using Distance Sampling surveys is equal to 4.5 m on a side (Krzysik, in review). Effective survey width for scats is approximately 1 m on a side. Therefore, burrow counts on 10 yard wide transects directly represent burrow density, while scat counts are relative numbers at best, and cannot be used as density estimates. Effective survey width is equal to half the width of survey transects when all survey objects are detected (Buckland et al. 1993).

Analysis of Variance

Burrow counts (densities) were similar at all DWMAs and for both 1999 and 2001. Interestingly, when only high (>6) TCS transects were analyzed, Superior – Cronese had higher burrow counts than Fremont – Kramer. Pinto Mtn. did not have any high TCS transects.

Scat and TCS counts produced similar results in ANOVA, because TCS is usually dominated by scat counts. Therefore, scat counts were used for all analyses, with the exception of the complete Factorial ANOVA where TCS was also used. Pinto Mtn. had lower scat counts than the other DWMAs in 1999, and when considering only Low TCS transects. Pinto Mtn. was not represented in 2001 nor in high TCS transects. In 2001, Superior – Cronese had higher scat counts than Fremont – Kramer. However, when high TCS transects were analyzed all DWMAs had similar scat counts.

Live tortoise counts were similar at all DWMAs, for both 1999 and 2001, and for both low and high TCS transects. However, statistical interpretation can be quite tenuous, because of the high variability and low sample sizes associated with finding tortoises on survey transects.

Carcass counts were highest at Fremont – Cramer and Superior – Cronese. Depending on the specific comparisons, these two DWMAs were either similar or the former had higher carcass counts than the latter. Ord – Rodman and Pinto Mtn. had lower carcass counts than the two above DWMAs, and they were similar to each other.

Based on the available data and sample sizes, the four DWMAs appear to be similar to one another in their tortoise and sign counts, and therefore, of similar value as desert tortoise conservation areas. Although there were some statistical differences with specific comparisons of scat and carcass counts, these parameters may not be important in elucidating actual tortoise densities. Although the analyses could not demonstrate statistical differences among DWMAs with respect to live tortoise counts, the high variability and small sample sizes makes interpretation tenuous. An interesting outcome of the ANOVA analyses was that burrow counts (i.e., densities) were higher at Superior – Cronese than at Fremont – Kramer for the high TCS transects. This suggests that either Superior – Cronese tortoises possess a higher burrow/tortoise ratio, or tortoises are more abundant at this DWMA. Further analyses are being planned and will be conducted to explore and further elucidate the patterns identified in this report.

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Statistical Analysis of BLM Desert Tortoise Surveys In Support of the West Mojave Management Plan

Report III: Desert Tortoises at DWMAs and Association of Tortoise Encounters and Sign Counts On Transects

5 September 2002

by

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Introduction

This report compares four Desert Wildlife Management Areas (DWMAs) with respect to tortoise survey transects, and also provides detailed statistical analyses and graphical presentations for exploring and assessing the association of live tortoise encounters with tortoise sign counts on surveyed 1.5 mile triangular transects. Three different databases were used in the analyses: 1370 (13 had missing data cells) transects surveyed in 1999 and 2001 at the four DWMAs, 624 transects surveyed in 1998, 1999, and 2001 at 7 "Calibration Plots", and 876 transects surveyed in 1998 at localities undisclosed in the database. Statistical procedures used in the analyses were: Analysis of Variance (ANOVA), Parametric and Nonparametric Bivariate Correlation Analyses, and Graphical Associations of Transect Means for the Association Analysis.

These data and analysis results support the U.S. Department of Interior, Bureau of Land Management, West Mojave Management Plan. Ed LaRue of BLM is the primary monitor of this analysis effort and the Principal Investigator for the incorporation of desert tortoise conservation and management in the development of this plan. Kathy Buescher, Senior Wildlife Biologist at Chambers Group, Inc., is the subcontract manager.

The databases used for these specific analyses were developed and sent to me by Emily Cohen, Ric Williams, and Hubert Switalski. I edited and modified the databases for statistical analysis procedures.

Methods

Data analyses were conducted with the SPSS statistical package (SPSS 1999a). Four tortoise sign counts were used in the analysis: burrows, scats, TCS, and carcasses. The variable *burrow* is the actual observed tortoise burrow count on individual surveyed transects and was available from the data matrix. The variable *scat* is the corrected tortoise scat count on individual surveyed transects, and was calculated from the data matrix as (TCS – burrow). Raw scat counts require to be "corrected" because some scats are found in clumps, which are treated as a "single count". The variable *TCS* (Total Corrected Sign) is the total burrow + corrected scat count on individual surveyed transects and was available from the data matrix. The variable *carcass* is the observation of tortoise shells (carapace/plastron) or skeletal remains on the transect. Survey transects were further classified into three different subclasses based on their TCS and burrow counts (Table 1).

Subclass 1	TCS
Low	0-6
High	>6

Subclass 2	TCS
1	0-1
2	2-3
3	4-6
4	7-9
5	>9

Subclass 3	Burrows
1	0
2	1
3	2
4	3
5	>3

Table 1. Classification of tortoise survey transects based on TCS and burrow counts.

Tortoise sign require square root data transformation, because the data represent counts with many data cells being "0". Counts, particularly of rare events, follow a Poisson distribution where the mean equals the variance, and therefore the mean and variance cannot be independent, but vary identically. All the sign data was transformed as $x = (x+0.5)^{1/2}$, where x represents a tortoise sign variable (Sokal and Rohlf 1995).

Analysis of Variance (ANOVA) was used to statistically assess differences among DWMAs with respect to burrows, scats, TCS, live tortoises, and carcasses. Years (1999, 2001) were analyzed separately, and also combined to increase sample size for analyses. TCS classes Low and High (Table 2) were analyzed separately and also combined for analyses.

Year	**1999**		**2001**		
TCS Class	**Low TCS (0-6)**	**High TCS (>6)**	**Low TCS (0-6)**	**High TCS (>6)**	**Total**
DWMA					
Superior - Cronese	**526**	**71**	**145**	**31**	**773**
Fremont - Cramer	**193**	**27**	**179**	**13**	**412**
Ord - Rodman	**97**	**11**	**20**	**1**	**129**
Pinto Mtn	**43**	**0**	**0**	**0**	**43**
Total	**859**	**109**	**344**	**45**	**1357**

Table 2. Sample sizes at the four DWMAs in 1999 and 2001 for Low TCS and High TCS classes.

The 5 percent significance level ($P<0.05$) was used based on experience and general acceptance in ecological research and field biology. Burrows, scats, TCS, tortoises, and carcasses were each used in separate analyses as dependent variables with DWMAs as "the factor", the independent variable. ANOVAs used Type III calculation of Sums of Squares, because this algorithm is generally recommended, it is invariant with respect to cell frequencies, and when there are no missing cells it is equivalent to Yates' weighted-squares-of-means method (Milliken and Johnson 1984, Shaw and Mitchell-Olds 1993).

Levene's Test for equality of error variances was used for all analyses, and does not depend on the assumption of normality (Levene 1960). Bartlett's test is often used to assess homogeneity, but its practical value has been questioned (Harris 1975), and this test is not very efficient and strongly affected by non-normality (Zar 1999). Levene's Test uses the average of absolute deviations instead of the mean square of deviations, making it less sensitive to skewed distributions (Snedecor and Cochran 1989). Levene's Test checks to see if error variances are homogeneous among the factors being compared in an ANOVA. Homogeneous variances are a parametric assumption in ANOVA. ANOVA is a parametric statistical procedure that technically requires parametric assumptions to be met: homogeneous error variances, normally distributed data, adequate sample sizes, and independence of sampling or experimental errors (random sampling, independence of observations). Nevertheless and importantly, ANOVA is considered robust to departures from the first two of these assumptions, particularly when proper transformations are employed (Sokal and Rohlf 1995, Underwood 1997, Zar 1999). Additionally, SPSS algorithms are very robust to nonnormality (Morgan and Griego 1998). Many researchers believe that the routine use of nonparametric statistics avoids many issues of parametric assumptions, but these methods are equally affected by the last two critical assumptions – independence of sampling errors and the loss of statistical power with inadequate sample sizes (Krzysik 1998). The routine use of nonparametric analysis in ecological research is not recommended (Johnson 1995, Smith 1995, Stewart-Oaton 1995), but see Potvin and Roff (1993). Table 3 provides the results of Levene's Test for the ANOVA analyses of DWMAs.

Year	TCS Class	Burrows	Scats	TCS	Tortoises	Carcasses	N
1999 & 2001	**All**	**0.001**	**<0.001**	**0.001**	**<0.001**	**<0.001**	**1357**
1999	**All**	**NS (0.070)**	**<0.001**	**0.003**	**0.001**	**<0.001**	**968**
2001	**All**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**389**
1999 & 2001	**Low**	**NS (0.23)**	**<0.001**	**0.041**	**<0.001**	**<0.001**	**1203**
1999 & 2001	**High**	**NS (0.61)**	**NS (0.23)**	**NS (0.12)**	**NS (0.14)**	**NS (0.36)**	**154**
1999	**Low**	**NS (0.61)**	**0.001**	**NS (0.072)**	**<0.001**	**<0.001**	**859**
1999	**High**	**NS (0.73)**	**NS (0.47)**	**NS (0.25)**	**NS (0.14)**	**NS (0.22)**	**109**

Table 3. Statistical significance of Levene's Test for homogeneity of variances for ANOVA of DWMAs in 1999 and 2001. Analyses were not conducted on TCS classes for 2001 because of small sample size and the lack of surveys at Pinto Mountain. Note the high degree of heterogeneity in the DWMA data set. Values of P <0.001 are highly significant.

ANOVA designs require the use of Post Hoc Multiple Comparison Tests to assess statistical significance when there are more than two levels for any factor. Five Post Hoc multiple comparison tests were used in the ANOVA analyses. The **Bonferroni** test, based on the Student's *t* statistic, adjusts the significance level for multiple comparisons. This test has the widest range of applications, is conservative, and when there are few comparisons has high power (Zolman 1993, SPSS 1999b). Conservative tests were desirable in these analyses, because they minimize Type I error, the probability of rejecting a true null hypothesis (null hypothesis = no significance difference) (Krzysik 1998). In other words, erroneously reporting significance when the comparison was not statistically significant. Importantly, when factor variances are heterogeneous (i.e., Levene's Test is significant), pooled estimates of variance cannot be used to calculate the standard error of the comparison (Day and Quinn 1989). The use of Post Hoc tests that specifically address variance heterogeneity are recommended (Day and Quinn 1989, SPSS 1999b). Therefore, the high degree of data heterogeneity (Table 3), motivated the use of four additional Post Hoc tests that fit this criteria.

Tamhane's T2 – conservative pairwise comparison test based on a *t* test

Dunnett's T3 – pairwise comparison test based on the Studentized maximum modulus, highly recommended (Fry 1993)

Games-Howell – liberal pairwise comparisons test, highly recommended (Fry 1993)

Dunnett's C – pairwise comparisons test based on the Studentized range

Although all five tests were examined for significance at the 0.05 level, **only the results of the conservative Tamhane's T2 test were reported**. The results of all five Post Hoc tests were usually similar for all the factorial ANOVA analyses conducted in this study. This indicates that the data were reasonably behaved. As expected, the Games-Howell test was more liberal, while the Bonferroni test was frequently very liberal in contrast to the other four tests, particularly when Levene's Test showed significant departure from homogeneous residuals.

Bivariate parametric and nonparametric correlation analyses were performed on the three data sets (DWMAs, Calibration Plots, 1998 Data) to assess the association of live tortoises with: burrows, scats, TCS, and carcasses on survey transects. The parametric test was the Pearson Product Moment Correlation Coefficient. Two nonparametric rank correlations were used: Spearman's rho and Kendall's tau, and these gave results similar to the parametric test. The values reported in Tables 5, 6, 7, and 8 are Pearson's Correlation Coefficient with the two-tailed analysis. The two-tailed analysis is more conservative than the one-tailed, and therefore, minimizes Type I error.

Graphical presentations are provided to visually assess the association of live tortoise encounters with tortoise sign on survey transects. The data used was based on transect means of tortoises, burrows, and scats assessed at the three subclasses shown in Table 1. Burrow and scat transect means were multiplied by "10" and tortoise means by "100" for the purpose of convenient scaling of the graphics. Association of metrics through graphical visualizations represents an important tool for conveying information to the reader that may be difficult to track statistically (Tufte 1983, Harris 1999).

Results

Statistical Comparison of Desert Wildlife Management Areas (DWMAs)

Analysis of Variance (ANOVA) of transformed data was used to compare four DWMAs (Superior – Cronese, Fremont – Kramer, Ord – Rodman, and Pinto Mountain). Data were collected in 1999 and 2001 on standardized 1.5 mile triangular transects. The Pinto Mountain

DWMA was not surveyed in 2001. Sample sizes for the analyses are provided in Table 2. Note that the data were subdivided into LOW (0-6) and HIGH (>6) Total Corrected Sign (TCS) classes. Table 3 provides the statistical significance of Levene's Test for homogeneity of variances for all of the ANOVA contrasts in the DWMA comparisons. Note that in most of the sign comparisons the data were highly variable – Levene's Test was highly significant. Data heterogeneity only stabilized when sign counts increased on the survey transects (i.e., TCS >6). Importantly, also note that burrow counts were more homogeneous than any other transect counts.

Table 4 provides a summary of the ANOVA comparisons at all four DWMAs. Analyses were not conducted separately for 2001 TCS classes because of small sample size and the lack of data for Pinto Mountain. Note that there was no significant difference among the DWMAs in the number of live tortoise encountered on transects. The analysis of transects with High TCS counts not only had a small sample size, but also innately selected transects with high scat counts. Therefore, it was not surprising that there were no significant differences among the DWMAs in scat and TCS counts. However, burrow counts were significantly different. I attribute this significance of burrow counts to the relatively small sample sizes, and the reality of high scat counts relative to burrow counts inflating some of the TCS values. Importantly, if the two data sets for "High TCS counts" are not included; note that scat, TCS, and carcass counts are highly significantly different among the DWMAs in all comparisons, while burrow counts are statistically similar at all DWMAs and parallel the results derived for live tortoises.

Year	TCS Class	Burrows	Scats	TCS	Tortoises	Carcasses	N
1999 and 2001	**All**	**NS (0.13)**	**** (0.002)**	***** (<0.001)**	**NS (>0.41)**	***** (<0.001)**	**1357**
1999	**All**	**NS (0.53)**	**** (0.003)**	**** (0.001)**	**NS (0.20)**	**** (0.001)**	**968**
2001	**All**	**NS (0.078)**	**** (0.002)**	**** (0.003)**	**NS (>0.05)**	**** (0.001)**	**389**
1999 and 2001	**Low**	**NS (0.91)**	***** (<0.001)**	**** (0.005)**	**NS (>0.27)**	***** (<0.001)**	**1203**
1999 and 2001	**High**	*** (0.018)**	**NS (0.55)**	**NS (0.64)**	**NS (0.63)**	**NS (0.94)**	**154**
1999	**Low**	**NS (0.97)**	**** (0.002)**	*** (0.010)**	**NS (>0.36)**	**** (0.001)**	**859**
1999	**High**	**** (0.008)**	**NS (0.41)**	**NS (0.73)**	**NS (0.60)**	**NS (0.89)**	**109**

Table 4. ANOVA results of the comparison of the four DWMAs with data collected in 1999 and 2001. See Table 2 for DWMA identification and specific sample sizes, and Table 1 for TCS class definition. NS = Not Significant (P>0.05).

The **Appendix** provides the results of the detailed Post-Hoc Multiple Comparison of all ANOVA results using Tamhane's T2 procedure (see Methods). These data along with Table 4 summarizes the results presented and discussed in Report II (Krzysik 2002b). These results suggest that in 1999 Pinto Mountain had less scat counts, and subsequently lower TCS counts than the other three DWMAs. In 2001, when Pinto Mountain was not surveyed, Fremont – Kramer had lower scat and TCS than Superior – Cronese when all TCS classes were considered, but only had lower scat than Ord – Rodman when Low TCS data were used.

Carcass counts were significantly different among the four DWMAs. On the basis of the data summarized in the **Appendix**, the following ranking of carcass counts was established.

Fremont – Kramer > Superior – Cronese > (Ord – Rodman = Pinto Mountain)

Ed LaRue provided me with Desert Tortoise estimated densities for the four DWMAs, where the Distance Sampling method was used for density estimation. Figure 1 provides these tortoise density estimates along with the standard error and the tortoise encounter rate for 100 km of transect.

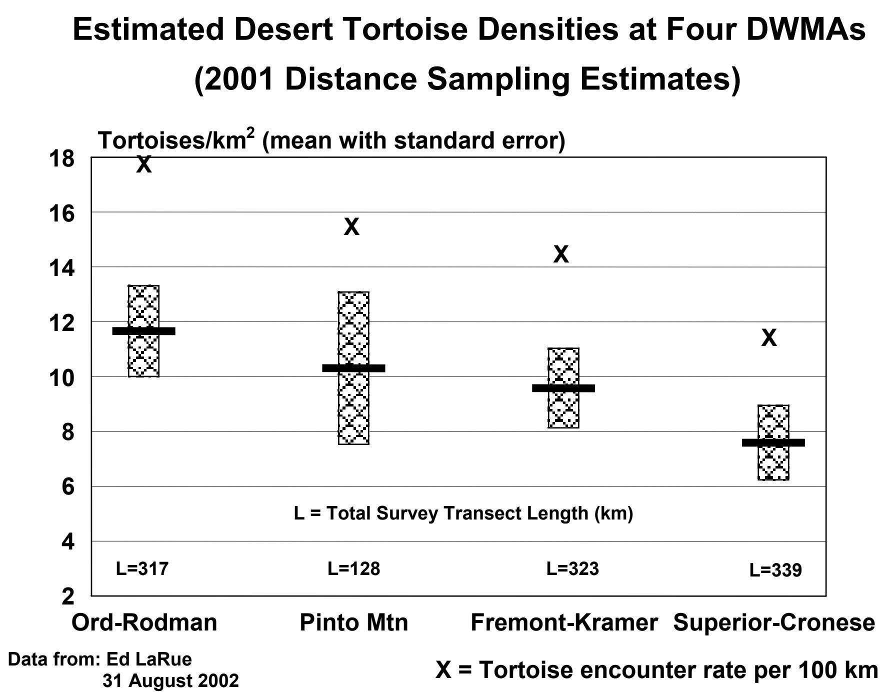

Figure 1. Estimated desert tortoise densities at the four DWMAs based on the Distance Sampling method. Data values are the mean with standard error.

Figure 2 provides the tortoise density estimates along with the 95% confidence interval of the estimates. Pinto Mountain has the largest "error bar" around the mean because of its smaller sample size. On the basis of the Distance Sampling estimated means and their error terms at all four DWMAs appear to possess similar tortoise densities, with the possibility that Superior-

Cronese has a slightly lower density. On the basis of the estimated mean tortoise density, Superior – Cronese had a 21% lower density than Fremont – Kramer, and 35% less than Ord – Rodman. Nevertheless, there was a great deal of overlap evident in the standard errors and 95% confidence intervals.

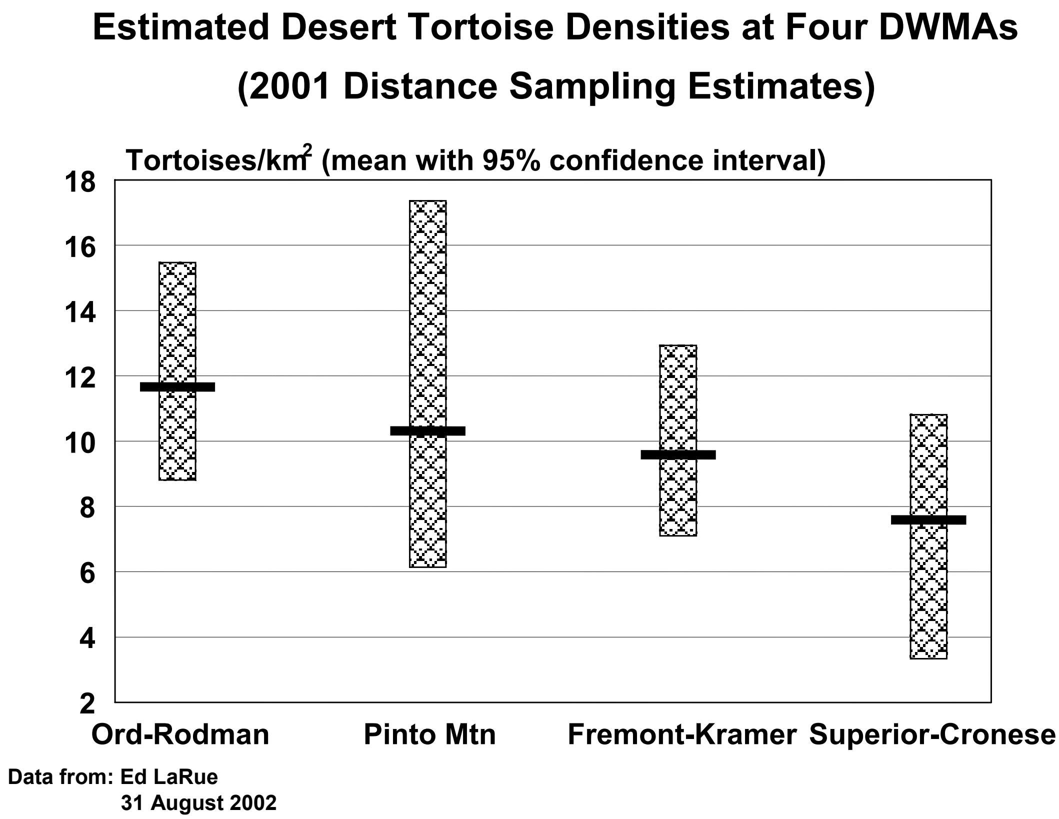

Figure 2. Estimated desert tortoise densities at the four DWMAs based on the Distance Sampling method. Data values are the mean with 95% confidence interval.

Bivariate Correlation Analyses

Extensive bivariate correlation analyses were performed to explore the association of live tortoise encounters on the 1.5 mile triangular survey transects with four other transect signs: burrows, scats, TCS (burrows + scats), and carcasses. In all analyses, similar results were obtained with Pearson's Product Moment Correlation Coefficient (Parametric) and the two Nonparametric rank correlations, Spearman's rho and Kendall's tau. The reality of extremely low tortoise encounter rates on survey transects (usually 0), makes for small correlation coefficients. Nevertheless, sample sizes are large enough to provide statistically significant correlations and explore potential relationships. This is discussed in greater detail in the next section.

Table 5 provides the bivariate correlations of live tortoise encounters with burrow, scat, TCS, and carcass counts on individual transects at the four DWMAs. This table was also provided in Report II (Krzysik 2002b, Table 3).

Sites: DWMAs **Year: 1999 and 2001**

Tortoise vs	Burrows	Scats	TCS	Carcasses	N
All	0.37**	0.20**	0.29**	0.045	1351
1999	0.35**	0.16**	0.26**	0.030	962
2001	0.44**	0.29**	0.38**	0.088	389
Low TCS	0.27**	0.95**	0.22**	0.024	1197
High TCS	0.38**	-0.11	0.062	0.058	154
0-1 TCS	0.13**	0.020	0.12**	-0.029	750
2-3 TCS	0.24**	-0.20**	0.12*	-0.036	277
4-6 TCS	0.16*	-0.11	0.020	0.076	170
7-9 TCS	0.34**	-0.31**	-0.14	0.16	88
>9 TCS	0.45**	-0.063	0.16	-0.085	66

Table 5. Pearson's Product Moment Correlation Coefficient of LIVE TORTOISES with four tortoise sign parameters: burrows, scats, TCS, and carcasses. N is the sample size.
* indicates statistical significance (P<0.05)
** indicates high statistical significance (P<0.01)

Table 6 provides the bivariate correlations of live tortoise encounters with burrow, scat, TCS, and carcass counts on individual transects at the Calibration Plots.

Sites: Calibration Plots Year: 1998, 1999, 2001

Tortoise vs	Burrows	Scats	TCS	Carcasses	N
All	0.39**	0.17**	0.26**	-0.004	624
1998	0.26**	0.020	0.099	0.11	180
1999	0.45**	0.22**	0.33**	-0.043	282
2001	0.43**	0.25**	0.33**	-0.074	162
Low TCS	0.24**	0.024	0.14**	-0.057	388
High TCS	0.40**	-0.005	0.18**	0.018	236
0-1 TCS	0.076	-0.071	0.001	-0.022	149
2-3 TCS	0.16	-0.21*	-0.084	-0.079	108
4-6 TCS	0.22*	-0.24**	-0.070	-0.075	131
7-9 TCS	0.40**	-0.41**	0.022	0.18	93
>9 TCS	0.39**	-0.004	0.19*	-0.11	143

Table 6. Pearson's Product Moment Correlation Coefficient of LIVE TORTOISES with four tortoise sign parameters: burrows, scats, TCS, and carcasses. N is the sample size.
* indicates statistical significance ($P<0.05$)
** indicates high statistical significance ($P<0.01$)

Sample sizes at Calibration Plots are as follows:

Plot	Number of Transects
Lucerne	186
Kramer	180
Fremont	156
Alvord	42
Liz	42
DTNA	12
Johnson	6

Table 7 provides the bivariate correlations of live tortoise encounters with burrow, scat, TCS, and carcass counts on individual transects for surveys conducted in 1998.

Sites: Unknown   Year: 1998

Tortoise vs	Burrows	Scats	TCS	Carcasses	N
All	0.29**	0.14**	0.23**	-0.004	876
Low TCS	0.28**	0.089*	0.22**	0.029	662
High TCS	0.21**	-0.007	0.12	-0.084	214
0-1 TCS	0.13*	-0.052	0.055	-0.038	308
2-3 TCS	0.15*	-0.081	0.11	0.013	192
4-6 TCS	0.22**	-0.27**	-0.13	-0.014	162
7-9 TCS	0.11	-0.058	0.11	-0.17	93
>9 TCS	0.27**	-0.032	0.14	-0.020	121

Table 7. Pearson's Product Moment Correlation Coefficient of LIVE TORTOISES with four tortoise sign parameters: burrows, scats, TCS, and carcasses. N is the sample size.

* indicates statistical significance (P<0.05)

** indicates high statistical significance (P<0.01)

Table 8 represents randomly selected subsets of transect data from the DWMA database. Ten bivariate correlation analyses were performed for **each** of six subsets of data from the original data. The data subsets represented approximately 2%, 3%, 5%, 10%, 20%, and 50% of the original data.

Tortoise vs	Burrows	Scats	TCS	N
2% of Data	0.48**	0.43**	0.48**	31
	0.086	-0.11	-0.045	28
	0.60**	0.43**	0.54**	30
	0.54**	0.43**	0.50**	33
	0.45**	0.45**	0.49**	28
	0.37	0.12	0.32	27
	0.094	0.060	0.072	34
	0.57**	0.41**	0.53**	25
	0.074	0.20	0.16	24
	0.38	-0.16	0.049	22

Tortoise vs	Burrows	Scats	TCS	N
3% of Data	0.26	0.088	0.16	35
	0.57**	0.26	0.43**	35
	0.60**	0.20	0.41**	43
	0.33*	0.15	0.24	42
	0.39*	0.25	0.38*	37
	0.21	0.17	0.20	53
	0.097	0.51	0.23	42
	0.26	0.28	0.29	42
	0.39*	0.40**	0.44**	42
	0.25	0.28	0.29	33

Table 8. Randomly generated subsets of the DWMA database. Ten bivariate correlation analyses were performed for **each** of six subsets of data. The data subsets represent 2%, 3%, 5%, 10%, 20%, and 50% of the original sample transects. Statistical significance as in Table 7.

Tortoise vs	Burrows	Scats	TCS	N
5% of Data	0.42**	0.32**	0.42**	83
	0.47**	0.32**	0.39**	65
	0.43**	0.037	0.23	52
	0.35**	0.40**	0.42**	59
	0.46**	0.14	0.27*	73
	0.21	0.16	0.20	57
	0.34**	0.44**	0.47**	68
	0.33*	0.13	0.21	59
	0.16	0.42**	0.42**	72
	0.26*	0.18	0.24	67

Tortoise vs	Burrows	Scats	TCS	N
10% of Data	0.31**	0.21*	0.28**	122
	0.35**	0.18*	0.28**	155
	0.37**	0.24**	0.32**	147
	0.35**	0.20*	0.27**	138
	0.47**	0.13	0.30**	132
	0.39**	0.30**	0.37**	140
	0.35**	0.039	0.17	133
	0.23**	0.17	0.22*	130
	0.39**	0.36**	0.40**	136
	0.31**	0.16	0.25**	121

Table 8. **(continued)**

Tortoise vs	Burrows	Scats	TCS	N
20% of Data	0.39**	0.27**	0.35**	266
	0.21**	0.15*	0.21**	285
	0.44**	0.19**	0.32**	252
	0.30**	0.13*	0.22**	283
	0.32**	0.083	0.20**	270
	0.34**	0.25**	0.33**	256
	0.33**	0.25**	0.33**	263
	0.38**	0.26**	0.35**	275
	0.35**	0.21**	0.29**	272
	0.33**	0.19**	0.27**	263

Tortoise vs	Burrows	Scats	TCS	N
50% of Data	0.34**	0.17**	0.26**	678
	0.36**	0.22**	0.30**	671
	0.37**	0.20**	0.30**	645
	0.35**	0.16**	0.25**	685
	0.41**	0.24**	0.33**	655
	0.45**	0.25**	0.36**	660
	0.36**	0.20**	0.28**	641
	0.30**	0.19**	0.26**	701
	0.36**	0.16**	0.26**	667
	0.33**	0.17**	0.25**	672

Tortoise vs	Burrows	Scats	TCS	N
100% of Data	0.37**	0.20**	0.29**	1352

Table 8. **(continued)**

Examination of the three data sets (Tables 5, 6, 7) reveals that tortoise encounters on transects are typically strongly correlated with burrow counts. Only 3 of 29 analyses do not possess a significant correlation, and two of these are on transects that had fewer than four TCS. On the other hand, 14 of 29 for scats and 15 of 29 for TCS do not show significant correlations. In all three data sets, when all transects were analyzed and the largest sample size was available, tortoise encounters were strongly correlated with any measure of sign count: burrows, scats, or TCS. Carcasses never had a significant correlation with live tortoise encounters on transects (0 for 29).

It was of interest to explore the effects of smaller sample sizes on the correlation of tortoise encounters with transect sign counts (Table 8), and the results were surprising. Note that sample sizes with approximately 20% of the original number of transects gave comparable results to the complete data set – burrows, scats, and TCS were all strongly correlated with tortoise counts. At 10% of the original data, burrows still maintained their strong correlation with tortoises, but TCS and especially scats were losing statistical significance. The number of significant correlation coefficients decreased as sample size decreased. Surprisingly, even at 2% of the original data half of the 10 analysis runs showed highly significant correlations of tortoises and their sign, including burrows, scats, and TCS!

Graphical Representations of Desert Tortoises and Their Sign at the Four DWMAs, Calibration Plots, and 1998 Surveys

Live tortoises found on transects were significantly correlated with burrows, scats, and TCS, but especially with burrows (Tables 5, 6, 7, 8). Correlations were commonly significant at the $P<0.01$ level. Nevertheless, the actual bivariate correlation coefficients were not particularly high, typically possessing values of 0.2 to 0.5. Correlations of this magnitude can be very highly significant when sample sizes are high. The reason for this is directly due to the reality that tortoise encounter rates on transects are very rare. Even in areas of the Mojave Desert that were known to possess "optimal" habitat and therefore tortoise densities, such as DWMAs and Calibration Plots, transect encounter rates were very low. Table 9 gives tortoise encounter rates along 2852 transects surveyed in the four DWMAs, Calibration Plots, and in the 1998 database. Note that more than three live tortoises were never encountered on a single transect, and three tortoises were only encountered a single time (0.035 percent), despite the total sample size of 2852 transects. This translates to 4278 miles (6883 km) of search transects. Tortoises were not encountered in 91 percent of the surveyed transects, a single tortoise was found on only seven percent, while two tortoises were only encountered one percent of the time.

The rarity of tortoise encounters on survey transects is well know among tortoise surveyors, and these results were not surprising. These results motivated the analysis and graphical representations presented in this section.

Databases	Year	Number of Transects	Number of Tortoises Found on 1.5 Mile Transects (Frequency in Percent)					
Sites			0	1	2	3	>3	Missing Data
DWMAs	1999 and 2001	1352	1264 (93.5)	77 (5.7)	11 (0.8)	0	0	18 (not included in total)
Calibration Plots	1998-1999-2001	624	557 (89.3)	57 (9.1)	9 (1.4)	1 (0.2)	0	0
Unknown	1998	876	787 (89.8)	76 (8.7)	13 (1.5)	0	0	0
All	All	2852	2608 (91.4)	210 (7.4)	33 (1.2)	1 (0.035)	0	

Table 9. Encounter rates of live desert tortoises on 1.5 mile transects using three databases and based on three years of effort. Data cells are number of tortoises and frequencies (in percent) are in parentheses. Note that more than three tortoises were never encountered on a single transect, and three tortoises were only encountered a single time, despite the total sample size of 2852 transects.

Figures 3 to 11 show the relationship between live tortoise encounters and tortoise sign on 1.5 mile survey transects. Figures 3 to 5 are data from the DWMAs and associate tortoises and burrows at Low and High TCS classes (Figure 3), and at a finer division of five TCS classes (Figure 4). Figure 5 associates tortoises and scats at five classes of burrow encounters. Figures 6 to 8 show the corresponding representations for the Calibration Plot transects. Similarly, Figures 9 to 11 show the corresponding representations for the 1998 database. An inspection of Figures 3 to 11 clearly reveals that there is a consistent and reliable relationship between tortoise encounters and both burrows and scats on survey transects. These figures represent graphical depictions of the correlation analyses presented in the previous section (Tables 5, 6, 7).

Figure 12 shows the relationship of tortoise and burrow encounter rates with Distance Sampling tortoise density estimates at the four DWMAs. The Distance Sampling data are from Figure 1. With the exception of the very high tortoise encounter rate at the Pinto Mountain DWMA, all three metrics are reasonably similar. The small sample size at Pinto Mountain was most likely responsible for the outlier datum.

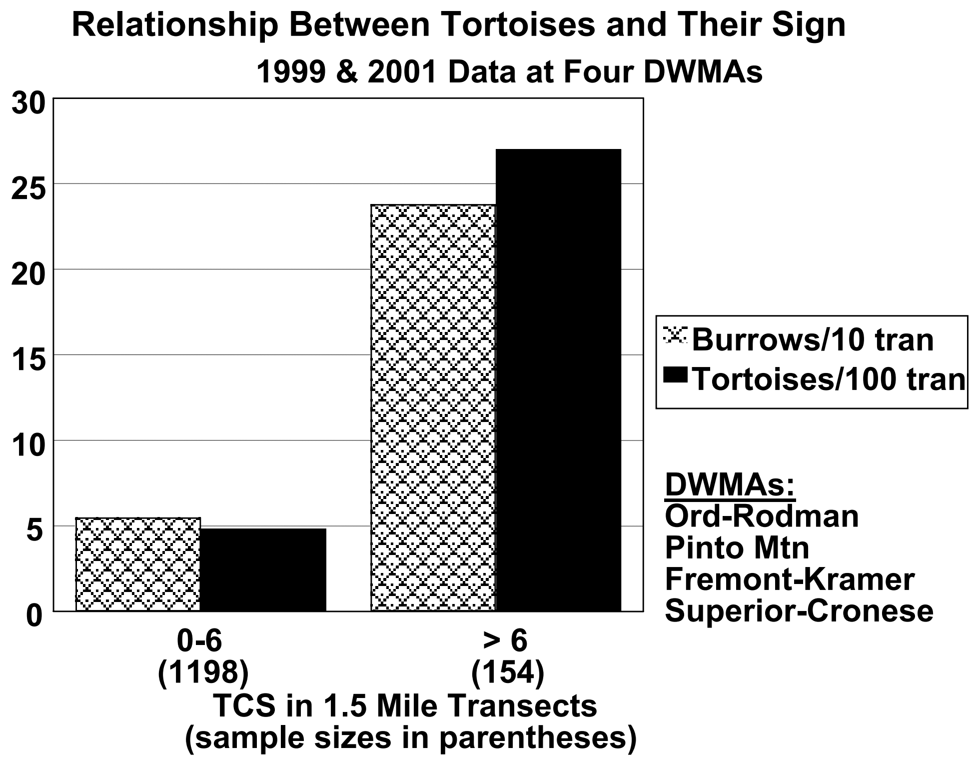

Figure 3. Relationship between tortoises and burrows at the four DWMAs, based on two classes of TCS counts.

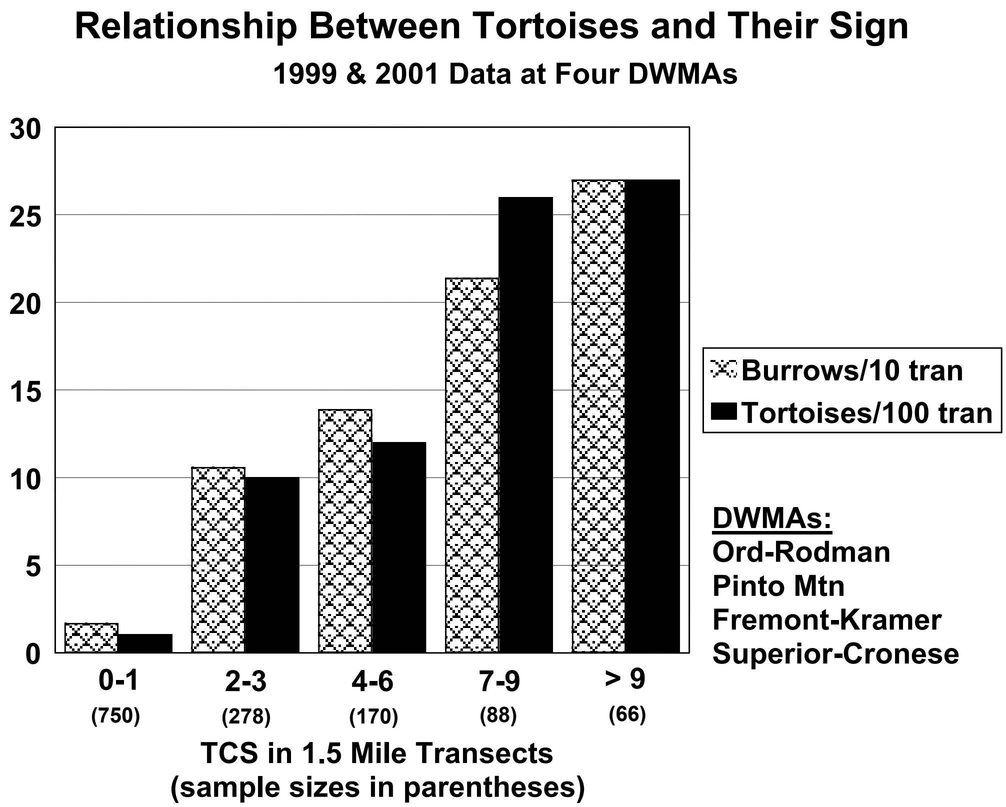

Figure 4. Relationship between tortoises and burrows at the four DWMAs, based on five classes of TCS counts.

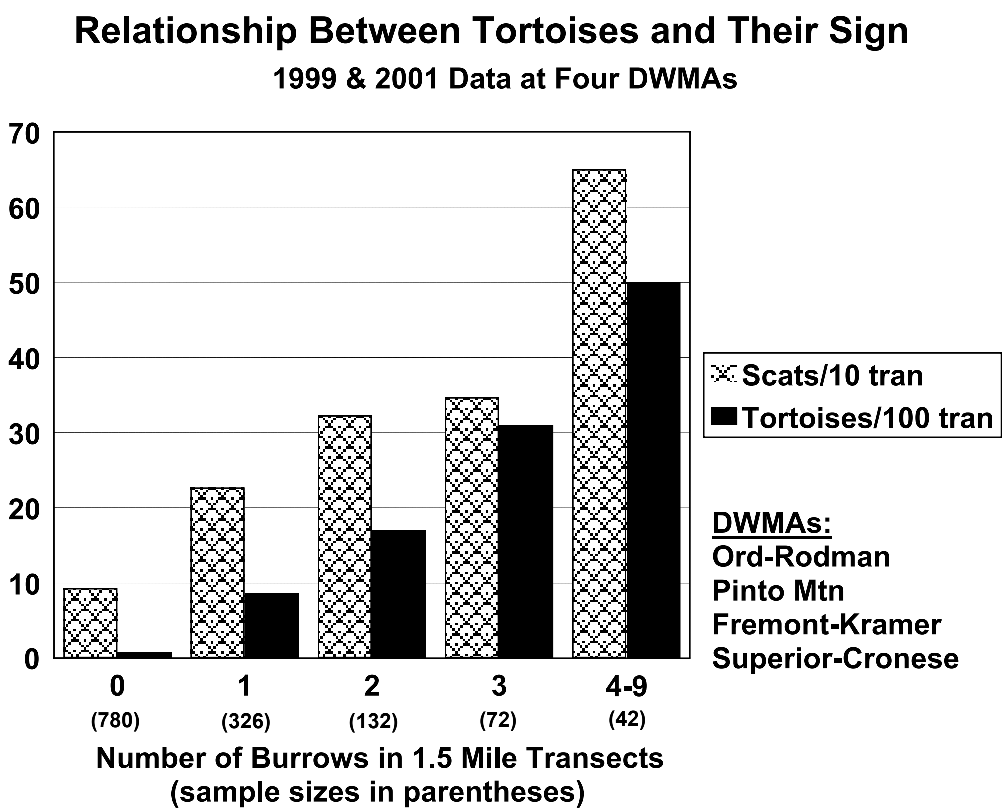

Figure 5. Relationship between tortoises and scats at the four DWMAs, based on five classes of burrow counts.

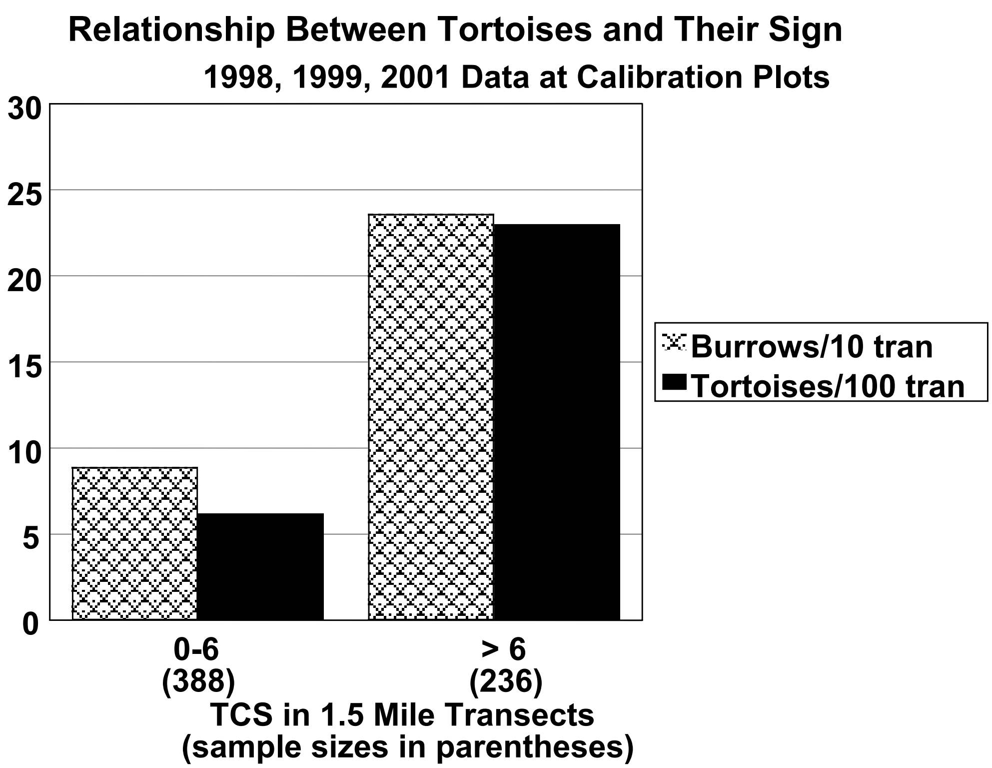

Figure 6. Relationship between tortoises and scats at the Calibration Plots (see Table 6 for Calibration Plot identification), based on two classes of TCS counts.

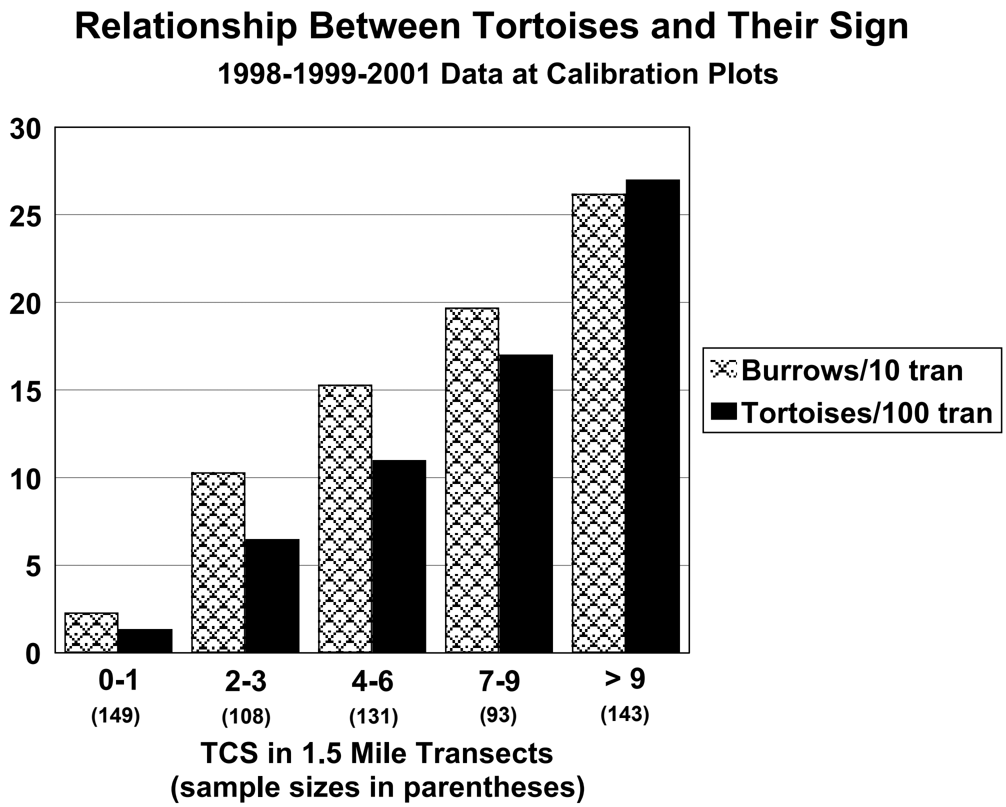

Figure 7. Relationship between tortoises and burrows at the Calibration Plots (see Table 6 for Calibration Plot identification), at five classes of TCS counts.

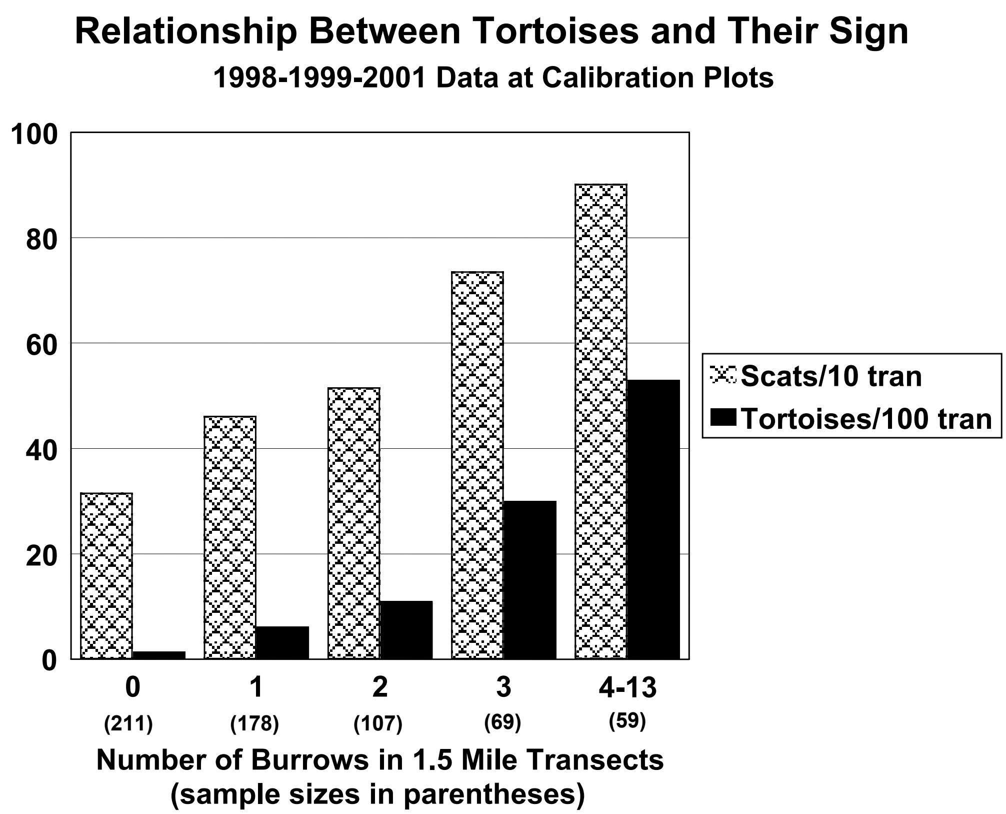

Figure 8. Relationship between tortoises and scats at the Calibration Plots (see Table 6 for Calibration Plot identification), at five classes of burrow counts.

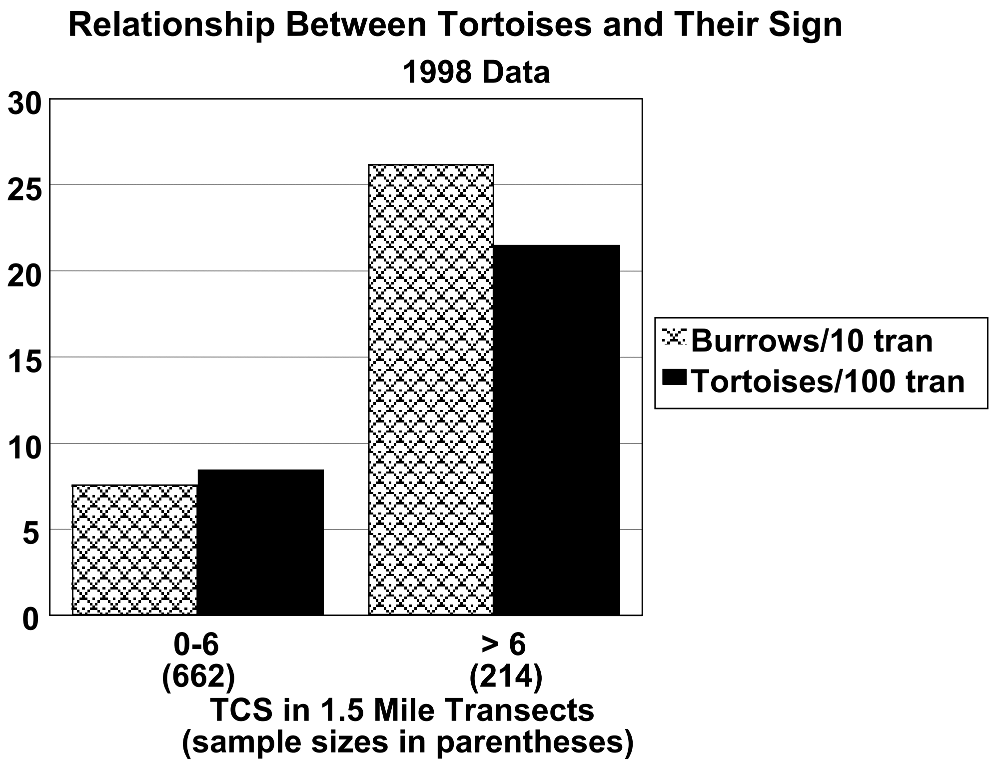

Figure 9. Relationship between tortoises and burrows at 1998 survey transects (Sites not identified in database), at two classes of TCS counts.

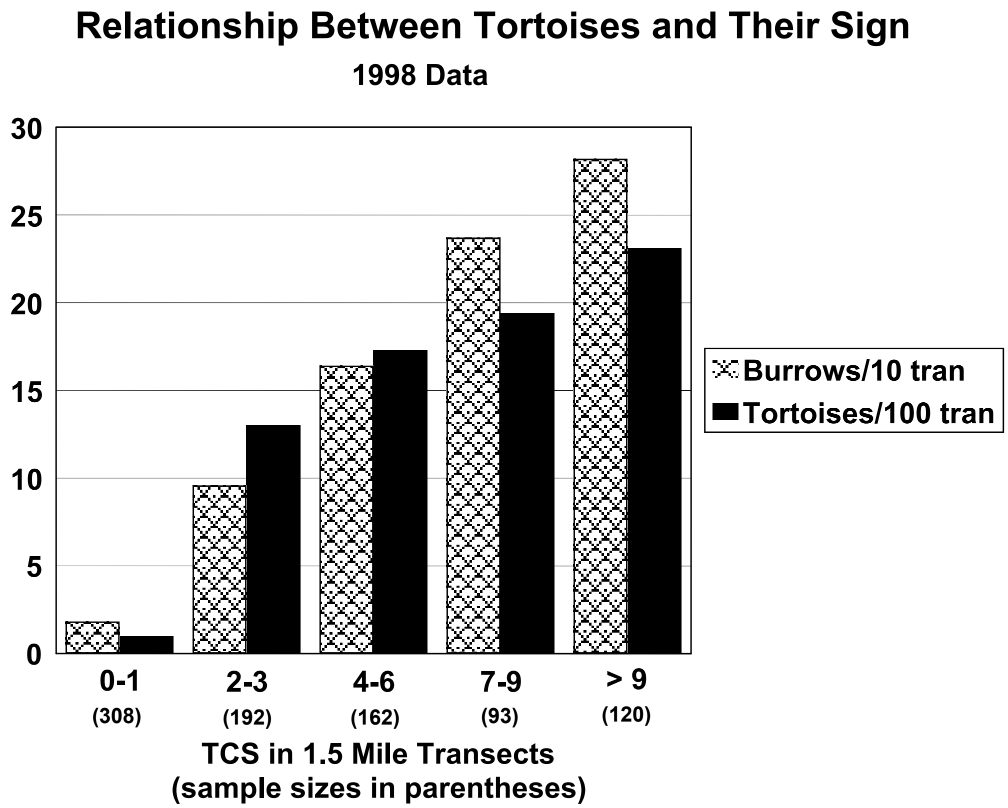

Figure 10. Relationship between tortoises and burrows at 1998 survey transects (Sites not identified in database), at five classes of TCS counts.

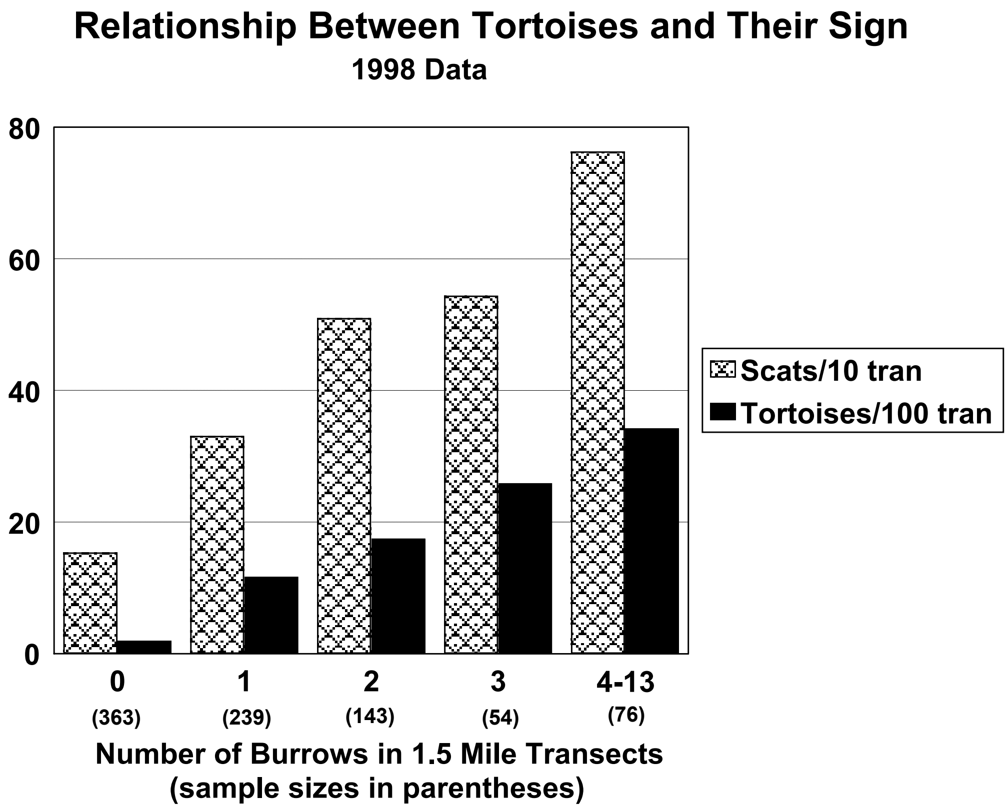

Figure 11. Relationship between tortoises and scats at 1998 survey transects (Sites not identified in database), at five classes of burrow counts.

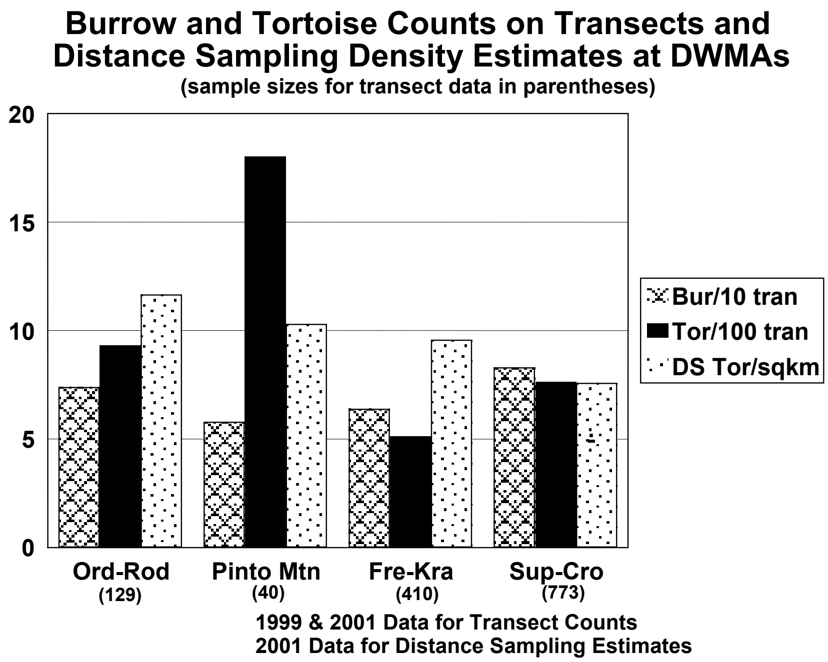

Figure 12. Tortoise and burrow counts on transects compared to Distance Sampling tortoise density estimates at the DWMAs.

Discussion and Conclusions

Desert Tortoises and Their Sign

Desert tortoises should be closely associated with their sign – burrows and scats. Desert tortoises possess relatively small home ranges even in highly productive years (averaging < 8 ha), and this home range dramatically decreases even further in a drought year (averaging < 3 ha) (Duda et al. 1999). Within their home range they build 2-11 burrows/tortoise in a productive year, and 1-6/tortoise in a drought year (Duda et al. 1999). Based on their dedication to small home ranges, and because tortoises spend a major portion of their lives in burrows, particularly during drought years and unfavorable weather conditions (Duda and Krzysik 1998), it is intuitive that tortoise signs (i.e. burrows and scats) have traditionally represented surrogates for actual live tortoises. Typically, desert tortoise surveys have summed burrow counts and "independent" scat counts to produce TCS, total corrected sign.

Analysis of Variance

Burrow counts were statistically similar at all DWMAs for both 1999 and 2001. Interestingly, when only high (>6) TCS transects were analyzed, Superior – Cronese had higher burrow counts than Fremont – Kramer. Pinto Mountain did not have any high TCS transects.

Scat and TCS counts produced similar results in ANOVA, because TCS is usually dominated by scat counts (Krzysik, data on file). Pinto Mountain had lower scat counts than the other DWMAs in 1999, and when considering only Low TCS transects. Pinto Mountain was not represented in 2001 nor in high TCS transects. In 2001, Superior – Cronese had higher scat counts than Fremont – Kramer. However, when high TCS transects were analyzed all DWMAs had similar scat counts. Detailed analysis results for both scats and TCS are presented in the **Appendix**.

Live tortoise counts were statistically similar at all DWMAs, for both 1999 and 2001, and for both low and high TCS transects. However, statistical interpretation can be quite tenuous, because of the high variability and low sample sizes associated with finding tortoises on survey transects.

Carcass counts were highest at Fremont – Cramer and Superior – Cronese. The following ranking of carcass counts were established by statistical significance:

Fremont – Cramer > Superior – Cronese > (Ord – Rodman = Pinto Mountain)

Ord – Rodman and Pinto Mountain had the highest Distance Sampling estimated tortoise densities. However, the ANOVA results of live tortoise and burrow encounters on surveys, and the significant overlap in standard error and 95% confidence intervals for the Distance Sampling estimates (Figures 1 and 2), strongly suggests that tortoise densities were similar at the four DWMAs.

Correlation Analyses

Despite the acknowledged difficulty of observing live desert tortoises on survey transects (Table 9), and the very high variability of tortoise sign (burrows and scats) among transects, there was a highly significant correlation ($P<0.01$) of live tortoises with burrows, scats, and TCS for all three databases (DWMAs, Calibration Plots, and the 1998 data set), see respectively, Tables 5, 6, and 7. When the data were further classified by the abundance of TCS counts (both into two and five classes), the results of the correlation analysis clearly showed that only burrows consistently provided a highly significant correlation with tortoise counts. Scat and TCS counts were inconsistently and unreliably correlated with live tortoises. Scat counts would occasionally produce significant **negative** correlations with tortoise counts, and this was observed in all three data sets.

The effect of sample sizes on analyses results were explored by randomly sampling 2, 3, 5, 10, 20, and 50 percent of the original data, and then conducting ten correlation analyses on each of the derived data sets. The motivation was to directly assess the relative effects that smaller sample sizes had on statistical significance and the original bivariate correlation analyses results. Once again, even with smaller sample sizes, burrows were more consistent and reliable correlates of tortoise counts than scats or TCS. The surprising result of this exercise was that analyses results were not as sensitive to sample sizes as first anticipated. Burrow counts produced highly significant and reliable correlations with tortoise counts when only 10 percent of the original data was used in the analyses (Table 8). These results provide compelling evidence that burrows are a more consistent and reliable surrogate for tortoise counts than scats or the combination of burrows + scats (TCS). The current analysis extends and reinforces the similar conclusions reached in the first two reports (Krzysik 2002a, 2002b). Additionally, Stepwise Linear Regression demonstrated that burrow counts were the only predictor variable necessary to explain the variability of tortoises on transects, and neither scat nor TCS counts contributed significant information to the regression (Krzysik 2002b).

Carcass counts were not correlated with transect live tortoise counts. A priori, everything else being equal, one would expect that DWMAs with higher tortoises densities would also possess higher carcass densities (a significant positive correlation), assuming mortality rates are similar. DWMAs that suffered higher tortoise mortality should show a negative correlation between live tortoises and carcasses. The carcass correlation data suggest that **BOTH** tortoise densities and tortoise mortality rates are similar at the DWMAs. However, the ANOVA data suggest that carcass counts were higher at both Fremont – Cramer and Superior – Cronese.

Graphical Representations of Desert Tortoises and Their Sign

An inspection of Figures 3 through 11 clearly reveals a persistent pattern of the consistent relationship between tortoise transect encounters and both burrow and scat counts on surveyed transects, and directly reflects the quantitative results of the bivariate correlation analysis (Tables 5, 6, and 7). There is a striking similarity in this pattern when one compares the three different databases. Figures 3, 6, and 9 demonstrate the close relationship between tortoises and burrows when transects are divided into Low and High TCS counts. Simply put, transects with high TCS counts also had higher burrow counts and were much more likely to encounter a live tortoise. The converse was noted for Low TCS count transects. This is not merely attributed to burrow counts influencing TCS, because TCS is primarily influenced by scat counts (Krzysik, on file data analysis). Therefore, transects with high scat counts, also possessed high burrow counts, and a greater likelihood of encountering the rare event of finding a tortoise.

Figures 4, 7, and 10 demonstrate a similar comparison when the TCS counts are more finely classified into five TCS classes. In all three databases, a similar and consistent pattern emerges. Tortoise and burrow encounters are extremely rare on transects that possess either single or no TCS counts. When TCS counts increased, burrow and tortoise encounters **BOTH** increased in a comparable and parallel pattern. The increase in burrows and tortoises followed a particularly "linear pattern" at the Calibration Plots (Figure 7) and with the 1998 data (Figure 10). The DWMA sites almost depict a trimodal distribution with 0-1, 2-6, and >6 TCS counts (Figure 4). Figures 7 and 10 could also be "forced" into a trimodal distribution of TCS classes.

Figures 5, 8, and 10 associate tortoise and scat encounters based on transects classified by burrow counts. Similarly, as in the previous two comparisons, the persistent pattern is retained. Transects where burrows were not observed possessed the lowest scat counts and tortoise encounters were very rare. As burrow counts on transects increased, so did the likelihood of encountering tortoises and observing higher scat counts. Two important insights were obtained from these last three figures. Even when burrows were not encountered on a transect, significant scat counts could be recorded. Also note that the increasing scat count histograms in these figures are "flatter" than the tortoise or burrow histograms in any of the nine figures discussed. I interpret these observations to suggest that scat counts are not as reliable as burrows in relating to tortoise counts. This is due to scats higher variability, both in space and in time, and in observer detection.

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Appendix

ANOVA results of DWMA comparisons. The column on the right provides statistical significance. NS = Not Statistically Significant ($P>0.05$).

Scats

1999 and 2001

All TCS Classes

Fremont – Kramer > Pinto Mtn	<0.001
Ord – Rodman > Pinto Mtn	<0.001
Superior – Cronese > Pinto Mtn	<0.001

TCS LOW (0-6)

Ord – Rodman > Fremont – Kramer	0.028
Ord – Rodman > Pinto Mtn	<0.001
Superior – Cronese > Pinto Mtn	0.006

TCS HIGH (>6)

NS	**0.55**

1999

All TCS Classes

Fremont – Kramer > Pinto Mtn	<0.001
Ord – Rodman > Pinto Mtn	<0.001
Superior – Cronese > Pinto Mtn	<0.001

TCS LOW (0-6)

Fremont – Kramer > Pinto Mtn	0.001
Ord – Rodman > Pinto Mtn	<0.001
Superior – Cronese > Pinto Mtn	0.005

TCS HIGH (>6)

NS	**0.47**

2001

All TCS Classes

Superior – Cronese > Fremont – Cramer	0.002

TCS

1999 and 2001

All TCS Classes

Fremont – Kramer > Pinto Mtn	<0.001
Ord – Rodman > Pinto Mtn	<0.001
Superior – Cronese > Pinto Mtn	<0.001

TCS LOW (0-6)

Ord – Rodman > Pinto Mtn	0.002
Superior – Cronese > Pinto Mtn	0.013

TCS HIGH (>6)

NS	**0.64**

1999

All TCS Classes

Fremont – Kramer > Pinto Mtn	<0.001
Ord – Rodman > Pinto Mtn	<0.001
Superior – Cronese > Pinto Mtn	<0.001

TCS LOW (0-6)

Fremont – Kramer > Pinto Mtn	0.007
Ord – Rodman > Pinto Mtn	0.003
Superior – Cronese > Pinto Mtn	0.009

TCS HIGH (>6)

NS	**0.73**

2001

All TCS Classes

Superior – Cronese > Fremont – Cramer	0.002

Burrows

1999 and 2001

All TCS Classes

NS	**0.13**

TCS LOW (0-6)

NS	**0.91**

TCS HIGH (>6)

Superior – Cronese > Fremont – Cramer 0.023

1999

All TCS Classes

NS **0.53**

TCS LOW (0-6)

NS **0.97**

TCS HIGH (>6)

Superior – Cronese > Fremont – Cramer 0.013

2001

All TCS Classes

NS **0.078**

Tortoises

1999 and 2001

All TCS Classes

NS **>0.41**

TCS LOW (0-6)

NS **>0.27**

TCS HIGH (>6)

NS **0.63**

1999

All TCS Classes

NS	**0.20**

TCS LOW (0-6)

NS	**>0.36**

TCS HIGH (>6)

NS	**0.60**

2001

All TCS Classes

NS	**>0.05**

Carcasses

1999 and 2001

All TCS Classes

Fremont – Kramer > Ord – Rodman	<0.001
Fremont – Kramer > Pinto Mtn	<0.001
Fremont – Kramer > Superior – Cronese	0.005
Superior – Cronese > Ord – Rodman	0.001
Superior – Cronese > Pinto Mtn	0.046

TCS LOW (0-6)

Fremont – Kramer > Ord – Rodman	<0.001
Fremont – Kramer > Pinto Mtn	<0.001
Fremont – Kramer > Superior – Cronese	0.002
Superior – Cronese > Ord – Rodman	0.001

TCS HIGH (>6)

NS	**0.94**

1999

All TCS Classes

Fremont – Kramer > Ord – Rodman	0.001
Fremont – Kramer > Pinto Mtn	0.002
Superior – Cronese > Ord – Rodman	0.021
Superior – Cronese > Pinto Mtn	0.043

TCS LOW (0-6)

Fremont – Kramer > Ord – Rodman	<0.001
Fremont – Kramer > Pinto Mtn	0.002
Superior – Cronese > Ord – Rodman	0.012

TCS HIGH (>6)

NS	**0.89**

2001

All TCS Classes

Fremont – Kramer > Ord – Rodman	<0.001
Fremont – Kramer > Superior - Cronese	0.021
Superior – Cronese > Ord – Rodman	<0.001

Appendices

APPENDIX L

MISCELLANEOUS TORTOISE BACKGROUND DATA

Appendices

MISCELLANEOUS TORTOISE BACKGROUND DATA

Appendix L presents a discussion of additional background material concerning the desert tortoise, field surveys, observations made during those surveys and other data that supports Chapter 3's treatment of the tortoise. The appendix addresses the following topics:

- Federal Lead Agencies and Tortoises Handled and Accidentally Killed
- Tortoise Sign Counts
- Revised Desert Tortoise Range Map (2002)
- Symptoms of URTD and Shell Disease Observed During Sign Count Surveys
- Carcass Observation Analysis
- Relative tortoise Occurrence in Open Areas

L.1 FEDERAL LEAD AGENCIES AND TORTOISES HANDLED AND ACCIDENTALLY KILLED

Of the 133 biological opinions issued in California, 101 led to ground disturbance when projects were developed, resulting in the loss of 53 tortoises (LaRue and Dougherty 1998). Table L-1 summarizes the federal lead agencies associated with these 101 projects.

Table L-1
Federal Lead Agencies And Tortoises Handled And Accidentally Killed During Construction Of 101 Projects In California Between 1990 And 1995

FEDERAL LEAD AGENCY	PROJECTS	TORTOISES HANDLED	DEAD TORTOISES
Federal Energy Reg. Comm.	1	559	38
BLM	50	317	9
Fort Irwin	2	12	4
Fed. Highway Admin.	5	9	1
China Lake NAWS	4	3	1
Farmer's Home Administration	1	3	1
Army Corps of Engineers	2	3	0
Dept. of Education	1	1	0
Dept. of Veterans Affairs	1	5	0
Edwards Air Force Base	27	10	0
NASA	4	0	0
National Park Service	1	0	0
29 Palms Marine Corps Base	3	0	0
Total	**101**	**922**	**54**

There were at least 13 federal lead agencies funding, authorizing, or carrying out projects in tortoise habitat between 1990 and 1995 in California. One biological opinion was issued to the Farmer's Home Administration, but that project had not been implemented as of the date of preparation of the 1995 report. The project, a 52-mile long water pipeline in the Copper Mountain Mesa area of San Bernardino County, was constructed late in 1995. One death was associated with construction and three tortoises were moved out of harm's way (Circle Mountain

Biological Consultants 1995). Although the Federal Energy Regulatory Commission was responsible for only one project (the Mojave-Kern River Pipeline), that one project was responsible for 72% (38 of 53 tortoises) of the documented tortoise mortality.

L.2 TORTOISE SIGN COUNTS

L.2.1 Sign Count Surveys Since 1988

Sign count surveys conducted since 1988 (see Map 3-6) provide the most recent, available data on the distribution of tortoise sign, which Dr. Anthony Krzysik (2002a, b, c; see Appendix K) has show to be positively correlated to incidence of tortoises. Over 8,100 transects have been surveyed on more that 6,300 square miles within the West Mojave planning area. These survey efforts are summarized in Table L-2.

Table L-2
Regional Tortoise Surveys Completed Since 1988

GEOGRAPHIC AREA	DATE	TRANSECTS	SQUARE MILES	LITERATURE CITATION
Outside Fort Irwin (west, east, and south)	1988	90	90	U.S. Fish and Wildlife Service 1988
Fort Irwin and Goldstone	1989	406	406	Woodman & Goodlett 1990, Krzysik 1994
California City, Rand Mountains, Fremont Valley, Spangler Hills	1990	450	150	Berry et al. 1994
China Lake Naval Air Weapons Station	1990	270	270	Kiva Biological Consulting and McClenahan & Hopkins Associates, Inc. 1990
Fort Irwin (including expansion areas)	1990	468	468	Chambers Group, Inc. 1990
Fort Irwin (including the North Alvord Slope proposed expansion area)	1992	134	134	Chambers Group, Inc. 1994
Edwards Air Force Base	1992	672	224	Mitchell et al. 1993
Edwards Air Force Base	1994	315	105	Laabs et al. 1996
Twentynine Palms Marine Corps Base	1997	850	850	GIS database provided by Marine Corps, with no associated document
West Mojave Survey	1998	875	856	Reported herein
West Mojave - Fort Irwin Survey	1999	1,553	1,291	Reported herein
Remaining West Mojave	2001 – 2002	1,453	1,329	Reported herein
Fort Irwin 2000 Expansion Area	2001	568	568	Karl 2002
Totals		**8,104**	**6,741**	

L.2.2 Methodology

Tortoise sign count data have historically been used to determine relative *tortoise densities* (Berry and Nicholson 1984; Chambers Group, Inc. 1990, 1994; Doak et al. 1994; Krzysik 1994; USFWS 1991b). For example, Berry and Nicholson (1984), using sign count data and other information, concluded that there were "...approximately 229,666 to more than 426,361 tortoises...present in the Western Mojave Region" as of that date. It has been very common in the literature for tortoise densities to be categorized as follows: 0-20, 20-50, 50-100, 100-250, and >250 tortoises/square mile. Berry's 1984 tortoise range map (Berry and Nicholson 1984) shows polygons of tortoise densities corresponding to the five categories. Results of sign count surveys have often been reported in terms of these density categories, for example (Chambers Group, Inc. 1990), "... the proposed [Fort Irwin] acquisition lands contained in this study comprise approximately 7.3 percent of all lands in the western Mojave with 21 to 50 tortoises per square mile, 14.5 percent of all lands in the western Mojave with 51 to 100 tortoises per square mile, and 4.9 percent of all lands in the western Mojave with 101 to 250 tortoises per square mile."

The method developed (reported in Berry and Nicholson 1984) required the use of tortoise density estimates that were previously determined during 60-day surveys on BLM permanent study plots. The BLM employed experienced tortoise biologists to mark all tortoises encountered during the first 30-day survey period covering the entire square mile, then had them resurvey the same plot during a second 30-day period to recapture previously-marked animals. The Lincoln-Peterson Index was then used to determine the density of tortoises occurring on that square mile.

As reported elsewhere, sign count surveys have been the primary means of assessing tortoise distribution and densities on regional scales since the mid-1970's. In each case, the tortoise biologists would survey a set of six 1.5-mile, equilateral transects on at least three of the permanent study plots, which until the early 1990's were surveyed (during the 60-day period) at about four-year intervals. Regression statistics applied to the resulting data required that the three plots include relatively low, medium, and high Total Corrected Sign (TCS) counts. In the planning area, these plots have traditionally included Fremont Peak (low), Kramer Hills (intermediate), and Lucerne Valley (high) plots.

Table L-3 shows the data that were collected at these three study plots by three different surveyors (1st column) in support of the 2001-2002 surveys completed for the West Mojave Plan. Each of the surveyors walked six 1.5-mile transects, along same compass bearings, and recorded Total Sign (outside the parenthesis in the following table) and Total Corrected Sign (inside the parenthesis). In this way, there can be direct comparisons among the surveyors to determine the relative abundance of tortoise sign (only scat and burrows are factored into TCS, although data on live animals and carcasses are recorded) on each of the plots.

Table L-3
Total Sign and Total Corrected Sign of
Tortoises Found on Three Permanent Study Plots in 2001-2002 in the WMPA

2001 FREMONT							
Surveyor	North	Northwest	West	South	Southeast	East	Totals
Boland	0 (0)	0 (0)	2 (2)	0 (0)	0 (0)	1 (1)	3 (3)
LaRue	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (2)	2 (3)
Vaughn	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)
2001 Kramer							
Surveyor	North	Northwest	West	South	Southeast	East	Totals
Boland	6 (8)	6 (6)	4 (4)	3 (3)	9 (10)	2 (2)	30 (33)
LaRue	5 (6)	6 (6)	8 (11)	6 (7)	4 (10)	10 (13)	39 (53)
Vaughn	9 (10)	5 (5)	6 (7)	5 (6)	7 (7)	6 (7)	38 (42)
2001 Lucerne							
Surveyor	North	Northwest	West	South	Southeast	East	Totals
Boland	20 (36)	3 (3)	4 (5)	14 (17)	19 (28)	15 (20)	75 (109)
LaRue	22 (39)	7 (10)	12 (21)	31 (43)	25 (37)	17 (23)	114 (173)
Vaughn	26 (37)	10 (14)	9 (15)	28 (31)	10 (12)	8 (13)	91 (122)

Although sign counts differed among surveyors, it should be apparent in the 8^{th} column that there was relatively less sign on the Fremont plot (average of 2 TCS), an intermediate number on the Kramer plot (average of 36), and relatively more on the Lucerne plot (average of 93). Given the inherent differences among surveyor's finding abilities, these data were used to calibrate the surveyor to known densities of tortoises occurring on low, medium, and high density study plot areas. A resulting, unique calibration coefficient was assigned to each surveyor. Later, when transects were surveyed throughout the region in areas of unknown tortoise densities, these coefficients were applied to each surveyor's field data (i.e., TCS), and used to estimate tortoise densities in those areas.

L.2.3 Determining Tortoise Densities from Sign Count Data

L.2.3.1 Use of Sign Count Data for West Mojave Planning Purposes

Sign count surveys are one means of sampling tortoises but are not a means of censussing tortoises, where determining absolute numbers is the goal. Krzysik (1992) has concluded that the standard sign count transect effectively covers about 1.3% of a given square mile, and as given above, multiple transects (at least three) are needed on a given square mile before statistically meaningful density estimates can be determined. Given budgetary restrictions and the underlying intent of determining patterns of occurrence, surveys performed in support of the planning process were necessarily restricted to either one transect per square mile (1998, non-expansion areas in 1999, and 2001-2001) or two/ square mile (1999 throughout the Fort Irwin expansion area).

The planning team decided, early on, to avoid using sign count data from these surveys to estimate tortoise densities. Instead, the data have been used to depict relative "patterns of occurrence" for tortoises throughout the planning area (West Mojave Plan Team 1999). Similarly, above-average and below-average sign counts have been used as relative measures of tortoise occurrence when deciding where protective measures are most effectively applied. Such an approach avoids valid criticisms associated with estimating tortoise densities, but does not provide a clear, understandable means of determining the relationship between higher versus lower sign counts and tortoise occurrence.

There is support in the literature for using the approach adopted by the planning team: "data are more valuable for determining the geographic distribution of tortoises" (National Ecology Research Center 1990); and, "It is important to obtain many positive and negative locality records because they best describe a species' patterns of occurrence or absence: areas with high frequency of records may indicate preferred habitats and corridors between populations, and areas with an absence of tortoises may be unsuitable habitat or barriers to gene flow...Although total sign on transects is used to estimate the density of tortoises..., we mostly used these data to document the presence or absence of tortoises" (Bury et al. 1994). Finally, Krzysik (1996) wrote that although "...the use of surrogate measures to assess or monitor wildlife populations has universally been criticized on issues of relevancy, accuracy, or precision ... statistical modeling revealed that both burrow and scat counts were strongly positively correlated with the occurrence of tortoises on survey transects."

L.2.3.2 2002 Analyses of 1998 Through 2002 Sign Count Data

Dr. Anthony Krzysik is a statistician who has worked with tortoise sign count data since 1983 (Woodman et al. 1984), and has recently performed comparative analyses among different tortoise survey techniques for the USFWS. During 2002, he was contracted by the planning team to help analyze sign count data collected since 1998. He has provided three summary reports outlining his preliminary findings. In the second report, Krzysik's emphasis (bold font) is maintained to show the points that he originally emphasized. The major findings of these three reports are given below; the reports are reprinted in their entirety in Appendix K.

Krzysik, A. J. 1 May 2002. ***Statistical Analysis of BLM Desert Tortoise Surveys In Support of the West Mojave Management Plan: Report I: Exploratory and Initial Data Analysis (1998, 1999, and 2001 Calibration Data).***

- Despite the acknowledged difficulty of observing live desert tortoises on survey transects, and the very high variability of tortoise sign (burrows and scats) among transects, there was a highly significant correlation ($P<0.01$) of live tortoises with burrows, scats, and TCS. Although in most cases the actual correlation coefficient does not appear to be particularly high, the large sample sizes involved make the relationship highly statistically significant. These results can be interpreted in the following general ways: (a) Transects associated with live tortoises are typically also associated with appreciable sign counts; and (b) Live tortoises are found to a much smaller extent on transects possessing little or no tortoise sign.

- A number of important patterns were evident from the correlation analyses: (a) The correlation analysis results were similar for all three data sets that were examined (i.e., Calibration Areas, 1998+1999+2001, 1998 tortoise survey areas, and 1999 tortoise survey areas), again possibly attributable to the high sample sizes; (b) Burrows had the highest correlation with tortoises, while scats had the lowest correlation; (c) Tortoises were not correlated with carcasses; (d) With a few exceptions, carcasses were not correlated with tortoise sign; and (e) As expected, TCS was strongly correlated with scat, because on a given transect, scat counts are usually much higher than burrow counts.

- The result of this analysis [Step-Wise Linear Regression Model] clearly demonstrated that burrow counts were the only predictor variable necessary to explain the variability of tortoises on transects. Statistically, scats and TCS did not contribute significant information to the regression.

- Desert tortoises should be closely associated with their sign (i.e., burrows and scats). Based on their dedication to small home ranges, and because tortoises spend a major portion of their lives in burrows, particularly in drought years and bad weather (Duda and Krzysik 1998), it is intuitive that tortoise sign represents a surrogate for actual live tortoises.

Krzysik, A. J. 19 June 2002. ***Statistical Analysis of BLM Desert Tortoise Surveys In Support of the West Mojave Management Plan, Report II: Statistical Comparison of DWMAs (1999 & 2001).***

- Despite the acknowledged difficulty of observing live desert tortoises on survey transects, and the very high variability of tortoise sign (burrows and scats) among transects, there was a highly significant correlation ($P<0.01$) of live tortoises with burrows, scats, and TCS for the total DWMA data set and in each of the two years [1998 and 1999].

- However, when the data were classified by the abundance of TCS, the results of the correlation analysis became interesting. On transects with high (>6) TCS, only burrows were significantly correlated with live tortoises. When the TCS counts were further delineated into five classes, burrows consistently for all five classes were significantly correlated with tortoise counts, while scat counts and TCS were inconsistent and unreliable.

- Scat counts were very unreliable, and even demonstrated **NEGATIVE** significant correlations with tortoises with TCS classes of 2-3 and 7-9. These results are very critical and interesting, because the majority of transects in any tortoise survey data set contain low sign counts, and high sample sizes may mask interesting details among gradients of sign densities.

- Carcass counts were not correlated with transect live tortoise counts. A priori, everything else being equal, one would expect that DWMAs with higher tortoises densities would also possess higher carcass densities (a significant positive correlation), assuming mortality rates are similar. DWMAs that suffered higher tortoise mortality should show a negative correlation between live tortoises and carcasses. The carcass data suggest that **BOTH** tortoise densities and tortoise mortality rates are similar in the four DWMAs analyzed.

- The result of this analysis [Stepwise Linear Regression Model] clearly demonstrated that **burrow counts were the only predictor variable** necessary to explain the variability of tortoises on transects. Statistically, scats and TCS did not contribute significant information to the regression. As in the correlation analysis, Stepwise Linear Regression reinforces the validity in using burrow counts as a surrogate for tortoise counts.

- The data presented here and other evidence suggest that tortoise burrows appear to be a better surrogate for comparisons of tortoise distribution and relative abundance patterns than either scats or TCS.

- Burrow counts (densities) were similar in all DWMAs and for both 1999 and 2001. Interestingly, when only high (>6) TCS transects were analyzed, Superior - Cronese had higher burrow counts than Fremont - Kramer. Pinto Mountain did not have any high TCS transects.

- Pinto Mountain had lower scat counts than the other DWMAs in 1999, and when considering only Low TCS transects. Pinto Mountain was not represented in 2001 nor in high TCS transects. In 2001, Superior - Cronese had higher scat counts than Fremont - Kramer. However, when high TCS transects were analyzed, all DWMAs had similar scat counts.

- Live tortoise counts were similar at all DWMAs, for both 1999 and 2001, and for both low and high TCS transects. However, statistical interpretation can be quite tenuous, because of the high variability and low sample sizes associated with finding tortoises on survey transects.

- Carcass counts were highest at Fremont - Kramer and Superior - Cronese. Depending on the specific comparisons, these two DWMAs were either similar or the former had higher carcass counts than the latter. Ord - Rodman and Pinto Mountain had lower carcass counts than the two above DWMAs, and they were similar to each other.

- Based on the available data and sample sizes, the four DWMAs appear to be similar to one another in their tortoise and sign counts, and therefore, of similar value as desert tortoise conservation areas. Although there were some statistical differences with specific comparisons of scat and carcass counts, these parameters may not be important in elucidating actual tortoise densities.

- An interesting outcome of the ANOVA analyses was that burrow counts (i.e., densities) were higher at Superior - Cronese than at Fremont - Kramer for the high TCS transects. This suggests that either Superior - Cronese tortoises possess a higher burrow/tortoise ratio, or tortoises are more abundant at this DWMA.

Of the many conclusions given above, for this discussion, Krzysik's findings that tortoise sign counts are a relatively good estimator of tortoise abundance is considered sufficient evidence to (a) continue to use above-average sign counts as an indicator of relatively high tortoise abundance and (b) the data are useful in determining relative tortoise occurrence, even though they are not being used as a means to estimate tortoise densities.

L.3 REVISED DESERT TORTOISE RANGE MAP

Survey data were used to produce an updated range map of current tortoise distribution (See Map 3-9). The 1984 range map identified approximately 11,255 mi^2 (7,203,107 acres) of tortoise habitat, whereas 11,134 mi^2 (7,125,842 acres) are identified in the 2002 Tortoise Range Map, which represents a reduction of about 121 mi^2. Each of these figures over-estimates occupied tortoise habitat, as dry lake playas, elevations above about 4,500 feet, and other marginal or unsuitable habitats are included within both range lines. They do not imply anything about the relative densities occurring in the older and more recent ranges. Map 3-9 depicts three regions within the 2002 tortoise range: reduction areas, expansion areas, and areas requiring more surveys.

Map 3-9 depicts three regions within the 2002 tortoise range: reduction areas, expansion areas, and areas requiring more surveys. The *range reduction areas* occur to the south and southwest, where presence-absence data suggest tortoises have been extirpated from about 1,092 mi^2 between Lucerne Valley and the Antelope Valley. Not all extirpations are recent. There are no available data to suggest that the southern and western portions of Antelope Valley supported tortoises when they were included in the 1984 range map. However, 1995 aerial photography clearly shows that most of the area is active or fallow agriculture, and therefore not suitable habitat. This does not represent a range reduction since 1984, but does provide a relatively accurate picture of historically occupied habitats that are no longer occupied.

The *range expansion area* is primarily to the north on Fort Irwin, China Lake, and on BLM-managed lands to the west and northwest. These are not new regions that have become occupied since 1984; they were likely occupied then as well. Data collected in the 1970's, 1988 on China Lake, and in 1999 up to Rose Valley along Highway 395 clearly show that some evidence of tortoise has been found north of the 1984 range line. In 2002, tortoise biologists (i.e., Peter Woodman, Dave Silverman, and Denise LaBerteaux) and land managers (i.e., Mickey Quillman of Fort Irwin, Tom Campbell of China Lake, and Bob Parker of Ridgecrest, BLM) were shown maps with available sign count data, 1984 range line, 20% slopes, and various other GIS coverages. Each provided comments that helped LaRue refine the northern boundary.

The *areas needing more survey* occur north of Rose Valley in Inyo County, north of Highway 138 in the Antelope Valley of Kern County, and in the vicinity of Pioneertown, north-northwest of Yucca Valley in San Bernardino County. As the name implies, there is some potential for tortoises to occur in these areas, but more focused surveys are needed before a relatively accurate range line can be delineated.

Alternative A's *No Survey Areas* within the 2002 range line are recently or historically occupied areas that apparently no longer support tortoises, based on the best available data. Presence-absence survey data, digitized structures from 1995 aerials, and personal knowledge (LaRue, pers. comm.) were the primary sources of information used to delineate these areas, particularly to the south. Agricultural fields were excluded, which affected substantial regions around Barstow, Hinkley, and the region bounded by Interstates 15 and 40, east to Troy Dry Lake. Non-vegetated portions of playas, delineated from 1995 aerial photography, are included in this designation.

Alternative A's *Survey Areas* occur both inside and outside proposed DWMAs. In most cases, sign count data were used inside DWMAs and other regions (i.e., BLM open areas, public lands in the ITA, etc.), and presence-absence data were used for urbanizing areas and less developed regions in all four counties. Areas needing more survey are included, but there is no evidence that tortoises occur. Otherwise, there is an assumption that tortoises may be found throughout designated Survey Areas.

L.4 SYMPTOMS OF URTD AND SHELL DISEASE OBSERVED DURING SIGN COUNT SURVEYS

During sign count surveys in the fall and winter of 1998 through 2002, disease symptoms were observed in 7 of the 275 (2.5%) tortoises inspected. During distance sampling surveys in the spring of 2001 and 2002 in the Fremont-Kramer and Superior-Cronese DWMAs, 6 of the 216 (2.8%) tortoises inspected showed clinical evidence of disease. These very similar, independently derived results (i.e., 2.5% versus 2.8% of the tortoises observed) are summarized in Table L-4.

Table L-4. Symptoms of URTD and Shell Disease Observed During Sign Count Surveys (1998-2001) and Distance Sampling Surveys (Fremont-Kramer and Superior-Cronese in 2001-2002)

<table>
<tr><th rowspan="2">SURVEY TYPE & YEAR</th><th colspan="2">TORTOISES OBSERVED</th><th rowspan="2">DISEASE TYPE[1]</th><th rowspan="2">COMMENTS</th></tr>
<tr><th>Gender</th><th>Age Class</th></tr>
<tr><td>Sign Count 1998</td><td>Male</td><td>Adult</td><td>URTD</td><td>Nares damp, eyes moist, chin glands enlarged</td></tr>
<tr><td>Sign Count 1999</td><td>Male</td><td>Adult</td><td>URTD</td><td>Puffy eyelids</td></tr>
<tr><td>Sign Count 2001</td><td>Male</td><td>Adult</td><td>URTD</td><td>Labored breathing, swollen eyelids</td></tr>
<tr><td>Sign Count 2001</td><td>Male</td><td>Adult</td><td>URTD</td><td>Nose clear, but wheezy</td></tr>
<tr><td>Sign Count 2001</td><td>Male</td><td>Adult</td><td>URTD</td><td>Wet around the eyes</td></tr>
<tr><td>Dist. Samp. 2001</td><td>Male</td><td>Adult</td><td>URTD</td><td>Exudate in left nare</td></tr>
<tr><td>Dist. Samp. 2001</td><td>Female</td><td>Adult</td><td>URTD</td><td>Raspy breathing</td></tr>
<tr><td>Dist. Samp. 2002</td><td>Male</td><td>Adult</td><td>URTD</td><td>Chin glands and eyes swollen</td></tr>
<tr><td>Dist. Samp. 2002</td><td>Male</td><td>Adult</td><td>URTD</td><td>Included in “nose discharge” in spread sheet</td></tr>
<tr><td>Sign Count 1999</td><td>Male</td><td>Adult</td><td>Lesions</td><td>Severe lesions on 60% of the carapace; no URTD</td></tr>
<tr><td>Sign Count 1998</td><td>Female</td><td>Adult</td><td>Lesions</td><td>Lesions on gular</td></tr>
<tr><td>Dist. Samp. 2002</td><td>Female</td><td>Adult</td><td>Lesions</td><td>Trauma and dyskeratosis slight</td></tr>
<tr><td>Dist. Samp. 2002</td><td>Female</td><td>Adult</td><td>Lesions</td><td>Appears that tort has been chewed on, but it could be from shell disease as well. Damage not severe.</td></tr>
<tr><td rowspan="2">TOTALS</td><td>8 MALE
1 Female</td><td>9 Adults</td><td>URTD</td><td rowspan="2"></td></tr>
<tr><td>1 MALE
3
FEMALE</td><td>4 Adults</td><td>Lesions</td></tr>
</table>

L.5 CARCASS OBSERVATION ANALYSIS

L.5.1 Overview

Carcass data were collected during the 1992 – 2002 sign count surveys and distance sampling surveys (2001 and 2002 in Fremont-Kramer and Superior-Cronese DWMAs). The results are summarized below.

Age Class of Carcasses: Sign count data included 1,033 carcasses. Age class was determined for 966 (94%) and could not be determined for 67 (6%). Of the 966 carcasses where age class was given, 809 (84%) were adults and 157 (16%) were subadults. Distance sampling data included 764 carcasses, where age class was given for 460 (60%) and not given for 304 (40%)[2]. Of the 460 carcasses where age class was given, 387 (84%) were adults and 73 (16%)

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[1] The comments given in the field notes are included in the 5th column. One distance sampling male was listed in the Excel spread sheet in the “nose discharge” column, but no comments were included. There were also nine distance sampling animals in 2001 under the spread sheet column called “Lesions.” Comments included, “lesions due to trauma,” “pitting scutes on carapace and plastron, mites, and ticks,” and “some scutes peeling,” etc. Dyskeratosis was not specifically mentioned, so none of these nine animals is included.

[2] The 2002 distance data were substantially affected by a higher incidence of unknown age classes recorded. Whereas, age class was unknown for only 36 of 283 (13%) carcasses found in 2001, age class was not recorded for 268 of 481 (56%) carcasses found in 2002. Consequently, percentages of both adult (i.e., 40% of 481 found) and subadult (i.e., 4%) carcasses were significantly lower in 2002 distance data than the other two data sets. For comparison, sign count data included 78% adult and 15% subadult carcasses, and 2001 distance data included 69% adult and 18% subadult carcasses. This survey artifact was accounted for in the text by reporting only the percentages of adult and subadult carcasses for those animals where age class was given.

were subadults. Combined, there were 1,196 (84%) adult and 230 (16%) subadult carcasses among the 1,426 carcasses where age class was recorded. Of the 1,426 carcasses where age class was given, 1,196 (84%) were adults and 230 (16%) were subadults, a carcass adult-to-subadult ratio of 5.2:1.

Although sign count surveys detected tortoises differentially based on season and gender, determination of age class was not affected. Lower detection of subadults likely resulted in under-estimating the subadult component of the population, as previously described. Given these factors, live adults comprised 87% of the 275 tortoises detected, and adult carcasses comprised 84% of those where age class could be determined. Subadults comprised 13% of the live animals and 16% of the carcasses where age class was given. These data indicate that the number of adult and subadult carcasses found is proportionate to the number of adult and subadult tortoises encountered. This suggests that tortoise mortality of adults and subadults is proportionate to numbers of adult and subadult tortoises observed.

L.5.2 Cause of Death

Cause of Death: Cause of death was given for 104 of 1,033 (10%) carcasses found between 1998 and 2002 throughout the planning area. Cause was given for 44 (6%) of the 764 carcasses observed in the Fremont-Kramer and Superior-Cronese distance sampling surveys of 2001 and 2002. As such, 1,779 carcasses were found during the two survey efforts, and cause of death was given for 148 (8%) of them. These data are summarized in Table L-5.

Table L-5
Carcass Information Derived from
Sign Count Data (1998-2001) & Distance Sampling Data (2001-2002)

		CAUSE OF DEATH GIVEN								
SURVEY TYPE	NO OBS	Major Causes of Identifiable Mortality				Minor Causes of Identifiable Mortality				
		Mammal Predation	**OHV**	Raven	Gun Shot	Tank	Mine Shaft	Camp	Pet	Gallst one
Sign Count	104	53 51%	28 27%	10 9%	8 8%	3 3%	0 0%	1 1%	1 1%	0 0%
Distance Sampling	44	23 52%	14 32%	3 7%	1 2%	0 0%	2 3%	0 0%	0 0%	1 2%
TOTAL	148	76 51%	42 28%	13 9%	9 6%	3 2%	2 1%	1 <1%	1 <1%	1 <1%

The major causes of identified mortality occurred in the same descending order of prevalence for both survey efforts: Mammalian Predation > Vehicle Crushing > Raven Predation > Shotgun. With the exception of shotgun, relative occurrences of these four factors were strikingly similar for sign count and distance sampling: 51% vs. 52% for Mammalian Predation, 27% vs. 32% for Vehicle Crushing, and 9% vs. 7% for Raven Predation. Evidence of gunshot was observed in relatively more carcasses for sign count surveys (8%) than distance sampling (2%).

Cause of Death Relative to DWMAs, Tortoise, and Vehicle Impact Areas: Of the

148 carcasses where cause of death was given, GIS-based spatial locations are used for 142[3] of them. Therefore throughout the text, the numbers of carcasses with cause of death given relative to DWMAs, higher tortoise areas, and higher impact areas are relative to 142 (96%) rather than 148 carcasses actually found.

Table L-6 summarizes the distribution of 142 carcasses where cause of death was given, relative to locations surveyed inside or outside DWMAs, higher tortoise areas, and higher impact areas. Since sign count and distance sampling data are combined, it is important to remember that all distance sampling was restricted to DWMAs, so there was relatively more survey effort inside compared to outside DWMAs. Spatial distribution of these carcasses in and adjacent to the three DWMAs is shown on Map 3-15. The map depicts 139 of 142 carcasses (98%), excluding two mammal-predated and one raven-predated carcass in the vicinity of Pinto Mountain; these three carcasses are included in the tabulated data.

Table L-6
Incidence of 142 Carcasses where Cause of Death Was Given
In DWMAs, Higher Tortoise Areas, and Higher Vehicle Impact Areas

	MORTALITY FACTORS WHERE CAUSE OF DEATH GIVEN					
Area of Comparison	Mammal Predation	Vehicle Crushed	Raven Predation	Gunshot	Tank Crushed	Found in Mine Shaft
Inside DWMA	48	24	10	8	1	0
Outside DWMA	25	18	3	1	2	2
Inside Vehicle Impact Area	13	13	3	4	N/A	0
Outside Vehicle Impact Area	60	29	10	5	N/A	2
Inside Higher Tortoise Area	12	7	6	2	N/A	0
Outside Higher Tortoise Area	61	35	7	7	N/A	2
Total for mortality factors	**73**	**42**	**13**	**9**	**3**	**2**

Interestingly, one of the three carcasses identified as being crushed by a tank was one mile south of the boundary of Fort Irwin, and two were within one mile north of the UTM 9-0 line on the installation. There were also 7 of 42 (17%) vehicle-crushed animals, 1 of 13 (8%) raven-predated, and 2 of 73 (3%) mammal-predated carcasses found on Fort Irwin. These 13 data points are dropped from the following analysis, as the intent is to characterize regions of BLM-managed lands. Two tortoises were found in the same mine shaft near the southern boundary of Edwards Air Force Base. A single data point provides no insight into how often throughout the region tortoises may fall into mining pits and miscellaneous excavations.

These values are useful in showing the raw data, but cannot be compared until the linear miles of survey effort are considered. In Table L-6, the 129 carcasses (i.e., 142 above minus 13 Fort Irwin carcasses) are divided by the number of transects surveyed inside and outside each of the three areas, as shown in the second column. The resulting values in the third column are the

[3] Spatial data were not available for 3 sign count carcasses, each of which was associated with mammalian predation. There were three carcasses where the cause of death was questionable: 1 with a gallstone, 1 at a campsite, and 1 captive release. As such, these six carcasses are excluded, and discussion is relative to the remaining 142 carcasses, as described in the text.

average number of each disturbance observed on transects within the region of comparison. To facilitate comparison, the larger number is divided by the smaller, to indicate the occurrence within one area relative to the other.

Table L-6. Relative Incidence Of 129 Carcasses Where Cause Of Death Was Given: In DWMAs, Higher Tortoise Areas, And Higher Vehicle Impact Areas

	MORTALITY FACTORS WHERE CAUSE OF DEATH GIVEN				
	No. Carcasses/No. Transects Surveyed in Area of Comparison (Higher Sum/Lower Sum = Prevalence in Higher Area)				
Area of Comparison	No. Transects Surveyed	Mammal Predation	Vehicle Crushed	Raven Predation	Gunshot
Inside DWMA	1,572	48	24	10	8
Outside DWMA	N/a	23	11	2	1
Inside Vehicle Impact Area	N/a	13	13	3	4
Outside Vehicle Impact Area	N/a	58	22	9	5
Inside Higher Tortoise Area	N/a	12	7	6	2
Outside Higher Tortoise Area	N/a	59	28	6	7
Total for mortality factors	N/a	**71**	**35**	**12**	**9**

Cause of Death Relative to Gender and Age Class: Table L-7 summarizes tortoise gender and age class for 104 sign count carcasses relative to the mortality factors given in the first column. Percentages in the first column are relative to 104 carcasses; percentages in the other columns are relative to each mortality factor.

Table L-7. Gender and Age Classes of 104 Sign Count Carcasses Where the Cause of Death Was Given

	GENDER			AGE CLASS	
Cause	MALE	**Female**	**Unk**	**Adult**	SUBADULT
Predation (53) 51%	8 15%	19 36%	26 49%	31 58%	22 42%
OHV (28) 27%	6 21%	9 32%	13 47%	23 85%	4 (1 unk) 15%
Ravens (10) 9%	0 0%	0 0%	10 100%	0 0%	10 100%
Gunshot (8) 8%	5 62%	1 13%	2 25%	6 75%	2 25%
Tanks (3) 3%	0 0%	1 3%	2 4%	2 67%	1 33%
Captive Release (1) 1%	1 5%	0 0%	0 0%	1 100%	0 0%
Camp Site (1) 1%	0 0%	1 3%	0 0%	1 100%	0 0%
104	**20** 19%	**31** 30%	**53** 51%	**64** 62%	**39 (1)** 38%

One sees from these data that:

- Although about 1.5 times more carcasses were identified as females (30%) than males (19%), gender was not determined for 51% (i.e., 53 of 104). As such, results are inconclusive in demonstrating differential mortality between males and females.
- Vehicle crushing was identified for 27 carcasses, including 23 (85%) adults and 4 (15%) subadults. The age class for one crushed carcass could not be determined.
- Evidence of gunshot was identified for 8 carcasses, including 6 (75%) adults and 2 (25%) subadults.
- Raven predation was only observed in subadult carcasses.
- The one carcass of a released captive and one carcass found at a campsite provide too little data to suggest that only adults would be affected by these mortality factors. The carcass at the campsite may have been collected rather than killed, as the surveyor recorded no evidence of trauma.

Time Since Death: Carcasses may persist for as many as 20 years (Kristin Berry, pers. comm.). However, they wear in such a way that the relative time since death can be estimated with some accuracy up to four years (Berry and Woodman 1984). The diagnostic key developed by Berry and Woodman allows biologists to estimate the time since death as being less than one year, between one and two years, between two and four years, and greater then four years. Pertinent observations are given in Table L-8.

Table L-8
Patterns Observed In Carcasses That Were Fractured Or Predated

CAUSE OF DEATH	OBSERVATIONS	INTERPRETATION
Mammalian Predation	47 of 53 (89%) died <4 years 6 of 53 (11%) died >4 years	Evidence for mammalian predation likely diminishes over time
OHV Crushing	21 of 28 (75%) died <4 years 7 of 28 (25%) died >4 years	Straight-line fractures persist over time, and may be more identifiable >4 years of death
Raven Predation	9 of 10 (90%) died <1 year 1 no time since death given	Detection diminishes with time; mammalian predators may scavenge carcasses
Gunshot	7 of 8 (88%) died <4 years 1 of 8 (12%) died >4 years	Concoidal fractures persist over time; may be less identifiable >4 years of death

Of the 99 carcasses included in these four categories, 84 (85%) were newer (four or less years old) carcasses, 14 (14%) older (more than four years old) carcasses, and 1 (1%) where time since death was not given. This suggests that diagnostic evidence for these mortality factors is more obvious in newer carcasses and diminishes with increased exposure.

Of the 84 newer carcasses, 47 (56%) were attributed to mammalian predation (or scavenging), 21 (25%) to crushing, 9 (11%) to raven predation (or scavenging), and 7 (8%) to gunshot. It is noteworthy that all nine raven-predated tortoises had died *within one year* of being found. This may suggest that mammalian scavengers wholly or partially consume subadult carcasses within a year or two of death. If raven-predated carcasses generally do not persist for more than a year or two, the prevalence of raven predation given herein would *underestimate* the relative impact.

Of the 14 older carcasses, 6 (43%) were attributed to mammalian predation, 7 (50%) to crushing, and 1 (7%) to gunshot. Evidence for these forms of mortality is persistent. Mammals often leave chew marks on the carcasses, or if freshly eaten, footprints may be seen in the soil around the carcass.

Both vehicle crushing and gunshot wounds result in shell fractures. Such fractures are the most persistent, although they would not be observable on extremely old carcasses, which may resemble a pile of chalk. This persistence is suggested by the relatively high percentage of older carcasses that were crushed (25%) compared to other categories (i.e., gunshot was next highest at 12%). However, between the two, concoidal gunshot fractures are much more difficult to see than are straight-line fractures associated with crushing.

Limitations Interpreting Carcass Data: One must be very careful interpreting and reporting these data for the following reasons. Primarily, the cause of death was not given for 1,636 carcasses, or about 92% of the 1,797 carcasses found. It is important that identified mortality factors are only relative to a small proportion of carcasses observed during each survey effort. Cause of death was given for 10% of the sign count carcasses, 6% of the distance sampling carcasses, and only 8% of carcasses observed during both survey efforts. One correct conclusion would be, "27% of *identified* tortoise mortality [i.e., 148 of 1,797 (8%) carcasses found] was attributed to vehicle crushing;" it would be incorrect and misleading to conclude,"27% of tortoise mortality was attributed to vehicle crushing."

Limitations Interpreting Mammalian Predation: The relative occurrence of mammalian predation reflected in these data is likely *overestimated* for the following reasons. Carcasses were mostly identified as being predated, rather than scavenged. Evidence such as teeth marks on marginal scutes, chewed-off gular horns, etc. was most often interpreted as predation, when in fact scavenging leaves behind the same or similar marks. The data indicate that mammalian predation was mostly observed in fresher carcasses. Fresher carcasses are far more likely to be scavenged than older ones.

Limitations Interpreting Vehicle Crushing: These data may result in over-estimates of current impacts, but would be more indicative of the spatial location, relative to other factors. The data suggest that carcasses are relatively long lasting (i.e., compared to raven-predated carcasses, and some evidence of mammal predation). If they persist for 20 years, as suggested, older and new carcasses would accumulate and tend to over-estimate the *current* impacts. The cumulative information is important to show where such impacts have occurred for up to 20 years, and still occur. It is likely more reflective of impact distribution than any of the other mortality data.

If undisturbed, a tortoise carcass will naturally fall apart within a year or two. Bones separate at natural divisions called "sutures," which is particularly true for bone plates in the carapace (top) and plastron (bottom) of the tortoise shell. Trauma to living and dead tortoises results in readily identifiable shell fractures and fragments. Fragments will often adhere together when a living animal is crushed, but not always. Even very small fragments often have straight-line edges that are readily differentiated from the small, jagged edges of bone that has fallen apart naturally. In general, these and other diagnostic characteristics significantly minimize surveyor subjectivity. Vehicles are the most likely objects in the desert to crush tortoises, although cattle trampling and tank crushing do occur. Therefore, it is important to consider the region in which crushed carcasses were found.

For vehicle crushing, mammalian predation, and raven predation there is the common issue of whether a living versus a dead animal was affected. In the case of crushing, which is relatively easy to identify due to straight-line fractures, the difference is not so critical. In either case, a tortoise was crushed.

Limitations Interpreting Raven Predation: These data *likely underestimate the relative impact, are useful in identifying areas where predation has recently occurred, and do not show the regional distribution*. Raven predation is diagnostic; occurrences under nests and perch sites facilitate positive identification. Data indicate that no older carcasses were found; all nine were estimated as occurring within one year. This *shortened detection period would lend to underestimating the relative impact*. Some actual raven predation may be obscured by subsequent mammalian predation. These data do not show regional distributions, which would require focused surveys for nests and indicate how many of them have evidence. However, in spite of small sample size and these other limitations, it is compelling that 75% of 12 raven-predated carcasses occurred within higher density areas, where 43% of all subadults were observed.

L.5.3 Distribution of Carcasses where Cause of Death Is Known

Fremont-Kramer DWMA: Some of the 129 carcasses with cause of death given were found within die-off regions; both sign count and distance sampling data are used (see Table L.9). Of the 129 carcasses, 14 (11%) occurred within Fremont-Kramer die-off regions.

Table L-9. Occurrence of 14 Carcasses where Cause of Death Was Given In the Fremont-Kramer Older and Newer Die-off Regions

REGION NO. & NAME	AGE OF DIE-OFF	NO. CARCASSES FOR EACH IDENTIFIED MORTALITY FACTOR				
		Mammal Predated	Vehicle Crushed	Raven Predated	Gunshot	Other
OLDER REGIONS NORTH OF HIGHWAY 58						
FK1. DTNA	Older	4	1	0	0	N/A
FK2. Cuddeback	Older	1	0	0	0	N/A
FK3. California City	Older	0	0	0	0	1 carcass of pet tortoise
FK4. NE Kramer Jct	Older	0	0	0	0	N/A
TOTALS		**5**	**1**	**0**	**0**	**1 pet**
NEWER REGION BISECTED BY AND SOUTH OF HIGHWAY 58						
FK5. N of HWY 58	Newer	2	3	1	1	N/A
FK6. S of HWY 58	Newer	0	0	0	0	N/A
FK7. Edwards Bowl	Newer	0	0	0	0	N/A
TOTALS		**2**	**3**	**1**	**1**	**N/A**

Superior-Cronese DWMA: Of the 129 carcasses, 26 (20%) occurred within Superior-Cronese die-off regions (see L-10).

Table L-10
Occurrence of 26 Carcasses where Cause of Death Was Given
In the Superior-Cronese Newer and Older Die-off Regions

REGION NO. & NAME	AGE OF DIE-OFF	NO. CARCASSES FOR EACH IDENTIFIED MORTALITY FACTOR				
		Mammal Predated	Vehicle Crushed	Raven Predated	Gunshot	Other
SC1	Newer	1	1	0	1	N/A
SC2	Newer	1	1	0	0	1 with gallstone
SC3	Newer	2	0	0	0	N/A
SC4	Newer	0	0	0	0	N/A
SC5	Newer	0	0	2	0	N/A
SC6	Newer	6	2	0	1	1 crushed by tank
SC7	Newer	3	2	0	0	N/A
SC8	Older	0	0	1	0	N/A
TOTALS		**13**	**6**	**3**	**2**	**2 others**

Summary of All Carcass Observations: A summary of sign count carcasses segregated by die-off region is presented in Table L-11. Region-wide, there were of 420 mi^2 of die-offs, including 279 mi^2 (66%) of newer die-offs and 141 mi^2 (34%) of older die-offs; given the overlap of 29 mi^2, there were a total of 391 mi^2 affected by both newer and older die-offs. This indicates that about 3.5% of the 2002 tortoise range (391 of 11,134 mi^2), or 11.6% of the surveyed area (391 of 3,362 mi^2), were within older and newer die-off regions.

A total of 600 carcasses was found within the die-off regions (59% of the 1,011 carcasses where coordinate information was available), including 388 (65%) newer carcasses and 212 (35%) older carcasses. This is a significant finding, indicating that tortoises are continuing to die throughout the planning area, particularly in the Superior-Cronese DWMA, and probably since about 1990. Newer die-off regions were characterized by 317 (85%) newer carcasses and 54 (15%) older carcasses; older die-off regions were characterized by 158 (69%) older carcasses and 71 (31%) newer carcasses. These latter findings suggest that tortoises continue to die in older die-off regions, even though older carcasses were twice as likely to be found as newer ones.

Table L-11. Sign Count Carcasses Segregated By Die-Off Region*

REGION	DIE-OFF	AREA (MI^2)	TOTAL CARCASSES	NEW CARCASSES	OLD CARCASSES
Fremont-Kramer					
FK1	Newer	13	30	13 (43%)	17 (57%)
	Older	*50*	*72*	*14 (19%)*	*58 (81%)*
FK2	Newer	5	11	7 (64%)	4 (36%)
	Older	*36*	*53*	*12 (23%)*	*41 (77%)*
FK3	Newer	5	5	5 (100%)	0
	Older	*22*	*21*	*0*	*21 (100%)*
FK4	Newer	6	7	5 (71%)	2 (29%)
	Older	*15*	*24*	*8 (33%)*	*16 (67%)*
FK5	Newer	32	37	29 (78%)	8 (22%)
FK6	Newer	19	26	25 (96%)	1 (4%)
FK7	Newer	4	4	4 (100%)	0
Superior-Cronese					
SC1	Newer	27	29	23 (79%)	6 (21%)
SC2	Newer	22	24	18 (75%)	6 (25%)
SC3	Newer	11	13	12 (92%)	1 (8%)
SC4	Newer	10	13	12 (92%)	1 (8%)
SC5	Newer	23	35	30 (86%)	5 (14%)
	Older	*5*	*8*	*4 (50%)*	*4 (50%)*
SC6	Newer	56	99	85 (86%)	14 (14%)
	Older	*7*	*26*	*15 (58%)*	*11 (42%)*
SC7	Newer	16	27	25 (93%)	2 (7%)
SC8	*Older*	*6*	*8*	*1 (13%)*	*7 (87%)*
Ord-Rodman					
OR1	Newer	7	9	8 (89%)	1 (11%)
OR2	Newer	5	4	4 (100%)	0
OR3	Newer	18	15	12 (80%)	3 (20%)
Total		**Newer 279** ***Older 141*** **420**	**Newer 388 (65%)** ***Older 212 (35%)*** **600 (59%) of 1,011**	**Newer 317 (85%)** ***Older 54 (15%)*** **371 (62%) of 600**	**Newer 71 (31%)** ***Older 158 (69%)*** **229 (38%) of 600**

L.6 RELATIVE TORTOISE OCCURRENCE IN OPEN AREAS

There are eight BLM open areas within the planning area, including Johnson Valley, Stoddard Valley, El Mirage, Spangler Hills, Jawbone Canyon, Dove Springs, Rasor, and Olancha. Of these, Johnson, Stoddard, El Mirage, and Spangler Hills are located well within the 2002 tortoise range. The boundary of the range bisects Jawbone Canyon and Dove Springs, with most of Jawbone west of the range. Rasor is on the eastern edge of the range, but tortoise habitat occurs east of there. The Olancha Open Area is outside the range.

Previously Documented Impacts: Stow (1988) assessed vehicle impacts in the Stoddard Valley, Johnson Valley, and Rasor open areas by comparing aerial photographs taken in 1977 and again in 1988. He found that Stoddard Valley had the greatest percent area disturbed and the greatest percent increase in OHV disturbances among the three areas. He reported that Stoddard Valley was used predominantly for competitive events. In the Johnson Valley Open Area, he found that competition, recreation, pitting, and camping were concentrated to the southwest (in the vicinity of Anderson Dry Lake, east of the Cinnamon Hills), and that northeastern portions were relatively inaccessible and little used. He indicated that, in 1988, about 94% of both the Stoddard Valley and Johnson Valley open areas had been disturbed by OHV activities, which represented a 25% increase since 1977.

Sign Count Surveys in Open Areas: Portions of the six open areas were surveyed between 1998 and 2002 for tortoise sign and human disturbances. The acreage, square miles surveyed, and percentage of each open area surveyed are given in Table L-11.

Table L-11. Portions of BLM Open Areas Surveyed Between 1998 and 2002

OPEN AREA	TOTAL ACREAGE (SQUARE MILES)	AREA SURVEYED (SQUARE MILES)	PERCENT OF OPEN AREA SURVEYED
Johnson Valley	294	231	79%
Spangler Hills	97	75	77%
Stoddard Valley	85	63	74%
Rasor	35	26	74%
Dove Springs	6	3	50%
El Mirage	40	16	40%
Jawbone	13	0	0%

Regional Occurrence of Tortoises in Open Areas and DWMAs: There are four higher density tortoise areas in the Johnson Valley Open Area. Two of these are contiguous to the Ord-Rodman DWMA. Higher density areas are also found throughout much of the northern part of the Stoddard Valley Open Area. These are contiguous to higher density areas east of Highway 247, along Lenwood Wash and south. There are no other overlaps, although several square miles of higher density areas were found immediately northwest of Spangler Hills. Table L-12 compares the number of tortoises observed within each open area, and the associated encounter rates[4]. Results observed in adjacent DWMAs are given for comparison.

Table L-12. Relative Numbers Of Sign Count Tortoises Observed in Six BLM Open Areas and Three Adjacent DWMAs

Tortoises in Open areas					TORTOISES IN ADJACENT DWMAS				
OPEN AREA	LINEAR MI	**No. Live**	ENCOUNTER RATE	MI TO SEE	DWMA	LINEAR MI	NO. LIVE	ENCOUNTER RATE	MI TO SEE
Johnson Valley	346.5	8	0.023	43.3	Ord-Rodman	352.5	29	0.082	12.1
Stoddard Valley	94.5	9	0.095	10.5					
El Mirage	24.0	3	0.125	8.0	Fremont-Kramer	858.0	46	0.054	18.6
Spangler Hills	112.5	2	0.018	56.2					

[4] Linear miles in the 2nd column were derived by multiplying the total number of transects by 1.5 (i.e. each transect was 1.5 miles long). Encounter rates indicate the number of live animals observed relative to the linear miles surveyed. These calculations indicate the number of tortoises observed per linear mile of transect. The "MI TO SEE" column was determined by dividing the linear miles of survey (2nd columns in open area and DWMA subsections) by the number of tortoises observed along those transects.

Dove Springs	4.5	0	N/A	N/A					
Rasor	39.0	0	N/A	N/A	Superior-Cronese	1,083.0	79	0.073	13.7
Total	**520**	**22**	**0.042**	**23.6**	**Total**	**2,293.5**	**154**	**0.067**	**14.9**

The number of animals observed in a given area is not meaningful until the relative level of survey effort is factored in, which is shown in the "Encounter Rate" and "MI TO SEE" columns. No tortoises were observed in the Dove Springs and Rasor open areas, however the transect lengths were relatively small. These data do not indicate that tortoises are absent in these two open areas. Rather, they indicate that a surveyor would need to walk more than 4.5 miles in Dove Springs and more than 39 miles in Rasor to encounter a tortoise.

Encounter rates are given so that sign count surveys in DWMAs can be compared with distance sampling surveys of 2001. In 2001, distance sampling encounter rates were 0.111 tortoises per linear mile surveyed in the Ord-Rodman, 0.090 in the Fremont-Kramer, and 0.071 in the Superior Cronese DWMAs. The encounter rate for sign count surveys in the Superior-Cronese DWMA was the same as that observed during distance sampling (i.e., 0.073 and 0.071). The other two distance sampling rates are somewhat higher for the Ord-Rodman (0.111 versus 0.082, 1.3 times higher) and Fremont-Kramer (0.090 versus 0.054, 1.7 times higher) DWMAs.

Another comparison is provided for in the "MI TO SEE" column, which uses sign count data. This column reports the distance a surveyor had to walk to see the number of tortoises indicated in the third column for both open areas and adjacent DWMAs. The figure given for El Mirage (8.0 miles to see one tortoise) is not reflective of higher tortoise densities because only 24 linear miles were surveyed. The sample size (i.e., transect length) is too small for this number to be meaningful. One interpretation is the limited number of transects surveyed occurred in an area of relative tortoise abundance, although no higher density areas were identified using methodologies previously described. Sample sizes were sufficiently large for Johnson Valley, Stoddard Valley, and Spangler Hills to make the following comparisons meaningful.

Tortoise encounters were the highest in the Stoddard Valley Open Area, where on average one tortoise was observed for every 10.5 miles walked. This may be reflective of the higher density tortoise areas that were observed in much of the northern portion of this open area. Eight tortoises were found within or adjacent to these higher density areas, including one subadult to the north, which suggests recruitment.

Data for the Johnson Valley Open Area indicate that a surveyor had to walk four times farther, compared to Stoddard Valley (i.e., 43.3 miles versus 10.5 miles), to see one tortoise. Data suggest that there are relatively fewer tortoises per square mile in the Johnson Valley than in the Stoddard Valley open area. These data corroborate numerous other observations that tortoises are relatively less common in the Spangler Hills open area, compared to Johnson Valley, Stoddard Valley, and El Mirage.

The final comparison is between open areas and adjacent DWMAs. When combined, one sees that tortoises were encountered about 1.6 times more often in DWMAs than in open areas (i.e., one tortoise observed every 14.9 miles in DWMAs versus one every 23.6 miles in open areas). The data suggest that tortoises are somewhat less frequently encountered in the Fremont-Kramer DWMA compared to the other two. However, the relatively low variability among the three DWMAs (i.e., 12.1, 13.7, and 18.6 miles to see one tortoise) suggests that they are relatively similar. Dr. Krzysik (2002a, b, c), in fact, concluded that population densities in these three DWMAs were not significantly different.

For comparison, the variability among open areas (i.e., from 8.0 to 56.2 miles to see a tortoise) suggests that population levels may be substantially different. Too few data are available to indicate the relative abundance in the El Mirage Open Area. However, the data do suggest that tortoises may be relatively more common, per unit area, in the Stoddard Valley Open Area than in the three DWMAs. Unlike the Fremont-Kramer and Superior-Cronese DWMAs where die-offs have decimated local and regional populations, no such die-off was found at Stoddard Valley. If die-offs were in response to URTD, the data suggest that tortoises in the Stoddard Valley are relatively disease-free. It may be significant that, like the Ord-Rodman DWMA, this open area is physically separated from populations that may have crashed due to disease.

The data suggest the following descending order of tortoise abundance in the four open areas: Stoddard Valley > Johnson Valley > El Mirage > Spangler Hills.

Relative Occurrence of Carcasses in Open Areas and DWMAs: The same types of comparisons and methodologies reported above for live tortoises were also applied to the sign count carcass data. Comparisons are given in Table L-13.

Table L-13. Relative Numbers Of Sign Count Carcasses Observed In Six BLM Open Areas And Three Adjacent DWMAs

CARCASSES IN OPEN AREAS					CARCASSES IN ADJACENT DWMAS				
OPEN AREA	LINEAR MI	NO. DEAD	ENCOUNTER RATE	MI TO SEE	DWMA	LINEAR MI	NO. DEAD	ENCOUNTER RATE	MI TO SEE
Johnson Valley	346.5	66	0.190	5.25	Ord-Rodman	352.5	51	0.145	6.91
Stoddard Valley	94.5	11	0.116	8.59					
El Mirage	24.0	5	0.208	4.8	Fremont-Kramer	858.0	324	0.378	2.65
Spangler Hills	112.5	9	0.080	12.5					
Dove Springs	4.5	0	N/A	N/A					
Rasor	39.0	0	N/A	N/A	Superior-Cronese	1,083.0	359	0.331	3.02
Total	**520**	**91**	**0.175**	**5.71**	**Total**	**2,293.5**	**734**	**0.320**	**3.13**

Overall, carcasses were much more commonly observed than live animals. These are not data sets that were independently collected (i.e., as with distance sampling versus sign count data); 275 live animals *and* 1,033 carcasses were found *along the same transects*. One might suggest that the prevalence of carcasses over live animals is due to the longevity of carcasses, which may persist up to 20 years. However, tortoises are also long-lived animals, with individuals that are known to live for more than 20 years in the wild[5].

There were 91 carcasses found in open areas and 734 found in DWMAs. When the relative survey effort is considered, there were about two times as many (i.e., 1.82) carcasses found in DWMAs as in open areas. For comparison, surveyors walked an average of 5.7 miles in an open area to find one carcass, compared to 3.1 miles in the three DWMAs. This may be due to catastrophic die-offs in DWMAs, which have not been observed in open areas.

Among open areas, the data indicate that there are relatively more carcasses found in the Johnson Valley, followed by Stoddard Valley, and Spangler Hills. Not enough linear miles of transects were surveyed in El Mirage for it to be compared among these three, where sample sizes were relatively large.

There is an inverse relationship between the number of tortoises and carcasses observed in DWMAs. Tortoises were more often encountered in the Ord-Rodman (i.e., one tortoise for every 12.1 miles of survey), followed by Superior-Cronese (i.e., one per 13.7 miles), and Fremont-Kramer (i.e., one per 18.6 miles). An opposite pattern was observed for carcasses: one carcass encountered per 2.65 miles in Fremont-Kramer, one per 3.02 miles in Superior-Cronese, and one per 6.91 miles in Ord-Rodman. This suggests that tortoises were most likely to be encountered in a DWMA where fewer carcasses were found. The converse conclusion is that fewer tortoises were found where there were more carcasses.

Although this may seem like a trivial point, it is not. It is entirely likely that carcasses may be more common in places where live animals are more common. Relatively more carcasses were seen in the western part of Johnson Valley Open Area, in the northwest part of the Ord-Rodman DWMA, and in the Water Valley/Mud Hills area. However, each of them was associated with a higher density tortoise area; carcasses were relatively less common than in identified die-off regions.

Table L-14 shows an inverse relationship between tortoise and carcass encounters between Stoddard Valley and three DWMAs, a relationship not observed in Johnson Valley.

[5] Boarman (pers. comm.) found one report of a pet tortoise that was more than 60 years old. There is at least one animal marked at one of the DTNA study plots in 1979 that was still alive in 2002 (M. Connor, pers. comm.). He did not indicate if it was an adult in 1979, but this animal is at least 23 years old. Except for anecdotal accounts, there are no data to indicate the average longevity of tortoises at the population level. It is reasonable to assume that many adult tortoises live substantially longer in the wild than 20 years.

Table L-14. Tortoise and Carcass Encounters in Open Areas and DWMAs

AREA OF COMPARISON	ONE TORTOISE OBSERVED EVERY	ONE CARCASS OBSERVED EVERY
Stoddard Valley	10.5 mi	8.59 mi
Ord-Rodman DWMA	12.1 mi	6.91 mi
Superor-Cronese	13.7 mi	3.02 mi
Fremont-Kramer	18.6 mi	2.65 mi
Johnson Valley	43.3 mi	5.25 mi

These observations suggest that carcass abundance decreases in the following manner:

Fremont-Kramer > Superior-Cronese > Ord-Rodman > Stoddard Valley

The pattern of relatively more tortoises where there are relatively few carcasses was not seen in the Johnson Valley Open Area. It took about four times as much effort to find a tortoise than in Stoddard Valley Open Area (i.e., the easiest place) and twice as long as in the Fremont-Kramer DWMA (i.e., the next hardest place). This indicates that the tortoise population – on a regional level – is relatively sparse, with denser areas to the west, adjacent to the Ord-Rodman DWMA. No recent or older die-offs were detected, nor do the data indicate why the population is less dense now than previously.

Dr. Berry documented a 77% decline between 1980 and 1994 on the Johnson Valley study plot, which is within the open area. All other such declines have occurred in the Fremont-Kramer and Superior-Cronese DWMAs. The two study plots showing the smallest declines were Lucerne Valley (i.e., 30% decrease between 1980 and 1994) and Stoddard Valley (5% between 1981 and 1991). All three of these areas are located west of Interstate 15.

Carcass encounters in Johnson Valley was intermediate between Ord-Rodman and Fremont-Kramer. As such, Johnson Valley may be inserted into the previous formula, which is given in descending order of carcass abundance:

Fremont-Kramer > Johnson Valley > Superior-Cronese > Ord-Rodman > Stoddard Valley

If disease has spread through tortoise populations west of Interstate 15, it would not spread to the tortoise populations east of the interstate (unless facilitated by unauthorized translocation). Although this has conservation benefits, the relatively small sizes of tortoise concentration areas in the Ord-Mountain also places them at heightened risk. Should they become extirpated, the sparse population in the Johnson Valley may provide for limited natural repatriation. The tortoises in the open area are likely to be more heavily impacted as the human population (and recreation) increases, which would further minimize emigration potential.

In summary, the data suggest the following **descending** order of relative tortoise abundance:

Stoddard Valley > Ord-Rodman DWMA > Superor-Cronese > Fremont-Kramer > Johnson Valley

Compared to the following **ascending** order of relative carcass abundance:

Stoddard Valley < Ord-Rodman < Superior-Cronese < Johnson Valley < Fremont-Kramer

These relationships become much more significant when one considers the relative area within each of these regions that was surveyed, and therefore reflective of the above comparisons.

Local Occurrence of Tortoises in the Fremont-Kramer DWMA: These comparisons are on a regional level, and suggest that outside the Johnson Valley Open Area, the most difficult place to find tortoises is in the Fremont-Kramer. However, the population within that DWMA is not homogenous in terms of tortoise distribution. Both current data and older data support the conclusion that there have been significant population declines in the northern and northwestern portions of the Fremont-Kramer DWMA.

For these reasons, comparisons similar to those given above for the five larger regions are given in Table L-15 areas north and south of Highway 58 in the Fremont-Kramer DWMA.

Table L-15
Relative Numbers of Tortoises and Carcasses
Observed in the Fremont-Kramer DWMA
North and South of Highway 58

TORTOISE DATA					CARCASS DATA				
AREA	LINE AR MI	NO. DEAD	ENCOUNTER RATE	MI TO SEE	AREA	LINEAR MI	NO. DEAD	ENCOUNTER RATE	MI TO SEE
North					North				
South					South				
Total					**Total**				

Characteristics of Vehicle Impact Areas: The types and intensity of impacts associated with each region are listed in Tables L-16, L-17 and l-18 and discussed below.

Recreational Impact Regions – BLM Open Areas: Open areas compared in the following table include Dove Springs/Jawbone Canyon (combined), Johnson Valley, Stoddard Valley, Spangler Hills, and El Mitage.. There are five columns for each of the seven types of disturbance data collected on sign count surveys, 1998-2002; where there are only four columns, the total mi^2 to the left applies. Data include (1) "Total mi^2," which are all square miles surveyed within the impact region. (2) "Mi^2 Obs., which is the subset of square miles wherein the given disturbance was observed. (3) "Sum," is the total number of disturbances observed. (4) "Average" is the Sum/Mi^2 Obs. (5) "Range" indicates the lowest and highest value for a given disturbance. Except where "0" is entered, the lower range limit is always 1, since there must be at least one observation for the transect to be included. For example, in Johnson Valley, there were 296 mi^2 surveyed, with a sum of 49,394 vehicle cross-country tracks, occurring on 296 mi^2, for an average of 180 tracks/ mi^2, ranging from as few as 1 track up to 1,625. As in other places, numbers of square miles equates to the number of transects surveyed.

Table L-16. Open Area Vehicle Impact Regions

Area	Total mi^2	Mi^2 Obs	Sum	Ave	Range	Mi^2 Obs	Sum	Ave	Range
TRAILS						**TRACKS**			
Dove/Jawbone	24	24	370	15.4	4-52	22	406	18.5	1-180
Spangler	131	121	2336	19.3	1-103	127	12140	95.6	2-2665
El Mirage	21	19	322	16.9	1-51	19	2294	120.7	2-418
Stoddard	119	99	1186	12.0	1-76	105	14675	138.9	1-4000
Johnson Valley	296	231	5203	22.5	1-250	275	49394	179.6	1-1625
Total	**591**	**494**	**9417**	**19.1**	**1-250**	**548**	**78909**	**144.0**	**1-4000**
LITTER						**DUMPS**			
Dove/Jawbone	24	22	381	17.3	1-63	0	0	0	0
Spangler	131	121	4734	39.1	1-525	0	0	0	0
El Mirage	21	20	437	21.9	1-75	0	0	0	0
Stoddard	119	115	4132	35.9	1-700	0	0	0	0
Johnson Valley	296	271	11135	41.1	1-1080	0	0	0	0
Total	**591**	**549**	**20819**	**37.9**	**1-1080**	**0**	**0**	**0**	**0**
TARGET						**HUNTING**			
Dove/Jawbone	24	16	281	17.6	1-142	1	1	1.0	1
Spangler	131	56	1006	18.0	1-110	12	13	1.1	1-2
El Mirage	21	12	136	11.3	1-32	6	14	2.3	1-5
Stoddard	119	30	310	10.3	1-97	21	64	3.0	1-18
Johnson Valley	296	99	1723	17.4	1-325	21	34	1.6	1-6
Total	**591**	**213**	**3456**	**16.2**	**1-325**	**61**	**126**	**2.1**	**1-18**
CAMPING									
Dove/Jawbone	24	2	5	2.5	1-4				
Spangler	131	7	18	2.4	1-6				
El Mirage	21	2	2	1.0	1				
Stoddard	119	28	52	1.9	1-5				
Johnson Valley	296	27	84	3.1	1-25				
Total	**591**	**66**	**161**	**2.4**	**1-25**				

Recreational Impact Regions – Higher OHV Use Areas: The following table compares vehicle impacts at California City to Rand Mountains, Edwards Bowl, and East Sierra de facto open areas.

Table L-17. Higher OHV Use Vehicle Impact Regions

Area	Total mi^2	Mi^2 Obs	Sum	Ave	Range	Mi^2 Obs	Sum	Ave	Range
TRAILS						**TRACKS**			
Cal City/Rands	168	110	878	8.0	1-35	156	8162	52.3	1-585
Edwards Bowl	14	12	66	5.5	1-14	14	599	42.8	7-80
East Sierra	31	6	10	1.7	1-2	14	142	10.1	1-76
Total	**213**	**128**	**954**	**7.4**	**1-35**	**184**	**8903**	**48.3**	**1-585**
LITTER						**DUMPS**			
Cal City/Rands	168	156	3295	21.1	1-159	0	0	0	0
Edwards Bowl	14	13	216	16.6	2-53	0	0	0	0
East Sierra	31	30	1429	47.6	3-305	0	0	0	0
Total	**213**	**199**	**4940**	**24.8**	**1-305**	**0**	**0**	**0**	**0**
TARGET						**HUNTING**			
Cal City/Rands	168	76	498	6.5	1-36	19	28	1.5	1-4
Edwards Bowl	14	3	5	1.7	1-2	6	11	1.8	1-3
East Sierra	31	19	150	7.8	1-53	0	0	0	0
Total	**213**	**98**	**653**	**6.7**	**1-53**	**25**	**39**	**1.6**	**1-4**
CAMPING									
Cal City/Rands	168	14	21	1.5	1-3				
Edwards Bowl	14	1	1	1.0	1				
East Sierra	31	0	0	0	0				
Total	**213**	**15**	**22**	**1.5**	**0-3**				

Residential Impact Regions: The following residential impact areas are compared in the table below: Silver Lakes, Hinkley, and Coyote Corner.

Table L-18. Residential Vehicle Impact Regions

Area	Total mi^2	Mi^2 Obs	Sum	Ave	Range	Mi^2 Obs	Sum	Ave	Range
TRAILS						**TRACKS**			
Silver Lakes	37	22	74	3.4	1-22	34	435	12.8	1-49
Hinkley	31	13	66	5.1	1-18	26	387	14.9	1-101
Coyote Corner	39	14	51	3.6	1-10	34	1939	57.0	2-341
Total	**107**	**49**	**191**	**3.9**	**1-22**	**94**	**2761**	**29.4**	**1-341**
LITTER						**DUMPS**			
Silver Lakes	37	35	1178	33.7	1-300	1	1	1.0	1
Hinkley	31	24	2492	103.8	1-1000	0	0	0	0
Coyote Corner	39	38	2004	52.7	1-725	5	6	1.2	1-2
Total	**107**	**97**	**5674**	**58.6**	**1-1000**	**6**	**7**	**1.2**	**0-2**
TARGET						**HUNTING**			
Silver Lakes	37	25	154	6.2	1-37	10	33	3.3	1-8
Hinkley	31	4	7	1.8	1-3	8	14	1.8	1-3
Coyote Corner	39	19	713	37.5	1-525	5	8	1.6	1-4
Total	**107**	**48**	**874**	**18.2**	**1-525**	**23**	**55**	**2.4**	**1-8**
CAMPING									
Silver Lakes	37	2	2	1.0	2				
Hinkley	31	4	7	1.8	1-4				
Coyote Corner	39	4	7	1.8	1-3				
Total	**107**	**10**	**16**	**1.6**	**1-4**				

Appendices

APPENDIX M

MOJAVE GROUND SQUIRREL BACKGROUND DATA

Appendices

APPENDIX M
MOHAVE GROUND SQUIRREL BACKGROUND DATA

M.1 STATUS OF MGS

The current, 2002 status of the MGS, in terms of numbers of individuals and amount of occupied habitat, cannot be assessed based on the limitations of available data. For example, Laabs (1998) indicated that determining the status of the MGS is confounded by aspects of its biology. The species is inactive throughout much of the year, and the period of surface activity varies from year to year. Trapping success decreases dramatically when temperatures rise above approximately 98 °F (37 °C) (Aardahl and Roush 1985). He cautioned that live-trapping studies must be scheduled carefully and cannot necessarily establish the absence of the species from a site.

Current Habitat Characteristics Where MGS Has Been Previously Observed: In 1998, BLM provided 7.5' USGS quad maps showing both specific locations (the 19 Aardahl and Roush sites) and general locations (most often within a 160-acre quarter section) for a total of 102 MGS records, including those of Aardahl. For reasons discussed in the 1999 evaluation report (BLM 1999), these locations are likely more indicative of where the MGS has been observed rather than a good indicator of where the MGS actually resides. For example, these records rarely indicated if the animal was an adult (and likely to be resident) or a juvenile (and potentially only dispersing through the area).

Even so, both home range areas and dispersal areas are important to the species, and there have been few attempts to revisit historic locations to characterize the plant communities. Even in that, one must exercise caution. Many of the data were collected in the 1970's (and earlier), and there may have been natural or human-induced alterations in the plant communities, so that what we see now is not necessarily indicative of the plant community when the MGS was observed. As already stated, it would appear that about 11% of the historic localities have been since converted to agricultural and urban uses. In spite of these and other limitations, the 102 transects were situated in what were considered the best available habitats as of 1993 (in terms of known occurrence and representative distribution throughout the range). In fact, LaRue had nine confirmed MGS observations (auditory, visual, and a combination of the two) while walking transects in 1998.

1998 Vegetation Surveys Within the Known Range: In 1998, a total of 344 transects was surveyed by LaRue (237 transects), botanists Dave Fleitner (87), Dave Silverman (7), and R.T. Hawke (3), and by biologist Dave Roddy (10) (Map 3-19). Each transect consisted of a ¾-mile, equilateral triangle, where all perennial plant species within one meter of the transect were counted. Transect locations included 102 places where the MGS was previously observed (i.e., CNDDB, Debi Clark records, and 19 of 22 sites surveyed by Aardahl and Roush (1985), and 208 locations in “High” and “Medium” quality habitats. The 208 transects were systematically (rather then randomly) located at about two-mile intervals within the 1993 polygons that CDFG and others identified as “High” and “Medium” quality habitats (although those designations have since been dismissed; see BLM 2000). Thirty-four (34) transects were also surveyed in the Ord-Rodman area, which is located east, south, and northeast of the known range.

Surveys were performed on 17 days between May 1 and May 29, and on 11 days between June 8 and June 25 of 1998. Data included observer name, date, beginning and ending times and temperatures, soil description, landform, plant community, perennial plant species on transect, numbers of winterfat and hopsage observed off the transect, annual plant species observed on and off the transect, special-status animal species, and occurrences of five human disturbances (OHV tracks, roads, shot gun/rifle shells, and “Other”). Data were entered into an Excel spread sheet, and later geo-referenced using GIS, Arc Info software.

Surveyors only recorded presence or absence of observable human disturbances; the abundance of a given disturbance was not recorded. These data were limited to several “observable” human impacts that recently occurred, and may be affected by temporal factors. For example, roads and dumps may remain for more than a hundred years, but domestic dog sign and single-pass motorcycle tracks disappear in a matter of months or years. The variability associated with multiple surveyors is somewhat minimized by the fact that LaRue surveyed 237 (69%) of the 344 transects and Fleitner surveyed 87 (25%), so that 94% of the transects were surveyed by two of the five surveyors.

Comparison of 1998 and 1985 Survey Results: Table M-1 summarizes the findings of the 1998 vegetation surveys (LaRue, 1998 unpublished data) for 19 of the 22 sites trapped for MGS by Aardahl and Roush (1985). The numbers of MGS trapped in 1985 are given in the second column, and listed in descending order of the number trapped. The vegetation data in the remainder of the table were collected in 1998.

Table M-1
Comparisons Of Aardahl-Roush’s 1985 MGS Trapping Results
With Data From The 1998 Plant Surveys

SITE	NO. MGS	NO. PERENNIAL/ COMMUNITY	NO. AND DOMINANT PERENNIAL	NO. ANNUAL PLANTS	WINTER-FAT	Hop-SAGE	ATRIPLEX
AR7 Golden Valley	68	8 Creosote	169 Ambrosia dumosa	12	5	3	0
AR3 CDFG Reserve	34	9 Saltbush	269 Atriplex spinifera	33	4	5	271
AR13 Steam Well	32	9 Creosote	124 Ambrosia dumosa	20	1	3	0
AR 6 Fremont E	25	11 Saltbush	194 Atriplex spinifera	29	15	24	0
AR 6 Fremont W	25	10 Saltbush	294 Atriplex spinifera	28	0	6	220
AR 2	22	5	824	25	0	0	294

Bowman S		Creosote	Ambrosia dumosa				
AR 2 Bowman N	19	8 Creosote	1056 Ambrosia dumosa	21	0	3	0
AR 9 Aqueduct S	19	11 Creosote	556 Ambrosia dumosa	16	4	1	0
AR10 Pilot Knob N	19	12 Creosote	225 Ambrosia dumosa	?	1	18	0
AR 14 Superior E	18	10 Saltbush	121 Ambrosia dumosa	26	77	12	179
AR 9 Aqueduct N	17	11 Creosote	633 Ericameria cooperi	26	0	3	0
AR 4 DTNA 4	15	10 Creosote	99 Ambrosia dumosa	19	0	5	0
AR11 Rand W	12	5 Creosote	83 Ambrosia dumosa	20	0	0	0
AR11 Rand E	7	9 Creosote	160 Larrea tridentata	21	0	0	0
AR14 Superior W	5	12 Saltbush	235 Ambrosia dumosa	31	36	35	135
AR8 Kramer Hills	4	9 Creosote	185 Ambrosia dumosa	19	0	0	141
AR1 Bird Springs E	4	10 Blackbush	248 Coleogyne ramosissima	12	8	111	0
AR1 Bird Springs W	4	12 Blackbush	656 Hymenoclea salsola	14	0	72	0
AR4 DTNA 14	1	3 Creosote	94 Ambrosia dumosa	17	0	0	0
TOTALS	350	3-12 9 12 creosote 5 saltbush 2 blackbush	12 Ambrosia dumosa 3 Atriplex spinifera 1 Larrea tridentata 1 Ericameria cooperi 1 C. ramosissima 1 Hymenoclea salsola	12-33 22	0-77 8	0-111 16	0-294 65

Limitations of Existing MGS Records for Determining Current Status: The WMP data base of year 2000 included 260 known records of the MGS throughout its known range. Except for the studies performed at Coso and several studies at Fort Irwin, no trapping efforts have persisted at a given site for more than a few seasons. Krzysik (1994) reports that a total 51 different sites had been trapped for rodents on Fort Irwin: 38 sites were sampled in only a single year, 7 were sampled in 2 different years, 1 site for 3 years, 1 site for 4 years, 2 sites for 5 years, and 2 sites for 6 years.

Although the available information provides a wealth of data points for MGS occurrence, itσ usefulness is significantly limited in several ways. In the absence of trapping efforts over multiple, consecutive years, one cannot know if trapped squirrels were resident or dispersing through the area when they were caught. Additionally, adult animals are more likely to be resident than juveniles, but most of the records do not indicate the ages of captured squirrels. (Laabs 1998)

The absence of data points does not indicate absence of the MGS, but likely indicates that focused studies were not performed in those areas. For example, many MGS records are associated with roadways, where MGS may be occasionally observed from a vehicle, found crushed, or observed during surveys of proposed utility right of ways adjacent and parallel to the road. Many MGS records are clustered in areas where extensive surveys have been performed, leaving a false impression of relative abundance. Such focused trapping efforts have occurred at Edwards AFB (Laabs et al. 1994), the Indian Wells Valley (Rempel and Clark 1990), the Coso region (Leitner's study sites), and on the Coolgardie Mesa, where Tom and Debi Clark made many observations.

Brooks and Matchett (2001) reported that the MGS had been detected at 264 sites between 1886 and 2000. Maps showing the distribution of these historic records collected over a 114 year period do not represent the current status of the MGS. However, they are useful in depicting the historically occupied range. These data allowed us, for example, to determine how much of the known range is now occupied by urban and agricultural development.

Plant Community Surveys: In 1992, biologists Debi Clark and Tom Clark, and botanist Denise LaBerteaux, mapped vegetation communities over approximately 90% of the WMPA. Following an unspecified amount of field reconnaissance, they plotted vegetation communities on 7.5' and 15' USGS quad maps, then further refined community boundaries using 1:24,000 aerial photography, dated 1989 (Source memorandum from Debi Clark to Larry Foreman, dated 15 May 1996). These data were later digitized and provided as a GIS (Arc Info) coverage. They mapped 42 different plant communities as occurring in the WMPA.

M.2 PREVALENCE AND DISTRIBUTION OF THREATS

Human Disturbances Observed During 1998 Vegetation Studies: During the 1998 Survey, biologists collected information on human disturbances observed along each transect, including those located near previous MGS reports (102 transects) and those located in high and medium quality habitats (208 transects). Table M-2 displays the prevalence of disturbance types found along these transects[6].

Table M-2

6 "OHV" refers to cross-country vehicle tracks, which were created by trucks, motorcycles, and all-terrain vehicles. "Road" includes trails, and usually included routes passable by trucks. Sheep, cow, and dog sign was usually feces. "Guns" does not differentiate between legal activities (e.g., hunting, regulated target practice, etc.) and illegal ones (e.g., shooting glass and articles at dump sites). "Dumps" generally required a vehicle to off-load the materials, so does not include litter. "Mines" may have included pits and adits, exploratory excavations, borrow pits, etc. "Ord." refers to military ordnance, which typically included spent cartridges and clips from aircraft. Two transects occurred in areas previously burned.

Prevalence of 10 Types of Disturbances
Observed within the Known Range of the MGS
During the 1998 Survey

TRANSECTS			DISTURBANCE TYPES										
Total	Disturbances		**OHV**	**Road**	**Sheep**	**Gun**	**Dump**	**Cow**	**Dog**	**Mine**	Ord.	**Burn**	Total
	None	**Yes**											
310	168	142	145	116	56	23	20	20	12	6	3	2	403
% of 310 transects			47%	37	18	7	6	6	4	2	<1	<1	
% of 403 disturbances			36%	29	14	6	5	5	3	1	<1	<1	

Surveyors found one or more disturbance categories on 142 (46%) transects, and none of the disturbances on 168 (54%) transects. The three most prevalent disturbances were cross-country travel on 145 (47%) of the 310 transects, roads on 116 (37%) transects, and sheep sign on 56 (18%) transects.

Agricultural Development: By the early 1990's, about 39,000 acres (61 square miles) of MGS habitat had been lost to agricultural development (Gustafson 1993). About 4% of historic MGS occurrences are found in agricultural areas (LaRue, 1998 unpublished data).

Grazing: Grazing occurs on both public lands managed by the BLM and private lands, but mostly on BLM managed allotments. There is little information available to show variable use areas. Sheep are grazed inside and outside BLM allotments. Cattle may wander up to several miles beyond designated allotment boundaries. Not all land within allotments is suitable or occupied MGS habitats. Mountainous areas, playas, and other unsuitable substrates may exist (Aardahl and Roush 1985 reported the MGS was somewhat less prevalent on desert pavement). Resident animals prefer substrates associated with lower bajadas and valley floors. Juveniles, however, may disperse through rockier habitats. As such, we have not dismissed the potential importance of mountainous areas for MGS dispersal.

On private lands, woolgrowers, or landowners giving them permission, are required to obtain federal Section 10(a) permits if their activities are likely to result in the take of tortoises. To date, there have been no such permits issued for sheep grazing. There is no discretionary action required by county or city jurisdictions for grazing on private lands, so consequently there is no clear means of regulating this impact on private lands outside sheep allotments.

When combining the acreage of BLM lands within sheep allotments (897,820 acres) with the acreage of private land given above (619,442 acres), we find that there are a total of 1,517,262 acres (2,370 square miles) of BLM sheep allotments within the known range that are actively being grazed.

There are no region-wide data to show the incidence of sheep grazing that is not associated with BLM allotments. However, because there exists the potential to graze in these areas, the total sheep grazing area given above likely underestimates actual sheep grazing within the known range.

Hybridization Between Round-tailed Ground Squirrels and the MGS: As shown in Map 3-17, the contact line between ranges of the MGS and round-tailed ground squirrel runs between Fort Irwin and Victorville along the Mojave River. Thus far, the only occurrences of hybrid (Wessman 1977) and suspected hybrid (Krzysik 1994; LaRue, 1997 pers. obs.) ground squirrels have been in the areas of Fort Irwin and Helendale. Gustafson (1993) reported that hybridization likely occurred in these areas due to ecological and behavioral changes in one or the other species that resulted from agricultural disturbances in the Helendale area and military maneuvers at Fort Irwin.

Dr. Recht (2001 pers. comm.) has recently trapped the round-tailed ground squirrel in the Superior Valley, 10 or more miles inside the known range of the MGS. This suggests that there is potential for hybridization to occur well into the known range, and not just along the edges.

No information was found on the dispersal abilities of round-tailed ground squirrels. If it is similar to that of the MGS, juvenile round-tails could to travel from one to several miles into the MGS range, assuming substrate conditions and other factors are favorable.

Military Maneuvers: The prevalence of MGS on a given installation is dependent on the occurrence of installations within the known range, naturally unsuitable habitats, types of military maneuvers, impacts associated with support facilities (e.g., cantonment areas, logistical areas), and other factors.

Extensive areas on south-central and southwestern Edwards AFB are comprised of small, clay-pan playas may constitute suitable habitats, but extensive trapping surveys conducted in 1994 failed to trap any animals throughout the large region (Laabs et al. 1994). Unlike Edwards, both China Lake and Fort Irwin have extensive mountainous areas (greater than 20% slope) that are not likely suitable for resident MGS, although there is some potential for dispersing juveniles to use the lower slopes of such areas.

Military maneuvers and their observable impacts vary dramatically between Fort Irwin (severe impacts) and either Edwards or China Lake (localized impacts). Edwards has cantonment areas west of Rogers Dry Lake, and logistical support facilities occur west of Rogers and east of the northern end (Leuhman Ridge facilities) that have been resulted in MGS habitat loss. China Lake has no cantonment area (Ridgecrest serves that function), and support facilities have resulted in minimal impacts to either the northern or southern ranges. Given that both installations practice air-to-ground maneuvers, with limited day-to-day ground disturbance, most of the habitats are still intact and potentially occupied.

Fort Irwin entertains 10 training rotations each year, where numerous mechanized vehicles and ground troops create new ground disturbances during each exercise (albeit in previously degraded areas). At Fort Irwin, Gustafson (1993) reported that military training had affected approximately 130,000 acres (203 square miles) in the known range. Most of the impacts are limited to areas below about 20% slope (LaRue and Boarman, in prep.), which coincides with the substrates most preferred by the MGS, where about 90% of 102 MGS records have occurred (LaRue, 1998 unpublished data). Krzysik (1991) noted heavy shrub losses from the main maneuver corridors at Fort Irwin. Many of the impacts identified for cross-country OHV use also pertain to impacts at Fort Irwin, except that impacts at Fort Irwin are far more intense.

Off-Highway Vehicles: Off highway vehicle impacts are concentrated in (a) BLM-designated vehicle open areas, (b) lands adjacent to open areas, and (c) heavy use areas that are not necessarily associated with either of the first two.

There is anecdotal evidence that the MGS may be killed on both paved and dirt roads, although it has been suggested that they are too quick for this to happen. For example, during tortoise surveys conducted near Water Valley, northwest of Barstow, in 1998, LaRue crushed a juvenile male MGS on a dirt road as it attempted to cross in front of his truck. In 1997, LaRue observed a juvenile male (likely a hybrid) as it was crushed on National Trails Highway, several miles north of Helendale. One of the nine MGS observed in 1998 (LaRue, unpublished data) darted into burrows that were located in the berms of a dirt road. The juvenile female was observed for about 20 minutes eating cryptantha alongside the road, and later using two different burrows located in berms on opposite sides of the road. Recht (1977) also observed MGS feeding on Russian thistle that was congregated along shoulders of roads in northeastern Los Angeles County.

Goodlett and Goodlett (1993) have shown, in the Rand Mountains, that the heaviest vehicle impacts occur immediately adjacent to both open and closed routes. It is plausible, then, that individual MGS using resources adjacent to roads are more likely to be in harm's way than those animals occurring in roadless areas. It is also plausible that juvenile MGS, which are most likely to travel longer distances than adults, are somewhat more susceptible to vehicle impacts than adults. Although adults may still be susceptible to vehicle impacts within their somewhat-fixed home ranges, dispersing juveniles are likely to encounter more roads than an adult living within a fixed region.

The potential to crush squirrels likely increases as the prevalence and use of roads increases in a given region. Given the relatively higher incidence of cross-country travel in open areas (1998-2001 WMP data), vehicle impacts are more likely to occur in open areas and other places with similar densities of cross-country tracks, depending on resident and dispersing populations of the MGS. Gustafson (1993) reported that four BLM open areas "…occupy over 103,000 acres [161 square miles] within the range of the squirrel, although not all of the habitat in that acreage has been destroyed."

Data collected within the known range during tortoise surveys (1998, 1999, and 2001) show that vehicle impacts are heaviest inside and adjacent to designated open areas. This is not surprising, in that these areas are designated for vehicle recreation both on and off roads.

Two of the 23 sites trapped for the MGS in 2002 included the El Mirage and Spangler

Hills open areas (Leitner, pers. comm. 2002). However, the absence of squirrels cannot be attributed to vehicle use in those two areas. El Mirage is located south of Highway 58, where no MGS were captured on eight of the nine trapping grids, including the one in the open area. Nor were any of the high concentrations of winterfat and hopsage identified in 1998 (LaRue, unpublished data) associated with either open area.

Data show that there is a “spill-over” effect from the open areas, where relatively higher incidences of vehicle impacts were found in adjacent areas, compared to non-adjacent lands. The prevalence of cross-country vehicle tracks north of El Mirage Open Area will probably be reduced due to boundary fencing installed in the late 1990’s. Other areas, adjacent to Jawbone and Spangler Hills, remain susceptible to open area-related impacts as no fences have been installed.

Vehicle-based impacts may be prevalent in areas that are not adjacent to open areas. Within the MGS conservation area, these areas include lands within the Rand Mountains, west of Silver Lakes, within Kramer Hills, north of Hinkley, and southwest of Fort Irwin. Smaller areas also exist east and northeast of Fremont Peak, Fremont Valley, Iron Mountains north of Silver Lakes, Superior Valley (one 4-mile region), and southeast of Harper Lake.

Urban Development: The MGS has been reported near urban and in rural sites outside the MGS conservation area south of Highway 138, near Pinyon Hills, and a second occurred near an aerospace industrial complex located adjacent to Palmdale (Becky Jones, pers. comm. 2002). In the first case, the site and adjacent lands are comprised of extensive tracts of undeveloped lands and those with relatively light rural development. At the second site, there are about five to six contiguous square miles of relatively undeveloped land, but the entire area is surrounded by urban and agricultural development.

The MGS has also been observed in residential backyards in Inyokern (Peter Woodman, 2000 pers. com.), and may be seen foraging on the golf course at China Lake (Tom Campbell, pers. comm.). In 1991, Laabs (Tierra Madre Consultants, Inc. 1991) tentatively identified an MGS burrow in the edge of an agricultural field in northeastern Lancaster. One squirrel was recently trapped at the proposed Hundai facility south of California City, where the consultant had identified habitats as being marginal (Michael Connor, pers. comm. 2002). In these latter cases, the sightings are adjacent to extensive areas of undeveloped lands.

Given these observations, the only certain areas of MGS extirpation within the range are those that have been physically developed. Such areas include, but are not limited to, paved roads and parking lots; residential, commercial, and industrial sites occupied by buildings, graded areas, and other areas where vegetation has been mechanically removed; solar facilities at Kramer Junction and Harper Lake; and large mined areas (U.S. Borax, Rand Mining Company, portions of the Shadow Mountains located east of Edwards AFB). Degraded habitats typify lands adjacent to cities and unincorporated communities. Site-specific data exist in consultant reports, which for the most part are inaccessible.

M.3 CURRENT MGS MANAGEMENT AREAS

Table M-3 identifies those managements areas that have been designated by the BLM's CDCA Plan that provide some form of management protection for the Mohave ground squirrel.

Table M-3
MGS Management Areas Identified In The BLM's CDCA Plan

MANAGEMENT AREA DESCRIPTIONS	SIERRA MOJAVE TECHACHAPI ECOTONE	ROSE VALLEY	DESERT TORTOISE NATURAL AREA	WESTERN MOJAVE CRUCIAL HABITAT	SUPERIOR VALLEY
Acreage	162,000	18,000	26,000	512,000	55,000
Species Status Information					
Target Species	MGS	MGS	Tortoise MGS	Tortoise MGS	Tortoise MGS
Special Wildlife Habitat	Yes	ND[7]	ND	Yes	Yes
Federally Listed Species[8]	No	No	No	No	No
State Listed Species	MGS	MGS	MGS	MGS	MGS
BLM Sensitive Species	No	No	Tortoise	Tortoise	ND
Area of Critical Environmental Concern	Yes[9]	No	Yes	No	No
Special Area	Yes	Yes	Yes	Yes	Yes
Habitat Management Plan	2-5 years	2-5 years	Complete	2-5 years	5-7 years
Other Designation					
Sikes Act Agreement	Yes	Yes	Yes	No	Yes
Specific Management Actions Requiring Immediate Implementation (1-3 years)					
Control Vehicle Access	Yes	No	No	Yes	No
Establish a Cooperative Agreement	Yes	No	No	Yes	No
Increase Surveillance	Yes	No	Yes	Yes	No
Restrict Camping and/or Parking	Yes	No	No	Yes	No
General Long Term Goals					
Land Acquisition	No	No	Yes	Yes	No
Change Livestock Grazing Practices	Yes	No	No	Yes	No

[7] ND = Not designated by the CDCA Plan for the expressed purpose of managing for MGS.

[8] In 1980 the tortoise was not federally listed, but rather designated as a BLM Sensitive Species.

[9] Jawbone-Butterbredt ACEC

MANAGEMENT AREA DESCRIPTIONS	SIERRA MOJAVE TECHACHAPI ECOTONE	ROSE VALLEY	DESERT TORTOISE NATURAL AREA	WESTERN MOJAVE CRUCIAL HABITAT	SUPERIOR VALLEY
Protect, Stabilize, Enhance Values	Yes	Yes	Yes	Yes	Yes

Table M-4 list the acreage of 18 wilderness areas for those portions that are inside and outside the MGS range. Those areas with a single asterisk are partially within the range; Malpais Mesa is outside the planning area, but partially within the range.

Table M-4
Locations and Acreage of 18 Wilderness Areas
Relative to the Range of the Mohave Ground Squirrel

WILDERNESS AREAS (MI^2)			
	TOTAL	INSIDE RANGE	OUTSIDE RANGE
INSIDE THE RANGE			
Black Mountain	33 mi^2	33 mi^2	All inside
Coso Range	82	82	All inside
Darwin Falls	13	13	All inside
El Paso Mountains	38	38	All inside
Golden Valley	57	57	All inside
Grass Valley	51	51	All inside
Argus Range	100	20	80
Kiavah	134	45	89
Malpais Mesa	50	18	32
Owens Peak	116	43	73
Sacatar Trail	78	30	48
Totals	**752 mi^2**	**430 mi^2 Inside**	**322 mi^2 Outside**
OUTSIDE THE RANGE			
Bighorn Mountain	42 mi^2	All outside	
Bright Star	13	All outside	
Cleghorn Lakes	62	All outside	
Newberry Mountains	43	All outside	
Rodman Mountains	54	All outside	
San Gorgonio	85	All outside	
Sheephole Valley	53	All outside	
Total Outside	**352 mi^2**		

APPENDIX N

WEST MOJAVE PLAN

SOCIO-ECONOMIC ANALYSIS

APPENDIX N
West MOJAVE PLAN
SOCIO-ECONOMIC ANALYSIS

Prepared by:
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April 2003

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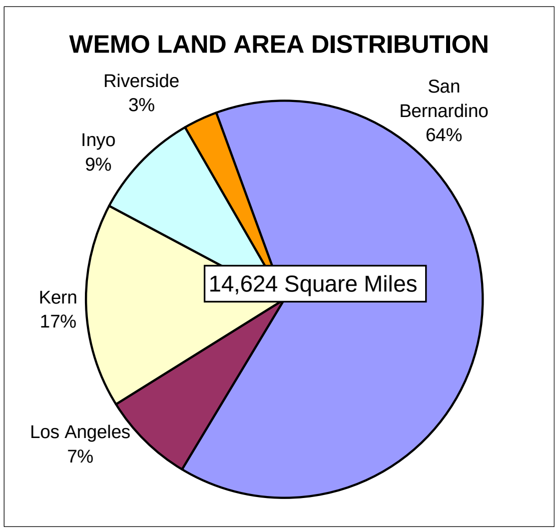
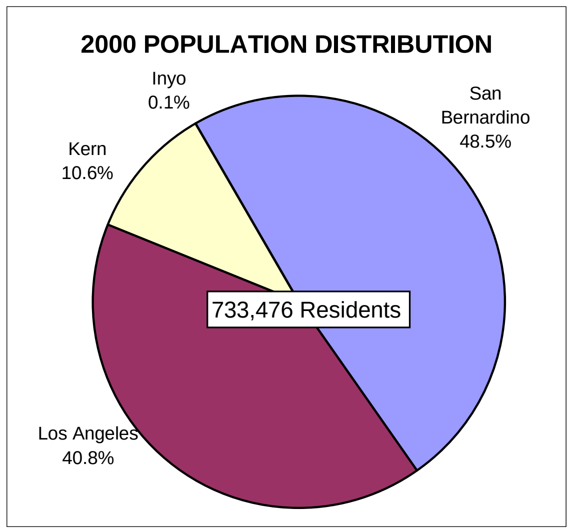
Existing Socio-Economic Setting

Socio-Economic Overview

Encompassing nearly 9.36 million acres, the West Mojave Plan Area (WEMO) is a substantial geographic region. If WEMO existed as separate corporate county, it would rank as the 2nd largest in the State behind San Bernardino County in terms of total land area. This large study area hosts over 733,000 residents (2000 Census) and would rank as the 13th most populated County in the State. WEMO, however, encompasses portions of five separate counties. The corresponding land area and resident population base within each of the respective county subareas that comprise WEMO is graphically summarized below.





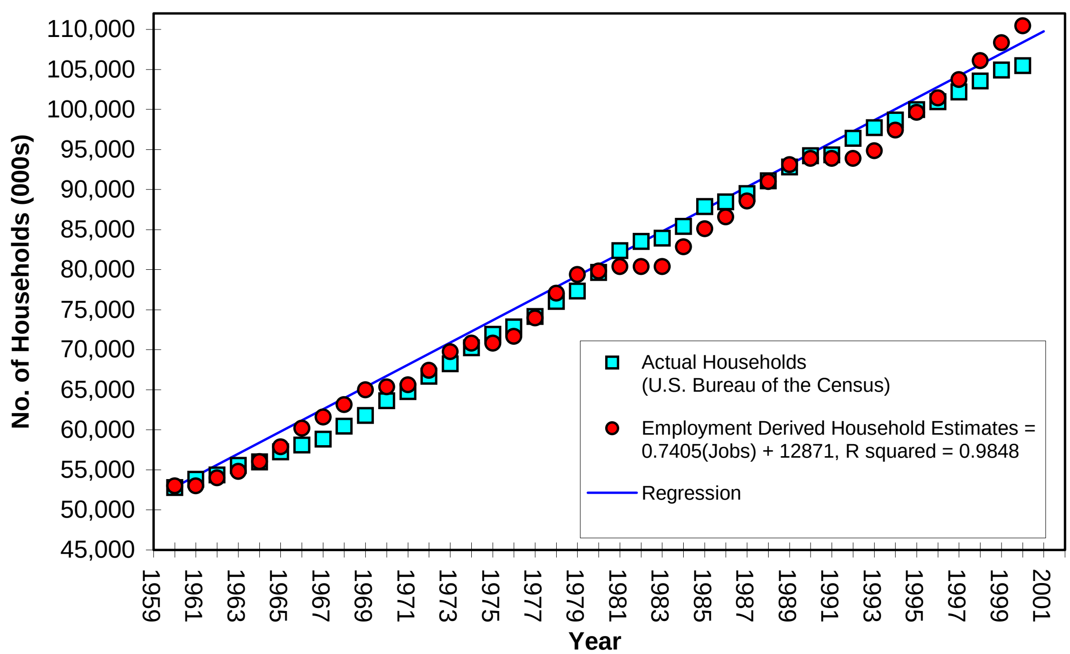
Approximately 3.0 percent or 262,000 acres of WEMO is within a portion of Riverside County that is Federally owned and designated as a National Park (Joshua Tree National Park) and habitat conservation open space. The resident population base and associated building and employment activity in this subarea is minimal and primarily defined by existing park service and habitat conservation activities. Socio-economic conditions within this Riverside County subarea will remain unaffected by the habitat conservation program proposed under WEMO. As such, the analysis of existing socio-economic conditions and potential effects associated with WEMO is effectively limited to conditions and impacts found within the other four remaining subareas comprising 97.0 percent of the study area.

The WEMO area constitutes a vast geographic region, exceeded in size by only one county in California, and hosts about 730,000 residents. In totality, the WEMO population base is significant but is widely dispersed in scattered concentrations ranging from as few as 25,000 residents in such areas as Barstow and Ridgecrest to more than 200,000 in the Palmdale-Lancaster area of Los Angeles County and also the Victor Valley area of San Bernardino County. A mature self-generating economy, by contrast, is invariably characterized by a relatively dense concentration of population in excess of 1.0 million residents (arguably more) due to the specialized nature of workforce skills and equally specialized industry sectors that exist in the 21st Century. The WEMO area is too small and dispersed to be realistically considered a self-generating economy. The WEMO area also is situated along the periphery of the huge Southern California industrial complex, even though certain industries such as aerospace, mining, military, and government operations have long provided local employment to area residents. By and large, the WEMO area is influenced and driven by growth within the larger economic region of which it is a part, namely Southern California.

The six-county Southern California region (Los Angeles, Orange, San Diego, San Bernardino, Riverside, and Ventura counties) hosting 19.7 million residents and 8.0 million nonagricultural wage and salary jobs in 2001 constitutes the principal economic engine driving demand for household formation within various sub locations of this region, such as WEMO. Kern County hosting 681,000 residents and 200,000 nonagricultural jobs in 2001 is expected to have a modest influence on housing and population growth in the Kern subarea of WEMO, since this region of Kern County is closely tied to the Antelope Valley area of Los Angeles County. Finally, Inyo County with less than 20,000 residents, and a heavy of mix of population-serving retail trade, service, and government jobs is not expected to function as a significant employment-based driver of WEMO area housing and population growth.

Historic Regional Trends

An understanding of growth trends across the greater Southern California region provides insight about socio-economic relationships that have influenced historic growth and can be expected to influence future growth in the sub-region environments such as WEMO. A wide variety of socio-economic factors can be evaluated but changes in population, employment, and housing reflect principal drivers of urbanization and associated economic activity. Area population growth is a product of household formation. Household formation is primarily driven by the availability of employment, with the exception of retirement households. Household formation closely correlates with nonagricultural employment gains as the following chart of U.S. households and employment-derived estimate of households indicates:



The illustrated correlation reflects an intuitive perception that most households require a means of gainful employment to pay necessary housing cost, whether as renters or owners. Population growth is sometimes used as a predictive indicator of the demand for housing, although the statistical correlation between population and housing is lower than noted above, and the logical argument for the use of population versus employment to evaluate housing demand is debated. The following discussion is supplemented by a series of detailed tables included in the A-Exhibits at the end this report.

Population

Total population within the six-county region of Southern California, plus Kern County, grew by 6.54 million residents over the 21-year period from 1980 to 2001 as summarized below:

TOTAL POPULATION GROWTH

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	7,498,300	1,947,000	668,700	897,800	1,876,500	529,700	13,418,000	406,350	13,824,350
1990	8,910,342	2,420,953	1,183,814	1,430,644	2,509,842	671,060	17,126,654	548,837	17,675,491
2001	9,739,331	2,909,854	1,613,966	1,762,397	2,889,076	772,624	19,687,247	680,598	20,367,845

Source: California Department of Finance; Alfred Gobar Associates.

Inyo County is addressed on a supplementary basis in regard to regional trends for the following reasons. This subarea is geographically isolated from the Southern California region and, as such, regional economic growth (population, housing, and employment) is expected to exert limited pressure for future growth in Inyo County. The household population base of Inyo County has also experienced very little change between 1980 (17,682 persons) and 2001 (18,042 persons). Further, the southern portion of Inyo County accounts for less than 0.1 percent, or roughly 600 residents, of the population base of WEMO. Corresponding housing, and employment trends roughly parallel the indicated household population trend.

As summarized above, total population throughout Southern California grew at an average annual rate of 1.84 percent, while total population in the three counties hosting the most populated subareas of WEMO grew by 1.25 percent (Los Angeles), 3.26 percent (San Bernardino), and 2.49 percent (Kern County) on average over the same reference period. Since 1990, the rate of population growth has slowed relative to the average rate experienced over the entire 21-year interval. Since 1990, total population in Southern California increased at an average annual rate of 1.27 percent with a corresponding rate of 0.81 percent for Los Angeles County, 1.91 percent for San Bernardino County, and 1.98 percent for Kern County.

In absolute terms, Los Angeles County accounts for the largest increase in total population, even at a significantly slower rate of growth than in other counties. Due to sheer size, Los Angeles County will continue to account for the largest share of total population in Southern California over the long run. The pattern of population growth, however, is shifting and outlying sub-regions are capturing a greater share of total growth as indicated below:

DISTRIBUTIVE SHARE OF TOTAL POPULATION

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	54.2%	14.1%	4.8%	6.5%	13.6%	3.8%	97.1%	2.9%	100.0%
1990	50.4%	13.7%	6.7%	8.1%	14.2%	3.8%	96.9%	3.1%	100.0%
2001	47.8%	14.3%	7.9%	8.7%	14.2%	3.8%	96.7%	3.3%	100.0%

Source: California Department of Finance; Alfred Gobar Associates.

As shown, outlying counties such as Riverside, San Bernardino, and Kern have steadily increased their respective share of total population over the 21-year reference period. An indexed measure of the shifting pattern of population growth, relative to conditions that existed in 1980, further illustrates these trends:

INDEXED SHARE OF POPULATION RELATIVE TO 1980

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1990	0.93	0.97	1.38	1.25	1.05	0.99	1.00	1.06	1.00
2001	0.88	1.01	1.64	1.33	1.04	0.99	1.00	1.14	1.00

Source: California Department of Finance; Alfred Gobar Associates.

Employment

Southern California growth trends describing total population are influenced by trends describing nonagricultural employment and related housing construction. Since 1980 the nonagricultural employment base for Southern California and Kern County has grown by 34.0 percent as indicated below:

TOTAL NONAGRICULTURAL WAGE AND SALARY EMPLOYMENT

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	3,610,400	836,400	189,704	244,296	650,300	152,900	5,684,000	131,200	5,815,200
1990	4,133,300	1,172,400	304,200	408,500	966,600	230,300	7,215,300	170,700	7,386,000
2001	4,093,900	1,418,300	472,400	556,700	1,221,600	280,200	8,043,100	200,000	8,243,100

Source: California Employment Development Department; Alfred Gobar Associates.

The aggregate increase in nonagricultural employment throughout the region since 1980 equates to an average annual growth rate of 1.68 percent. This 21-year average rate is significantly lower than the corresponding rate between 1980 and 1990 (2.42 percent) but significantly higher than the average rate since 1990 (1.00 percent). The seven-County region created 1.57 million new jobs (net) between 1980 and 1990 compared to 0.86 million (net) since 1990. On a combined basis, economic growth within the three WEMO area counties (Los Angeles, San Bernardino, and Kern) created about 138,000 additional jobs (net) since 1990, or 16.1 percent of net employment gains throughout the region. By contrast, the corresponding share of total job gains between 1980 and 1990 was 46.3 percent. The share of employment growth occurring in the three WEMO area counties has been substantially less since 1990 than during the previous decade.

The reduced rate of employment growth among the WEMO area counties is indicative of broader employment trends describing overall economic expansion throughout the region as indicated by the following employment share data:

DISTRIBUTIVE SHARE OF TOTAL EMPLOYMENT

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	62.1%	14.4%	3.3%	4.2%	11.2%	2.6%	97.7%	2.3%	100.0%
1990	56.0%	15.9%	4.1%	5.5%	13.1%	3.1%	97.7%	2.3%	100.0%
2001	49.7%	17.2%	5.7%	6.8%	14.8%	3.4%	97.6%	2.4%	100.0%

Source: California Employment Development Department; Alfred Gobar Associates.

In 1980, Los Angeles County accounted for 62.1 percent of nonagricultural employment throughout the Southern California region, including Kern County. By comparison, Los Angeles County's respective share was down to 49.7 percent in 2001. In fact, aggregate 2001 employment within Los Angeles County remains below levels reported in 1990 due to the protracted recession during the early 90's and heavy losses in the manufacturing sector, particularly aerospace and defense related jobs. By comparison, San Bernardino County has captured an increasing share of employment (from 4.2 percent in 1980 to 6.8 percent in 2001), while the corresponding share for Kern County has remained relatively constant (2.4 percent).

Since 1980, net employment gains in Orange County (581,000 jobs) and San Diego County (571,300 jobs) have each exceeded net employment gains in Los Angeles

County (483,500 jobs), which accounted for 62.1 percent of the region's employment in 1980. Since 1990, these two counties have led all other individual counties in job growth. Both Riverside and San Bernardino County are commonly recognized as a single metropolitan statistical area (Inland Empire) for purpose of tracking most socio-economic trends. On the basis of this definition, the Inland Empire has actually led Southern California in net employment gains since 1990 (314,400 jobs). As these trends suggest, the proportionate share of nonagricultural employment growth has been shifting over the 21-year reference period, principally from Los Angeles County to the other six counties as the following indexed measures further illustrate:

INDEXED SHARE OF EMPLOYMENT RELATIVE TO 1980

	Southern California								So Cal
	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Total	Kern	Including
Year	County	County	County	County	County	County	So Cal	County	Kern Co.
1980	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1990	0.90	1.10	1.26	1.32	1.17	1.19	1.00	1.02	1.00
2001	0.80	1.20	1.76	1.61	1.33	1.29	1.00	1.08	1.00

Source: California Employment Development Department; Alfred Gobar Associates.

Average annual rates of growth are useful in describing overall long-term trends that affect a region. Economic growth, however, is cyclical in nature and subject to volatility on a year-to-year basis. The Southern California economy has not been immune to such volatility since 1980 as the graph in Exhibit 1 indicates. The graph covers two recession periods, a sharp but relatively short recession from 1982 to 1983 then a more severe and protracted recession that started in 1990 then bottomed out in 1993 before significant recovery began in 1995. The graph also depicts the onset of the current economic slump that began in earnest throughout California following the technology sector fallout at the end of 2000. Careful review of the graph shows that San Bernardino County and Kern County weathered the recession of the early 90's fairly well while Los Angeles County suffered the most. The impact of the 90's recession on aggregate employment levels is graphically depicted in Exhibit 2. As shown, the Southern California economy did not return to 1990 employment levels until 1997, and Los Angeles County has not yet recovered all jobs lost during the early 90's.

Housing

Southern California housing growth trends are also characterized by year-to-year volatility and shifting development activity throughout the region. Since 1980 roughly 1.93 million construction permits have been issued for new housing development. The average annual volume of development activity for all forms of housing (detached, attached, condo, apartment, etc.) is summarized below:

AVERAGE ANNUAL UNITS CONSTRUCTED - ALL HOUSING

	Southern California								So Cal
Period	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1981-85	31,073	13,211	11,904	13,654	21,740	3,694	95,276	4,912	100,188
1986-90	50,112	20,366	23,277	21,556	27,547	4,916	147,773	4,496	152,269
1991-95	10,166	7,911	7,920	5,708	6,658	1,977	40,338	3,556	43,894
1996-00	11,963	11,379	11,799	5,927	12,353	3,265	56,686	3,008	59,694
2001	18,118	8,585	18,097	8,395	15,468	3,453	72,116	3,494	75,610
22 Yr Avg	25,611	12,902	13,656	11,410	16,824	3,488	83,890	3,925	87,815

Source: Bureau of the Census - Construction Statistics Division; Alfred Gobar Associates.

Inyo County housing growth is not explicitly described above but grew at an average annual rate of approximately 28 dwelling units per year between 1980 and 2000. In contrast to Southern California trends, average annual construction throughout the entire County averaged close to 33 units per year between 1990 and 2000 compared to 23 units per year between 1980 and 1990.

Regional trends identified above clearly show that the volume of development activity in all seven counties of the region has dropped considerably since peak building activity between 1984 and 1989. The 80’s reflected a period of rampant overbuilding fueled by lack of oversight in the savings and loan industry and inadequate foresight on the part of many developers. Housing construction activity was significantly outpacing sales volume just as the Southern California economy was being impacted by the post-Cold War recession in 1990. In effect, the bottom dropped out of Southern California’s aerospace and defense industry, heavily concentrated in Los Angeles County, which fueled more wide spread job losses as illustrated in Exhibit 3. During the subsequent recovery period (1995 to 2000), annual job growth began to approach previous peak levels but housing development has continued at much more moderate levels.

The employment and housing market collapse in the early 90's ushered a shift in the pattern of housing development activity throughout Southern California, albeit at a significantly slower pace than during the 80's. After 1990, Orange, Riverside, Ventura, and Kern County began to capture significantly greater shares of housing development activity than during the previous decade as summarized below:

DISTRIBUTIVE SHARE OF TOTAL HOUSING ACTIVITY

	Southern California								So Cal
Period	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1981-85	31.0%	13.2%	11.9%	13.6%	21.7%	3.7%	95.1%	4.9%	100.0%
1986-90	32.9%	13.4%	15.3%	14.2%	18.1%	3.2%	97.0%	3.0%	100.0%
1991-95	23.2%	18.0%	18.0%	13.0%	15.2%	4.5%	91.9%	8.1%	100.0%
1996-00	20.0%	19.1%	19.8%	9.9%	20.7%	5.5%	95.0%	5.0%	100.0%
2001	24.0%	11.4%	23.9%	11.1%	20.5%	4.6%	95.4%	4.6%	100.0%

Source: Bureau of the Census – Construction Statistics Division; Alfred Gobar Associates.

The indicated shift in housing development activity, starting after 1990, generally reflects the corresponding shift in share of employment (positive or negative) throughout the region with the exception of San Bernardino County. San Bernardino County's share of regional housing activity began declining after 1990, despite accounting for increasing shares of regional nonagricultural employment.

Relative changes in housing activity within the three WEMO area counties and Southern California is graphically illustrated in Exhibit 4. Since the market decline in 1990, the volume of housing development activity throughout Southern California has grown modestly but has yet to surpass the average indexed volume for the 22 reporting periods shown. The same housing cycle pattern applies to San Bernardino and Los Angeles County, while Kern County housing trends indicate this submarket is less affected by Southern California housing dynamics.

Job-Housing Mix

The Southern California economy has been characterized by a shifting pattern of employment, housing, and population growth trending outward from the traditional urban centers. The interrelationship of job and housing growth is illustrated in Exhibit 5 for Southern California overall and each county sub-region. For the 22 reporting periods shown, Southern California's economy has effectively generated 1.20 nonagricultural wage and salary jobs per household, although this average has fluctuated in cyclical fashion. In 1980, Los Angeles County was the traditional employment center and led all other counties in local jobs per occupied household, followed by Orange County fast emerging as an employment center at that time. Since 1980, the ratio of local jobs per occupied household has increased substantially in Orange County (1.51 jobs per household in 2001), and San Diego County (1.22 jobs per household in 2001). Despite substantial employment losses during the early 90's, Los Angeles County recently has been generating local jobs at a ratio approaching its long-term average rate (1.31 jobs per household). Relatively isolated employment submarkets in Ventura County and Kern County have also increased relative job-housing performance since the early 90's. The rate of local job growth in San Bernardino County and Riverside County has accelerated since 1995, but these sub-regions continue to lag the overall region (0.98 jobs per household). A significant portion of housing growth within these two sub-regions continues to reflect the sub-region's attraction as an affordable housing destination for workers commuting to jobs in the major metropolitan employment centers.

Whether or not outlying sub-regions, such as the WEMO area, can realistically reflect the Southern California equilibrium ratio of local jobs to occupied housing (1.20 persons per household on average since 1980) is debatable. In 1980, San Diego County represented a sizeable and relatively isolated local economy with a population of 1.88 million persons and jobs-housing mix of 0.97 jobs per occupied household. In 1980 Kern County also represented a relatively isolated but significantly smaller local economy with a population base of 406,000 persons, and had a jobs-housing mix of 0.94 jobs per occupied household. Between 1980 and 2001, the local job base in Kern County grew 52.0 percent, but the job-housing mix remains at a ratio of 0.95 jobs per occupied household. The noted increase in the jobs-housing mix in Ventura County has been significantly influenced by the proximity of Westlake Village, Thousand Oaks, and Simi Valley to San Fernando Valley and the greater Los Angeles employment complex.

Wealth and Income

Personal income data provides some useful insight about the relative distribution of wealth throughout the region and extent discretionary income available to households within distinct sub-regions may be growing or failing to keep pace with inflationary pressure. Personal income generally includes private earnings, plus income from government and government enterprises, dividends, interest, rent, and transfer payments (social security, pensions, Medicare, etc.) less earnings contributed to social security. Personal income is not the same as wages and salary earnings but includes wages and salary as part of a broader measure of personal wealth. In 2000, reported personal income throughout Southern California and Kern County exceeded $575.0 billion. The distribution of personal income among the region's households for selected periods since 1990 is summarized as follows:

PERSONAL INCOME PER HOUSEHOLD

	Southern California								So Cal
	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Total	Kern	Including
Year	County	County	County	County	County	County	So Cal	County	Kern Co.
1990	$65,481	$74,890	$57,185	$53,677	$59,864	$69,594	$64,606	$50,483	$64,179
1995	70,649	82,645	60,593	57,266	67,183	79,026	70,295	54,825	69,798
2000	89,529	109,505	78,815	72,127	91,684	96,993	90,787	64,240	89,902

Source: California Statistical Abstract; Bureau of Labor Statistics; Department of Finance; California State University, Long Beach; Alfred Gobar Associates.

Estimated 2000 personal income for the region is about $90,800 per household. Clearly, this is not the average household income level describing the region but reflects an equivalent level of wealth generated per occupied household. The corresponding distribution of wealth is summarized for each County as an index, relative to Southern California:

INDEXED PERSONAL INCOME PER HOUSEHOLD (COUNTY VS SOUTHERN CALIFORNIA)

	Southern California								So Cal
	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Total	Kern	Including
Year	County	County	County	County	County	County	So Cal	County	Kern Co.
1990	1.01	1.16	0.89	0.83	0.93	1.08	1.00	0.78	0.99
1995	1.01	1.18	0.86	0.81	0.96	1.12	1.00	0.78	0.99
2000	0.99	1.21	0.87	0.79	1.01	1.07	1.00	0.71	0.99

Source: California Statistical Abstract; Bureau of Labor Statistics; Department of Finance; California State University, Long Beach; Alfred Gobar Associates.

As shown, personal income per household within two of the three WEMO area counties has been consistently lower than Southern California overall. The lower level of personal income does not necessarily imply less income available for baseline and discretionary expenditures since housing costs in these sub-regions is also lower. Gains in personal income reflect an important consideration that helps gauge whether or not income available to area households is keeping pace with the cost of living. The following summary describes the increase in personal income per household relative to 1990:

INDEXED PERSONAL INCOME PER HOUSEHOLD (REFERENCE YEAR VS 1990)

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1990	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1995	1.08	1.10	1.06	1.07	1.12	1.14	1.09	1.09	1.09
2000	1.37	1.46	1.38	1.34	1.53	1.39	1.41	1.27	1.40

Source: California Statistical Abstract; Bureau of Labor Statistics; Department of Finance; California State University, Long Beach; Alfred Gobar Associates.

The Consumer Price Index (CPI) for All Urban Consumers in Southern California increased at an average annual rate of 2.36 percent between 1990 and 2000. Based on this rate of inflation, the corresponding 2000 index should equal or exceed 1.26 if personal income per household in each sub-region is keeping up with inflation. As shown, overall wealth in each respective sub-region of Southern California has matched or exceeded the corresponding rate of inflation.

Because housing costs constitutes the largest single component of living expense, another useful gauge of the effective increase or decrease in personal wealth is to compare relative gains in personal income per housing unit to relative increases in the price of housing. This form of comparison for Southern California is graphically illustrated in Exhibit 6. While average housing cost has increased 37.0 percent in 12 years to $275,000 in 2000, corresponding personal income has increased 65.0 percent. Households as a whole have benefited from disproportionately larger increases in personal income than the corresponding cost of housing.

Projected Regional Growth

Historic trends describing regional growth between 1980 and 2000 reflect a period of significant flux including two recessions followed by two sustained periods of economic recovery and expansion. Each cycle has contributed to the dispersion of economic activity across the region with relatively greater shares of growth occurring in outlying areas that previously served as host locations for workforce commuters. An outgrowth of the economic cycles discussed above and preceding cycles has been the emergence of new centers of economic activity. The overall progression, however, has not been linear or immune to contraction. This is particularly true in peripheral housing markets that are first to feel the impact of fluctuations in the regional economy and last to reap the benefits of premium pricing pressure associated with sustained periods of growing demand. The WEMO area reflects a peripheral employment and housing market in the context of the greater Southern California economy, of which it is largely a part. As such, future growth in WEMO is linked to the level of growth anticipated throughout the entire region.

Several agency sources have been compiled and referenced to describe projected long-term growth within the seven-County region evaluated above in terms of historic trends. Specifically, research projections prepared by several Council of Government (COG) agencies – Southern California Association of Governments, San Diego Association of Governments, and Kern Council of Governments, and the California Department of Finance (DOF) have been used to describe the regional growth outlook from 2000 to 2020. By comparison, the WEMO Habitat Conservation Plan (HCP) will be implemented and managed over a 30-year period, up to 15 years longer than the projections compiled from agency sources. To address the extended project period describing WEMO, a least-squares method of extension was used to trend agency-driven growth projections through the Year 2035.

Long-term growth projections reflect a far-reaching vision based on current understanding of socio-economic dynamics, observation of historic interactions, and anticipated future interactions. Population projections generally consist of three fundamental components: a natural rate of growth (the difference between births and deaths as influenced by the existing age-cohort structure); net domestic migration (from other U.S. States); and international immigration (both documented and undocumented). Considerable expertise and resources are used in the preparation of published projections since they establish the framework for government programs and policies, infrastructure planning, finance, and other forms of capital investment. Due to their inherent predictive nature and the extended time frame for their application, even the best of projections will inevitably fail to anticipate all socio-economic dynamics and consequently overestimate or underestimate conditions at the end of the projection period. This reality can be illustrated using the 1982 SCAG forecast projections for a five-County portion of Southern California as follows:

COMPARATIVE SUMMARY OF PROJECTED VS REPORTED POPULATION

Agency Source	1980	2000	Chg 80-00	Avg Yrly Rate
SCAG 1982 Forecast (5-County)	11,444,800	14,438,100	2,993,300	1.17%
DOF (Census Adj. E-5 Reports)	11,541,500	16,652,573	5,111,073	1.85%
Difference:	(96,700)	(2,214,473)	(2,117,773)	n.a.
Difference As % of DOF:	0.84%	13.30%	41.43%	

Source: Southern California Association of Governments; California Department of Finance

If applied without periodic update and revision the 1982 growth projections effectively underestimated cumulative population growth by 13.3 percent over the 20-year time frame identified.

It is important to recognize that the seemingly tenuous nature of long-term projections is inextricably tied to the inability to accurately predict the future, which is dependent on interactions within a complex social structure (Southern California) heavily influenced by environmental, economic, political, and international factors. The challenge remains, nonetheless, and the outlook for future growth must be anticipated on the basis of current understanding. Summarized below are alternative population projections for a portion of the broader region used to describe the economic environment influencing future growth within the WEMO area:

COMPARATIVE SUMMARY OF SOUTHERN CALIFORNIA PROJECTIONS

Agency Source	2000	2020	Chg 00-20	Avg Yrly Rate
SCAG 2001\ Forecast (5-County)	16,670,256	21,024,482	4,354,226	1.17%
DOF (Interim County Projections)	16,589,860	21,461,403	4,871,543	1.30%
Difference:	80,396	(436,921)	(517,317)	n.a.
Difference As % of DOF:	0.48%	2.04%	10.62%	

Source: Southern California Association of Governments; California Department of Finance

These alternative projection sources are reasonably close in terms of their respective estimate of total household population that will exist in 2020 (2.04 percent difference).

For purpose of assigning future growth to the WEMO area, an average of the two projection sources noted above is used as summarized in Exhibit 7 for the seven-County Southern California regional environment and the WEMO Counties. As shown, the seven-County regional environment is projected to increase by 51.0

percent or 10.3 million residents over a 35-year period, equal to an average annual rate of 1.18 percent. For purpose of comparison, the regional environment grew at an average annual rate of 2.49 percent between 1980 and 1990 and at 1.35 percent annually between 1990 and 2000. In relative terms, the regional environment is projected to grow at a relatively slower pace over the next 20 to 35 years than was true during the previous 20 years. In absolute terms, the population is projected to grow by about 300,000 residents per year between 2000 and 2020, compared to an average of 320,000 per year between 1980 and 2000 (roughly 6.0 percent less per year on average). Because the regional environment was 1.5 times larger in 2000 than in 1980, a lower rate of growth supports a comparable volume of absolute growth. Similar dynamics are expected to characterize growth over the next 20 to 35 years.

Also shown in Exhibit 7 is a breakout for a portion of the regional environment represented by the WEMO Counties (including Los Angeles, San Bernardino, Kern, and Inyo Counties). Due to the size of the population and employment base in Los Angeles County, the WEMO Counties are projected to account for more than 50.0 percent of total increase throughout the region over the next 20 to 35 years, even at considerably slower rates of average annual growth. In the future, the effective share of total population, employment, and housing in the WEMO Counties sub-region is projected to decline (population from 60.0 percent in 2000 to 57.0 percent in 2035) as other counties and sub-regions capture increasing amounts of future growth. The future outlook for growth in the WEMO area, therefore, must be considered in relation to its host counties that constitute a majority but diminishing share of regional economic activity.

WEMO Area Demographics

The WEMO study area extends across large portions of four counties with a combined 2000 Census population (11.7 million residents) representing nearly 35.0 percent of the corresponding Statewide population (33.8 million residents). The vast majority of residents in the four-County region, however, reside in substantially developed and urbanized settings with average population densities generally ranging from 2,500 persons to more than 7,500 persons per square mile. The high desert setting of the WEMO study area is significantly less populated, accounting for nearly 34.0 percent of the four-County land area but only 6.3 percent of its resident population base. Even within the incorporated boundaries of the eleven WEMO area cities (accounting for 71.0 percent of the WEMO population base), the average population density is about 680 persons per square mile. The Census Bureau utilizes a minimum threshold of 1,000 person per square mile to denote an urbanized setting. The WEMO study area is rural in character and distinctly different than the urbanized setting hosting the majority of residents in the four-County region.

Demographic traits describing the 2000 population base of the four WEMO subarea regions are detailed in Exhibit 8. Included in the B-Exhibits at the end of this report is a series of demographic tables identifying Statewide, County, study area, and City-level demographic traits from the 2000 Census and corresponding data from the 1990 Census. Selected demographic attributes of the WEMO study area are described below with respect to differences that distinguish each of the County subareas.

Age Distribution

- Overall, WEMO has a relatively young population base. The median age describing WEMO area residents is 31.7 years (2000 Census) compared to 33.3 years for the State overall. The population base of WEMO has been aging relatively quickly over the past 10 years. The median age was 26.9 years in 1990 but has since increase by 18.0 percent. The Statewide median age has also increased in the last 10 years but at half the rate (9.0 percent).
- Overall, WEMO has a greater share of children and young adults 20 years of age or younger (36.7 percent) than was true for the State as a whole in 2000 (31.6 percent). The relative abundance of young people representing the area's future labor base market is greatest within the Los Angeles subarea (38.7 percent). Inyo County is the only subarea whose proportion of youth (26.2 percent) is below the Statewide average.
- The proportion of residents 55 years and older throughout WEMO (17.5 percent) is slightly lower than typical throughout the State (18.4 percent) as is the proportion of young working age adults 21 to 34 years of age (17.4 percent versus 21.0 percent). The proportion of working age adults in their primary earning years (35 to 54 years of age) is comparable to the Statewide average (29.0 percent).
- Within the WEMO subareas, there is a greater proportion of retirement age seniors (65+ years of age) in the San Bernardino and Inyo subareas but a significantly smaller proportion within the Los Angeles subarea. Similarly, there is a greater proportion of pre-retirement working age adults (55 to 64 years of age) in the Kern and Inyo subareas and smaller proportion in Los Angeles County. The San Bernardino subarea has the highest proportion (18.2 percent) of young working age adults (21 to 34 years of age) but still lags the Statewide average (21.0 percent).

Household Type and Size

- Overall, WEMO has a relatively high proportion of family households. Families represent 75.0 percent of all WEMO area households compared to 68.9 percent for the State. The proportion of families as a share of total WEMO households has declined over the last 10 years from 76.4 percent in 1990. By comparison, families as a share of all households have increased slightly throughout the State from 68.7 percent.
- Throughout WEMO the proportion of family households is highest in the Los Angeles subarea (76.6 percent) followed by San Bernardino (74.7 percent), Kern (71.3 percent), and Inyo (59.8 percent). Families as a share of all households in each subarea have declined since 1990 but remain above the Statewide average, with the exception of the Inyo subarea.
- The average household size throughout WEMO (2.92 persons per household) is comparable to the Statewide average (2.87 persons per household). The average household size throughout WEMO increased slightly since 1990 but decreased in the San Bernardino subarea (2.90 to 2.84 in 2000) and the Kern subarea (2.80 in 1990 to 2.65 in 2000). The largest average household size is in the Los Angeles subarea (3.12 persons per household) and smallest is in the Inyo subarea (2.37 persons per household).
- Small households (2 or fewer persons) account for 46.6 percent of all WEMO households compared to 53.1 percent throughout the State in 2000. Small households make up a substantially greater share of total households in the Kern subarea (57.1 percent) and Inyo subarea (75.5 percent). Large households (5 or more persons) account for 17.2 percent of total WEMO households compared to 15.9 percent throughout the State. The Los Angeles subarea has the greatest proportion of large households (20.2 percent), followed by San Bernardino (16.1 percent), Kern (12.1 percent), and Inyo (7.4 percent).

Racial-Ethnic Composition

- The WEMO study area contains a relatively homogenous population base when compared to the State as a whole. The single largest racial-ethnic group includes Non-Hispanic Whites representing 58.0 percent of the entire population base compared to 46.7 percent for the State. Despite its relatively homogenous character, WEMO has experienced increased racial-ethnic diversification since 1990 when 73.9 percent of the population base consisted of Non-Hispanic Whites. Racial-ethnic groups contributing most to the areas increased diversification include Hispanics (from 16.4 percent in 1990 to 25.9 percent in 2000), Blacks (from 5.8 percent to 9.3 percent), and persons of some other or mixed race (from 0.2 percent to 3.1 percent).
- WEMO subareas with the greatest racial-ethnic diversification include Los Angeles and San Bernardino, the two most populated subareas. In all subareas the single largest racial-ethnic group includes Non-Hispanic Whites (73.7 percent – Inyo; 70.7 percent – Kern; 61.5 percent – San Bernardino; and 50.5 percent – Los Angeles). Hispanics make up the second largest single racial-ethnic group (29.5 percent – Los Angeles; 25.0 percent – San Bernardino; 21.5 percent – Inyo; and 16.6 percent – Kern).

Housing Type and Tenure

- Overall, WEMO households represent a newer, if not more transient, population base than is true for the State as a whole. About 23.5 percent of WEMO households occupied their residence less than 15 months at the time of the 2000 Census, which is only slightly higher than the State at 21.4 percent. By comparison, short-term occupancy accounted for 32.4 percent of WEMO households in 1990 compared to 12.1 percent for the State at that time. Trends describing the transient nature of WEMO area households contrast sharply against broader trends describing the State and major metro areas.
- Long-term WEMO households (occupying their current residence more than 20 years) only account for 9.6 percent of total households compared to 15.7 percent for the State. Compared to broader Statewide trends, WEMO area households have occupied residences in a cyclical manner. Between 1980 and 1989, WEMO experienced a disproportionately greater share of area housing occupied by existing households. A similar trend occurred between 1990 and 1994. Between 1995 and 1998, a relatively small share of housing was occupied by existing households.
- The vast majority of WEMO households (72.7 percent) occupy single-family detached units versus attached or mobile home units. Detached residential units reflect the predominant housing type occupied by WEMO households, particularly when compared to the Statewide average (56.8 percent). The strong preference for detached housing is not strictly limited to stick-built units. About 9.3 percent of WEMO households also occupy mobile home units, compared to 4.1 percent for the State on average.
- On a combined basis, detached housing (stick-built or manufactured) reflects the overwhelming preference of WEMO area households and accounts for 82.0 percent of all occupied housing. The strong preference for some form of detached housing exists in all subareas including Inyo (93.5 percent), Kern (84.3 percent), San Bernardino (82.5 percent), and Los Angeles (80.7 percent). The relative preference for detached housing is greatest in those subareas furthest removed from the metropolitan employment centers of Southern California.
- WEMO area households show a relatively strong preference for ownership. Owner-occupied housing accounts for 66.5 percent of total occupied housing throughout the WEMO area compared to a Statewide average of 56.9 percent. The preference for ownership among WEMO area households has remained relatively constant since 1990, as is the case throughout the State. WEMO area households within the eleven WEMO cities suggest similarly strong preference for home ownership (65.6 percent on average), with the exception of households in Barstow (54.1 percent) and 29-Palms (43.3 percent).

Workforce Participation

- Relatively fewer WEMO area residents indicate some level of employment participation than is true for the State as a whole. The incidence of workers per household (persons indicating a place of work versus local jobs) suggests 1.11 workers per WEMO area household compared to a Statewide average of 1.28 workers per household in 2000. The lower incidence of worker participation cannot be attributed to a significantly greater proportion of retirement households (householder 65 years of age or older). Retirement households in WEMO account for 19.0 percent of total households, essentially the same as for the State at 18.8 percent. By comparison, WEMO residents in the principal working age range (age 18 to 64 years) account for a relatively smaller share of the total population (58.0 percent) when compared to the Statewide average (62.1 percent). In fact, the proportionate share of principal working age residents in WEMO has declined since 1990 (from 60.0 percent) while Statewide the relationship has remained unchanged.

- Throughout WEMO the implicit rate or workforce participation is highest within the Los Angeles subarea (1.16 workers per household), followed by San Bernardino (1.11 workers per household), Kern (1.10 workers per household), and Inyo (0.82 workers per household). By contrast the proportionate share of working age residents throughout WEMO is generally the same, ranging from 57.8 percent in San Bernardino to 59.5 percent in the Kern subarea.
- Current estimates from the California Employment Development Department and data purveyors place the 2002 employment base (local jobs, as distinct from resident workers) throughout WEMO at approximately 232,500 civilian jobs available to a base population of 758,000 persons or 247,900 households. These estimates indicate that there are fewer job opportunities in the WEMO area (0.94 jobs per occupied household) than is true for the State economy or Southern California as a whole (1.20 jobs per household – long-term average). The incidence of local job opportunities in WEMO, however, is comparable to other outlying regions of Southern California, including Kern County (0.92 jobs per household) and the Inland Empire (0.98 jobs per household).
- The difference between the incidence of WEMO residents claiming to have a place of work (1.11 workers per household) and agency estimates of local area employment (0.94 jobs per household) can be attributed in part to the independent survey methods used to compile such data. The difference is also attributed to the fact that many workers residing in the WEMO area commute to jobs in more central urban locations of Southern California. 2000 Census data for the eleven WEMO cities indicates that roughly 1 out of every 5 workers drives 60 minutes or more to their place of employment.
- About 69.0 percent of workers residing in the WEMO area identify their work as a White-Collar occupation, including management, finance, service, professional, sales, office, or similar positions. About 31.0 percent of WEMO area residents are employed in Blue-Collar occupations, including agriculture, resource extraction, construction, production, materials moving, transportation, and similar positions. The proportion of WEMO residents employed in White-Collar occupations is higher than is true of the State overall (62.7 percent) and has jumped substantially since last reported in 1990 (31.1 percent).
- The proportion of WEMO area residents employed in White-Collar occupations is highest within the Kern subarea (70.2 percent) but exceeds the Statewide average within all WEMO subareas.
- There is a greater prevalence of WEMO area households with only a single worker (37.5 percent) or zero workers (15.8 percent) than is true Statewide (32.4 and 13.8 percent, respectively). By contrast, a substantially smaller share of WEMO households includes two or more workers (46.9 percent) than is true Statewide (56.3 percent). The proportion of multi-worker households in the

WEMO area has declined nearly 13.0 percent from 1990 (from 53.7 percent). This helps explain the lower incidence of worker participation among WEMO area households.

- The incidence of multi-worker households is greatest within the Los Angeles subarea (49.3 percent) followed by Kern (46.9 percent), San Bernardino (45.0 percent), and Inyo (40.4 percent). The greatest incidence of WEMO households with zero workers occurs in the Inyo subarea (21.3 percent), followed by San Bernardino (17.7 percent), Kern (14.7 percent), and Los Angeles (13.0 percent). The proportion of retirement age householders in each subarea exceeds the proportions of zero-worker households, and suggests notable levels of employment participation among WEMO area seniors.

Educational Attainment

- Overall educational attainment throughout the WEMO study area compares favorably to Statewide averages in many respects. Approximately 21.5 percent of all WEMO area adults over 25 years of age do not have a high school diploma compared to 23.2 percent for the State as a whole. Within the WEMO subareas non-high school graduates represent as little as 13.4 percent of adults in the Los Angeles subarea. A relatively greater proportion of WEMO area adults have obtained a high school education (27.5 percent) than is true for the State (20.1 percent) and a greater share (37.2 percent) have 1 to 3 years of additional college education than is true Statewide (30.0 percent). By contrast, only 13.8 percent of WEMO area adults have obtained a Bachelor's degree or post-graduate education compared to 26.6 percent Statewide.

Household Income

- Median household income provides a good central measure of disposable wealth since it is not subject to the influence of very high-income households that can distort the indicated average within a relatively small population base. The 2000 median household income in WEMO equates to $40,100 per year, a level that is 16.0 percent below the Statewide median income level of approximately $47,500 per household. Compared to 1990, the 2000 reported median household income in WEMO has increased at a rate of 1.7 percent annually over the 10-year period compared to 2.8 percent for the State overall. The corresponding inflationary index (CPI) for All Urban Consumers in the Southern California metro area increased at an average annual rate of 2.36 percent. The Census-based measure of household income reflects "self-reported" income (primarily salary and wages) and is distinctly different and not directly comparable to "Personal Income" measures that reflect tax-based reporting from employers, government agencies, and financial institutions.

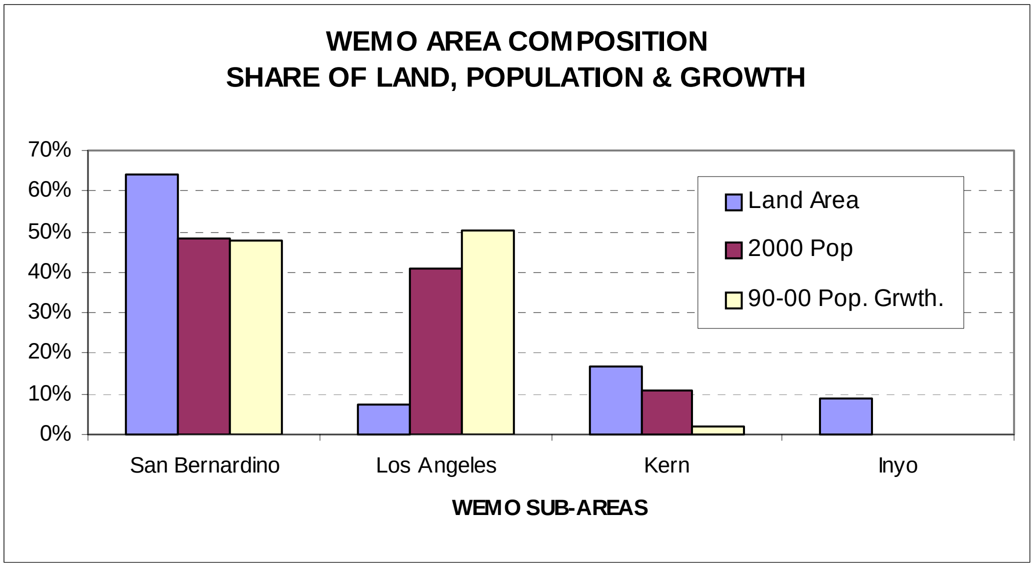
- Year 2000 median household income also varies considerably among the WEMO subareas. Median household income in WEMO varies according to the incidence of workforce participation and proportion of multi-worker households. The Los Angeles subarea with the highest level of workforce participation and proportion of multi-worker households reports the highest level of median income ($42,200 per year). Median household income for the remaining subareas include Kern ($40,700 per year), San Bernardino ($36,000 per year), and Inyo ($24,700 per year). The median income for residents of all eleven WEMO area cities is

$40,100 per year but ranges from $30,400 in Yucca Valley to $46,900 in Palmdale.

- The distribution of household income is also an important indicator or relative wealth. Throughout WEMO approximately 37.5 percent of all households report annual income of $30,000 or less compared to 31.1 percent for the State. High-income households reporting $100,000 or more per year account for 8.8 percent of WEMO households compared to 17.3 percent throughout the State. WEMO subareas with the highest proportion of lower income households ($30,000 or less per year) include Inyo (58.3 percent) and San Bernardino (40.5 percent). WEMO subareas with the highest proportion of high-income households (reporting $100,000 or more per year) includes Los Angeles (11.3 percent) and Kern (8.9 percent). The proportion of households reporting annual income between $30,000 and $60,000 per year is consistent throughout WEMO at 32.0 to 33.0 percent of all households, with the exception of the Inyo subarea (27.0 percent).

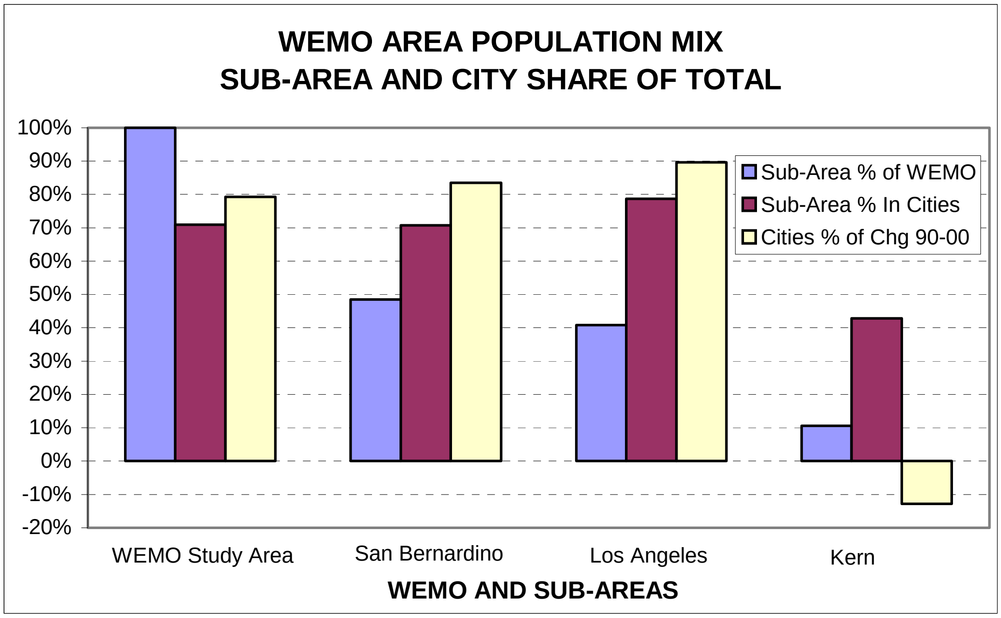
The WEMO study area consists of a relatively young population base but is aging more rapidly than the State overall or more central metropolitan areas of Southern California. The WEMO area includes a relative strong composition of families and similarly has a greater proportion of residents 20 years of age or younger. As result, there are relatively fewer small households (two persons or less). Workforce participation among WEMO households continues to lag overall rates of participation describing the State or Southern California economy. The WEMO area is still attracting a relatively large number of new households but at a slower rate than experienced through the 80's and mid-90's.

Demographic traits and growth trends describing the WEMO area overall can vary considerably among the four subareas. This is particularly evident with respect to the distribution of population and land area throughout WEMO as summarized below:



The San Bernardino subarea accounts for 64.0 percent of WEMO land area, nearly 49.0 percent of the 2000 resident population, and nearly 48.0 percent of population growth between 1990 and 2000. By comparison, the Los Angeles subarea only accounts for 7.0 percent of WEMO land area, but 41.0 percent of the 2000 resident population, and over 50.0 percent of corresponding population growth. The Kern subarea accounted for 11.0 percent of the 2000 population base but less than 2.0 percent of total corresponding growth. The Inyo subarea with fewer than 600 residents accounts for less than 0.01 percent of the WEMO population and has experienced an overall decline in population since 1990. On a combined basis, the Los Angeles and San Bernardino subareas accounted for over 98.0 percent of total population growth between 1990 and 2000.

The distribution of WEMO area population cannot be distinguished strictly on the basis of subarea alone. A distinct pattern of population and growth is evident and is expected to significantly influence the future direction of growth as indicated below:



The eleven WEMO area cities account for 71.0 percent of the total 2000 population. Within each subarea location the corresponding share of population within a city limit boundary ranges from 43.0 percent in the Kern subarea to 79.0 percent in the Los Angeles subarea. There are no incorporated cities within the Inyo subarea of WEMO. The indicated pattern of population growth further underscores the expected role WEMO cities will have in hosting future population growth. As shown, 79.0 percent of population growth between 1990 and 2000 occurred within city limits, as distinct from outlying unincorporated areas. Within the Los Angeles subarea, cities accounted for 90.0 percent of subarea population growth. Similarly, cities accounted for 84.0 percent of population growth within the San Bernardino subarea. In effect, over 85.0 percent of WEMO area population growth since 1990 has been concentrated in those cities within the Los Angeles and San Bernardino subareas. The share of population growth experienced since 1990 within these two subareas was equal to or greater than each subarea's respective share of WEMO population as of the 1990 Census, indicating these two subareas appear to be capturing a disproportionately large share of WEMO area growth. The Census information used to evaluate the population growth trends noted above also indicate similar trends for overall housing and employment participation. Several of the cities in these two subareas (Palmdale, Lancaster, Apple Valley, Victorville, Hesperia, and Adelanto) represent gateway housing markets for the major employment centers located within the Inland Empire and Los Angeles County.

On a combined basis, the Kern subarea cities (California City and Ridgecrest) actually experienced a net decline in population between 1990 and 2000, equal to 1,155 persons. In actuality, the resident population of Ridgecrest declined by about 3,500 residents or 10.4 percent, while California City increased by about 2,350 residents or 40.0 percent over this time period. Population trends in the Kern subarea of WEMO appear more related to the geographic proximity to Antelope Valley, an employment submarket of Los Angeles County (the Los Angeles subarea of WEMO). Census data compiled by ZIP Code location indicates that those portions of the Kern subarea within the Antelope Valley (Rosamond, Mojave, and California City) experienced an increase of approximately 7,330 residents or 36.0 percent over the 1990 population base, while the resident population in the remaining portions of the Kern subarea declined by about 6,100 residents or 12.0 percent.

Census data strongly suggest that population and housing growth throughout the WEMO over the past 12 years area has been substantially concentrated within cities and unincorporated enclaves located closest to the major employment centers of Southern California.

WEMO Growth Capacity

Economic growth within any given jurisdiction is ultimately affected by its latent capacity to host additional amounts of land use development. The latent holding capacity of an area is largely dictated by underlying land use policy adopted by the affected jurisdiction in the form of a General Plan. The WEMO area includes 15 distinct government jurisdictions (11 cities and 4 counties) charged with the responsibility of planning for land use development within their respective jurisdiction. Each City or County agency has formulated a unique series of land use policies, primarily in the form of General Plan land use designations, to guide and control the eventual quantity and intensity of distinct land uses that may ultimately exist in its respective jurisdiction. The growth capacity of WEMO is cumulatively defined by distinct land use policies adopted by the 15 affected jurisdictions.

To assess ultimate growth capacity of WEMO, it is necessary to review the distinct land use policies in each jurisdiction and then tabulate (when necessary) the corresponding supply of land area allocated to each land use activity. Because each jurisdiction formulates its own respective policy pertaining to land use intensity (dwelling units per acre, FAR, etc.), it is necessary to review and compare specific land use policies rather than associated nomenclature. As example, “Medium Density Residential” may provide for a target density of 6 dwelling units per acre in one jurisdiction but only 4 dwelling units per acre in the next. The distinction is particularly important when determining the ultimate holding capacity within a study area as large as WEMO. As part of the comparative review of distinct policies, a universal land use intensity scheme has been developed in order to describe various City and County General Plan growth objectives in terms of a common reference. Exhibit 9 and Exhibit 10 summarize the comparative review process with respect to the eleven WEMO cities and four WEMO subareas (incorporated and unincorporated combined) used to evaluate socio-economic conditions. Additional summaries of land use growth capacity within each subarea are detailed in a series of tables included in the C-Exhibits at the end of this report.

Exhibit 9 summarizes ultimate land use capacity for the WEMO area overall and each respective subarea. In all, land use growth capacity is identified for approximately 9.1 million acres of the WEMO area. Approximately 0.26 million acres in Riverside County is not included, since the parkland and habitat open space designations that predominate the area will not be affected by the proposed project or alternatives. Twelve unique residential density classifications are used to describe the various target densities of the City and County jurisdictions represented. Due to the diverse and overlapping range of land uses permitted within a given nonresidential designation, four generic classifications are used for more intensive nonresidential activities (Office, Retail, Industrial, and Institutional). Considerable effort was required to distinguish “Other” nonresidential land uses characterized by negligible or limited building space per acre utilized. Overall, the designated supply of residential and nonresidential land use throughout WEMO has the capacity to support roughly 4.86 million residents, 1.58 million residential dwelling units, and 3.09 million local jobs if all WEMO properties are developed and utilized according to General Plan policy.

The indicated job base capacity reflects the assignment of density employment ratios compiled from several regional planning, urban policy research, and industry association groups, as well as an internal database describing the incidence of employment per unit of land or building area. Actual employment density can range substantially, even for a narrowly defined land use classification, due to the diversity of site-specific activities permitted by General Plan land use policies. The indicated job base capacity reflects a theoretical employment yield corresponding to the amount of land designated for various nonresidential activities and not necessarily the base of local employment that can be realistically anticipated if the WEMO area eventually hosted a self-sustaining economy and population base exceeding 4.5 million residents.

If all WEMO land uses were developed according to General Plan policy, the area would effectively host 1.95 local jobs per housing unit (rough equivalent of 2.15 jobs per occupied household). Since 1990, overall workforce participation throughout WEMO has been declining from about 1.16 workers (including self-employed) per household to 1.11 workers per household in 2000, with many of these workers commuting to jobs in the metropolitan regions of San Bernardino and Los Angeles County. The corresponding rate of workforce participation for the State has been increasing from 1.63 workers per household in 1990 to 1.71 workers per household in 2000. To achieve the local employment generation rate suggested by General Plan policies the WEMO area would have to rival or exceed Orange County (2.00 total employment jobs per occupied household in 2000) as a leading employment generator within Southern California.

It is highly unlikely the WEMO area will become a leading Southern California employment generator within the 30-year life of the habitat conservation plan (HCP) project. An aggressive but more realistic outlook for employment capacity is for the WEMO area to generate local employment at a rate reflective of the State overall (averaging 411.25 jobs per 1,000 population between 1990 and 2000). Based on the Statewide rate, the buildout population capacity of WEMO (4.86 million residents) implies a total employment base of 2.2 to 2.4 million jobs. In relation to its residential holding capacity, the WEMO area has a fundamental oversupply of nonresidential designated land use (office, retail, industrial, and institutional forms of land use in particular).

General Plan land use policies suggest a substantially different geographic distribution of population and related land use than currently exists in the WEMO area as indicated below:

WEMO AREA POPULATION
CURRENT VS POLICY-DRIVEN DISTRIBUTION

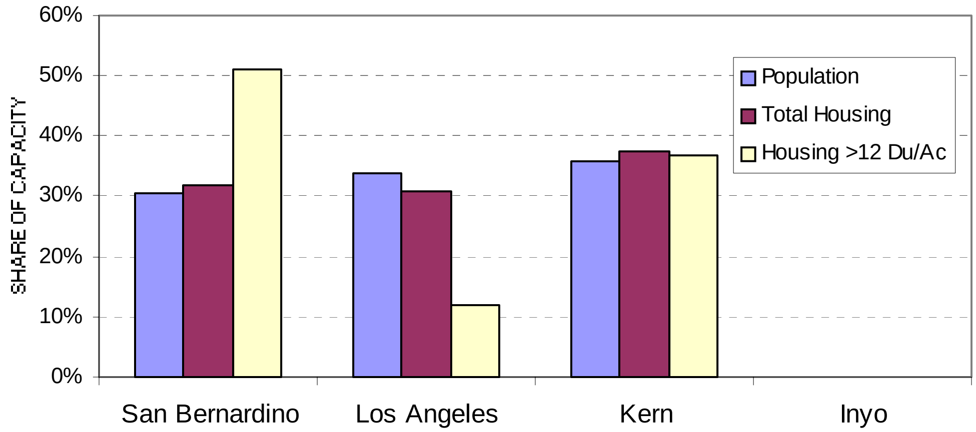
	Subarea Location			
Reference	San Bernardino	Los Angeles	Kern	Inyo
2000 Current	48.5%	40.8%	10.6%	0.1%
Buildout	30.4%	33.7%	35.9%	0.0%

Source: Alfred Gobar Associates.

Given a 2000 population base of roughly 730,000 residents, the San Bernardino subarea accounts for nearly half of total population while the Kern subarea accounts for little more than 10.0 percent. Upon buildout, the WEMO area population base will be roughly 6.6 times greater (at 4.86 million) with the Kern subarea accounting for nearly 36.0 percent of the total (an increase exceeding 22 times the current subarea population). Because the geography within each WEMO subarea is large, corresponding land use designations suggest a vastly different environment than currently exists if ultimately developed to full buildout capacity.

Aside from the order of magnitude changes implicit with buildout of General Plan policy, the distribution of land use across subareas provides some perspective about policy that will influence vectors of growth during interim periods, such as the 30-year implementation life of the HCP project. With respect to population holding capacity, the respective share of residential land uses planned throughout the WEMO area is graphically illustrated as follows:

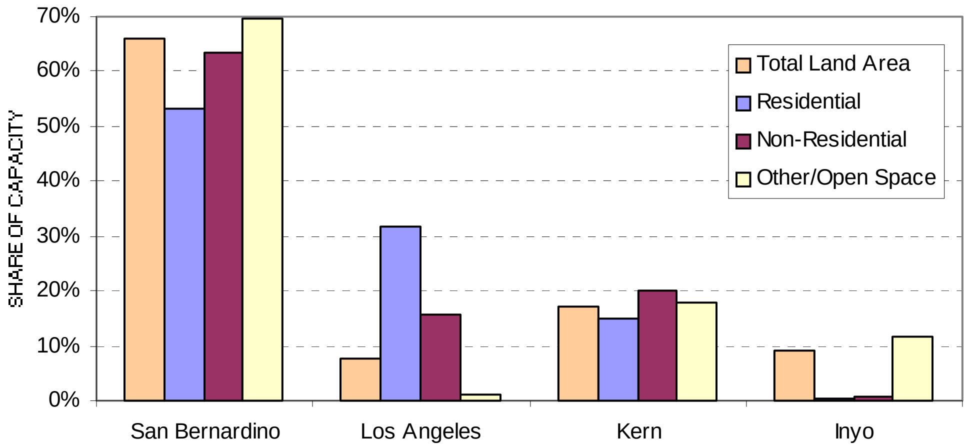
WEMO GENERAL PLAN POLICY
SUBAREA SHARE OF RESIDENTIAL CAPACITY



Again, growth policies in the Kern subarea indicate a sustained emphasis on residential development that culminates in a 36.0 percent share of buildout population and slightly higher share of total housing. Housing growth policy in the Kern subarea also places an emphasis on relatively high-density housing (12 dwellings per acre) to host future residents, accounting for a 37.0 percent share of this housing product type at WEMO buildout. By comparison, growth policies in the Los Angeles subarea essentially forward the existing pattern of housing development with very little emphasis on higher-density product to host future residents. Consequently, the Los Angeles subarea will account for a smaller relative share of WEMO area housing and population upon buildout under current policy. Growth policies in the San Bernardino subarea effectively limit its respective share of WEMO area population and housing upon full buildout, despite a heavy emphasis on the construction of higher density housing product to host future residents. The reality is San Bernardino subarea policies, while limiting the ultimate supply of housing relative to the Kern subarea, are not likely to constrain the market supply of housing over the 30-year life of the HCP project. San Bernardino growth policies provide for more than a four-fold increase in this subarea population base (from 355,000 residents in 2000 to 1.48 million at buildout). General Plan buildout policy in the Inyo subarea provides for a very limited amount of growth and reflects the extensive supply of property under government or Department of Water and Power control that effectively precludes residential development at any significant density.

The respective subarea share of major classifications of land use provided for by General Plan policy throughout WEMO is graphically illustrated below:

WEMO GENERAL PLAN POLICY
SUBAREA SHARE OF DESIGNATED LAND USE



As shown, the San Bernardino subarea accounts for the majority share of total land area in WEMO and General Plan buildout policies promote a majority share of the three major classes of land use activity identified. Ironically, growth policy in the San Bernardino subarea provides for the majority share of higher-density residential property in WEMO (57.0 percent), majority share of all forms of residential property (53.0 percent), but less than one-third of total housing and population. This seeming disparity is explained by comparing the effective average density of housing promoted by residential growth policies throughout WEMO as summarized below:

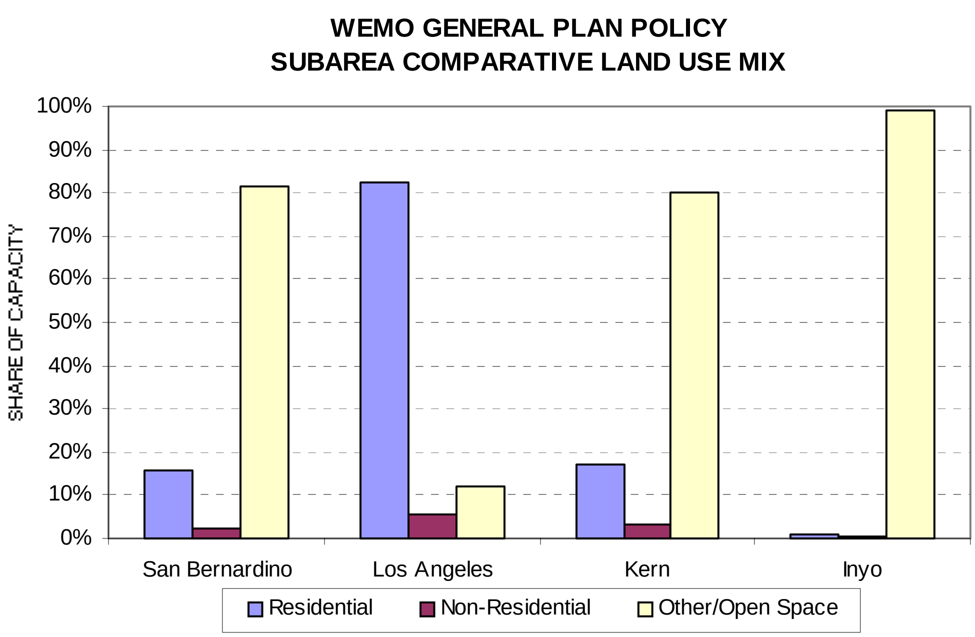
WEMO AREA RESIDENTIAL POLICY
EFFECTIVE AVERAGE DENSITIES AT BUILDOUT

	Subarea Location			
Buildout Policy	San Bernardino	Los Angeles	Kern	Inyo
Avg DU's/Ac	0.53	0.86	2.21	0.07
Pop/Sq Mi	994	1,857	4,181	111

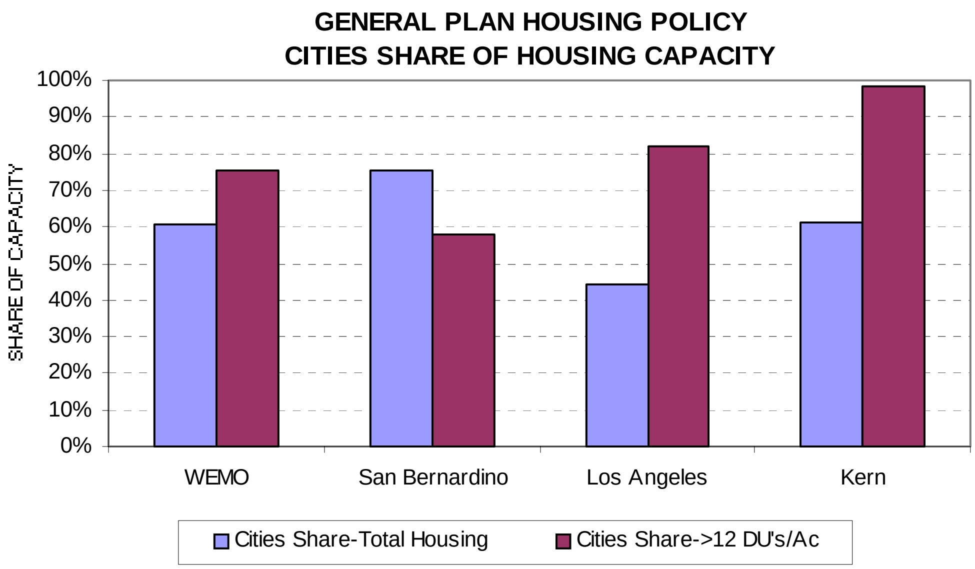
Source: Alfred Gobar Associates.

The majority share of total housing and higher density housing within the San Bernardino subarea reflects its overall size while the effective density of residential development is substantially less than in the other subarea environments, with the exception of the Inyo subarea. By comparison, effective population density promoted by residential growth policies in the Kern subarea is characteristic of population densities found in the metropolitan portions of San Bernardino County. Growth policy in the Kern subarea does not included a disproportionately large share of total residential land describing WEMO but instead promotes future residential development at substantially higher overall densities and, as result, would account for nearly 36.0 percent of total WEMO population under a buildout scenario.

Growth policies describing the WEMO area overall promote a substantial increase over the current base of resident population, local employment, and housing. In order to reach planned buildout within a probable HCP approval and implementation time frame of 35 years (2000 to 2035), the WEMO area would have to grow at a pace 9.0 times faster (118,000 residents per year) than experienced since 1990 (13,100 residents per year). The relative mix of land use promoted by General Plan policies still provides for a substantial supply of non-urbanized land uses, such as open space, agriculture, resource extraction, military, and utilities as the following bar graph illustrates:



WEMO cities accounted for 71.0 percent of the areas population base in 2000 and 79.0 percent of total population growth since 1990. General Plan housing development policies, summarized in Exhibit 10, suggest the recent pattern of development is likely to continue if not increase in the future. The following graph illustrates the proportionate mix of housing suggested by residential land use designations within City limits and in unincorporated portions of each subarea.



Overall, 60.0 percent of total housing capacity is designated with the eleven WEMO cities. Over 75.0 percent of residential housing envisioned at relatively high densities (12 units per acre or higher) is designated within City limits. The proportion of total housing planned within City locations is greatest within the San Bernardino subarea (75.0 percent) in part because seven of the eleven WEMO cities are in this subarea. Interestingly enough, a lower share of higher density housing is planned within the San Bernardino subarea cities than is true of the other subareas or WEMO overall. In effect, San Bernardino County General Plan policy envisions relatively dense pockets of residential development locations outside or adjacent to the principal development areas of WEMO. The vast majority of higher density housing within the Kern subarea is planned to occur in a City location. In fact, nearly 99.0 percent of such higher density residential development is planned to occur within the City of California City (in excess of 90,000 units).

An understanding of General Plan policy direction is important, not because such policy necessarily dictates a precise pattern of development, because such policy tends to influence property owner expectations about the eventual yield from site development. It is the interaction of property holder expectations and the economic limits of market potential that determines the probable timing of site development.

Since 1990, the predominant form of housing developed in the WEMO area has been single-family detached homes. The vast supply of undeveloped residential properties combined with strong consumer preference for single-family detached units, high desert market pricing limits, and the prevalence of construction defect litigation suggests the form of housing that has characterized development since 1990 can be expected to persist indefinitely. To achieve buildout in a manner consistent with General Plan policies, historical market dynamics and consumer preferences in the WEMO area will need to shift substantially. Absent a significant change in housing market dynamics that have characterized growth in outlying regions of Southern California during the past 20 years, the probable timing of buildout for WEMO is likely to occur during the life span of the HCP project. Recent growth trends and the long-term outlook for housing development is summarized based on Census reported changes in area housing:

WEMO AREA HOUSING DEVELOPMENT OUTLOOK
EFFECTIVE MIX OF DETACHED VS HIGHER DENSITY PRODUCT

Type Housing	Buildout	2000 Est.	1990 Est.	Chg 2000-Buildout	Chg 1990-2000
All Housing	1,580,000	271,250	230,125	1,308,750	41,125
Higher Density	253,000	41,775	38,900	211,225	2,875
% High Density	16.0%	15.4%	16.9%	16.1%	7.0%

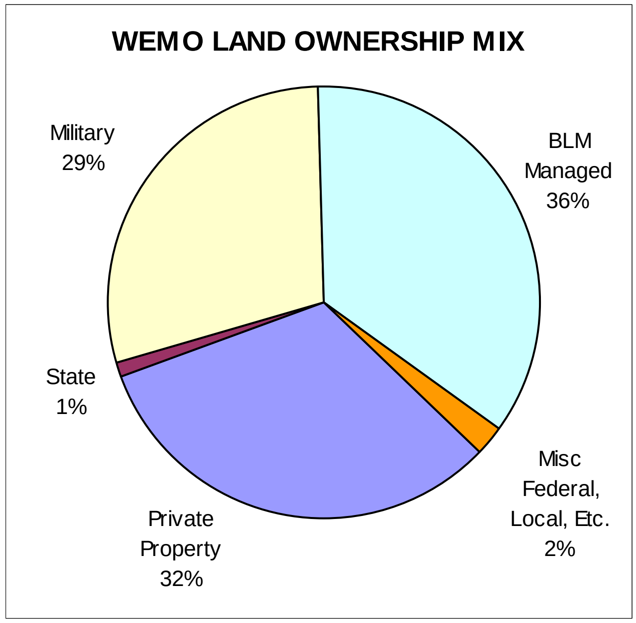
Source: Bureau of Census; Alfred Gobar Associates.

Census-based information indicates the total supply of housing in WEMO increased by about 41,000 dwelling units between 1990 and 2000, with 7.0 percent of total units representing higher density product. Independently reported permit information from the Bureau of Census Residential Construction Branch indicates a substantially smaller number of units were issued building permits over this 10-year period. Historically, a significant component of housing construction activity in the high desert region has occurred without associated permits. The statistical difference between both independent sources, however, is significant (in excess of 20.0 percent), suggesting actual market construction activity likely reflects a lower overall volume of housing development than suggested by the above Census information.

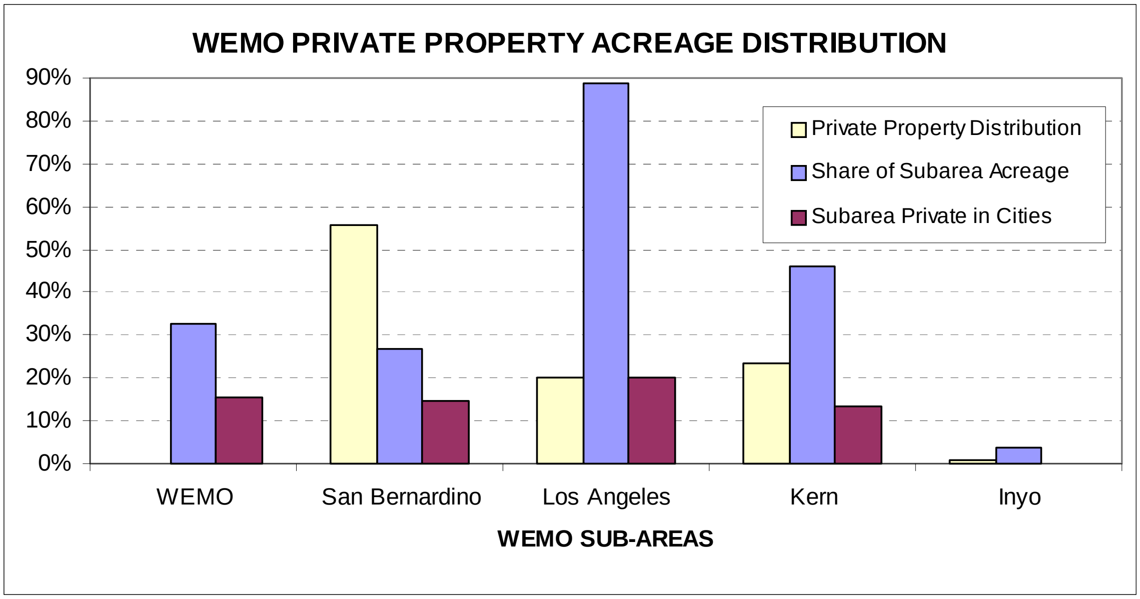
Property valuation throughout WEMO represents an important consideration in relation to the HCP program. The assessed value of WEMO property largely determines the amount of property tax revenue appropriated to each of the eleven WEMO Cities and four County governments in order to provide necessary public services (police, fire, health & safety, cultural and community, etc.). The assessed value of property within selected portions of WEMO, namely the Habitat Conservation Areas (HCA's), also determines the mitigation fee that will be imposed within the HCP compensation framework for Allowable Ground Disturbance (AGD) and incidental taking permits needed to facilitate future development and generate funds to acquire additional habitat area. These two areas of consideration are important for the following reasons. As the HCP is implemented and privately owned property in the HCA's is purchased and removed from the tax rolls, affected City and County governments will need to forego corresponding property tax revenue used to support public service responsibilities. The HCP mitigation fee establishes a definitive expense that that must be shouldered by site-specific development in order to eliminate case-by-case cost uncertainties associated with enforcement of current endangered species regulations (CESA and FESA). The following discussion is supplemented by detailed tables included in the D-Exhibits at the end of this report.

Subarea Valuation

Property tax revenue-generating potential within a given jurisdiction is largely limited to the assessed value of private property, since government owned land is exempt from direct payment of property tax. Although the four-County region of WEMO encompasses more than 9.0 million acres, the vast majority of land area reflects government owned land as illustrated below:

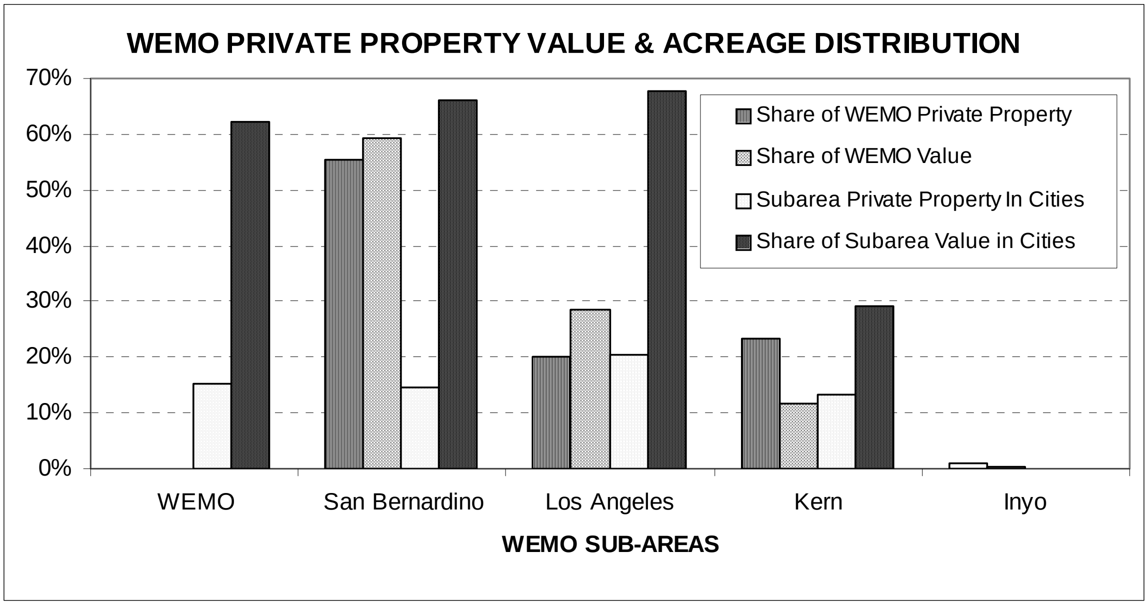


As shown, only 32.0 percent or 2.9 million acres of WEMO is privately owned and subject to property tax. Under current taxing regulations, private property is taxed according to a basic levy equal to 1.0 percent of its assessed value. City and County governments are allocated a portion of the property tax proceeds, along with other government service agencies (school districts, flood control districts, vector control districts, cemetery districts, library districts, etc.). The relative supply of private property within a given jurisdiction affects the amount of fiscal operating revenue that can be anticipated in the form of property tax versus other fiscal sources (sales tax, transient occupancy tax, franchise fees, motor vehicle fees, government subventions, service revenue, fines and forfeitures, etc.). The relative supply of private property throughout WEMO and its respective subareas is illustrated below:



As shown, the San Bernardino Subarea accounts for the greatest relative share of total private property within WEMO at 56.0 percent (vs. 66.0 of all land in WEMO), followed by the Kern Subarea at 23.0 percent (vs. 17.0 percent of all land), the Los Angeles Subarea at 20.0 percent (vs. 8.0 percent of all land), and finally the Inyo Subarea at 1.0 percent (vs. 9.0 percent of all land). Private property accounts for 32.0 percent of all land throughout WEMO but varies considerably within each subarea. Private property accounts for the greatest share of total land area within the Los Angeles Subarea at 89.0 percent, followed by the Kern Subarea at 46.0 percent, the San Bernardino Subarea at 27.0 percent, and finally the Inyo Subarea at 4.0 percent. Over 90.0 percent of total land area describing all eleven WEMO Cities is privately owned, but Cities as a group account for less than 6.0 percent of total land area throughout WEMO. As a result, the corresponding share of subarea private property situated within a City limit area versus unincorporated location is also limited, generally ranging from a 13.0 percent within the Kern Subarea to 20.0 percent within the Los Angeles Subarea.

The estimated 2002 assessed value of private property is detailed in Exhibit 11 for incorporated and unincorporated locations throughout WEMO. The overall 2002 assessed value generating property tax revenue is estimated at roughly $22.2 billion, or approximately $7,900 per acre on average. Estimated City assessed values reflect 2002 Auditor-Controller reported data as compiled from City budget documents. Corresponding estimates for property in unincorporated subareas are based on a sampling of Assessor reported values for improved and unimproved private property. Indicated City assessed values exclude valuation within designated redevelopment project areas, which can account for a substantial part of total value in selected cities. The relative distribution of private property acreage and taxable value detailed in Exhibit 11 is graphically summarized as follows:



The above graph compares the amount of private land in various subareas of WEMO and the corresponding share of assessed value. The bar describing the "Share of WEMO Private Property" illustrates how private property is currently distributed across the four subareas. The bar depicting "Share of WEMO Value" illustrates a similar distribution with respect to total assessed value. The bar depicting "Subarea Private Property in Cities" identifies the proportion of private property in each given subarea that is situated within a City limit boundary. The final bar depicts a similar ratio with respect to the assessed value of such private property.

With respect to County subareas, San Bernardino and Los Angeles account for a relatively greater proportion of assessed value than corresponding share of private property acreage. By comparison, the assessed value for the Kern and Inyo subareas is disproportionately low relative to the corresponding share of private property acreage. This interrelationship helps explains the higher average assessed value per acre in the San Bernardino Subarea (about $8,400 per acre) and Los Angeles Subarea (about $11,300 per acre).

The geographic distribution of value is also important, particularly as it relates to the proportion of value within City versus unincorporated (or otherwise more remote) locations. For WEMO overall, about 15.0 percent of all private property is located within a City but accounts for 62.0 percent of total assessed value. The average assessed value within WEMO Cities is higher overall (approximately $405,000 per acre on average) because a substantially greater portion of private property includes building improvements. Within the San Bernardino Subarea, about 15.0 percent of all private property is located within a City and accounts for 66.0 percent of total subarea assessed value. The corresponding relationship for the Los Angeles Subarea is 20.0 percent of acreage and 68.0 percent of assessed value, with the Kern Subarea at 13.0 percent of acreage and 29.0 percent of assessed value. A substantial portion of WEMO assessed value (principal determinant of property tax revenue) is concentrated on relatively limited amounts of private property located within existing City jurisdictions.

Habitat Conservation Area Valuation

The HCP program will establish a mitigation fee as compensation for habitat disturbance within WEMO. A principal objective of the HCP is to provide a means of acquiring undeveloped private property in the HCA's in order to expand the supply of undisturbed property that is suitable for the preservation and survival of previously identified threatened and endangered species. A key objective of the mitigation fee is to supplant ambiguity and cost uncertainties associated with the current myriad of endangered species regulations with a greater level of certainty defined by scheduled mitigation expense. The mitigation fee will apply to all new ground-disturbance activities (real estate development primarily) that fall within the jurisdiction of all City and County agencies participating in the HCP program. The HCP clearly directs the determination of the mitigation fee to be based on "the average value of an acre of private land to be acquired for implementation of this plan."

The WEMO area is vast and can be characterized as a collection of real estate submarkets, each influenced by distinct geographic, infrastructure, socio-economic and market dynamics driving land value. The "average value" criteria, therefore, is not intended as a strict reflection of true market value for the vast spectrum of site-specific circumstances that exist throughout WEMO. Instead, the "average value" simply reflects an objective measure of a central value agreed to be used as the basis for scheduled fee mitigation upon site development and accumulation of funds applied to acquisition of vacant habitat property.

A sampling approach has been used to estimate assessed valuation for large sections of WEMO, including sample values to determine the mitigation fee driving the Compensation Framework component of the HCP. In effect, the mitigation fee reflects the average 2002 assessed value of unimproved private property associated with the HCA geography of WEMO.

To account for vast distinctions that might influence average land value throughout WEMO, a large sample of 2002 property data was compiled from County Assessor records as procured from electronic appraisal data purveyors. A data sample was compiled that consists of all property records available from Assessor Map Book records roughly approximating the entire WEMO area in order to reduce bias that may be inherent to a limited sampling randomly selected from diverse micro-market environments. The data sample used as the basis to estimate average assessed value for all of WEMO and selected sub-locations is summarized below:

2002 DATA SAMPLE BASE FOR WEMO AVERAGE VALUE ANALYSIS

WEMO Subarea	Data Record Sample	Govt & Corrupt Data Records	Private Property Data Records	Sample Mix
San Bernardino	215,224	42,031	173,193	49%
Los Angeles	155,840	38,413	117,427	33%
Kern	120,185	64,574	55,611	16%
Inyo	16,682	7,492	9,190	3%
WEMO Area Overall:	507,931	152,510	355,421	100%

Source: Alfred Gobar Associates

The corresponding sample base used to estimate the average value of unimproved private lands in the HCA to be acquired is considerably smaller than the record sample for WEMO overall. The record sample base for the HCA area is smaller due to fewer unique parcels and vast sections of government owned land, including BLM owned properties. In fact, the HCA boundary in Inyo County does not include any privately owned parcels. The corresponding sample base used to estimate average includes roughly 38,500 private property records.

Exhibit 12 summarizes the estimated average value of unimproved private property used to determine the appropriate mitigation fee value applicable to the HCA boundaries of WEMO. The determined value reflects a weighting of indicated average value per acre according to the supply of private lands in each HCA subarea. The estimated 2002 average assessed land value describing unimproved private property throughout the HCA's equates to $770 per acre.

The mitigation fee component of the HCP program is characterized by a tiered compensation schedule that reflects the priority assigned to WEMO sub-locations for habitat conservation. The tiered schedule simply reflects predetermined multiples of the baseline average land value describing target properties for habitat conservation. Within the HCA's and areas reflecting the highest conservation priority, the scheduled fee is five times the average land value designated in Exhibit 12. In WEMO sub-locations largely impacted by existing development or that otherwise reflect a lower priority for habitat conservation, the mitigation fee is one-half the average land value. In all other areas of WEMO, the mitigation fee is equal to the average assessed land value of HCA target properties.

WEMO Market Share and Projected Growth

As a peripheral market of the Southern California employment complex, future long-term growth in WEMO is affected by economic expansion of the regional environment, including associated shifts in employment, housing, and population to various county sub-regions. Job, housing, and population trends have been discussed above within the context of the regional environment in order to identify broad vectors of growth. Historical trends describing population and housing growth within WEMO itself have also been discussed above based on Census-reported information for the eleven cities and four county subareas. Employment trends affecting WEMO have been indirectly identified on the basis of Census-reported workforce participation (residence of workers) since regularly reported employment data (place of work) is not readily available below the County-level or otherwise suppressed to protect employer confidentiality within specialized industrial sectors. In addition to the major growth factors discussed above, construction permit data provides a useful market-based perspective of housing capture trends likely to affect future growth within WEMO. The following discussion of market capture and projected growth trends is supplemented by a detailed series of tables included in the E-Exhibits at the end of this report.

WEMO Area Market Share

Residential construction constitutes the form of land use likely to result in the greatest amount of permanent ground disturbance (subdivision grading) among common development activities closely associated with the future urbanization of WEMO (retail, office-institutional, and industrial land use reflecting the other principal urban land forms). During the most recent 10-year period of construction activity, the effective share of building permits issued within the principal growth locations of WEMO is summarized as follows:

RESIDENTIAL PERMITS – 10-YEAR AVERAGE SHARE/MIX

	All Units	SFD	MF/Other
San Bernardino Subarea	52.0%	52.8%	25.5%
Los Angeles Subarea	45.9%	45.0%	61.5%
Kern Subarea	2.1%	2.2%	13.0%
WEMO Overall	100.0%	100.0%	100.0%
WEMO Unit Mix	100.0%	89.6%	10.4%

Source: U.S. Bureau of the Census - Residential Construction Branch.

As shown, within the last 10 years, the San Bernardino subarea has accounted for the largest share of total permits, followed closely by the Los Angeles subarea. The Los Angeles subarea, by comparison, has captured a substantial share of attached housing construction activity, including townhomes, condos, and apartments. Traditional single-family detached housing, however, represents the predominant form of new housing readily marketed throughout WEMO. The permit construction mix summarized above is consistent with independent housing data from the 1990 and 2000 Census.

The 10-year average share of permit activity in each of the subareas described above is not static but in fact reflects a shifting pattern of growth. Overall, the total share of housing activity in the San Bernardino and Kern subareas has been declining, while the corresponding share occurring in the Los Angeles subarea has been growing. Los Angeles subarea's respective share of WEMO housing activity jumped from 41.6 percent to 50.1 percent between the first and second half of the latest 10-year reporting period. By contrast, the San Bernardino subarea share declined from an average of 54.8 percent to 49.2 percent over the same period, while the Kern subarea share also declined from 3.6 percent to 0.7 percent.

The geographic shift indicated above also reflects market repercussions associated with rampant overbuilding during the late 1980's and early 1990's. Average unit construction volume in WEMO during the latest 10-year period is down 55.0 percent on average compared to reported permit activity during the early 90's. By comparison, average 10-year housing construction volume for the three WEMO area counties (San Bernardino, Los Angeles, and Kern) is about 53.0 percent lower than the corresponding average during the early 90's. Within WEMO, the Kern subarea has suffered the largest relative drop in housing activity, down 86.0 percent on average from construction activity levels during the peak building years. The corresponding decline for the San Bernardino subarea is consistent with WEMO overall (55.0 percent drop), while the Los Angeles subarea has suffered the least (46.0 percent drop). The relative buoyancy of housing market activity in each of these subarea locations is a large factor contributing to the relative shift in development patterns expected to influence the projected growth outlook.

Long-term housing growth in WEMO is also influenced by the relative attraction of competing site locations for area housing demand. The Consultant utilizes a proprietary Micro-modeling system to estimate housing product demand for site-specific housing projects. The housing demand model reflects a statistical simulation developed and refined over the past 30 years and applied on more than 2,000 projects throughout Southern California and United States on behalf of private developers, lenders, investors, and even public agencies. The fundamental objective of the simulation is to predict unit sales potential across a range of alternative product price points based on site locale demographics, site proximity to employment opportunities, and near-term changes in employment. The underlying notion and intuitive premise of the model is that householders, by and large, need a job to meet housing costs and will favor locations relatively close to employment (or employment options) within their income limits.

Exhibit 13 graphically illustrates the results of simultaneous housing demand simulations conducted for several tactical site areas throughout WEMO. The numeric results reflect an index ranking of absorption potential across a broad range of alternative pricing levels. For investment purposes, the model results provide a near-term (9 months to 1 year) determination of demand potential since the actual rate of potential sales (sales per week – not illustrated) is subject to market fluctuation. The illustrated analysis, however, is described in relative terms and provides a substantially longer-term perspective about the relative attraction of alternative housing locations throughout WEMO.

As shown in Exhibit 13, the southern reaches of the Antelope Valley around Palmdale represent the alternative WEMO housing location with the greatest relative market attraction (index score of 1.00). This housing submarket is relatively close to the Los Angeles metropolitan employment complex, as well as a high number of aerospace and defense industry jobs in Antelope Valley. The geographic distribution of indexed housing demand indicates that relatively remote housing submarket locations such as Ridgecrest, California City, Kramer Junction, Barstow, Lucerne Valley, Yucca Valley, and 29 Palms are less likely to feel the impulse of demand associated with employment growth and pent-up housing demand in the major metropolitan markets of Southern California. Conversely, submarket locations most proximate to metropolitan employment centers in Los Angeles and San Bernardino represent first-tier locations to capitalize on overflow housing demand associated with sustained regional employment growth. Exceptions include locations where local land use policy and lack of available infrastructure limit development density and intensity, including many enclaves along the Pear Blossom Highway.

Long-term growth in WEMO is not solely driven by regional employment gains but is also influenced by increases in the local population base, which generates population-serving employment and attendant housing demand from jobs created. The Consultant's housing demand model accounts for subarea employment opportunity. Housing submarket locations assigned the highest indexed demand values are also conveniently located within or adjacent to the major population centers of WEMO, namely the Lancaster-Palmdale area of Los Angeles County and the Victor Valley area of San Bernardino County.

Housing submarket locations with relatively strong housing demand tend to support higher average product pricing, reflecting market preferences of prospective residents. Summarized below is the estimated average unit value for new single-family detached homes issued building permits during the first eight months of 2002:

WEMO AVERAGE HOUSING VALUE – NEW SFD UNITS

WEMO Location	2002 Avg. SFD Value	10-Yr. Index vs. WEMO	2002 Indexed Average	
			vs. 1992	vs. WEMO
Palmdale	$242,800	1.08	1.64	1.17
Victorville	$232,500	0.94	1.74	1.12
Lancaster	$211,800	1.09	1.37	1.02
Hesperia	$203,000	0.95	1.28	0.98
Apple Valley	$189,800	1.05	1.22	0.91
California City	$164,600	0.88	1.34	0.79
Ridgecrest	$161,000	0.88	1.42	0.78
Yucca Valley	$153,300	0.83	1.14	0.74
Barstow	$139,500	1.01	1.07	0.67
29 Palms	$112,900	0.75	0.91	0.54
Adelanto	$91,100	0.53	1.23	0.44
San Bernardino Subarea	$192,100	0.91	1.60	0.93
Los Angeles Subarea	$231,800	1.11	1.47	1.12
Kern Subarea	$163,400	0.89	1.38	0.79
WEMO Overall	$207,600	1.00	1.54	1.00
WEMO Counties (3)	$257,900	1.29	1.39	1.24

Source: U.S. Bureau of the Census - Residential Construction Branch; Alfred Gobar Associates.

Within WEMO, cities and housing submarket locations closest to metropolitan employment centers have consistently realized higher average unit values. Indicated pricing patterns are symptomatic of demand preferences expected to drive future growth. The City of Adelanto reflects the notable exception. Historically overlooked, Adelanto is now experiencing increased housing activity due to its location along the principal growth vector of the City of Victorville. Overall, WEMO remains a price-competitive market in relation to the broader Southern California housing market, the three WEMO Counties in particular.

During the past 10 years, WEMO has captured nearly 14.0 percent average share of all new home construction activity within the three WEMO Counties as summarized below:

10-YEAR AVERAGE SHARE OF COUNTY HOUSING PERMITS

	All Units	SFD	MF/Other
San Bernardino Subarea	24.4%	25.0%	18.2%
Los Angeles Subarea	11.6%	17.8%	2.7%
Kern Subarea	2.1%	2.2%	1.1%
WEMO vs. 3 Counties	13.8%	17.2%	4.3%

Source: U.S. Bureau of the Census – Residential Construction Branch.

The respective share of single-family detached housing construction has actually exceeded 17.0 percent for this type construction product during the past 10 years. The San Bernardino subarea has accounted for 25.0 percent of total single-family detached permits in the County, although San Bernardino County's proportionate share of regional housing growth has been decreasing since the late 80's. Similarly, the Los Angeles subarea has attracted nearly 18.0 percent of detached new home construction in the County, whose share of regional growth has been steadily declining since the late 80's. The respective share of attached housing development throughout WEMO as a share of the surrounding sub-region is substantially smaller compared to detached housing. The San Bernardino subarea is the notable exception, but this form of development has been largely restricted to central Victor Valley locations and a massive rental housing project in 29 Palms in 1992.

WEMO Area Projected Growth

Exhibit 14 summarizes two alternative projections of long-term population and housing growth in WEMO. The indicated projection period is 35 years and is intended to reflect enough time for HCP Project adoption (2 to 3 years) and the subsequent 30-year implementation period. The growth projections are further summarized below:

COMPARATIVE SUMMARY OF WEMO POPULATION PROJECTIONS

Projection Alternative	2000	2035	Chg 00-35	Avg. Yrly. Rate
COG/DOF Driven Projections	795,000	1,706,500	911,500	2.21%
Trend Adjusted Projections	795,000	1,379,500	584,500	1.59%
Difference:	-	(327,000)	(327,000)	n.a.
Difference As % of COG/DOF:	0.0%	23.7%	55.9%	

Source: Alfred Gobar Associates.

By 2035, the population base of WEMO is projected to range from 1.38 to 1.71 million residents based on the two alternatives. The high-end projection reflects COG-based projections prepared for specific city locations from 2000 to 2020 and extended to 2035 using the same least-squares technique applied to regional projections. The lower projection reflects an adjustment to the COG-based projection based upon review of market capture trends since 1990 and General Plan Growth policies. Both sets of projections reflect alternative views about probable market capture within the WEMO area relative to broader regional trends.

Factors that distinguish both sets of projections are more clearly understood by the following comparison of housing development activity implicit with each alternative:

COMPARISON OF HISTORIC AND PROJECTED GROWTH

Growth Criteria	Since 1990	2000 - 2035 Projection	
		COG Based	Adjusted
Avg. Annual Housing Units Built:	3,150 to 4,150	10,800	7,350
Avg. Share of County Activity:	13.9% to 18.0%	18.6%	12.7%

Source: Alfred Gobar Associates.

Census and construction permit data describing new housing development in WEMO since 1990 suggest alternative levels of historic development activity but equate to an average of 3,650 units per year or 16.0 percent of reported construction activity. Under the COG-based projection, the WEMO area share of total housing activity (18.6 percent) is consistent with its relative share of single-family new home construction during the past 10 years and Census-reported housing stock increase between 1990 and 2000. On the basis of COG-driven projections, housing development in WEMO is expected to accelerate to a pace that is nearly three times the level experienced since the early 90's and rival or exceed peak levels of construction activity witnessed during the late 80's. Unlike the boom-bust period of the late 80's, COG-driven projections imply sustained development activity at very high levels (10,800 units per year) during the entire 35-year projection period. By contrast, the adjusted projection anticipates a long-term regional capture rate 20.0 percent lower than experienced since 1990 (12.7 percent). Even at this reduced rate of capture, the absolute volume of housing development in WEMO is projected to continue at a pace that is nearly twice the level experienced since the last major recession (7,350 units per year).

Between 1990 and 2000, the population base of WEMO increased by an average of 13,100 residents per year. The COG-based projection indicates a protracted rate of growth on the order of 26,000 residents per year, while the adjusted projection suggests 16,700 additional residents will move to the WEMO area each year. In terms of absolute levels of projected growth, both sets of WEMO projections reflect an aggressive interpretation of probable future market attraction. In terms of relative attraction, indicated growth reflects precedent rates of performance over a moderately long period (10 years).

Area-specific breakdowns of COG-based growth projections for WEMO are summarized in Exhibit 15 for household population and Exhibit 16 for total housing units. Corresponding projections based on an adjusted interpretation of market capture are detailed in Exhibit 17 and Exhibit 18. Under the COG-driven projection, increased housing demand in central city locations is expected to drive increased growth in surrounding unincorporated areas. The COG-driven projection suggests 27.0 percent of total growth will occur on unincorporated County lands that can be tied into city-serving infrastructure systems. Under the adjusted projection, future housing demand is not as intense, and consequently the share of overall housing development on unincorporated lands near central city locations accounts for no more than 22.0 percent of future growth.

Projected Growth vs. Planned Capacity

The long-term projections discussed above reflect alternative interpretations of continuing economic pressure on land use without direct consideration of constraints that may be imposed by local policy objectives. By and large, policy-driven land use capacity in WEMO exceeds any realistic projections of long-term growth by a substantial margin. This is particularly true for principal forms of urbanized nonresidential land use including retail, office and institutional, and industrial development. With respect to residential land use, local policies may have a limiting effect on potential growth within selected jurisdictional boundaries. Exhibit 19 details and compares the projected distribution of housing in 2035 against housing capacity limits inherent to target densities and land area allocations within the various local jurisdictions that comprise WEMO. Also shown is the percentage share of planned housing capacity that must be utilized for alternative projections of growth to be realized.

Overall, long-term housing growth throughout WEMO is projected to consume between 35.0 and 43.0 percent of total housing development capacity inherent to local General Plan policy. Within the eleven WEMO area cities where the bulk of future housing development is projected to occur, between 42.0 and 50.0 percent of current housing capacity will be consumed by 2035. By comparison, only 26.0 to 33.0 percent of current housing capacity designated in the unincorporated sections of WEMO will be consumed over this period. Within each of the respective subareas, future housing growth is not expected to pressure current policy capacity, with the exception of the Inyo subarea. In effect, current housing development policy describing WEMO overall, the eleven WEMO cities as a whole, and each WEMO subarea is not expected to constrain the total supply of long-term housing growth.

Within selected areas of WEMO, local land use policy can be expected to limit the ability to satisfy market demand for additional housing in the distant future. Policy-induced constraints on market-driven demand suggested in Exhibit 19, therefore, reflect a localized development issue that will likely result in a shifting pattern of growth somewhat different than has characterized local areas during the past decade. Even under the most aggressive projection, significant potential for policy constraints on housing growth is limited to the City of Lancaster, City of Palmdale, City of Ridgecrest, and the Inyo subarea. Within the Antelope Valley cities, current residential land use policy is not expected to represent a potential constraint on projected growth until after 2020. The theoretical timing of policy restrictions on future housing in the City of Ridgecrest and Inyo subarea is less distant, on the order of 10 years based on the more aggressive growth projection.

The potential for policy limits on market housing activity within the Los Angeles subarea is likely to reflect a self-mitigating issue whereby demand for local area housing is readily satisfied in adjoining unincorporated County lands. In effect, this submarket locale can be expected to experience a shift in the proportionate share of permits issued within a city jurisdiction versus the County jurisdiction. The cities of Palmdale and Lancaster both cover a substantial amount of land area with roughly 60.0 percent of housing unit capacity available in 2000. As these communities continue to grow into more urbanized centers, there is a strong likelihood that portions of residential land currently designated for development at less than 3.0 units per gross acre (57.0 percent of housing capacity for both cities) will be amended to permit higher density residential development. The theoretical policy constraint associated with localized land use policy in the Los Angeles subarea is not realistically expected to represent a material constraint to long-term housing growth.

With respect to the City of Ridgecrest, the theoretical constraint on future housing growth is likely overstated for a number of reasons. Projected growth is based on COG projections prepared in advance of the 2000 Census release data. The projection-driven number of housing units in 2000 (12,800 dwellings) exceeds the Census estimate by 1,500 units. Subsequent projected growth (8,340 units – COG driven; 5,020 units – Adjusted) builds on top of this already high estimate. The resulting 35-year housing projection also includes an 11.7 percent unit vacancy allowance based on a review of subarea vacancy trends. If projected growth is adjusted to account for the Year 2000 estimating error and also restrict overall vacancy, the City's current residential land use policy will still have a reservoir capacity of approximately 1,580 units (11.0 percent of capacity) based on the adjusted projection and a shortage of 1,350 units (10.0 percent of capacity) based on the COG-driven projection. The City of Ridgecrest has not attracted a significant level of housing development since the 80's. Between 1980 and 1990, the City grew by 457 units per year on average but only six units per year between 1990 and 2000. Both growth projections substantially exceed the actual level of growth experienced since the last economic recession that included significant restructuring in the aeronautic and engineering sectors of the defense industry (one of the primary base industries in the Ridgecrest area).

Socio-Economic Impacts

Overview Of Potential Socio-Economic Effects

Components of the Habitat Conservation Plan (HCP) program with the greatest potential to significantly affect the socio-economic environment of WEMO include the following:

- Habitat Conservation Areas (HCA's) – selected land areas where urban development will not be permitted or will be restricted to a maximum 1.0 percent allowable ground disturbance (AGD) in order to conserve habitat environments deemed necessary for the survival of threatened or endangered species.
- Amended Permitting Regulations – intended to reduce risk and ambiguity inherent to the current Section 10a (FESA) and Section 2081 (CESA) permitting process. Amended regulations prescribe alternative requirements, each with associated cost (presence-absence surveys, clearance surveys, monitoring, and mitigation fees) that varies based on the geographic location of private property within WEMO.
- Best Management Practices – prescriptions of conduct and resource utilization for grazing, mining, and recreation activities intended to minimize undue impacts on threatened and endangered species.

Each of the above components of the HCP will influence distinct forms of socio-economic activity within WEMO including land development, cattle grazing, resource mining, recreation, and associated employment. As such, it is important to consider whether such influence can be reasonably expected to create a significant impediment for future socio-economic activity and growth throughout the area.

Habitat Conservation Areas

The HCA's constitute areas where minimal disturbance to the existing habitat is sought. In all about 2.5 million acres of WEMO land in the four-county area is proposed for HCA designation, including roughly 575,000 acres of private property planned for acquisition and permanent placement as habitat open space. Acquisition and placement of private property could have the effect of significantly reducing the growth capacity of WEMO to the point of impeding foreseeable economic growth over the next 30 to 35 years. In addition, the removal of such vast amount of private property from the tax rolls might adversely affect property tax revenue streams benefiting local city and county governments. The potential effect of the HCP and

HCA designation on grazing, mining, and recreation activities in WEMO is discussed separately in the Environmental Report.

Amended Permitting Regulations

The amended regulations represent a modified approach to current regulatory practices. The amended regulation scheme is designed to reduce impediments to growth in less sensitive habitat areas but at the same time establish a long-term funding mechanism that enables BLM to acquire and set aside private property for habitat conservation. Funding capacity inherent to existing and amended regulations is summarized below:

PRIVATE LAND PERMITTING COST FOR TYPICAL 10-ACRE PARCEL

ENVIRONMENTAL REMEDY	CURRENT REGULATORY SITUATION	AMMENDED REGULATIONS - HCP ALTERNATIVE A		
		DWMA	SURVEY AREA	NO SURVEY AREA
Presence-absence Survey	$125-1,250	$125-1,250	$0	$0
Permits Drafted • Cost • Timeframe	$5,000-65,000 1 - 5 years (3 years average)	$0 No Delay	$0 No Delay	$0 No Delay
Other Surveys • Clearance Survey • Weekly Monitoring	$250-2,500 $350-500	$250-2,500 $350-500	$250-2,500 $350-500	$0 $0
Compensation • Mitigation Fee • Endowment Funds	$21,000 $295	$38,500 $0	$7,700 or $3,850 $0	$7,700 or $3,850 $0
Total Costs	$27,020 to $90,545	$39,225 to $42,750	$8,300 to $10,700 in 1:1 area, $4,250 to $6,850 in ½:1 area	$7,700 in 1:1 area, $3,850 in ½:1 area

Note: Total cost of amended regulations based on an average value of $770 per acre of private property in designated HCA's

As shown, the cost of satisfying current CESA/FESA regulations can range substantially. Also, the extent of environmental remedy, associated cost, and time delays required before private property can be developed is largely uncertain and dictated by site-specific circumstances difficult to identify in advance. The Section 10a and Section 2081 permitting process does not necessarily apply to all private property in the WEMO area but remains a pervasive concern for private property developers. As such, current regulations effectively impose a high degree of uncertainty related to cost and time and add to the underlying risk of developing private property in many areas of WEMO.

The amended regulations, by comparison, will apply equally throughout WEMO based on identified prescriptions of environmental remedy within designated areas. In short, all private property in WEMO is subject to the amended regulations but in return a reasonably predictable range of environmental remedy and associated cost is established. As example, the amended regulations can be expected to involve a cost of about $3,850 to satisfy prescribed environmental remedy before a 10-acre parcel located in a "No Survey Area" and "0.5-to-1.0 Mitigation Fee Zone" of WEMO can be developed. Private property development under the current regulatory situation might not involve the same level of cost but most likely involves costs ranging anywhere from $27,000 to $95,000 with significant time delays.

The amended regulatory framework is intended to reduce impediments to long-term growth in WEMO. Whether the proposed framework enhances or impedes future growth throughout WEMO depends on the additional cost required to remove uncertainties inherent to existing regulations.

Best Management Practices

Best management practices (BMP's) do not necessarily exclude sensitive habitat areas from being used but prescribe a variety of protective measures that might effectively reduce land area utilization, increase associated costs, or both. The impact of BMP's on grazing, mining, and recreation activities throughout WEMO is discussed separately in the Environmental Report.

Effect On WEMO Growth

Long-term projections of growth indicate the resident population base in WEMO is expected to increase by 580,000 to 910,000 persons (roughly 258,000 to 378,000 housing units) over the next 30 to 35 years. These projections reflect an optimistic (aggressive) outlook that suggests the WEMO area could grow 1.25 to 2.00 times faster over the next 35 years than it did during the previous 20 years. The most probable long-term growth outlook that can be reasonably expected based on the analysis of existing socio-economic conditions suggests the resident population will increase by about 580,000 persons, or 1.57 percent annually, to 1.38 million residents total over the next 35 years. This reflects the most probable "Worst Case" scenario guiding the analysis of project impact on WEMO growth potential.

The growth capacity of existing General Plan land use policies throughout WEMO suggests the area could host about 4.86 million residents, 1.58 million housing units, and nearly 241,000 acres of commercial development (office, retail, industrial, and institutional – excluding local schools). Over the next 35 years, there is some limited potential that the existing supply and density of residential land use around Lancaster, Palmdale, Ridgecrest, and Southern Inyo County might constrain the projected volume of housing growth. The potential constraint is limited to a maximum of 7,000 units during the 35-year time frame (likely much less) or about 1.25 percent of the total projected housing stock throughout WEMO. This potential housing constraint does not represent a materially significant limitation on growth opportunity over the next 35 years because the theoretical shortage is likely to be offset by land use policy amendments (i.e.: PUD's and zone changes to higher density), expansion of City boundaries (i.e.: annexation of Master Plan projects), and available supply of vacant housing stock (projected at roughly 50,000 vacant and seasonal units in 35 years).

Identified growth capacity far exceeds overall levels of growth projected to occur over the long term, with a few limited exceptions. The current supply of WEMO land designated for development, therefore, does not represent a compounding issue that must be considered when evaluating the material effect of the HCP program on area growth potential over the next 35 years.

Nonresidential Growth

The WEMO growth capacity analysis determined that the existing supply of land use designated for commercial development far exceeds the amount of land that will likely be required to support a mature economic region comprised of 4.86 million residents, 1.58 million housing units, and roughly 2.2 million local jobs. Current General Plan land use policy designates approximately 241,000 acres for various forms of nonresidential development (office, retail, industrial, and institutional). It is estimated that roughly 160,000 acres of developed commercial land use is the supply base required to support a mature self-generating economy at buildout in the WEMO area. Assuming the WEMO area rapidly matures into a self-generating economy with a base population of 1.38 million residents (highly aggressive outlook), roughly 45,000 to 50,000 acres of nonresidential development will be required or about 20.0 percent of the current designated supply.

The likely impact of HCA designations on the potential for nonresidential development throughout WEMO is insignificant. The majority of land area designated for nonresidential development is situated within existing City Limit boundaries, while the preponderance of land area proposed for HCA designation is located in remote settings of the unincorporated WEMO area. The proportionate mix of nonresidential land use throughout WEMO is summarized as follows:

LOCATION CRITERIA	OFFICE	RETAIL	INDUST.	INST.	ALL NONRESIDENTIAL INCL. INST.	ALL NONRESIDENTIAL EXCLD. INST.
WEMO Total (Ac.)	14,049	44,014	104,865	77,949	240,879	162,930
WEMO Mix	5.8%	18.3%	43.5%	32.4%	100.0%	67.7%
WEMO Cities	71%	73%	55%	15%	46%	61%
Uninc. Subareas	29%	27%	45%	85%	54%	31%

Identified institutional land use does not include land that will ultimately be required to host local schools (elementary, Jr. High, etc.). This land use requirement is an implicit component of the designated supply of residential land use. Excluding the institutional land use designation (hospitals, civic centers, etc.), 61.0 percent of nonresidential land or about 99,000 acres is situated within existing City Limit boundaries. The current City-based supply of nonresidential land is two times the amount likely required to host all nonresidential development throughout WEMO over the next 30 to 35 years. In addition, about 88.0 percent of projected WEMO population and housing growth is expected to occur within the eleven WEMO cities. Even if the proposed WEMO HCA designation effectively precludes all forms of nonresidential development in the unincorporated sections of WEMO, realistic potential to develop these forms of land use will not be materially impeded over the next 35 years. The reality is that very little, if any, nonresidential land is currently designated within proposed HCA boundaries. Due to location requirements for many nonresidential activities, it is also highly unlikely that any significant amount of land (exceeding the 1.0 percent AGD) within proposed HCA boundaries would be built, absent the HCA designation.

Residential Growth

Residential construction constitutes the land use most likely to result in the greatest amount of permanent ground disturbance (subdivision grading) among all forms of development commonly associated with economic growth in WEMO. As such, residential growth is also more likely than any other form of development to be affected by habitat conservation and protection policies of the HCP program.

Exhibit 20 summarizes projected long-term housing development throughout the WEMO Study Area. As shown, the most probable outlook of future growth indicates that roughly 258,000 additional housing units (mostly single-family detached units) will be constructed throughout WEMO over the next 35 years. Also shown is whether or not a given jurisdiction includes land (regardless of land use designation) within proposed HCA's, survey areas, or mitigation fee zones that dictate the scope of environmental remedy and associated cost needed to obtain construction permits.

Land located within a DWMA is subject to the most restrictive and costly remedy under the amended permitting regulations. The DWMA's effectively describe proposed HCA's, which also limit total ground disturbance to no more than 1.0 percent of parcel area. Three San Bernardino County cities include a very small portion of land area within the HCA boundaries, while a significant portion of California City in Kern County falls within an HCA. The vast majority of private property within HCA boundaries (roughly 575,000 acres), however, is located in remote unincorporated reaches of WEMO where General Plan policies tend to designate land use for open space, agriculture, resource development, and other uses requiring little or no building area.

The most probable worst-case impact of the HCA designation on long-term potential for housing development throughout WEMO is negligible for a number of reasons. When planning policy designates residential land use in remote locations that characterize the HCA's, prescribed densities rarely exceed a maximum of 0.2 dwelling per acre (minimum lot size – 5 acres but more often 20 to 40 acres). In addition, site-specific market demand for housing in such remote location is only a fraction (usually 20 to 50 times less) of the demand for housing identified for WEMO site locations closer to the large employment markets of Southern California. Remote desert locations often include a disproportionate share of housing used for seasonal and vacation purposes versus permanent residency. Also, limited value opportunities combined with restricted densities in such locations preclude realistic potential for conventional homebuilding and sales programs. The absence of infrastructure and cost to service such remote sites further limits the scale of residential development that can be realistically created in a single location. Finally, an abundance of suitable sites outside the proposed HCA's will continue to exist throughout WEMO to meet demand for housing in remote locations, particularly seasonal and vacation housing.

As shown in Exhibit 20, all areas of WEMO will be subject to some level of permitting regulation that does not necessarily limit allowable ground disturbance, as is the case in the HCA's, but requires alternative levels of environmental remedy (clearance surveys, monitoring, mitigation fees, etc.) and associated cost. The effect of such amended regulation on long-term housing potential in WEMO depends on the effective cost burden or benefit created for housing developers and prospective homebuyers. The vast majority of future housing throughout WEMO can be expected to reflect production housing built and marketed by private developers as a price-competitive alternative to more costly homes within Santa Clarita Valley, Western San Bernardino County, and Coachella Valley. In short, WEMO area housing is and will continue to be sensitive to price differences that distinguish the high desert from surrounding low land markets.

The amended permitting regulations involve environmental remedies commonly described in terms of associated cost per acre of development. The corresponding benefit or burden on housing potential, however, depends on the effective cost per unit, which inevitably varies from one location to the next. For the foreseeable future, single-family detached housing represents the principal form of new housing that will be constructed throughout WEMO. The effective density of such housing is not uniform, nor can it be expected to conform strictly to the underlying General Plan target densities. Instead, the typical lot size and corresponding density of conventional housing is largely determined by the competitive dynamics within a local market. In some local markets throughout WEMO, big homes on small lots achieve brisk sales while in other local markets prospective buyers prefer larger lots.

Exhibit 21 describes the average lot size for home sale and subdivision activity throughout selected sections of the WEMO area. Compiled building records represent roughly 10 years of housing development activity and provide the basis for assigning typical unit densities referenced when evaluating the impact of the amended permitting regulations within each of the eleven WEMO Cities and four unincorporated County subarea locations.

Exhibit 22 identifies the effective cost per unit associated with the amended permitting regulations based on the low-range estimate used to describe the development of a typical 10-acre parcel. The effective cost per unit varies on the basis of several factors including; the form of remedy corresponding with the site (DWMA, Survey Area, No Survey Area), the mitigation fee zone (5:1, 1:1, or 0.5:1), and the effective gross density used to characterize residential development for a given city or county subarea (2.09 units per acre, 4.41 units per acre, etc.). Also shown is the effective cost per unit described as a percentage of estimated average new home value in the area during 2002. Finally, the cost of complying with existing CESA/FESA permitting regulations is also identified in terms of cost per unit and share of unit value. The estimated cost of complying with environmental permitting regulations is also detailed in Exhibit 23 based on high-range cost estimates.

Currently, the existing CESA/FESA permitting regulations represent an effective cost burden ranging from $508 to $2,729 per unit based on the low-range estimates and from $1,702 to $9,146 per unit based on high-range estimates. In general, the per unit cost burden of existing regulations tends to be lowest for local housing markets closest to metropolitan employment centers (Victorville and Palmdale) but increases in locations that are more distant or rural in character. The effective per unit cost burden of existing regulations tends to be greater in more remote or rural residential markets because supportable market pricing of homes and effective unit densities are lower in these locations. The heavy cost burden associated with current CESA/FESA regulation ($27,020 to $90,545 per 10-acre parcel) must be amortized across fewer relatively low-valued units. As example, high-range estimates (Exhibit 23) indicate the current cost burden is equal to 0.7 percent of the 2002 average home value representing conventional housing in Victorville, where home values and unit densities are higher, but 6.6 percent of the average value describing Barstow, where home values and unit densities are relatively low.

The relative cost burden or benefit created by the amended regulations depends the form of environmental remedy that applies to a given private property location. With respect to the designated HCA's, its conceivable amended permitting regulations could result in higher cost to authorize building activity ($39,225 per 10-acre parcel versus $27,020). In reality, this scenario is highly unlikely because the HCA's have been delineated in areas identified to have the greatest habitat resource value, and consequently highest potential for presence of threatened or endangered species. The low-range cost estimate describing current regulations ($27,020 per 10-acre parcel) reflects the probable cost of complying with regulations absent the need for significant protective measures. Within the HCA's, the probable presence of threatened and endangered species is much higher as is the likelihood of incurring the high-range cost estimate ($90,545 per 10-acre parcel). The overall supply of future WEMO housing likely to be affected by permitting costs required for development in the HCA's is minimal as discussed above. In addition, non-production single-family residences (owner built, family cabin, custom home, etc.) are exempt from the environmental remedies and associated cost prescribed by the amended regulations. Individual residences on existing lots represent the predominant form of future housing likely to be considered in the HCA's.

With respect to property locations in the "Survey" and "No Survey" areas of WEMO, the amended permitting regulations create a cost-savings benefit compared to existing regulations. As example, the environmental permitting process is estimated to involve a cost ranging from $184 to $512 per unit for residential subdivision development in Yucca Valley, compared to potential cost ranging from $1,293 to $4,332 per unit, excluding associated 1 to 3 year processing delays, under current CESA/FESA regulations. As the Yucca Valley example demonstrates, the amended regulations establish a certain and predictable cost structure for all residential development that is 60.0 to 96.0 percent less expensive than the likely but uncertain cost exposure that exists under current CESA/FESA permitting regulations.

The effective cost burden imposed by current permitting regulations is high, but its application is uncertain (cannot be determined without first conducting site-specific inspection). It is conceivable that future development of numerous undetermined properties throughout WEMO would not be subject to the heavy cost burden imposed by current regulations. The amended permitting regulations, therefore, might represent an effective cost burden for these undetermined properties. The likely effect of such potential cost on housing development throughout WEMO depends on the relative cost burden associated with species surveys and mitigation fees.

As shown in Exhibit 23 (high-range estimate), the total permitting cost under the amended regulations ranges from $3,850 to $10,700 per 10-acre parcel. For the bulk of residential subdivision development projected to occur in WEMO, the effective per unit cost burden ranges from 0.1 percent to 0.8 percent of the estimated 2002 average home value. It is estimated the effective per unit cost might be highest for new development in the southwest section of the City of Barstow ($1,081 per unit or 0.8 percent of average value) and lowest in the south and westerly section of Victorville ($72 per unit or 0.1 percent of average value). Again, the relative cost burden is lowest in local markets closest to metropolitan employment centers.

The incidence of WEMO residential properties likely to incur minimal cost under current permitting regulation cannot be precisely determined. Roughly 75.0 to 80.0 percent of WEMO housing growth is projected to occur within and adjacent to the Cities of Adelanto, Apple Valley, Hesperia, Lancaster, Palmdale, and Victorville. Within these communities the maximum estimated cost burden per unit created under the amended permitting regulations ranges from $175 to $512 per unit or 0.1 to 0.3 percent of average home value (Exhibit 23). In fact, the maximum potential cost burden created by the amended regulations is not expected to exceed 0.3 percent of WEMO average home values (at sites in a Survey Area requiring 1.0:1.0 mitigation fees) with the exception of Barstow and 29 Palms, where typical subdivision density is considerably less than most contemporary projects throughout the WEMO area.

In light of recent trends throughout the State where significant capital improvement and habitat conservation fees are being imposed, the implicit cost burden of the amended permitting regulations for “Survey” and “No Survey” locations is not considered a significant impediment to the long-term growth of WEMO housing resources. For roughly 75.0 to 80.0 percent of the future WEMO housing stock, the amended permitting cost structure does not add more than 0.3 percent to the estimated average home value. By comparison, Riverside County has begun imposing a Transportation Uniform Mitigation Fee (TUMF) in all City and unincorporated areas that amounts to $6,650 per unit or 2.7 percent of the estimated average new home value in 2002 ($247,300 per unit on average). The impact fee, while deemed onerous by many private sector developers, is not expected to impede near-term development activity. Although, the high desert housing market is relatively price sensitive, the potential cost burden implicit to an undetermined number of parcels does not represent a material detriment to housing development based on the average home values and subdivision densities identified.

Within the communities of Barstow and 29 Palms (representing around 2.7 percent of future WEMO housing growth), the use of clustered subdivision layout designs that yield effective gross densities characteristic of the WEMO area overall (4.06 units per acre) are recommended to substantially reduce the potential cost burden identified for an undetermined number of parcels. Based on these density design modifications, the maximum potential cost burden could be reduced to less than 0.25 percent of the average home value in these local markets.

Effect On Fiscal Revenue

The most probable fiscal effect associated with the HCP program includes the potential loss of property tax revenue that would otherwise be received by WEMO Cities and Counties. A principal objective of the HCP program is to acquire private property in the HCA's in order to consolidate and conserve habitat environments capable of hosting threatened and endangered species. BLM would act as the lead agent for the property acquisition program, thereby removing private property from local tax roles. The level of impact inherent to the HCP program is dependent on the amount, value, and geographic distribution of private property in the HCA that crosses city and county jurisdictions of WEMO. Property tax revenue losses associated with property acquisition would, however, be offset in part through payments in-lieu of tax (PILT) received from the Federal Government. Whether or not PILT effectively mitigates any identified significant impact can be reasonably assessed by reviewing precedent levels of payment to local agencies.

The WEMO area encompasses about 9.36 million acres, of which the majority (6.46 million acres) includes government-owned lands already exempt from the payment of property taxes. The proposed HCA's of WEMO will encompass about 2.54 million acres, of which the majority (1.97 million acres) includes government-owned land

(BLM, USFS, Military, County/City, etc.) already exempt from property taxes. Overall, there is approximately 2.9 million acres of private property throughout WEMO, of which approximately 575,000 acres, or roughly 20.0 percent, will be included within the proposed HCA's and considered for acquisition by BLM during the 30-year life of the program. Many private properties in the HCA's are already developed and, as result, are exempt from the land acquisition component of the HCP program. These improved properties represent an undetermined reduction in the total amount and value of private property that would effectively be removed from the tax rolls of affected jurisdictions.

Under the HCP program only vacant private property will be targeted for acquisition by BLM. The potential loss to the tax roll, therefore, does not include existing improved properties with higher values. The 2002 average assessed value per acre is currently estimated at approximately $772 per acre. If all private property in the HCA's was vacant, the potential loss to local agency tax rolls would be equal to roughly $450.0 to $460.0 million. The estimated 2002 assessed value for all private lands in WEMO (vacant and improved) is roughly $22.2 billion. The maximum theoretical loss in tax roll value associated with the HCA land acquisition program is equal to 2.2 percent of the existing tax base for WEMO as a whole.

The loss of General Fund property tax revenue for a given city or county depends on the underlying appropriation structure for property tax (the basic 1.0 percent levy). Exhibit 24 identifies the assessed value of the 2002 tax roll in each of the eleven WEMO cities and the amount of reported property tax revenue generated, based the latest available data provided by city officials. Also shown, is each city's effective share of every dollar of property tax generated from private property. On average, WEMO cities receive roughly 12.1 cents for every dollar of property tax generated. Individually, the respective share of property tax varies substantially, as shown, due to the underlying tax appropriation structure of multiple tax rate areas that exist in any given jurisdiction. As an example, for every $100 loss of tax roll value, the corresponding loss in property tax revenue for the City of Hesperia is about $1.76 but as much as $27.35 for California City.

Corresponding data for each of the four WEMO counties with land area in the HCA's is also detailed in Exhibit 25. The potential rate of property tax revenue loss in the county areas of WEMO is defined by the effective tax rate describing the unincorporated County. Overall, WEMO counties receive about 23.8 cents for every dollar of property tax generated but this rate ranges from 11.4 cents per dollar of property tax for properties in unincorporated San Bernardino County to 29.6 cents in unincorporated Los Angeles County. As a result, the effective revenue loss per dollar of value removed from the tax rolls would be relatively greater in Los Angeles County than in San Bernardino County.

Clearly the underlying tax rate affects the relative level of impact for every dollar of taxable property value removed from the tax rolls. The absolute amount of potential loss, however, is ultimately dictated by the amount of HCA land existing within each WEMO area jurisdiction. The Survey Area maps prepared by BLM illustrate the geographic distribution of HCA's throughout WEMO and the corresponding jurisdictional boundaries of the eleven WEMO cities and four WEMO counties addressed by this analysis. The proposed HCA boundaries are almost exclusively limited to unincorporated locations and do not include any portion of the eleven WEMO cities with the exception of the City of California City. BLM mapping details suggest that roughly 15.0 percent of the total land area within California City, or 19,000 acres of largely vacant land along the City's northern border, would be included in an HCA designation.

The maximum theoretical loss of tax roll value and property tax to each of the affected agencies is summarized in Exhibit 26. As shown, the maximum amount of property tax revenue that would be eliminated if all private land in the HCA's were removed from the tax rolls equates to approximately $940,000 per year. As a share of property tax revenue corresponding to 2002 assessed values, the indicated impact would not adversely impact the fiscal revenue structure of the affected agencies. The indicated impact reflects a worst case scenario since an undetermined amount of private land in the HCA's is already developed, and most forms of future housing are likely to reflect individual residences, both forms of development exempt from the HCA restrictions.

The theoretical property tax revenue loss identified does not include payment in-lieu of taxes (PILT) likely to be received by the affected agencies. PILT reflects a common form of reimbursement by the Federal Government to offset property tax revenue foregone by local agencies because such land is exempt from taxes. PILT is paid out according to formulas that take into account the population within the affected unit of government, number of acres of eligible Federal land, and amount of selected payments received by the affected county for mining, livestock, harvesting, etc., and other licensed/lease activities permitted. The actual amount of PILT paid out must be determined and appropriated on an annual basis by Congress. In 2002, total Federal PILT amounted to $220 million paid to 1,900 local governments with California agencies receiving $22.8 million. The PILT program continues to receive increased scrutiny from local and State governments where Federal land accounts for a substantial portion of the prospective tax base. Local governments argue PILT payments are failing to keep pace with corresponding costs created or are not being paid fully as prescribed by Federal formulas. The Federal administration indicates that PILT is increasing and part of a broader package of entitlement but opposes legislation that mandates PILT payments to local agencies.

Exhibit 27 summarizes PILT payments received over the latest four-year period for the respective WEMO counties individually and combined, and the State of California overall. The four-year trends suggest that since 1999 the amount of PILT received per acre increment of Federal land area has been on the rise. In 2002, the WEMO counties received about $4.19 million in PILT or 18.3 percent of the Statewide total. The amount of PILT received, however, also varies by county location due to the formula criteria used in calculating payments. Between 1999 and 2002, San Bernardino County received an average of $0.16 per acre of federal land, while Los Angeles and Kern County received $0.76 and $0.91, respectively.

PILT represents a source of offsetting revenue that local agencies have come to rely upon to reduce the impact of foregone property tax revenue associated with Federal lands. The WEMO HCP program seeks to place up to 575,000 acres of private property under federal ownership for purpose of conserving sensitive habitat areas. The maximum theoretical loss to affected agencies is summarized in Exhibit 27. Corresponding mitigation potential associated with future offsetting PILT is summarized below:

PILT OFFSET OF MAXIMUM POTENTIAL PROPERTY TAX REVENUE LOSS

Affected Agency	Private Land in HCA's (Acres)	Est. Future PILT Payment Per Acre	Annual Offsetting PILT Revenue	Net Effective Property Tax Revenue Loss	Revenue Loss As Share of 2002 Revenue
California City	19,000	$0.91	$17,290	$1,938	0.23%
San Bernardino County	401,000	0.16	64,160	159,381	0.82%
Los Angeles County	77,800	0.76	59,128	536,757	0.35%
Kern County	76,700	0.91	69,797	31,658	0.06%
WEMO Overall	574,500	$0.37	$210,375	$729,734	0.32%

Source: County Assessor Records; Bureau of Land Management; Alfred Gobar Associates.

Future PILT revenue can be expected to reduce potential property tax revenue loss by approximately $210,000 per year or 22.0 percent. PILT provides an established, while not guaranteed, source of Federal revenue that further minimizes the fiscal impact of the proposed HCP program.

Effect On Employment & Income

The HCP program is expected to influence a wide range of economic activity throughout the WEMO area, most notably urban development, grazing activities, resource development, and recreation. To the extent the effects of the HCP program have been identified, corresponding implications for area employment and income also merit consideration. The California EDD estimates current 2002 local employment (jobs) throughout the WEMO area at approximately 232,500 jobs. The maximum theoretical effect on current employment associated with selected activities affected by the HCP program is discussed below as well as the probable direct effect of identified environmental impacts.

Urban Development

Urban development (building construction) throughout WEMO most directly affects construction trades, engineering services, selected elements of the transportation and utilities sector, limited retail trades, and local government services related to site construction. On a combined basis, these selected job sectors represent about 9.3 percent of the current employment base throughout WEMO or roughly 21,600 jobs.

The estimated composition of employment sectors influenced by urban development is summarized as follows:

WEMO EMPLOYMENT INFLUENCED BY URBAN DEVELOPMENT

Employment Sector	Share of WEMO Employment	Share of Sector Employment
Construction	3.87%	100%
Transp./Utilities	2.01%	42%
Retail Trades	1.34%	6%
Services	1.24%	4%
Government	0.85%	5%
Total	9.31%	

Employment within each of these sectors is largely driven by the overall level of urbanization throughout WEMO with the exception of construction, which responds most directly to real estate development pressure. As result, the maximum possible direct impact of the HCP program on urban development employment is substantially less than indicated, most likely not exceeding 5.0 percent of the WEMO employment base. This maximum theoretical effect exceeds the worst-case scenario that can be attributed to the HCP program. Instead, this maximum theoretical effect describes direct employment losses that would result if future construction of all urban infrastructure, commercial buildings, and homes were to cease entirely, a highly unlikely scenario.

The HCP program is expected to have a negligible impact on the rate and location future urban development throughout the WEMO area, particularly for nonresidential development such as retail, office, industrial, and institutional. A more probable deterrent to future growth over the next 30 to 35 years involves existing residential land use policies within the communities of Lancaster and Palmdale, and to much lesser extent the City of Ridgecrest and the Southern area of Inyo County. Existing land use policies imply a theoretical constraint equal to approximately 200 units per year or less than 3.0 of annual projected housing development (7,375 units per year). The projected level of housing development throughout WEMO is expected to generate approximately 9,175 housing construction jobs providing about $33,620 in annual income per worker. Potential limitations on housing growth inherent to the HCA designations and environmental permitting fees of the HCP program are considered negligible because the areas with highest probable impact are in remote locations where the majority of housing will consist of individual residences built on existing lots.

Grazing Activity

Most grazing production (cattle, sheep, etc.) is exported for additional grazing or processing outside the WEMO region. Consequently, the area employment base most directly affected by grazing is limited to the agricultural sector, accounting for less than 0.9 percent of WEMO employment, or roughly 2,000 jobs. Grazing activity has a long history throughout the WEMO area but represents a declining component of economic activity, both in absolute and relative terms. The bulk of agricultural employment includes agricultural service jobs (roughly 1,400), as distinct from stock production (less than 250 jobs) most directly associated with grazing activities. The bulk of agricultural service jobs are commonly geared to the support of crop production. Theoretically, the maximum direct impact associated with the HCP program is defined by the proportionate share of agricultural sector employment directed to stock production. This maximum theoretical impact exceeds the probable worst-case effect associated with the HCP program because BLM grazing leases will be recognized until such time voluntarily relinquished by area ranchers.

Resource Development

Due to the richness and diversity of mineral deposits throughout the WEMO area, resource development includes a wide range of related mining and extraction activities. Such location dependent activities involve varying degrees of on-site processing of natural resources that are largely exported out of the region for further processing or consumption. Mining and natural resource extraction describes the area employment base most directly affected by such location dependent activities. Mining activity has a long history throughout the WEMO area but represents a static if not declining component of employment activity, both in absolute and relative terms. Current BLM records suggest this sector accounts for approximately 1.2 percent of the WEMO employment base, or roughly 2,700 jobs. By contrast, EDD-based simulations suggest a significantly lower level of direct employment. The current base of mining employment describes the maximum conceivable economic impact that could possibly result from the removal of lands currently used for resources extraction, milling, and on-site production.

The maximum conceivable impact greatly exceeds the probable worst case scenario of socio-economic effect possible under the HCP program. Proposed conservation policies do not limit active operations at existing claims, which account for the current base of sector employment identified by BLM records. Most of the active operations discussed separately are not expected to exhaust remaining on-site resource capacity or represent the only verified deposits for a particular resource in the WEMO area. The proposed HCA designations, however, are likely to have a material but unknown effect on the long-term potential for future extraction and production of mineral resources not yet identified or quantified within the WEMO area. HCP regulations will require the development of future resources in designated HCA's to comply with the 1.0 percent AGD limitation and conform with best management practices for the protection of threatened and endangered species. Such limitations do not effectively preclude future operations but are likely to add to the cost structure defining current operations. In a number of undetermined circumstances, the HCP regulations are likely to render the development of future sites with yet unknown potential financially infeasible.

Recreation

Fundamental aspects of the WEMO recreation experience influence the potential effect on area employment. Documented recreation activities throughout the WEMO area encompass a highly diverse range of activities, but most commonly evolve around the use of motor vehicles as a focal or ancillary element of the visitor experience. Beyond the mobility component of the experience, described recreation activities tend to emphasize immersion in the area's natural bounty (solitude, expansive vistas, wildlife, terrain, minerals, etc.) as opposed to manmade attractions and conveniences (theme parks, outlet centers, vacation resorts, convention centers, etc.). Also, Southern California describes the geographic origin for the vast majority of recreation visitors to the WEMO. These factors affect the duration and nature of recreation visits to the WEMO area and also employment sectors most likely to be influenced by the recreational pursuits of day-trippers and overnight visitors.

Sectors most directly influenced by described recreation activities include: selected transportation services; retail activities involving the sale of food, provisions, gas, and meals; specialized services such as lodging, vehicle repair, and recreation; and directed government services (park rangers, sheriff, etc.). On a combined basis, these employment sectors represent about 18.0 percent of the current job base in WEMO or roughly 41,800 jobs. The estimated composition of employment influenced by recreation activity is summarized as follows:

WEMO EMPLOYMENT INFLUENCED BY RECREATION

Employment Sector	Share of WEMO Employment	Share of Sector Employment
Transp./Utilities	0.36%	8%
Retail Trades	12.28%	57%
Services	4.51%	13%
Government	0.85%	5%
Total	18.00%	

The overall employment level identified for each of the above sectors is primarily driven by the current level of urbanization throughout WEMO, not recreation visitors.

Recreation visits are expected to augment identified employment levels but not necessarily drive a significant share of jobs identified. As an example, OHV usage throughout WEMO is broadly estimated to attract roughly 2.0 million visitors per year. This level of trip-volume is consistent with annual shopper-trips describing a busy neighborhood shopping center (i.e.: 120,000-square-foot center supporting roughly 200 retail jobs). Most OHV visitors, however, are part of a larger group, which significantly reduces realistic shopper-trip potential associated with OHV recreation, particularly for non-dining retail expenditures. In addition, a substantial portion of OHV trip-related expenditures are made within the hometown location of recreation visitors who primarily drive up from the Metropolitan Areas of Southern California. Consequently, non-dining retail expenditures are not likely to support more than 50 retail sector jobs providing $30,360 in annual income per worker, on average. A greater portion of OHV visitors can be expected to make dining-related expenditures during a given visit. A 60.0 percent incident rate describing the purchase of a hot or cold meal while within the WEMO area (aggressive) suggests equivalent economic support for roughly 140 restaurant jobs providing an average of $14,960 in annual income per worker, on average.

On a combined basis, the above levels of retail support describing OHV visitor expenditures represent roughly 190 jobs or about 0.8 percent of food store and dining retail sector jobs that currently exist throughout WEMO. The magnitude of effect used to describe the influence of outdoor recreation activity on the retail sector of WEMO tends to characterize the level of effect for other employment sectors identified. Reported recreation visitor activity in the WEMO area generates a notable but supplemental level of economic support for the current employment base of the region. The maximum possible effect of recreation activity on WEMO employment and income, therefore, is substantially less than the above levels of employment describing those sectors influenced by recreation activity.

Designated routes and closures under the HCP program and corresponding impact on recreation usage within the WEMO area effectively determines the impact on employment opportunities in WEMO. The identified impact of closures ranges from low to moderate. For the most part, areas that tend to experience high levels of recreation visitation will have minimal closures, although some degree of closure is designated in these locations. Anticipated usage impacts resulting from planned closures and access limits have been identified in relative terms (low, moderate, high) but not are specifically identified in terms of the corresponding loss in visitor-trips. Current OHV areas, representing the bulk of recreation visitor trips within WEMO, will not be reduced as a result of planned closures. The closure of areas supporting other forms of recreational activity is expected to cause a spillover effect into adjoining areas but not significantly reduce current levels of visitation related to respective recreation interests. Access limitations off certain designated routes (50-foot limit) is expected to eliminate or minimize motorized access in these locations and corresponding frequency of campsites set up at the end of ancillary spur routes. The overall effect of this limitation is not considered significant in relation to the volume of recreation visits dependent on the use of motorized vehicles. The overall impact of the HCP program on recreation usage and visitation is not precisely quantified but is not expected to significantly limit current levels of recreation activity. The corresponding effect on area employment and income also cannot be readily quantified, but the magnitude of effect does not represent a potential adverse impact on socio-economic income and employment opportunities throughout WEMO.

EXHIBIT 1
NONAGRICULTURAL EMPLOYMENT TRENDS
SOUTHERN CALIFORNIA AND WEMO AREA COUNTIES

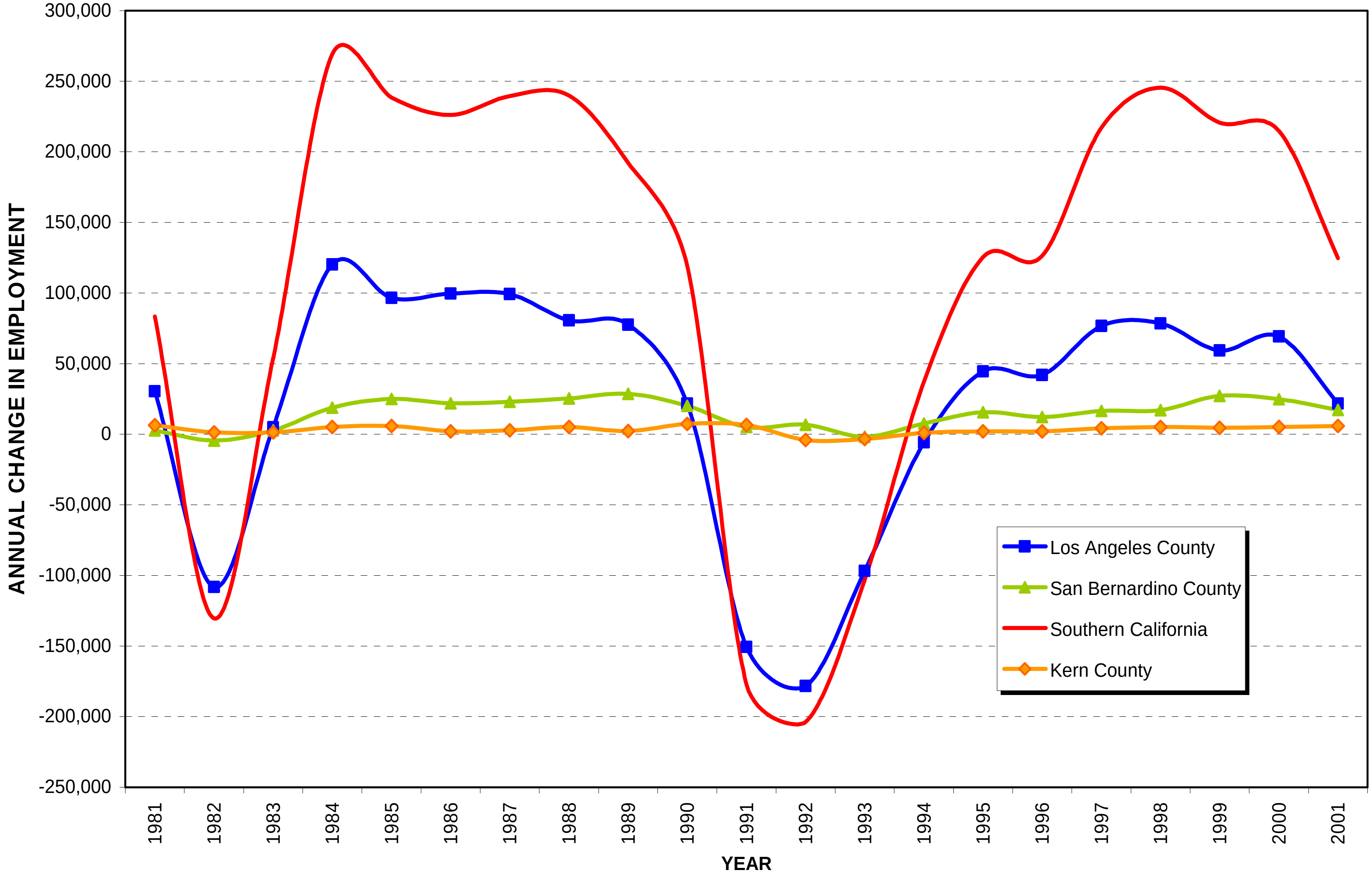


EXHIBIT 2
EMPLOYMENT TRENDS INDEX
WEST MOJAVE REGION

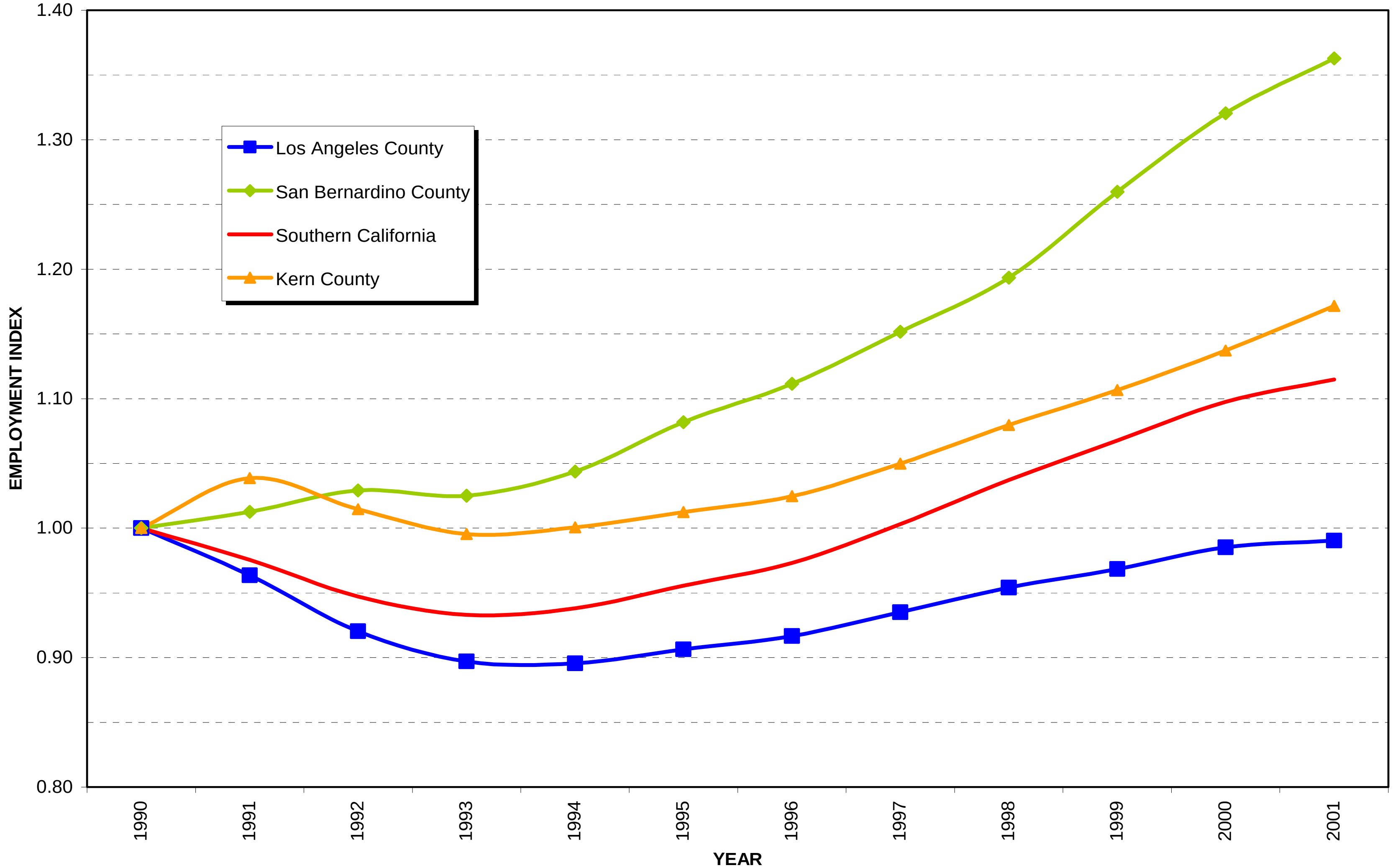


EXHIBIT 3
INDEXED ANNUAL CHANGE IN NONAGRICULTURAL EMPLOYMENT AND HOUSING ACTIVITY
SOUTHERN CALIFORNIA AND KERN COUNTY REGION

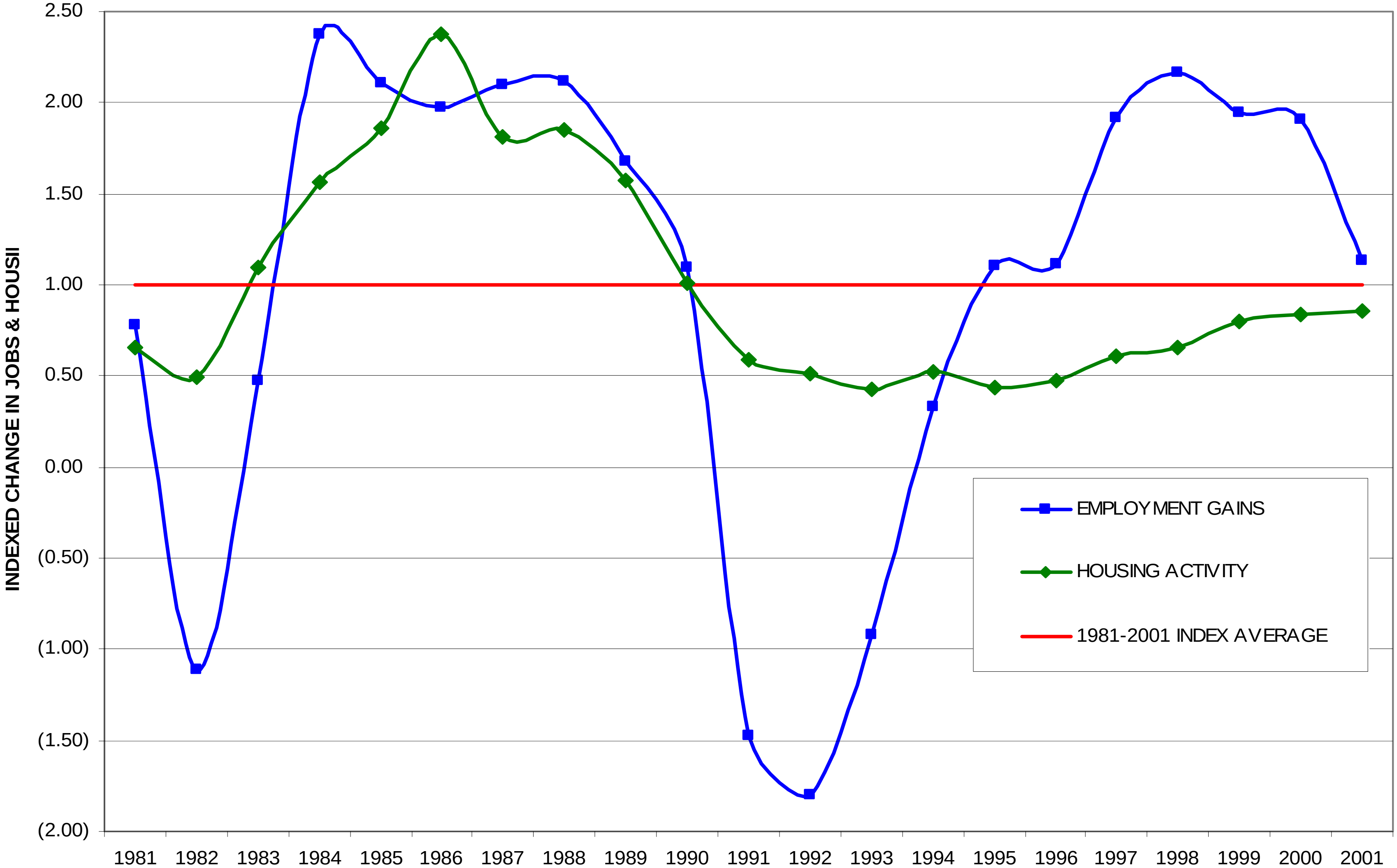


EXHIBIT 4

INDEXED VOLUME OF HOUSING ACTIVITY VERSUS 22-YEAR AVERAGE

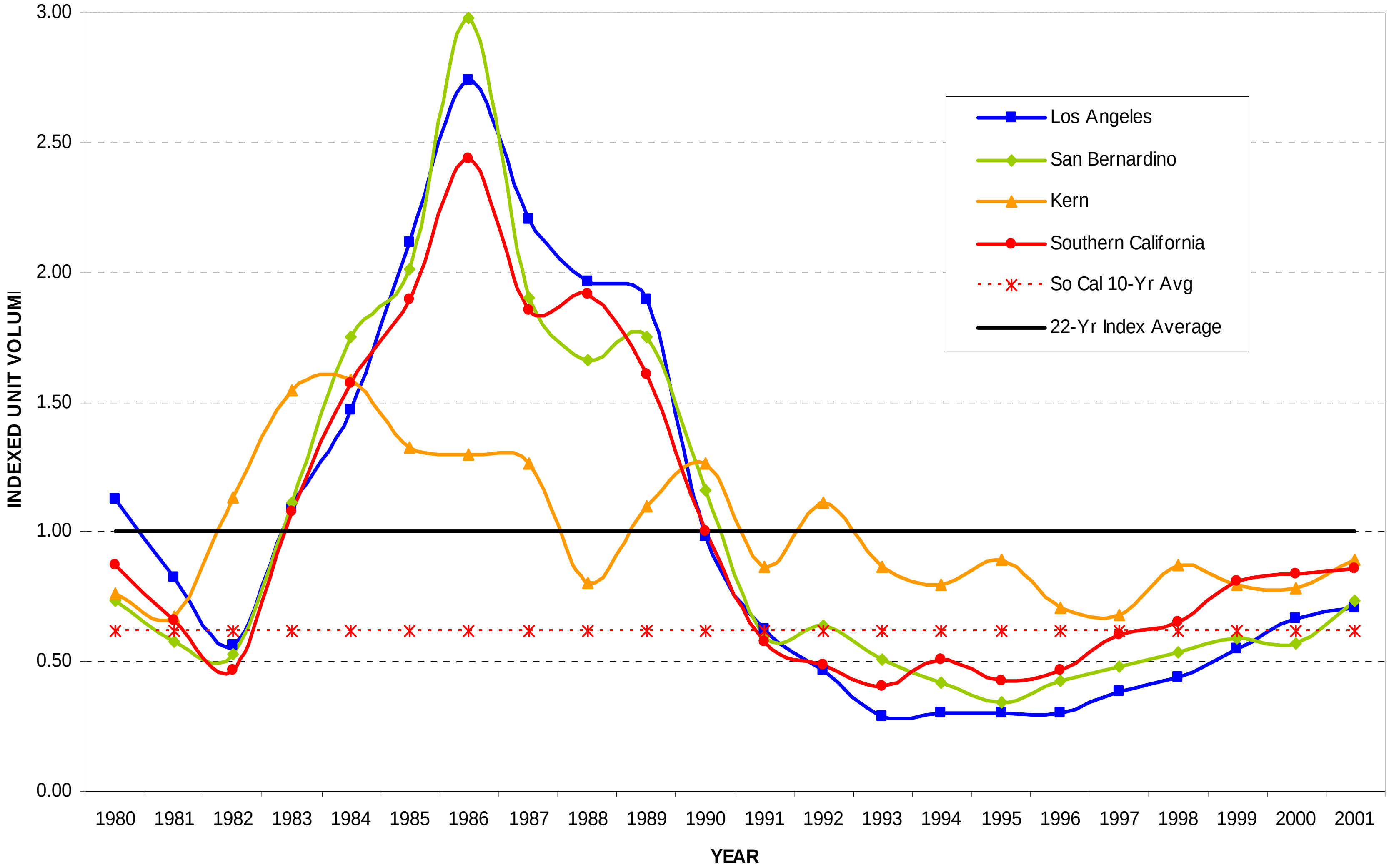
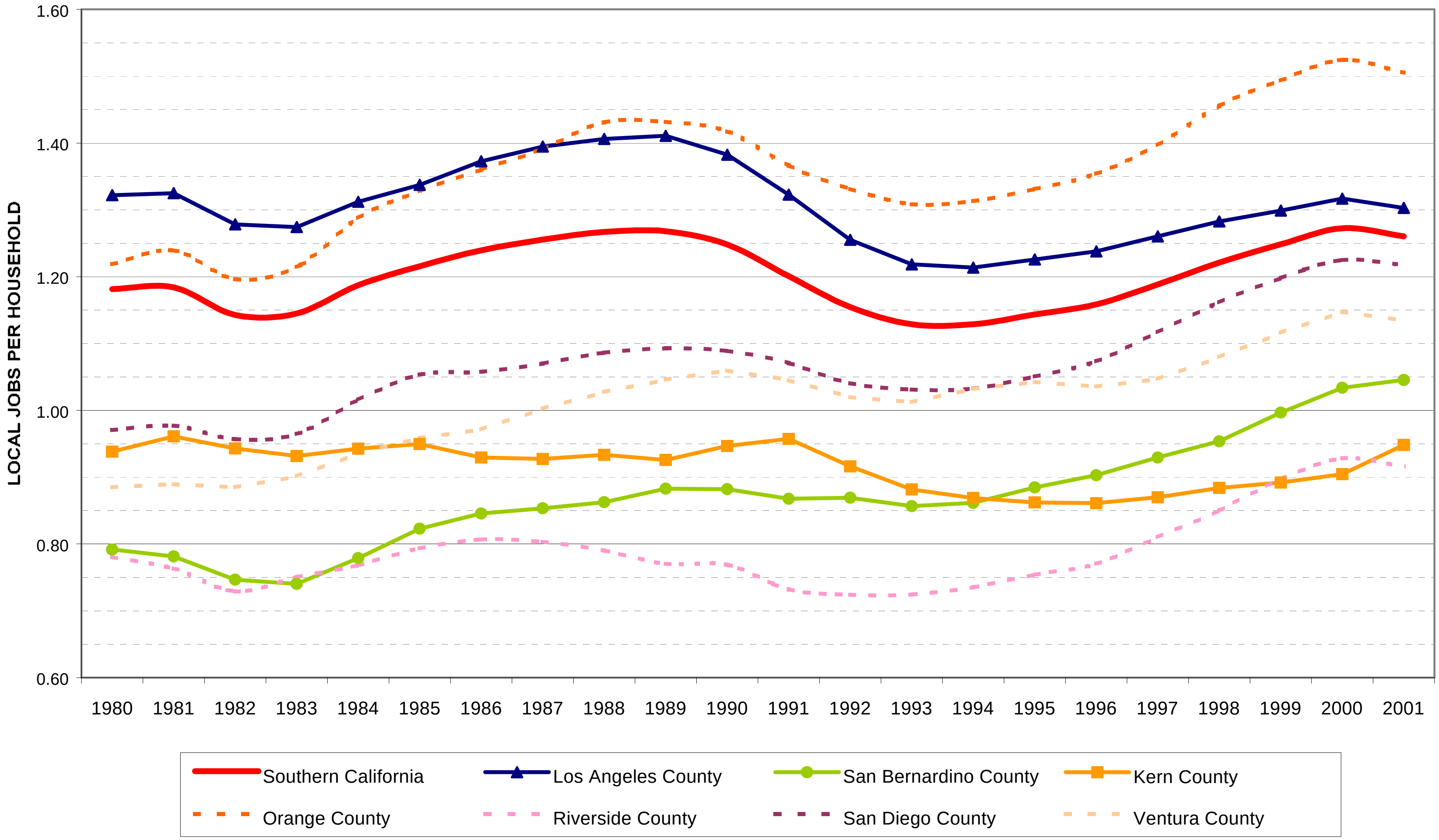


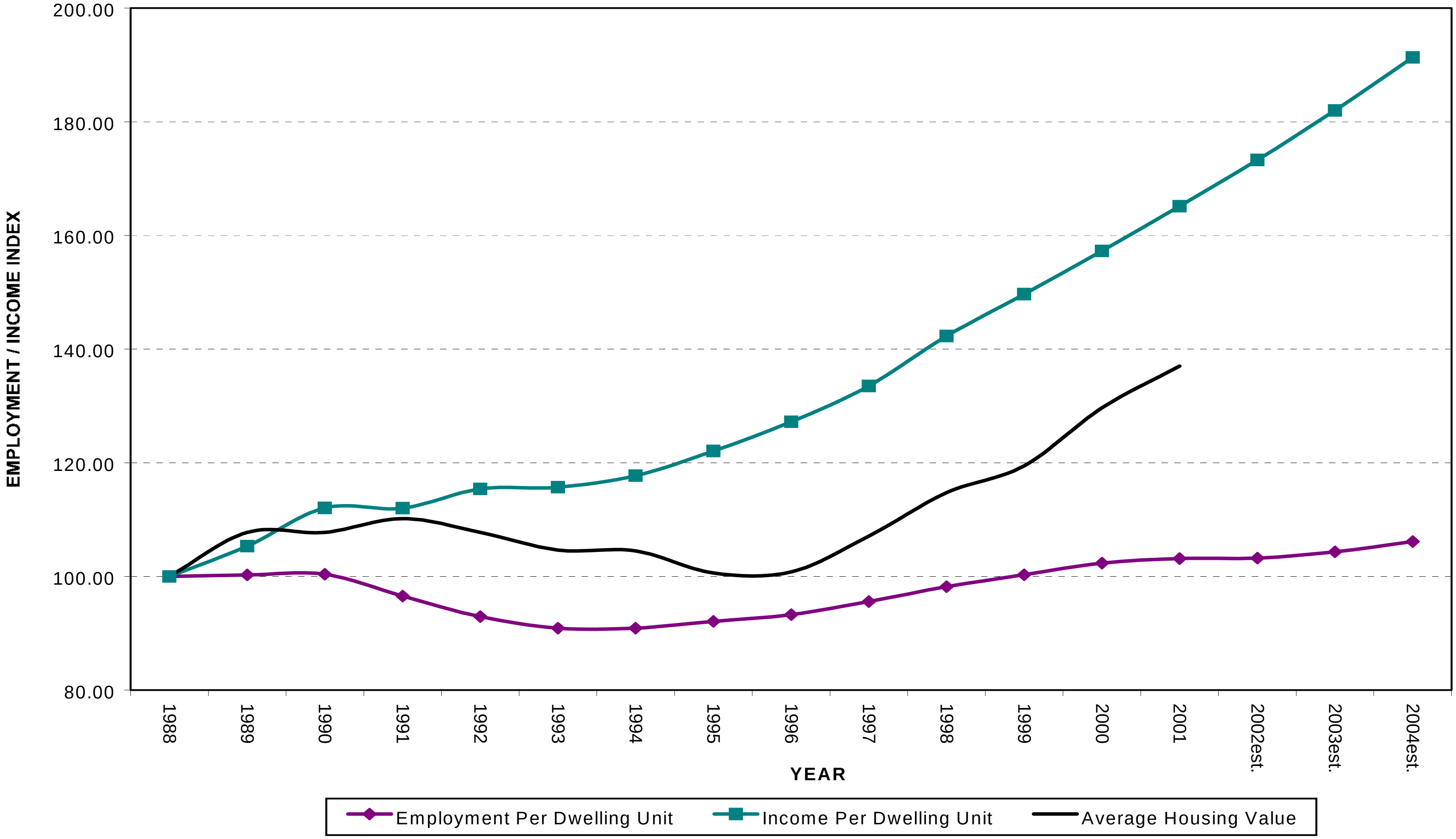
EXHIBIT 5

NONAGRICULTURAL EMPLOYMENT PER HOUSEHOLD



Source: California Employment Development Department; California Department of Finance; Alfred Gobar Associates.

EXHIBIT 6
SOUTHERN CALIFORNIA, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT INDEX



Source: California Statistical Abstract; Bureau of Labor Statistics; Bureau of The Census - Construction Statistics Division; Real Estate Research Council of Southern California; California State University, Long Beach.

EXHIBIT 7

LONG TERM GROWTH PROJECTIONS
SOUTHERN CALIFORNIA AND KERN COUNTY

Projection Criteria	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	Avg Rate
7-County Regional Environment										
Population	20,229,100	21,792,300	23,234,400	24,533,900	26,195,200	27,599,100	29,066,500	30,533,900	10,304,800	1.18%
5Yr-Average Annual Rate:	n.a.	1.50%	1.29%	1.09%	1.32%	1.05%	1.04%	0.99%		
Employment	8,920,200	9,722,800	10,469,200	10,975,200	11,471,400	12,218,200	12,853,600	13,489,100	4,568,900	1.19%
Jobs Per 1,000 Population	441	446	451	447	438	443	442	442		
Households	6,607,000	7,031,500	7,547,400	8,030,200	8,574,600	9,038,300	9,531,600	10,025,000	3,418,000	1.20%
Persons Per Household	3.06	3.10	3.08	3.06	3.05	3.05	3.05	3.05		
WEMO Counties Region (San Bernardino, Los Angeles, Kern, & Inyo)										
Population	12,247,400	13,004,400	13,701,200	14,414,800	15,332,800	16,014,400	16,772,600	17,530,700	5,283,300	1.03%
5Yr-Average Annual Rate:	n.a.	1.21%	1.05%	1.02%	1.24%	0.87%	0.93%	0.89%		
Employment	5,267,800	5,651,800	6,048,100	6,311,400	6,526,600	6,914,300	7,232,000	7,549,700	2,281,900	1.03%
Jobs Per 1,000 Population	430	435	441	438	426	432	431	431		
Households	3,916,900	4,098,900	4,376,500	4,668,700	4,998,200	5,231,600	5,504,800	5,778,100	1,861,200	1.12%
Persons Per Household	3.13	3.17	3.13	3.09	3.07	3.06	3.05	3.03		

Source: Southern California Association of Governments, Kern County Council of Governments, California Department of Finance, San Diego Association of Governments; Alfred Gobar Associates.

EXHIBIT 8

2000 CENSUS DEMOGRAPHIC COMPARISON
WEST MOJAVE PLAN BY SUBAREA

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Total Population	**733,476**	355,964	299,181	77,769	562
% Share of Total	**100.0%**	48.5%	40.8%	10.6%	0.1%
Population Growth (1990-2000)	**13.4%**	18.1%	28.4%	3.1%	-8.6%
Age Distribution					
Age 0 to 20	**36.7%**	35.5%	38.7%	34.2%	26.2%
Age 21 to 34	**17.4%**	18.2%	16.8%	16.9%	9.3%
Age 35 to 54	**28.4%**	26.7%	30.1%	29.5%	28.3%
Age 55 to 64	**7.5%**	7.8%	6.7%	8.9%	16.5%
Age 65+	**10.0%**	11.8%	7.7%	10.5%	19.7%
Race Distribution					
Non-Hispanic	**74.1%**	75.0%	70.5%	83.4%	78.5%
White	**58.0%**	61.5%	50.5%	70.7%	73.7%
Black alone	**9.3%**	7.2%	13.0%	5.1%	0.0%
Am Indian/Alskn alone	**0.8%**	0.9%	0.6%	1.0%	0.9%
Asian alone	**2.6%**	2.0%	3.2%	2.9%	0.9%
Hawaiian/Pac Islndr alone	**0.3%**	0.3%	0.2%	0.3%	0.0%
Some other race alone	**0.2%**	0.2%	0.3%	0.2%	0.0%
Two or More Races	**2.9%**	2.9%	2.7%	3.2%	3.0%
Hispanic	**25.9%**	25.0%	29.5%	16.6%	21.5%
Families as % of Households	**75.0%**	74.7%	76.6%	71.3%	59.8%
Population in Group Quarters	**3.2%**	3.8%	2.7%	1.3%	0.0%
Institutionalized	**1.8%**	1.7%	2.3%	0.2%	0.0%
Correctional	**0.9%**	0.4%	1.7%	0.1%	0.0%
Nursing Homes	**0.2%**	0.3%	0.3%	0.1%	0.0%
Other Institutions	**0.6%**	1.0%	0.3%	0.0%	0.0%
Noninstitutionalized	**1.4%**	2.2%	0.4%	1.1%	0.0%
College on off campus	**0.0%**	0.0%	0.0%	0.0%	0.0%
Military Quarters	**1.0%**	1.8%	0.0%	1.0%	0.0%
Other	**0.3%**	0.3%	0.3%	0.1%	0.0%
Persons Per Household					
1 Person Per Unit	**20.2%**	20.4%	18.5%	24.3%	35.4%
2 Person Per Unit	**29.4%**	31.1%	26.2%	32.8%	40.1%
3 Person Per Unit	**16.9%**	16.9%	17.1%	16.3%	6.6%
4 Person Per Unit	**16.4%**	15.6%	18.1%	14.6%	10.5%
5 Person Per Unit	**9.6%**	9.1%	11.0%	7.3%	3.5%
6 Person Per Unit	**4.4%**	4.1%	5.2%	2.9%	2.7%
7+ Person Per Unit	**3.2%**	2.9%	4.0%	1.9%	1.2%

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Average Household Size	**2.92**	2.84	3.12	2.65	2.37
Householder Age					
Age 15 - 24	**5.4%**	5.9%	4.5%	5.9%	2.0%
Age 25 - 34	**15.9%**	15.4%	16.6%	15.8%	14.5%
Age 35 - 54	**46.3%**	42.8%	51.9%	45.0%	38.8%
Age 55 - 64	**13.5%**	13.9%	12.5%	14.8%	23.0%
Age 65+	**18.9%**	22.1%	14.5%	18.5%	21.7%
Housing by Tenure					
Owner-Occupied	**66.5%**	66.1%	68.3%	62.5%	69.1%
Renter-Occupied	**33.5%**	33.9%	31.7%	37.5%	30.9%
Vacant Units	**11.6%**	13.1%	8.5%	14.4%	34.9%
For Seasonal, Rec, or Occ	**1.7%**	2.6%	0.6%	1.6%	11.2%
Housing Value					
Less Than $19,999	**0.8%**	1.0%	0.3%	1.6%	0.0%
$20,000 to $39,999	**3.1%**	3.9%	0.7%	8.5%	16.7%
$40,000 to $59,999	**7.7%**	9.3%	3.2%	17.2%	45.2%
$60,000 to $79,999	**17.8%**	18.9%	15.1%	23.0%	28.6%
$80,000 to $99,999	**22.8%**	24.1%	21.0%	22.9%	0.0%
$100,000 to $124,999	**17.0%**	16.9%	18.1%	12.6%	4.8%
$125,000 to $149,999	**12.5%**	11.6%	15.2%	6.3%	0.0%
$150,000 to $174,999	**7.2%**	6.4%	9.1%	3.1%	0.0%
$175,000 to $199,999	**3.9%**	3.2%	5.3%	1.9%	0.0%
$200,000 to $249,999	**3.6%**	2.5%	5.5%	1.7%	0.0%
$250,000 to $299,999	**1.7%**	1.1%	2.9%	0.6%	0.0%
$300,000 to $399,999	**1.3%**	0.7%	2.3%	0.5%	0.0%
$400,000 to $499,999	**0.4%**	0.2%	0.7%	0.0%	0.0%
$500,000 to $749,999	**0.2%**	0.1%	0.3%	0.1%	4.8%
$750,000 to $999,999	**0.0%**	0.0%	0.1%	0.0%	0.0%
$1,000,000 or more	**0.1%**	0.1%	0.2%	0.1%	0.0%
Median Housing Value	**$89,062**	$93,949	$106,661	$79,725	$52,499
Monthly Rent					
No Cash Rent	**10.1%**	12.9%	3.0%	18.2%	35.7%
Less Than $199	**4.3%**	4.0%	5.0%	3.8%	7.1%
$200 to $249	**2.4%**	2.8%	1.5%	3.0%	3.6%
$250 to $299	**4.1%**	4.7%	1.6%	8.3%	23.2%
$300 to $349	**5.9%**	6.5%	3.6%	10.3%	3.6%
$350 to $399	**8.7%**	10.1%	5.7%	11.3%	7.1%
$400 to $499	**20.8%**	22.9%	18.1%	19.4%	19.6%
$500 to $599	**16.9%**	14.4%	22.8%	10.3%	0.0%
$600 to $699	**11.6%**	10.3%	15.4%	6.8%	0.0%
$700 to $799	**7.6%**	6.6%	10.0%	5.0%	0.0%
$800 to $899	**4.0%**	2.7%	6.7%	2.0%	0.0%
$900 to $999	**1.5%**	0.9%	2.6%	0.6%	0.0%
$1,000 to $1,249	**1.5%**	0.8%	2.8%	0.6%	0.0%
$1,250 to $1,499	**0.4%**	0.2%	0.9%	0.1%	0.0%
$1,500 to $1,999	**0.3%**	0.2%	0.4%	0.1%	0.0%
$2,000 or more	**0.0%**	0.0%	0.0%	0.1%	0.0%
Median Rent	**$469**	$439	$550	$378	$273

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Year Structure Built					
1999-March 00	**1.1%**	1.2%	1.0%	0.9%	2.6%
1995-1998	**5.5%**	5.6%	5.7%	4.4%	12.3%
1990-1994	**17.0%**	16.1%	18.2%	17.0%	5.2%
1980-1989	**35.1%**	34.5%	38.3%	26.9%	27.3%
1970-1979	**16.8%**	18.3%	13.2%	21.7%	12.3%
1960-1969	**9.5%**	10.5%	7.2%	12.0%	13.6%
1959 or earlier	**15.1%**	13.8%	16.5%	17.2%	26.6%
Year Moved In					
1999-March 00	**23.5%**	23.5%	23.1%	24.7%	24.7%
1995-1998	**30.8%**	29.5%	33.6%	27.4%	25.3%
1990-1994	**18.6%**	17.8%	19.6%	18.6%	20.8%
1980-1989	**17.5%**	19.2%	15.4%	16.6%	14.9%
1970-1979	**6.6%**	7.1%	5.1%	9.4%	9.1%
1969 or earlier	**3.0%**	2.9%	3.1%	3.3%	5.2%
Units in Structure					
1, detached	**72.7%**	72.8%	74.6%	65.6%	50.0%
1, attached	**3.1%**	3.6%	2.4%	3.3%	0.0%
2	**1.9%**	2.4%	0.8%	3.2%	0.0%
3 or 4	**4.1%**	4.7%	3.1%	4.6%	0.0%
5 to 9	**2.8%**	2.5%	3.6%	1.7%	0.0%
10 to 19	**1.8%**	1.5%	2.3%	1.1%	0.0%
20 to 49	**1.2%**	0.7%	2.0%	0.6%	0.0%
50 or more	**2.8%**	1.7%	4.8%	1.0%	0.0%
Mobile Home	**9.3%**	9.7%	6.1%	18.7%	43.5%
Boat, RV, Van, etc.	**0.3%**	0.3%	0.3%	0.2%	6.5%
Household Income					
Less Than $15,000	**17.3%**	18.4%	15.8%	16.7%	27.6%
$15,000-$19,999	**6.8%**	7.4%	5.9%	7.1%	14.1%
$20,000-$29,999	**13.3%**	14.6%	11.8%	12.5%	16.6%
$30,000-$39,999	**12.4%**	13.1%	11.5%	12.3%	7.4%
$40,000-$49,999	**10.8%**	11.0%	10.7%	10.0%	11.0%
$50,000-$59,999	**9.4%**	9.2%	9.7%	9.6%	8.6%
$60,000-$74,999	**11.0%**	10.4%	11.7%	11.5%	3.1%
$75,000-$99,999	**10.1%**	8.7%	11.7%	11.5%	6.7%
$100,000-$124,999	**4.6%**	3.8%	5.8%	4.7%	3.7%
$125,000-$149,999	**2.0%**	1.5%	2.6%	1.9%	1.2%
$150,000-$199,999	**1.3%**	1.0%	1.6%	1.4%	0.0%
$200,000 or more	**1.0%**	0.7%	1.3%	0.8%	0.0%
Median Household Income	**$40,101**	$36,044	$42,205	$40,723	$24,666
Educational Attainment (Age 25+)					
Less than 9th Grade	**8.9%**	8.2%	10.2%	7.2%	14.6%
Some High School	**12.6%**	12.5%	13.2%	10.5%	15.4%
High School Diploma	**27.5%**	29.2%	25.7%	25.3%	30.3%
College 1-3 years	**37.2%**	37.3%	36.5%	39.2%	31.1%
Bachelor's Degree	**9.0%**	8.3%	9.6%	10.9%	6.7%
Grad/Prof Degree	**4.8%**	4.5%	4.7%	6.9%	2.0%

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Occupation (Age 16+)					
White Collar	**68.9%**	67.9%	69.8%	70.2%	63.7%
Blue Collar	**31.1%**	32.1%	30.2%	29.8%	36.3%
Workers Per Family					
0 Workers	**15.6%**	17.7%	13.0%	14.7%	21.3%
1 Worker	**37.5%**	37.3%	37.7%	37.4%	38.3%
2 Workers	**38.8%**	37.4%	39.8%	41.9%	28.7%
3+ Workers	**8.1%**	7.6%	9.5%	6.0%	11.7%
Avg Income by Workers/Family					
0 Workers	**$27,490**	$28,423	$24,509	$31,881	$14,813
1 Worker	**$43,575**	$40,965	$46,817	$45,340	$32,223
2 Workers	**$67,472**	$63,478	$72,731	$67,708	$58,867
3+ Workers	**$85,591**	$82,114	$89,916	$83,430	$88,891
Vehicles Per Household					
0 Vehicles	**7.6%**	7.4%	7.9%	7.4%	7.1%
1 Vehicle	**32.7%**	34.1%	30.8%	32.8%	35.7%
2 Vehicle	**39.1%**	38.5%	40.2%	38.5%	27.3%
3+ Vehicles	**20.6%**	20.0%	21.1%	21.3%	29.9%

Source: Alfred Gobar Associates; U.S. Bureau of the Census; AnySite Online.

EXHIBIT 9
GENERAL PLAN BUILD OUT CAPACITY - SELECTED WEMO AREAS
COUNTY SUB AREA LOCATIONS

Land Use & Intensity	San Bernardino County			Los Angeles County			Kern County			Inyo County			WEMO Area Total		
Residential	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*
DU's/Ac: 0.00 - 0.20	757,798	11,489	34,346	467,763	231,862	810,998	10,587	529	1,600	5,393	270	648	1,241,541	244,150	847,593
0.21 - 0.50	38,269	14,134	37,934	17,888	14,247	48,995	146,337	63,169	184,005	929	186	445	203,423	91,736	271,379
0.51 - 0.99	11,148	8,510	7,218	25,664	25,664	86,243	57	43	130	-	-	-	36,869	34,217	93,591
1.0 - 1.5	47,927	52,606	158,300	15,583	27,076	86,689	16,715	16,715	49,751	-	-	-	80,226	96,398	294,741
1.5 - 1.8	15,458	30,916	90,244	18,182	72,334	214,034	-	-	-	-	-	-	33,640	103,250	304,277
2.0 - 2.9	29,722	60,482	181,907	5,311	15,934	55,801	19,398	41,456	117,859	-	-	-	54,432	117,872	355,568
3.0 - 3.9	4,106	879	2,467	-	-	-	253	760	2,298	-	-	-	4,359	1,639	4,766
4.0 - 4.9	15,443	62,228	197,565	9,899	53,252	183,257	4,614	18,458	55,797	-	-	-	29,956	133,938	436,619
5.0 - 7.9	15,392	76,960	230,114	1,700	17,082	53,485	45,193	226,424	668,051	-	-	-	62,285	320,467	951,649
8.0 - 10.0	6,448	53,753	161,970	1,765	25,737	81,332	16,185	129,681	391,523	-	-	-	24,397	209,171	634,825
12.0 - 15.0	9,210	129,394	373,895	205	4,416	15,344	6,883	82,600	238,722	-	-	-	16,298	216,411	627,960
20.0 - 30.0	6	120	364	-	-	-	544	10,870	32,861	-	-	-	550	10,990	33,224
Residential Sub-Total:	950,927	501,472	1,476,323	563,960	487,605	1,636,179	266,768	590,706	1,742,598	6,322	455	1,093	**1,787,977**	**1,580,238**	**4,856,193**
		Pop/Hshld:	2.94		Pop/Hshld:	3.36		Pop/Hshld:	2.95		Pop/Hshld:	2.40		Avg. Pop/Hshld:	3.07
Non-Residential	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs
					(000SF/Ac)										
Office**	7,196	39.00	280,627	1,682	39.00	65,579	5,172	39.00	201,695	-	-	-	14,049	39.00	547,901
Retail**	32,184	15.00	482,759	5,260	15.00	78,893	6,419	15.00	96,291	151	15.00	2,265	44,014	15.00	660,209
Industrial**	46,120	14.00	645,681	25,512	14.00	357,167	31,757	14.00	444,601	1,479	14.00	20,706	104,868	14.00	1,468,154
Institutional**	66,921	2.56	171,010	5,546	7.34	40,731	5,058	4.44	22,470	424	1.62	688	77,949	3.01	234,899
Comm'l/Ind/Inst Sub-Total:	152,420		1,580,076	37,999		542,370	48,406		765,058	2,054		23,659	240,879		2,911,163
Other:															
Open Space - Mixed	10,095			12,365			0			80			22,540		
Open Space - City/County	1,610			6,907			1,301			5			9,823		
Open Space - Private	20			0			856			0			876		
Open Space - Other Govt	1,590			13,447			460,821			361,368			837,226		
Govt - Utilities/Infra./Circ.	694.00			-			-			240.00			934.00		
Govt - Military	1,863,285			48,838			451,737			457,000			2,820,860		
Aviation	2,773			346			4,900			0			8,018		
Resource - Agg/Mineral	2,996,138			741			161,566			390			3,158,835		
Agricultural	32,816			0			149,146			3,762			185,725		
Conservation	142			0			22,986			0			23,128		
Misc./Undesignated	0			0			156			0			156		
Other Sub-Total:	4,909,163		59,214	82,643		51,413	1,253,470		64,012	822,845		26	7,068,121		174,664
Non-Residential Sub-Total:	5,061,583		1,639,290	120,642		593,782	1,301,876		829,070	824,899		23,685	**7,309,001**		**3,085,828**
Study Area Totals															
Total Acreage:	6,012,511			684,602			1,568,644			831,221			**9,096,978**	Total Acreage	
Dwelling Unit Capacity:	501,472			487,605			590,706			455			**1,580,238**	Dwelling Unit Capacity	
Population Potential:	1,476,323			1,636,179			1,742,598			1,093			**4,856,193**	Potential Residents	
Job Base Capacity:	1,639,290			593,782			829,070			23,685			**3,085,828**	Job Base Capacity	

* Population coefficient drivers (Persons/Dwelling unit) were obtained form the California Department of Finance, January 2001.

** Employment coefficient drivers (Jobs/Acre) represent averages obtained form Building Owners Managers Association; Urban Land Institute, Southern California Real Estate Magazine.

Source: City of 29 Palm Plan, City of Yucca Valley, City of Adelanto, City of Barstow, City of Victorville, City of Lancaster, City of Palmdale, City of Hesperia, City of Victorville, City of California City, Town of Apple Valley, County of San Bernardino, County of Los Angeles, County of Kern, County of Inyo; Alfred Gobar Associates.

EXHIBIT 10
GENERAL PLAN BUILD OUT CAPACITY - SELECTED WEMO AREAS
WEMO AREA CITIES

Land Use & Intensity	City of 29 Palms			Yucca Valley			City of Adelanto			City of Barstow			City of Victorville			City of Hesperia		
Residential	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*
DU's/Ac: 0.00 - 0.20	4,318	864	2,424	5,019	502	1,197	3,415	683	2,418				7,851	1,570	4,788	979	98	
0.21 - 0.50	15,095	6,038	16,949	10,191	2,548	6,078	1,037	415	1,468	2,482	621	1,691	1,045	523				
0.51 - 0.99																8,172	6,129	
1.0 - 1.5	2,161	2,161	6,066	2,319	2,319	5,532		326	1,154	454	454	1,237				10,882	15,235	47,761
1.5 - 1.8																		
2.0 - 2.9	2,067	4,134	11,604	3,774	7,548	18,007	3,845	7,690	27,223	658	1,316	3,586	14,343	28,686	87,464	1,153	3,344	10,482
3.0 - 3.9	293	879	2,467															
4.0 - 4.9	4,008	16,032	45,002	49	196	468	6,448	25,792	91,304							507	2,484	7,788
5.0 - 7.9				1,267	6,335	15,113	1,920	9,600	33,984	4,130	20,650	56,271	923	4,615	14,071	5,174	25,870	81,102
8.0 - 10.0	879	8,790	24,674	48	384	916							4,349	34,792	106,081	758	6,064	19,011
12.0 - 15.0	87	1,044	2,931							4,276	64,133	174,761	2,016	30,240	92,202	793	9,516	29,833
20.0 - 30.0																		
Residential Sub-Total:	28,908	39,942	112,116	22,667	19,832	47,310	16,665	44,506	157,551	12,000	87,173	237,546	30,527	100,426	304,605	28,418	68,740	195,978
		Pop/Hshld:	2.81		Pop/Hshld:	2.39		Pop/Hshld:	3.54		Pop/Hshld:	2.73		Pop/Hshld:	3.03		Pop/Hshld:	2.85
Non-Residential	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs
Office**	96	39.00	3,744	53	39.00	2,067	524	39.00	20,452	1,200	39.00	46,816	1,341	39.00	52,291	1,675	39.00	65,325
Retail**	1,512	15.00	22,680	951	15.00	14,265	2,197	15.00	32,949	3,846	15.00	57,687	6,917	15.00	103,749	6,606	15.00	99,096
Industrial**	1,039	14.00	14,546	998	14.00	13,972	10,479	14.00	146,706	2,252	14.00	31,526	5,470	14.00	76,576	2,015	14.00	28,210
Institutional**	848	5.50	4,664	216	13.00	2,808	449	21.00	9,429	1,075	13.00	13,974	1,143	16.00	18,286	307	38.00	11,666
Comm'l/Ind/Inst Sub-Total:	3,495		45,634	2,218		33,112	13,649		209,536	8,373		150,003	14,870		250,902	10,603		204,297
Other:		41.60	10%		59.35	8%		59.85	4%		58.83	9%		60.03	7%		59.53	6%
Open Space - Mixed	2,420			382			1,043			967			894			1,546		
Open Space - City/County				137												1,473		
Open Space - Private																20		
Open Space - Other Govt																		
Govt - Utilities/Infra./Circ.													648			37		
Govt - Military	2,563									3,905								
Aviation				52			2,690									31		
Resource - Agg/Mineral	368															22		
Agricultural																		
Conservation																142		
Misc./Undesignated																		
Other Sub-Total:	5,351		3,106	571		1,310	3,733		4,364	4,872		6,580	1,542		8,438	3,271		5,429
Non-Residential Sub-Total:	8,846		48,740	2,789		34,422	17,382		213,900	13,245		156,583	16,412		259,340	13,874		209,726
Study Area Totals																		
Total Acreage:	37,754			25,456			34,047			25,245			46,939			42,292		
Dwelling Unit Capacity:	39,942			19,832			44,506			87,173			100,426			68,740		
Population Potential:	112,116			47,310			157,551			237,546			304,605			195,978		
Job Base Capacity:	48,740			34,422			213,900			156,583			259,340			209,726		

* Population coefficient drivers (Persons/Dwelling unit) were obtained form the California Department of Finance, January 2001.

** Employment coefficient drivers (Jobs/Acre) represent averages obtained form Building Owners Managers Association; Urban Land Institute, Southern California Real Estate Magazine.

Source: City of 29 Palm Plan, City of Yucca Valley, City of Adelanto, City of Barstow, City of Victorville, City of Lancaster, City of Palmdale, City of Hesperia, City of Victorville, City of California City, Town of Apple Valley, County of San Bernardino, County of Los Angeles, County of Kern, County of Inyo; Alfred Gobar Associates.

EXHIBIT 10 (Cont'd)
GENERAL PLAN BUILD OUT CAPACITY - SELECTED WEMO AREAS
WEMO AREA CITIES

Land Use & Intensity	City of Lancaster			City of Palmdale			City of Ridgecrest			California City			Town of Apple Valley			WEMO Cities Total		
Residential	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*
DU's/Ac: 0.00 - 0.20													2,163	433	1,263	23,745	4,149	12,090
0.21 - 0.50	6,653	1,663	4,916	3,208	1,198	4,120	664	133	336	64,824	32,412	88,615	6,230	3,115	9,093	111,429	48,665	133,265
0.51 - 0.99				17,888	14,247	48,995										26,060	20,376	48,995
1.0 - 1.5	6,653	6,653	19,665				700	700	1,769	1,496	1,496	4,090	7,778	7,778	22,703	32,442	37,121	109,978
1.5 - 1.8	6,653	13,305	39,331	8,930	13,771	47,358							15,458	30,916	90,244	31,041	57,992	176,933
2.0 - 2.9	17,985	71,940	212,655				2,659	7,977	20,158	6,064	12,129	33,159				52,548	144,763	424,337
3.0 - 3.9																293	879	2,467
4.0 - 4.9													1,626	6,504	18,985	12,638	51,008	163,547
5.0 - 7.9				9,574	51,302	176,428	459	2,754	6,959	34,197	170,984	467,470	836	4,180	12,201	58,480	296,290	863,600
8.0 - 10.0	1,089	10,890	32,191	611	6,192	21,294	101	1,013	2,559							7,835	68,125	206,725
12.0 - 15.0	1,089	15,246	45,067	479	7,538	25,923	115	1,377	3,480	2,969	35,628	97,407				11,823	164,721	471,603
20.0 - 30.0				80	1,914	6,582										80	1,914	6,582
Residential Sub-Total:	40,121	119,697	353,825	40,770	96,162	330,701	4,698	13,953	35,260	109,550	252,649	690,741	34,091	52,925	154,488	**368,414**	**896,004**	**2,620,122**
		Pop/Hshld:	2.96		Pop/Hshld:	3.44		Pop/Hshld:	2.53		Pop/Hshld:	2.73		Pop/Hshld:	2.92		Avg. Pop/Hshld:	2.92
Non-Residential	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs
Office**	469	39.00	18,272	1,001	39.00	39,029	420	39.00	16,388	1,807	39.00	70,481	1,439	39.00	56,102	10,025	39.00	390,966
Retail**	1,406	15.00	21,094	3,002	15.00	45,034	1,681	15.00	25,212	602	15.00	9,036	3,301	15.00	49,521	32,022	15.00	480,323
Industrial**	11,277	14.00	157,878	13,592	14.00	190,288	210	14.00	2,940	6,315	14.00	88,411	4,062	14.00	56,874	57,709	14.00	807,927
Institutional**	1,329	16.00	21,264	3,738	5.00	18,690	1,213	1.70	2,062	379	39.00	14,782	713	13.00	9,271	11,410	11.12	126,897
Comm'l/Ind/Inst Sub-Total:	14,481		218,507	21,333		293,041	3,524		46,602	9,104		182,711	9,516		171,768	111,165		1,806,113
Other:		60.10	10%		56.52	6%		58.48	4%		21.40	8%		60.01	5%		48.43	7%
Open Space - Mixed	700			4,446									2,843			15,241		
Open Space - City/County	200															1,810		
Open Space - Private							717									737		
Open Space - Other Govt				677												677		
Govt - Utilities/Infra./Circ.													9			694		
Govt - Military																6,468		
Aviation							2,420									5,193		
Resource - Agg/Mineral				741												523,741		
Agricultural													508			508		
Conservation										11,561						11,703		
Misc./Undesignated																0		
Other Sub-Total:	900		9,801	5,864		9,160	3,137		977	11,561		19,134	3,360		4,279	44,162		72,577
Non-Residential Sub-Total:	15,381		228,308	27,197		302,201	6,661		47,579	20,665		201,845	12,876		176,047	**155,327**		**1,878,690**
Study Area Totals																		
Total Acreage:	55,502			67,967			11,359			130,215			46,966			**523,741** Total Acreage		
Dwelling Unit Capacity:	119,697			96,162			13,953			252,649			52,925			**896,004** Dwelling Unit Capacity		
Population Potential:	353,825			330,701			35,260			690,741			154,488			**2,620,122** Potential Residents		
Job Base Capacity:	228,308			302,201			47,579			201,845			176,047			**1,878,690** Job Base Capacity		

* Population coefficient drivers (Persons/Dwelling unit) were obtained form the California Department of Finance, January 2001.

** Employment coefficient drivers (Jobs/Acre) represent averages obtained form Building Owners Managers Association; Urban Land Institute, Southern California Real Estate Magazine.

Source: City of 29 Palm Plan, City of Yucca Valley, City of Adelanto, City of Barstow, City of Victorville, City of Lancaster, City of Palmdale, City of Hesperia, City of Victorville, City of California City, Town of Apple Valley, County of San Bernardino, County of Los Angeles, County of Kern, County of Inyo; Alfred Gobar Associates.

EXHIBIT 11

WEMO PRIVATE PROPERTY VALUATION
ESTIMATED 2002 ASSESSED VALUE

Geographic Reference	Estimated Acreage	Estimated 2002 A.V.	Average A.V./Acre	Share Of Acreage	Share Of Value	Value Index[1]
WEMO Unicorporated Subareas						
San Bernardino	1,383,188	$4,614,702,000	$3,336	47.4%	20.1%	0.42
Los Angeles	464,487	2,111,564,000	4,546	15.9%	9.2%	0.58
Kern	593,766	1,911,902,000	3,220	20.3%	8.3%	0.41
Inyo	30,057	82,797,000	2,755	1.0%	0.4%	0.35
WEMO Cities						
29 Palms (SB)	31,802	$408,995,000	$12,861	1.1%	1.8%	1.63
Adelanto (SB)	33,343	343,267,000	10,295	1.1%	1.5%	1.31
Apple Valley (SB)	45,464	2,356,389,000	51,830	1.6%	10.2%	6.57
Barstow (SB)	19,027	572,437,000	30,086	0.7%	2.5%	3.82
California City (K)	84,519	309,311,000	3,660	2.9%	1.3%	0.46
Hesperia (SB)	42,322	2,000,150,000	47,260	1.5%	8.7%	5.99
Lancaster (LA)	60,592	1,051,109,000	17,347	2.1%	4.6%	2.20
Palmdale (LA)	57,545	3,413,372,000	59,317	2.0%	14.8%	7.52
Ridgecrest (K)	6,103	476,661,000	78,103	0.2%	2.1%	9.91
Victorville (SB)	41,699	2,562,174,000	61,444	1.4%	11.1%	7.79
Yucca Valley (SB)	24,176	791,014,000	32,719	0.8%	3.4%	4.15
WEMO Subareas Overall						
San Bernardino	1,621,021	$13,649,128,000	$8,420	55.6%	59.3%	1.07
Los Angeles	582,624	6,576,045,000	11,287	20.0%	28.6%	1.43
Kern	684,388	2,697,874,000	3,942	23.5%	11.7%	0.50
Inyo	30,057	82,797,000	2,755	1.0%	0.4%	0.35
WEMO Overall[2]	**2,918,090**	**$23,005,844,000**	**$7,884**	**100.0%**	**100.0%**	**1.00**

Note:

[1] Index value describes share of assessed value relative to share of private property acreage.

[2] Identified acreage only reflects private property within WEMO representing 32.0 percent of total land area within the four-county region evaluated.

Source: Alfred Gobar Associates

EXHIBIT 12

WEMO HABITAT CONSERVATION AREA - AVERAGE LAND VALUE
UNIMPROVED PRIVATE PROPERTY

Private Lands/Subareas	Avg. Value Per Acre	Sample Records	Sample Mix	Reference Land Area	Land Area Mix	Est. of Private Land Value
2002 Assessed Value						
San Bernardino	$489	20,208	52%	401,005	64%	$196,091,000
Los Angeles	2,587	7,755	20%	77,842	12%	201,377,000
Kern	650	10,509	27%	95,682	15%	62,193,000
Inyo[1]	0	0	0%	0	0%	0
Previously Acquired						
LR2000 Database[2]	$457	38	0.1%	51,769	8%	$23,658,000
Critical Habitat Lands:	$772	38,510	100%	626,298	100%	$483,319,000

HCA Mitigation Fee

$3,860/Ac	5.0:1.0 Ratio
$770/Ac	1.0:1.0 Ratio
$390/Ac	0.5:1.0 Ratio

Note:

[1] The designated HCA within Inyo County specifically excludes privately held property.

[2] Excludes three large acquisition transactions involving approximately 416,000 acres.

Source: County Assessor Records; BLM LR2000 Database; Alfred Gobar Associates

EXHIBIT 13

WEMO AREA RELATIVE HOUSING DEMAND
DECEMBER 2002

Source: Alfred Gobar Associates.

EXHIBIT 14

LONG TERM GROWTH PROJECTIONS
WEMO STUDY AREA

Projection Criteria	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
COG/DOF Driven Projections										
Population	795,000	890,300	1,015,800	1,144,800	1,312,600	1,427,100	1,565,200	1,706,500	911,500	2.21%
5Yr-Average Annual Rate:	n.a.	2.29%	2.67%	2.42%	2.77%	1.69%	1.86%	1.74%		
Households	274,700	300,800	351,300	404,500	464,600	509,500	563,700	620,200	345,500	2.35%
Persons Per Household	2.89	2.96	2.89	2.83	2.83	2.80	2.78	2.75		
Housing Units	303,200	331,800	387,000	445,200	511,000	560,100	619,500	681,400	378,200	2.34%
Implicit Vacancy Rate:	9.40%	9.34%	9.22%	9.14%	9.08%	9.03%	9.01%	8.98%		
Trend Adjusted Projections										
Population	795,000	854,600	943,200	1,035,500	1,147,500	1,214,500	1,297,300	1,379,500	584,500	1.59%
5Yr-Average Annual Rate:	n.a.	1.46%	1.99%	1.88%	2.08%	1.14%	1.33%	1.24%		
Households	274,800	290,000	326,200	365,500	405,700	435,900	472,600	510,800	236,000	1.79%
Persons Per Household	2.89	2.95	2.89	2.83	2.83	2.79	2.75	2.70		
Housing Units	303,300	319,900	359,300	402,200	446,100	479,000	519,100	560,800	257,500	1.77%
Implicit Vacancy Rate:	9.40%	9.35%	9.21%	9.12%	9.06%	9.00%	8.96%	8.92%		

Source: Alfred Gobar Associates; Southern California Association of Governments, Kern County Council of Governments, California Department of Finance,

EXHIBIT 15

LONG-TERM PROJECTED GROWTH
WEST MOJAVE PLAN AREA - HOUSEHOLD POPULATION

									35 Year Trends	
Projection Criteria	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**Tot. Chg.**	**Avg Rate**
San Bernardino Subarea										
Barstow	23,460	24,995	27,639	30,663	34,528	36,598	39,379	42,159	18,699	1.7%
Twentynine Palms	15,403	16,223	18,228	20,245	22,473	23,963	25,779	27,595	12,192	1.7%
Yucca Valley	18,512	19,424	20,834	21,766	22,793	23,937	25,027	26,118	7,606	1.0%
Adelanto	16,022	18,986	22,278	26,096	30,980	33,980	37,683	41,385	25,363	2.7%
Apple Valley	56,369	60,259	63,314	66,854	71,406	74,641	78,308	81,975	25,606	1.1%
Hesperia	66,785	76,011	87,108	100,008	116,536	126,339	138,689	151,039	84,254	2.4%
Victorville	68,386	78,698	91,551	106,522	125,700	136,907	151,152	165,397	97,011	2.6%
Subarea Cities:	264,937	294,596	330,952	372,154	424,416	456,366	496,017	535,669	270,732	2.0%
Unincorporated Area	109,706	120,110	131,501	143,972	157,625	172,573	188,939	206,857	97,151	1.8%
Subarea Total	**374,643**	**414,706**	**462,453**	**516,126**	**582,041**	**628,939**	**684,956**	**742,526**	**367,883**	**2.0%**
Los Angeles Subarea										
Lancaster	137,818	156,756	195,447	231,808	284,021	311,407	348,153	384,899	247,081	3.0%
Palmdale	129,161	150,948	174,133	195,695	226,275	246,935	270,832	294,730	165,569	2.4%
Subarea Cities:	266,979	307,704	369,580	427,503	510,296	558,342	618,986	679,629	412,650	2.7%
Unincorporated Area	72,355	79,217	86,729	94,954	103,959	113,818	124,612	136,429	64,074	2.0%
Subarea Total	**339,334**	**386,921**	**456,309**	**522,457**	**614,255**	**672,160**	**743,598**	**816,058**	**476,724**	**2.5%**
Kern Subarea										
California City	9,215	9,952	10,748	11,608	12,536	13,301	14,131	14,961	5,746	1.4%
Ridgecrest	25,233	27,756	30,531	33,585	36,943	39,584	42,509	45,434	20,201	1.7%
Subarea Cities:	34,448	37,708	41,279	45,193	49,479	52,886	56,640	60,395	25,947	1.6%
Unincorporated Area	45,973	50,333	55,106	60,332	66,054	72,318	79,176	86,685	40,712	1.1%
Subarea Total	**80,421**	**88,041**	**96,385**	**105,525**	**115,533**	**125,204**	**135,816**	**147,080**	**66,659**	**1.7%**
Inyo Subarea										
Subarea Total	**600**	**633**	**668**	**704**	**742**	**782**	**825**	**870**	**270**	**1.1%**
WEMO Study Area:	**794,998**	**890,301**	**1,015,815**	**1,144,812**	**1,312,571**	**1,427,085**	**1,565,195**	**1,706,534**	**911,536**	**2.2%**
WEMO Area Cities:	566,364	640,008	741,811	844,850	984,191	1,067,594	1,171,643	1,275,693	709,329	2.3%
WEMO Outlying Areas:	228,634	250,293	274,004	299,962	328,380	359,491	393,552	430,841	202,207	1.8%

Source: Alfred Gobar Associates

EXHIBIT 16

LONG-TERM PROJECTED GROWTH
WEST MOJAVE PLAN AREA - HOUSING UNITS

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	8,710	8,950	9,900	10,900	12,180	12,630	13,360	14,030	5,320	1.4%
Twentynine Palms	6,350	7,160	7,920	8,820	9,770	10,570	11,400	12,220	5,870	1.9%
Yucca Valley	8,400	8,780	9,230	9,540	9,880	10,180	10,440	10,680	2,280	0.7%
Adelanto	5,640	6,310	7,590	8,960	10,790	11,620	12,810	13,970	8,330	2.6%
Apple Valley	19,700	20,310	21,970	23,820	26,360	27,380	29,010	30,640	10,940	1.3%
Hesperia	21,960	23,490	27,790	32,580	39,500	42,050	46,360	50,660	28,700	2.4%
Victorville	23,100	25,900	30,460	35,510	42,610	45,700	50,180	54,550	31,450	2.5%
Subarea Cities:	93,860	100,900	114,860	130,130	151,090	160,130	173,560	186,750	92,890	2.0%
Unincorporated Area	52,430	55,500	61,570	67,920	75,690	81,680	89,180	97,290	44,860	1.8%
Subarea Total	**146,290**	**156,400**	**176,430**	**198,050**	**226,780**	**241,810**	**262,740**	**284,040**	**137,750**	**1.9%**
Los Angeles Subarea										
Lancaster	44,530	49,500	65,170	81,660	98,140	111,180	126,720	142,750	98,220	3.4%
Palmdale	41,790	49,070	59,610	69,720	81,720	92,170	103,920	116,270	74,480	3.0%
Subarea Cities:	86,320	98,570	124,780	151,380	179,860	203,350	230,640	259,020	172,700	3.2%
Unincorporated Area	29,710	32,220	37,180	42,690	46,530	52,640	58,960	66,020	36,310	2.3%
Subarea Total	**116,030**	**130,790**	**161,960**	**194,070**	**226,390**	**255,990**	**289,600**	**325,040**	**209,010**	**3.0%**
Kern Subarea										
California City	4,030	4,310	4,610	4,930	5,280	5,510	5,760	5,990	1,960	1.1%
Ridgecrest	12,800	13,950	15,210	16,580	18,070	19,050	20,120	21,140	8,340	1.4%
Subarea Cities:	16,830	18,260	19,820	21,510	23,350	24,560	25,880	27,130	10,300	1.4%
Unincorporated Area	23,660	25,900	28,360	31,050	33,990	37,220	40,740	44,610	20,950	1.8%
Subarea Total	**40,490**	**44,160**	**48,180**	**52,560**	**57,340**	**61,780**	**66,620**	**71,740**	**31,250**	**1.6%**
Inyo Subarea										
Subarea Total	410	430	450	470	500	520	550	580	**170**	**1.0%**
WEMO Study Area:	**303,220**	**331,780**	**387,020**	**445,150**	**511,010**	**560,100**	**619,510**	**681,400**	**378,180**	**2.3%**
WEMO Area Cities:	197,010	217,730	259,460	303,020	354,300	388,040	430,080	472,900	275,890	2.5%
WEMO Outlying Areas:	106,210	114,050	127,560	142,130	156,710	172,060	189,430	208,500	102,290	1.9%

Source: Alfred Gobar Associates

EXHIBIT 17

LONG-TERM PROJECTED GROWTH - ADJUSTED
WEST MOJAVE PLAN AREA - HOUSEHOLD POPULATION

Projection Criteria	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	23,460	23,970	25,690	27,880	30,390	31,470	33,110	34,720	11,260	1.1%
Twentynine Palms	15,400	15,560	16,940	18,410	19,780	20,610	21,670	22,730	7,330	1.1%
Yucca Valley	18,510	18,630	19,360	19,790	20,060	20,590	21,040	21,510	3,000	0.4%
Adelanto	16,020	18,210	20,710	23,730	27,260	29,220	31,680	34,080	18,060	2.2%
Apple Valley	56,370	57,790	58,850	60,800	62,840	64,190	65,840	67,510	11,140	0.5%
Hesperia	66,790	72,900	80,970	90,950	102,550	108,650	116,610	124,390	57,600	1.8%
Victorville	68,390	75,480	85,100	96,870	110,620	117,740	127,090	136,210	67,820	2.0%
Subarea Cities:	264,950	282,530	307,610	338,430	373,490	392,460	417,040	441,150	176,200	1.5%
Unincorporated Area	109,711	115,564	121,729	128,223	135,063	142,268	149,858	157,853	48,142	1.0%
Subarea Total	**374,661**	**398,094**	**429,339**	**466,653**	**508,553**	**534,728**	**566,898**	**599,003**	**224,342**	**1.3%**
Los Angeles Subarea										
Lancaster	137,830	150,340	181,660	210,800	249,940	267,800	292,720	316,980	179,150	2.4%
Palmdale	129,170	144,770	161,850	177,960	199,120	212,360	227,710	242,730	113,560	1.8%
Subarea Cities:	267,000	295,100	343,520	388,770	449,070	480,160	520,430	559,710	292,710	2.1%
Unincorporated Area	72,360	76,220	80,286	84,569	89,081	93,833	98,839	104,112	31,752	1.1%
Subarea Total	**339,360**	**371,320**	**423,806**	**473,339**	**538,151**	**573,993**	**619,269**	**663,822**	**324,462**	**1.9%**
Kern Subarea										
California City	9,220	9,540	9,990	10,560	11,030	11,440	11,880	12,320	3,100	0.8%
Ridgecrest	25,230	26,620	28,380	30,540	32,510	34,040	35,740	37,420	12,190	1.1%
Subarea Cities:	34,450	36,160	38,370	41,100	43,540	45,480	47,620	49,740	15,290	1.1%
Unincorporated Area	45,976	48,429	51,013	53,734	56,601	59,621	62,802	66,152	20,176	0.6%
Subarea Total	**80,426**	**84,589**	**89,383**	**94,834**	**100,141**	**105,101**	**110,422**	**115,892**	**35,466**	**1.0%**
Inyo Subarea										
Subarea Total	**600**	**619**	**638**	**658**	**678**	**699**	**721**	**743**	**143**	**0.6%**
WEMO Study Area:	**795,047**	**854,622**	**943,166**	**1,035,484**	**1,147,523**	**1,214,521**	**1,297,310**	**1,379,460**	**584,413**	**1.6%**
WEMO Area Cities:	566,400	613,790	689,500	768,300	866,100	918,100	985,090	1,050,600	484,200	1.8%
WEMO Outlying Areas:	228,647	240,832	253,666	267,184	281,423	296,421	312,220	328,860	100,213	1.0%

Source: Alfred Gobar Associates

EXHIBIT 18

LONG-TERM PROJECTED GROWTH - ADJUSTED
WEST MOJAVE PLAN AREA - HOUSING UNITS

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	8,710	8,850	9,200	9,910	10,720	10,950	11,400	11,830	3,120	0.9%
Twentynine Palms	6,350	6,870	7,360	8,020	8,600	9,160	9,730	10,300	3,950	1.4%
Yucca Valley	8,400	8,420	8,580	8,680	8,690	8,820	8,910	9,000	600	0.2%
Adelanto	5,640	6,050	7,060	8,150	9,490	10,070	10,930	11,770	6,130	2.1%
Apple Valley	19,710	20,080	20,430	21,660	23,200	23,720	24,760	25,830	6,120	0.8%
Hesperia	21,960	22,530	25,830	29,630	34,760	36,440	39,570	42,710	20,750	1.9%
Victorville	23,110	24,840	28,320	32,290	37,490	39,600	42,830	45,990	22,880	2.0%
Subarea Cities:	93,880	97,640	106,780	118,340	132,950	138,760	148,130	157,430	63,550	1.5%
Unincorporated Area	52,440	53,880	57,010	60,480	64,860	67,860	71,800	76,000	23,560	1.1%
Subarea Total	**146,320**	**151,520**	**163,790**	**178,820**	**197,810**	**206,620**	**219,930**	**233,430**	**87,110**	**1.3%**
Los Angeles Subarea										
Lancaster	44,540	47,470	60,580	74,260	86,360	96,350	108,140	120,350	75,810	2.9%
Palmdale	41,800	47,060	55,410	63,400	71,910	79,880	88,690	98,020	56,220	2.5%
Subarea Cities:	86,340	94,530	115,990	137,660	158,270	176,230	196,830	218,370	132,030	2.7%
Unincorporated Area	29,710	31,000	34,420	38,020	39,870	43,730	47,470	51,580	21,870	1.6%
Subarea Total	**116,050**	**125,530**	**150,410**	**175,680**	**198,140**	**219,960**	**244,300**	**269,950**	**153,900**	**2.4%**
Kern Subarea										
California City	4,030	4,130	4,290	4,490	4,640	4,780	4,910	5,050	1,020	0.6%
Ridgecrest	12,800	13,380	14,140	15,070	15,900	16,500	17,180	17,820	5,020	0.9%
Subarea Cities:	16,830	17,510	18,430	19,560	20,540	21,280	22,090	22,870	6,040	0.9%
Unincorporated Area	23,660	24,920	26,250	27,650	29,130	30,680	32,320	34,040	10,380	1.0%
Subarea Total	**40,490**	**42,430**	**44,680**	**47,210**	**49,670**	**51,960**	**54,410**	**56,910**	**16,420**	**1.0%**
Inyo Subarea										
Subarea Total	410	420	430	440	450	470	480	490	**80**	**0.5%**
WEMO Study Area:	**303,270**	**319,900**	**359,310**	**402,150**	**446,070**	**479,010**	**519,120**	**560,780**	**257,510**	**1.8%**
WEMO Area Cities:	197,050	209,680	241,200	275,560	311,760	336,270	367,050	398,670	201,620	2.0%
WEMO Outlying Areas:	106,220	110,220	118,110	126,590	134,310	142,740	152,070	162,110	55,890	1.2%

Source: Alfred Gobar Associates

EXHIBIT 19

YEAR 2035 PROJECTED GROWTH VS PLANNED CAPACITY - HOUSING
WEMO STUDY AREA

	General Plan	COG Based Projection		Adjusted Projection	
	Capacity	Units	% Capacity	Units	% Capacity
San Bernardino Subarea					
Barstow	87,173	14,030	16%	11,830	14%
Twentynine Palms	39,942	12,220	31%	10,300	26%
Yucca Valley	19,832	10,680	54%	9,000	45%
Adelanto	44,506	13,970	31%	11,770	26%
Apple Valley	52,925	30,640	58%	25,830	49%
Hesperia	68,740	50,660	74%	42,710	62%
Victorville	63,724	54,550	86%	45,990	72%
Subarea Cities:	**376,842**	**186,750**	**50%**	**157,430**	**42%**
Unincorporated Area	124,631	97,290	78%	76,000	61%
Subarea Total	**501,473**	**284,040**	**57%**	**233,430**	**47%**
Los Angeles Subarea					
Lancaster	119,697	142,750	119%	120,350	101%
Palmdale	96,162	116,270	121%	98,020	102%
Subarea Cities:	**215,859**	**259,020**	**120%**	**218,370**	**101%**
Unincorporated Area	271,746	66,020	24%	51,580	19%
Subarea Total	**487,605**	**325,040**	**67%**	**269,950**	**55%**
Kern Subarea					
California City	347,565	5,990	2%	5,050	1%
Ridgecrest	13,953	21,140	152%	17,820	128%
Subarea Cities:	**361,518**	**27,130**	**8%**	**22,870**	**6%**
Unincorporated Area	229,188	44,610	19%	34,040	15%
Subarea Total	**590,706**	**71,740**	**12%**	**56,910**	**10%**
Inyo Subarea					
Subarea Total	**455**	**580**	**127%**	**490**	**108%**
WEMO Study Area:	**1,580,239**	**681,400**	**43%**	**560,780**	**35%**
WEMO Area Cities:	954,219	472,900	50%	398,670	42%
WEMO Outlying Areas:	626,020	208,500	33%	162,110	26%

Source: Alfred Gobar Associates

EXHIBIT 20

PROJECTED HOUSING UNIT GROWTH
WEMO STUDY AREA

	WEMO Area Projected Growth[1]			Potential Sites In HCA and Fee Area[2]				
	Total DU's	Avg Du's	Share of	DWMA	Survey Area		No Survey Area	
Selected WEMO Locations	In 35 Yrs	Per Year	Growth	5.0:1.0	1.0:1.0	0.5:1.0	1.0:1.0	0.5:1.0
San Bernardino Subarea								
29 Palms	3,950	113	1.5%	Neg'l	X	X	n.a.	X
Adelanto	6,130	175	2.4%	n.a.	X	X	n.a.	X
Apple Valley	6,120	175	2.4%	n.a.	X	Neg'l	n.a.	X
Barstow	3,120	89	1.2%	Neg'l	X	X	X	X
Hesperia	20,750	593	8.1%	n.a.	n.a.	n.a.	X	X
Victorville	22,880	654	8.9%	Neg'l	X	X	X	X
Yucca Valley	600	17	0.2%	n.a.	X	X	n.a.	X
Unincorporated Area	23,560	673	9.1%	X	X	X	X	X
Subarea Total	87,110	2,489	33.8%					
Los Angeles Subarea								
Lancaster	75,810	2,166	29.4%	n.a.	X	n.a.	X	X
Palmdale	56,220	1,606	21.8%	n.a.	X	n.a.	X	X
Unincorporated Area	21,870	625	8.5%	X	X	X	X	X
Subarea Total	153,900	4,397	59.8%					
Kern Subarea								
California City	1,020	29	0.4%	X	X	X	n.a.	X
Ridgecrest	5,020	143	1.9%	n.a.	X	n.a.	X	X
Unincorporated Area	10,380	297	4.0%	X	X	X	X	X
Subarea Total	16,420	469	6.4%					
Inyo Subarea								
Subarea Total	80	2	0.0%	n.a.	n.a.	n.a.	X	X
WEMO Study Area:	257,510	7,357	100.0%					
WEMO Area Cities:	201,620	5,760	78.3%					
WEMO Outlying Areas:	55,890	1,597	21.7%					

Note:
[1] Based on COG projections adjusted to reflect market capture trends within the WEMO area.
[2] Identifies whether or not stated jurisdiction includes land (regardless of designation) within each geographic area requiring alternative levels of environmental remedy. The DWMA essentially describes designated HCA locations. Fee areas describe alternative ratios of the average per acre value of private HCA property ($770 per acre) required as a mitigation fee

Source: Alfred Gobar Associates

EXHIBIT 21

SINGLE FAMILY DETACHED AVERAGE LOT SIZE TRENDS
WEMO AREA SUBDIVISION ACTIVITY

	SFD Subdivision Activity 1998 2nd Qtr - 2002 2nd Qtr		Pipeline SFD Units Third Quarter 2002		Estimated Gross Residential Densities		
High Desert Markets	Number of Units	Average Lot Size	Number of Units	Average Lot Size	Reference Supply (Lots)	Typical Lot Size	Equiv. Gross Units/Acre
San Bernardino Co.							
Adelanto	512	7,200	730	7,679	1,242	7,480	4.41
Apple Valley	1,430	15,107	750	18,641	2,180	16,320	2.09
Baldy Mesa	529	17,791			529	17,790	1.91
Barstow	39	35,169			39	35,170	0.99
Helendale	14	6,000			14	6,000	5.38
Hesperia	264	7,306	2,620	7,496	2,884	7,480	4.41
Lucerne Valley			238	5,948	238	5,950	5.42
Victorville	4,878	6,134	5,074	6,011	9,952	6,070	5.32
High Desert Area	**7,666**	**8,871**	**9,412**	**7,559**	**17,078**	**8,147**	4.05
Antelope Valley							
Lancaster	2,064	7,059	3,220	9,854	5,284	8,760	3.77
Palmdale	3,344	7,610	5,382	6,575	8,726	6,970	4.73
Quartz Hill	483	9,689	66	7,841	549	9,470	3.48
Antelope Valley Area	**5,891**	**7,588**	**8,668**	**7,803**	**14,559**	**7,714**	4.18
Sample WEMO Areas	**13,557**	**8,313**	**18,080**	**7,676**	**31,637**	**7,950**	4.06

Source: Alfred Gobar Associates; The Meyers Group.

EXHIBIT 22

PRIVATE LAND PERMITTING COST - LOW RANGE ESTIMATE
TYPICAL 10-ACRE RESIDENTIAL PARCEL

WEMO Location	Gross Subdiv. Density	2002 Avg SFD Value	CESA/FESA Existing Conditions		DWMA		WEMO Habitat Conservation Plan - Alternative A: Survey Area 1:1 Area		Survey Area 1/2:1 Area		No Survey Area 1:1 Area		No Survey Area 1/2:1 Area	
*Total permitting cost for10-acre parcel:			$27,020		$39,225		$8,300		$4,250		$7,700		$3,850	
WEMO Cities	(DU's/AC)		($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value
29 Palms	2.09	$112,900	1,293	1.1%	n.a.	n.a.	397	0.4%	203	0.2%	n.a.	n.a.	184	0.2%
Adelanto	4.41	$91,100	613	0.7%	n.a.	n.a.	188	0.2%	96	0.1%	175	0.2%	87	0.1%
Apple Valley	2.09	$189,800	1,293	0.7%	n.a.	n.a.	397	0.2%	n.a.	n.a.	n.a.	n.a.	184	0.1%
Barstow	0.99	$139,500	2,729	2.0%	n.a.	n.a.	838	0.6%	429	0.3%	778	0.6%	389	0.3%
California City	3.48	$164,600	776	0.5%	1,127	0.7%	239	0.1%	122	0.1%	n.a.	n.a.	111	0.1%
Hesperia	4.41	$203,000	613	0.3%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	175	0.1%	87	0.0%
Lancaster	3.77	$211,800	717	0.3%	n.a.	n.a.	220	0.1%	n.a.	n.a.	204	0.1%	102	0.0%
Palmdale	4.73	$242,500	571	0.2%	n.a.	n.a.	175	0.1%	n.a.	n.a.	163	0.1%	81	0.0%
Ridgecrest	4.18	$161,000	646	0.4%	n.a.	n.a.	199	0.1%	n.a.	n.a.	184	0.1%	92	0.1%
Victorville	5.32	$232,500	508	0.2%	n.a.	n.a.	156	0.1%	80	0.0%	145	0.1%	72	0.0%
Yucca Valley	2.09	$153,300	1,293	0.8%	n.a.	n.a.	397	0.3%	203	0.1%	n.a.	n.a.	184	0.1%
Unincorporated County Subareas														
San Bernardino	3.04	$202,500	889	0.4%	1,290	0.6%	273	0.1%	140	0.1%	253	0.1%	127	0.1%
Los Angeles	3.48	$231,800	776	0.3%	1,127	0.5%	239	0.1%	122	0.1%	221	0.1%	111	0.0%
Kern	2.09	$163,400	1,293	0.8%	1,877	1.1%	397	0.2%	203	0.1%	368	0.2%	184	0.1%
Inyo	0.99	$91,100	2,729	3.0%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	778	0.9%	389	0.4%

* Total permitting cost for 10-acre parcel based on average HCA private land value of $770/acre.

Source: WEMO EIR-EIS Chapter 4, U.S. Bureau of Census - Residential Construction Branch; Alfred Gobar Associates.

EXHIBIT 23

PRIVATE LAND PERMITTING COST - HIGH RANGE ESTIMATE
TYPICAL 10-ACRE RESIDENTIAL PARCEL

	Gross		CESA/FESA				WEMO Habitat Conservation Plan - Alternative A							
	Subdiv.	2002 Avg	Existing				Survey Area				No Survey Area			
WEMO Location	Density	SFD Value	Conditions		DWMA		1:1 Area		1/2:1 Area		1:1 Area		1/2:1 Area	
*Total permitting cost for10-acre parcel:			$90,545		$42,750		$10,700		$6,850		$7,700		$3,850	
WEMO Cities	(DU's/AC)		($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value	($/DU)	% of Value
29 Palms	2.09	$112,900	4,332	3.8%	n.a.	n.a.	512	0.5%	328	0.3%	n.a.	n.a.	184	0.2%
Adelanto	4.41	$91,100	2,053	2.3%	n.a.	n.a.	243	0.3%	155	0.2%	175	0.2%	87	0.1%
Apple Valley	2.09	$189,800	4,332	2.3%	n.a.	n.a.	512	0.3%	n.a.	n.a.	n.a.	n.a.	184	0.1%
Barstow	0.99	$139,500	9,146	6.6%	n.a.	n.a.	1,081	0.8%	692	0.5%	778	0.6%	389	0.3%
California City	3.48	$164,600	2,602	1.6%	1,228	0.7%	307	0.2%	197	0.1%	n.a.	n.a.	111	0.1%
Hesperia	4.41	$203,000	2,053	1.0%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	175	0.1%	87	0.0%
Lancaster	3.77	$211,800	2,402	1.1%	n.a.	n.a.	284	0.1%	n.a.	n.a.	204	0.1%	102	0.0%
Palmdale	4.73	$242,500	1,914	0.8%	n.a.	n.a.	226	0.1%	n.a.	n.a.	163	0.1%	81	0.0%
Ridgecrest	4.18	$161,000	2,166	1.3%	n.a.	n.a.	256	0.2%	n.a.	n.a.	184	0.1%	92	0.1%
Victorville	5.32	$232,500	1,702	0.7%	n.a.	n.a.	201	0.1%	129	0.1%	145	0.1%	72	0.0%
Yucca Valley	2.09	$153,300	4,332	2.8%	n.a.	n.a.	512	0.3%	328	0.2%	n.a.	n.a.	184	0.1%
Unincorporated County Subareas														
San Bernardino	3.04	$202,500	2,978	1.5%	1,406	0.7%	352	0.2%	225	0.1%	253	0.1%	127	0.1%
Los Angeles	3.48	$231,800	2,602	1.1%	1,228	0.5%	307	0.1%	197	0.1%	221	0.1%	111	0.0%
Kern	2.09	$163,400	4,332	2.7%	2,045	1.3%	512	0.3%	328	0.2%	368	0.2%	184	0.1%
Inyo	0.99	$91,100	9,146	10.0%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	778	0.9%	389	0.4%

* Total permitting cost for 10-acre parcel based on average HCA private land value of $770/acre.

Source: WEMO EIR-EIS Chapter 4, U.S. Bureau of Census - Residential Construction Branch; Alfred Gobar Associates.

EXHIBIT 24

WEMO AREA CITIES
2002 ASSESSED VALUE & SHARE OF BASIC LEVY

WEMO City	Fiscal Year	Assessment Value: Secured	Assessment Value: Unsecured	Assessment Value: Total	Property Tax Revenue: Secured	Property Tax Revenue: Unsecured	Property Tax Revenue: Total	Effective Share of Basic Levy
29 Palms	2002-2003	$ 399,944,945	$ 9,050,334	$ 408,995,279	$ 1,029,608	$ 30,392	$ 1,060,000	25.92%
Adelanto	2001-2002	339,118,762	4,148,596	343,267,358	69,082	855	69,927	2.04%
Apple Valley	2002-2003	2,299,327,916	57,061,103	2,356,389,019	1,244,125	30,875	1,275,000	5.41%
Barstow	2002-2003	521,250,305	51,186,602	572,436,907	661,000	64,910	725,910	12.68%
California City	2002-2003	307,806,285	1,504,910	309,311,195	841,864	4,136	846,000	27.35%
Hesperia	2002-2003	1,937,208,798	62,941,186	2,000,149,984	340,000	11,047	351,047	1.76%
Lancaster	2002-2003	859,545,344	191,563,900	1,051,109,244	2,126,152	473,848	2,600,000	24.74%
Palmdale	2002-2003	3,307,059,000	106,313,000	3,413,372,000	2,928,129	94,131	3,022,260	8.85%
Ridgecrest	2002-2003	453,349,118	23,311,494	476,660,612	379,432	20,568	400,000	8.39%
Victorville	2002-2003	2,440,373,562	121,800,522	2,562,174,084	4,934,847	246,301	5,181,148	20.22%
Yucca Valley	2002-2003	761,768,184	29,246,247	791,014,431	1,639,661	65,460	1,705,121	21.56%
	Total:	**$ 13,626,752,219**	**$ 658,127,894**	**$ 14,284,880,113**	**$ 16,193,899**	**$ 1,042,524**	**$ 17,236,413**	**12.07%**

Note: Indicated value and property tax collected is net of redevelopment project areas.

Source: City of 29 Palm Plan, City of Yucca Valley, City of Adelanto, City of Barstow, City of Victorville, City of Lancaster, City of Palmdale, City of Hesperia, City of Victorville, City of California City, Town of Apple Valley, County of San Bernardino, County of Los Angeles, County of Kern, County of Inyo; Alfred Gobar Associates.

EXHIBIT 25

WEMO AREA COUNTIES
ASSESSED VALUE & SHARE OF BASIC LEVY
2002-2003 BUDGETED/PROPOSED

	Assessed Value ($)		Property Tax Collected ($)		
County	County Total	Unincorporated County	County Total	Unincorporated County	Effective Tax Rate
San Bernardino	92,076,222,091	17,108,015,616	118,485,250	19,503,138	0.1140%
Los Angeles	655,111,182,396	51,570,126,279	1,607,000,000	152,680,759	0.2961%
Kern	40,192,999,893	27,998,943,343	116,627,000	56,977,850	0.2035%
Inyo	2,611,498,398	2,316,237,003	8,067,000	6,773,615	0.2924%
	789,991,902,778	**98,993,322,241**	**1,850,179,250**	**235,935,362**	**0.2383%**

Note: Indicated value and property tax collected is net of redevelopment project areas.

Source: County of San Bernardino, County of Los Angeles, County of Kern, County of Inyo; Alfred Gobar Associates.

EXHIBIT 26

ESTIMATE OF MAXIMUM THEORETICAL LOSS OF TAX VALUE AND PROPERTY TAX
WEMO HABITAT CONSERVATION PROGRAM

Geographic Reference	Private Land in HCA's (Acres)	Avg. Value Per Acre	Effective Tax Rate	Maximum Theoretical Loss: 2002 Tax Roll ($000)	Maximum Theoretical Loss: Property Tax[1]	Share of FY2002-03 Tax Revenue	FY2002-03 Total Property Tax Revenue
WEMO Cities							(City Limits)
California City	19,000	$370 [2]	0.00274	$7,030	$19,228	2.27%	$846,000
Other WEMO Cities	Neg'l	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Unincorporated Areas							(Unincorp. Areas)
San Bernardino County	401,000	$489	0.00114	$196,089	$223,541	1.15%	$19,503,138
Los Angeles County	77,800	2,587	0.00296	201,269	595,885	0.39%	152,680,759
Kern County	76,700	650	0.00204	49,855	101,455	0.18%	56,977,850
Inyo County	n.a.	n.a.	0.00292	n.a.	n.a.	n.a.	n.a.
WEMO Overall	574,500			$454,243	$940,109	0.41%	$230,007,747

Note:

[1] Identified loss is gross annual theoretical loss possible if all private lands vacant and does not account for offsetting revenue to be received from PILT.

[2] Identified average value based on specific review of Assessor Map Books corresponding to localized area proposed for HCA designation.

Source: County Assessor Records; Alfred Gobar Associates

EXHIBIT 27

SUMMARY OF PAYMENT IN LIEU OF TAXES
1999-2002

	INYO COUNTY	KERN COUNTY	LOS ANGELES COUNTY	SAN BERNARDINO COUNTY	4 COUNTY TOTAL	CALIFORNIA STATE TOTAL
PAYMENTS ($)						
2002	817,921	1,222,494	615,194	1,530,275	4,185,884	22,847,692
2001	779,153	1,142,624	633,251	1,433,507	3,988,535	20,899,051
2000	542,930	832,862	419,193	990,375	3,105,390	14,277,119
1999	514,362	754,938	416,980	947,089	2,633,369	12,789,337
4 Year Average	**$663,592**	**$988,230**	**$521,155**	**$1,225,312**	**$3,478,295**	**$17,703,300**
ACRES OF FEDERAL LAND						
2002	5,692,905	1,078,342	681,756	8,023,396	15,476,399	43,474,220
2001	5,692,905	1,078,520	681,355	7,913,718	15,366,498	43,349,053
2000	5,692,905	1,082,426	681,377	7,576,545	15,033,253	43,012,781
1999	5,692,790	1,085,869	681,776	7,611,994	15,072,429	42,820,923
4 Year Average	**5,692,876**	**1,081,289**	**681,566**	**7,781,413**	**15,237,145**	**43,164,244**
PILT($)/Acre						
2002	0.14	1.13	0.90	0.19	0.27	0.53
2001	0.14	1.06	0.93	0.18	0.26	0.48
2000	0.10	0.77	0.62	0.13	0.21	0.33
1999	0.09	0.70	0.61	0.12	0.17	0.30
4 Year Average	**$0.12**	**$0.91**	**$0.76**	**$0.16**	**$0.23**	**$0.41**
2002-1999 Change	59%	63%	48%	53%	55%	76%

Source: US Bureau of Land Management; Alfred Gobar Associates.

A – Exhibits
Regional Environment

EXHIBIT A-1

ANNUAL AVERAGE POPULATION
SOUTHERN CALIFORNIA

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	**7,498,300**	**1,947,000**	**668,700**	**897,800**	**1,876,500**	**529,700**	**13,418,000**	**406,350**	**13,824,350**
1981	7,622,400	1,999,400	697,700	933,650	1,921,600	545,300	13,720,050	419,550	14,139,600
1982	7,768,400	2,044,750	726,300	964,300	1,961,250	559,100	14,024,100	433,350	14,457,450
1983	7,915,950	2,084,300	757,650	993,400	2,007,800	572,350	14,331,450	446,900	14,778,350
1984	8,053,000	2,123,450	794,800	1,026,200	2,056,950	584,700	14,639,100	459,950	15,099,050
1985	8,203,550	2,168,400	838,900	1,069,450	2,114,600	597,500	14,992,400	473,550	15,465,950
1986	8,369,150	2,218,350	891,150	1,124,900	2,186,250	611,550	15,401,350	486,750	15,888,100
1987	8,518,750	2,267,900	951,700	1,192,350	2,262,200	627,350	15,820,250	498,550	16,318,800
1988	8,645,750	2,318,250	1,020,500	1,270,200	2,344,750	644,700	16,244,150	511,250	16,755,400
1989	8,769,350	2,371,300	1,100,800	1,353,850	2,434,400	660,150	16,689,850	527,800	17,217,650
1990	8,910,342	2,420,953	1,183,814	1,430,644	2,509,842	671,060	17,126,654	548,837	17,675,491
1991	9,051,870	2,466,018	1,246,036	1,486,701	2,561,527	679,488	17,491,638	569,686	18,061,323
1992	9,161,825	2,510,826	1,286,646	1,524,168	2,598,845	688,295	17,770,604	586,042	18,356,646
1993	9,244,368	2,551,083	1,318,218	1,549,384	2,626,365	697,563	17,986,979	598,635	18,585,614
1994	9,303,991	2,583,098	1,343,780	1,565,911	2,648,547	705,633	18,150,959	608,503	18,759,462
1995	9,350,867	2,614,725	1,368,676	1,579,915	2,670,338	711,422	18,295,942	616,603	18,912,545
1996	9,422,663	2,654,914	1,391,083	1,596,059	2,705,573	717,386	18,487,677	624,805	19,112,482
1997	9,529,138	2,706,032	1,420,710	1,618,240	2,762,417	726,837	18,763,372	633,227	19,396,599
1998	9,651,137	2,761,650	1,461,121	1,645,881	2,825,841	738,780	19,084,408	641,554	19,725,962
1999	9,799,593	2,808,559	1,502,030	1,674,763	2,883,685	750,696	19,419,325	652,408	20,071,733
2000	9,769,055	2,854,256	1,553,223	1,715,209	2,885,683	760,830	19,538,256	666,290	20,204,545
2001	9,739,331	2,909,854	1,613,966	1,762,397	2,889,076	772,624	19,687,247	680,598	20,367,845

DISTRIBUTIVE SHARE OF TOTAL POPULATION

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	**54.2%**	**14.1%**	**4.8%**	**6.5%**	**13.6%**	**3.8%**	**97.1%**	**2.9%**	**100.0%**
1981	53.9%	14.1%	4.9%	6.6%	13.6%	3.9%	97.0%	3.0%	100.0%
1982	53.7%	14.1%	5.0%	6.7%	13.6%	3.9%	97.0%	3.0%	100.0%
1983	53.6%	14.1%	5.1%	6.7%	13.6%	3.9%	97.0%	3.0%	100.0%
1984	53.3%	14.1%	5.3%	6.8%	13.6%	3.9%	97.0%	3.0%	100.0%
1985	53.0%	14.0%	5.4%	6.9%	13.7%	3.9%	96.9%	3.1%	100.0%
1986	52.7%	14.0%	5.6%	7.1%	13.8%	3.8%	96.9%	3.1%	100.0%
1987	52.2%	13.9%	5.8%	7.3%	13.9%	3.8%	96.9%	3.1%	100.0%
1988	51.6%	13.8%	6.1%	7.6%	14.0%	3.8%	96.9%	3.1%	100.0%
1989	50.9%	13.8%	6.4%	7.9%	14.1%	3.8%	96.9%	3.1%	100.0%
1990	50.4%	13.7%	6.7%	8.1%	14.2%	3.8%	96.9%	3.1%	100.0%
1991	50.1%	13.7%	6.9%	8.2%	14.2%	3.8%	96.8%	3.2%	100.0%
1992	49.9%	13.7%	7.0%	8.3%	14.2%	3.7%	96.8%	3.2%	100.0%
1993	49.7%	13.7%	7.1%	8.3%	14.1%	3.8%	96.8%	3.2%	100.0%
1994	49.6%	13.8%	7.2%	8.3%	14.1%	3.8%	96.8%	3.2%	100.0%
1995	49.4%	13.8%	7.2%	8.4%	14.1%	3.8%	96.7%	3.3%	100.0%
1996	49.3%	13.9%	7.3%	8.4%	14.2%	3.8%	96.7%	3.3%	100.0%
1997	49.1%	14.0%	7.3%	8.3%	14.2%	3.7%	96.7%	3.3%	100.0%
1998	48.9%	14.0%	7.4%	8.3%	14.3%	3.7%	96.7%	3.3%	100.0%
1999	48.8%	14.0%	7.5%	8.3%	14.4%	3.7%	96.7%	3.3%	100.0%
2000	48.4%	14.1%	7.7%	8.5%	14.3%	3.8%	96.7%	3.3%	100.0%
2001	47.8%	14.3%	7.9%	8.7%	14.2%	3.8%	96.7%	3.3%	100.0%

Source: California Department of Finance; Alfred Gobar Associates.

EXHIBIT A-1 (Cont'd)

POPULATION INDEX
(REFERENCE PERIOD VS 1980)

Year	Southern California: Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
1980	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
1981	1.02	1.03	1.04	1.04	1.02	1.03	1.02	1.03	1.02
1982	1.04	1.05	1.09	1.07	1.05	1.06	1.05	1.07	1.05
1983	1.06	1.07	1.13	1.11	1.07	1.08	1.07	1.10	1.07
1984	1.07	1.09	1.19	1.14	1.10	1.10	1.09	1.13	1.09
1985	1.09	1.11	1.25	1.19	1.13	1.13	1.12	1.17	1.12
1986	1.12	1.14	1.33	1.25	1.17	1.15	1.15	1.20	1.15
1987	1.14	1.16	1.42	1.33	1.21	1.18	1.18	1.23	1.18
1988	1.15	1.19	1.53	1.41	1.25	1.22	1.21	1.26	1.21
1989	1.17	1.22	1.65	1.51	1.30	1.25	1.24	1.30	1.25
1990	1.19	1.24	1.77	1.59	1.34	1.27	1.28	1.35	1.28
1991	1.21	1.27	1.86	1.66	1.37	1.28	1.30	1.40	1.31
1992	1.22	1.29	1.92	1.70	1.38	1.30	1.32	1.44	1.33
1993	1.23	1.31	1.97	1.73	1.40	1.32	1.34	1.47	1.34
1994	1.24	1.33	2.01	1.74	1.41	1.33	1.35	1.50	1.36
1995	1.25	1.34	2.05	1.76	1.42	1.34	1.36	1.52	1.37
1996	1.26	1.36	2.08	1.78	1.44	1.35	1.38	1.54	1.38
1997	1.27	1.39	2.12	1.80	1.47	1.37	1.40	1.56	1.40
1998	1.29	1.42	2.19	1.83	1.51	1.39	1.42	1.58	1.43
1999	1.31	1.44	2.25	1.87	1.54	1.42	1.45	1.61	1.45
2000	1.30	1.47	2.32	1.91	1.54	1.44	1.46	1.64	1.46
2001	1.30	1.49	2.41	1.96	1.54	1.46	1.47	1.67	1.47

POPULATION INDEX DISTRIBUTIVE SHARE OF TOTAL

Year	Southern California: Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
1980	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
1981	0.99	1.00	1.02	1.02	1.00	1.01	1.00	1.01	1.00
1982	0.99	1.00	1.04	1.03	1.00	1.01	1.00	1.02	1.00
1983	0.99	1.00	1.06	1.04	1.00	1.01	1.00	1.03	1.00
1984	0.98	1.00	1.09	1.05	1.00	1.01	1.00	1.04	1.00
1985	0.98	1.00	1.12	1.06	1.01	1.01	1.00	1.04	1.00
1986	0.97	0.99	1.16	1.09	1.01	1.00	1.00	1.04	1.00
1987	0.96	0.99	1.21	1.13	1.02	1.00	1.00	1.04	1.00
1988	0.95	0.98	1.26	1.17	1.03	1.00	1.00	1.04	1.00
1989	0.94	0.98	1.32	1.21	1.04	1.00	1.00	1.04	1.00
1990	0.93	0.97	1.38	1.25	1.05	0.99	1.00	1.06	1.00
1991	0.92	0.97	1.43	1.27	1.04	0.98	1.00	1.07	1.00
1992	0.92	0.97	1.45	1.28	1.04	0.98	1.00	1.09	1.00
1993	0.92	0.97	1.47	1.28	1.04	0.98	1.00	1.10	1.00
1994	0.91	0.98	1.48	1.29	1.04	0.98	1.00	1.10	1.00
1995	0.91	0.98	1.50	1.29	1.04	0.98	1.00	1.11	1.00
1996	0.91	0.99	1.50	1.29	1.04	0.98	1.00	1.11	1.00
1997	0.91	0.99	1.51	1.28	1.05	0.98	1.00	1.11	1.00
1998	0.90	0.99	1.53	1.28	1.06	0.98	1.00	1.11	1.00
1999	0.90	0.99	1.55	1.28	1.06	0.98	1.00	1.11	1.00
2000	0.89	1.00	1.59	1.31	1.05	0.98	1.00	1.12	1.00
2001	0.88	1.01	1.64	1.33	1.04	0.99	1.00	1.14	1.00

Source: California Department of Finance; Alfred Gobar Associates.

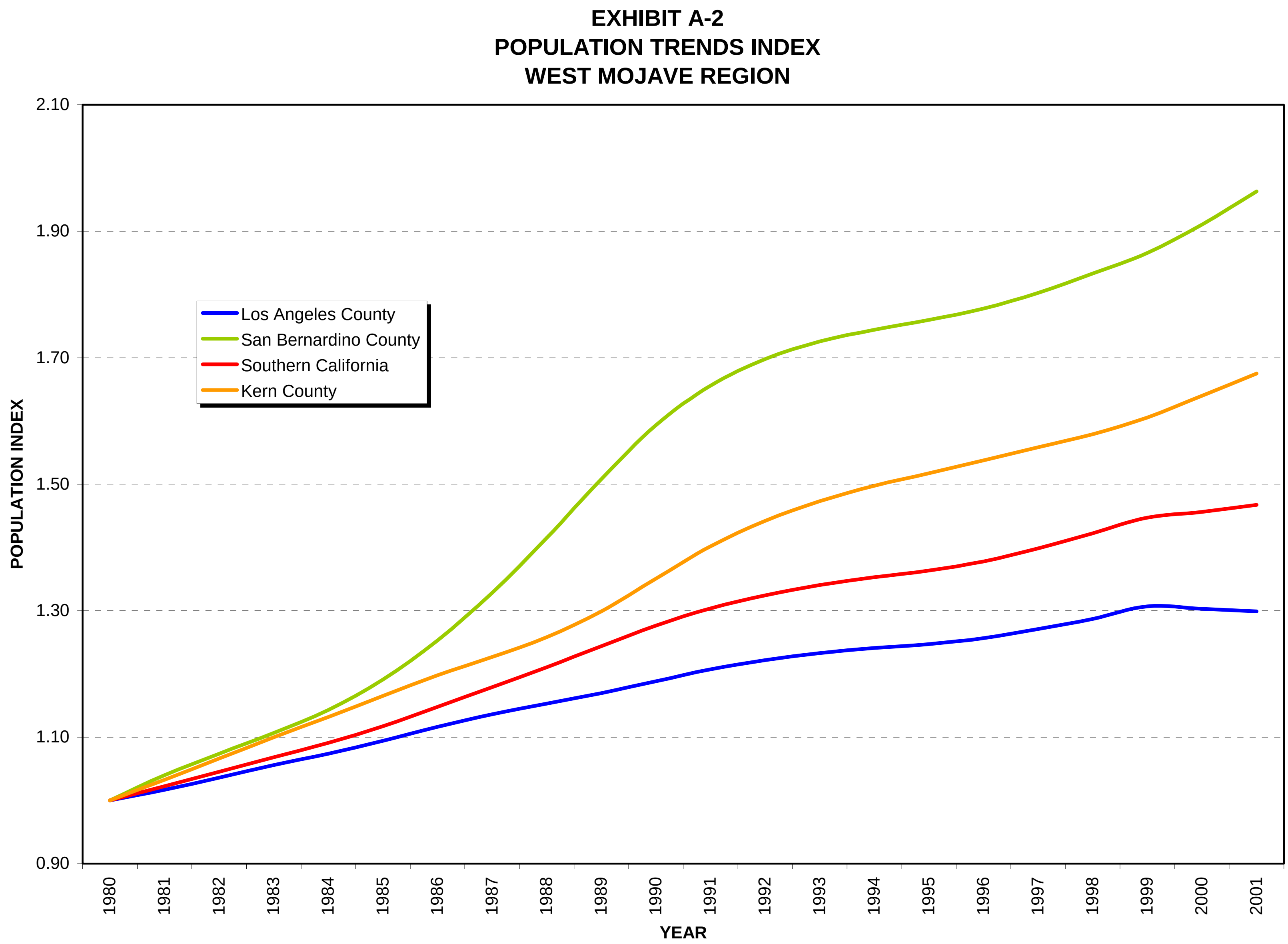


EXHIBIT A-2
POPULATION TRENDS INDEX
WEST MOJAVE REGION
POPULATION INDEX
2.10
1.90
1.70
1.50
1.30
1.10
0.90
Los Angeles County
San Bernardino County
Southern California
Kern County
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
YEAR

EXHIBIT A-3

TOTAL NONAGRICULTURAL WAGE AND SALARY EMPLOYMENT SOUTHERN CALIFORNIA

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	**3,610,400**	**836,400**	**189,704***	**244,296***	**650,300**	**152,900**	**5,684,000**	**131,200**	**5,815,200**
1981	3,640,900	864,300	191,088*	247,112*	666,000	158,000	5,767,400	137,500	5,904,900
1982	3,532,800	848,600	189,145*	242,655*	662,700	161,200	5,637,100	138,900	5,776,000
1983	3,537,700	869,200	197,666*	245,434*	674,700	166,300	5,691,000	140,200	5,831,200
1984	3,657,900	932,600	209,244*	264,356*	721,100	174,900	5,960,100	145,400	6,105,500
1985	3,754,500	978,000	224,680*	289,420*	768,600	183,200	6,198,400	151,200	6,349,600
1986	3,854,200	1,022,000	240,014*	311,386*	806,200	190,700	6,424,500	153,200	6,577,700
1987	3,953,400	1,069,100	254,286*	334,414*	851,000	201,800	6,664,000	155,900	6,819,900
1988	4,034,000	1,129,900	265,400	359,700	901,500	213,300	6,903,800	161,100	7,064,900
1989	4,111,500	1,156,700	279,900	388,300	938,000	221,600	7,096,000	163,400	7,259,400
1990	4,133,300	1,172,400	304,200	408,500	966,600	230,300	7,215,300	170,700	7,386,000
1991	3,982,700	1,143,700	305,200	413,600	962,600	230,400	7,038,200	177,300	7,215,500
1992	3,804,400	1,126,000	309,200	420,400	947,800	226,600	6,834,400	173,200	7,007,600
1993	3,707,700	1,115,400	315,300	418,700	947,200	227,000	6,731,300	169,900	6,901,200
1994	3,701,900	1,126,800	324,900	426,300	955,300	233,300	6,768,500	170,800	6,939,300
1995	3,746,500	1,151,700	338,000	441,900	978,600	237,300	6,894,000	172,800	7,066,800
1996	3,788,500	1,184,300	349,400	454,000	1,006,200	237,900	7,020,300	174,900	7,195,200
1997	3,865,100	1,233,900	371,000	470,500	1,054,200	242,700	7,237,400	179,200	7,416,600
1998	3,943,500	1,299,200	394,700	487,500	1,105,500	252,400	7,482,800	184,300	7,667,100
1999	4,002,900	1,345,100	424,400	514,600	1,152,900	263,600	7,703,500	188,900	7,892,400
2000	4,072,100	1,388,900	449,000	539,400	1,193,800	275,100	7,918,300	194,100	8,112,400
2001	4,093,900	1,418,300	472,400	556,700	1,221,600	280,200	8,043,100	200,000	8,243,100

DISTRIBUTIVE SHARE OF TOTAL EMPLOYMENT

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	**62.1%**	**14.4%**	**3.3%***	**4.2%***	**11.2%**	**2.6%**	**97.7%**	**2.3%**	**100.0%**
1981	61.7%	14.6%	3.2%*	4.2%*	11.3%	2.7%	97.7%	2.3%	100.0%
1982	61.2%	14.7%	3.3%*	4.2%*	11.5%	2.8%	97.6%	2.4%	100.0%
1983	60.7%	14.9%	3.4%*	4.2%*	11.6%	2.9%	97.6%	2.4%	100.0%
1984	59.9%	15.3%	3.4%*	4.3%*	11.8%	2.9%	97.6%	2.4%	100.0%
1985	59.1%	15.4%	3.5%*	4.6%*	12.1%	2.9%	97.6%	2.4%	100.0%
1986	58.6%	15.5%	3.6%*	4.7%*	12.3%	2.9%	97.7%	2.3%	100.0%
1987	58.0%	15.7%	3.7%*	4.9%*	12.5%	3.0%	97.7%	2.3%	100.0%
1988	57.1%	16.0%	3.8%	5.1%	12.8%	3.0%	97.7%	2.3%	100.0%
1989	56.6%	15.9%	3.9%	5.3%	12.9%	3.1%	97.7%	2.3%	100.0%
1990	56.0%	15.9%	4.1%	5.5%	13.1%	3.1%	97.7%	2.3%	100.0%
1991	55.2%	15.9%	4.2%	5.7%	13.3%	3.2%	97.5%	2.5%	100.0%
1992	54.3%	16.1%	4.4%	6.0%	13.5%	3.2%	97.5%	2.5%	100.0%
1993	53.7%	16.2%	4.6%	6.1%	13.7%	3.3%	97.5%	2.5%	100.0%
1994	53.3%	16.2%	4.7%	6.1%	13.8%	3.4%	97.5%	2.5%	100.0%
1995	53.0%	16.3%	4.8%	6.3%	13.8%	3.4%	97.6%	2.4%	100.0%
1996	52.7%	16.5%	4.9%	6.3%	14.0%	3.3%	97.6%	2.4%	100.0%
1997	52.1%	16.6%	5.0%	6.3%	14.2%	3.3%	97.6%	2.4%	100.0%
1998	51.4%	16.9%	5.1%	6.4%	14.4%	3.3%	97.6%	2.4%	100.0%
1999	50.7%	17.0%	5.4%	6.5%	14.6%	3.3%	97.6%	2.4%	100.0%
2000	50.2%	17.1%	5.5%	6.6%	14.7%	3.4%	97.6%	2.4%	100.0%
2001	49.7%	17.2%	5.7%	6.8%	14.8%	3.4%	97.6%	2.4%	100.0%

*County estimate based on "County Business Patterns" factor applied to Inland Empire nonag employment.

Source: California Employment Development Department; Alfred Gobar Associates.

EXHIBIT A-3 (Cont'd)

EMPLOYMENT INDEX
(REFERENCE PERIOD VS 1980)

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	**1.00**	**1.00**	**1.00***	**1.00***	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
1981	1.01	1.03	1.01*	1.01*	1.02	1.03	1.01	1.05	1.02
1982	0.98	1.01	1.00*	0.99*	1.02	1.05	0.99	1.06	0.99
1983	0.98	1.04	1.04*	1.00*	1.04	1.09	1.00	1.07	1.00
1984	1.01	1.12	1.10*	1.08*	1.11	1.14	1.05	1.11	1.05
1985	1.04	1.17	1.18*	1.18*	1.18	1.20	1.09	1.15	1.09
1986	1.07	1.22	1.27*	1.27*	1.24	1.25	1.13	1.17	1.13
1987	1.10	1.28	1.34*	1.37*	1.31	1.32	1.17	1.19	1.17
1988	1.12	1.35	1.40	1.47	1.39	1.40	1.21	1.23	1.21
1989	1.14	1.38	1.48	1.59	1.44	1.45	1.25	1.25	1.25
1990	1.14	1.40	1.60	1.67	1.49	1.51	1.27	1.30	1.27
1991	1.10	1.37	1.61	1.69	1.48	1.51	1.24	1.35	1.24
1992	1.05	1.35	1.63	1.72	1.46	1.48	1.20	1.32	1.21
1993	1.03	1.33	1.66	1.71	1.46	1.48	1.18	1.29	1.19
1994	1.03	1.35	1.71	1.75	1.47	1.53	1.19	1.30	1.19
1995	1.04	1.38	1.78	1.81	1.50	1.55	1.21	1.32	1.22
1996	1.05	1.42	1.84	1.86	1.55	1.56	1.24	1.33	1.24
1997	1.07	1.48	1.96	1.93	1.62	1.59	1.27	1.37	1.28
1998	1.09	1.55	2.08	2.00	1.70	1.65	1.32	1.40	1.32
1999	1.11	1.61	2.24	2.11	1.77	1.72	1.36	1.44	1.36
2000	1.13	1.66	2.37	2.21	1.84	1.80	1.39	1.48	1.40
2001	1.13	1.70	2.49	2.28	1.88	1.83	1.42	1.52	1.42

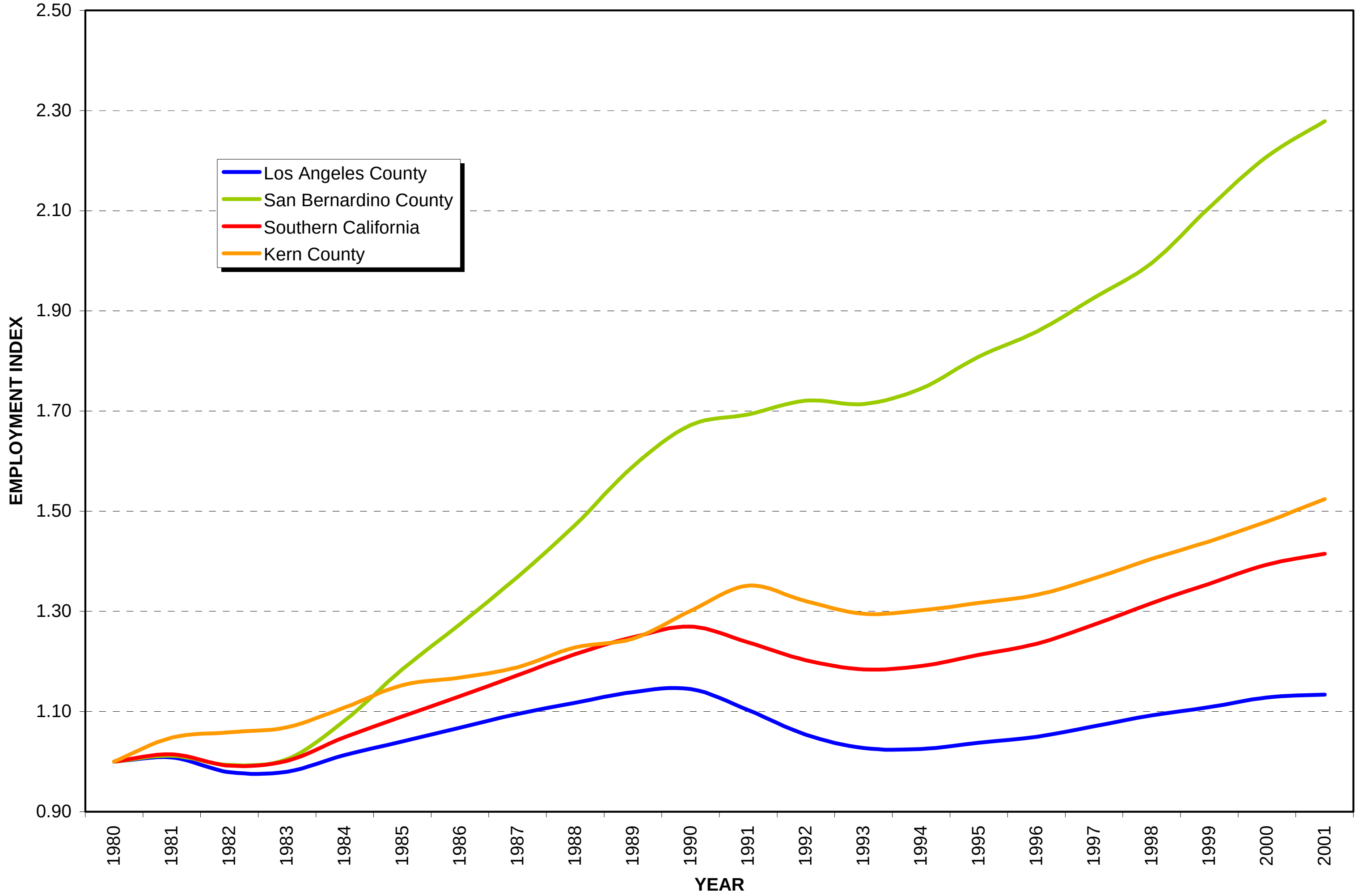
EMPLOYMENT INDEX DISTRIBUTIVE SHARE OF TOTAL

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	**1.00**	**1.00**	**1.00***	**1.00***	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
1981	0.99	1.02	0.99*	1.00*	1.01	1.02	1.00	1.03	1.00
1982	0.99	1.02	1.00*	1.00*	1.03	1.06	1.00	1.07	1.00
1983	0.98	1.04	1.04*	1.00*	1.03	1.08	1.00	1.07	1.00
1984	0.96	1.06	1.05*	1.03*	1.06	1.09	1.00	1.06	1.00
1985	0.95	1.07	1.08*	1.09*	1.08	1.10	1.00	1.06	1.00
1986	0.94	1.08	1.12*	1.13*	1.10	1.10	1.00	1.03	1.00
1987	0.93	1.09	1.14*	1.17*	1.12	1.13	1.00	1.01	1.00
1988	0.92	1.11	1.15	1.21	1.14	1.15	1.00	1.01	1.00
1989	0.91	1.11	1.18	1.27	1.16	1.16	1.00	1.00	1.00
1990	0.90	1.10	1.26	1.32	1.17	1.19	1.00	1.02	1.00
1991	0.89	1.10	1.30	1.36	1.19	1.21	1.00	1.09	1.00
1992	0.87	1.12	1.35	1.43	1.21	1.23	1.00	1.10	1.00
1993	0.87	1.12	1.40	1.44	1.23	1.25	1.00	1.09	1.00
1994	0.86	1.13	1.44	1.46	1.23	1.28	1.00	1.09	1.00
1995	0.85	1.13	1.47	1.49	1.24	1.28	1.00	1.08	1.00
1996	0.85	1.14	1.49	1.50	1.25	1.26	1.00	1.08	1.00
1997	0.84	1.16	1.53	1.51	1.27	1.24	1.00	1.07	1.00
1998	0.83	1.18	1.58	1.51	1.29	1.25	1.00	1.07	1.00
1999	0.82	1.18	1.65	1.55	1.31	1.27	1.00	1.06	1.00
2000	0.81	1.19	1.70	1.58	1.32	1.29	1.00	1.06	1.00
2001	0.80	1.20	1.76	1.61	1.33	1.29	1.00	1.08	1.00

*County estimate based on "County Business Patterns" factor applied to Inland Empire nonag employment.

Source: California Employment Development Department; Alfred Gobar Associates.

EXHIBIT A-4
EMPLOYMENT TRENDS INDEX
WEST MOJAVE REGION



Source: California Employment Development Department; Alfred Gobar Associates

EXHIBIT A-5

RESIDENTIAL CONSTRUCTION TRENDS - ALL HOUSING
SOUTHERN CALIFORNIA AND KERN COUNTY

HOUSING DEVELOPMENT VOLUME - ALL UNITS

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	28,761	10,915	7,839	8,394	13,167	4,022	73,098	3,002	76,100
1981	21,091	9,396	6,330	6,578	8,998	2,766	55,159	2,648	57,807
1982	14,424	5,394	4,779	6,038	7,502	1,148	39,285	4,433	43,718
1983	27,967	13,353	12,233	12,722	20,781	3,514	90,570	6,050	96,620
1984	37,691	17,437	19,006	19,992	33,180	4,858	132,164	6,220	138,384
1985	54,192	20,477	17,171	22,941	38,239	6,182	159,202	5,207	164,409
1986	70,225	24,913	23,693	33,964	44,130	7,513	204,438	5,101	209,539
1987	56,482	24,681	17,597	21,684	30,609	4,205	155,258	4,965	160,223
1988	50,285	23,455	34,186	18,933	28,552	5,154	160,565	3,158	163,723
1989	48,441	16,797	25,546	19,951	18,710	5,087	134,532	4,303	138,835
1990	25,125	11,983	15,362	13,250	15,732	2,620	84,072	4,954	89,026
1991	15,914	6,555	9,283	6,809	7,891	2,194	48,646	3,400	52,046
1992	11,965	5,821	8,220	7,251	6,071	1,720	41,048	4,366	45,414
1993	7,432	6,344	7,274	5,778	5,750	1,372	33,950	3,396	37,346
1994	7,754	12,640	8,015	4,809	6,943	2,456	42,617	3,124	45,741
1995	7,763	8,193	6,806	3,892	6,633	2,142	35,429	3,496	38,925
1996	7,731	10,173	7,540	4,822	6,848	2,321	39,435	2,767	42,202
1997	9,829	12,261	9,747	5,448	11,139	2,329	50,753	2,659	53,412
1998	11,226	9,704	12,527	6,127	11,891	3,298	54,773	3,425	58,198
1999	14,060	12,239	14,154	6,767	16,295	4,418	67,933	3,118	71,051
2000	16,968	12,520	15,025	6,471	15,592	3,960	70,536	3,070	73,606
2001	18,118	8,585	18,097	8,395	15,468	3,453	72,116	3,494	75,610

DISTRIBUTIVE SHARE OF VOLUME

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	37.8%	14.3%	10.3%	11.0%	17.3%	5.3%	96.1%	3.9%	100.0%
1981	36.5%	16.3%	11.0%	11.4%	15.6%	4.8%	95.4%	4.6%	100.0%
1982	33.0%	12.3%	10.9%	13.8%	17.2%	2.6%	89.9%	10.1%	100.0%
1983	28.9%	13.8%	12.7%	13.2%	21.5%	3.6%	93.7%	6.3%	100.0%
1984	27.2%	12.6%	13.7%	14.4%	24.0%	3.5%	95.5%	4.5%	100.0%
1985	33.0%	12.5%	10.4%	14.0%	23.3%	3.8%	96.8%	3.2%	100.0%
1986	33.5%	11.9%	11.3%	16.2%	21.1%	3.6%	97.6%	2.4%	100.0%
1987	35.3%	15.4%	11.0%	13.5%	19.1%	2.6%	96.9%	3.1%	100.0%
1988	30.7%	14.3%	20.9%	11.6%	17.4%	3.1%	98.1%	1.9%	100.0%
1989	34.9%	12.1%	18.4%	14.4%	13.5%	3.7%	96.9%	3.1%	100.0%
1990	28.2%	13.5%	17.3%	14.9%	17.7%	2.9%	94.4%	5.6%	100.0%
1991	30.6%	12.6%	17.8%	13.1%	15.2%	4.2%	93.5%	6.5%	100.0%
1992	26.3%	12.8%	18.1%	16.0%	13.4%	3.8%	90.4%	9.6%	100.0%
1993	19.9%	17.0%	19.5%	15.5%	15.4%	3.7%	90.9%	9.1%	100.0%
1994	17.0%	27.6%	17.5%	10.5%	15.2%	5.4%	93.2%	6.8%	100.0%
1995	19.9%	21.0%	17.5%	10.0%	17.0%	5.5%	91.0%	9.0%	100.0%
1996	18.3%	24.1%	17.9%	11.4%	16.2%	5.5%	93.4%	6.6%	100.0%
1997	18.4%	23.0%	18.2%	10.2%	20.9%	4.4%	95.0%	5.0%	100.0%
1998	19.3%	16.7%	21.5%	10.5%	20.4%	5.7%	94.1%	5.9%	100.0%
1999	19.8%	17.2%	19.9%	9.5%	22.9%	6.2%	95.6%	4.4%	100.0%
2000	23.1%	17.0%	20.4%	8.8%	21.2%	5.4%	95.8%	4.2%	100.0%
2001	24.0%	11.4%	23.9%	11.1%	20.5%	4.6%	95.4%	4.6%	100.0%

Source: Bureau of the Census - Construction Statistics Division; Alfred Gobar Associates.

EXHIBIT A-5 (Cont'd)

RESIDENTIAL CONSTRUCTION TRENDS - ALL HOUSING
SOUTHERN CALIFORNIA AND KERN COUNTY

HOUSING ACTIVITY INDEX (REFERENCE PERIOD VS 1980)

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1981	0.73	0.86	0.81	0.78	0.68	0.69	0.75	0.88	0.76
1982	0.50	0.49	0.61	0.72	0.57	0.29	0.54	1.48	0.57
1983	0.97	1.22	1.56	1.52	1.58	0.87	1.24	2.02	1.27
1984	1.31	1.60	2.42	2.38	2.52	1.21	1.81	2.07	1.82
1985	1.88	1.88	2.19	2.73	2.90	1.54	2.18	1.73	2.16
1986	2.44	2.28	3.02	4.05	3.35	1.87	2.80	1.70	2.75
1987	1.96	2.26	2.24	2.58	2.32	1.05	2.12	1.65	2.11
1988	1.75	2.15	4.36	2.26	2.17	1.28	2.20	1.05	2.15
1989	1.68	1.54	3.26	2.38	1.42	1.26	1.84	1.43	1.82
1990	0.87	1.10	1.96	1.58	1.19	0.65	1.15	1.65	1.17
1991	0.55	0.60	1.18	0.81	0.60	0.55	0.67	1.13	0.68
1992	0.42	0.53	1.05	0.86	0.46	0.43	0.56	1.45	0.60
1993	0.26	0.58	0.93	0.69	0.44	0.34	0.46	1.13	0.49
1994	0.27	1.16	1.02	0.57	0.53	0.61	0.58	1.04	0.60
1995	0.27	0.75	0.87	0.46	0.50	0.53	0.48	1.16	0.51
1996	0.27	0.93	0.96	0.57	0.52	0.58	0.54	0.92	0.55
1997	0.34	1.12	1.24	0.65	0.85	0.58	0.69	0.89	0.70
1998	0.39	0.89	1.60	0.73	0.90	0.82	0.75	1.14	0.76
1999	0.49	1.12	1.81	0.81	1.24	1.10	0.93	1.04	0.93
2000	0.59	1.15	1.92	0.77	1.18	0.98	0.96	1.02	0.97
2001	0.63	0.79	2.31	1.00	1.17	0.86	0.99	1.16	0.99

INDEXED SHARE OF VOLUME (REFERENCE PERIOD VS 1980)

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1981	0.97	1.13	1.06	1.03	0.90	0.91	0.99	1.16	1.00
1982	0.87	0.86	1.06	1.25	0.99	0.50	0.94	2.57	1.00
1983	0.77	0.96	1.23	1.19	1.24	0.69	0.98	1.59	1.00
1984	0.72	0.88	1.33	1.31	1.39	0.66	0.99	1.14	1.00
1985	0.87	0.87	1.01	1.27	1.34	0.71	1.01	0.80	1.00
1986	0.89	0.83	1.10	1.47	1.22	0.68	1.02	0.62	1.00
1987	0.93	1.07	1.07	1.23	1.10	0.50	1.01	0.79	1.00
1988	0.81	1.00	2.03	1.05	1.01	0.60	1.02	0.49	1.00
1989	0.92	0.84	1.79	1.30	0.78	0.69	1.01	0.79	1.00
1990	0.75	0.94	1.68	1.35	1.02	0.56	0.98	1.41	1.00
1991	0.81	0.88	1.73	1.19	0.88	0.80	0.97	1.66	1.00
1992	0.70	0.89	1.76	1.45	0.77	0.72	0.94	2.44	1.00
1993	0.53	1.18	1.89	1.40	0.89	0.70	0.95	2.31	1.00
1994	0.45	1.93	1.70	0.95	0.88	1.02	0.97	1.73	1.00
1995	0.53	1.47	1.70	0.91	0.98	1.04	0.95	2.28	1.00
1996	0.48	1.68	1.73	1.04	0.94	1.04	0.97	1.66	1.00
1997	0.49	1.60	1.77	0.92	1.21	0.83	0.99	1.26	1.00
1998	0.51	1.16	2.09	0.95	1.18	1.07	0.98	1.49	1.00
1999	0.52	1.20	1.93	0.86	1.33	1.18	1.00	1.11	1.00
2000	0.61	1.19	1.98	0.80	1.22	1.02	1.00	1.06	1.00
2001	0.63	0.79	2.32	1.01	1.18	0.86	0.99	1.17	1.00

Source: Bureau of the Census - Construction Statistics Division; Alfred Gobar Associates.

EXHIBIT A-6

RESIDENTIAL VALUE TRENDS - ALL HOUSING
SOUTHERN CALIFORNIA

Average Unit Value - All Type Housing

Growth Period	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Southern California
1980	$63,154	$59,918	$38,068	$51,190	$55,144	$69,967	$57,539
1990	118,547	95,907	107,254	102,885	115,716	124,669	110,449
1997	150,731	148,684	142,506	139,009	153,639	209,420	150,730
1998	137,103	165,971	149,380	148,806	164,989	209,755	156,763
1999	135,155	164,514	164,559	172,409	163,752	196,093	161,104
2000	139,344	158,249	171,975	161,184	175,252	205,883	163,327
2001	135,610	188,723	170,845	159,705	180,515	238,014	168,114
Period Average							
1980-89	$73,777	$71,708	$69,293	$63,702	$76,338	$87,900	$72,436
1990-99	135,296	137,778	129,203	125,000	151,346	171,966	137,947
1997-01	139,589	165,228	159,853	156,223	167,629	211,833	160,008

Average Unit Indexed Value - Southern California Base

Growth Period	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Southern California
1980	1.10	1.04	0.66	0.89	0.96	1.22	1.00
1990	1.07	0.87	0.97	0.93	1.05	1.13	1.00
1997	1.00	0.99	0.95	0.92	1.02	1.39	1.00
1998	0.87	1.06	0.95	0.95	1.05	1.34	1.00
1999	0.84	1.02	1.02	1.07	1.02	1.22	1.00
2000	0.85	0.97	1.05	0.99	1.07	1.26	1.00
2001	0.81	1.12	1.02	0.95	1.07	1.42	1.00
Period Average							
1980-89	1.03	0.98	0.95	0.88	1.04	1.22	1.00
1990-99	0.99	1.00	0.93	0.90	1.10	1.24	1.00
1997-01	0.87	1.03	1.00	0.98	1.05	1.32	1.00

Distributive Share of Development Value

Growth Period	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Southern California
1980	43%	16%	7%	10%	17%	7%	100%
1990	32%	12%	18%	15%	20%	4%	100%
1997	19%	24%	18%	10%	22%	6%	100%
1998	18%	19%	22%	11%	23%	8%	100%
1999	17%	18%	21%	11%	24%	8%	100%
2000	21%	17%	22%	9%	24%	7%	100%
2001	20%	13%	26%	11%	23%	7%	100%
Period Average							
1980-89	36%	14%	13%	12%	21%	5%	100%
1990-99	23%	20%	19%	12%	20%	6%	100%
1997-01	19%	18%	22%	10%	23%	7%	100%

Indexed Share of Value - Share of Volume (Value divided by Volume)

Growth Period	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Southern California
1980	1.10	1.04	0.66	0.89	0.96	1.22	1.00
1990	1.07	0.87	0.97	0.93	1.05	1.13	1.00
1997	1.00	0.99	0.95	0.92	1.02	1.39	1.00
1998	0.87	1.06	0.95	0.95	1.05	1.34	1.00
1999	0.84	1.02	1.02	1.07	1.02	1.22	1.00
2000	0.85	0.97	1.05	0.99	1.07	1.26	1.00
2001	0.81	1.12	1.02	0.95	1.07	1.42	1.00
Period Average							
1980-89	1.03	0.98	0.95	0.88	1.04	1.22	1.00
1990-99	0.99	1.00	0.93	0.90	1.10	1.24	1.00
1997-01	0.87	1.03	1.00	0.98	1.05	1.32	1.00

Source: Bureau of the Census - Construction Statistics Division; Alfred Gobar Associates.

EXHIBIT A-7

SINGLE-FAMILY DETACHED HOUSING VALUE TRENDS
SOUTHERN CALIFORNIA

Average Unit Value - All Type Housing

Growth Period	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Southern California
1980	$77,558	$71,254	$43,696	$58,056	$73,902	$81,635	$67,484
1990	180,930	151,541	120,953	112,886	176,081	181,273	144,192
1997	183,835	189,966	151,771	144,160	179,198	218,607	173,553
1998	187,023	196,245	165,897	157,526	192,230	227,370	183,249
1999	189,092	214,489	178,138	176,716	216,079	223,463	196,850
2000	215,776	225,316	185,026	173,077	230,248	241,397	207,611
2001	195,811	230,446	181,260	178,795	233,880	250,419	203,535
Period Average							
1980-89	$107,167	$100,480	$79,532	$75,899	$108,698	$106,895	$94,549
1990-99	178,761	175,929	137,530	130,483	183,759	199,062	161,626
1997-01	194,307	211,292	172,418	166,055	210,327	232,251	192,959

Indexed Average Unit Value (County vs So Cal)

Growth Period	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Southern California
1980	1.15	1.06	0.65	0.86	1.10	1.21	1.00
1990	1.25	1.05	0.84	0.78	1.22	1.26	1.00
1997	1.06	1.09	0.87	0.83	1.03	1.26	1.00
1998	1.02	1.07	0.91	0.86	1.05	1.24	1.00
1999	0.96	1.09	0.90	0.90	1.10	1.14	1.00
2000	1.04	1.09	0.89	0.83	1.11	1.16	1.00
2001	0.96	1.13	0.89	0.88	1.15	1.23	1.00
Period Average							
1980-89	1.14	1.05	0.84	0.81	1.14	1.13	1.00
1990-99	1.11	1.09	0.85	0.80	1.14	1.24	1.00
1997-01	1.01	1.09	0.89	0.86	1.09	1.21	1.00

Distributive Share of Development Value

Growth Period	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Southern California
1980	27%	20%	10%	15%	19%	9%	100%
1990	25%	10%	23%	19%	18%	4%	100%
1997	17%	23%	20%	11%	22%	7%	100%
1998	16%	19%	23%	12%	23%	9%	100%
1999	16%	17%	23%	12%	23%	9%	100%
2000	19%	16%	26%	10%	22%	7%	100%
2001	16%	14%	29%	12%	22%	8%	100%
Period Average							
1980-89	26%	15%	17%	15%	21%	6%	100%
1990-99	20%	19%	21%	13%	20%	7%	100%
1997-01	17%	18%	24%	11%	22%	8%	100%

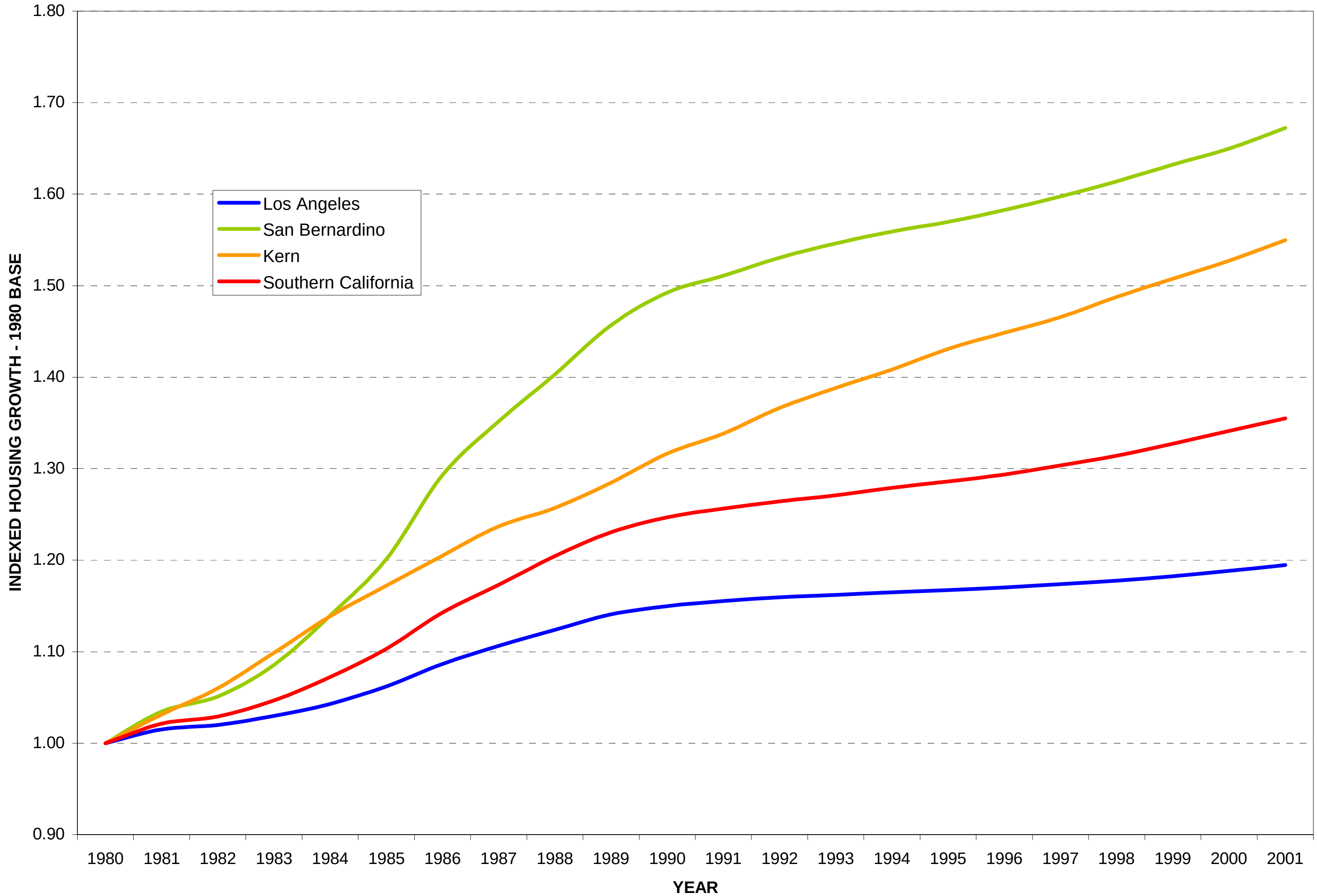
Indexed Share of Value - Share of Volume (Value divided by Volume)

Growth Period	Los Angeles	Orange	Riverside	San Bernardino	San Diego	Ventura	Southern California
1980	1.15	1.06	0.65	0.86	1.10	1.21	1.00
1990	1.25	1.05	0.84	0.78	1.22	1.26	1.00
1997	1.06	1.09	0.87	0.83	1.03	1.26	1.00
1998	1.02	1.07	0.91	0.86	1.05	1.24	1.00
1999	0.96	1.09	0.90	0.90	1.10	1.14	1.00
2000	1.04	1.09	0.89	0.83	1.11	1.16	1.00
2001	0.96	1.13	0.89	0.88	1.15	1.23	1.00
Period Average							
1980-89	1.14	1.05	0.84	0.81	1.14	1.13	1.00
1990-99	1.11	1.09	0.85	0.80	1.14	1.24	1.00
1997-01	1.01	1.09	0.89	0.86	1.09	1.21	1.00

Source: Bureau of the Census - Construction Statistics Division; Alfred Gobar Associates.

EXHIBIT A-8

INDEX OF HOUSING GROWTH



Source: Bureau of The Census – Construction Statistics Division; California Department of Finance; Alfred Gobar Associates

EXHIBIT A-9

EMPLOYMENT PER HOUSEHOLD TRENDS[1]
SOUTHERN CALIFORNIA AND KERN COUNTY

Year	Southern California								So Cal
	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
1980	1.32	1.22	0.78	0.79	0.97	0.88	1.18	0.94	1.17
1981	1.32	1.24	0.76	0.78	0.98	0.89	1.18	0.96	1.18
1982	1.28	1.20	0.73	0.75	0.96	0.89	1.14	0.94	1.14
1983	1.27	1.21	0.75	0.74	0.96	0.90	1.14	0.93	1.14
1984	1.31	1.29	0.77	0.78	1.02	0.94	1.19	0.94	1.18
1985	1.34	1.33	0.79	0.82	1.05	0.96	1.22	0.95	1.21
1986	1.37	1.36	0.81	0.85	1.06	0.97	1.24	0.93	1.23
1987	1.39	1.39	0.80	0.85	1.07	1.00	1.26	0.93	1.25
1988	1.41	1.43	0.79	0.86	1.09	1.03	1.27	0.93	1.26
1989	1.41	1.43	0.77	0.88	1.09	1.05	1.27	0.93	1.26
1990	1.38	1.42	0.77	0.88	1.09	1.06	1.25	0.95	1.24
1991	1.32	1.37	0.73	0.87	1.07	1.05	1.20	0.96	1.19
1992	1.26	1.33	0.72	0.87	1.04	1.02	1.15	0.92	1.15
1993	1.22	1.31	0.72	0.86	1.03	1.01	1.13	0.88	1.12
1994	1.21	1.31	0.74	0.86	1.03	1.03	1.13	0.87	1.12
1995	1.23	1.33	0.75	0.88	1.05	1.04	1.14	0.86	1.13
1996	1.24	1.35	0.77	0.90	1.07	1.04	1.16	0.86	1.15
1997	1.26	1.40	0.81	0.93	1.12	1.05	1.19	0.87	1.18
1998	1.28	1.46	0.85	0.95	1.16	1.08	1.22	0.88	1.21
1999	1.30	1.49	0.90	1.00	1.20	1.12	1.25	0.89	1.24
2000	1.32	1.52	0.93	1.03	1.23	1.15	1.27	0.90	1.26
2001	1.30	1.51	0.92	1.05	1.22	1.13	1.26	0.95	1.25
22Yr Avg	1.31	1.36	0.79	0.87	1.07	1.01	1.20	0.92	1.19

Note

[1] Local nonagricultural full-time and part-time jobs per occupied household

Source: California Employment Development Department; California Department of Finance; Alfred Gobar Associates.

EXHIBIT A-10

SAN BERNARDINO COUNTY, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT

Year	Average Housing Stock [1]	Employment	Personal Income (Millions)	Employment Per Dwelling Unit	Income Per Dwelling Unit	Average Housing Value (Actual)
1988	509,195	359,700	$20,232.0	0.706	$39,733	$119,242
1989	529,219	388,300	$22,419.6	0.734	$42,364	$132,790
1990	546,405	408,500	$24,857.9	0.748	$45,494	$137,771
1991	559,435	413,600	$25,670.0	0.739	$45,886	$141,815
1992	567,851	420,400	$26,837.5	0.740	$47,261	$139,449
1993	575,469	418,700	$27,075.2	0.728	$47,049	$134,994
1994	581,762	426,300	$27,775.3	0.733	$47,743	$132,093
1995	586,532	441,900	$28,602.2	0.753	$48,765	$126,771
1996	590,601	454,000	$29,598.4	0.769	$50,116	$126,256
1997	595,433	470,500	$31,173.7	0.790	$52,355	$130,221
1998	601,147	487,500	$33,450.1	0.811	$55,644	$135,667
1999	607,189	514,600	$35,341.1	0.848	$58,204	$142,886
2000	608,063	539,400	$37,641.5	0.887	$61,904	$153,032
2001	609,350	556,700	$39,766.8	0.914	$65,261	$164,199

[1] Extrapolated at 5.65% per year - similar to trends from 1995 - 2000.

Source: California Department of Finance; California Employment Development Department; U.S. Bureau of Economic Analysis
Real Estate Research Council of Southern California.

EXHIBIT A-11

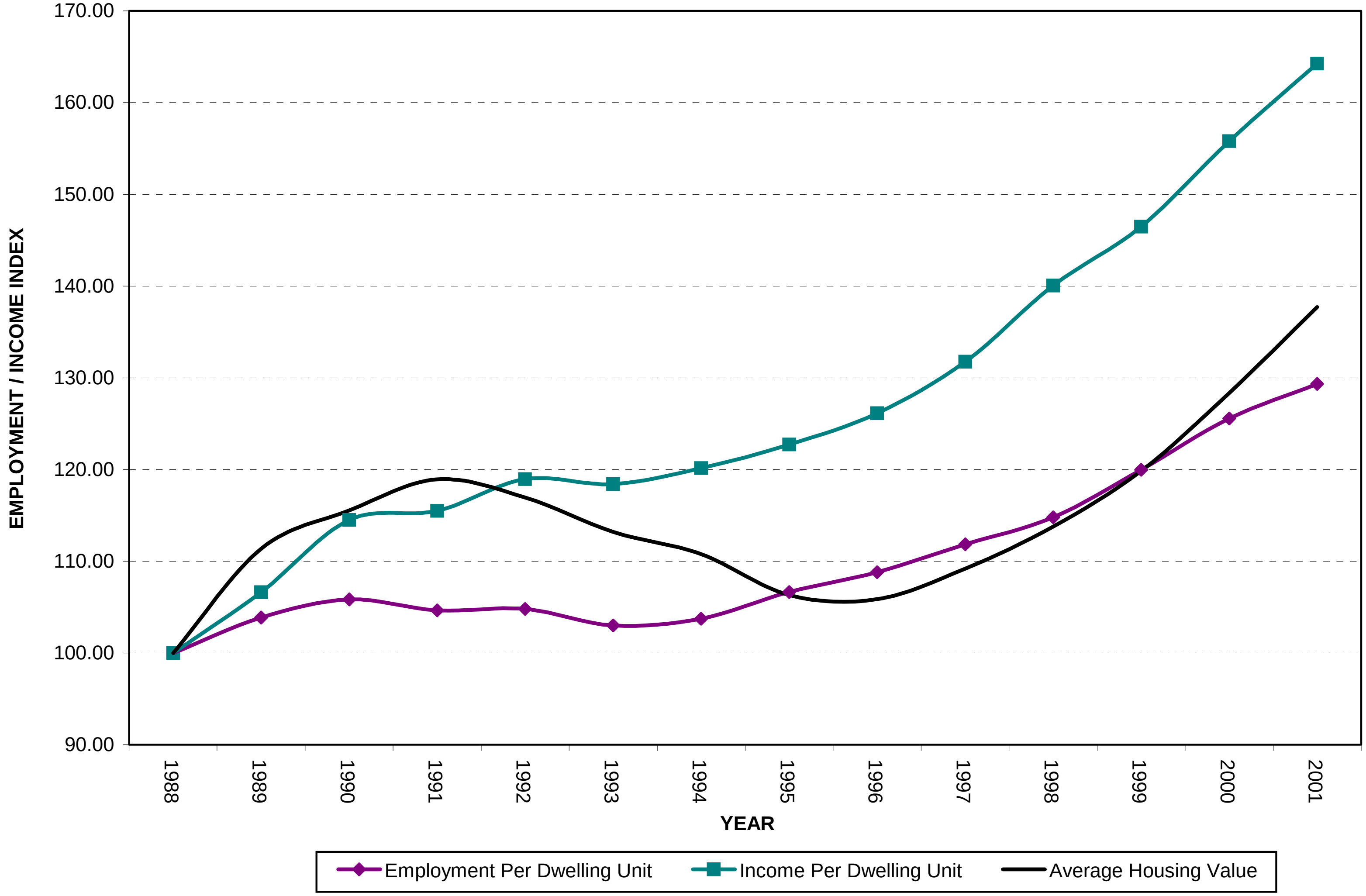
SAN BERNARDINO COUNTY, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT INDEX

Year	Average Housing Stock [1]	Employment	Personal Income (Millions)	Employment Per Dwelling Unit	Income Per Dwelling Unit	Average Housing Value (Actual)
1988	100.0	100.0	100.0	100.0	100.0	100.0
1989	103.9	108.0	110.8	103.9	106.6	111.4
1990	107.3	113.6	122.9	105.8	114.5	115.5
1991	109.9	115.0	126.9	104.7	115.5	118.9
1992	111.5	116.9	132.6	104.8	118.9	116.9
1993	113.0	116.4	133.8	103.0	118.4	113.2
1994	114.3	118.5	137.3	103.7	120.2	110.8
1995	115.2	122.9	141.4	106.7	122.7	106.3
1996	116.0	126.2	146.3	108.8	126.1	105.9
1997	116.9	130.8	154.1	111.9	131.8	109.2
1998	118.1	135.5	165.3	114.8	140.0	113.8
1999	119.2	143.1	174.7	120.0	146.5	119.8
2000	119.4	150.0	186.0	125.6	155.8	128.3
2001	119.7	154.8	196.6	129.3	164.2	137.7

[1] Extrapolated at 5.65% per year - similar to trends from 1995 - 2000.

Source: California Department of Finance; California Employment Development Department; U.S. Bureau of Economic Analysis; Real Estate Research Council of Southern California.

EXHIBIT A-12
SAN BERNARDINO COUNTY, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT INDEX VS.
AVERAGE HOUSING VALUE



Source: California Statistical Abstract; Bureau of the Census – Construction Statistics Division; Real Estate Research Council of So. Calif.

EXHIBIT A-13

LOS ANGELES COUNTY, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT

Year	Average Housing Stock	Employment	Personal Income (Millions)	Employment Per Dwelling Unit	Income Per Dwelling Unit	Median Housing Value (Actual)
1988	3,106,849	4,034,000	$169,727.7	1.298	$54,630	$191,100
1989	3,147,210	4,111,500	$180,506.1	1.306	$57,354	$217,100
1990	3,170,276	4,133,300	$195,757.3	1.304	$61,748	$210,300
1991	3,197,040	3,982,700	$196,364.4	1.246	$61,421	$213,400
1992	3,213,826	3,804,400	$203,214.9	1.184	$63,231	$208,100
1993	3,224,764	3,707,700	$204,054.1	1.150	$63,277	$194,700
1994	3,232,478	3,701,900	$207,403.3	1.145	$64,162	$182,700
1995	3,238,320	3,746,500	$215,948.8	1.157	$66,685	$175,900
1996	3,243,883	3,788,500	$225,143.8	1.168	$69,406	$167,100
1997	3,250,956	3,865,100	$235,074.9	1.189	$72,309	$176,500
1998	3,258,261	3,943,500	$251,636.7	1.210	$77,230	$192,600
1999	3,266,960	4,002,900	$263,814.8	1.225	$80,752	$199,000
2000	3,275,807	4,072,100	$276,820.8 [3]	1.243	$84,505	$215,900
2001	3,286,346	4,093,900	$290,468.1 [3]	1.246	$88,386	$241,400
2002est.	3,300,153 [1]	4,094,800 [2]	$304,788.2 [3]	1.241	$92,356	
2003est.	3,311,918 [1]	4,144,700 [2]	$319,814.2 [3]	1.251	$96,565	
2004est.	3,322,814 [1]	4,233,600 [2]	$335,581.1 [3]	1.274	$100,993	

[1] Based on recent and anticipated building permit activity.
[2] California State University, Long Beach "Southern California Economic Forecast" projections.
[3] Increased by 4.93% per year compound - similar to increase per year 1994-1999 (4.93% per year)

Source: California Statistical Abstract; Bureau of Labor Statistics; Bureau of The Census - Construction Statistics Division; Real Estate Research Council of Southern California; California State University, Long Beach.

EXHIBIT A-14

LOS ANGELES COUNTY, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT INDEX

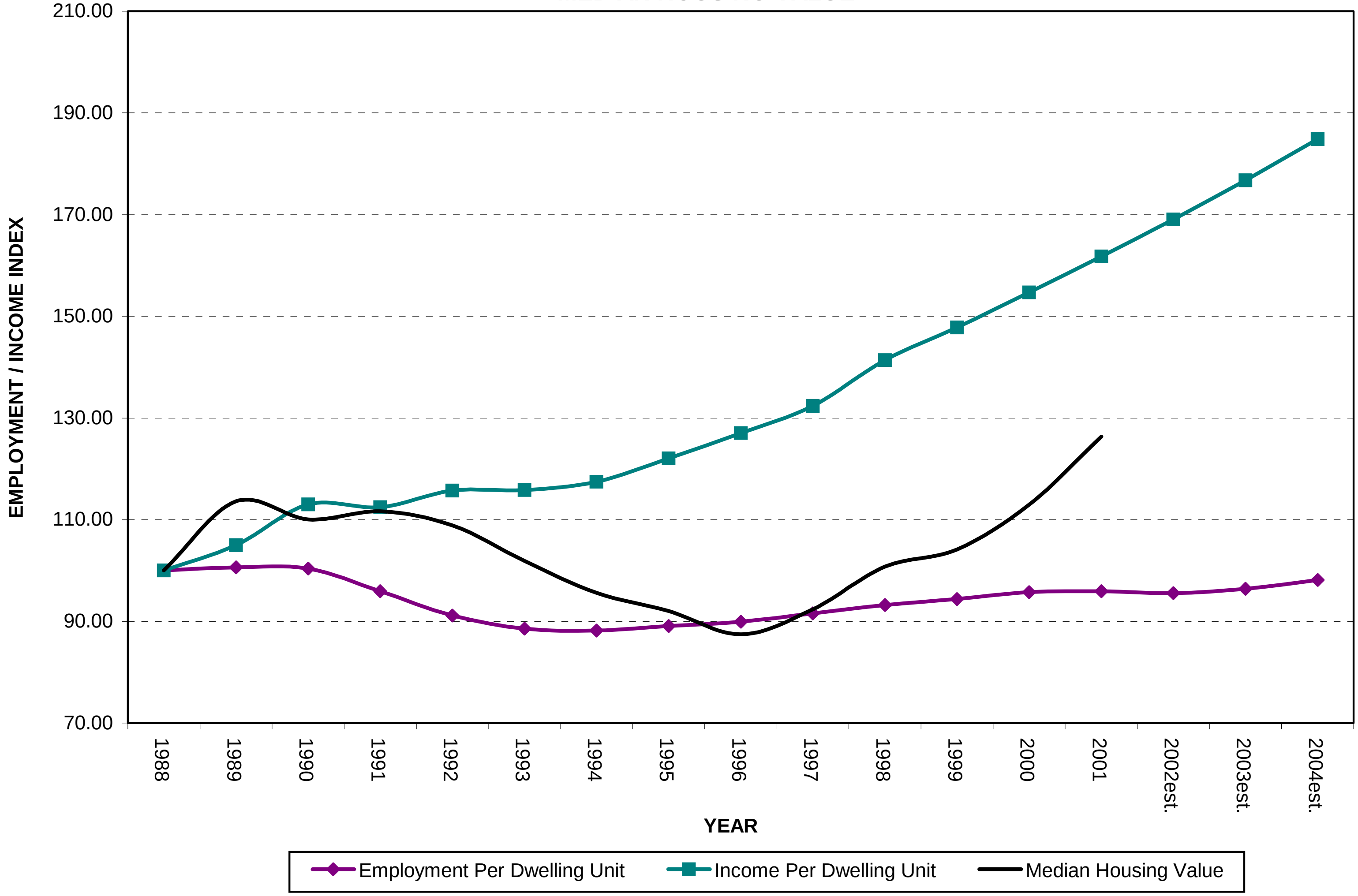
Year	Average Housing Stock	Employment	Personal Income (Millions)	Employment Per Dwelling Unit	Income Per Dwelling Unit	Median Housing Value (Actual)
1988	100.0	100.0	100.0	100.0	100.0	100.0
1989	101.3	101.9	106.4	100.6	105.0	113.6
1990	102.0	102.5	115.3	100.4	113.0	110.0
1991	102.9	98.7	115.7	95.9	112.4	111.7
1992	103.4	94.3	119.7	91.2	115.7	108.9
1993	103.8	91.9	120.2	88.6	115.8	101.9
1994	104.0	91.8	122.2	88.2	117.4	95.6
1995	104.2	92.9	127.2	89.1	122.1	92.0
1996	104.4	93.9	132.7	89.9	127.0	87.4
1997	104.6	95.8	138.5	91.6	132.4	92.4
1998	104.9	97.8	148.3	93.2	141.4	100.8
1999	105.2	99.2	155.4	94.4	147.8	104.1
2000	105.4	100.9	163.1 [2]	95.7	154.7	113.0
2001	105.8	101.5	171.1 [2]	95.9	161.8	126.3
2002est.	106.2 [1]	101.5	179.6 [2]	95.6	169.1	
2003est.	106.6 [1]	102.7	188.4 [2]	96.4	176.8	
2004est.	107.0 [1]	104.9	197.7 [2]	98.1	184.9	

1 Based on recent and anticipated building permit activity.

2 Increased by 4.93% per year compound - similar to increase per year 1994-1999 (4.93% per year)

Source: California Statistical Abstract; Bureau of Labor Statistics; Bureau of The Census - Construction Statistics Division; Real Estate Research Council of Southern California; California State University, Long Beach.

EXHIBIT A-15
LOS ANGELES COUNTY, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT INDEX VS.
MEDIAN HOUSING VALUE



Source: California Statistical Abstract; Bureau of Labor Statistics; Bureau of the Census – Construction Statistics Division; National Assoc. of Realtors

EXHIBIT A-16

KERN COUNTY, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT

Year	Average Housing Stock	Employment	Personal Income (Millions)	Employment Per Dwelling Unit	Income Per Dwelling Unit	Median Housing Value (Actual) [2]
1988	195,813	161,100	$7,800.4	0.823	$39,836	$87,187
1989	199,676	163,400	$8,337.0	0.818	$41,753	$97,372
1990	202,122	170,700	$9,103.7	0.845	$45,041	$113,074
1991	204,759	177,300	$9,569.7	0.866	$46,737	$118,137
1992	208,868	173,200	$9,974.8	0.829	$47,757	$119,187
1993	213,047	169,900	$10,428.9	0.797	$48,951	$116,083
1994	217,196	170,800	$10,609.5	0.786	$48,848	$111,973
1995	220,727	172,800	$10,985.5	0.783	$49,770	$108,494
1996	223,798	174,900	$11,398.7	0.782	$50,933	$106,701
1997	226,828	179,200	$11,873.1	0.790	$52,344	$108,239
1998	229,959	184,300	$12,577.0	0.801	$54,693	$113,611
1999	233,058	188,900	$12,920.9	0.811	$55,441	$121,411
2000	234,272	194,100	$13,786.7	0.829	$58,849	$137,978
2001	235,853	200,000	$14,427.5 [1]	0.848	$61,172	$161,557

[1] Increased by 4.65% per year compound - similar to increase per year 1995-2000.
[2] Based on median housing values for Central Valley area.

Source: California Department of Finance; California Employment Development Department; U.S. Bureau of Economic Analysis; California Association of Realtors.

EXHIBIT A-17

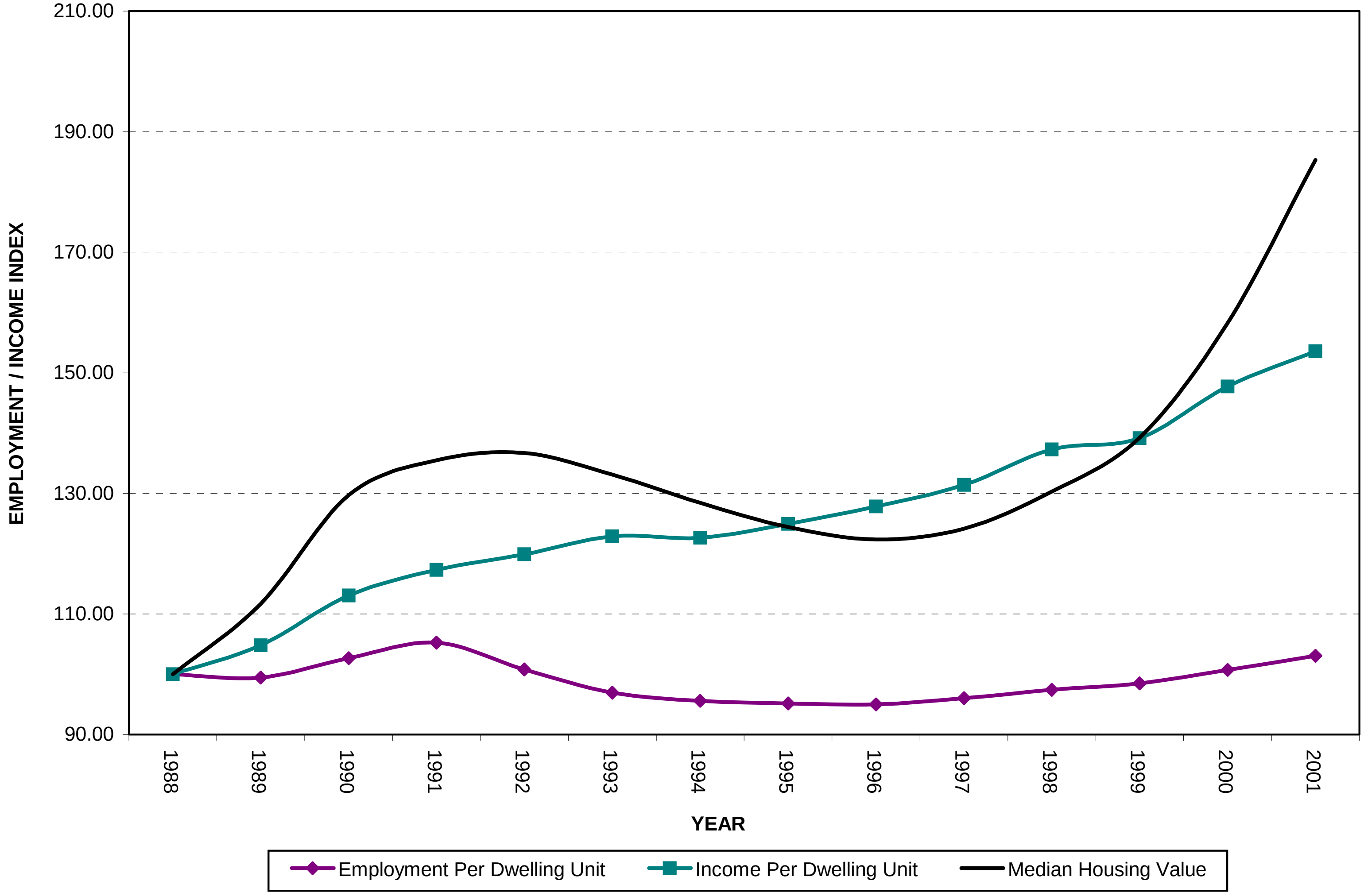
KERN COUNTY, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT INDEX

Year	Average Housing Stock	Employment	Personal Income (Millions)	Employment Per Dwelling Unit	Income Per Dwelling Unit	Median Housing Value (Actual) [2]
1988	100.0	100.0	100.0	100.0	100.0	100.0
1989	102.0	101.4	106.9	99.5	104.8	111.7
1990	103.2	106.0	116.7	102.7	113.1	129.7
1991	104.6	110.1	122.7	105.2	117.3	135.5
1992	106.7	107.5	127.9	100.8	119.9	136.7
1993	108.8	105.5	133.7	96.9	122.9	133.1
1994	110.9	106.0	136.0	95.6	122.6	128.4
1995	112.7	107.3	140.8	95.2	124.9	124.4
1996	114.3	108.6	146.1	95.0	127.9	122.4
1997	115.8	111.2	152.2	96.0	131.4	124.1
1998	117.4	114.4	161.2	97.4	137.3	130.3
1999	119.0	117.3	165.6	98.5	139.2	139.3
2000	119.6	120.5	176.7	100.7	147.7	158.3
2001	120.4	124.1	185.0 [1]	103.1	153.6	185.3

[1] Increased by 4.65% per year compound - similar to increase per year 1995-2000.
[2] Based on median housing values for Central Valley area.

Source: California Department of Finance; California Employment Development Department; U.S. Bureau of Economic Analysis; California Association of Realtors.

EXHIBIT A-18
KERN COUNTY, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT INDEX VS. MEDIAN HOUSING VALUE



Source: California Statistical Abstract; Bureau of Labor Statistics; Bureau of The Census – Construction Statistics Division; National Assoc. of Realtors

EXHIBIT A-19

SOUTHERN CALIFORNIA
EMPLOYMENT AND INCOME PER DWELLING UNIT

Year	Aggregate Housing Stock	Employment	Personal Income (Millions)	Employment Per Dwelling Unit	Income Per Dwelling Unit	Average Housing Value (Actual) [1]
1988	6,016,302	6,903,800	$320,059.5	1.148	$53,199	$201,005
1989	6,166,668	7,096,000	$345,557.0	1.151	$56,036	$216,622
1990	6,264,096	7,215,200	$373,426.0	1.152	$59,614	$216,612
1991	6,351,692	7,038,200	$378,471.8	1.108	$59,586	$221,422
1992	6,408,857	6,834,400	$393,380.8	1.066	$61,381	$216,580
1993	6,452,781	6,731,300	$397,164.6	1.043	$61,549	$210,329
1994	6,489,889	6,768,600	$406,532.3	1.043	$62,641	$210,032
1995	6,524,970	6,894,000	$423,775.4	1.057	$64,947	$202,210
1996	6,559,826	7,020,400	$443,963.1	1.070	$67,679	$202,625
1997	6,598,108	7,237,300	$468,708.1	1.097	$71,037	$215,257
1998	6,641,569	7,482,800	$502,798.6	1.127	$75,705	$230,609
1999	6,693,394	7,703,400	$533,017.6	1.151	$79,633	$240,135
2000	6,742,650	7,918,300	$564,096.4	1.174	$83,661	$260,642
2001	6,796,105	8,043,100	$597,041.1	1.183	$87,850	$275,420
2002est.	6,856,090	8,121,875	$631,966.8	1.185	$92,176	
2003est.	6,909,122	8,272,542	$668,996.3	1.197	$96,828	
2004est.	6,958,740	8,475,712	$708,259.9	1.218	$101,780	

[1] Includes Santa Barbara County.

Source: California Statistical Abstract; Bureau of Labor Statistics; Bureau of The Census - Construction Statistics Division; Real Estate Research Council of Southern California; California State University, Long Beach.

EXHIBIT A-20

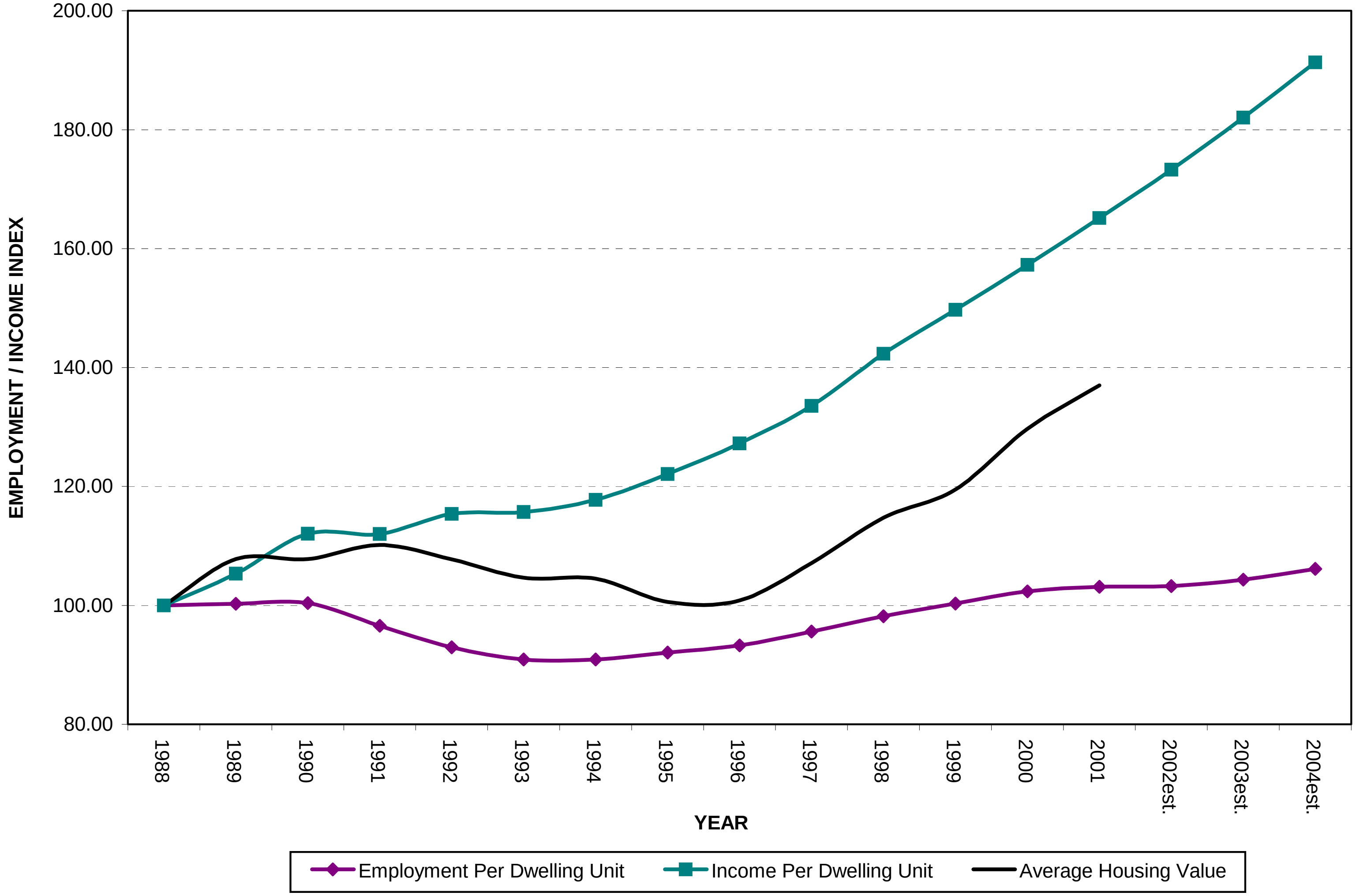
SOUTHERN CALIFORNIA
EMPLOYMENT AND INCOME PER DWELLING UNIT INDEX

Year	Average Housing Stock	Employment	Personal Income (Millions)	Employment Per Dwelling Unit	Income Per Dwelling Unit	Average Housing Value (Actual) [1]
1988	100.0	100.0	100.0	100.0	100.0	100.0
1989	102.5	102.8	108.0	100.3	105.3	107.8
1990	104.1	104.5	116.7	100.4	112.1	107.8
1991	105.6	101.9	118.3	96.6	112.0	110.2
1992	106.5	99.0	122.9	92.9	115.4	107.7
1993	107.3	97.5	124.1	90.9	115.7	104.6
1994	107.9	98.0	127.0	90.9	117.7	104.5
1995	108.5	99.9	132.4	92.1	122.1	100.6
1996	109.0	101.7	138.7	93.3	127.2	100.8
1997	109.7	104.8	146.4	95.6	133.5	107.1
1998	110.4	108.4	157.1	98.2	142.3	114.7
1999	111.3	111.6	166.5	100.3	149.7	119.5
2000	112.1	114.7	176.2	102.3	157.3	129.7
2001	113.0	116.5	186.5	103.1	165.1	137.0
2002est.	114.0	117.6	197.5	103.2	173.3	
2003est.	114.8	119.8	209.0	104.3	182.0	
2004est.	115.7	122.8	221.3	106.1	191.3	

[1] Includes Santa Barbara County.

Source: California Statistical Abstract; Bureau of Labor Statistics; Bureau of The Census - Construction Statistics Division; Real Estate Research Council of Southern California; California State University, Long Beach.

EXHIBIT A-21
SOUTHERN CALIFORNIA, CA
EMPLOYMENT AND INCOME PER DWELLING UNIT INDEX



Source: California Statistical Abstract; Bureau of Labor Statistics; Bureau of The Census – Construction Statistics Division; Real Estate Research Council of So. Calif

EXHIBIT A-22

SOUTHERN CALIFORNIA AND KERN COUNTY PROJECTIONS

TOTAL PROJECTED POPULATION

Year	Southern California: Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
2000	9,716,000	2,813,368	1,577,700	1,742,300	2,911,468	740,492	19,501,328	678,500	20,179,828
2005	10,169,100	3,003,179	1,864,700	1,980,000	3,223,400	765,008	21,005,387	771,300	21,776,687
2010	10,605,200	3,160,512	2,159,700	2,231,600	3,437,600	832,939	22,427,551	871,600	23,299,151
2015	10,983,900	3,272,412	2,459,600	2,487,700	3,609,480	868,648	23,681,740	972,700	24,654,440
2020	11,584,800	3,352,947	2,817,600	2,800,900	3,853,300	905,156	25,314,703	1,088,600	26,403,303

DISTRIBUTIVE SHARE OF TOTAL POPULATION

Year	Southern California: Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
2000	48.1%	13.9%	7.8%	8.6%	14.4%	3.7%	96.6%	3.4%	100.0%
2005	46.7%	13.8%	8.6%	9.1%	14.8%	3.5%	96.5%	3.5%	100.0%
2010	45.5%	13.6%	9.3%	9.6%	14.8%	3.6%	96.3%	3.7%	100.0%
2015	44.6%	13.3%	10.0%	10.1%	14.6%	3.5%	96.1%	3.9%	100.0%
2020	43.9%	12.7%	10.7%	10.6%	14.6%	3.4%	95.9%	4.1%	100.0%

TOTAL PROJECTED EMPLOYMENT[1]

Year	Southern California: Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
2000	4,425,819	1,501,864	511,645	582,070	1,324,000	322,141	8,667,539	252,700	8,920,239
2005	4,652,424	1,666,733	641,638	713,976	1,419,300	350,807	9,444,878	277,970	9,722,848
2010	4,874,519	1,798,088	778,854	858,001	1,472,100	379,658	10,161,220	308,000	10,469,220
2015	5,019,218	1,888,935	859,880	942,501	1,525,400	397,362	10,633,296	341,880	10,975,176
2020	5,131,809	1,980,067	932,947	1,018,647	1,627,900	411,837	11,103,207	368,200	11,471,407

DISTRIBUTIVE SHARE OF TOTAL EMPLOYMENT

Year	Southern California: Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
2000	49.6%	16.8%	5.7%	6.5%	14.8%	3.6%	97.2%	2.8%	100.0%
2005	47.9%	17.1%	6.6%	7.3%	14.6%	3.6%	97.1%	2.9%	100.0%
2010	46.6%	17.2%	7.4%	8.2%	14.1%	3.6%	97.1%	2.9%	100.0%
2015	45.7%	17.2%	7.8%	8.6%	13.9%	3.6%	96.9%	3.1%	100.0%
2020	44.7%	17.3%	8.1%	8.9%	14.2%	3.6%	96.8%	3.2%	100.0%

TOTAL PROJECTED HOUSEHOLDS

Year	Southern California: Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
2000	3,137,300	917,169	502,987	535,968	1,039,089	240,046	6,372,559	234,487	6,607,046
2005	3,249,756	966,122	570,041	581,811	1,153,700	252,130	6,773,560	257,936	7,031,496
2010	3,437,814	1,009,370	655,766	645,267	1,245,200	270,268	7,263,685	283,729	7,547,414
2015	3,629,335	1,035,379	734,263	717,249	1,319,912	281,926	7,718,064	312,102	8,030,166
2020	3,845,121	1,054,849	833,239	799,549	1,404,100	294,404	8,231,262	343,312	8,574,574

DISTRIBUTIVE SHARE OF TOTAL HOUSEHOLDS

Year	Southern California: Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
2000	47.5%	13.9%	7.6%	8.1%	15.7%	3.6%	96.5%	3.5%	100.0%
2005	46.2%	13.7%	8.1%	8.3%	16.4%	3.6%	96.3%	3.7%	100.0%
2010	45.5%	13.4%	8.7%	8.5%	16.5%	3.6%	96.2%	3.8%	100.0%
2015	45.2%	12.9%	9.1%	8.9%	16.4%	3.5%	96.1%	3.9%	100.0%
2020	44.8%	12.3%	9.7%	9.3%	16.4%	3.4%	96.0%	4.0%	100.0%

Note:
[1] Includes total farm and non-farm wage, salary and proprietor employment as compiled by Bureau of Economic Analysis

Source: Southern California Association of Governments, Kern County Council of Governments, California Department of Finance, San Diego Association of Governments; Alfred Gobar Associates.

EXHIBIT A-23

POPULATION PROJECTIONS
SOUTHERN CALIFORNIA AND KERN COUNTY

TOTAL PROJECTED POPULATION

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
2000	9,716,000	2,813,368	1,577,700	1,742,300	2,911,468	740,492	19,501,328	678,500	20,179,828
2005	10,169,100	3,003,179	1,864,700	1,980,000	3,223,400	765,008	21,005,387	771,300	21,776,687
2010	10,605,200	3,160,512	2,159,700	2,231,600	3,437,600	832,939	22,427,551	871,600	23,299,151
2015	10,983,900	3,272,412	2,459,600	2,487,700	3,609,480	868,648	23,681,740	972,700	24,654,440
2020	11,584,800	3,352,947	2,817,600	2,800,900	3,853,300	905,156	25,314,703	1,088,600	26,403,303

DISTRIBUTIVE SHARE OF TOTAL POPULATION

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
2000	48.1%	13.9%	7.8%	8.6%	14.4%	3.7%	96.6%	3.4%	100.0%
2005	46.7%	13.8%	8.6%	9.1%	14.8%	3.5%	96.5%	3.5%	100.0%
2010	45.5%	13.6%	9.3%	9.6%	14.8%	3.6%	96.3%	3.7%	100.0%
2015	44.6%	13.3%	10.0%	10.1%	14.6%	3.5%	96.1%	3.9%	100.0%
2020	43.9%	12.7%	10.7%	10.6%	14.6%	3.4%	95.9%	4.1%	100.0%

POPULATION INDEX (REFERENCE YEAR VS 2000)

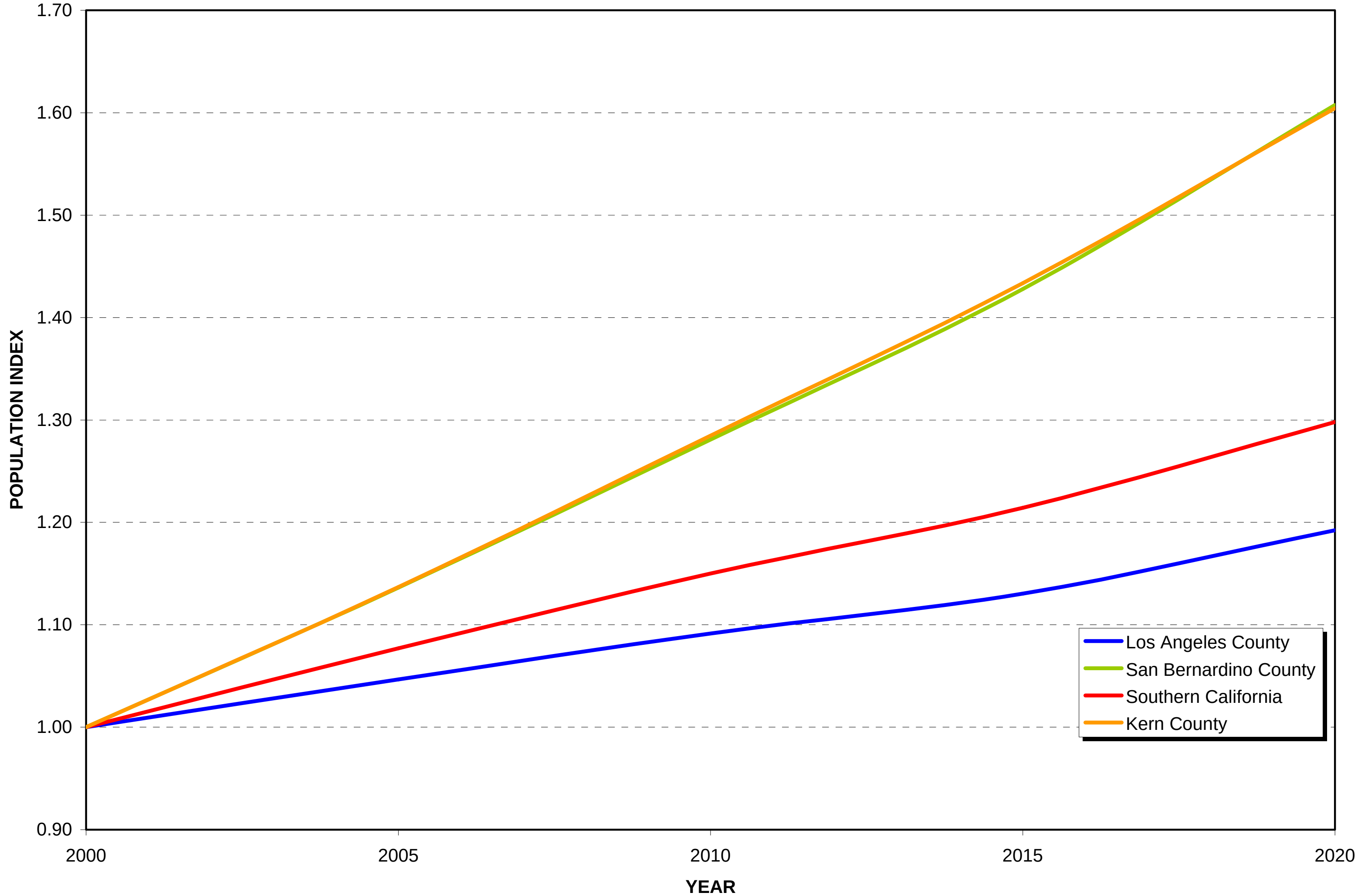
	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
2000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2005	1.05	1.07	1.18	1.14	1.11	1.03	1.08	1.14	1.08
2010	1.09	1.12	1.37	1.28	1.18	1.12	1.15	1.28	1.15
2015	1.13	1.16	1.56	1.43	1.24	1.17	1.21	1.43	1.22
2020	1.19	1.19	1.79	1.61	1.32	1.22	1.30	1.60	1.31

INDEXED DISTRIBUTIVE SHARE OF POPULATION (REFERENCE YEAR VS 2000)

	Southern California								So Cal
Year	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	Including Kern Co.
2000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2005	0.97	0.99	1.10	1.05	1.03	0.96	1.00	1.05	1.00
2010	0.95	0.97	1.19	1.11	1.02	0.97	1.00	1.11	1.00
2015	0.93	0.95	1.28	1.17	1.01	0.96	0.99	1.17	1.00
2020	0.91	0.91	1.36	1.23	1.01	0.93	0.99	1.23	1.00

Source: California Department of Finance; Alfred Gobar Associates.

EXHIBIT A-24
PROJECTED POPULATION INDEX
WEST MOJAVE REGION



Source: Southern Calif. Association of Governments; Kern Co. Council of Governments; Calif. Dept. of Finance; San Diego Assoc. of Governments; Alfred Gobar Assoc.

EXHIBIT A-25

EMPLOYMENT PROJECTIONS
SOUTHERN CALIFORNIA AND KERN COUNTY

TOTAL PROJECTED EMPLOYMENT[1]

Year	Southern California Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
2000	4,425,819	1,501,864	511,645	582,070	1,324,000	322,141	8,667,539	252,700	8,920,239
2005	4,652,424	1,666,733	641,638	713,976	1,419,300	350,807	9,444,878	277,970	9,722,848
2010	4,874,519	1,798,088	778,854	858,001	1,472,100	379,658	10,161,220	308,000	10,469,220
2015	5,019,218	1,888,935	859,880	942,501	1,525,400	397,362	10,633,296	341,880	10,975,176
2020	5,131,809	1,980,067	932,947	1,018,647	1,627,900	411,837	11,103,207	368,200	11,471,407

DISTRIBUTIVE SHARE OF TOTAL EMPLOYMENT

Year	Southern California Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
2000	49.6%	16.8%	5.7%	6.5%	14.8%	3.6%	97.2%	2.8%	100.0%
2005	47.9%	17.1%	6.6%	7.3%	14.6%	3.6%	97.1%	2.9%	100.0%
2010	46.6%	17.2%	7.4%	8.2%	14.1%	3.6%	97.1%	2.9%	100.0%
2015	45.7%	17.2%	7.8%	8.6%	13.9%	3.6%	96.9%	3.1%	100.0%
2020	44.7%	17.3%	8.1%	8.9%	14.2%	3.6%	96.8%	3.2%	100.0%

EMPLOYMENT INDEX (REFERENCE YEAR VS 2000)

Year	Southern California Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
2000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2005	1.05	1.11	1.25	1.23	1.07	1.09	1.09	1.10	1.09
2010	1.10	1.20	1.52	1.47	1.11	1.18	1.17	1.22	1.17
2015	1.13	1.26	1.68	1.62	1.15	1.23	1.23	1.35	1.23
2020	1.16	1.32	1.82	1.75	1.23	1.28	1.28	1.46	1.29

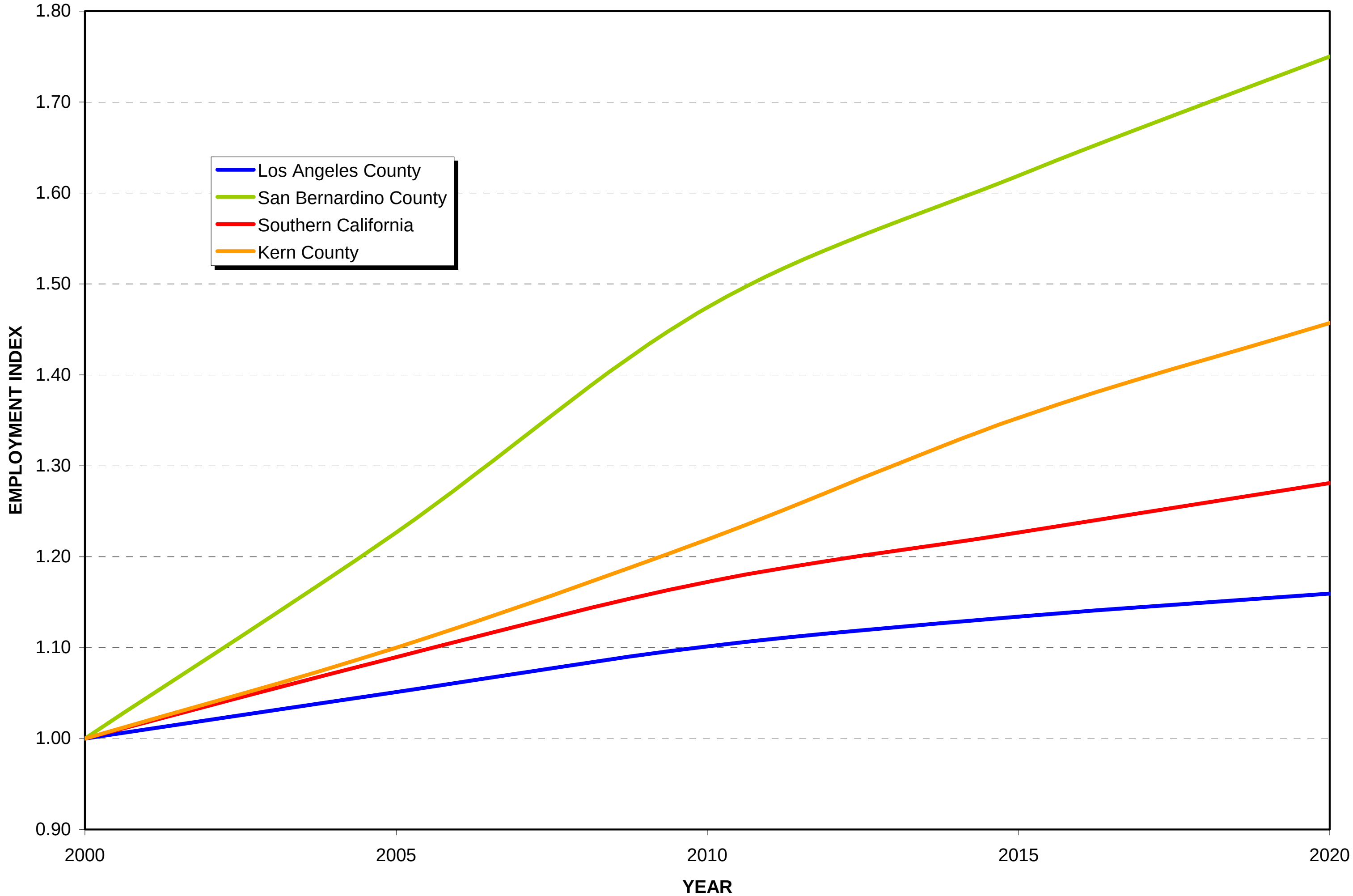
INDEXED DISTRIBUTIVE SHARE OF EMPLOYMENT (REFERENCE YEAR VS 2000)

Year	Southern California Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County	Total So Cal	Kern County	So Cal Including Kern Co.
2000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2005	0.96	1.02	1.15	1.13	0.98	1.00	1.00	1.01	1.00
2010	0.94	1.02	1.30	1.26	0.95	1.00	1.00	1.04	1.00
2015	0.92	1.02	1.37	1.32	0.94	1.00	1.00	1.10	1.00
2020	0.90	1.03	1.42	1.36	0.96	0.99	1.00	1.13	1.00

Note:
[1] Includes total farm and non-farm wage, salary and proprietor employment as compiled by Bureau of Economic Analysis

Source: Southern California Association of Governments, Kern County Council of Governments, California Department of Finance, San Diego Association of Governments; Alfred Gobar Associates.

EXHIBIT A-26
PROJECTED EMPLOYMENT INDEX
WEST MOJAVE REGION



Source: California Employment Development Department; Alfred Gobar Associates

EXHIBIT A-27

HOUSEHOLD PROJECTIONS
SOUTHERN CALIFORNIA AND KERN COUNTY

TOTAL PROJECTED HOUSEHOLDS

Year	Southern California						Total So Cal	Kern County	So Cal Including Kern Co.
	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County			
2000	3,137,300	917,169	502,987	535,968	1,039,089	240,046	6,372,559	234,487	6,607,046
2005	3,249,756	966,122	570,041	581,811	1,153,700	252,130	6,773,560	257,936	7,031,496
2010	3,437,814	1,009,370	655,766	645,267	1,245,200	270,268	7,263,685	283,729	7,547,414
2015	3,629,335	1,035,379	734,263	717,249	1,319,912	281,926	7,718,064	312,102	8,030,166
2020	3,845,121	1,054,849	833,239	799,549	1,404,100	294,404	8,231,262	343,312	8,574,574

DISTRIBUTIVE SHARE OF TOTAL HOUSEHOLDS

Year	Southern California						Total So Cal	Kern County	So Cal Including Kern Co.
	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County			
2000	47.5%	13.9%	7.6%	8.1%	15.7%	3.6%	96.5%	3.5%	100.0%
2005	46.2%	13.7%	8.1%	8.3%	16.4%	3.6%	96.3%	3.7%	100.0%
2010	45.5%	13.4%	8.7%	8.5%	16.5%	3.6%	96.2%	3.8%	100.0%
2015	45.2%	12.9%	9.1%	8.9%	16.4%	3.5%	96.1%	3.9%	100.0%
2020	44.8%	12.3%	9.7%	9.3%	16.4%	3.4%	96.0%	4.0%	100.0%

HOUSEHOLD INDEX (REFERENCE YEAR VS 2000)

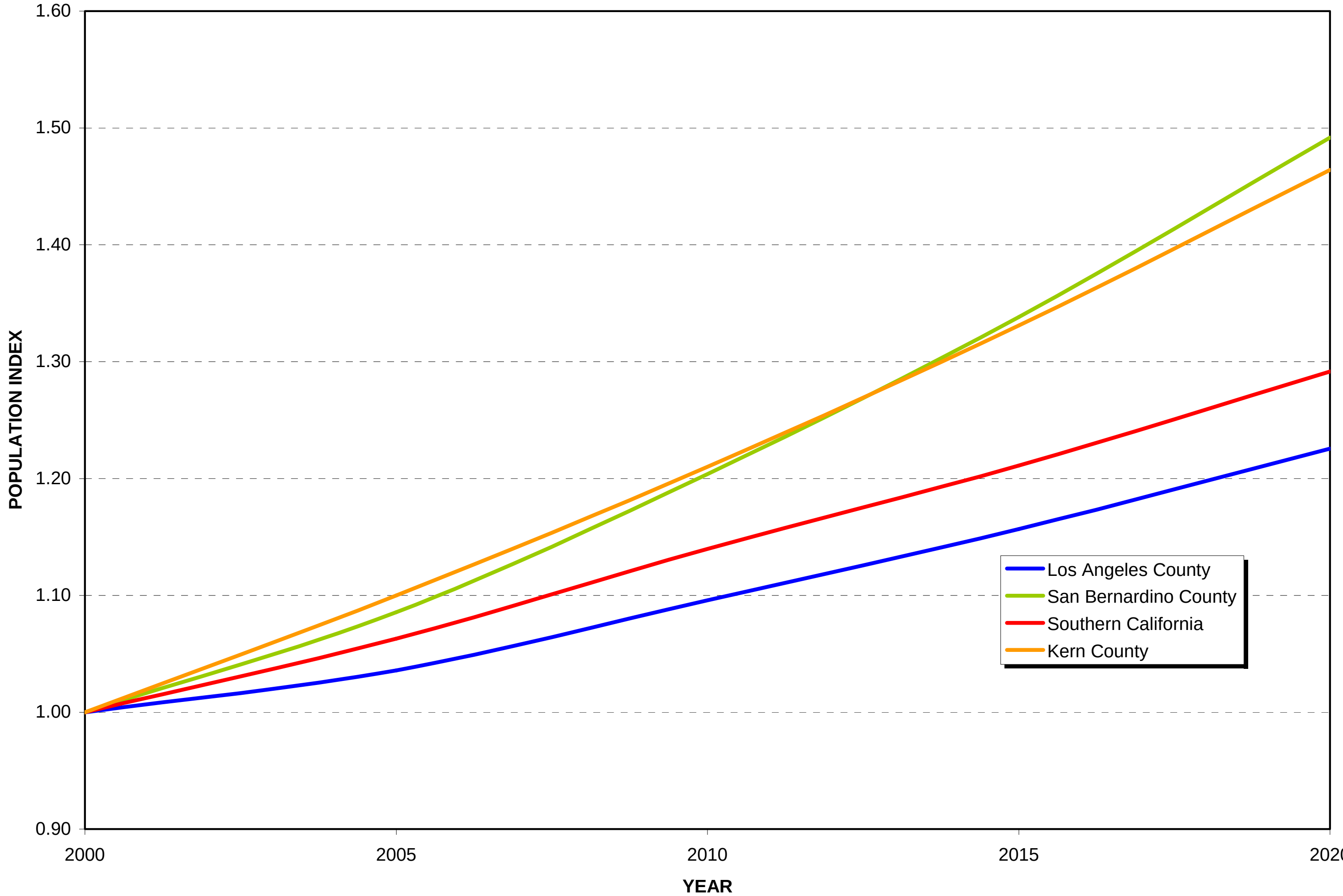
Year	Southern California						Total So Cal	Kern County	So Cal Including Kern Co.
	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County			
2000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2005	1.04	1.05	1.13	1.09	1.11	1.05	1.06	1.10	1.06
2010	1.10	1.10	1.30	1.20	1.20	1.13	1.14	1.21	1.14
2015	1.16	1.13	1.46	1.34	1.27	1.17	1.21	1.33	1.22
2020	1.23	1.15	1.66	1.49	1.35	1.23	1.29	1.46	1.30

INDEXED DISTRIBUTIVE SHARE OF HOUSEHOLDS (REFERENCE YEAR VS 2000)

Year	Southern California						Total So Cal	Kern County	So Cal Including Kern Co.
	Los Angeles County	Orange County	Riverside County	San Bernardino County	San Diego County	Ventura County			
2000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2005	0.97	0.99	1.06	1.02	1.04	0.99	1.00	1.03	1.00
2010	0.96	0.96	1.14	1.05	1.05	0.99	1.00	1.06	1.00
2015	0.95	0.93	1.20	1.10	1.05	0.97	1.00	1.10	1.00
2020	0.94	0.89	1.28	1.15	1.04	0.95	1.00	1.13	1.00

Source: Southern California Association of Governments, Kern County Council of Governments, California Department of Finance,
San Diego Association of Governments; Alfred Gobar Associates.

EXHIBIT A-28
PROJECTED HOUSING INDEX
WEST MOJAVE REGION



Source: Southern Calif. Association of Governments, Kern County Council of Governments, Calif. Department of Finance, San Diego Assoc. of Governments, Alfred Gobar Associates

EXHIBIT A-29

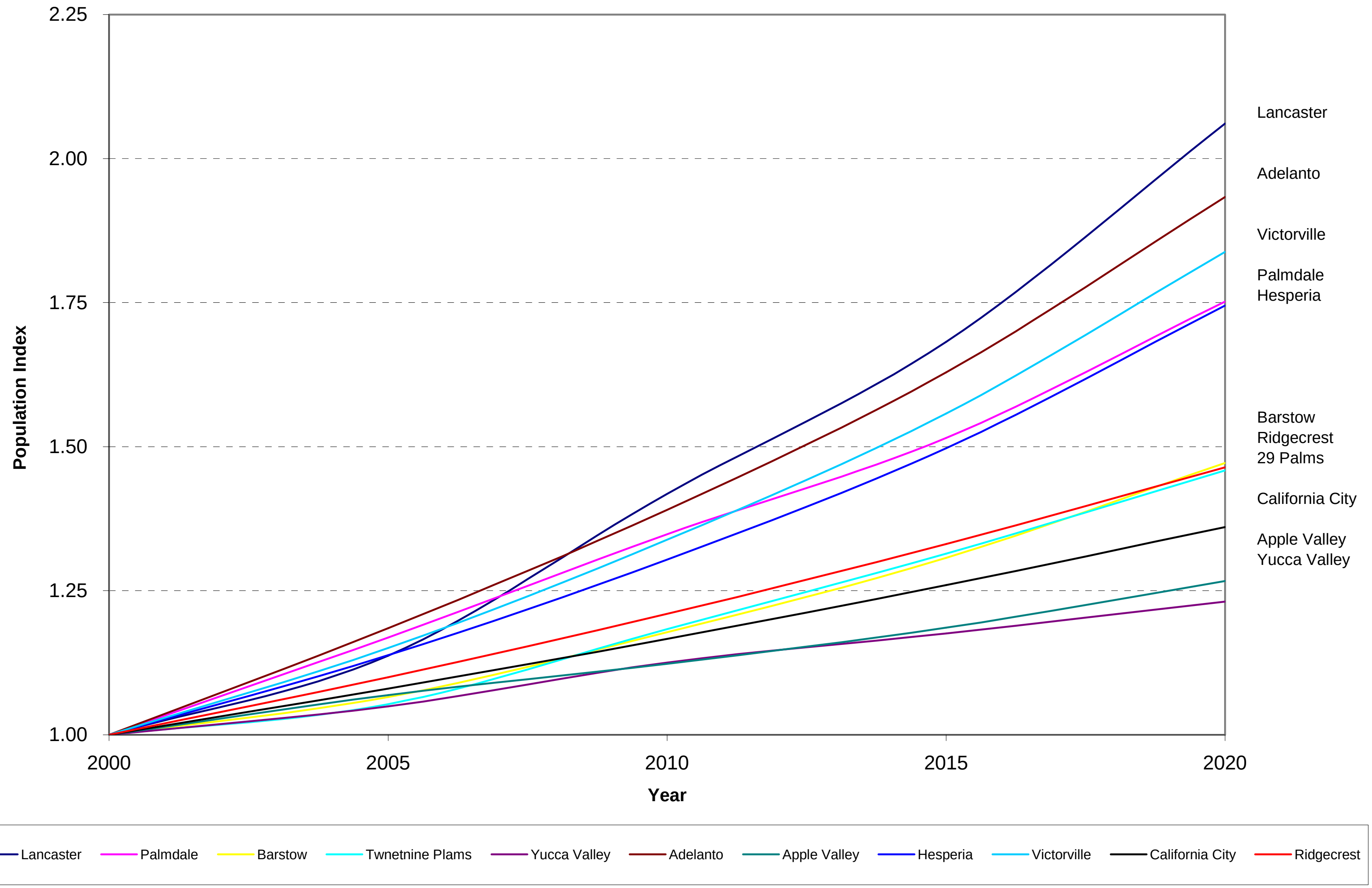
POPULATION PROJECTIONS
SOUTHERN CALIFORNIA AND SELECTED WEMO CITIES

County/City	2000	2005	2010	2015	2020	2000-2020 Change
Los Angeles						
Lancaster	137,818	156,756	195,447	231,808	284,021	106%
Palmdale	129,161	150,948	174,133	195,695	226,275	75%
City Total:	266,980	307,705	369,581	427,505	510,298	91%
County Total:	**9,846,681**	**10,361,133**	**10,767,297**	**11,166,489**	**11,714,038**	**19%**
San Bernardino						
Barstow	23,460	24,995	27,639	30,663	34,528	47%
Twentynine Palms	15,403	16,223	18,228	20,245	22,473	46%
Yucca Valley	18,512	19,424	20,834	21,766	22,793	23%
Adelanto	16,022	18,986	22,278	26,096	30,980	93%
Apple Valley	56,369	60,259	63,314	66,854	71,406	27%
Hesperia	66,785	76,011	87,108	100,008	116,536	74%
Victorville	68,386	78,698	91,551	106,522	125,700	84%
City Total:	264,943	294,603	330,959	372,162	424,425	60%
County Total:	**1,704,035**	**1,853,129**	**2,042,914**	**2,255,608**	**2,509,417**	**47%**
Kern						
California City	9,215	9,952	10,748	11,608	12,536	36%
Ridgecrest	25,233	27,756	30,531	33,585	36,943	46%
City Total:	34,449	37,709	41,280	45,194	49,480	44%
County Total:	**678,500**	**771,300**	**871,600**	**972,700**	**1,088,600**	**60%**
Riverside						
County Total:	**1,565,680**	**1,811,979**	**2,037,483**	**2,248,022**	**2,542,924**	**62%**
Inyo						
County Total:	**18,200**	**18,800**	**19,400**	**20,000**	**20,700**	**14%**
San Diego						
County Total:	**2,911,468**	**3,223,400**	**3,437,600**	**3,609,480**	**3,853,300**	**32%**
Orange						
County Total:	**2,813,368**	**3,003,179**	**3,160,512**	**3,272,412**	**3,352,947**	**19%**
Ventura						
County Total:	**740,492**	**765,008**	**832,939**	**868,648**	**905,156**	**22%**
So California Total:	**20,278,424**	**21,807,928**	**23,169,745**	**24,413,359**	**25,987,082**	**28%**
WEMO Cities Total:	**566,372**	**640,017**	**741,821**	**844,861**	**984,204**	**74%**

Source: Southern California Association of Governments, Kern County Council of Governments, California Department of Finance; Alfred Gobar Associates.

EXHIBIT A-30

WEMO AREA CITIES INDEXED POPULATION GROWTH



Source: Southern California Association of Governments, California Department of Finance, Kern County Council of Governments; Alfred Gobar Associates.

EXHIBIT A-31

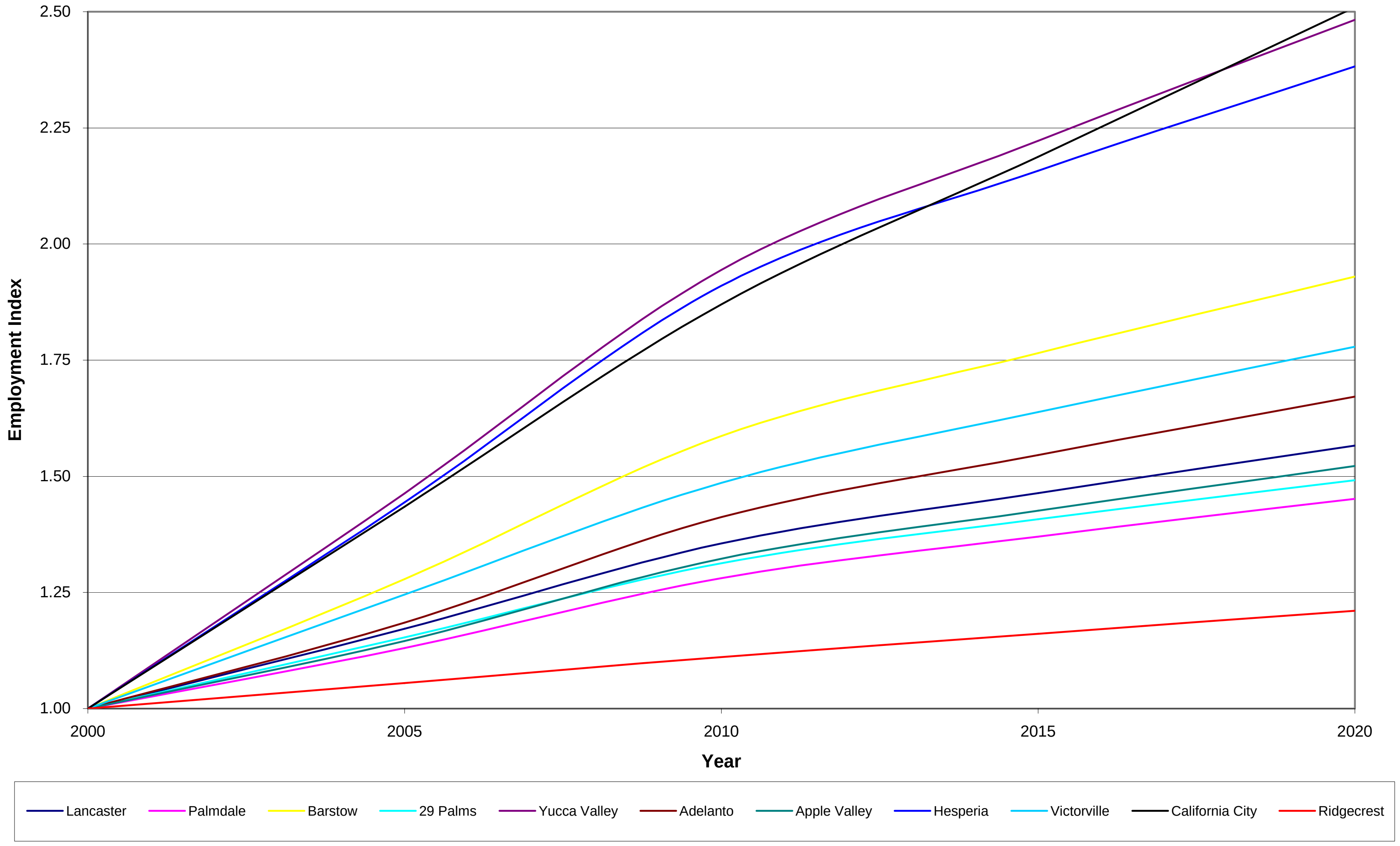
EMPLOYMENT PROJECTIONS
SOUTHERN CALIFORNIA AND SELECTED WEMO CITIES

County/City	2000	2005	2010	2015	2020	2000-2020 Change
Los Angeles						
Lancaster	51,251	60,061	69,467	75,044	80,273	57%
Palmdale	55,995	63,305	71,719	76,729	81,285	45%
City Total:	107,247	123,367	141,187	151,774	161,560	51%
County Total:	**4,425,819**	**4,652,424**	**4,874,519**	**5,019,218**	**5,131,809**	**16%**
San Bernardino						
Barstow	12,396	15,851	19,671	21,884	23,928	93%
Twentynine Palms	4,717	5,442	6,193	6,640	7,037	49%
Yucca Valley	2,540	3,717	4,939	5,645	6,306	148%
Adelanto	4,037	4,785	5,702	6,240	6,749	67%
Apple Valley	12,680	14,526	16,772	18,081	19,305	52%
Hesperia	17,621	25,443	33,659	38,019	41,980	138%
Victorville	31,842	39,666	47,321	52,179	56,650	78%
City Total:	85,839	109,438	134,266	148,699	161,966	89%
County Total:	**582,070**	**713,976**	**858,001**	**942,501**	**1,018,647**	**75%**
Kern						
California City	4,028	5,780	7,533	8,814	10,110	151%
Ridgecrest	17,563	18,529	19,514	20,392	21,269	21%
City Total:	21,591	24,309	27,047	29,206	31,379	45%
County Total:	**252,700**	**277,970**	**308,000**	**341,880**	**368,200**	**46%**
Riverside						
County Total:	**511,645**	**641,638**	**778,854**	**859,880**	**932,947**	**82%**
Inyo						
County Total:	**7,250**	**7,467**	**7,616**	**7,769**	**7,924**	**9%**
San Diego						
County Total:	**1,324,000**	**1,419,300**	**1,472,100**	**1,525,400**	**1,627,900**	**23%**
Orange						
County Total:	**1,501,864**	**1,666,733**	**1,798,088**	**1,888,935**	**1,980,067**	**32%**
Ventura						
County Total:	**322,141**	**350,807**	**379,658**	**397,362**	**411,837**	**28%**
So California Total:	**8,927,489**	**9,730,315**	**10,476,836**	**10,982,945**	**11,479,331**	**29%**
WEMO Cities Total:	**214,677**	**257,114**	**302,501**	**329,679**	**354,905**	**65%**

Source: Southern California Association of Governments, Kern County Council of Governments, California Department of Finance; Alfred Gobar Associates.

EXHIBIT A-32

WEMO AREA CITIES INDEXED EMPLOYMENT GROWTH



Source: Southern California Association of Governments,California Department of Finance, Kern County Council of Governments; Alfred Gobar Associates.

EXHIBIT A-33

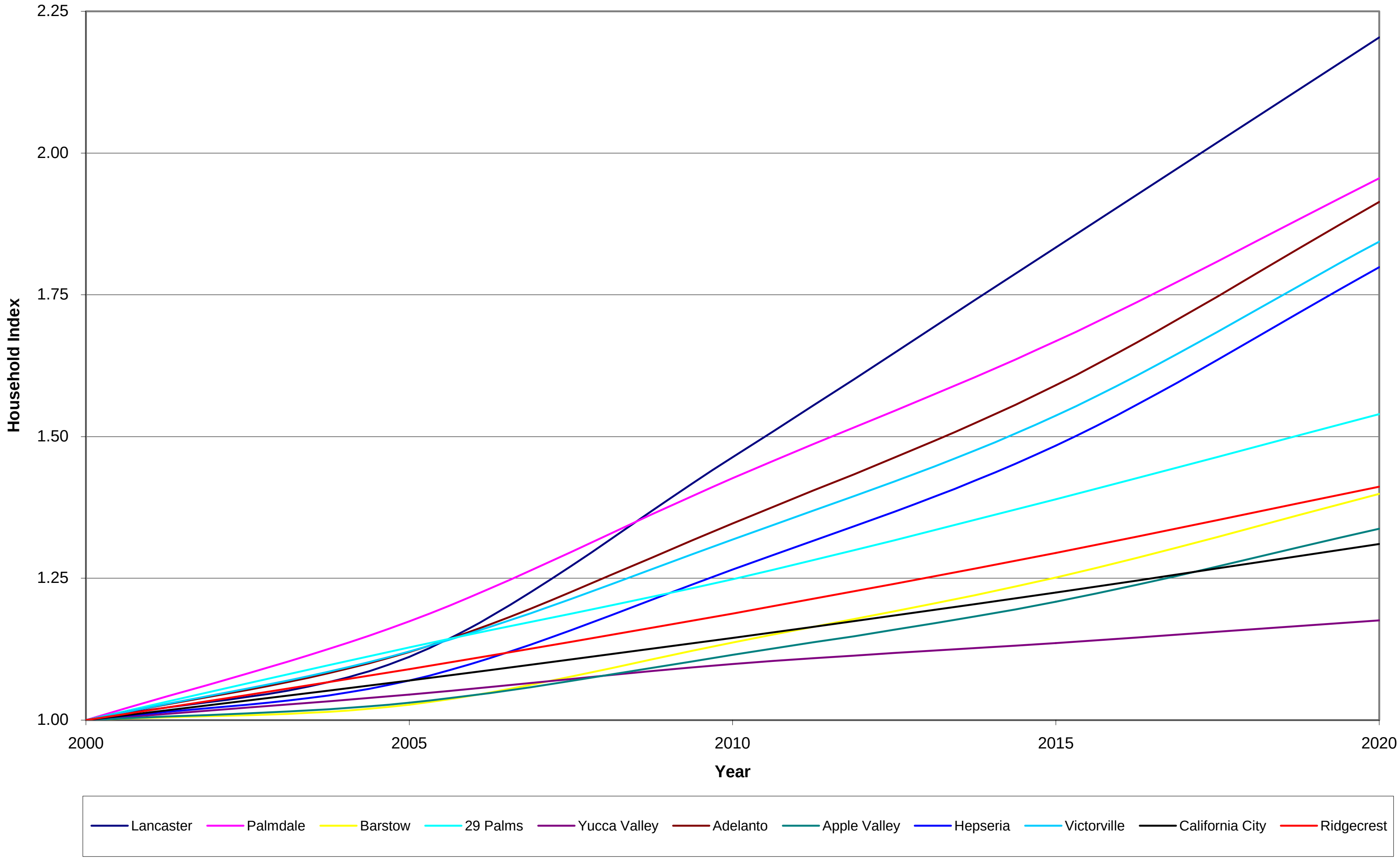
HOUSEHOLD PROJECTIONS
SOUTHERN CALIFORNIA AND SELECTED WEMO CITIES

County/City	2000	2005	2010	2015	2020	2000-2020 Change
Los Angeles						
Lancaster	41,449	46,074	60,661	76,010	91,345	120%
Palmdale	38,898	45,674	55,486	64,894	76,066	96%
City Total:	80,348	91,749	116,148	140,906	167,413	108%
County Total:	**3,137,300**	**3,249,756**	**3,437,814**	**3,629,335**	**3,845,121**	**23%**
San Bernardino						
Barstow	8,004	8,222	9,100	10,018	11,196	40%
Twentynine Palms	5,833	6,581	7,282	8,105	8,979	54%
Yucca Valley	7,720	8,070	8,484	8,771	9,079	18%
Adelanto	5,179	5,801	6,976	8,238	9,912	91%
Apple Valley	18,108	18,661	20,193	21,886	24,222	34%
Hesperia	20,178	21,588	25,534	29,943	36,295	80%
Victorville	21,232	23,802	27,995	32,629	39,153	84%
City Total:	86,260	92,731	105,571	119,598	138,845	61%
County Total:	**535,968**	**581,811**	**645,267**	**717,249**	**799,549**	**49%**
Kern						
California City	3,605	3,857	4,127	4,416	4,725	31%
Ridgecrest	11,457	12,488	13,612	14,837	16,172	41%
City Total:	15,062	16,345	17,739	19,253	20,897	39%
County Total:	**234,487**	**257,936**	**283,729**	**312,102**	**343,312**	**46%**
Riverside						
County Total:	**502,987**	**570,041**	**655,766**	**734,263**	**833,239**	**66%**
Inyo						
County Total:	**9,119**	**9,392**	**9,674**	**9,964**	**10,263**	**13%**
San Diego						
County Total:	**1,039,089**	**1,153,700**	**1,245,200**	**1,319,912**	**1,404,100**	**35%**
Orange						
County Total:	**917,169**	**966,122**	**1,009,370**	**1,035,379**	**1,054,849**	**15%**
Ventura						
County Total:	**240,046**	**252,130**	**270,268**	**281,926**	**294,404**	**23%**
So California Total:	**6,616,165**	**7,040,888**	**7,557,088**	**8,040,130**	**8,584,837**	**30%**
WEMO Cities Total:	**181,670**	**200,826**	**239,459**	**279,757**	**327,155**	**80%**

Source: Southern California Association of Governments, Kern County Council of Governments, California Department of Finance, San Diego Association of Governments; Alfred Gobar Associates.

EXHIBITA-34

WEMO AREAS CITIES INDEX HOUSEHOLD GROWTH



Source: Southern California Association of Governments, California Department of Finance, Kern County Council of Governments; Alfred Gobar Associates.

B – Exhibits
WEMO Area and Regional Demographics

EXHIBIT B-1

2000 CENSUS DEMOGRAPHIC COMPARISON
WEST MOJAVE PLAN BY SUBAREA

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Total Population	**733,476**	355,964	299,181	77,769	562
% Share of Total	**100.0%**	48.5%	40.8%	10.6%	0.1%
Population Growth (1990-2000)	**13.4%**	18.1%	28.4%	3.1%	-8.6%
Age Distribution					
Age 0 to 20	**36.7%**	35.5%	38.7%	34.2%	26.2%
Age 21 to 34	**17.4%**	18.2%	16.8%	16.9%	9.3%
Age 35 to 54	**28.4%**	26.7%	30.1%	29.5%	28.3%
Age 55 to 64	**7.5%**	7.8%	6.7%	8.9%	16.5%
Age 65+	**10.0%**	11.8%	7.7%	10.5%	19.7%
Race Distribution					
Non-Hispanic	**74.1%**	75.0%	70.5%	83.4%	78.5%
White	**58.0%**	61.5%	50.5%	70.7%	73.7%
Black alone	**9.3%**	7.2%	13.0%	5.1%	0.0%
Am Indian/Alskn alone	**0.8%**	0.9%	0.6%	1.0%	0.9%
Asian alone	**2.6%**	2.0%	3.2%	2.9%	0.9%
Hawaiian/Pac Islndr alone	**0.3%**	0.3%	0.2%	0.3%	0.0%
Some other race alone	**0.2%**	0.2%	0.3%	0.2%	0.0%
Two or More Races	**2.9%**	2.9%	2.7%	3.2%	3.0%
Hispanic	**25.9%**	25.0%	29.5%	16.6%	21.5%
Families as % of Households	**75.0%**	74.7%	76.6%	71.3%	59.8%
Population in Group Quarters	**3.2%**	3.8%	2.7%	1.3%	0.0%
Institutionalized	**1.8%**	1.7%	2.3%	0.2%	0.0%
Correctional	**0.9%**	0.4%	1.7%	0.1%	0.0%
Nursing Homes	**0.2%**	0.3%	0.3%	0.1%	0.0%
Other Institutions	**0.6%**	1.0%	0.3%	0.0%	0.0%
Noninstitutionalized	**1.4%**	2.2%	0.4%	1.1%	0.0%
College on off campus	**0.0%**	0.0%	0.0%	0.0%	0.0%
Military Quarters	**1.0%**	1.8%	0.0%	1.0%	0.0%
Other	**0.3%**	0.3%	0.3%	0.1%	0.0%
Persons Per Household					
1 Person Per Unit	**20.2%**	20.4%	18.5%	24.3%	35.4%
2 Person Per Unit	**29.4%**	31.1%	26.2%	32.8%	40.1%
3 Person Per Unit	**16.9%**	16.9%	17.1%	16.3%	6.6%
4 Person Per Unit	**16.4%**	15.6%	18.1%	14.6%	10.5%
5 Person Per Unit	**9.6%**	9.1%	11.0%	7.3%	3.5%
6 Person Per Unit	**4.4%**	4.1%	5.2%	2.9%	2.7%
7+ Person Per Unit	**3.2%**	2.9%	4.0%	1.9%	1.2%
Average Household Size	**2.92**	2.84	3.12	2.65	2.37
Householder Age					
Age 15 - 24	**5.4%**	5.9%	4.5%	5.9%	2.0%
Age 25 - 34	**15.9%**	15.4%	16.6%	15.8%	14.5%
Age 35 - 54	**46.3%**	42.8%	51.9%	45.0%	38.8%
Age 55 - 64	**13.5%**	13.9%	12.5%	14.8%	23.0%
Age 65+	**18.9%**	22.1%	14.5%	18.5%	21.7%

EXHIBIT B-1 (cont.)

2000 CENSUS DEMOGRAPHIC COMPARISON
WEST MOJAVE PLAN BY SUBAREA

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Housing by Tenure					
Owner-Occupied	**66.5%**	66.1%	68.3%	62.5%	69.1%
Renter-Occupied	**33.5%**	33.9%	31.7%	37.5%	30.9%
Vacant Units	**11.6%**	13.1%	8.5%	14.4%	34.9%
For Seasonal, Rec, or Occ	**1.7%**	2.6%	0.6%	1.6%	11.2%
Housing Value					
Less Than $19,999	**0.8%**	1.0%	0.3%	1.6%	0.0%
$20,000 to $39,999	**3.1%**	3.9%	0.7%	8.5%	16.7%
$40,000 to $59,999	**7.7%**	9.3%	3.2%	17.2%	45.2%
$60,000 to $79,999	**17.8%**	18.9%	15.1%	23.0%	28.6%
$80,000 to $99,999	**22.8%**	24.1%	21.0%	22.9%	0.0%
$100,000 to $124,999	**17.0%**	16.9%	18.1%	12.6%	4.8%
$125,000 to $149,999	**12.5%**	11.6%	15.2%	6.3%	0.0%
$150,000 to $174,999	**7.2%**	6.4%	9.1%	3.1%	0.0%
$175,000 to $199,999	**3.9%**	3.2%	5.3%	1.9%	0.0%
$200,000 to $249,999	**3.6%**	2.5%	5.5%	1.7%	0.0%
$250,000 to $299,999	**1.7%**	1.1%	2.9%	0.6%	0.0%
$300,000 to $399,999	**1.3%**	0.7%	2.3%	0.5%	0.0%
$400,000 to $499,999	**0.4%**	0.2%	0.7%	0.0%	0.0%
$500,000 to $749,999	**0.2%**	0.1%	0.3%	0.1%	4.8%
$750,000 to $999,999	**0.0%**	0.0%	0.1%	0.0%	0.0%
$1,000,000 or more	**0.1%**	0.1%	0.2%	0.1%	0.0%
Median Housing Value	**$89,062**	$93,949	$106,661	$79,725	$52,499
Monthly Rent					
No Cash Rent	**10.1%**	12.9%	3.0%	18.2%	35.7%
Less Than $199	**4.3%**	4.0%	5.0%	3.8%	7.1%
$200 to $249	**2.4%**	2.8%	1.5%	3.0%	3.6%
$250 to $299	**4.1%**	4.7%	1.6%	8.3%	23.2%
$300 to $349	**5.9%**	6.5%	3.6%	10.3%	3.6%
$350 to $399	**8.7%**	10.1%	5.7%	11.3%	7.1%
$400 to $499	**20.8%**	22.9%	18.1%	19.4%	19.6%
$500 to $599	**16.9%**	14.4%	22.8%	10.3%	0.0%
$600 to $699	**11.6%**	10.3%	15.4%	6.8%	0.0%
$700 to $799	**7.6%**	6.6%	10.0%	5.0%	0.0%
$800 to $899	**4.0%**	2.7%	6.7%	2.0%	0.0%
$900 to $999	**1.5%**	0.9%	2.6%	0.6%	0.0%
$1,000 to $1,249	**1.5%**	0.8%	2.8%	0.6%	0.0%
$1,250 to $1,499	**0.4%**	0.2%	0.9%	0.1%	0.0%
$1,500 to $1,999	**0.3%**	0.2%	0.4%	0.1%	0.0%
$2,000 or more	**0.0%**	0.0%	0.0%	0.1%	0.0%
Median Rent	**$469**	$439	$550	$378	$273

EXHIBIT B-1 (cont.)

2000 CENSUS DEMOGRAPHIC COMPARISON
WEST MOJAVE PLAN BY SUBAREA

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Year Structure Built					
1999-March 00	**1.1%**	1.2%	1.0%	0.9%	2.6%
1995-1998	**5.5%**	5.6%	5.7%	4.4%	12.3%
1990-1994	**17.0%**	16.1%	18.2%	17.0%	5.2%
1980-1989	**35.1%**	34.5%	38.3%	26.9%	27.3%
1970-1979	**16.8%**	18.3%	13.2%	21.7%	12.3%
1960-1969	**9.5%**	10.5%	7.2%	12.0%	13.6%
1959 or earlier	**15.1%**	13.8%	16.5%	17.2%	26.6%
Year Moved In					
1999-March 00	**23.5%**	23.5%	23.1%	24.7%	24.7%
1995-1998	**30.8%**	29.5%	33.6%	27.4%	25.3%
1990-1994	**18.6%**	17.8%	19.6%	18.6%	20.8%
1980-1989	**17.5%**	19.2%	15.4%	16.6%	14.9%
1970-1979	**6.6%**	7.1%	5.1%	9.4%	9.1%
1969 or earlier	**3.0%**	2.9%	3.1%	3.3%	5.2%
Units in Structure					
1, detached	**72.7%**	72.8%	74.6%	65.6%	50.0%
1, attached	**3.1%**	3.6%	2.4%	3.3%	0.0%
2	**1.9%**	2.4%	0.8%	3.2%	0.0%
3 or 4	**4.1%**	4.7%	3.1%	4.6%	0.0%
5 to 9	**2.8%**	2.5%	3.6%	1.7%	0.0%
10 to 19	**1.8%**	1.5%	2.3%	1.1%	0.0%
20 to 49	**1.2%**	0.7%	2.0%	0.6%	0.0%
50 or more	**2.8%**	1.7%	4.8%	1.0%	0.0%
Mobile Home	**9.3%**	9.7%	6.1%	18.7%	43.5%
Boat, RV, Van, etc.	**0.3%**	0.3%	0.3%	0.2%	6.5%
Household Income					
Less Than $15,000	**17.3%**	18.4%	15.8%	16.7%	27.6%
$15,000-$19,999	**6.8%**	7.4%	5.9%	7.1%	14.1%
$20,000-$29,999	**13.3%**	14.6%	11.8%	12.5%	16.6%
$30,000-$39,999	**12.4%**	13.1%	11.5%	12.3%	7.4%
$40,000-$49,999	**10.8%**	11.0%	10.7%	10.0%	11.0%
$50,000-$59,999	**9.4%**	9.2%	9.7%	9.6%	8.6%
$60,000-$74,999	**11.0%**	10.4%	11.7%	11.5%	3.1%
$75,000-$99,999	**10.1%**	8.7%	11.7%	11.5%	6.7%
$100,000-$124,999	**4.6%**	3.8%	5.8%	4.7%	3.7%
$125,000-$149,999	**2.0%**	1.5%	2.6%	1.9%	1.2%
$150,000-$199,999	**1.3%**	1.0%	1.6%	1.4%	0.0%
$200,000 or more	**1.0%**	0.7%	1.3%	0.8%	0.0%
Median Household Income	**$40,101**	$36,044	$42,205	$40,723	$24,666

EXHIBIT B-1 (cont.)

2000 CENSUS DEMOGRAPHIC COMPARISON
WEST MOJAVE PLAN BY SUBAREA

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Educational Attainment (Age 25+)					
Less than 9th Grade	**8.9%**	8.2%	10.2%	7.2%	14.6%
Some High School	**12.6%**	12.5%	13.2%	10.5%	15.4%
High School Diploma	**27.5%**	29.2%	25.7%	25.3%	30.3%
College 1-3 years	**37.2%**	37.3%	36.5%	39.2%	31.1%
Bachelor's Degree	**9.0%**	8.3%	9.6%	10.9%	6.7%
Grad/Prof Degree	**4.8%**	4.5%	4.7%	6.9%	2.0%
Occupation (Age 16+)					
White Collar	**68.9%**	67.9%	69.8%	70.2%	63.7%
Blue Collar	**31.1%**	32.1%	30.2%	29.8%	36.3%
Workers Per Family					
0 Workers	**15.6%**	17.7%	13.0%	14.7%	21.3%
1 Worker	**37.5%**	37.3%	37.7%	37.4%	38.3%
2 Workers	**38.8%**	37.4%	39.8%	41.9%	28.7%
3+ Workers	**8.1%**	7.6%	9.5%	6.0%	11.7%
Avg Income by Workers/Family					
0 Workers	**$27,490**	$28,423	$24,509	$31,881	$14,813
1 Worker	**$43,575**	$40,965	$46,817	$45,340	$32,223
2 Workers	**$67,472**	$63,478	$72,731	$67,708	$58,867
3+ Workers	**$85,591**	$82,114	$89,916	$83,430	$88,891
Vehicles Per Household					
0 Vehicles	**7.6%**	7.4%	7.9%	7.4%	7.1%
1 Vehicle	**32.7%**	34.1%	30.8%	32.8%	35.7%
2 Vehicle	**39.1%**	38.5%	40.2%	38.5%	27.3%
3+ Vehicles	**20.6%**	20.0%	21.1%	21.3%	29.9%

Source: Alfred Gobar Associates; U.S. Bureau of the Census; AnySite Online.

EXHIBIT B-2

2000 CENSUS DEMOGRAPHIC COMPARISON
INCORPORATED CITIES WITHIN WEST MOJAVE PLAN REGION

Census Variable	**Combined Cities**	City of Adelanto	Town of Apple Valley	City of Barstow	City of California City	City of Hesperia	City of Lancaster	City of Palmdale	City of Ridgecrest	City of Twentynine Palms	City of Victorville	City of Yucca Valley
Total Population	**520,428**	18,130	54,239	21,119	8,385	62,582	118,718	116,670	24,927	14,764	64,029	16,865
% Share of Total	**100.0%**	3.5%	10.4%	4.1%	1.6%	12.0%	22.8%	22.4%	4.8%	2.8%	12.3%	3.2%
Population Growth (1990-2000)	**24.9%**	146.6%	17.2%	-4.2%	39.8%	22.2%	22.4%	47.5%	-9.7%	24.5%	24.2%	1.7%
Age Distribution												
Age 0 to 20	**37.8%**	42.0%	35.4%	35.4%	34.4%	37.5%	36.8%	42.4%	33.2%	36.9%	38.3%	28.5%
Age 21 to 34	**17.3%**	23.1%	14.0%	18.3%	14.0%	16.2%	18.9%	16.9%	16.2%	23.9%	17.6%	12.9%
Age 35 to 54	**28.2%**	25.3%	27.8%	26.8%	32.0%	27.9%	29.1%	29.7%	29.6%	24.1%	26.1%	25.8%
Age 55 to 64	**7.0%**	4.5%	9.0%	7.5%	8.9%	7.4%	6.6%	5.4%	9.7%	6.5%	6.8%	10.0%
Age 65+	**9.7%**	5.1%	13.7%	12.1%	10.7%	11.0%	8.6%	5.6%	11.3%	8.6%	11.2%	22.8%
Race Distribution												
Non-Hispanic	**71.7%**	54.2%	81.4%	63.5%	83.0%	70.6%	75.9%	62.3%	88.0%	85.1%	66.5%	88.6%
White	**53.7%**	36.5%	67.7%	43.4%	61.3%	62.4%	52.4%	41.0%	76.5%	64.7%	47.5%	82.0%
Black alone	**11.0%**	12.7%	7.6%	11.1%	12.4%	3.8%	15.6%	14.1%	3.4%	8.9%	11.6%	2.1%
Am Indian/Alskn alone	**0.7%**	0.7%	0.7%	1.7%	1.2%	0.7%	0.6%	0.5%	0.8%	1.1%	0.6%	0.9%
Asian alone	**3.0%**	1.5%	2.2%	3.0%	3.5%	1.0%	3.7%	3.7%	3.8%	3.7%	3.3%	1.3%
Hawaiian/Pac Islndr alone	**0.3%**	0.1%	0.2%	0.9%	0.3%	0.2%	0.2%	0.1%	0.5%	1.7%	0.2%	0.2%
Some other race alone	**0.2%**	0.2%	0.2%	0.2%	0.2%	0.1%	0.4%	0.2%	0.1%	0.3%	0.2%	0.1%
Two or More Races	**2.9%**	2.5%	2.9%	3.2%	4.2%	2.3%	3.0%	2.6%	2.8%	4.7%	3.2%	2.0%
Hispanic	**28.3%**	45.8%	18.6%	36.5%	17.0%	29.4%	24.1%	37.7%	12.0%	14.9%	33.5%	11.4%
Families as % of Households	**75.5%**	81.5%	77.4%	68.7%	73.6%	79.0%	72.4%	82.0%	68.1%	68.2%	76.0%	64.6%
Population in Group Quarters	**2.1%**	8.2%	0.7%	1.9%	0.7%	0.5%	5.9%	0.1%	1.2%	0.3%	1.0%	1.8%
Institutionalized	**1.8%**	8.2%	0.3%	1.4%	0.6%	0.3%	5.4%	0.0%	0.4%	0.1%	0.6%	0.5%
Correctional	**1.3%**	8.2%	0.0%	0.0%	0.6%	0.1%	4.2%	0.0%	0.0%	0.0%	0.2%	0.0%
Nursing Homes	**0.3%**	0.0%	0.3%	1.4%	0.0%	0.2%	0.6%	0.0%	0.3%	0.1%	0.4%	0.5%
Other Institutions	**0.1%**	0.0%	0.1%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%
Noninstitutionalized	**0.4%**	0.0%	0.3%	0.5%	0.1%	0.2%	0.5%	0.1%	0.9%	0.2%	0.4%	1.4%
College on off campus	**0.0%**	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Military Quarters	**0.0%**	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%
Other	**0.3%**	0.0%	0.3%	0.5%	0.1%	0.2%	0.4%	0.1%	0.1%	0.2%	0.4%	1.3%
Persons Per Household												
1 Person Per Unit	**19.7%**	14.3%	18.0%	25.9%	21.2%	16.5%	22.1%	13.9%	27.6%	25.1%	19.4%	30.0%
2 Person Per Unit	**28.2%**	21.2%	33.4%	28.7%	33.8%	28.8%	27.4%	22.7%	34.0%	31.3%	27.7%	36.1%
3 Person Per Unit	**17.1%**	16.4%	16.7%	17.8%	17.7%	17.7%	17.3%	17.7%	15.1%	18.5%	16.7%	14.2%
4 Person Per Unit	**16.9%**	20.1%	15.8%	13.4%	15.0%	17.1%	16.3%	21.1%	13.1%	15.2%	17.2%	11.0%
5 Person Per Unit	**10.1%**	13.9%	9.1%	8.5%	7.8%	10.8%	9.4%	13.5%	6.6%	6.0%	10.7%	5.2%
6 Person Per Unit	**4.6%**	8.2%	4.3%	3.3%	2.9%	5.2%	4.4%	6.3%	2.3%	2.2%	4.7%	2.1%
7+ Person Per Unit	**3.4%**	5.9%	2.7%	2.4%	1.7%	3.9%	3.2%	4.9%	1.3%	1.6%	3.5%	1.4%

EXHIBIT B-2 (con't.)

2000 CENSUS DEMOGRAPHIC COMPARISON
INCORPORATED CITIES WITHIN WEST MOJAVE PLAN REGION

Census Variable	**Combined Cities**	City of Adelanto	Town of Apple Valley	City of Barstow	City of California City	City of Hesperia	City of Lancaster	City of Palmdale	City of Ridgecrest	City of Twentynine Palms	City of Victorville	City of Yucca Valley
Average Household Size	**3.00**	3.53	2.90	2.71	2.72	3.12	2.92	3.40	2.51	2.60	3.03	2.38
Householder Age												
Age 15 - 24	**5.6%**	6.3%	4.2%	8.3%	4.9%	4.7%	6.0%	4.4%	6.5%	16.6%	5.3%	4.3%
Age 25 - 34	**17.1%**	25.8%	13.2%	17.6%	12.2%	15.2%	17.9%	19.0%	15.4%	20.8%	18.7%	10.9%
Age 35 - 54	**46.7%**	46.9%	43.3%	41.5%	49.9%	45.8%	48.1%	55.4%	44.0%	36.9%	43.0%	35.0%
Age 55 - 64	**12.4%**	9.7%	14.8%	12.4%	14.2%	13.2%	12.3%	10.5%	15.2%	10.5%	11.7%	14.5%
Age 65+	**18.1%**	11.2%	24.5%	20.3%	18.8%	21.1%	15.8%	10.7%	18.9%	15.2%	21.3%	35.3%
Housing by Tenure												
Owner-Occupied	**65.6%**	63.8%	70.0%	54.1%	67.1%	72.3%	61.4%	71.0%	63.0%	43.3%	65.1%	68.0%
Renter-Occupied	**34.4%**	36.2%	30.0%	45.9%	32.9%	27.7%	38.6%	29.0%	37.0%	56.7%	34.9%	32.0%
Vacant Units	**9.4%**	15.0%	8.0%	16.5%	13.8%	6.5%	8.4%	7.6%	13.1%	18.7%	7.1%	12.6%
For Seasonal, Rec, or Occ	**0.6%**	0.6%	0.7%	0.8%	1.0%	0.4%	0.3%	0.3%	0.6%	2.5%	0.5%	2.4%
Housing Value												
Less Than $19,999	**0.3%**	0.0%	0.2%	1.4%	1.0%	0.3%	0.3%	0.3%	0.8%	0.4%	0.0%	0.3%
$20,000 to $39,999	**1.8%**	1.4%	0.7%	2.6%	7.8%	0.6%	0.6%	0.6%	9.8%	11.7%	1.1%	4.2%
$40,000 to $59,999	**6.1%**	12.7%	2.2%	15.7%	12.0%	4.5%	3.8%	2.4%	22.7%	17.9%	4.2%	16.9%
$60,000 to $79,999	**18.0%**	32.5%	13.7%	36.9%	26.5%	17.5%	17.5%	12.8%	26.2%	27.3%	15.6%	25.2%
$80,000 to $99,999	**25.4%**	31.9%	24.1%	23.1%	26.8%	34.0%	25.0%	20.2%	19.9%	22.6%	30.9%	20.4%
$100,000 to $124,999	**19.0%**	15.7%	17.8%	13.1%	17.6%	19.7%	19.8%	20.7%	8.1%	10.5%	25.9%	13.9%
$125,000 to $149,999	**13.4%**	4.6%	13.6%	4.6%	5.3%	14.5%	14.2%	18.1%	5.5%	4.7%	14.0%	9.1%
$150,000 to $174,999	**7.2%**	0.8%	11.0%	0.9%	1.7%	5.5%	7.9%	10.7%	3.1%	1.8%	5.1%	4.3%
$175,000 to $199,999	**3.6%**	0.3%	6.4%	0.5%	0.5%	1.8%	3.9%	5.5%	2.2%	1.4%	2.2%	2.1%
$200,000 to $249,999	**3.0%**	0.0%	6.0%	0.5%	0.4%	0.9%	4.5%	4.4%	1.4%	1.6%	0.5%	1.6%
$250,000 to $299,999	**1.1%**	0.0%	2.6%	0.0%	0.0%	0.2%	1.1%	2.3%	0.1%	0.0%	0.0%	0.8%
$300,000 to $399,999	**0.7%**	0.0%	1.1%	0.0%	0.4%	0.1%	0.8%	1.4%	0.2%	0.0%	0.1%	0.4%
$400,000 to $499,999	**0.2%**	0.0%	0.3%	0.7%	0.0%	0.1%	0.3%	0.2%	0.0%	0.0%	0.0%	0.4%
$500,000 to $749,999	**0.1%**	0.0%	0.2%	0.0%	0.0%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.2%
$750,000 to $999,999	**0.0%**	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
$1,000,000 or more	**0.1%**	0.0%	0.1%	0.0%	0.0%	0.3%	0.1%	0.2%	0.0%	0.0%	0.2%	0.2%
Median Housing Value	**$89,377**	$81,700	$112,700	$75,700	$81,900	$95,900	$103,700	$116,400	$72,400	$75,400	$98,700	$83,200
Average Housing Value	**$113,064**	$84,431	$129,408	$82,575	$84,607	$107,287	$119,696	$129,805	$80,712	$79,641	$106,300	$97,088

EXHIBIT B-2 (con't.)

2000 CENSUS DEMOGRAPHIC COMPARISON
INCORPORATED CITIES WITHIN WEST MOJAVE PLAN REGION

Census Variable	**Combined Cities**	City of Adelanto	Town of Apple Valley	City of Barstow	City of California City	City of Hesperia	City of Lancaster	City of Palmdale	City of Ridgecrest	City of Twentynine Palms	City of Victorville	City of Yucca Valley
Monthly Rent												
No Cash Rent	**3.7%**	4.5%	2.8%	1.8%	2.4%	4.9%	2.3%	2.6%	5.0%	15.8%	3.1%	3.1%
Less Than $199	**4.7%**	3.8%	1.9%	8.4%	5.2%	2.9%	5.9%	4.6%	3.4%	7.0%	3.5%	5.1%
$200 to $249	**2.2%**	10.8%	2.3%	4.9%	4.6%	1.5%	1.2%	1.0%	3.6%	3.1%	1.3%	3.4%
$250 to $299	**3.3%**	12.3%	0.2%	7.0%	8.7%	2.2%	1.4%	1.5%	10.5%	4.7%	3.6%	6.1%
$300 to $349	**5.4%**	11.0%	3.5%	9.3%	10.9%	3.4%	3.0%	4.4%	12.6%	7.1%	4.7%	9.7%
$350 to $399	**8.8%**	12.0%	10.7%	15.1%	11.6%	9.3%	3.5%	8.3%	12.8%	13.2%	7.4%	19.0%
$400 to $499	**22.7%**	12.0%	34.7%	25.8%	23.2%	21.2%	17.1%	19.8%	25.6%	30.9%	26.5%	21.4%
$500 to $599	**19.4%**	10.8%	14.6%	13.5%	18.3%	22.2%	27.2%	17.9%	10.7%	7.9%	22.6%	15.6%
$600 to $699	**13.4%**	10.1%	15.8%	6.7%	13.5%	19.1%	18.2%	12.0%	7.6%	5.9%	10.5%	9.0%
$700 to $799	**8.2%**	8.4%	6.2%	5.0%	1.6%	10.6%	10.1%	9.4%	4.5%	2.7%	10.3%	3.5%
$800 to $899	**4.3%**	3.2%	3.2%	1.0%	0.0%	2.3%	5.6%	8.8%	1.9%	1.1%	3.6%	1.4%
$900 to $999	**1.6%**	0.9%	2.4%	0.0%	0.0%	0.4%	1.7%	3.8%	0.6%	0.1%	1.4%	0.0%
$1,000 to $1,249	**1.6%**	0.0%	1.6%	0.3%	0.0%	0.0%	1.9%	4.1%	0.7%	0.1%	0.7%	2.4%
$1,250 to $1,499	**0.4%**	0.0%	0.2%	0.8%	0.0%	0.1%	0.3%	1.4%	0.2%	0.2%	0.1%	0.0%
$1,500 to $1,999	**0.3%**	0.0%	0.0%	0.3%	0.0%	0.0%	0.4%	0.4%	0.2%	0.0%	0.8%	0.3%
$2,000 or more	**0.0%**	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Median Rent	**$495**	$391	$483	$418	$450	$526	$563	$551	$418	$416	$506	$421
Average Rent	**$498**	$412	$501	$417	$416	$491	$548	$565	$412	$343	$505	$430
Year Structure Built												
1999-March 00	**1.1%**	0.4%	1.9%	0.4%	0.2%	1.4%	1.2%	1.1%	0.1%	0.3%	1.4%	0.3%
1995-1998	**5.9%**	16.8%	5.1%	1.8%	4.9%	5.2%	5.3%	7.8%	1.1%	6.3%	7.8%	2.5%
1990-1994	**18.9%**	45.8%	14.9%	6.1%	36.7%	15.4%	15.8%	25.7%	10.8%	14.9%	25.8%	6.0%
1980-1989	**36.4%**	16.0%	44.1%	16.1%	29.7%	42.5%	35.3%	42.0%	33.7%	28.9%	36.8%	25.4%
1970-1979	**16.0%**	6.5%	18.3%	19.6%	13.8%	22.5%	14.6%	8.2%	29.8%	17.5%	12.3%	31.6%
1960-1969	**8.9%**	6.5%	8.0%	23.0%	11.0%	6.5%	8.0%	5.4%	12.2%	12.9%	7.7%	21.0%
1959 or earlier	**12.7%**	8.1%	7.7%	33.0%	3.7%	6.4%	19.8%	9.7%	12.3%	19.2%	8.2%	13.1%
Year Moved In												
1999-March 00	**24.6%**	30.9%	22.4%	28.5%	23.0%	20.0%	26.5%	23.2%	25.0%	38.9%	23.2%	23.3%
1995-1998	**32.2%**	30.1%	31.4%	27.6%	31.8%	30.9%	33.7%	36.3%	24.7%	25.1%	34.3%	27.3%
1990-1994	**18.8%**	33.1%	16.7%	12.2%	24.3%	17.9%	17.4%	21.9%	16.0%	14.1%	21.3%	15.1%
1980-1989	**15.9%**	3.3%	22.1%	10.8%	15.3%	23.2%	12.3%	14.5%	19.1%	10.5%	15.2%	21.4%
1970-1979	**5.7%**	1.8%	5.3%	12.3%	4.5%	7.0%	6.1%	2.4%	12.1%	8.6%	3.3%	9.8%
1960-1969	**2.8%**	0.9%	2.2%	8.6%	1.1%	1.0%	4.1%	1.7%	3.0%	2.8%	2.7%	3.1%
1969 or earlier	**0.0%**	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

EXHIBIT B-2 (con't.)

2000 CENSUS DEMOGRAPHIC COMPARISON
INCORPORATED CITIES WITHIN WEST MOJAVE PLAN REGION

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Units in Structure												
1, detached	**73.2%**	72.6%	75.9%	60.3%	78.9%	81.4%	66.7%	78.0%	70.3%	67.0%	72.9%	77.5%
1, attached	**2.5%**	3.3%	3.4%	3.6%	1.5%	1.6%	2.8%	2.3%	2.9%	3.8%	1.7%	1.7%
2	**2.0%**	1.6%	1.7%	4.0%	2.3%	1.9%	1.4%	0.4%	6.3%	4.9%	1.7%	3.7%
3 or 4	**4.7%**	4.2%	7.9%	6.2%	5.0%	2.6%	5.1%	2.0%	6.1%	14.9%	3.8%	4.2%
5 to 9	**3.6%**	0.6%	3.6%	6.1%	2.8%	2.3%	5.3%	2.7%	2.6%	1.5%	4.6%	1.8%
10 to 19	**2.2%**	3.8%	2.0%	3.0%	1.1%	2.3%	3.0%	2.0%	1.5%	1.6%	1.8%	1.3%
20 to 49	**1.6%**	2.9%	0.5%	1.6%	1.2%	0.9%	1.8%	2.9%	1.2%	0.7%	0.9%	0.7%
50 or more	**3.9%**	2.6%	0.2%	4.1%	0.0%	1.7%	6.6%	5.7%	0.7%	1.0%	5.5%	0.5%
Mobile Home	**6.2%**	8.5%	4.8%	11.1%	7.3%	4.8%	7.1%	4.0%	8.3%	4.4%	7.1%	8.6%
Boat, RV, Van, etc.	**0.1%**	0.0%	0.0%	0.2%	0.0%	0.5%	0.2%	0.0%	0.2%	0.1%	0.1%	0.0%
Household Income												
Less Than $15,000	**17.2%**	21.7%	16.2%	21.2%	17.0%	15.9%	16.7%	14.5%	15.5%	18.5%	19.9%	25.9%
$15,000-$19,999	**6.9%**	8.5%	6.2%	8.6%	7.2%	6.3%	7.0%	5.0%	6.5%	10.2%	8.6%	7.6%
$20,000-$29,999	**13.3%**	17.5%	14.9%	13.5%	10.0%	14.4%	12.8%	11.1%	11.2%	18.9%	13.6%	15.6%
$30,000-$39,999	**12.5%**	13.5%	12.1%	14.5%	11.0%	13.1%	11.8%	11.7%	12.1%	16.0%	12.8%	14.9%
$40,000-$49,999	**10.8%**	13.3%	10.9%	10.1%	7.9%	12.1%	11.0%	10.8%	9.3%	10.4%	10.3%	10.6%
$50,000-$59,999	**9.7%**	9.9%	8.9%	8.2%	11.5%	11.3%	10.1%	9.7%	9.2%	8.2%	10.0%	6.9%
$60,000-$74,999	**11.0%**	8.6%	10.3%	9.8%	13.8%	12.0%	10.5%	13.2%	11.4%	7.6%	11.2%	6.2%
$75,000-$99,999	**10.1%**	5.2%	10.8%	7.9%	12.1%	8.3%	10.4%	12.9%	12.7%	5.4%	8.4%	7.5%
$100,000-$124,999	**4.6%**	1.3%	5.2%	3.5%	5.6%	3.4%	4.9%	6.5%	6.3%	3.4%	2.9%	2.3%
$125,000-$149,999	**1.8%**	0.3%	1.7%	1.2%	1.6%	1.2%	2.3%	2.4%	2.9%	0.8%	1.4%	1.1%
$150,000-$199,999	**1.2%**	0.1%	1.6%	1.0%	1.4%	0.8%	1.3%	1.5%	2.1%	0.5%	0.7%	0.8%
$200,000 or more	**0.9%**	0.2%	1.2%	0.5%	0.9%	1.2%	1.2%	0.8%	0.9%	0.0%	0.3%	0.5%
Median Household Income	**$40,095**	$31,594	$40,421	$35,069	$45,735	$40,201	$41,127	$46,941	$44,971	$31,178	$36,187	$30,420
Average Household Income	**$49,051**	$35,912	$51,299	$43,671	$53,620	$47,898	$51,080	$54,994	$53,898	$37,843	$43,254	$38,361
Educational Attainment (Age 25+)												
Less than 9th Grade	**9.5%**	14.6%	6.0%	11.5%	6.9%	11.4%	8.4%	12.3%	5.4%	6.0%	10.0%	5.4%
Some High School	**13.2%**	18.3%	11.7%	10.9%	10.3%	16.0%	13.3%	13.6%	7.2%	12.0%	13.3%	12.8%
High School Diploma	**27.5%**	29.4%	27.7%	31.3%	25.6%	30.7%	26.0%	24.9%	23.5%	28.5%	29.6%	32.6%
College 1-3 years	**36.5%**	31.8%	38.2%	37.2%	45.1%	34.0%	36.5%	35.8%	39.5%	40.2%	36.4%	36.3%
Bachelor's Degree	**8.8%**	3.9%	9.8%	5.8%	7.5%	5.3%	10.2%	9.5%	15.9%	8.4%	6.9%	9.2%
Grad/Prof Degree	**4.6%**	2.0%	6.6%	3.3%	4.6%	2.6%	5.6%	3.8%	8.5%	4.8%	3.7%	3.8%

EXHIBIT B-2 (con't.)

2000 CENSUS DEMOGRAPHIC COMPARISON
INCORPORATED CITIES WITHIN WEST MOJAVE PLAN REGION

Census Variable	**Combined Cities**	City of Adelanto	Town of Apple Valley	City of Barstow	City of California City	City of Hesperia	City of Lancaster	City of Palmdale	City of Ridgecrest	City of Twentynine Palms	City of Victorville	City of Yucca Valley
Occupation (Age 16+)												
White Collar	**69.0%**	63.1%	70.3%	68.3%	69.0%	65.4%	70.7%	69.4%	73.1%	70.1%	67.9%	68.9%
Blue Collar	**31.0%**	36.9%	29.7%	31.7%	31.0%	34.6%	29.3%	30.6%	26.9%	29.9%	32.1%	31.1%
Workers Per Family												
0 Workers	**15.4%**	17.2%	20.4%	13.2%	17.5%	16.5%	14.2%	11.0%	13.6%	13.2%	17.2%	28.1%
1 Worker	**38.2%**	40.2%	35.4%	42.1%	35.1%	37.8%	39.2%	38.2%	36.8%	37.2%	39.8%	33.8%
2 Workers	**38.0%**	34.9%	36.5%	36.7%	41.7%	37.0%	37.3%	41.0%	43.2%	43.7%	35.0%	32.9%
3+ Workers	**8.4%**	7.7%	7.7%	8.1%	5.8%	8.8%	9.4%	9.7%	6.4%	5.9%	7.9%	5.2%
Avg Income by Workers/Family												
0 Workers	**$26,517**	$15,332	$29,730	$34,277	$47,138	$24,418	$25,558	$21,284	$36,554	$28,933	$23,303	$33,091
1 Worker	**$42,402**	$31,203	$45,345	$40,545	$39,742	$42,714	$43,678	$46,547	$44,888	$30,963	$37,388	$36,122
2 Workers	**$67,283**	$50,720	$74,239	$59,321	$73,609	$64,669	$69,368	$71,028	$76,074	$47,648	$61,512	$57,311
3+ Workers	**$84,916**	$64,540	$87,727	$78,699	$88,388	$85,000	$94,612	$83,078	$89,775	$73,211	$74,470	$79,709
Vehicles Per Household												
0 Vehicles	**8.4%**	12.0%	7.0%	12.2%	6.4%	6.2%	9.3%	7.2%	8.2%	8.3%	9.4%	9.4%
1 Vehicle	**33.8%**	32.4%	32.7%	42.1%	35.7%	29.9%	35.6%	28.8%	33.0%	45.5%	35.6%	39.5%
2 Vehicle	**39.2%**	39.6%	38.8%	33.7%	35.9%	39.2%	38.6%	43.2%	39.4%	33.8%	38.8%	35.5%
3+ Vehicles	**18.7%**	15.9%	21.5%	11.9%	22.1%	24.6%	16.4%	20.7%	19.4%	12.4%	16.2%	15.6%

Source: Alfred Gobar Associates; U.S. Bureau of the Census; AnySite Online.

EXHIBIT B-3

2000 Population Profile

State of California

Population	33,871,648	**Households**	11,502,870	**Persons in Households**	33,051,894
		Families	7,920,049 68.9%	**Persons in Families**	27,165,979
				Persons in Group Qtrs	819,754

Age Distribution		**%**	**Male**	**Female**
Under 5	2,486,981	7.3%	1,272,884	1,214,097
Age 5-9	2,725,880	8.0%	1,396,480	1,329,400
Age 10-14	2,570,822	7.6%	1,317,135	1,253,687
Age 15-17	1,466,146	4.3%	758,039	708,107
Age 18-20	1,475,571	4.4%	772,215	703,356
Age 21-24	1,890,459	5.6%	986,902	903,557
Age 25-29	2,543,541	7.5%	1,311,445	1,232,096
Age 30-34	2,685,521	7.9%	1,382,355	1,303,166
Age 35-44	5,485,341	16.2%	2,772,494	2,712,847
Age 45-54	4,331,635	12.8%	2,133,761	2,197,874
Age 55-59	1,467,252	4.3%	711,203	756,049
Age 60-64	1,146,841	3.4%	546,105	600,736
Age 65-74	1,887,823	5.6%	854,703	1,033,120
Age 75-84	1,282,178	3.8%	524,989	757,189
Age 85+	425,657	1.3%	134,182	291,475
Median Age	33.3		32.2	34.4

Relationship by Household Type (Total Population)

In Households	33,051,894	97.6%
In Family Households	28,259,546	83.4%
Householder	7,920,049	23.4%
Male	5,646,949	16.7%
Female	2,273,100	6.7%
Spouse	5,877,084	17.4%
Parent	445,614	1.3%
Other relatives	1,061,884	3.1%
Nonrelatives	1,093,567	3.2%
In Non-Family Households	4,792,348	14.1%
Male Householder	1,718,168	5.1%
Male HHldr living alone	1,212,065	3.6%
Male HHldr not living alone	506,103	1.5%
Female Householder	1,864,653	5.5%
Female HHldr living alone	1,496,243	4.4%
Female HHldr not living alone	368,410	1.1%
In group quarters	819,754	2.4%
Institutionalized	413,656	1.2%
Noninstitutionalized	406,098	1.2%

Population in Group Quarters	**819,754**	**2.4%**
Institutionalized Population	**413,656**	1.2%
Correctional	248,516	0.7%
Nursing Homes	120,724	0.4%
Other Institutions	44,416	0.1%
Noninstitutionalized Population	**406,098**	**1.2%**
College on off Campus	126,715	0.4%
Military Quarters	58,810	0.2%
Other	220,573	0.7%

Non-Hispanic Population By Race	**22,905,092**	**67.6%**
White alone	15,816,790	46.7%
Black alone	2,181,926	6.4%
American Indian/Alaskan Native alone	178,984	0.5%
Asian alone	3,648,860	10.8%
Native Hawaiian/Pac Islander alone	103,736	0.3%
Some other race alone	71,681	0.2%
Two or More Races	903,115	2.7%

Hispanic Population By Race	**10,966,556**	**32.4%**
White alone	4,353,269	12.9%
Black alone	81,956	0.2%
American Indian/Alaskan Native alone	154,362	0.5%
Asian alone	48,653	0.1%
Native Hawaiian/Pac Islander alone	13,225	0.0%
Some other race alone	5,610,560	16.6%
Two or More Races	704,531	2.1%

Relationship by Household Type (Age 65+)

Population Age 65+	**3,595,658**	**10.6%**
In Households	3,425,705	10.1%
In Family Households	2,405,163	7.1%
Householder	1,199,987	3.5%
Male	933,071	2.8%
Female	266,916	0.8%
Spouse	754,331	2.2%
Parent	247,375	0.7%
Other relatives	171,519	0.5%
Nonrelatives	31,951	0.1%
In Non-Family Households	1,020,542	3.0%
Male Householder	270,918	0.8%
Male HHldr living alone	238,295	0.7%
Male HHldr not living alone	32,623	0.1%
Female Householder	691,582	2.0%
Female HHldr living alone	653,912	1.9%
Female HHldr not living alone	37,670	0.1%
Nonrelatives	58,042	0.2%
In group quarters	169,953	0.5%
Institutionalized	116,765	0.3%
Noninstitutionalized	53,188	0.2%

Unmarried Partner Households	**683,516**	**5.9%**
Male hhldr and male partner	49,614	0.4%
Male hhldr and female partner	323,236	2.8%
Female hhldr and female partner	42,524	0.4%
Female hhldr and male partner	268,142	2.3%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-3 (Cont'd)

2000 Housing Profile

State of California

Total Housing Units	**12,214,549**	
Occupied Housing Units	**11,502,870**	**100.0%**
Owner-Occupied	6,546,334	56.9%
Renter-Occupied	4,956,536	43.1%
Vacant Housing Units	**711,679**	**5.8%**
Vacant For Rent	190,321	1.6%
Vacant For Sale	92,197	0.8%
Not Yet Occupied	50,846	0.4%
Seasonal, Rec, Occ Use	236,857	1.9%
For Migrant Workers	2,205	0.0%
Other Vacant	139,253	1.1%
Housing Value	**5,527,618**	
Less than $19,999	16,344	0.3%
$20,000 to $39,999	42,254	0.8%
$40,000 to $59,999	68,531	1.2%
$60,000 to $79,999	182,382	3.3%
$80,000 to $99,999	331,572	6.0%
$100,000 to $124,999	403,671	7.3%
$125,000 to $149,999	531,060	9.6%
$150,000 to $174,999	540,092	9.8%
$175,000 to $199,999	487,183	8.8%
$200,000 to $249,999	698,988	12.6%
$250,000 to $299,999	535,474	9.7%
$300,000 to $399,999	669,261	12.1%
$400,000 to $499,999	385,627	7.0%
$500,000 to $749,999	370,041	6.7%
$750,000 to $999,999	136,519	2.5%
$1,000,000 or more	128,619	2.3%
Median Housing Value	$211,500	
Average Housing Value	$283,891	
Monthly Rent	**4,921,581**	
No Cash Rent	152,858	3.1%
Less Than $199	173,034	3.5%
$200 to $249	69,627	1.4%
$250 to $299	75,797	1.5%
$300 to $349	135,144	2.7%
$350 to $399	190,411	3.9%
$400 to $499	528,673	10.7%
$500 to $599	690,031	14.0%
$600 to $699	676,908	13.8%
$700 to $799	544,908	11.1%
$800 to $899	438,783	8.9%
$900 to $999	316,988	6.4%
$1,000 to $1,249	447,614	9.1%
$1,250 to $1,499	218,934	4.4%
$1,500 to $1,999	182,568	3.7%
$2,000 or more	79,303	1.6%
Median Rent	$677	0.0%
Average Rent	$723	0.0%

Persons Per Household	Owner	%	Renter	%
1 Person Per Unit	1,240,197	18.9%	1,468,111	29.6%
2 Persons Per Unit	2,154,005	32.9%	1,254,291	25.3%
3 Persons Per Unit	1,059,758	16.2%	782,210	15.8%
4 Persons Per Unit	1,060,816	16.2%	647,145	13.1%
5 Persons Per Unit	538,906	8.2%	388,633	7.8%
6 Persons Per Unit	249,015	3.8%	201,905	4.1%
7+ Persons Per Unit	243,637	3.7%	214,241	4.3%
Average Household Size	2.87			

Persons Per Family/Non-F	Family	%	Non-Family	%
1 Person Per Unit	-	-	2,708,308	75.6%
2 Persons Per Unit	2,732,275	34.5%	676,021	18.9%
3 Persons Per Unit	1,719,557	21.7%	122,411	3.4%
4 Persons Per Unit	1,661,554	21.0%	46,407	1.3%
5 Persons Per Unit	911,538	11.5%	16,001	0.4%
6 Persons Per Unit	443,687	5.6%	7,233	0.2%
7+ Persons Per Unit	451,438	5.7%	6,440	0.2%
Average Family Size	3.43			
Average Non-Family Size	1.64			

Units In Structure	Owner	%	Renter	%
1, detached	5,291,196	80.8%	1,247,909	25.2%
1, attached	505,733	7.7%	369,510	7.5%
2	53,396	0.8%	253,484	5.1%
3 or 4	82,041	1.3%	573,090	11.6%
5 to 9	69,450	1.1%	608,074	12.3%
10 to 19	44,898	0.7%	537,443	10.8%
20 to 49	49,680	0.8%	533,067	10.8%
50 or more	62,147	0.9%	729,089	14.7%
Mobile Home	373,351	5.7%	99,842	2.0%
Boat, RV, Van, etc.	14,345	0.2%	5,125	0.1%

Tenure By Year Structure	Owner	%	Renter	%
1999-March 00	115,372	1.8%	40,049	0.8%
1995-1998	359,942	5.5%	145,387	2.9%
1990-1994	509,177	7.8%	289,753	5.8%
1980-1989	1,141,514	17.4%	829,835	16.7%
1970-1979	1,260,440	19.3%	1,093,120	22.1%
1960-1969	1,005,648	15.4%	921,555	18.6%
1959 or earlier	2,154,144	32.9%	1,636,934	33.0%

Tenure by Year Moved In	Owner	%	Renter	%
1999-March 00	724,512	11.1%	1,731,914	34.9%
1995-1998	1,617,115	24.7%	2,013,406	40.6%
1990-1994	1,175,311	18.0%	667,076	13.5%
1980-1989	1,385,908	21.2%	366,517	7.4%
1970-1979	898,435	13.7%	125,093	2.5%
1969 or earlier	744,956	11.4%	52,627	1.1%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-3 (Cont'd)

2000 Socioeconomic Profile

State of California

Income Distribution	**Household Income**		**Family Income**	
Less than $10,000	967,089	8.4%	457,118	5.7%
$10,000 to $14,999	648,780	5.6%	365,527	4.6%
$15,000 to $19,999	645,181	5.6%	400,403	5.0%
$20,000 to $24,999	673,065	5.8%	433,914	5.4%
$25,000 to $29,999	653,245	5.7%	432,066	5.4%
$30,000 to $34,999	661,840	5.7%	441,330	5.5%
$35,000 to $39,999	619,875	5.4%	422,096	5.3%
$40,000 to $44,999	595,943	5.2%	410,308	5.1%
$45,000 to $49,999	530,143	4.6%	375,534	4.7%
$50,000 to $59,999	984,798	8.6%	707,271	8.9%
$60,000 to $74,999	1,218,075	10.6%	908,139	11.4%
$75,000 to $99,999	1,326,569	11.5%	1,034,671	13.0%
$100,000 to $124,999	780,489	6.8%	623,796	7.8%
$125,000 to $149,999	412,129	3.6%	331,581	4.2%
$150,000 to $199,999	385,248	3.3%	310,407	3.9%
$200,000 or more	409,551	3.6%	331,328	4.1%
Total	11,512,020		7,985,489	
Median Income	$47,493		$53,025	
Average Income	$65,628		$71,951	

Workers Per Family			**Average Income**
0 Workers	934,219	11.8%	$37,951
1 Workers	2,530,553	32.0%	$57,532
2 Workers	3,379,044	42.7%	$86,694
3+ Workers	1,076,233	13.6%	$93,452

Vehicles Per Household		
0 Vehicles	1,091,214	9.5%
1 Vehicle	3,927,721	34.1%
2 Vehicle	4,342,204	37.7%
3+ Vehicles	2,141,731	18.6%

Householder Race	Owner	%	Renter	%
Single Race				
White	4,867,060	74.3%	2,910,565	58.7%
Black/African America	307,709	4.7%	485,770	9.8%
American Ind/Alaska	46,791	0.7%	54,748	1.1%
Asian	613,195	9.4%	494,007	10.0%
Hawaiian/Pac Islndr	13,092	0.2%	16,382	0.3%
Some Other Race	518,017	7.9%	760,220	15.3%
Two or More Races	180,470	2.8%	234,844	4.7%

Householder Age	Owner	%	Renter	%
Age 15 - 24	62,750	1.0%	475,863	7.3%
Age 25 - 34	678,567	10.4%	1,452,741	22.2%
Age 35 - 44	1,521,143	23.2%	1,276,914	19.5%
Age 45 - 54	1,573,078	24.0%	815,538	12.5%
Age 55 - 64	1,087,794	16.6%	395,995	6.0%
Age 65 - 74	851,284	13.0%	263,448	4.0%
Age 75 - 84	612,715	9.4%	196,357	3.0%
Age 85+	159,003	2.4%	79,680	1.2%

Occupation for Employed Population Age 16+		%
White Collar	14,718,928	72.9%
Mgmt/Bus/Finance	2,145,895	10.6%
Professional	3,149,174	15.6%
Sales/Office	3,939,383	19.5%
Blue Collar	5,484,476	27.1%
Service	2,173,874	10.8%
Farm/Fish/Forestry	196,695	1.0%
Const/Ext/Maintenance	1,239,160	6.1%
Prod/Transp/Materials	1,874,747	9.3%

Educational Attainment		
Population 25+	**21,298,900**	
Less than 9th Grade	2,956,875	13.9%
Some High School	1,985,868	9.3%
High School Diploma	4,288,452	20.1%
College 1-3 years	6,397,739	30.0%
Bachelor's Degree	3,640,157	17.1%
Grad/Prof Degree	2,029,809	9.5%

Place of Work		
Total Workers Age 16+	14,525,322	
Living in an MSA/PMSA:	14,102,227	97.1%
Living in a central city:	5,690,785	39.2%
Worked in MSA/PMSA of residence:	5,137,594	35.4%
Central City	3,678,013	25.3%
Remainder	1,459,581	10.0%
Worked outside MSA/PMSA of res	553,191	3.8%
Worked in dift MSA/PMSA of res:	532,209	3.7%
Central City	224,871	1.5%
Remainder	307,338	2.1%
Worked outside any MSA/PMSA:	20,982	0.1%
Living in remainder of MSA/PMSA:	8,411,442	57.9%
Worked in MSA/PMSA of residence:	7,090,453	48.8%
Central City	2,159,284	14.9%
Remainder	4,931,169	33.9%
Worked outside MSA/PMSA of res:	1,320,989	9.1%
Worked in dift MSA/PMSA of res:	1,282,708	8.8%
Central City	552,500	3.8%
Remainder	730,208	5.0%
Worked outside any MSA/PMSA:	38,281	0.3%
Not Living in an MSA/PMSA:	423,095	2.9%
Worked in MSA/PMSA:	61,087	0.4%
Central City	28,267	0.2%
Remainder	32,820	0.2%
Worked outside any MSA/PMSA:	362,008	2.5%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-4

2000 Population Profile

San Bernardino County, CA

Population	1,709,434	**Households**	528,594	**Persons in Households**	1,664,402
		Families	404,327 76.5%	**Persons in Families**	1,448,964
				Persons in Group Qtrs	45,032

Age Distribution		**%**	**Male**	**Female**
Under 5	143,076	8.4%	73,273	69,803
Age 5-9	163,860	9.6%	84,064	79,796
Age 10-14	158,202	9.3%	80,787	77,415
Age 15-17	86,909	5.1%	44,408	42,501
Age 18-20	80,410	4.7%	43,007	37,403
Age 21-24	95,390	5.6%	50,436	44,954
Age 25-29	117,758	6.9%	59,421	58,337
Age 30-34	125,270	7.3%	62,663	62,607
Age 35-44	272,633	15.9%	135,412	137,221
Age 45-54	203,670	11.9%	101,040	102,630
Age 55-59	65,315	3.8%	32,217	33,098
Age 60-64	50,482	3.0%	24,342	26,140
Age 65-74	81,244	4.8%	36,865	44,379
Age 75-84	49,965	2.9%	20,280	29,685
Age 85+	15,250	0.9%	4,809	10,441
Median Age	30.3		29.3	31.4

Relationship by Household Type (Total Population)

In Households	1,664,402	97.4%
In Family Households	1,503,202	87.9%
Householder	404,327	23.7%
Male	287,163	16.8%
Female	117,164	6.9%
Spouse	294,701	17.2%
Parent	20,171	1.2%
Other relatives	51,327	3.0%
Nonrelatives	54,238	3.2%
In Non-Family Households	161,200	9.4%
Male Householder	60,572	3.5%
Male HHldr living alone	44,279	2.6%
Male HHldr not living alone	16,293	1.0%
Female Householder	63,695	3.7%
Female HHldr living alone	53,203	3.1%
Female HHldr not living alone	10,492	0.6%
In group quarters	45,032	2.6%
Institutionalized	26,852	1.6%
Noninstitutionalized	18,180	1.1%

Population in Group Quarters	**45,032**	**2.6%**
Institutionalized Population	**26,852**	1.6%
Correctional	16,959	1.0%
Nursing Homes	4,767	0.3%
Other Institutions	5,126	0.3%
Noninstitutionalized Population	**18,180**	**1.1%**
College on off Campus	1,590	0.1%
Military Quarters	7,111	0.4%
Other	9,479	0.6%

Non-Hispanic Population By Race	**1,040,047**	**60.8%**
White alone	752,222	44.0%
Black alone	150,201	8.8%
American Indian/Alaskan Native alone	9,804	0.6%
Asian alone	78,154	4.6%
Native Hawaiian/Pac Islander alone	4,387	0.3%
Some other race alone	3,039	0.2%
Two or More Races	42,240	2.5%

Hispanic Population By Race	**669,387**	**39.2%**
White alone	254,738	14.9%
Black alone	5,147	0.3%
American Indian/Alaskan Native alone	10,111	0.6%
Asian alone	2,063	0.1%
Native Hawaiian/Pac Islander alone	723	0.0%
Some other race alone	352,804	20.6%
Two or More Races	43,801	2.6%

Relationship by Household Type (Age 65+)

Population Age 65+	**146,459**	**8.6%**
In Households	140,410	8.2%
In Family Households	100,712	5.9%
Householder	50,179	2.9%
Male	38,579	2.3%
Female	11,600	0.7%
Spouse	30,882	1.8%
Parent	10,526	0.6%
Other relatives	7,963	0.5%
Nonrelatives	1,162	0.1%
In Non-Family Households	39,698	2.3%
Male Householder	10,999	0.6%
Male HHldr living alone	9,616	0.6%
Male HHldr not living alone	1,383	0.1%
Female Householder	26,492	1.5%
Female HHldr living alone	25,206	1.5%
Female HHldr not living alone	1,286	0.1%
Nonrelatives	2,207	0.1%
In group quarters	6,049	0.4%
Institutionalized	4,311	0.3%
Noninstitutionalized	1,738	0.1%

Unmarried Partner Households	**33,025**	**6.2%**
Male hhldr and male partner	1,305	0.2%
Male hhldr and female partner	16,883	3.2%
Female hhldr and female partner	1,583	0.3%
Female hhldr and male partner	13,254	2.5%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-4 (Cont'd)

2000 Housing Profile
San Bernardino County, CA

Total Housing Units	**601,369**	
Occupied Housing Units	**528,594**	**100.0%**
Owner-Occupied	340,933	64.5%
Renter-Occupied	187,661	35.5%
Vacant Housing Units	**72,775**	**12.1%**
Vacant For Rent	14,725	2.4%
Vacant For Sale	10,808	1.8%
Not Yet Occupied	3,366	0.6%
Seasonal, Rec, Occ Use	31,632	5.3%
For Migrant Workers	38	0.0%
Other Vacant	12,206	2.0%
Housing Value	**296,705**	
Less than $19,999	1,427	0.5%
$20,000 to $39,999	3,351	1.1%
$40,000 to $59,999	9,073	3.1%
$60,000 to $79,999	25,597	8.6%
$80,000 to $99,999	47,189	15.9%
$100,000 to $124,999	48,635	16.4%
$125,000 to $149,999	50,551	17.0%
$150,000 to $174,999	34,579	11.7%
$175,000 to $199,999	22,547	7.6%
$200,000 to $249,999	24,146	8.1%
$250,000 to $299,999	13,472	4.5%
$300,000 to $399,999	10,283	3.5%
$400,000 to $499,999	3,234	1.1%
$500,000 to $749,999	1,605	0.5%
$750,000 to $999,999	541	0.2%
$1,000,000 or more	475	0.2%
Median Housing Value	$131,500	
Average Housing Value	$152,294	
Monthly Rent	**186,461**	
No Cash Rent	9,679	5.2%
Less Than $199	6,184	3.3%
$200 to $249	2,899	1.6%
$250 to $299	3,736	2.0%
$300 to $349	6,823	3.7%
$350 to $399	11,496	6.2%
$400 to $499	32,043	17.2%
$500 to $599	37,032	19.9%
$600 to $699	28,843	15.5%
$700 to $799	20,065	10.8%
$800 to $899	12,867	6.9%
$900 to $999	6,913	3.7%
$1,000 to $1,249	5,264	2.8%
$1,250 to $1,499	1,635	0.9%
$1,500 to $1,999	814	0.4%
$2,000 or more	168	0.1%
Median Rent	$568	0.3%
Average Rent	$551	0.3%

Persons Per Household	Owner	%	Renter	%
1 Person Per Unit	54,961	16.1%	42,521	22.7%
2 Persons Per Unit	98,486	28.9%	43,023	22.9%
3 Persons Per Unit	55,907	16.4%	33,932	18.1%
4 Persons Per Unit	60,902	17.9%	30,190	16.1%
5 Persons Per Unit	36,484	10.7%	19,340	10.3%
6 Persons Per Unit	18,147	5.3%	9,738	5.2%
7+ Persons Per Unit	16,046	4.7%	8,917	4.8%
Average Household Size	3.15			

Persons Per Family/Non-Family	Family	%	Non-Family	%
1 Person Per Unit	-	-	97,482	78.4%
2 Persons Per Unit	120,664	29.8%	20,845	16.8%
3 Persons Per Unit	86,269	21.3%	3,570	2.9%
4 Persons Per Unit	89,673	22.2%	1,419	1.1%
5 Persons Per Unit	55,269	13.7%	555	0.4%
6 Persons Per Unit	27,649	6.8%	236	0.2%
7+ Persons Per Unit	24,803	6.1%	160	0.1%
Average Family Size	3.58			
Average Non-Family Size	1.73			

Units In Structure	Owner	%	Renter	%
1, detached	296,252	86.9%	70,118	37.4%
1, attached	11,781	3.5%	11,835	6.3%
2	700	0.2%	7,882	4.2%
3 or 4	1,943	0.6%	23,922	12.8%
5 to 9	1,230	0.4%	17,920	9.6%
10 to 19	464	0.1%	12,583	6.7%
20 to 49	326	0.1%	9,124	4.9%
50 or more	590	0.2%	27,366	14.6%
Mobile Home	27,038	7.9%	6,603	3.5%
Boat, RV, Van, etc.	690	0.2%	227	0.1%

Tenure By Year Structure Built	Owner	%	Renter	%
1999-March 00	6,291	1.8%	959	0.5%
1995-1998	20,563	6.0%	6,229	3.3%
1990-1994	40,663	11.9%	18,789	10.0%
1980-1989	94,954	27.8%	54,837	29.2%
1970-1979	65,742	19.3%	38,905	20.7%
1960-1969	41,761	12.2%	27,759	14.8%
1959 or earlier	71,040	20.8%	40,102	21.4%

Tenure by Year Moved In	Owner	%	Renter	%
1999-March 00	42,446	12.4%	78,770	42.0%
1995-1998	91,218	26.7%	76,367	40.7%
1990-1994	69,094	20.3%	19,823	10.6%
1980-1989	77,715	22.8%	9,381	5.0%
1970-1979	36,361	10.7%	2,175	1.2%
1969 or earlier	24,180	7.1%	1,064	0.6%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-4 (Cont'd)

2000 Socioeconomic Profile

San Bernardino County, CA

Income Distribution	Household Income		Family Income	
Less than $10,000	47,943	9.1%	27,892	6.8%
$10,000 to $14,999	34,849	6.6%	21,307	5.2%
$15,000 to $19,999	33,237	6.3%	23,157	5.7%
$20,000 to $24,999	35,517	6.7%	25,848	6.3%
$25,000 to $29,999	32,988	6.2%	24,676	6.1%
$30,000 to $34,999	33,525	6.3%	25,286	6.2%
$35,000 to $39,999	31,472	6.0%	24,493	6.0%
$40,000 to $44,999	30,436	5.8%	23,778	5.8%
$45,000 to $49,999	26,331	5.0%	21,053	5.2%
$50,000 to $59,999	49,067	9.3%	39,759	9.8%
$60,000 to $74,999	58,622	11.1%	49,529	12.2%
$75,000 to $99,999	56,907	10.8%	49,387	12.1%
$100,000 to $124,999	28,231	5.3%	25,177	6.2%
$125,000 to $149,999	13,102	2.5%	11,459	2.8%
$150,000 to $199,999	9,619	1.8%	8,427	2.1%
$200,000 or more	6,993	1.3%	5,977	1.5%
Total	528,839		407,205	
Median Income	$42,066		$46,574	
Average Income	$53,064		$56,975	

Workers Per Family			Average Income
0 Workers	48,733	12.1%	$26,965
1 Workers	140,939	34.9%	$42,701
2 Workers	163,251	40.4%	$69,811
3+ Workers	51,404	12.7%	$86,988

Vehicles Per Household		
0 Vehicles	42,120	8.0%
1 Vehicle	171,126	32.4%
2 Vehicle	204,829	38.7%
3+ Vehicles	110,519	20.9%

Householder Race	Owner	%	Renter	%
Single Race				
White	243,686	71.5%	107,043	57.0%
Black/African America	21,708	6.4%	26,017	13.9%
American Ind/Alaska	3,335	1.0%	2,618	1.4%
Asian	14,901	4.4%	7,503	4.0%
Hawaiian/Pac Islndr	582	0.2%	628	0.3%
Some Other Race	45,597	13.4%	35,145	18.7%
Two or More Races	11,124	3.3%	8,707	4.6%

Householder Age	Owner	%	Renter	%
Age 15 - 24	5,373	1.6%	22,172	6.5%
Age 25 - 34	44,414	13.0%	54,682	16.0%
Age 35 - 44	87,583	25.7%	49,560	14.5%
Age 45 - 54	81,820	24.0%	29,691	8.7%
Age 55 - 64	51,423	15.1%	14,206	4.2%
Age 65 - 74	39,264	11.5%	9,096	2.7%
Age 75 - 84	25,032	7.3%	6,026	1.8%
Age 85+	6,024	1.8%	2,228	0.7%

Occupation for Employed Population Age 16+		%
White Collar	661,272	69.2%
Mgmt/Bus/Finance	73,833	7.7%
Professional	112,263	11.7%
Sales/Office	180,447	18.9%
Blue Collar	294,729	30.8%
Service	104,728	11.0%
Farm/Fish/Forestry	3,040	0.3%
Const/Ext/Maintenance	74,519	7.8%
Prod/Transp/Materials	112,442	11.8%

Educational Attainment		
Population 25+	**983,273**	
Less than 9th Grade	129,788	13.2%
Some High School	123,806	12.6%
High School Diploma	246,155	25.0%
College 1-3 years	326,943	33.3%
Bachelor's Degree	102,339	10.4%
Grad/Prof Degree	54,242	5.5%

Place of Work		
Total Workers Age 16+	658,708	
Living in an MSA/PMSA:	658,708	100.0%
Living in a central city:	60,601	9.2%
Worked in MSA/PMSA of residence:	55,195	8.4%
Central City	26,922	4.1%
Remainder	28,273	4.3%
Worked outside MSA/PMSA of res	5,406	0.8%
Worked in dift MSA/PMSA of res:	5,350	0.8%
Central City	1,771	0.3%
Remainder	3,579	0.5%
Worked outside any MSA/PMSA:	56	0.0%
Living in remainder of MSA/PMSA:	598,107	90.8%
Worked in MSA/PMSA of residence:	453,389	68.8%
Central City	61,244	9.3%
Remainder	392,145	59.5%
Worked outside MSA/PMSA of res:	144,718	22.0%
Worked in dift MSA/PMSA of res:	143,042	21.7%
Central City	41,841	6.4%
Remainder	101,201	15.4%
Worked outside any MSA/PMSA:	1,676	0.3%
Not Living in an MSA/PMSA:	0	0.0%
Worked in MSA/PMSA:	0	0.0%
Central City	0	0.0%
Remainder	0	0.0%
Worked outside any MSA/PMSA:	0	0.0%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-5

2000 Population Profile

Los Angeles County, CA

Population	9,519,338	**Households**	3,133,774		**Persons in Households**	9,344,086
		Families	2,136,977	68.2%	**Persons in Families**	7,708,611
					Persons in Group Qtrs	175,252

Age Distribution		**%**	**Male**	**Female**
Under 5	737,631	7.7%	377,819	359,812
Age 5-9	802,047	8.4%	409,618	392,429
Age 10-14	723,652	7.6%	370,008	353,644
Age 15-17	404,646	4.3%	209,476	195,170
Age 18-20	419,114	4.4%	215,042	204,072
Age 21-24	561,543	5.9%	285,824	275,719
Age 25-29	779,031	8.2%	395,422	383,609
Age 30-34	802,691	8.4%	410,209	392,482
Age 35-44	1,517,478	15.9%	761,325	756,153
Age 45-54	1,148,612	12.1%	556,313	592,299
Age 55-59	389,457	4.1%	185,550	203,907
Age 60-64	306,763	3.2%	144,259	162,504
Age 65-74	492,833	5.2%	218,666	274,167
Age 75-84	324,693	3.4%	130,496	194,197
Age 85+	109,147	1.1%	34,078	75,069
Median Age	32.0		31.0	33.0

Non-Hispanic Population By Race	**5,277,125**	**55.4%**
White alone	2,959,614	31.1%
Black alone	901,472	9.5%
American Indian/Alaskan Native alone	25,609	0.3%
Asian alone	1,124,569	11.8%
Native Hawaiian/Pac Islander alone	23,265	0.2%
Some other race alone	19,935	0.2%
Two or More Races	222,661	2.3%
Hispanic Population By Race	**4,242,213**	**44.6%**
White alone	1,677,448	17.6%
Black alone	29,485	0.3%
American Indian/Alaskan Native alone	51,379	0.5%
Asian alone	12,931	0.1%
Native Hawaiian/Pac Islander alone	3,788	0.0%
Some other race alone	2,220,062	23.3%
Two or More Races	247,120	2.6%

Relationship by Household Type (Total Population)

In Households	9,344,086	98.2%
In Family Households	8,043,375	84.5%
Householder	2,136,977	22.4%
Male	1,455,887	15.3%
Female	681,090	7.2%
Spouse	1,491,327	15.7%
Parent	164,620	1.7%
Other relatives	381,201	4.0%
Nonrelatives	334,764	3.5%
In Non-Family Households	1,300,711	13.7%
Male Householder	490,133	5.1%
Male HHldr living alone	358,915	3.8%
Male HHldr not living alone	131,218	1.4%
Female Householder	506,664	5.3%
Female HHldr living alone	412,939	4.3%
Female HHldr not living alone	93,725	1.0%
In group quarters	175,252	1.8%
Institutionalized	77,712	0.8%
Noninstitutionalized	97,540	1.0%
Population in Group Quarters	**175,252**	**1.8%**
Institutionalized Population	**77,712**	0.8%
Correctional	28,193	0.3%
Nursing Homes	36,088	0.4%
Other Institutions	13,431	0.1%
Noninstitutionalized Population	**97,540**	**1.0%**
College on off Campus	41,103	0.4%
Military Quarters	163	0.0%
Other	56,274	0.6%

Relationship by Household Type (Age 65+)

Population Age 65+	**926,673**	**9.7%**
In Households	879,888	9.2%
In Family Households	623,259	6.5%
Householder	296,893	3.1%
Male	218,822	2.3%
Female	78,071	0.8%
Spouse	171,338	1.8%
Parent	87,210	0.9%
Other relatives	57,523	0.6%
Nonrelatives	10,295	0.1%
In Non-Family Households	256,629	2.7%
Male Householder	72,120	0.8%
Male HHldr living alone	63,689	0.7%
Male HHldr not living alone	8,431	0.1%
Female Householder	169,815	1.8%
Female HHldr living alone	159,784	1.7%
Female HHldr not living alone	10,031	0.1%
Nonrelatives	14,694	0.2%
In group quarters	46,785	0.5%
Institutionalized	33,238	0.3%
Noninstitutionalized	13,547	0.1%
Unmarried Partner Households	**185,892**	**5.9%**
Male hhldr and male partner	14,468	0.5%
Male hhldr and female partner	89,151	2.8%
Female hhldr and female partner	10,705	0.3%
Female hhldr and male partner	71,568	2.3%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-5 (Cont'd)

2000 Housing Profile

Los Angeles County, CA

Total Housing Units	**3,270,909**	
Occupied Housing Units	**3,133,774**	**100.0%**
Owner-Occupied	1,499,744	47.9%
Renter-Occupied	1,634,030	52.1%
Vacant Housing Units	**137,135**	**4.2%**
Vacant For Rent	56,089	1.7%
Vacant For Sale	23,874	0.7%
Not Yet Occupied	11,716	0.4%
Seasonal, Rec, Occ Use	13,565	0.4%
For Migrant Workers	68	0.0%
Other Vacant	31,823	1.0%
Housing Value	**1,287,679**	
Less than $19,999	5,631	0.4%
$20,000 to $39,999	10,819	0.8%
$40,000 to $59,999	6,647	0.5%
$60,000 to $79,999	16,889	1.3%
$80,000 to $99,999	36,692	2.8%
$100,000 to $124,999	68,707	5.3%
$125,000 to $149,999	139,000	10.8%
$150,000 to $174,999	172,624	13.4%
$175,000 to $199,999	151,431	11.8%
$200,000 to $249,999	189,620	14.7%
$250,000 to $299,999	127,266	9.9%
$300,000 to $399,999	142,171	11.0%
$400,000 to $499,999	75,526	5.9%
$500,000 to $749,999	79,535	6.2%
$750,000 to $999,999	31,937	2.5%
$1,000,000 or more	33,184	2.6%
Median Housing Value	$209,300	
Average Housing Value	$286,633	
Monthly Rent	**1,630,542**	
No Cash Rent	32,001	2.0%
Less Than $199	53,441	3.3%
$200 to $249	18,709	1.1%
$250 to $299	18,919	1.2%
$300 to $349	37,960	2.3%
$350 to $399	55,739	3.4%
$400 to $499	193,019	11.8%
$500 to $599	299,578	18.4%
$600 to $699	273,778	16.8%
$700 to $799	194,960	12.0%
$800 to $899	139,851	8.6%
$900 to $999	94,864	5.8%
$1,000 to $1,249	115,057	7.1%
$1,250 to $1,499	47,798	2.9%
$1,500 to $1,999	37,253	2.3%
$2,000 or more	17,615	1.1%
Median Rent	$643	0.0%
Average Rent	$683	0.0%

Persons Per Household	Owner	%	Renter	%
1 Person Per Unit	279,298	18.6%	492,556	30.1%
2 Persons Per Unit	437,386	29.2%	382,982	23.4%
3 Persons Per Unit	244,516	16.3%	249,853	15.3%
4 Persons Per Unit	246,107	16.4%	219,052	13.4%
5 Persons Per Unit	138,620	9.2%	138,707	8.5%
6 Persons Per Unit	72,295	4.8%	74,435	4.6%
7+ Persons Per Unit	81,522	5.4%	76,445	4.7%
Average Household Size	2.98			

Persons Per Family/Non-Family	Family	%	Non-Family	%
1 Person Per Unit	-	-	771,854	77.4%
2 Persons Per Unit	642,113	30.0%	178,255	17.9%
3 Persons Per Unit	465,284	21.8%	29,085	2.9%
4 Persons Per Unit	454,715	21.3%	10,444	1.0%
5 Persons Per Unit	273,596	12.8%	3,731	0.4%
6 Persons Per Unit	144,909	6.8%	1,821	0.2%
7+ Persons Per Unit	156,360	7.3%	1,607	0.2%
Average Family Size	3.61			
Average Non-Family Size	1.64			

Units In Structure	Owner	%	Renter	%
1, detached	1,219,233	81.3%	324,332	19.8%
1, attached	112,689	7.5%	118,098	7.2%
2	15,352	1.0%	69,582	4.3%
3 or 4	20,111	1.3%	166,571	10.2%
5 to 9	20,325	1.4%	235,736	14.4%
10 to 19	17,941	1.2%	233,919	14.3%
20 to 49	25,903	1.7%	249,939	15.3%
50 or more	28,011	1.9%	224,987	13.8%
Mobile Home	38,437	2.6%	10,170	0.6%
Boat, RV, Van, etc.	1,692	0.1%	746	0.0%

Tenure By Year Structure Built	Owner	%	Renter	%
1999-March 00	9,606	0.6%	8,662	0.5%
1995-1998	32,155	2.1%	30,439	1.9%
1990-1994	59,802	4.0%	70,816	4.3%
1980-1989	173,413	11.6%	214,549	13.1%
1970-1979	185,447	12.4%	302,096	18.5%
1960-1969	222,641	14.8%	333,517	20.4%
1959 or earlier	816,630	54.5%	674,001	41.2%

Tenure by Year Moved In	Owner	%	Renter	%
1999-March 00	144,525	9.6%	503,217	30.8%
1995-1998	335,811	22.4%	679,832	41.6%
1990-1994	243,523	16.2%	240,040	14.7%
1980-1989	314,020	20.9%	135,480	8.3%
1970-1979	230,207	15.4%	54,180	3.3%
1969 or earlier	231,608	15.4%	21,331	1.3%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-5 (Cont'd)

2000 Socioeconomic Profile

Los Angeles County, CA

Income Distribution	Household Income		Family Income	
Less than $10,000	330,000	10.5%	166,376	7.7%
$10,000 to $14,999	203,819	6.5%	128,303	6.0%
$15,000 to $19,999	196,731	6.3%	131,598	6.1%
$20,000 to $24,999	201,561	6.4%	136,302	6.3%
$25,000 to $29,999	191,887	6.1%	129,778	6.0%
$30,000 to $34,999	189,179	6.0%	127,054	5.9%
$35,000 to $39,999	169,484	5.4%	115,585	5.4%
$40,000 to $44,999	162,317	5.2%	110,680	5.1%
$45,000 to $49,999	140,505	4.5%	97,425	4.5%
$50,000 to $59,999	253,707	8.1%	176,300	8.2%
$60,000 to $74,999	304,843	9.7%	220,822	10.3%
$75,000 to $99,999	318,521	10.2%	242,750	11.3%
$100,000 to $124,999	181,732	5.8%	141,075	6.5%
$125,000 to $149,999	95,240	3.0%	75,049	3.5%
$150,000 to $199,999	87,864	2.8%	69,451	3.2%
$200,000 or more	108,889	3.5%	85,763	4.0%
Total	3,136,279		2,154,311	
Median Income	$42,189		$46,452	
Average Income	$61,811		$67,022	

Workers Per Family			Average Income
0 Workers	244,928	11.5%	$30,781
1 Workers	721,445	33.8%	$52,668
2 Workers	860,225	40.3%	$83,402
3+ Workers	310,378	14.5%	$87,332

Vehicles Per Household		
0 Vehicles	393,309	12.6%
1 Vehicle	1,158,027	37.0%
2 Vehicle	1,079,792	34.5%
3+ Vehicles	502,646	16.0%

Householder Race	Owner	%	Renter	%
Single Race				
White	956,195	63.8%	797,970	48.8%
Black/African America	127,161	8.5%	219,541	13.4%
American Ind/Alaska	8,139	0.5%	13,771	0.8%
Asian	184,329	12.3%	177,142	10.8%
Hawaiian/Pac Islndr	2,390	0.2%	4,210	0.3%
Some Other Race	174,688	11.6%	336,205	20.6%
Two or More Races	46,842	3.1%	85,191	5.2%

Householder Age	Owner	%	Renter	%
Age 15 - 24	14,438	1.0%	131,895	8.8%
Age 25 - 34	157,076	10.5%	488,866	32.6%
Age 35 - 44	349,070	23.3%	431,458	28.8%
Age 45 - 54	360,435	24.0%	271,074	18.1%
Age 55 - 64	254,545	17.0%	136,089	9.1%
Age 65 - 74	192,121	12.8%	90,710	6.0%
Age 75 - 84	136,040	9.1%	62,078	4.1%
Age 85+	36,019	2.4%	21,860	1.5%

Occupation for Employed Population Age 16+		%
White Collar	3,953,415	72.4%
Mgmt/Bus/Finance	531,055	9.7%
Professional	824,918	15.1%
Sales/Office	1,090,059	20.0%
Blue Collar	1,507,383	27.6%
Service	580,809	10.6%
Farm/Fish/Forestry	6,650	0.1%
Const/Ext/Maintenance	306,450	5.6%
Prod/Transp/Materials	613,474	11.2%

Educational Attainment		
Population 25+	**5,882,948**	
Less than 9th Grade	1,147,025	19.5%
Some High School	623,499	10.6%
High School Diploma	1,108,314	18.8%
College 1-3 years	1,541,721	26.2%
Bachelor's Degree	945,634	16.1%
Grad/Prof Degree	516,755	8.8%

Place of Work		
Total Workers Age 16+	3,858,750	
Living in an MSA/PMSA:	3,858,750	100.0%
Living in a central city:	1,783,616	46.2%
Worked in MSA/PMSA of residence:	1,691,085	43.8%
Central City	1,138,318	29.5%
Remainder	552,767	14.3%
Worked outside MSA/PMSA of res	92,531	2.4%
Worked in dift MSA/PMSA of res:	89,487	2.3%
Central City	25,660	0.7%
Remainder	63,827	1.7%
Worked outside any MSA/PMSA:	3,044	0.1%
Living in remainder of MSA/PMSA:	2,075,134	53.8%
Worked in MSA/PMSA of residence:	1,885,321	48.9%
Central City	621,408	16.1%
Remainder	1,263,913	32.8%
Worked outside MSA/PMSA of res:	189,813	4.9%
Worked in dift MSA/PMSA of res:	185,963	4.8%
Central City	52,598	1.4%
Remainder	133,365	3.5%
Worked outside any MSA/PMSA:	3,850	0.1%
Not Living in an MSA/PMSA:	0	0.0%
Worked in MSA/PMSA:	0	0.0%
Central City	0	0.0%
Remainder	0	0.0%
Worked outside any MSA/PMSA:	0	0.0%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-6

2000 Population Profile

Kern County, CA

Population	661,645	**Households**	208,652	**Persons in Households**	631,675
		Families	156,401 75.0%	**Persons in Families**	546,910
				Persons in Group Qtrs	29,970

Age Distribution		**%**	**Male**	**Female**
Under 5	55,707	8.4%	28,545	27,162
Age 5-9	61,659	9.3%	31,676	29,983
Age 10-14	59,544	9.0%	30,396	29,148
Age 15-17	34,469	5.2%	17,832	16,637
Age 18-20	30,573	4.6%	16,356	14,217
Age 21-24	36,993	5.6%	20,233	16,760
Age 25-29	45,797	6.9%	24,846	20,951
Age 30-34	47,454	7.2%	25,654	21,800
Age 35-44	103,676	15.7%	54,607	49,069
Age 45-54	76,557	11.6%	39,124	37,433
Age 55-59	26,239	4.0%	13,033	13,206
Age 60-64	20,923	3.2%	10,173	10,750
Age 65-74	34,287	5.2%	15,847	18,440
Age 75-84	21,310	3.2%	8,929	12,381
Age 85+	6,457	1.0%	2,131	4,326
Median Age	30.6		30.0	31.4

Relationship by Household Type (Total Population)		
In Households	631,675	95.5%
In Family Households	565,941	85.5%
Householder	156,401	23.6%
Male	111,890	16.9%
Female	44,511	6.7%
Spouse	114,025	17.2%
Parent	5,943	0.9%
Other relatives	16,261	2.5%
Nonrelatives	19,031	2.9%
In Non-Family Households	65,734	9.9%
Male Householder	25,351	3.8%
Male HHldr living alone	19,241	2.9%
Male HHldr not living alone	6,110	0.9%
Female Householder	26,900	4.1%
Female HHldr living alone	23,138	3.5%
Female HHldr not living alone	3,762	0.6%
In group quarters	29,970	4.5%
Institutionalized	26,278	4.0%
Noninstitutionalized	3,692	0.6%

Population in Group Quarters	**29,970**	**4.5%**
Institutionalized Population	**26,278**	4.0%
Correctional	23,800	3.6%
Nursing Homes	1,782	0.3%
Other Institutions	696	0.1%
Noninstitutionalized Population	**3,692**	**0.6%**
College on off Campus	240	0.0%
Military Quarters	742	0.1%
Other	2,710	0.4%

Non-Hispanic Population By Race	**407,609**	**61.6%**
White alone	327,190	49.5%
Black alone	37,845	5.7%
American Indian/Alaskan Native alone	5,885	0.9%
Asian alone	21,177	3.2%
Native Hawaiian/Pac Islander alone	728	0.1%
Some other race alone	989	0.1%
Two or More Races	13,795	2.1%

Hispanic Population By Race	**254,036**	**38.4%**
White alone	80,391	12.2%
Black alone	1,953	0.3%
American Indian/Alaskan Native alone	4,114	0.6%
Asian alone	1,091	0.2%
Native Hawaiian/Pac Islander alone	244	0.0%
Some other race alone	152,621	23.1%
Two or More Races	13,622	2.1%

Relationship by Household Type (Age 65+)

Population Age 65+	**62,054**	**9.4%**
In Households	59,853	9.0%
In Family Households	41,755	6.3%
Householder	21,835	3.3%
Male	17,085	2.6%
Female	4,750	0.7%
Spouse	13,852	2.1%
Parent	3,221	0.5%
Other relatives	2,428	0.4%
Nonrelatives	419	0.1%
In Non-Family Households	18,098	2.7%
Male Householder	5,100	0.8%
Male HHldr living alone	4,577	0.7%
Male HHldr not living alone	523	0.1%
Female Householder	12,171	1.8%
Female HHldr living alone	11,666	1.8%
Female HHldr not living alone	505	0.1%
Nonrelatives	827	0.1%
In group quarters	2,201	0.3%
Institutionalized	1,891	0.3%
Noninstitutionalized	310	0.0%

Unmarried Partner Households	**13,117**	**6.3%**
Male hhldr and male partner	560	0.3%
Male hhldr and female partner	6,775	3.2%
Female hhldr and female partner	584	0.3%
Female hhldr and male partner	5,198	2.5%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-6 (Cont'd)

2000 Housing Profile

Kern County, CA

Total Housing Units	**231,564**	
Occupied Housing Units	**208,652**	**100.0%**
Owner-Occupied	129,609	62.1%
Renter-Occupied	79,043	37.9%
Vacant Housing Units	**22,912**	**9.9%**
Vacant For Rent	7,029	3.0%
Vacant For Sale	3,409	1.5%
Not Yet Occupied	1,267	0.5%
Seasonal, Rec, Occ Use	5,738	2.5%
For Migrant Workers	202	0.1%
Other Vacant	5,267	2.3%
Housing Value	**109,487**	
Less than $19,999	796	0.7%
$20,000 to $39,999	2,955	2.7%
$40,000 to $59,999	9,364	8.6%
$60,000 to $79,999	22,775	20.8%
$80,000 to $99,999	26,994	24.7%
$100,000 to $124,999	17,427	15.9%
$125,000 to $149,999	11,239	10.3%
$150,000 to $174,999	6,227	5.7%
$175,000 to $199,999	3,922	3.6%
$200,000 to $249,999	3,440	3.1%
$250,000 to $299,999	1,944	1.8%
$300,000 to $399,999	1,498	1.4%
$400,000 to $499,999	504	0.5%
$500,000 to $749,999	254	0.2%
$750,000 to $999,999	67	0.1%
$1,000,000 or more	81	0.1%
Median Housing Value	$93,300	
Average Housing Value	$111,850	
Monthly Rent	**78,400**	
No Cash Rent	4,651	5.9%
Less Than $199	3,834	4.9%
$200 to $249	2,520	3.2%
$250 to $299	4,872	6.2%
$300 to $349	7,954	10.1%
$350 to $399	11,936	15.2%
$400 to $499	18,811	24.0%
$500 to $599	10,230	13.0%
$600 to $699	6,559	8.4%
$700 to $799	3,752	4.8%
$800 to $899	1,663	2.1%
$900 to $999	531	0.7%
$1,000 to $1,249	537	0.7%
$1,250 to $1,499	201	0.3%
$1,500 to $1,999	223	0.3%
$2,000 or more	126	0.2%
Median Rent	$429	0.5%
Average Rent	$424	0.5%

Persons Per Household	Owner	%	Renter	%
1 Person Per Unit	23,069	17.8%	19,310	24.4%
2 Persons Per Unit	41,712	32.2%	17,672	22.4%
3 Persons Per Unit	20,294	15.7%	13,990	17.7%
4 Persons Per Unit	21,096	16.3%	12,366	15.6%
5 Persons Per Unit	12,174	9.4%	7,876	10.0%
6 Persons Per Unit	5,959	4.6%	4,097	5.2%
7+ Persons Per Unit	5,305	4.1%	3,732	4.7%
Average Household Size	3.03			

Persons Per Family/Non-Family	Family	%	Non-Family	%
1 Person Per Unit	-	-	42,379	81.1%
2 Persons Per Unit	51,614	33.0%	7,770	14.9%
3 Persons Per Unit	33,023	21.1%	1,261	2.4%
4 Persons Per Unit	32,963	21.1%	499	1.0%
5 Persons Per Unit	19,870	12.7%	180	0.3%
6 Persons Per Unit	9,965	6.4%	91	0.2%
7+ Persons Per Unit	8,966	5.7%	71	0.1%
Average Family Size	3.50			
Average Non-Family Size	1.62			

Units In Structure	Owner	%	Renter	%
1, detached	111,102	85.7%	33,097	41.9%
1, attached	3,068	2.4%	4,342	5.5%
2	506	0.4%	5,680	7.2%
3 or 4	880	0.7%	10,863	13.8%
5 to 9	193	0.1%	5,792	7.3%
10 to 19	129	0.1%	3,084	3.9%
20 to 49	163	0.1%	3,419	4.3%
50 or more	91	0.1%	7,625	9.7%
Mobile Home	13,310	10.3%	4,999	6.3%
Boat, RV, Van, etc.	219	0.2%	90	0.1%

Tenure By Year Structure Built	Owner	%	Renter	%
1999-March 00	3,188	2.5%	1,094	1.4%
1995-1998	10,847	8.4%	3,954	5.0%
1990-1994	16,438	12.7%	5,384	6.8%
1980-1989	27,563	21.3%	15,932	20.2%
1970-1979	22,828	17.6%	17,620	22.3%
1960-1969	16,467	12.7%	12,617	16.0%
1959 or earlier	32,330	24.9%	22,390	28.3%

Tenure by Year Moved In	Owner	%	Renter	%
1999-March 00	15,027	11.6%	34,829	44.1%
1995-1998	33,469	25.8%	29,414	37.2%
1990-1994	27,842	21.5%	8,047	10.2%
1980-1989	26,351	20.3%	4,605	5.8%
1970-1979	14,784	11.4%	1,380	1.7%
1969 or earlier	12,188	9.4%	716	0.9%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-6 (Cont'd)

2000 Socioeconomic Profile

Kern County, CA

Income Distribution	**Household Income**		**Family Income**	
Less than $10,000	25,140	12.0%	14,496	9.2%
$10,000 to $14,999	16,865	8.1%	10,750	6.8%
$15,000 to $19,999	16,900	8.1%	12,497	7.9%
$20,000 to $24,999	15,700	7.5%	11,224	7.1%
$25,000 to $29,999	14,807	7.1%	11,280	7.2%
$30,000 to $34,999	13,722	6.6%	9,973	6.3%
$35,000 to $39,999	12,380	5.9%	9,631	6.1%
$40,000 to $44,999	10,982	5.3%	8,491	5.4%
$45,000 to $49,999	10,019	4.8%	7,737	4.9%
$50,000 to $59,999	17,132	8.2%	13,966	8.9%
$60,000 to $74,999	19,325	9.3%	16,392	10.4%
$75,000 to $99,999	18,459	8.8%	15,795	10.0%
$100,000 to $124,999	8,675	4.2%	7,797	4.9%
$125,000 to $149,999	3,506	1.7%	3,117	2.0%
$150,000 to $199,999	2,674	1.3%	2,398	1.5%
$200,000 or more	2,500	1.2%	2,179	1.4%
Total	208,786		157,723	
Median Income	$35,446		$39,403	
Average Income	$47,107		$51,273	

Workers Per Family			**Average Income**
0 Workers	22,858	14.6%	$25,516
1 Workers	54,696	35.0%	$40,366
2 Workers	61,755	39.5%	$64,920
3+ Workers	17,093	10.9%	$75,284

Vehicles Per Household		
0 Vehicles	21,732	10.4%
1 Vehicle	70,717	33.9%
2 Vehicle	79,425	38.1%
3+ Vehicles	36,778	17.6%

Householder Race	Owner	%	Renter	%
Single Race				
White	98,627	76.1%	48,412	61.2%
Black/African American	4,414	3.4%	6,618	8.4%
American Ind/Alaska	1,668	1.3%	1,521	1.9%
Asian	3,816	2.9%	2,244	2.8%
Hawaiian/Pac Islndr	124	0.1%	134	0.2%
Some Other Race	17,135	13.2%	16,858	21.3%
Two or More Races	3,825	3.0%	3,256	4.1%

Householder Age	Owner	%	Renter	%
Age 15 - 24	2,249	1.7%	10,447	8.1%
Age 25 - 34	15,635	12.1%	21,849	16.9%
Age 35 - 44	30,545	23.6%	20,439	15.8%
Age 45 - 54	29,262	22.6%	12,136	9.4%
Age 55 - 64	20,848	16.1%	6,136	4.7%
Age 65 - 74	16,940	13.1%	4,215	3.3%
Age 75 - 84	11,271	8.7%	2,772	2.1%
Age 85+	2,859	2.2%	1,049	0.8%

Occupation for Employed Population Age 16+		%
White Collar	232,461	67.2%
Mgmt/Bus/Finance	23,196	6.7%
Professional	39,504	11.4%
Sales/Office	56,117	16.2%
Blue Collar	113,644	32.8%
Service	40,983	11.8%
Farm/Fish/Forestry	15,517	4.5%
Const/Ext/Maintenance	25,660	7.4%
Prod/Transp/Materials	31,484	9.1%

Educational Attainment		
Population 25+	**383,667**	
Less than 9th Grade	70,044	18.3%
Some High School	50,937	13.3%
High School Diploma	97,344	25.4%
College 1-3 years	113,473	29.6%
Bachelor's Degree	34,739	9.1%
Grad/Prof Degree	17,130	4.5%

Place of Work		
Total Workers Age 16+	229,733	
Living in an MSA/PMSA:	229,733	100.0%
Living in a central city:	99,769	43.4%
Worked in MSA/PMSA of residence:	96,816	42.1%
Central City	65,935	28.7%
Remainder	30,881	13.4%
Worked outside MSA/PMSA of res	2,953	1.3%
Worked in dift MSA/PMSA of res:	2,672	1.2%
Central City	1,205	0.5%
Remainder	1,467	0.6%
Worked outside any MSA/PMSA:	281	0.1%
Living in remainder of MSA/PMSA:	129,964	56.6%
Worked in MSA/PMSA of residence:	118,142	51.4%
Central City	33,181	14.4%
Remainder	84,961	37.0%
Worked outside MSA/PMSA of res:	11,822	5.1%
Worked in dift MSA/PMSA of res:	11,125	4.8%
Central City	4,967	2.2%
Remainder	6,158	2.7%
Worked outside any MSA/PMSA:	697	0.3%
Not Living in an MSA/PMSA:	0	0.0%
Worked in MSA/PMSA:	0	0.0%
Central City	0	0.0%
Remainder	0	0.0%
Worked outside any MSA/PMSA:	0	0.0%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-7

2000 Population Profile

Inyo County, CA

Population	17,945	**Households**	7,703		
		Families	4,937	64.1%	

Persons in Households	17,788
Persons in Families	14,243
Persons in Group Qtrs	157

Age Distribution		**%**	**Male**	**Female**
Under 5	961	5.4%	493	468
Age 5-9	1,184	6.6%	595	589
Age 10-14	1,360	7.6%	702	658
Age 15-17	871	4.9%	436	435
Age 18-20	525	2.9%	270	255
Age 21-24	513	2.9%	252	261
Age 25-29	644	3.6%	325	319
Age 30-34	849	4.7%	417	432
Age 35-44	2,714	15.1%	1,332	1,382
Age 45-54	2,911	16.2%	1,435	1,476
Age 55-59	1,101	6.1%	560	541
Age 60-64	883	4.9%	459	424
Age 65-74	1,790	10.0%	826	964
Age 75-84	1,224	6.8%	512	712
Age 85+	415	2.3%	147	268
Median Age	42.8		42.2	43.6

Relationship by Household Type (Total Population)

In Households	17,788	99.1%
In Family Households	14,607	81.4%
Householder	4,937	27.5%
Male	3,486	19.4%
Female	1,451	8.1%
Spouse	3,835	21.4%
Parent	129	0.7%
Other relatives	208	1.2%
Nonrelatives	364	2.0%
In Non-Family Households	3,181	17.7%
Male Householder	1,329	7.4%
Male HHldr living alone	1,117	6.2%
Male HHldr not living alone	212	1.2%
Female Householder	1,437	8.0%
Female HHldr living alone	1,299	7.2%
Female HHldr not living alone	138	0.8%
In group quarters	157	0.9%
Institutionalized	141	0.8%
Noninstitutionalized	16	0.1%

Population in Group Quarters	**157**	**0.9%**
Institutionalized Population	**141**	0.8%
Correctional	0	0.0%
Nursing Homes	141	0.8%
Other Institutions	0	0.0%
Noninstitutionalized Population	**16**	**0.1%**
College on off Campus	0	0.0%
Military Quarters	0	0.0%
Other	16	0.1%

Non-Hispanic Population By Race	**15,688**	**87.4%**
White alone	13,352	74.4%
Black alone	20	0.1%
American Indian/Alaskan Native alone	1,678	9.4%
Asian alone	158	0.9%
Native Hawaiian/Pac Islander alone	15	0.1%
Some other race alone	23	0.1%
Two or More Races	442	2.5%

Hispanic Population By Race	**2,257**	**12.6%**
White alone	1,015	5.7%
Black alone	9	0.1%
American Indian/Alaskan Native alone	124	0.7%
Asian alone	5	0.0%
Native Hawaiian/Pac Islander alone	0	0.0%
Some other race alone	802	4.5%
Two or More Races	302	1.7%

Relationship by Household Type (Age 65+)

Population Age 65+	**3,429**	**19.1%**
In Households	3,293	18.4%
In Family Households	2,136	11.9%
Householder	1,146	6.4%
Male	914	5.1%
Female	232	1.3%
Spouse	861	4.8%
Parent	83	0.5%
Other relatives	43	0.2%
Nonrelatives	3	0.0%
In Non-Family Households	1,157	6.4%
Male Householder	347	1.9%
Male HHldr living alone	315	1.8%
Male HHldr not living alone	32	0.2%
Female Householder	761	4.2%
Female HHldr living alone	729	4.1%
Female HHldr not living alone	32	0.2%
Nonrelatives	49	0.3%
In group quarters	136	0.8%
Institutionalized	136	0.8%
Noninstitutionalized	0	0.0%

Unmarried Partner Households	**399**	**5.2%**
Male hhldr and male partner	24	0.3%
Male hhldr and female partner	199	2.6%
Female hhldr and female partner	21	0.3%
Female hhldr and male partner	155	2.0%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-7 (Cont'd)

2000 Housing Profile

Inyo County, CA

Total Housing Units	**9,042**	
Occupied Housing Units	**7,703**	**100.0%**
Owner-Occupied	5,076	65.9%
Renter-Occupied	2,627	34.1%
Vacant Housing Units	**1,339**	**14.8%**
Vacant For Rent	195	2.2%
Vacant For Sale	95	1.1%
Not Yet Occupied	101	1.1%
Seasonal, Rec, Occ Use	554	6.1%
For Migrant Workers	0	0.0%
Other Vacant	394	4.4%

Housing Value	**3,208**	
Less than $19,999	19	0.6%
$20,000 to $39,999	61	1.9%
$40,000 to $59,999	111	3.5%
$60,000 to $79,999	154	4.8%
$80,000 to $99,999	231	7.2%
$100,000 to $124,999	360	11.2%
$125,000 to $149,999	461	14.4%
$150,000 to $174,999	459	14.3%
$175,000 to $199,999	363	11.3%
$200,000 to $249,999	386	12.0%
$250,000 to $299,999	252	7.9%
$300,000 to $399,999	252	7.9%
$400,000 to $499,999	64	2.0%
$500,000 to $749,999	31	1.0%
$750,000 to $999,999	2	0.1%
$1,000,000 or more	2	0.1%
Median Housing Value	$161,300	
Average Housing Value	$181,557	

Monthly Rent	**2,608**	
No Cash Rent	222	8.5%
Less Than $199	194	7.4%
$200 to $249	136	5.2%
$250 to $299	231	8.9%
$300 to $349	358	13.7%
$350 to $399	190	7.3%
$400 to $499	540	20.7%
$500 to $599	321	12.3%
$600 to $699	172	6.6%
$700 to $799	126	4.8%
$800 to $899	35	1.3%
$900 to $999	14	0.5%
$1,000 to $1,249	23	0.9%
$1,250 to $1,499	0	0.0%
$1,500 to $1,999	46	1.8%
$2,000 or more	0	0.0%
Median Rent	$414	15.9%
Average Rent	$396	15.2%

Persons Per Household	Owner	%	Renter	%
1 Person Per Unit	1,375	27.1%	1,041	39.6%
2 Persons Per Unit	2,190	43.1%	671	25.5%
3 Persons Per Unit	584	11.5%	361	13.7%
4 Persons Per Unit	564	11.1%	304	11.6%
5 Persons Per Unit	258	5.1%	154	5.9%
6 Persons Per Unit	77	1.5%	70	2.7%
7+ Persons Per Unit	28	0.6%	26	1.0%
Average Household Size	2.31			

Persons Per Family/Non-Family	Family	%	Non-Family	%
1 Person Per Unit	-	-	2,416	87.3%
2 Persons Per Unit	2,554	51.7%	307	11.1%
3 Persons Per Unit	915	18.5%	30	1.1%
4 Persons Per Unit	860	17.4%	8	0.3%
5 Persons Per Unit	409	8.3%	3	0.1%
6 Persons Per Unit	146	3.0%	1	0.0%
7+ Persons Per Unit	53	1.1%	1	0.0%
Average Family Size	2.88			
Average Non-Family Size	1.28			

Units In Structure	Owner	%	Renter	%
1, detached	3,389	66.8%	1,281	48.7%
1, attached	57	1.1%	119	4.5%
2	10	0.2%	115	4.4%
3 or 4	8	0.2%	197	7.5%
5 to 9	3	0.1%	133	5.1%
10 to 19	26	0.5%	93	3.5%
20 to 49	0	0.0%	113	4.3%
50 or more	0	0.0%	32	1.2%
Mobile Home	1,553	30.6%	526	20.0%
Boat, RV, Van, etc.	29	0.6%	19	0.7%

Tenure By Year Structure Built	Owner	%	Renter	%
1999-March 00	64	1.3%	17	0.6%
1995-1998	167	3.3%	107	4.1%
1990-1994	439	8.7%	125	4.8%
1980-1989	1,080	21.3%	347	13.2%
1970-1979	1,243	24.5%	526	20.0%
1960-1969	830	16.4%	486	18.5%
1959 or earlier	1,252	24.7%	1,020	38.8%

Tenure by Year Moved In	Owner	%	Renter	%
1999-March 00	450	8.9%	1,013	38.5%
1995-1998	1,114	22.0%	1,060	40.3%
1990-1994	1,004	19.8%	311	11.8%
1980-1989	1,287	25.4%	143	5.4%
1970-1979	741	14.6%	58	2.2%
1969 or earlier	479	9.4%	43	1.6%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-7 (Cont'd)

2000 Socioeconomic Profile

Inyo County, CA

Income Distribution	Household Income		Family Income	
Less than $10,000	907	11.8%	306	6.2%
$10,000 to $14,999	680	8.9%	257	5.2%
$15,000 to $19,999	689	9.0%	341	6.9%
$20,000 to $24,999	526	6.9%	316	6.4%
$25,000 to $29,999	521	6.8%	371	7.5%
$30,000 to $34,999	513	6.7%	318	6.5%
$35,000 to $39,999	469	6.1%	259	5.3%
$40,000 to $44,999	432	5.6%	298	6.0%
$45,000 to $49,999	309	4.0%	260	5.3%
$50,000 to $59,999	766	10.0%	587	11.9%
$60,000 to $74,999	607	7.9%	523	10.6%
$75,000 to $99,999	606	7.9%	506	10.3%
$100,000 to $124,999	362	4.7%	327	6.6%
$125,000 to $149,999	144	1.9%	133	2.7%
$150,000 to $199,999	80	1.0%	73	1.5%
$200,000 or more	62	0.8%	54	1.1%
Total	7,673		4,929	
Median Income	$35,006		$44,970	
Average Income	$44,932		$53,749	

Workers Per Family			Average Income
0 Workers	913	18.5%	$37,078
1 Workers	1,523	30.9%	$41,125
2 Workers	2,050	41.5%	$66,437
3+ Workers	450	9.1%	$71,576

Vehicles Per Household		
0 Vehicles	649	8.4%
1 Vehicle	2,664	34.6%
2 Vehicle	2,703	35.1%
3+ Vehicles	1,687	21.9%

Householder Race	Owner	%	Renter	%
Single Race				
White	4,365	86.0%	2,154	82.0%
Black/African American	2	0.0%	6	0.2%
American Ind/Alaska	476	9.4%	201	7.7%
Asian	26	0.5%	28	1.1%
Hawaiian/Pac Islndr	1	0.0%	6	0.2%
Some Other Race	94	1.9%	132	5.0%
Two or More Races	112	2.2%	100	3.8%

Householder Age	Owner	%	Renter	%
Age 15 - 24	60	1.2%	184	3.6%
Age 25 - 34	260	5.1%	467	9.2%
Age 35 - 44	853	16.8%	695	13.7%
Age 45 - 54	1,087	21.4%	619	12.2%
Age 55 - 64	969	19.1%	255	5.0%
Age 65 - 74	972	19.1%	198	3.9%
Age 75 - 84	689	13.6%	147	2.9%
Age 85+	186	3.7%	62	1.2%

Occupation for Employed Population Age 16+		%
White Collar	8,007	67.8%
Mgmt/Bus/Finance	839	7.1%
Professional	1,373	11.6%
Sales/Office	1,994	16.9%
Blue Collar	3,801	32.2%
Service	1,865	15.8%
Farm/Fish/Forestry	117	1.0%
Const/Ext/Maintenance	957	8.1%
Prod/Transp/Materials	862	7.3%

Educational Attainment		
Population 25+	**12,566**	
Less than 9th Grade	854	6.8%
Some High School	1,366	10.9%
High School Diploma	3,934	31.3%
College 1-3 years	4,259	33.9%
Bachelor's Degree	1,321	10.5%
Grad/Prof Degree	832	6.6%

Place of Work		
Total Workers Age 16+	7,884	
Living in an MSA/PMSA:	0	0.0%
Living in a central city:	0	0.0%
Worked in MSA/PMSA of residence:	0	0.0%
Central City	0	0.0%
Remainder	0	0.0%
Worked outside MSA/PMSA of res	0	0.0%
Worked in dift MSA/PMSA of res:	0	0.0%
Central City	0	0.0%
Remainder	0	0.0%
Worked outside any MSA/PMSA:	0	0.0%
Living in remainder of MSA/PMSA:	0	0.0%
Worked in MSA/PMSA of residence:	0	0.0%
Central City	0	0.0%
Remainder	0	0.0%
Worked outside MSA/PMSA of res:	0	0.0%
Worked in dift MSA/PMSA of res:	0	0.0%
Central City	0	0.0%
Remainder	0	0.0%
Worked outside any MSA/PMSA:	0	0.0%
Not Living in an MSA/PMSA:	7,884	100.0%
Worked in MSA/PMSA:	217	2.8%
Central City	54	0.7%
Remainder	163	2.1%
Worked outside any MSA/PMSA:	7,667	97.2%

Source: U.S. Bureau of the Census - 2000 Census SF1 and SF3; Alfred Gobar Associates.

EXHIBIT B-8

1990 CENSUS DEMOGRAPHIC COMPARISON
WEST MOJAVE PLAN BY SUBAREA

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Total Population	**602,492**	293,447	233,014	75,416	615
% Share of Total	**100.0%**	48.7%	38.7%	12.5%	0.1%
Population Growth (1990-2000)	**13.4%**	18.1%	28.4%	3.1%	-8.6%
Age Distribution					
Age 0 to 20	**35.4%**	35.1%	36.2%	34.4%	21.3%
Age 21 to 34	**25.2%**	24.1%	26.6%	25.2%	18.5%
Age 35 to 54	**23.3%**	22.0%	24.1%	25.4%	27.5%
Age 55 to 64	**7.1%**	7.7%	6.1%	7.5%	13.0%
Age 65+	**9.1%**	11.2%	7.0%	7.6%	19.7%
Race Distribution					
Non-Hispanic	**83.6%**	83.5%	82.0%	88.9%	89.8%
White	**73.9%**	74.1%	71.5%	80.9%	87.7%
Black	**5.8%**	5.9%	6.3%	4.0%	0.0%
Am Indian/Alskn	**0.9%**	1.0%	0.8%	1.0%	1.6%
Asian	**2.8%**	2.3%	3.3%	2.9%	0.5%
Hawaiian/Pac Islndr	**0.0%**	0.0%	0.0%	0.0%	0.0%
Some other race	**0.2%**	0.1%	0.2%	0.1%	0.0%
Hispanic	**16.4%**	16.5%	18.0%	11.1%	10.2%
Families as % of Households	**76.4%**	76.6%	77.1%	74.2%	63.5%
Persons Per Household					
1 Person Per Unit	**18.5%**	18.8%	17.3%	20.8%	31.4%
2 Person Per Unit	**31.1%**	32.8%	28.6%	31.9%	41.3%
3 Person Per Unit	**18.0%**	17.5%	18.8%	17.7%	12.0%
4 Person Per Unit	**17.5%**	16.5%	19.1%	16.8%	8.8%
5 Person Per Unit	**8.9%**	8.7%	9.7%	8.1%	4.6%
6 Person Per Unit	**3.6%**	3.6%	4.0%	3.0%	1.8%
7+ Person Per Unit	**2.2%**	2.1%	2.6%	1.7%	0.0%
Average Household Size	**2.87**	2.90	3.10	2.80	2.20
Householder Age					
Age 15 - 24	**6.2%**	6.7%	5.3%	6.3%	3.4%
Age 25 - 34	**26.4%**	24.1%	29.7%	27.0%	15.4%
Age 35 - 44	**23.5%**	22.0%	25.7%	23.7%	19.2%
Age 45 - 54	**14.8%**	14.3%	15.2%	16.1%	15.4%
Age 55 - 64	**12.3%**	13.0%	11.1%	12.6%	16.8%
Age 65 - 74	**10.8%**	12.7%	8.3%	9.4%	18.8%
Age 75+	**6.1%**	7.3%	4.6%	4.9%	11.0%
Housing by Tenure					
Owner-Occupied	**66.0%**	64.4%	69.9%	61.1%	61.9%
Renter-Occupied	**34.0%**	35.6%	30.1%	38.9%	38.1%
Vacant Units	**12.4%**	15.3%	9.0%	9.8%	34.8%
For Seasonal, Rec, or Occ	**2.3%**	3.8%	0.5%	1.3%	18.1%

EXHIBIT B-8 (Cont'd)

1990 CENSUS DEMOGRAPHIC COMPARISON
WEST MOJAVE PLAN BY SUBAREA

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Housing Value					
Less Than $19,999	**0.6%**	0.9%	0.3%	0.9%	14.7%
$20,000 to $39,999	**2.1%**	3.1%	0.3%	3.4%	24.0%
$40,000 to $59,999	**6.7%**	10.3%	0.8%	11.0%	28.0%
$60,000 to $74,999	**9.8%**	14.2%	2.0%	18.6%	14.7%
$75,000 to $99,999	**21.5%**	27.0%	10.7%	37.1%	10.7%
$100,000 to $124,999	**18.3%**	17.7%	19.9%	15.0%	5.3%
$125,000 to $149,999	**16.4%**	11.7%	24.9%	6.9%	0.0%
$150,000 to $174,999	**10.0%**	6.4%	16.4%	3.6%	0.0%
$175,000 to $199,999	**5.0%**	3.2%	8.2%	1.5%	1.3%
$200,000 to $249,999	**4.7%**	2.9%	7.9%	1.1%	0.0%
$250,000 to $299,999	**2.3%**	1.3%	4.0%	0.4%	0.0%
$300,000 to $399,999	**1.6%**	0.8%	3.0%	0.3%	0.0%
$400,000 to $499,999	**0.6%**	0.3%	1.1%	0.0%	0.0%
$500,000 or more	**0.4%**	0.2%	0.6%	0.1%	1.3%
Median Housing Value	**$106,300**	$94,947	$141,187	$85,833	$45,499
Monthly Rent					
No Cash Rent	**9.7%**	10.6%	2.3%	23.1%	37.8%
Less Than $199	**5.6%**	5.0%	7.1%	4.5%	31.7%
$200 to $249	**2.9%**	3.3%	1.8%	3.5%	6.1%
$250 to $299	**4.7%**	5.9%	2.0%	6.3%	3.7%
$300 to $349	**7.9%**	10.4%	3.1%	8.6%	6.1%
$350 to $399	**11.4%**	14.0%	6.6%	11.4%	7.3%
$400 to $499	**24.7%**	27.4%	20.4%	24.0%	4.9%
$500 to $599	**15.6%**	11.3%	25.5%	9.9%	1.2%
$600 to $699	**8.8%**	7.5%	12.6%	5.2%	0.0%
$700 to $999	**8.0%**	4.2%	16.9%	3.3%	0.0%
$1,000 or more	**0.8%**	0.3%	1.7%	0.4%	1.2%
Median Rent	**$431**	$420	$527	$417	$196
Year Structure Built					
1989 - March 1990	**32.4%**	32.3%	32.4%	33.0%	17.1%
1985 - 1988	**35.9%**	34.7%	38.9%	33.0%	21.6%
1980 - 1984	**12.7%**	13.4%	11.8%	12.6%	16.1%
1970 - 1979	**13.0%**	13.9%	10.7%	15.5%	28.1%
1960 - 1969	**3.9%**	3.8%	4.0%	3.9%	10.6%
<1959	**2.1%**	1.9%	2.2%	2.1%	6.5%
Year Moved In					
1989 - March 1990	**32.4%**	32.3%	32.4%	33.0%	17.1%
1985 - 1988	**35.9%**	34.7%	38.9%	33.0%	21.6%
1980 - 1984	**12.7%**	13.4%	11.8%	12.6%	16.1%
1970 - 1979	**13.0%**	13.9%	10.7%	15.5%	28.1%
1960 - 1969	**3.9%**	3.8%	4.0%	3.9%	10.6%
<1959	**2.1%**	1.9%	2.2%	2.1%	6.5%

EXHIBIT B-8 (Cont'd)

1990 CENSUS DEMOGRAPHIC COMPARISON
WEST MOJAVE PLAN BY SUBAREA

Census Variable	**TOTAL West Mojave Plan Area**	San Bernardino County Subarea	Los Angeles County Subarea	Kern County Subarea	Inyo County Subarea
Units in Structure					
1 Unit, Detached	**66.7%**	66.9%	69.8%	56.5%	54.1%
1 Unit, Attached	**3.5%**	4.5%	2.1%	3.6%	1.0%
2 Units	**2.7%**	3.3%	1.1%	4.3%	0.0%
3-9 Units	**8.0%**	8.4%	7.6%	7.7%	2.4%
10-19 Units	**2.7%**	2.4%	3.4%	1.9%	0.0%
20-49 Units	**1.5%**	1.0%	2.6%	0.6%	0.0%
50 or More Units	**1.3%**	0.6%	2.9%	0.0%	0.0%
Mobile Home or Trailer	**13.1%**	12.5%	9.9%	25.0%	41.1%
Other	**0.5%**	0.5%	0.5%	0.4%	1.4%
Household Income					
Less Than $15,000	**20.4%**	24.3%	15.2%	17.9%	42.0%
$15,000-$19,999	**7.9%**	9.2%	5.7%	8.7%	13.0%
$20,000-$29,999	**15.2%**	16.7%	12.8%	15.8%	18.4%
$30,000-$39,999	**16.2%**	16.1%	16.3%	16.7%	7.2%
$40,000-$49,999	**13.1%**	11.8%	15.2%	13.0%	7.8%
$50,000-$59,999	**9.7%**	8.3%	11.7%	10.2%	6.5%
$60,000-$74,999	**8.7%**	6.8%	11.2%	10.1%	5.1%
$75,000-$99,999	**5.8%**	4.4%	7.8%	5.7%	0.0%
$100,000-$124,999	**1.5%**	1.1%	2.4%	1.0%	0.0%
$125,000-$149,999	**0.6%**	0.5%	0.7%	0.5%	0.0%
$150,000 or more	**0.9%**	0.8%	1.1%	0.5%	0.0%
Median Household Income	**$33,869**	$29,892	$40,021	$34,395	$18,091
Educational Attainment (Age 25+)					
Less than 9th Grade	**6.2%**	6.5%	5.9%	5.5%	9.6%
Some High School	**15.5%**	16.2%	15.3%	12.9%	15.1%
High School Diploma	**29.9%**	31.7%	27.5%	28.5%	57.4%
College 1-3 years	**35.0%**	33.4%	37.2%	35.5%	12.4%
Bachelor's Degree	**9.0%**	8.0%	9.7%	11.6%	4.0%
Grad/Prof Degree	**4.5%**	4.2%	4.4%	6.0%	1.5%
Occupation (Age 16+)					
White Collar	**55.3%**	53.5%	56.2%	59.9%	31.1%
Blue Collar	**44.7%**	46.5%	43.8%	40.1%	68.9%
Workers Per Family					
0 Workers	**13.8%**	17.1%	10.0%	10.4%	30.6%
1 Worker	**32.4%**	33.3%	31.4%	31.7%	28.0%
2 Workers	**44.5%**	41.1%	48.5%	48.4%	33.3%
3+ Workers	**9.2%**	8.5%	10.1%	9.5%	8.1%
Vehicles Per Household					
0 Vehicles	**4.9%**	5.2%	4.6%	4.3%	3.8%
1 Vehicle	**30.1%**	32.9%	25.8%	30.5%	16.4%
2 Vehicle	**41.4%**	39.4%	44.4%	41.6%	33.4%
3+ Vehicles	**23.6%**	22.4%	25.2%	23.6%	46.4%

Source: Alfred Gobar Associates; U.S. Bureau of the Census; AnySite Online.

EXHIBIT B-9

1990 CENSUS DEMOGRAPHIC COMPARISON
INCORPORATED CITIES WITHIN WEST MOJAVE PLAN REGION

Census Variable	**Combined Cities**	City of Adelanto	Town of Apple Valley	City of Barstow	California City	City of Hesperia	City of Lancaster	City of Palmdale	City of Ridgecrest	City of Twentynine Palms	City of Victorville	City of Yucca Valley
Total Population	**416,571**	7,351	46,274	22,041	5,997	51,192	97,025	79,079	27,617	11,859	51,548	16,588
% Share of Total	**100.0%**	1.8%	11.1%	5.3%	1.4%	12.3%	23.3%	19.0%	6.6%	2.8%	12.4%	4.0%
Population Growth (1990-2000)	**24.9%**	146.6%	17.2%	-4.2%	39.8%	22.2%	22.4%	47.5%	-9.7%	24.5%	24.2%	1.7%
Age Distribution												
Age 0 to 20	**35.5%**	39.5%	35.6%	35.7%	34.7%	36.9%	34.1%	38.6%	32.6%	35.9%	36.0%	26.7%
Age 21 to 34	**25.7%**	28.6%	21.7%	25.4%	24.3%	21.3%	27.5%	28.6%	25.6%	27.6%	28.0%	16.1%
Age 35 to 54	**22.9%**	19.0%	24.8%	22.2%	25.1%	23.3%	23.5%	22.6%	27.0%	20.8%	19.8%	21.2%
Age 55 to 64	**6.8%**	6.1%		8.0%		7.3%		4.9%		6.1%		10.0%
Age 65+	**9.1%**	6.8%	10.0%	8.8%		11.2%		5.2%		9.5%		26.0%
Race Distribution			7.9%		7.7%		6.7%		7.6%		6.4%	
Non-Hispanic	**82.7%**	80.0%	87.3%	68.5%	8.2% 89.7%	81.1%	8.2% 84.8%	78.0%	7.2% 92.1%	89.7%	9.8% 79.1%	93.0%
White	**72.6%**	63.8%	80.3%	53.7%	74.0%	76.7%	73.4%	67.4%	84.7%	76.0%	64.8%	89.5%
Black alone	**6.0%**	12.1%		9.8%	11.2%	2.3%		5.7%		8.2%		
Am Indian/Alskn alone	**0.8%**	1.6%	0.8%	1.7%	0.7%	0.7%	0.8%	0.7%	0.8%	1.2%	0.8%	
Asian alone	**3.1%**	2.3%	3.8% 2.2%	3.0%	3.8%	1.2%	7.1% 3.4%	4.0%	2.9% 3.6%	4.0%	9.5% 3.8%	1.2%
Some other race alone	**0.1%**	0.2%	0.1%	0.2%	0.0%	0.1%	0.2%	0.2%	0.1%	0.2%	0.2%	0.9%
Hispanic	**17.3%**	20.0%	12.7%	31.5%	10.3%	18.9%	15.2%	22.0%	7.9%	10.3%	20.9%	1.3% 0.1% 7.0%
Families as % of Households	**76.0%**	72.8%	80.4%	72.3%	76.7%	80.4%	73.2%	80.1%	70.7%	70.5%	77.3%	66.7%
Persons Per Household												
1 Person Per Unit	**18.7%**	20.8%	14.7%	22.2%	18.5%	15.4%	20.5%	14.6%	23.3%	24.2%	18.0%	28.1%
2 Person Per Unit	**30.7%**	31.1%	33.6%	29.5%	32.8%	30.9%	30.2%	26.4%	32.7%	31.9%	30.4%	40.0%
3 Person Per Unit	**18.2%**	18.6%	18.6%	18.7%	17.7%	17.3%	18.3%	20.0%	17.4%	19.2%	18.2%	13.5%
4 Person Per Unit	**17.6%**	14.3%	18.5%	15.8%	17.8%	18.7%	17.5%	21.2%	15.4%	14.3%	17.3%	10.2%
5 Person Per Unit	**8.9%**	8.6%		7.9%		10.4%		11.0%		6.5%		
6 Person Per Unit	**3.6%**	4.4%	3.5%	3.7%	3.6%	4.4%	3.4%	4.2%	2.6%	2.6%	3.9%	
7+ Person Per Unit	**2.2%**	2.3%	8.9% 2.3%	2.2%	8.5% 1.1%	2.9%	8.2% 2.0%	2.7%	7.3% 1.4%	1.3%	9.8% 2.4%	5.4%
Average Household Size	**2.89**	2.80	3.00	2.80	2.80	3.10	3.00	3.10	2.70	2.60	3.00	1.7% 1.1% 2.40
Householder Age												
Age 15 - 24	**6.7%**	14.2%		9.8%		5.1%		6.1%		15.7%	7.6%	
Age 25 - 34	**27.6%**	31.9%	23.7%	24.9%	26.8%	22.7%	28.9%	34.6%	26.4%	25.6%	30.4%	14.9%
Age 35 - 54	**37.5%**	30.9%	5.6% 40.0%	35.0%	5.7% 40.8%	38.7%	6.4% 37.9%	40.5%	6.2% 42.0%	31.6%	32.9%	4.2% 28.4%
Age 55 - 64	**11.6%**	10.9%	12.9%	13.7%	12.5%	12.2%	12.0%	9.0%	12.7%	10.0%	11.0%	13.6%
Age 65+	**16.6%**	12.1%	17.8%	16.5%	14.2%	21.3%	14.8%	9.9%	12.7%	17.1%	18.1%	38.9%

EXHIBIT B-9 (Cont'd)

1990 CENSUS DEMOGRAPHIC COMPARISON
INCORPORATED CITIES WITHIN WEST MOJAVE PLAN REGION

Census Variable	**Combined Cities**	City of Adelanto	Town of Apple Valley	City of Barstow	California City	City of Hesperia	City of Lancaster	City of Palmdale	City of Ridgecrest	City of Twentynine Palms	City of Victorville	City of Yucca Valley
Housing by Tenure												
Owner-Occupied	**64.9%**	39.5%	69.2%	52.7%	68.8%		63.7%	70.8%	63.2%	52.1%	56.9%	69.3%
Renter-Occupied	**35.1%**	60.5%	30.8%	47.3%	31.2%		36.3%	29.2%	36.8%	47.9%	43.1%	30.7%
Vacant Units	**9.1%**	13.4%	6.8%	10.2%	11.1%	73.9% 26.1% 4.7%	8.9%	9.2%	8.0%	24.9%	8.3%	11.8%
For Seasonal, Rec, or Occ	**0.7%**	1.5%	0.7%	0.5%	1.3%		0.2%	0.4%	0.3%	2.2%	0.4%	3.8%
Housing Value												
Less Than $19,999	**0.3%**	1.1%	0.2%	0.8%	0.3%	0.4%	0.1%	0.2%	0.2%	1.1%	0.3%	0.7%
$20,000 to $39,999	**0.9%**	3.8%	0.5%	2.5%	0.8%		0.2%	0.2%	1.3%	7.5%	0.8%	2.4%
$40,000 to $59,999	**4.6%**	20.3%	1.7%	18.4%	10.4%	0.4% 3.2%	0.7%	0.4%	7.2%	29.8%	3.9%	18.1%
$60,000 to $74,999	**8.9%**	32.4%	6.2%	36.3%	21.7%	0.4% 9.4%	2.3%	1.2%	18.1%	24.9%	9.7%	20.3%
$75,000 to $99,999	**22.6%**	31.7%	26.1%	30.4%	42.3%		15.1%	7.1%	43.4%	22.8%	30.1%	29.6%
$100,000 to $124,999	**19.9%**	4.9%	21.2%	8.2%	15.4%		22.3%	16.3%	16.3%	8.0%	28.7%	12.3%
$125,000 to $149,999	**18.7%**	1.7%	15.9%	2.2%	6.0%	29.9% 16.3%	25.7%	29.2%	7.8%	2.9%	17.5%	6.9%
$150,000 to $174,999	**11.2%**	1.7%	10.8%	0.7%	2.2%	25.2%	14.8%	21.8%	3.2%	1.4%	5.7%	3.9%
$175,000 to $199,999	**5.3%**	0.4%	6.4%	0.2%	0.2%		7.1%	10.5%	1.2%	0.6%	2.1%	2.4%
$200,000 to $249,999	**4.4%**	1.3%	5.7%	0.2%	0.3%	7.8%	6.5%	8.0%	0.8%	0.6%	0.8%	1.8%
$250,000 to $299,999	**1.8%**	0.4%	2.5%	0.1%	0.3%	3.2%	2.8%	3.1%	0.2%	0.3%	0.3%	0.6%
$300,000 to $399,999	**1.0%**	0.0%	1.8%	0.1%	0.0%	2.6%	1.6%	1.4%	0.2%	0.0%	0.1%	0.5%
$400,000 to $499,999	**0.3%**	0.0%	0.6%	0.0%	0.0%	1.1%	0.4%	0.4%	0.0%	0.1%	0.1%	0.2%
$500,000 or more	**0.2%**	0.2%	0.3%	0.0%	0.0%	0.3%	0.2%	0.2%	0.1%	0.1%	0.1%	0.3%
Median Housing Value	**$115,930**	$71,446	$117,996	$71,721	$84,873	0.1% 0.1% $106,539	$133,900	$146,082	$88,346	$67,001	$104,595	$82,161
Monthly Rent												
No Cash Rent	**4.3%**	1.0%	1.9%	2.3%	2.1%		1.6%	1.6%	6.4%	2.5%	15.9%	3.4%
Less Than $199	**5.6%**	3.3%	1.7%	10.8%	3.6%		6.8%	7.6%	3.0%	6.8%	3.7%	8.0%
$200 to $249	**2.3%**	3.2%	1.3%	4.7%	2.3%	2.6%	1.8%	1.3%	2.1%	6.4%	2.3%	4.4%
$250 to $299	**3.7%**	12.5%	2.5%	7.6%	11.0%	3.3%	1.7%	1.5%	3.9%	12.1%	3.2%	7.1%
$300 to $349	**7.0%**	21.3%	4.9%	11.9%	10.3%	1.1% 8.1%	2.7%	2.5%	8.4%	16.8%	7.8%	14.1%
$350 to $399	**11.6%**	31.6%	13.9%	16.8%	13.6%	1.9%	6.1%	6.8%	14.3%	18.8%	11.1%	19.5%
$400 to $499	**26.7%**	21.3%	40.6%	25.6%	26.3%		18.7%	22.8%	32.2%	26.4%	29.8%	24.8%
$500 to $599	**18.5%**	3.6%	13.5%	13.7%	14.7%	11.7%	28.3%	26.1%	14.8%	7.1%	13.4%	11.4%
$600 to $699	**10.2%**	1.7%	12.3%	5.7%	10.0%	34.4% 13.7%	14.7%	10.1%	8.7%	2.6%	8.2%	5.6%
$700 to $749	**3.2%**	0.1%	2.7%	0.5%	2.4%	15.7%	5.5%	4.6%	2.6%	0.4%	1.9%	0.5%
$750 to $999	**6.0%**	0.2%	4.3%	0.5%	3.2%		10.9%	13.1%	2.9%	0.1%	2.5%	1.0%
$1,000 or more	**0.8%**	0.0%	0.5%	0.0%	0.6%	3.9%	1.3%	2.0%	0.8%	0.0%	0.2%	0.0%
Median Rent	**$459**	$363	$460			3.4% 0.3%	$537		$450		$441	
				$391	$426	$466		$523		$367		$386

EXHIBIT B-9 (Cont'd)

1990 CENSUS DEMOGRAPHIC COMPARISON
INCORPORATED CITIES WITHIN WEST MOJAVE PLAN REGION

Census Variable	**Combined Cities**	City of Adelanto	Town of Apple Valley	City of Barstow	California City	City of Hesperia	City of Lancaster	City of Palmdale	City of Ridgecrest	City of Twentynine Palms	City of Victorville	City of Yucca Valley
Year Structure Built												
1989-March 90	**7.4%**	6.3%	6.9%	3.6%	20.6%	5.0%	6.8%	12.1%	3.7%	2.2%	10.1%	2.0%
1985 - 1988	**27.8%**	31.7%	33.2%	7.0%	28.1%	27.9%	26.6%	38.5%		22.1%		15.4%
1980 - 1984	**16.5%**	26.8%	21.8%	9.5%	4.9%	24.3%	13.2%	16.4%		17.2%		17.1%
1970 - 1979	**19.4%**	15.2%	21.1%	16.7%	26.1%	28.0%	18.2%	9.2%	23.0% 30.9%	17.2%	27.9%	30.0%
1960 - 1969	**11.5%**	9.4%	8.5%	26.3%	16.8%	9.2%	10.4%	7.5%	11.3% 14.7%	12.2%	16.1% 10.9%	23.2%
1950 - 1959	**13.3%**	3.0%	7.1%	24.3%	2.9%	4.7%	20.6%	14.5%		19.3%	17.4%	8.6%
1940 or earlier	**4.1%**	7.6%	1.5%	12.7%	0.8%	0.9%	4.2%	1.9%	4.0%	9.8%	7.4%	3.7%
									12.3%		10.2%	
Year Moved In												
1989 - March 1990	**34.3%**	56.6%	30.9%	34.6%	45.1%	26.0%	33.2%	37.5%		44.0%		27.0%
1985 - 1988	**36.3%**	28.0%	40.2%	23.9%	29.4%	39.3%	35.4%	41.8%		25.4%		29.4%
1980 - 1984	**11.8%**	9.0%	13.0%	9.5%	8.1%	16.0%	11.2%	9.1%	30.8% 13.5%	11.0%	40.2%	18.5%
1970 - 1979	**12.0%**	4.9%	11.4%	16.3%	15.3%	16.0%	12.5%	7.1%	34.6% 16.1%	12.2%	37.6% 7.8%	20.3%
1960 - 1969	**3.8%**	0.7%	3.0%	9.5%	1.7%	2.4%	5.3%	2.8%	3.5%	5.6%	10.2% 2.8%	3.5%
<1959	**1.8%**	0.8%	1.6%	6.3%	0.4%	0.3%	2.4%	1.6%	1.6%	1.8%	1.5%	1.3%
Units in Structure												
1 Unit, Detached	**66.7%**	32.0%	73.4%	59.3%	74.5%	79.6%	61.5%	71.3%		72.9%		73.9%
1 Unit, Attached	**3.1%**	2.0%	1.8%	2.8%	0.9%	1.6%	2.6%	2.1%	5.4%	2.6%	7.7%	2.9%
2 Units	**2.8%**	6.1%	2.6%	5.4%	3.7%	2.6%	1.7%	0.6%	62.2% 7.4%	6.0%	57.3% 2.8%	3.6%
3-9 Units	**10.0%**	18.1%	14.4%	12.5%	9.8%	5.2%	12.1%	5.8%	10.0%	9.5%	11.6%	6.8%
10-19 Units	**3.6%**	11.8%	2.6%	5.9%	2.3%	3.9%	4.2%	3.9%	1.7%	0.9%	2.6%	2.2%
20-49 Units	**2.0%**	8.3%	0.2%	1.9%	0.0%	0.6%	2.4%	4.0%	1.0%	0.4%	2.8%	0.0%
50 or More Units	**2.0%**	0.0%	0.0%	0.9%	0.0%	0.7%	3.1%	4.8%	0.0%	0.0%	2.9%	0.0%
Mobile Home or Trailer	**9.2%**	20.7%	4.8%	10.3%	8.7%	5.4%	11.9%	7.0%	12.1%	7.0%	11.6%	10.1%
Other	**0.5%**	1.0%	0.2%	0.9%	0.0%	0.5%	0.5%	0.4%	0.4%	0.7%	0.6%	0.5%

EXHIBIT B-9 (Cont'd)

1990 CENSUS DEMOGRAPHIC COMPARISON
INCORPORATED CITIES WITHIN WEST MOJAVE PLAN REGION

Census Variable	**Combined Cities**	City of Adelanto	Town of Apple Valley	City of Barstow	California City	City of Hesperia	City of Lancaster	City of Palmdale	City of Ridgecrest	City of Twentynine Palms	City of Victorville	City of Yucca Valley
Household Income												
Less Than $15,000	**20.0%**	43.6%	18.8%	25.1%	16.8%	23.1%	17.0%	13.8%	14.3%	29.8%	23.0%	32.3%
$15,000-$19,999	**7.8%**	13.0%	7.9%	9.0%	4.3%	9.3%	6.6%	5.1%	6.9%	10.5%	10.1%	10.4%
$20,000-$29,999	**15.2%**	15.0%	15.4%	18.7%	13.7%	15.5%	13.5%	11.9%	13.3%	20.5%	19.6%	18.1%
$30,000-$39,999	**16.2%**	11.9%	17.6%	16.3%	21.0%	17.1%	15.4%	16.5%	15.2%	16.8%	17.1%	12.7%
$40,000-$49,999	**13.3%**	5.1%	11.5%	12.7%	15.1%	12.4%	15.1%	15.6%	15.1%	10.6%	11.5%	9.5%
$50,000-$59,999	**10.0%**	5.6%	9.6%	8.0%	12.8%	9.1%	10.4%	13.8%	11.6%	4.6%	7.8%	6.3%
$60,000-$74,999	**8.8%**	2.9%	8.3%	6.8%	10.9%	7.5%	10.0%	12.5%	12.2%	3.6%	5.1%	4.9%
$75,000-$99,999	**5.9%**	1.4%	6.6%	2.3%	4.0%	4.2%	7.9%	7.3%	8.5%	2.9%	4.0%	2.8%
$100,000-$124,999	**1.5%**	1.0%	1.4%	0.4%	1.4%	1.2%	2.4%	2.1%	1.4%	0.3%	0.9%	1.0%
$125,000-$149,999	**0.6%**	0.2%	0.9%	0.4%	0.0%	0.4%	0.5%	0.6%	0.9%	0.3%	0.5%	0.7%
$150,000 or more	**0.9%**	0.5%	2.0%	0.4%	0.0%	0.4%	1.2%	0.8%	0.6%	0.2%	0.4%	1.3%
Median Household Income	**$33,270**	$17,484	$34,430	$28,629	$36,864	$31,243	$38,386	$41,766	$40,179	$24,281	$28,688	$23,666
Average Household Income	**$39,557**	$24,293	$43,174	$33,383	$38,769	$34,920	$43,512	$44,706	$44,554	$28,378	$33,681	$32,729
Educational Attainment (Age 25+)												
Less than 9th Grade	**6.3%**	13.7%	4.6%	8.9%	5.6%	8.7%	5.8%	5.3%	3.6%	4.1%	7.4%	7.3%
Some High School	**15.4%**	23.7%	15.3%	16.0%	11.8%	19.7%	14.0%	15.6%	9.7%	12.1%	15.1%	19.7%
High School Diploma	**29.2%**	34.2%	28.9%	32.4%	34.9%	32.0%	27.3%	28.1%	22.1%	35.7%	30.7%	31.7%
College 1-3 years	**35.7%**	25.8%	36.1%	32.6%	36.3%	32.7%	36.9%	38.0%	38.3%	34.8%	36.1%	29.8%
Bachelor's Degree	**8.9%**	1.9%	9.2%	5.9%	7.7%	4.5%	10.5%	9.4%	17.2%	8.5%	7.8%	7.1%
Grad/Prof Degree	**4.5%**	0.7%	5.9%	4.3%	3.7%	2.4%	5.6%	3.5%	9.2%	4.8%	2.9%	4.4%
Occupation (Age 16+)												
White Collar	**55.7%**	33.4%	55.6%	50.8%	52.2%	46.6%	59.4%	55.4%	70.7%	52.2%	52.4%	54.9%
Blue Collar	**44.3%**	66.6%	44.4%	49.2%	47.8%	53.4%	40.6%	44.6%	29.3%	47.8%	47.6%	45.1%
Workers Per Family												
0 Workers	**13.5%**	29.3%	15.3%	15.2%	10.9%	18.8%	10.5%	8.6%	7.3%	13.3%	14.0%	29.7%
1 Worker	**32.0%**	35.5%	33.2%	32.9%	27.9%	33.5%	30.4%	30.6%	29.8%	34.6%	34.0%	34.5%
2 Workers	**45.0%**	30.2%	42.3%	40.6%	51.5%	37.9%	48.3%	51.6%	51.6%	45.2%	43.6%	30.0%
3+ Workers	**9.5%**	5.0%	9.2%	11.3%	9.7%	9.8%	10.7%	9.3%	11.3%	7.0%	8.4%	5.8%
Vehicles Per Household												
0 Vehicles	**5.2%**	11.1%	3.3%	9.4%	4.0%	4.4%	5.7%	4.0%	4.9%	8.0%	5.3%	6.4%
1 Vehicle	**31.1%**	46.5%	26.4%	39.9%	29.0%	27.1%	30.1%	25.2%	31.7%	43.0%	37.2%	39.5%
2 Vehicle	**41.6%**	31.3%	42.0%	35.5%	45.4%	42.2%	42.1%	47.8%	40.1%	33.0%	40.4%	35.5%
3+ Vehicles	**22.0%**	11.2%	28.3%	15.1%	21.6%	26.4%	22.1%	23.1%	23.3%	16.0%	17.1%	18.6%

Source: Alfred Gobar Associates; U.S. Bureau of the Census; AnySite Online.

EXHIBIT B-10

1990 Population Profile
State of California

Population	29,759,163
Households	10,381,043
Families	7,139,189
Persons in Households	29,007,324
Persons in Families	23,708,354
Persons in Group Qtrs	751,839

Age Distribution		**%**	**Male**	**Female**
Age 0-5	2,862,071	9.6%	900,420	1,961,651
Age 6-9	1,759,493	5.9%	823,376	936,117
Age 10-13	1,605,561	5.4%	787,490	818,071
Age 14-17	1,523,412	5.1%	755,209	768,203
Age 18-20	1,411,158	4.7%	1,074,097	337,061
Age 21-24	2,000,962	6.7%	1,494,655	506,307
Age 25-29	2,853,917	9.6%	1,454,998	1,398,919
Age 30-34	2,832,200	9.5%	2,339,072	493,128
Age 35-44	4,639,267	15.6%	1,440,943	3,198,324
Age 45-54	2,902,506	9.8%	551,970	2,350,536
Age 55-59	1,133,892	3.8%	513,930	619,962
Age 60-64	1,099,320	3.7%	827,393	271,927
Age 65-74	1,857,194	6.2%	381,540	1,475,654
Age 75-84	979,189	3.3%	86,830	892,359
Age 85+	299,081	1.0%	0	299,081
Median Age	30.5			

Hispanic Population By Race	**7,686,985**	**25.8%**
White	3,494,903	11.7%
Black	116,328	0.4%
American Indian, Eskimo, or Aleut	58,029	0.2%
Asian or Pacific Islander	135,254	0.5%
Other Race	3,882,471	13.0%

Hispanic Population By Origin		%
Mexican	6,118,268	20.6%
Puerto Rican	126,386	0.4%
Cuban	71,943	0.2%
Other Hispanic	1,370,512	4.6%

Marital Status		**%**	**Male**	**Female**
Population 15+ Years	23,160,250	77.8%	11,517,598	11,642,652
Never Married	6,972,964	23.4%	4,034,027	2,938,937
Now Married, Excl. S	12,010,252	40.4%	6,095,874	5,914,378
Separated	612,297	2.1%	252,586	359,711
Widowed	1,385,704	4.7%	237,665	1,148,039
Divorced	2,179,033	7.3%	897,446	1,281,587

Age of Householder	**Owner**	**Renter**
15-24 yrs	64,051	528,235
25-34 yrs	833,757	#######
35-44 yrs	1,383,496	#######
45-54 yrs	1,125,580	527,120
55-64 yrs	960,941	330,687
65-74 yrs	861,429	278,496
75+ yrs	544,667	255,237

Race Distribution		%
White	20,523,972	68.7%
Black	2,208,827	7.4%
American Indian	236,054	0.8%
Eskimo	2,510	0.0%
Aleut	3,491	0.0%
Asian or Pac Isldr	2,845,259	9.5%
Chinese	704,871	2.4%
Filipino	731,694	2.4%
Japanese	313,017	1.0%
Asian Indian	159,962	0.5%
Korean	259,937	0.9%
Vietnamese	280,190	0.9%
Cambodian	68,143	0.2%
Hmong	46,889	0.2%
Laotian	58,047	0.2%
Thai	32,006	0.1%
Other Asian	80,183	0.3%
Hawaiian	34,404	0.1%
Samoan	31,846	0.1%
Tongan	7,905	0.0%
Other Polynesian	1,645	0.0%
Guamanian	25,018	0.1%
Other Micronesian	1,546	0.0%
Melanesian	5,750	0.0%
Pacific Isldr, not spe	2,206	0.0%
Other Race	3,938,565	13.2%

Persons Per Family		%
2 Persons	2,619,634	36.7%
3 Persons	1,600,444	22.4%
4 Persons	1,466,268	20.5%
5 Persons	742,416	10.4%
6 Persons	348,901	4.9%
7+ Persons	361,717	5.1%
Average Family Size	3.30	

Population In Family		%
Householder	7,139,189	29.0%
Spouse	5,469,417	22.2%
Child	8,575,890	34.8%
Child, Step	441,307	1.8%
Grandchild	493,028	2.0%
Other Relatives	1,589,475	6.5%
Non-Relatives	921,657	3.7%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-10 (Cont'd)

1990 Housing Profile

State of California

Total Housing Units	**11,182,671**	
Occupied Housing Units	**10,381,205**	**92.8%**
Owner-Occupied	5,773,938	51.6%
Renter-Occupied	4,607,267	41.2%
Vacant Housing Units	**801,466**	**7.2%**
Vacant For Rent	291,006	2.6%
Vacant For Sale	119,689	1.1%
Not Yet Occupied	69,418	0.6%
Seasonal, Rec, or Occ Use	195,304	1.7%
For Migrant Workers	3,034	0.0%
Other Vacant	123,015	1.1%

Housing Value		%
Less Than $15,000	11,824	0.3%
$15,000 - $19,999	7,361	0.2%
$20,000 - $24,999	10,234	0.2%
$25,000 - $29,999	11,083	0.2%
$30,000 - $34,999	13,976	0.3%
$35,000 - $39,999	15,397	0.3%
$40,000 - $44,999	22,226	0.5%
$45,000 - $49,999	26,079	0.6%
$50,000 - $59,999	77,570	1.7%
$60,000 - $74,999	174,204	3.7%
$75,000 - $99,999	384,719	8.2%
$100,000 - $124,999	380,375	8.1%
$125,000 - $149,999	431,710	9.2%
$150,000 - $174,999	438,963	9.4%
$175,000 - $199,999	412,542	8.8%
$200,000 - $249,999	647,405	13.8%
$250,000 - $299,999	503,547	10.7%
$300,000 - $399,999	539,596	11.5%
$400,000 - $499,999	241,901	5.2%
$500,000 And Greater	338,313	7.2%
Total	4,689,025	
Median Housing Value	$195,530	

Persons Per Unit		%
1 Person Per Unit	2,429,849	23.4%
2 Persons Per Unit	3,231,022	31.1%
3 Persons Per Unit	1,725,767	16.6%
4 Persons Per Unit	1,514,239	14.6%
5 Persons Per Unit	756,931	7.3%
6 Persons Per Unit	355,653	3.4%
7+ Persons Per Unit	367,409	3.5%
Average Household Size	2.90	

Units in Structure	**Owner**	**Renter**
1 Unit, Detached	44.3%	11.2%
1 Unit, Attached	4.1%	3.2%
2 Units	0.5%	2.4%
3-9 Units	1.2%	10.8%
10-19 Units	0.5%	5.7%
20-49 Units	0.4%	5.2%
50 or More Units	0.3%	4.5%
Mobile Home or Trailer	3.9%	0.8%
Other	0.5%	0.6%

Year Moved Into Unit	**Owner**	**Renter**
1989 - March 1990	6.7%	18.9%
1985 - 1988	15.7%	16.0%
1980 - 1984	8.0%	5.1%
1970 - 1979	13.6%	3.4%
1960 - 1969	6.6%	0.7%
<1959	5.1%	0.3%
Stability (5 Year) Percentage		44.60%
Turnover (1 Year) Percentage		23.74%

Contract Rent		%
Less Than $100	26,501	0.6%
$100 - $149	79,545	1.8%
$150 - $199	110,987	2.5%
$200 - $249	113,048	2.5%
$250 - $299	152,928	3.4%
$300 - $349	228,094	5.0%
$350 - $399	288,758	6.4%
$400 - $449	345,093	7.6%
$450 - $499	369,925	8.2%
$500 - $549	407,298	9.0%
$550 - $599	368,283	8.1%
$600 - $649	350,309	7.7%
$650 - $699	316,853	7.0%
$700 - $749	249,644	5.5%
$750 - $999	668,459	14.8%
$1,000 And Greater	323,790	7.2%
No Cash Rent	122,283	2.7%
Total	4,521,798	
Median Rent	$560	

Year Structure Built	**Owner**	**Renter**
1989 - March 1990	1.6%	1.0%
1985 - 1988	5.5%	5.0%
1980 - 1984	4.9%	4.0%
1970 - 1979	12.3%	9.4%
1960 - 1969	10.1%	8.6%
1950 - 1959	10.9%	6.9%
1940 - 1949	5.1%	4.1%
<1939	5.3%	5.4%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-10 (Cont'd)

1990 Socio-Economic Profile

State of California

Income Distribution	Household Income	%	Family Income	%
Less Than $5,000	401,942	3.9%	190,017	2.7%
$5,000 - $9,999	790,470	7.6%	328,060	4.6%
$10,000 - $12,499	407,118	3.9%	222,542	3.1%
$12,500 - $14,999	362,318	3.5%	219,655	3.1%
$15,000 - $17,499	408,333	3.9%	244,312	3.4%
$17,500 - $19,999	363,503	3.5%	226,892	3.2%
$20,000 - $22,499	440,723	4.2%	272,056	3.8%
$22,500 - $24,999	359,224	3.5%	233,041	3.3%
$25,000 - $27,499	424,799	4.1%	272,187	3.8%
$27,500 - $29,999	335,571	3.2%	226,865	3.2%
$30,000 - $32,499	450,261	4.3%	294,049	4.1%
$32,500 - $34,999	316,281	3.0%	224,857	3.1%
$35,000 - $37,499	387,033	3.7%	267,476	3.7%
$37,500 - $39,999	293,699	2.8%	212,689	3.0%
$40,000 - $42,499	386,024	3.7%	273,373	3.8%
$42,500 - $44,999	265,532	2.6%	201,404	2.8%
$45,000 - $47,499	311,232	3.0%	233,538	3.3%
$47,500 - $49,999	241,813	2.3%	187,093	2.6%
$50,000 - $54,499	525,975	5.1%	407,987	5.7%
$55,000 - $59,999	416,466	4.0%	333,991	4.7%
$60,000 - $74,999	965,407	9.3%	790,431	11.1%
$75,000 - $99,999	791,990	7.6%	660,689	9.3%
$100,000 - $124,999	335,079	3.2%	280,308	3.9%
$125,000 - $149,999	140,724	1.4%	118,706	1.7%
$150,000 And Greater	258,400	2.5%	216,616	3.0%
Per Capita Income		$24,527		
Average Income		$81,668		$92,502
Median Income		$35,950		$41,231

School Enrollment (3+ Years)		%
Public Preprimary	286,803	1.0%
Private Preprimary	220,236	0.8%
Public Elem or HS	4,703,493	16.6%
Private Elem or HS	483,831	1.7%
Public College	2,170,352	7.7%
Private College	417,100	1.5%
Not enrolled in school	19,990,477	70.7%
Total	28,272,292	

Educational Attainment (25+ Years)		%
Less than 9th grade	2,073,438	11.2%
9-12th grade, no diploma	2,350,636	12.6%
HS graduate (incl equiv)	4,144,933	22.3%
Some college, no degree	4,204,355	22.6%
Associate degree	1,476,664	7.9%
Bachelor's degree	2,843,450	15.3%
Graduate or prof degree	1,501,878	8.1%
Total	18,595,354	
Median School Years	12.2	

Workers In Family (1989)		%
0 Workers	879,436	12.3%
1 Worker	2,033,350	28.5%
2 Worker	3,197,975	44.8%
3+ Workers	1,027,556	14.4%

Employment by Occupation	13,996,111	%
Total White Collar Employment	8,534,617	61.0%
Exec, Admin, and Managerial	1,939,944	13.9%
Professional specialty occupations	2,057,786	14.7%
Tech & related support occupations	527,655	3.8%
Sales occupations	1,689,378	12.1%
Admin support occ, incl clerical	2,319,854	16.6%
Total Blue Collar Employment	5,461,494	39.0%
Private household occupations	95,033	0.7%
Protective service occupations	235,881	1.7%
Service occ, ex protective & HH	1,402,400	10.0%
Farm, forest & fishing occupations	381,881	2.7%
Precision prod, craft & repair	1,548,740	11.1%
Mach operators, assemblers & inspec	797,167	5.7%
Trans & material moving	480,132	3.4%
Handlers, equip cleaners & laborers	520,260	3.7%

Labor Force By Gender	Male	Female
Population, Age 16+	11,322,141	11,457,416
In Armed Forces	246,121	23,090
Civilian Employed	7,845,659	6,150,514
Civilian Unemployed	561,169	433,859
Not in Labor Force	2,669,192	4,849,953

Vehicles Available	Total	Owner	Renter
0 Vehicles	8.9%	3.5%	15.6%
1 Vehicle	33.2%	24.2%	44.5%
2 Vehicles	37.7%	43.7%	30.2%
3 Vehicles	14.1%	19.5%	7.3%
4 Vehicles	4.4%	6.4%	1.8%
5+ Vehicles	1.7%	2.6%	0.6%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-11

1990 Population Profile

San Bernardino County, CA

Population	1,418,383	**Households**	464,742
		Families	351,694

Persons in Households	1,381,083
Persons in Families	1,194,710
Persons in Group Qtrs	37,300

Age Distribution		**%**	**Male**	**Female**
Age 0-5	165,282	11.7%	52,293	112,989
Age 6-9	102,093	7.2%	47,246	54,847
Age 10-13	91,422	6.4%	41,582	49,840
Age 14-17	80,396	5.7%	35,574	44,822
Age 18-20	65,366	4.6%	47,063	18,303
Age 21-24	89,047	6.3%	68,142	20,905
Age 25-29	134,355	9.5%	69,183	65,172
Age 30-34	137,617	9.7%	107,693	29,924
Age 35-44	213,014	15.0%	61,778	151,236
Age 45-54	122,356	8.6%	22,884	99,472
Age 55-59	46,964	3.3%	21,355	25,609
Age 60-64	45,533	3.2%	33,721	11,812
Age 65-74	75,724	5.3%	15,055	60,669
Age 75-84	38,399	2.7%	3,255	35,144
Age 85+	10,783	0.8%	0	10,783
Median Age	28.3			

Hispanic Population By Race	**378,571**	**26.7%**
White	173,219	12.2%
Black	5,778	0.4%
American Indian, Eskimo, or Aleut	3,382	0.2%
Asian or Pacific Islander	3,811	0.3%
Other Race	192,381	13.6%

Hispanic Population By Origin		%
Mexican	321,561	22.7%
Puerto Rican	7,339	0.5%
Cuban	3,076	0.2%
Other Hispanic	46,581	3.3%

Marital Status		**%**	**Male**	**Female**
Population 15+ Years	1,039,044	73.3%	516,727	522,317
Never Married	267,061	18.8%	156,863	110,198
Now Married, Excl. Sep	586,943	41.4%	296,320	290,623
Separated	30,860	2.2%	12,819	18,041
Widowed	56,811	4.0%	10,099	46,712
Divorced	97,369	6.9%	40,626	56,743

Age of Householder	**Owner**	**Renter**
15-24 yrs	4,941	24,509
25-34 yrs	57,590	63,505
35-44 yrs	75,909	38,140
45-54 yrs	51,746	17,770
55-64 yrs	42,597	10,602
65-74 yrs	37,706	8,827
75+ yrs	23,747	7,128

Race Distribution		%
White	1,035,338	72.8%
Black	114,936	8.1%
American Indian	13,164	0.9%
Eskimo	113	0.0%
Aleut	122	0.0%
Asian or Pac Isldr	59,150	4.2%
Chinese	8,459	0.6%
Filipino	16,167	1.1%
Japanese	5,045	0.4%
Asian Indian	4,370	0.3%
Korean	6,295	0.4%
Vietnamese	6,689	0.5%
Cambodian	1,638	0.1%
Hmong	89	0.0%
Laotian	334	0.0%
Thai	1,731	0.1%
Other Asian	3,928	0.3%
Hawaiian	1,495	0.1%
Samoan	1,161	0.1%
Tongan	698	0.0%
Other Polynesian	88	0.0%
Guamanian	749	0.1%
Other Micronesian	78	0.0%
Melanesian	30	0.0%
Pacific Isldr, not spec	106	0.0%
Other Race	195,503	13.7%

Persons Per Family		%
2 Persons	116,561	33.1%
3 Persons	79,411	22.6%
4 Persons	79,690	22.7%
5 Persons	41,992	11.9%
6 Persons	18,819	5.4%
7+ Persons	15,217	4.3%
Average Family Size	3.40	

Population In Family		%
Householder	351,694	28.5%
Spouse	273,957	22.2%
Child	453,526	36.8%
Child, Step	30,513	2.5%
Grandchild	25,926	2.1%
Other Relatives	59,097	4.8%
Non-Relatives	38,135	3.1%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-11 (Cont'd)

1990 Housing Profile

San Bernardino County, CA

Total Housing Units	**542,315**	
Occupied Housing Units	**464,731**	**85.7%**
Owner-Occupied	294,243	54.3%
Renter-Occupied	170,488	31.4%
Vacant Housing Units	**77,584**	**14.3%**
Vacant For Rent	16,346	3.0%
Vacant For Sale	9,697	1.8%
Not Yet Occupied	4,336	0.8%
Seasonal, Rec, or Occ Use	34,683	6.4%
For Migrant Workers	91	0.0%
Other Vacant	12,431	2.3%

Housing Value		%
Less Than $15,000	804	0.3%
$15,000 - $19,999	478	0.2%
$20,000 - $24,999	568	0.2%
$25,000 - $29,999	628	0.3%
$30,000 - $34,999	962	0.4%
$35,000 - $39,999	1,074	0.4%
$40,000 - $44,999	1,637	0.7%
$45,000 - $49,999	2,038	0.8%
$50,000 - $59,999	6,724	2.7%
$60,000 - $74,999	17,774	7.2%
$75,000 - $99,999	43,362	17.7%
$100,000 - $124,999	39,671	16.2%
$125,000 - $149,999	40,507	16.5%
$150,000 - $174,999	29,505	12.0%
$175,000 - $199,999	17,655	7.2%
$200,000 - $249,999	17,839	7.3%
$250,000 - $299,999	10,479	4.3%
$300,000 - $399,999	8,698	3.5%
$400,000 - $499,999	2,690	1.1%
$500,000 And Greater	2,142	0.9%
Total	245,235	
Median Housing Value	$129,256	

Persons Per Unit		%
1 Person Per Unit	88,101	19.0%
2 Persons Per Unit	135,410	29.1%
3 Persons Per Unit	83,048	17.9%
4 Persons Per Unit	81,133	17.5%
5 Persons Per Unit	42,545	9.2%
6 Persons Per Unit	19,069	4.1%
7+ Persons Per Unit	15,384	3.3%
Average Household Size	3.10	

Units in Structure	**Owner**	**Renter**
1 Unit, Detached	53.5%	12.9%
1 Unit, Attached	2.1%	2.3%
2 Units	0.1%	1.9%
3-9 Units	0.5%	9.1%
10-19 Units	0.1%	4.2%
20-49 Units	0.1%	2.4%
50 or More Units	0.0%	2.5%
Mobile Home or Trailer	6.6%	1.2%
Other	0.3%	0.4%

Year Moved Into Unit	**Owner**	**Renter**
1989 - March 1990	9.8%	19.1%
1985 - 1988	22.1%	12.9%
1980 - 1984	9.4%	2.9%
1970 - 1979	13.3%	1.3%
1960 - 1969	5.1%	0.3%
<1959	3.6%	0.2%
Stability (5 Year) Percentage		37.79%
Turnover (1 Year) Percentage		24.77%

Contract Rent		%
Less Than $100	1,071	0.6%
$100 - $149	3,275	2.0%
$150 - $199	4,078	2.4%
$200 - $249	4,311	2.6%
$250 - $299	6,263	3.7%
$300 - $349	11,194	6.7%
$350 - $399	15,891	9.5%
$400 - $449	18,220	10.9%
$450 - $499	20,433	12.2%
$500 - $549	18,959	11.3%
$550 - $599	15,472	9.2%
$600 - $649	11,566	6.9%
$650 - $699	9,274	5.5%
$700 - $749	6,236	3.7%
$750 - $999	12,393	7.4%
$1,000 And Greater	2,220	1.3%
No Cash Rent	6,863	4.1%
Total	167,719	
Median Rent	$488	

Year Structure Built	**Owner**	**Renter**
1989 - March 1990	3.0%	1.2%
1985 - 1988	11.7%	8.2%
1980 - 1984	8.3%	5.3%
1970 - 1979	14.7%	7.0%
1960 - 1969	9.7%	5.3%
1950 - 1959	10.1%	4.8%
1940 - 1949	3.4%	2.7%
<1939	2.5%	2.2%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-11 (Cont'd)

1990 Socio-Economic Profile

San Bernardino County, CA

Income Distribution	Household Income		Family Income	
Less Than $5,000	18,498	4.0%	10,406	3.0%
$5,000 - $9,999	39,362	8.5%	18,499	5.3%
$10,000 - $12,499	19,800	4.3%	12,244	3.5%
$12,500 - $14,999	17,851	3.8%	12,070	3.4%
$15,000 - $17,499	19,686	4.2%	13,323	3.8%
$17,500 - $19,999	17,662	3.8%	12,247	3.5%
$20,000 - $22,499	19,774	4.3%	14,064	4.0%
$22,500 - $24,999	16,783	3.6%	12,448	3.5%
$25,000 - $27,499	19,922	4.3%	14,852	4.2%
$27,500 - $29,999	15,058	3.2%	11,323	3.2%
$30,000 - $32,499	21,950	4.7%	16,473	4.7%
$32,500 - $34,999	15,376	3.3%	12,298	3.5%
$35,000 - $37,499	19,284	4.1%	14,978	4.3%
$37,500 - $39,999	14,102	3.0%	11,206	3.2%
$40,000 - $42,499	19,002	4.1%	15,366	4.4%
$42,500 - $44,999	12,409	2.7%	10,636	3.0%
$45,000 - $47,499	15,165	3.3%	12,813	3.6%
$47,500 - $49,999	11,933	2.6%	10,394	3.0%
$50,000 - $54,499	24,926	5.4%	21,464	6.1%
$55,000 - $59,999	18,358	4.0%	16,368	4.7%
$60,000 - $74,999	41,253	8.9%	36,623	10.4%
$75,000 - $99,999	28,626	6.2%	25,560	7.3%
$100,000 - $124,999	9,097	2.0%	8,126	2.3%
$125,000 - $149,999	3,490	0.8%	3,083	0.9%
$150,000 And Greater	5,341	1.1%	4,727	1.3%
Per Capita Income		$19,126		
Average Income		$72,473		$79,731
Median Income		$33,744		$37,626

Employment by Occupation	591,702	%
Total White Collar Employment	329,179	55.6%
Exec, Admin, and Managerial	69,748	11.8%
Professional specialty occupations	71,131	12.0%
Tech & related support occupations	18,800	3.2%
Sales occupations	71,369	12.1%
Admin support occ, incl clerical	98,131	16.6%
Total Blue Collar Employment	262,523	44.4%
Private household occupations	2,132	0.4%
Protective service occupations	14,163	2.4%
Service occ, ex protective & HH	59,944	10.1%
Farm, forest & fishing occupations	11,023	1.9%
Precision prod, craft & repair	85,337	14.4%
Mach operators, assemblers & inspec	32,644	5.5%
Trans & material moving	29,483	5.0%
Handlers, equip cleaners & laborers	27,797	4.7%

School Enrollment (3+ Years)		%
Public Preprimary	14,917	1.1%
Private Preprimary	10,371	0.8%
Public Elem or HS	263,626	19.8%
Private Elem or HS	21,256	1.6%
Public College	79,183	5.9%
Private College	16,009	1.2%
Not enrolled in school	929,153	69.6%
Total	1,334,515	

Educational Attainment (25+ Years)		%
Less than 9th grade	72,874	8.8%
9-12th grade, no diploma	129,990	15.8%
HS graduate (incl equiv)	222,809	27.0%
Some college, no degree	206,146	25.0%
Associate degree	69,590	8.4%
Bachelor's degree	80,515	9.8%
Graduate or prof degree	42,693	5.2%
Total	824,617	
Median School Years	11.9	

Workers In Family (1989)		%
0 Workers	45,398	12.9%
1 Worker	109,263	31.1%
2 Worker	154,621	44.0%
3+ Workers	42,387	12.1%

Labor Force By Gender	Male	Female
Population, Age 16+	506,301	512,361
In Armed Forces	19,066	1,977
Civilian Employed	338,980	252,704
Civilian Unemployed	27,663	21,087
Not in Labor Force	120,592	236,593

Vehicles Available	Total	Owner	Renter
0 Vehicles	6.6%	3.0%	12.8%
1 Vehicle	31.3%	23.1%	45.6%
2 Vehicles	40.3%	45.0%	32.0%
3 Vehicles	15.3%	19.9%	7.3%
4 Vehicles	4.6%	6.2%	1.6%
5+ Vehicles	2.0%	2.7%	0.7%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-12

1990 Population Profile

Los Angeles County, CA

Population	8,863,166	**Households**	2,989,557
		Families	2,013,928

Persons in Households	8,691,106
Persons in Families	7,059,790
Persons in Group Qtrs	172,060

Age Distribution		**%**	**Male**	**Female**
Age 0-5	873,566	9.9%	260,859	612,707
Age 6-9	510,449	5.8%	241,907	268,542
Age 10-13	472,262	5.3%	242,527	229,735
Age 14-17	469,889	5.3%	234,995	234,894
Age 18-20	441,089	5.0%	345,912	95,177
Age 21-24	647,955	7.3%	471,325	176,630
Age 25-29	899,625	10.2%	440,495	459,130
Age 30-34	858,158	9.7%	668,295	189,863
Age 35-44	1,336,652	15.1%	415,096	921,556
Age 45-54	845,371	9.5%	160,172	685,199
Age 55-59	331,675	3.7%	147,357	184,318
Age 60-64	315,951	3.6%	221,738	94,213
Age 65-74	507,456	5.7%	100,599	406,857
Age 75-84	267,712	3.0%	23,824	243,888
Age 85+	85,421	1.0%	0	85,421

Median Age 29.7

Hispanic Population By Race	**3,351,226**	**37.8%**
White	1,416,266	16.0%
Black	58,193	0.7%
American Indian, Eskimo, or Aleut	16,332	0.2%
Asian or Pacific Islander	46,669	0.5%
Other Race	1,813,766	20.5%

Hispanic Population By Origin		%
Mexican	2,527,171	28.5%
Puerto Rican	40,081	0.5%
Cuban	45,882	0.5%
Other Hispanic	738,121	8.3%

Marital Status		**%**	**Male**	**Female**
Population 15+ Years	6,893,827	77.8%	3,414,634	3,479,193
Never Married	2,369,170	26.7%	1,342,998	1,026,172
Now Married, Excl. Se	3,294,564	37.2%	1,673,882	1,620,682
Separated	214,264	2.4%	84,941	129,323
Widowed	414,291	4.7%	71,001	343,290
Divorced	601,538	6.8%	241,812	359,726

Age of Householder	**Owner**	**Renter**
15-24 yrs	15,634	151,906
25-34 yrs	199,855	528,010
35-44 yrs	338,265	371,026
45-54 yrs	294,434	189,437
55-64 yrs	254,683	122,178
65-74 yrs	210,863	98,717
75+ yrs	127,078	87,471

Race Distribution		%
White	5,035,098	56.6%
Black	992,976	11.2%
American Indian	43,889	0.5%
Eskimo	630	0.0%
Aleut	954	0.0%
Asian or Pac Isldr	954,349	10.7%
Chinese	245,038	2.8%
Filipino	219,665	2.5%
Japanese	129,743	1.5%
Asian Indian	43,820	0.5%
Korean	145,420	1.6%
Vietnamese	62,579	0.7%
Cambodian	27,799	0.3%
Hmong	360	0.0%
Laotian	3,742	0.0%
Thai	19,004	0.2%
Other Asian	28,333	0.3%
Hawaiian	8,001	0.1%
Samoan	11,906	0.1%
Tongan	1,542	0.0%
Other Polynesian	532	0.0%
Guamanian	5,617	0.1%
Other Micronesian	199	0.0%
Melanesian	571	0.0%
Pacific Isldr, not spe	478	0.0%
Other Race	1,835,091	20.6%

Persons Per Family		%
2 Persons	660,320	32.8%
3 Persons	441,426	21.9%
4 Persons	405,236	20.1%
5 Persons	231,837	11.5%
6 Persons	124,710	6.2%
7+ Persons	150,395	7.5%

Average Family Size 3.50

Population In Family		%
Householder	2,013,928	27.2%
Spouse	1,454,423	19.7%
Child	2,624,058	35.5%
Child, Step	114,948	1.6%
Grandchild	176,455	2.4%
Other Relatives	675,995	9.1%
Non-Relatives	334,923	4.5%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-12 (Cont'd)

1990 Housing Profile

Los Angeles County, CA

Total Housing Units	**3,163,309**	
Occupied Housing Units	**2,989,547**	**94.5%**
Owner-Occupied	1,440,826	45.5%
Renter-Occupied	1,548,721	49.0%
Vacant Housing Units	**173,762**	**5.5%**
Vacant For Rent	96,472	3.0%
Vacant For Sale	27,715	0.9%
Not Yet Occupied	18,511	0.6%
Seasonal, Rec, or Occ Use	6,421	0.2%
For Migrant Workers	125	0.0%
Other Vacant	24,518	0.8%

Housing Value		%
Less Than $15,000	2,594	0.2%
$15,000 - $19,999	1,991	0.2%
$20,000 - $24,999	2,558	0.2%
$25,000 - $29,999	2,376	0.2%
$30,000 - $34,999	2,163	0.2%
$35,000 - $39,999	1,893	0.2%
$40,000 - $44,999	1,890	0.2%
$45,000 - $49,999	1,553	0.1%
$50,000 - $59,999	4,666	0.4%
$60,000 - $74,999	13,592	1.1%
$75,000 - $99,999	54,319	4.5%
$100,000 - $124,999	75,931	6.3%
$125,000 - $149,999	95,013	7.9%
$150,000 - $174,999	119,378	9.9%
$175,000 - $199,999	122,302	10.2%
$200,000 - $249,999	188,226	15.6%
$250,000 - $299,999	136,723	11.4%
$300,000 - $399,999	154,982	12.9%
$400,000 - $499,999	79,000	6.6%
$500,000 And Greater	142,596	11.8%
Total	1,203,746	
Median Housing Value	$226,471	

Persons Per Unit		%
1 Person Per Unit	745,937	25.0%
2 Persons Per Unit	835,430	27.9%
3 Persons Per Unit	474,898	15.9%
4 Persons Per Unit	417,933	14.0%
5 Persons Per Unit	236,052	7.9%
6 Persons Per Unit	126,852	4.2%
7+ Persons Per Unit	152,391	5.1%
Average Household Size	3.00	

Units in Structure	**Owner**	**Renter**
1 Unit, Detached	39.2%	10.4%
1 Unit, Attached	3.2%	3.3%
2 Units	0.5%	2.4%
3-9 Units	1.2%	13.0%
10-19 Units	0.7%	8.1%
20-49 Units	0.8%	8.2%
50 or More Units	0.6%	5.5%
Mobile Home or Trailer	1.5%	0.3%
Other	0.5%	0.6%

Year Moved Into Unit	**Owner**	**Renter**
1989 - March 1990	4.8%	19.3%
1985 - 1988	12.4%	18.5%
1980 - 1984	6.3%	7.1%
1970 - 1979	11.8%	5.4%
1960 - 1969	6.9%	1.2%
<1959	6.0%	0.4%

Stability (5 Year) Percentage	47.17%
Turnover (1 Year) Percentage	22.77%

Contract Rent		%
Less Than $100	6,399	0.4%
$100 - $149	21,620	1.4%
$150 - $199	32,689	2.1%
$200 - $249	30,808	2.0%
$250 - $299	37,846	2.5%
$300 - $349	63,562	4.2%
$350 - $399	86,310	5.6%
$400 - $449	119,101	7.8%
$450 - $499	138,543	9.0%
$500 - $549	161,076	10.5%
$550 - $599	140,192	9.2%
$600 - $649	129,316	8.4%
$650 - $699	113,756	7.4%
$700 - $749	87,406	5.7%
$750 - $999	224,903	14.7%
$1,000 And Greater	113,475	7.4%
No Cash Rent	24,209	1.6%
Total	1,531,211	
Median Rent	$569	

Year Structure Built	**Owner**	**Renter**
1989 - March 1990	0.7%	1.2%
1985 - 1988	2.9%	4.9%
1980 - 1984	2.9%	3.3%
1970 - 1979	6.2%	8.3%
1960 - 1969	7.8%	10.6%
1950 - 1959	13.6%	10.2%
1940 - 1949	7.6%	6.4%
<1939	6.6%	6.7%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-12 (Cont'd)

1990 Socio-Economic Profile

Los Angeles County, CA

Income Distribution	Household Income		Family Income	
Less Than $5,000	141,785	4.7%	70,554	3.5%
$5,000 - $9,999	239,697	8.0%	104,617	5.2%
$10,000 - $12,499	122,547	4.1%	69,765	3.5%
$12,500 - $14,999	102,205	3.4%	64,457	3.2%
$15,000 - $17,499	117,304	3.9%	71,898	3.6%
$17,500 - $19,999	105,014	3.5%	66,280	3.3%
$20,000 - $22,499	130,689	4.4%	80,013	4.0%
$22,500 - $24,999	100,637	3.4%	65,013	3.2%
$25,000 - $27,499	123,463	4.1%	77,398	3.8%
$27,500 - $29,999	94,253	3.2%	62,148	3.1%
$30,000 - $32,499	128,910	4.3%	81,251	4.0%
$32,500 - $34,999	87,595	2.9%	60,860	3.0%
$35,000 - $37,499	109,101	3.6%	72,435	3.6%
$37,500 - $39,999	80,517	2.7%	56,640	2.8%
$40,000 - $42,499	107,751	3.6%	72,842	3.6%
$42,500 - $44,999	71,914	2.4%	52,873	2.6%
$45,000 - $47,499	83,805	2.8%	60,473	3.0%
$47,500 - $49,999	64,194	2.1%	47,860	2.4%
$50,000 - $54,499	142,069	4.8%	105,850	5.3%
$55,000 - $59,999	112,668	3.8%	87,921	4.4%
$60,000 - $74,999	264,269	8.8%	209,178	10.4%
$75,000 - $99,999	223,401	7.5%	181,506	9.0%
$100,000 - $124,999	100,936	3.4%	82,038	4.1%
$125,000 - $149,999	43,201	1.4%	35,458	1.8%
$150,000 And Greater	91,356	3.1%	74,490	3.7%
Per Capita Income		$24,737		
Average Income		$79,557		$90,654
Median Income		$35,013		$40,122

School Enrollment (3+ Years)		%
Public Preprimary	74,355	0.9%
Private Preprimary	62,561	0.7%
Public Elem or HS	1,428,333	17.0%
Private Elem or HS	185,419	2.2%
Public College	614,258	7.3%
Private College	153,048	1.8%
Not enrolled in school	5,894,773	70.1%
Total	8,412,747	

Educational Attainment (25+ Years)		%
Less than 9th grade	848,785	15.6%
9-12th grade, no diploma	783,615	14.4%
HS graduate (incl equiv)	1,127,383	20.7%
Some college, no degree	1,070,829	19.7%
Associate degree	400,282	7.3%
Bachelor's degree	788,770	14.5%
Graduate or prof degree	427,990	7.9%
Total	5,447,654	
Median School Years	12.0	

Workers In Family (1989)		%
0 Workers	227,961	11.3%
1 Worker	598,535	29.7%
2 Worker	858,407	42.6%
3+ Workers	328,865	16.3%

Employment by Occupation	4,203,401	%
Total White Collar Employment	2,517,201	59.9%
Exec, Admin, and Managerial	555,423	13.2%
Professional specialty occupations	603,263	14.4%
Tech & related support occupations	141,649	3.4%
Sales occupations	486,104	11.6%
Admin support occ, incl clerical	730,762	17.4%
Total Blue Collar Employment	1,686,200	40.1%
Private household occupations	44,480	1.1%
Protective service occupations	65,714	1.6%
Service occ, ex protective & HH	406,384	9.7%
Farm, forest & fishing occupations	52,469	1.2%
Precision prod, craft & repair	462,898	11.0%
Mach operators, assemblers & inspec	345,482	8.2%
Trans & material moving	142,366	3.4%
Handlers, equip cleaners & laborers	166,407	4.0%

Labor Force By Gender	Male	Female
Population, Age 16+	3,355,017	3,422,438
In Armed Forces	17,505	1,516
Civilian Employed	2,383,088	1,820,270
Civilian Unemployed	191,316	142,885
Not in Labor Force	763,108	1,457,767

Vehicles Available	Total	Owner	Renter
0 Vehicles	11.2%	3.9%	17.9%
1 Vehicle	35.7%	24.5%	46.2%
2 Vehicles	34.9%	42.7%	27.7%
3 Vehicles	12.6%	19.4%	6.2%
4 Vehicles	4.0%	6.8%	1.5%
5+ Vehicles	1.6%	2.8%	0.5%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-13

1990 Population Profile

Kern County, CA

Population	543,479		**Households**	181,477		**Persons in Households**	529,835
			Families	135,923		**Persons in Families**	457,878
						Persons in Group Qtrs	13,644

Age Distribution		**%**	**Male**	**Female**
Age 0-5	62,993	11.6%	20,854	42,139
Age 6-9	40,728	7.5%	18,440	22,288
Age 10-13	35,686	6.6%	16,183	19,503
Age 14-17	31,592	5.8%	12,171	19,421
Age 18-20	23,238	4.3%	16,265	6,973
Age 21-24	31,342	5.8%	25,447	5,895
Age 25-29	48,980	9.0%	26,133	22,847
Age 30-34	50,116	9.2%	40,041	10,075
Age 35-44	77,941	14.3%	24,563	53,378
Age 45-54	48,890	9.0%	9,727	39,163
Age 55-59	19,701	3.6%	9,298	10,403
Age 60-64	19,557	3.6%	14,694	4,863
Age 65-74	32,133	5.9%	6,789	25,344
Age 75-84	16,461	3.0%	1,310	15,151
Age 85+	4,118	0.8%	0	4,118

Median Age 28.7

Hispanic Population By Race	**151,987**	**28.0%**
White	37,584	6.9%
Black	1,280	0.2%
American Indian, Eskimo, or Aleut	1,403	0.3%
Asian or Pacific Islander	1,661	0.3%
Other Race	110,059	20.3%

Hispanic Population By Origin		%
Mexican	134,992	24.8%
Puerto Rican	2,044	0.4%
Cuban	292	0.1%
Other Hispanic	14,664	2.7%

Marital Status		**%**	**Male**	**Female**
Population 15+ Years	395,993	72.9%	198,474	197,519
Never Married	94,345	17.4%	55,065	39,280
Now Married, Excl. Sep	228,374	42.0%	117,571	110,803
Separated	12,307	2.3%	5,038	7,269
Widowed	23,982	4.4%	4,404	19,578
Divorced	36,985	6.8%	16,396	20,589

Age of Householder	**Owner**	**Renter**
15-24 yrs	1,647	9,899
25-34 yrs	17,712	26,874
35-44 yrs	24,596	16,629
45-54 yrs	19,303	8,048
55-64 yrs	17,598	5,116
65-74 yrs	16,389	3,971
75+ yrs	10,405	3,295

Race Distribution		%
White	378,479	69.5%
Black	30,134	5.5%
American Indian	6,950	1.3%
Eskimo	43	0.0%
Aleut	34	0.0%
Asian or Pac Isldr	16,537	3.0%
Chinese	1,893	0.3%
Filipino	8,191	1.5%
Japanese	903	0.2%
Asian Indian	1,414	0.3%
Korean	1,157	0.2%
Vietnamese	628	0.1%
Cambodian	324	0.1%
Hmong	7	0.0%
Laotian	317	0.1%
Thai	231	0.0%
Other Asian	742	0.1%
Hawaiian	350	0.1%
Samoan	103	0.0%
Tongan	3	0.0%
Other Polynesian	9	0.0%
Guamanian	236	0.0%
Other Micronesian	8	0.0%
Melanesian	6	0.0%
Pacific Isldr, not spe	15	0.0%
Other Race	111,299	20.5%

Persons Per Family		%
2 Persons	48,082	35.4%
3 Persons	29,620	21.8%
4 Persons	29,222	21.5%
5 Persons	15,660	11.5%
6 Persons	7,144	5.3%
7+ Persons	6,202	4.6%

Average Family Size 3.40

Population In Family		%
Householder	135,923	28.8%
Spouse	105,008	22.2%
Child	173,989	36.9%
Child, Step	11,683	2.5%
Grandchild	10,842	2.3%
Other Relatives	20,442	4.3%
Non-Relatives	14,141	3.0%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-13 (Cont'd)

1990 Housing Profile
Kern County, CA

Total Housing Units	**198,627**	
Occupied Housing Units	**181,473**	**91.4%**
Owner-Occupied	107,648	54.2%
Renter-Occupied	73,825	37.2%
Vacant Housing Units	**17,154**	**8.6%**
Vacant For Rent	5,030	2.5%
Vacant For Sale	2,328	1.2%
Not Yet Occupied	1,637	0.8%
Seasonal, Rec, or Occ Use	4,942	2.5%
For Migrant Workers	105	0.1%
Other Vacant	3,112	1.6%

Housing Value		%
Less Than $15,000	646	0.8%
$15,000 - $19,999	385	0.5%
$20,000 - $24,999	562	0.7%
$25,000 - $29,999	713	0.8%
$30,000 - $34,999	1,145	1.3%
$35,000 - $39,999	1,380	1.6%
$40,000 - $44,999	2,146	2.5%
$45,000 - $49,999	2,805	3.3%
$50,000 - $59,999	8,338	9.8%
$60,000 - $74,999	17,130	20.1%
$75,000 - $99,999	23,579	27.6%
$100,000 - $124,999	11,137	13.1%
$125,000 - $149,999	6,396	7.5%
$150,000 - $174,999	3,444	4.0%
$175,000 - $199,999	1,958	2.3%
$200,000 - $249,999	1,755	2.1%
$250,000 - $299,999	783	0.9%
$300,000 - $399,999	617	0.7%
$400,000 - $499,999	210	0.2%
$500,000 And Greater	196	0.2%
Total	85,325	
Median Housing Value	$82,858	

Persons Per Unit		%
1 Person Per Unit	36,851	20.3%
2 Persons Per Unit	54,654	30.1%
3 Persons Per Unit	30,906	17.0%
4 Persons Per Unit	29,719	16.4%
5 Persons Per Unit	15,848	8.7%
6 Persons Per Unit	7,243	4.0%
7+ Persons Per Unit	6,261	3.4%
Average Household Size	3.00	

Units in Structure	**Owner**	**Renter**
1 Unit, Detached	48.7%	16.6%
1 Unit, Attached	1.3%	2.1%
2 Units	0.2%	3.3%
3-9 Units	0.3%	9.3%
10-19 Units	0.1%	2.6%
20-49 Units	0.0%	2.0%
50 or More Units	0.0%	1.9%
Mobile Home or Trailer	8.3%	2.4%
Other	0.3%	0.5%

Year Moved Into Unit	**Owner**	**Renter**
1989 - March 1990	7.8%	20.5%
1985 - 1988	15.9%	14.4%
1980 - 1984	10.4%	3.4%
1970 - 1979	13.4%	1.7%
1960 - 1969	6.5%	0.4%
<1959	5.2%	0.3%
Stability (5 Year) Percentage		43.06%
Turnover (1 Year) Percentage		25.88%

Contract Rent		%
Less Than $100	726	1.0%
$100 - $149	2,345	3.3%
$150 - $199	3,325	4.6%
$200 - $249	4,702	6.5%
$250 - $299	8,389	11.6%
$300 - $349	10,640	14.8%
$350 - $399	12,145	16.9%
$400 - $449	7,520	10.4%
$450 - $499	5,978	8.3%
$500 - $549	3,702	5.1%
$550 - $599	2,632	3.7%
$600 - $649	1,752	2.4%
$650 - $699	1,335	1.9%
$700 - $749	734	1.0%
$750 - $999	1,071	1.5%
$1,000 And Greater	353	0.5%
No Cash Rent	4,677	6.5%
Total	72,026	
Median Rent	$364	

Year Structure Built	**Owner**	**Renter**
1989 - March 1990	2.1%	0.5%
1985 - 1988	7.1%	4.9%
1980 - 1984	7.5%	6.3%
1970 - 1979	13.3%	8.7%
1960 - 1969	9.4%	6.5%
1950 - 1959	11.1%	7.1%
1940 - 1949	5.1%	3.8%
<1939	3.7%	2.9%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-13 (Cont'd)

1990 Socio-Economic Profile

Kern County, CA

Income Distribution	Household Income		Family Income	
Less Than $5,000	9,063	5.0%	4,907	3.6%
$5,000 - $9,999	19,498	10.7%	9,513	7.0%
$10,000 - $12,499	9,408	5.2%	6,169	4.5%
$12,500 - $14,999	8,167	4.5%	5,890	4.3%
$15,000 - $17,499	9,413	5.2%	6,731	5.0%
$17,500 - $19,999	8,023	4.4%	5,848	4.3%
$20,000 - $22,499	9,008	5.0%	6,595	4.9%
$22,500 - $24,999	7,334	4.0%	5,557	4.1%
$25,000 - $27,499	7,934	4.4%	6,044	4.4%
$27,500 - $29,999	6,248	3.4%	4,791	3.5%
$30,000 - $32,499	8,670	4.8%	6,673	4.9%
$32,500 - $34,999	5,759	3.2%	4,827	3.6%
$35,000 - $37,499	7,091	3.9%	5,542	4.1%
$37,500 - $39,999	5,392	3.0%	4,484	3.3%
$40,000 - $42,499	6,936	3.8%	5,593	4.1%
$42,500 - $44,999	4,300	2.4%	3,631	2.7%
$45,000 - $47,499	5,068	2.8%	4,340	3.2%
$47,500 - $49,999	4,054	2.2%	3,522	2.6%
$50,000 - $54,499	8,170	4.5%	6,955	5.1%
$55,000 - $59,999	6,058	3.3%	5,278	3.9%
$60,000 - $74,999	12,083	6.7%	10,619	7.8%
$75,000 - $99,999	7,990	4.4%	7,255	5.3%
$100,000 - $124,999	2,758	1.5%	2,452	1.8%
$125,000 - $149,999	1,093	0.6%	967	0.7%
$150,000 And Greater	1,924	1.1%	1,727	1.3%

	Household	Family
Per Capita Income	$16,745	
Average Income	$63,004	$70,300
Median Income	$28,809	$32,213

Employment by Occupation	214,927	%
Total White Collar Employment	111,443	51.9%
Exec, Admin, and Managerial	22,060	10.3%
Professional specialty occupations	26,693	12.4%
Tech & related support occupations	7,567	3.5%
Sales occupations	23,659	11.0%
Admin support occ, incl clerical	31,464	14.6%
Total Blue Collar Employment	103,484	48.1%
Private household occupations	913	0.4%
Protective service occupations	5,045	2.3%
Service occ, ex protective & HH	22,215	10.3%
Farm, forest & fishing occupations	18,081	8.4%
Precision prod, craft & repair	28,633	13.3%
Mach operators, assemblers & inspec	8,578	4.0%
Trans & material moving	11,674	5.4%
Handlers, equip cleaners & laborers	8,345	3.9%

School Enrollment (3+ Years)		%
Public Preprimary	6,819	1.3%
Private Preprimary	3,224	0.6%
Public Elem or HS	105,708	20.6%
Private Elem or HS	5,410	1.1%
Public College	29,037	5.7%
Private College	3,081	0.6%
Not enrolled in school	358,922	70.1%
Total	512,201	

Educational Attainment (25+ Years)		%
Less than 9th grade	46,808	14.7%
9-12th grade, no diploma	56,029	17.6%
HS graduate (incl equiv)	79,960	25.2%
Some college, no degree	70,305	22.1%
Associate degree	22,585	7.1%
Bachelor's degree	28,911	9.1%
Graduate or prof degree	13,285	4.2%
Total	317,883	
Median School Years	11.7	

Workers In Family (1989)		%
0 Workers	19,491	14.3%
1 Worker	43,288	31.9%
2 Worker	57,480	42.3%
3+ Workers	15,637	11.5%

Labor Force By Gender	Male	Female
Population, Age 16+	194,327	193,467
In Armed Forces	3,327	504
Civilian Employed	124,746	90,141
Civilian Unemployed	12,886	10,217
Not in Labor Force	53,368	92,605

Vehicles Available	Total	Owner	Renter
0 Vehicles	8.5%	3.7%	15.5%
1 Vehicle	34.2%	25.9%	46.4%
2 Vehicles	39.0%	45.4%	29.8%
3 Vehicles	13.4%	18.2%	6.5%
4 Vehicles	3.7%	5.2%	1.5%
5+ Vehicles	1.2%	1.7%	0.4%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-14

1990 Population Profile

Inyo County, CA

Population	18,281	**Households**	7,565
		Families	5,063

Persons in Household:	17,789
Persons in Families	14,604
Persons in Group Qtrs	492

Age Distribution		**%**	**Male**	**Female**
Age 0-5	1,465	8.0%	545	920
Age 6-9	1,081	5.9%	483	598
Age 10-13	1,020	5.6%	435	585
Age 14-17	871	4.8%	250	621
Age 18-20	471	2.6%	300	171
Age 21-24	563	3.1%	539	24
Age 25-29	1,071	5.9%	701	370
Age 30-34	1,367	7.5%	1,482	-115
Age 35-44	2,909	15.9%	1,038	1,871
Age 45-54	2,063	11.3%	449	1,614
Age 55-59	929	5.1%	522	407
Age 60-64	1,080	5.9%	938	142
Age 65-74	1,959	10.7%	448	1,511
Age 75-84	1,083	5.9%	90	993
Age 85+	349	1.9%	0	349
Median Age	38.0			

Hispanic Population By Race	**1,536**	**8.4%**
White	958	5.2%
Black	8	0.0%
American Indian, Eskimo, or Aleut	161	0.9%
Asian or Pacific Islander	6	0.0%
Other Race	403	2.2%

Hispanic Population By Origin		%
Mexican	1,322	7.2%
Puerto Rican	5	0.0%
Cuban	9	0.0%
Other Hispanic	200	1.1%

Marital Status		**%**	**Male**	**Female**
Population 15+ Years	14,474	79.2%	7,077	7,397
Never Married	2,568	14.0%	1,551	1,017
Now Married, Excl. Se	8,632	47.2%	4,339	4,293
Separated	319	1.7%	157	162
Widowed	1,336	7.3%	239	1,097
Divorced	1,619	8.9%	791	828

Age of Householder	**Owner**	**Renter**
15-24 yrs	44	166
25-34 yrs	453	726
35-44 yrs	977	640
45-54 yrs	840	346
55-64 yrs	918	263
65-74 yrs	1,014	223
75+ yrs	771	184

Race Distribution		%
White	15,777	86.2%
Black	79	0.4%
American Indian	1,824	10.0%
Eskimo	1	0.0%
Aleut	1	0.0%
Asian or Pac Isldr	178	1.0%
Chinese	47	0.3%
Filipino	31	0.2%
Japanese	40	0.2%
Asian Indian	24	0.1%
Korean	7	0.0%
Vietnamese	4	0.0%
Cambodian	0	0.0%
Hmong	0	0.0%
Laotian	1	0.0%
Thai	3	0.0%
Other Asian	9	0.0%
Hawaiian	12	0.1%
Samoan	0	0.0%
Tongan	0	0.0%
Other Polynesian	0	0.0%
Guamanian	0	0.0%
Other Micronesian	0	0.0%
Melanesian	0	0.0%
Pacific Isldr, not spec	0	0.0%
Other Race	421	2.3%

Persons Per Family		%
2 Persons	2,634	52.0%
3 Persons	964	19.0%
4 Persons	872	17.2%
5 Persons	393	7.8%
6 Persons	138	2.7%
7+ Persons	62	1.2%
Average Family Size	2.90	

Population In Family		%
Householder	5,063	34.0%
Spouse	4,143	27.8%
Child	4,533	30.4%
Child, Step	295	2.0%
Grandchild	220	1.5%
Other Relatives	350	2.3%
Non-Relatives	295	2.0%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-14 (Cont'd)

1990 Housing Profile

Inyo County, CA

Total Housing Units	**8,712**	
Occupied Housing Units	**7,565**	**86.8%**
Owner-Occupied	5,017	57.6%
Renter-Occupied	2,548	29.2%
Vacant Housing Units	**1,147**	**13.2%**
Vacant For Rent	132	1.5%
Vacant For Sale	153	1.8%
Not Yet Occupied	50	0.6%
Seasonal, Rec, or Occ Use	565	6.5%
For Migrant Workers	18	0.2%
Other Vacant	229	2.6%

Housing Value		%
Less Than $15,000	43	1.5%
$15,000 - $19,999	15	0.5%
$20,000 - $24,999	18	0.6%
$25,000 - $29,999	20	0.7%
$30,000 - $34,999	26	0.9%
$35,000 - $39,999	24	0.8%
$40,000 - $44,999	35	1.2%
$45,000 - $49,999	60	2.1%
$50,000 - $59,999	129	4.5%
$60,000 - $74,999	249	8.8%
$75,000 - $99,999	493	17.4%
$100,000 - $124,999	485	17.1%
$125,000 - $149,999	366	12.9%
$150,000 - $174,999	319	11.2%
$175,000 - $199,999	182	6.4%
$200,000 - $249,999	176	6.2%
$250,000 - $299,999	102	3.6%
$300,000 - $399,999	62	2.2%
$400,000 - $499,999	16	0.6%
$500,000 And Greater	18	0.6%
Total	2,838	
Median Housing Value	$115,824	

Persons Per Unit		%
1 Person Per Unit	2,194	29.0%
2 Persons Per Unit	2,892	38.2%
3 Persons Per Unit	996	13.2%
4 Persons Per Unit	884	11.7%
5 Persons Per Unit	396	5.2%
6 Persons Per Unit	140	1.9%
7+ Persons Per Unit	63	0.8%
Average Household Size	2.40	

Units in Structure	**Owner**	**Renter**
1 Unit, Detached	39.5%	16.5%
1 Unit, Attached	0.6%	1.2%
2 Units	0.2%	1.9%
3-9 Units	0.3%	4.5%
10-19 Units	0.2%	2.1%
20-49 Units	0.0%	0.6%
50 or More Units	0.0%	0.0%
Mobile Home or Trailer	25.2%	6.3%
Other	0.4%	0.5%

Year Moved Into Unit	**Owner**	**Renter**
1989 - March 1990	7.3%	13.9%
1985 - 1988	18.0%	11.7%
1980 - 1984	13.1%	4.2%
1970 - 1979	17.1%	2.6%
1960 - 1969	6.1%	0.6%
<1959	4.8%	0.7%
Stability (5 Year) Percentage		48.11%
Turnover (1 Year) Percentage		18.41%

Contract Rent		%
Less Than $100	98	4.0%
$100 - $149	147	6.0%
$150 - $199	180	7.3%
$200 - $249	289	11.8%
$250 - $299	281	11.4%
$300 - $349	341	13.9%
$350 - $399	277	11.3%
$400 - $449	196	8.0%
$450 - $499	155	6.3%
$500 - $549	97	3.9%
$550 - $599	57	2.3%
$600 - $649	43	1.7%
$650 - $699	25	1.0%
$700 - $749	6	0.2%
$750 - $999	25	1.0%
$1,000 And Greater	7	0.3%
No Cash Rent	235	9.6%
Total	2,459	
Median Rent	$316	

Year Structure Built	**Owner**	**Renter**
1989 - March 1990	1.3%	0.4%
1985 - 1988	4.4%	1.2%
1980 - 1984	8.3%	3.5%
1970 - 1979	20.3%	8.1%
1960 - 1969	14.6%	5.5%
1950 - 1959	6.3%	4.5%
1940 - 1949	5.7%	5.0%
<1939	5.4%	5.5%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-14 (Cont'd)

1990 Socio-Economic Profile

Inyo County, CA

Income Distribution	Household Income		Family Income	
Less Than $5,000	404	5.3%	150	3.0%
$5,000 - $9,999	1,056	13.9%	321	6.3%
$10,000 - $12,499	481	6.3%	240	4.7%
$12,500 - $14,999	280	3.7%	171	3.4%
$15,000 - $17,499	460	6.1%	308	6.1%
$17,500 - $19,999	466	6.1%	295	5.8%
$20,000 - $22,499	375	4.9%	245	4.8%
$22,500 - $24,999	333	4.4%	244	4.8%
$25,000 - $27,499	354	4.7%	277	5.5%
$27,500 - $29,999	286	3.8%	217	4.3%
$30,000 - $32,499	319	4.2%	205	4.0%
$32,500 - $34,999	196	2.6%	161	3.2%
$35,000 - $37,499	271	3.6%	220	4.3%
$37,500 - $39,999	159	2.1%	144	2.8%
$40,000 - $42,499	223	2.9%	194	3.8%
$42,500 - $44,999	183	2.4%	165	3.3%
$45,000 - $47,499	241	3.2%	199	3.9%
$47,500 - $49,999	134	1.8%	102	2.0%
$50,000 - $54,499	313	4.1%	273	5.4%
$55,000 - $59,999	178	2.3%	173	3.4%
$60,000 - $74,999	463	6.1%	411	8.1%
$75,000 - $99,999	240	3.2%	203	4.0%
$100,000 - $124,999	81	1.1%	68	1.3%
$125,000 - $149,999	32	0.4%	32	0.6%
$150,000 And Greater	54	0.7%	50	1.0%

	Household	Family
Per Capita Income	$21,345	
Average Income	$50,143	$58,781
Median Income	$24,547	$30,804

Employment by Occupation	**7,793**	%
Total White Collar Employment	3,963	50.9%
Exec, Admin, and Managerial	790	10.1%
Professional specialty occupations	1,014	13.0%
Tech & related support occupations	208	2.7%
Sales occupations	864	11.1%
Admin support occ, incl clerical	1,087	13.9%
Total Blue Collar Employment	3,830	49.1%
Private household occupations	19	0.2%
Protective service occupations	187	2.4%
Service occ, ex protective & HH	1,358	17.4%
Farm, forest & fishing occupations	369	4.7%
Precision prod, craft & repair	991	12.7%
Mach operators, assemblers & inspec	264	3.4%
Trans & material moving	353	4.5%
Handlers, equip cleaners & laborers	289	3.7%

School Enrollment (3+ Years)		%
Public Preprimary	265	1.5%
Private Preprimary	82	0.5%
Public Elem or HS	2,970	16.9%
Private Elem or HS	44	0.3%
Public College	627	3.6%
Private College	129	0.7%
Not enrolled in school	13,458	76.6%
Total	17,575	

Educational Attainment (25+ Years)		%
Less than 9th grade	672	5.2%
9-12th grade, no diploma	1,668	13.0%
HS graduate (incl equiv)	4,845	37.8%
Some college, no degree	3,008	23.5%
Associate degree	881	6.9%
Bachelor's degree	1,203	9.4%
Graduate or prof degree	532	4.2%
Total	12,809	
Median School Years	11.8	

Workers In Family (1989)		%
0 Workers	1,017	20.1%
1 Worker	1,447	28.6%
2 Worker	2,226	44.0%
3+ Workers	371	7.3%

Labor Force By Gender	**Male**	**Female**
Population, Age 16+	6,960	7,301
In Armed Forces	6	0
Civilian Employed	4,344	3,449
Civilian Unemployed	300	212
Not in Labor Force	2,310	3,640

Vehicles Available	**Total**	**Owner**	**Renter**
0 Vehicles	7.9%	4.9%	13.9%
1 Vehicle	31.1%	25.4%	42.4%
2 Vehicles	39.2%	43.0%	31.8%
3 Vehicles	16.5%	20.0%	9.5%
4 Vehicles	3.5%	4.3%	1.8%
5+ Vehicles	1.8%	2.5%	0.5%

Source: Alfred Gobar Associates; AnySite.com - Integration Technologies, Inc.

EXHIBIT B-15

SUMMARY OF HOUSING UNIT TRENDS BETWEEN 1990 AND 2000
WEST MOJAVE PLAN REGION BY SUBAREA

	Single Family Units				Multi-Family Units				Mobile Homes				TOTAL			
Area	1990 [1]	2000 [1]	Growth 90-00	% of Region	1990 [1]	2000 [1]	Growth 90-00	% of Region	1990 [1]	2000 [1]	Growth 90-00	% of Region	1990 [1]	2000 [1]	Growth 90-00	% of Region
SAN BERNARDINO CO. SUBAREA																
Incorporated Cities	51,449	70,012	18,563	48.2%	15,848	16,812	964	33.4%	6,071	6,464	393	-163.1%	73,368	93,287	19,919	48.4%
Unincorporated Area	33,616	32,182	-1,434	-3.7%	2,652	2,668	17	0.6%	7,393	7,450	56	-23.4%	43,661	42,300	-1,361	-3.3%
TOTAL SUBAREA [2]	85,065	102,194	17,129	44.5%	18,500	19,480	980	34.0%	13,464	13,913	449	-186.5%	117,029	135,587	18,558	45.1%
LOS ANGELES CO. SUBAREA																
Incorporated Cities	40,702	57,380	16,679	43.4%	13,657	16,184	2,527	87.5%	5,929	5,139	-790	327.9%	60,288	78,704	18,416	44.8%
Unincorporated Area	18,637	19,431	793	2.1%	1,770	1,447	-323	-11.2%	2,164	2,046	-118	48.9%	22,571	22,924	352	0.9%
TOTAL SUBAREA [2]	59,339	76,811	17,472	45.4%	15,427	17,631	2,204	76.3%	8,093	7,185	-908	376.8%	82,859	101,628	18,769	45.6%
KERN COUNTY SUBAREA																
Incorporated Cities	10,588	10,586	-2	0.0%	2,993	2,988	-5	-0.2%	1,280	1,279	-1	0.3%	14,861	14,853	-8	0.0%
Unincorporated Area	7,614	11,524	3,910	10.2%	1,960	1,676	-284	-9.8%	5,376	5,597	221	-91.7%	14,950	18,797	3,847	9.4%
TOTAL SUBAREA [2]	18,202	22,110	3,908	10.2%	4,953	4,663	-290	-10.0%	6,656	6,876	220	-91.4%	29,811	33,650	3,839	9.3%
INYO COUNTY SUBAREA																
Incorporated Cities		- n/a -				- n/a -				- n/a -				- n/a -		
Unincorporated Area	260	225	-35	-0.1%	8	0	-8	-0.3%	157	154	-3	1.1%	425	379	-46	-0.1%
TOTAL SUBAREA [2]	260	225	-35	-0.1%	8	0	-8	-0.3%	157	154	-3	1.1%	425	379	-46	-0.1%
TOTAL REGION																
Incorporated Cities	102,739	137,978	35,240	91.6%	32,498	35,984	3,486	120.7%	13,280	12,882	-398	165.1%	148,517	186,844	38,327	93.2%
Unincorporated Area	60,127	63,361	3,234	8.4%	6,390	5,791	-599	-20.7%	15,090	15,247	157	-65.1%	81,607	84,399	2,792	6.8%
TOTAL REGION [2]	162,866	201,339	38,473	100.0%	38,888	41,775	2,887	100.0%	28,370	28,129	-241	100.0%	230,124	271,243	41,119	100.0%

[1] Number of units in structure (Census SF-3 file) adjusted to total housing units in SF-1 file.

[2] Number of units in structure based on zipcode boundaries (Census SF-3 file) adjusted to total housing units based on polygon boundaries (Census SF-1 file.)

Source: Alfred Gobar Associates; U.S. Bureau of the Census-SF1 and SF3 Files; AnySite Online.com.

EXHIBIT B-16

Housing Unit Trend Analysis For West Mojave Plan Area

Methodology

- In order to assess historical long-term housing development trends throughout the West Mojave Region, Census-reported housing unit counts (by number of units in structure) based on the 1990 and 2000 Census were compared.

- Although building permit trends are traditionally used to determine housing development trends, the Census-based data allows a more detailed geographical view of development—particularly, at the zip code level, which dissects the unincorporated areas otherwise aggregated into one single number under building permit reporting.

- Housing demographics are found on two separate Census Files—the SF-1 File (based on the short-form questionnaire, distributed to all households) and the SF-3 File (based on the long-form questionnaire, distributed to a sample of households). The SF-3 file provides a distribution of housing units based on the number of units in structure:

  1 unit, Detached
  1 unit, Attached
  2 units
  3 or 4 units
  5 to 9 units
  10 to 19 units
  20 to 49 units
  50 or more units
  Mobile homes
  Boat, van, RV, etc.

- For purposes of this analysis, "Single-Family units" included by 1 unit Detached and 1 unit Attached; "Multi-family units" included structures with two units or more. Mobile homes were included in the comparison, while Boats/vans/RVs were excluded.

- The total housing unit count differs slightly in the SF-1 and SF-3 files. The units in structure distribution from the SF-3 file was applied to the total housing unit count from the SF-1 file to estimate the units in structure for the entire population.

- The method used to estimate the change in housing units by number of units in structure was as follows:

METHODOLOGY FOR ESTIMATION OF HOUSING UNITS BY NUMBER OF UNITS IN STRUCTURE
1990 AND 2000 CENSUS

GEOGRAPHIC LEVEL	METHOD TO ESTIMATE NUMBER OF UNITS IN STRUCTURE	
	1990	2000
Subarea (based on Polygon)	1. AnySite Online.com provided distribution of Number of Housing Units in Structure (SF-3). 2. The distribution was then adjusted based on the Total Housing Units in Structure (SF-1) from Anysite Online.com.	1. Number of Housing Units in Structure distribution (SF-3) obtained for Zip Codes within Subarea from the Census website. 2. The distribution for each Zip Code was then adjusted based on the Total Housing Units in Structure (SF-1) from the Census website. 3. The zip code data was then aggregated and the distribution applied to the Total Housing Units in Structure (SF-1) based on the Polygon.
Incorporated Cities	1. The Census website provided distribution of Number of Housing Units in Structure (SF-3). 2. The distribution was then adjusted based on the Total Housing Units in Structure (SF-1) from the Census website.	1. The Census website provided distribution of Number of Housing Units in Structure (SF-3). 2. The distribution was then adjusted based on the Total Housing Units in Structure (SF-1) from the Census website.
Unincorporated Area	Subarea Total minus Incorporated Cities Total	Subarea Total minus Incorporated Cities Total
Zip Codes	1. AnySite Online provided the Number of Housing Units in Structure adjusted to the Total Housing Units in Structure (SF-1).	1. The Census website provided distribution of Number of Housing Units in Structure (SF-3) by zip code. 2. The distribution was then adjusted based on the Total Housing Units in Structure (SF-1) for each zip code.

Source: AnySite Online.Com; U.S. Bureau of the Census - 1990 and 2000 Census SF-1 and SF-3 Files; Alfred Gobar Associates.

- Differences in data collection, methodology, and geographic definitions between the 1990 and 2000 Census may cause overstated/understated ten-year trends. One of these problems occurs in the geographic boundary definitions of the cities between the two Censuses:

CHANGE IN CITY BOUNDARIES AND LAND DENSITY BETWEEN 1990 CENSUS AND 2000 CENSUS
INCORPORATED AREAS WITHIN WEST MOJAVE PLAN AREA

	1990 Census			2000 Census			1990 - 2000 Change		
Area	Sq. Miles	Pop.	Pop./ Sq. Mile	Sq. Miles	Pop.	Pop./ Sq. Mile	Sq. Miles	Pop.	Pop./ Sq. Mile
San Bernardino County Subarea									
Adelanto	36.9	8,517	230.9	53.5	18,130	338.9	16.6	9,613	108.0
Apple Valley	67.2	46,079	685.6	73.3	54,239	740.0	6.1	8,160	54.4
Barstow	22.9	21,472	937.1	33.6	21,119	628.5	10.7	-353	-308.6
Hesperia	48.3	50,418	1,043.7	67.3	62,582	929.9	19.0	12,164	-113.8
Twentynine Palms	54.1	11,821	218.5	54.8	14,764	269.4	0.7	2,943	50.9
Victorville	41.8	40,674	972.3	72.8	64,029	879.5	31.0	23,355	-92.8
Yucca Valley	13.9	13,701	984.4	40.0	16,865	421.6	26.1	3,164	-562.8
TOTAL INCORPORATED IN SUBAREA	285.1	192,682	5,072.5	395.3	251,728	4,207.9	110.2	59,046	-864.6
Los Angeles County Subarea									
Lancaster	88.8	97,291	1,095.7	94.0	118,718	1,263.0	5.2	21,427	167.3
Palmdale	77.6	68,842	886.9	105.0	116,670	1,111.1	27.4	47,828	224.2
TOTAL INCORPORATED IN SUBAREA	166.4	166,133	1,982.6	199.0	235,388	2,374.1	32.6	69,255	391.5
Kern County Subarea									
California City	478.1	5,955	32.3	203.6	8,385	41.2	-274.5	2,430	8.9
Ridgecrest	53.8	27,725	1,335.0	21.1	24,927	1,181.4	-32.7	-2,798	-153.6
TOTAL INCORPORATED IN SUBAREA	531.9	33,680	1,367.3	224.7	33,312	1,222.6	-307.2	-368	-144.7
TOTAL INCORPORATED IN REGION	983.4	392,495	8,422.4	819.0	520,428	7,804.5	-164.4	127,933	-617.9

Source: U.S. Bureau of the Census; Alfred Gobar Associates.

- In the San Bernardino subarea, the land area of incorporated cities increased by 110.2 square miles between 1990 and 2000, while the population density decreased by 846 persons per square mile. The corresponding decrease in housing units within the unincorporated area may therefore be partially attributed to the decrease in unincorporated land area.
- The land area of incorporated cities within the Los Angeles subarea increased by 32.6 square miles between 1990 and 2000, yet its population density increased by 391 persons per square mile. The negative growth in multi-family units and mobile homes may be attributed to the decrease in unincorporated land area.
- In the Kern County Subarea, the land area of incorporated cities actually decreased between 1990 and 2000 by 307.2 square miles. This may be reflected in the negative growth of housing stock in the incorporated cities and a positive growth in the unincorporated areas of the Kern County subarea.

C – Exhibits
WEMO Growth Capacity

EXHIBIT C-1
GENERAL PLAN BUILD OUT CAPACITY - SELECTED WEMO AREAS
SAN BERNARDINO COUNTY

Land Use & Intensity	City of 29 Palms			Yucca Valley			City of Adelanto			City of Barstow			City of Victorville		
Residential	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*
DU's/Ac: 0.00 - 0.20	4,318	864	2,424	5,019	502	1,197	3,415	683	2,418				7,851	1,570	4,788
0.21 - 0.50	15,095	6,038	16,949	10,191	2,548	6,078	1,037	415	1,468	2,482	621	1,691	1,045	523	
0.51 - 0.99															
1.0 - 1.5	2,151	2,151	6,038	2,219	2,219	5,294		326	1,154	454	454	1,237			
1.5 - 1.8															
2.0 - 2.9	2,067	4,134	11,604	3,774	7,548	18,007	3,845	7,690	27,223	658	1,316	3,586	14,343	28,686	87,464
3.0 - 3.9	293	879	2,467												
4.0 - 4.9	4,008	16,032	45,002	49	196	468	6,448	25,792	91,304						
5.0 - 7.9				1,267	6,335	15,113	1,920	9,600	33,984	4,130	20,650	56,271	923	4,615	14,071
8.0 - 10.0	879	8,790	24,674	48	384	916							4,349	34,792	106,081
12.0 - 15.0	87	1,044	2,931							4,276	64,133	174,761	2,016	30,240	92,202
20.0 - 30.0															
Residential Sub-Total:	28,898	39,932	112,088	22,567	19,732	47,072	16,665	44,506	157,551	12,000	87,173	237,546	30,527	100,426	304,605
		Pop/Hshld:	2.81		Pop/Hshld:	2.39		Pop/Hshld:	3.54		Pop/Hshld:	2.73		Pop/Hshld:	3.03
Non-Residential	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs
					(000SF/Ac)										
Office**	96	39.00	3,744	53	39.00	2,067	524	39.00	20,452	1,200	39.00	46,816	1,341	39.00	52,291
Retail**	1,512	15.00	22,680	951	15.00	14,265	2,197	15.00	32,949	3,846	15.00	57,687	6,917	15.00	103,749
Industrial**	1,039	14.00	14,546	998	14.00	13,972	10,479	14.00	146,706	2,252	14.00	31,526	5,460	14.00	76,436
Institutional**	848	5.50	4,664	216	13.00	2,808	449	21.00	9,429	1,075	13.00	13,974	1,143	16.00	18,286
Comm'l/Ind/Inst Sub-Total:	3,495		45,634	2,218		33,112	13,649		209,536	8,373		150,003	14,860		250,762
Other:															
Open Space - Mixed	2,420			382			1,043			967			894		
Open Space - City/County				137											
Open Space - Private															
Open Space - Other Govt															
Govt - Utilities/Infra./Circ.													648		
Govt - Military	2,563									3,905					
Aviation				52			2,690								
Resource - Agg/Mineral	368														
Agricultural															
Conservation															
Misc./Undesignated															
Other Sub-Total:	5,351		3,106	571		1,310	3,733		4,364	4,872		6,580	1,542		8,438
Non-Residential Sub-Total:	8,846		48,740	2,789		34,422	17,382		213,900	13,245		156,583	16,402		259,200
Study Area Totals															
Total Acreage:	37,744			25,356			34,047			25,245			46,929		
BLM Calculated Acreage:	37,623			25,508			33,949			25,407			47,160		
Dwelling Unit Capacity:	39,932			19,732			44,506			87,173			100,426		
Population Potential:	112,088			47,072			157,551			237,546			304,605		
Job Base Capacity:	48,740			34,422			213,900			156,583			259,200		

* Population coefficient drivers (Persons/Dwelling unit) were obtained form the California Department of Finance, January 2001.

** Employment coefficient drivers (Jobs/Acre) represent averages obtained form Building Owners Managers Association; Urban Land Institute, Southern California Real Estate Magazine.

Source: City of 29 Palm Plan, City of Yucca Valley, City of Adelanto, City of Barstow, City of Victorville, City of Hesperia, City of Victorville, Town of Apple Valley, County of San Bernardino; Alfred Gobar Associates.

EXHIBIT C-1 (Cont'd)
GENERAL PLAN BUILD OUT CAPACITY - SELECTED WEMO AREAS
SAN BERNARDINO COUNTY

Land Use & Intensity	City of Hesperia			Town of Apple Valley			Unincorporated County			WEMO Sub-Area Total		
Residential	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*
DU's/Ac: 0.00 - 0.20	969	97		2,163	433	1,263	734,063	7,341	22,257	757,798	11,489	34,346
0.21 - 0.50				6,230	3,115	9,093	2,189	876	2,655	38,269	14,134	37,934
0.51 - 0.99	8,172	6,129					2,976	2,381	7,218	11,148	8,510	7,218
1.0 - 1.5	10,882	15,235	47,761	7,778	7,778	22,703	24,444	24,444	74,114	47,927	52,606	158,300
1.5 - 1.8				15,458	30,916	90,244				15,458	30,916	90,244
2.0 - 2.9	1,153	3,344	10,482				3,882	7,764	23,541	29,722	60,482	181,907
3.0 - 3.9							3,813			4,106	879	2,467
4.0 - 4.9	507	2,484	7,788	1,626	6,504	18,985	2,805	11,220	34,018	15,443	62,228	197,565
5.0 - 7.9	5,174	25,870	81,102	736	3,680	10,742	1,242	6,210	18,830	15,392	76,960	230,114
8.0 - 10.0	758	6,064	19,011				414	3,723	11,289	6,448	53,753	161,970
12.0 - 15.0	793	9,516	29,833				2,038	24,462	74,169	9,210	129,394	373,895
20.0 - 30.0							6	120	364	6	120	364
Residential Sub-Total:	28,408	68,739	195,978	33,991	52,425	153,029	777,872	88,541	268,455	950,927	501,472	1,476,323
		Pop/Hshld:	2.85		Pop/Hshld:	2.92		Pop/Hshld:	3.03		Avg. Pop/Hshld:	2.94
Non-Residential	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs
Office**	1,675	39.00	65,325	1,439	39.00	56,102	867	39.00	33,831	7,196	39.00	280,627
Retail**	6,606	15.00	99,096	3,301	15.00	49,521	6,854	15.00	102,812	32,184	15.00	482,759
Industrial**	2,015	14.00	28,210	4,062	14.00	56,874	19,815	14.00	277,411	46,120	14.00	645,681
Institutional**	307	38.00	11,666	713	13.00	9,271	62,170	1.62	100,911	66,921	2.56	171,010
Comm'l/Ind/Inst Sub-Total:	10,603		204,297	9,516		171,768	89,706		514,965	152,420		1,580,076
Other:												
Open Space - Mixed	1,546			2,843						10,095		
Open Space - City/County	1,473									1,610		
Open Space - Private	20									20		
Open Space - Other Govt							1,590			1,590		
Govt - Utilities/Infra./Circ.	37			9						694		
Govt - Military							1,856,817		18,272	1,863,285		
Aviation	31									2,773		
Resource - Agg/Mineral	22						2,995,748			2,996,138		
Agricultural				508			32,308			32,816		
Conservation	142									142		
Misc./Undesignated												
Other Sub-Total:	3,271		5,429	3,360		4,279	4,886,463		25,708	4,909,163		59,214
Non-Residential Sub-Total:	13,874		209,726	12,876		176,047	4,976,169		540,673	**5,061,583**		**1,639,290**
Study Area Totals												
Total Acreage:	42,282			46,866			5,754,042			**6,012,511**	Total Acreage	
BLM Calculated Acreage:	43,385			46,912			5,718,618			**6,012,511**	BLM Calculated Acreage	
Dwelling Unit Capacity:	68,739			52,425			88,541			**501,472**	Dwelling Unit Capacity	
Population Potential:	195,978			153,029			268,455			**1,476,323**	Potential Residents	
Job Base Capacity:	209,726			176,047			540,673			**1,639,290**	Job Base Capacity	

* Population coefficient drivers (Persons/Dwelling unit) were obtained form the California Department of Finance, January 2001.

****** Employment coefficient drivers (Jobs/Acre) represent averages obtained form Building Owners Managers Association; Urban Land Institute, Southern California Real Estate Magazine.

Source: City of 29 Palm Plan, City of Yucca Valley, City of Adelanto, City of Barstow, City of Victorville, City of Hesperia, City of Victorville, Town of Apple Valley, County of San Bernardino; Alfred Gobar Associates

EXHIBIT C-2
GENERAL PLAN BUILD OUT CAPACITY - SELECTED WEMO AREAS
LOS ANGELES COUNTY

Land Use & Intensity	City of Lancaster			City of Palmdale			Unincorporated County			WEMO Sub-Area Total		
Residential	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*
DU's/Ac: 0.00 - 0.20												
0.21 - 0.50	6,653	1,663	4,916	3,108	1,198	4,120	458,002	229,001	801,962	467,763	231,862	810,998
0.51 - 0.99				17,888	14,247	48,995				17,888	14,247	48,995
1.0 - 1.5	6,653	6,653	19,665				19,011	19,011	66,577	25,664	25,664	86,243
1.5 - 1.8	6,653	13,305	39,331	8,930	13,771	47,358				15,583	27,076	86,689
2.0 - 2.9	17,985	71,940	212,655				197	394	1,379	18,182	72,334	214,034
3.0 - 3.9							5,311	15,934	55,801	5,311	15,934	55,801
4.0 - 4.9												
5.0 - 7.9				9,574	51,302	176,428	325	1,950	6,830	9,899	53,252	183,257
8.0 - 10.0	1,089	10,890	32,191	611	6,192	21,294				1,700	17,082	53,485
12.0 - 15.0	1,089	15,246	45,067	479	7,538	25,923	197	2,953	10,342	1,765	25,737	81,332
20.0 - 30.0				80	1,914	6,582	125	2,502	8,762	205	4,416	15,344
Residential Sub-Total:	40,121	119,697	353,825	40,670	96,162	330,701	483,169	271,746	951,653	**563,960**	**487,605**	**1,636,179**
		Pop/Hshld:	2.96		Pop/Hshld:	3.44		Pop/Hshld:	3.50		Avg. Pop/Hshld:	3.36
Non-Residential	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs
Office**	469	39.00	18,272	1,001	39.00	39,029	212	39.00	8,278	1,682	39.00	65,579
Retail**	1,406	15.00	21,094	3,002	15.00	45,034	851	15.00	12,766	5,260	15.00	78,893
Industrial**	11,277	14.00	157,878	13,592	14.00	190,288	643	14.00	9,001	25,512	14.00	357,167
Institutional**	1,329	16.00	21,264	3,738	5.00	18,690	479	1.62	777	5,546	7.34	40,731
Comm'l/Ind/Inst Sub-Total:	14,481		218,507	21,333		293,041	2,185		30,821	37,999		542,370
Other:												
Open Space - Mixed	600			4,446			7,319			12,365		
Open Space - City/County	200						6,707			6,907		
Open Space - Private										0		
Open Space - Other Govt				677			12,770			13,447		
Govt - Utilities/Infra./Circ.										0		
Govt - Military							48,838		6,091	48,838		
Aviation							346			346		
Resource - Agg/Mineral				741						741		
Agricultural										0		
Conservation										0		
Misc./Undesignated										0		
Other Sub-Total:	800		9,801	5,864		9,160	75,979		32,451	82,643		51,413
Non-Residential Sub-Total:	15,281		228,308	27,197		302,201	78,165		63,273	**120,642**		**593,782**
Study Area Totals												
Total Acreage:	55,402			67,867			561,333			**684,602**	Total Acreage	
BLM Calculated Acreage:	60,592			63,439			561,333			**684,602**	BLM Calculated Acreage	
Dwelling Unit Capacity:	119,697			96,162			271,746			**487,605**	Dwelling Unit Capacity	
Population Potential:	353,825			330,701			951,653			**1,636,179**	Potential Residents	
Job Base Capacity:	228,308			302,201			63,273			**593,782**	Job Base Capacity	

* Population coefficient drivers (Persons/Dwelling unit) were obtained form the California Department of Finance, January 2001.

****** Employment coefficient drivers (Jobs/Acre) represent averages obtained form Building Owners Managers Association; Urban Land Institute, Southern California Real Estate Magazine.

Source: City of Lancaster, City of Palmdale, County of Los Angeles; Alfred Gobar Associates.

EXHIBIT C-3
GENERAL PLAN BUILD OUT CAPACITY - SELECTED WEMO AREAS
KERN COUNTY

Land Use & Intensity	City of Ridgecrest			California City			Unincorporated County			WEMO Sub-Area Total		
Residential	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*
DU's/Ac: 0.00 - 0.20							10,587	529	1,600	10,587	529	1,600
0.21 - 0.50	664	133	336	47,665	23,833	65,158	98,008	39,203	118,511	146,337	63,169	184,005
0.51 - 0.99							57	43	130	57	43	130
1.0 - 1.5	700	700	1,769	1,496	1,496	4,090	14,519	14,519	43,892	16,715	16,715	49,751
1.5 - 1.8												
2.0 - 2.9	2,659	7,977	20,158	6,064	12,129	33,159	10,675	21,350	64,542	19,398	41,456	117,859
3.0 - 3.9							253	760	2,298	253	760	2,298
4.0 - 4.9							4,614	18,458	55,797	4,614	18,458	55,797
5.0 - 7.9	459	2,754	6,959	10,425	52,123	142,504	34,309	171,547	518,587	45,193	226,424	668,051
8.0 - 10.0	101	1,013	2,559				16,084	128,668	388,964	16,185	129,681	391,523
12.0 - 15.0	115	1,377	3,480	2,969	35,628	97,407	3,800	45,595	137,835	6,883	82,600	238,722
20.0 - 30.0							544	10,870	32,861	544	10,870	32,861
Residential Sub-Total:	4,698	13,953	35,260	68,619	125,208	342,319	193,451	451,544	1,365,019	**266,768**	**590,706**	**1,742,598**
		Pop/Hshld:	2.53		Pop/Hshld:	2.73		Pop/Hshld:	3.02		Avg. Pop/Hshld:	2.95
Non-Residential	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs
Office**	420	39.00	16,388	1,807	39.00	70,481	2,944	39.00	114,826	5,172	39.00	201,695
Retail**	1,681	15.00	25,212	602	15.00	9,036	4,136	15.00	62,043	6,419	15.00	96,291
Industrial**	210	14.00	2,940	6,315	14.00	88,411	25,232	14.00	353,250	31,757	14.00	444,601
Institutional**	1,213	1.70	2,062	379	39.00	14,782	3,466	1.62	5,626	5,058	4.44	22,470
Comm'l/Ind/Inst Sub-Total:	3,524		46,602	9,104		182,711	35,779		535,745	48,406		765,058
Other:												
Open Space - Mixed												
Open Space - City/County							1,301			1,301		
Open Space - Private	717						139			856		
Open Space - Other Govt							460,821			460,821		
Govt - Utilities/Infra./Circ.												
Govt - Military							451,737		6,091	451,737		
Aviation	2,420						2,480			4,900		
Resource - Agg/Mineral							161,566			161,566		
Agricultural							149,146			149,146		
Conservation				11,551			11,435			22,986		
Misc./Undesignated							156			156		
Other Sub-Total:	3,137		977	11,551		19,134	1,238,782		43,902	1,253,470		64,012
Non-Residential Sub-Total:	6,661		47,579	20,655		201,845	1,274,561		579,647	**1,301,876**		**829,070**
Study Area Totals												
Total Acreage:	11,359			89,274			1,468,012			**1,568,644**	Total Acreage	
BLM Calculated Acreage:	12,238			89,276			1,467,130			**1,568,644**	BLM Calculated Acreage	
Dwelling Unit Capacity:	13,953			125,208			451,544			**590,706**	Dwelling Unit Capacity	
Population Potential:	35,260			342,319			1,365,019			**1,742,598**	Potential Residents	
Job Base Capacity:	47,579			201,845			579,647			**829,070**	Job Base Capacity	

* Population coefficient drivers (Persons/Dwelling unit) were obtained form the California Department of Finance, January 2001.

** Employment coefficient drivers (Jobs/Acre) represent averages obtained form Building Owners Managers Association; Urban Land Institute, Southern California Real Estate Magazine.

Source: City of Ridgecrest, City of California City, County of Kern; Alfred Gobar Associates.

EXHIBIT C-4
GENERAL PLAN BUILD OUT CAPACITY - SELECTED WEMO AREAS
INYO COUNTY

Land Use & Intensity	Military & Other			Coso Junction			Darwin			Dunmovin			Haiwee		
Residential	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*
DU's/Ac: 0.00 - 0.20													896	45	108
0.21 - 0.50				26	5	11	50	10	24	70	14	34			
0.51 - 0.99															
1.0 - 1.5															
1.5 - 1.8															
2.0 - 2.9															
3.0 - 3.9															
4.0 - 4.9															
5.0 - 7.9															
8.0 - 10.0															
12.0 - 15.0															
20.0 - 30.0															
Residential Sub-Total:	0	0	0	26	5	11	50	10	24	70	14	34	896	45	108
		Pop/Hshld:	n.a.		Pop/Hshld:	2.04		Pop/Hshld:	2.40		Pop/Hshld:	2.40		Pop/Hshld:	2.40
Non-Residential	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs
					(000SF/Ac)										
Office**															
Retail**				26	15.00	390	1	15.00	15	36	15.00	540			
Industrial**															
Institutional**															
Comm'l/Ind/Inst Sub-Total:	0		0	26		390	1		15	36		540	0		0
Other:															
Open Space - Mixed															
Open Space - City/County															
Open Space - Private															
Open Space - Other Govt	330,790												1,024		
Govt - Utilities/Infra./Circ.															
Govt - Military	457,000														
Aviation															
Resource - Agg/Mineral										70					
Agricultural				53											
Conservation															
Misc./Undesignated															
Other Sub-Total:	787,790			53			0			70			1,024		
Non-Residential Sub-Total:	787,790		0	79		390	1		15	106		540	1,024		0
Study Area Totals															
Total Acreage:	787,790			105			51			176			1,920		
BLM Calculated Acreage:	788,208			n.a.			n.a.			n.a.			n.a.		
Dwelling Unit Capacity:	0			5			10			14			45		
Population Potential:	0			11			24			34			108		
Job Base Capacity:	0			390			15			540			0		

* Population coefficient drivers (Persons/Dwelling unit) were obtained form the California Department of Finance, January 2001.

** Employment coefficient drivers (Jobs/Acre) represent averages obtained form Building Owners Managers Association; Urban Land Institute, Southern California Real Estate Magazine.

Source: County of Kern; Alfred Gobar Associates.

EXHIBIT C-4 (Cont'd)
GENERAL PLAN BUILD OUT CAPACITY - SELECTED WEMO AREAS
INYO COUNTY

Land Use & Intensity	Homewood Canyon			Little Lake			Olancha & Cartago			Pearsonville			Valley Wells			WEMO Sub-Area Total		
Residential	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*	Acres	DU's	Pop.*
DU's/Ac: 0.00 - 0.20	440	22	53				2,847	142	342	640	32	77	570	29	68	5,393	270	648
0.21 - 0.50							768	154	369	15	3	7				929	186	445
0.51 - 0.99																0	0	0
1.0 - 1.5																0	0	0
1.5 - 1.8																0	0	0
2.0 - 2.9																0	0	0
3.0 - 3.9																0	0	0
4.0 - 4.9																0	0	0
5.0 - 7.9																0	0	0
8.0 - 10.0																0	0	0
12.0 - 15.0																0	0	0
20.0 - 30.0																0	0	0
Residential Sub-Total:	440	22	53	0	0	0	3,615	296	711	655	35	84	570	29	68	5,097	392	940
		Pop/Hshld:	2.40		Pop/Hshld:			Pop/Hshld:	2.40		Pop/Hshld:	2.40		Pop/Hshld:	2.40		Avg. Pop/Hshld:	2.40
Non-Residential	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs
Office**																0	0.00	0
Retail**							38	15.00	570	40	15.00	600	10	15.00	150	151	15.00	2,265
Industrial**							227	14.00	3,178	100	14.00	1,400	1,152	14.00	16,128	1,479	14.00	20,706
Institutional**	10	1.62	16							30	1.62	49	384	1.62	623	424	1.62	688
Comm'l/Ind/Inst Sub-Total:	10		16	0		0	265		3,748	170		2,049	1,546		16,901	2,054		23,659
Other:																		
Open Space - Mixed										80						80		
Open Space - City/County										5						5		
Open Space - Private																0		
Open Space - Other Govt	320			6			29,036						192			361,368		
Govt - Utilities/Infra./Circ.										240						240		
Govt - Military																457,000		
Aviation																0		
Resource - Agg/Mineral							320									390		
Agricultural							3,709									3,762		
Conservation																0		
Misc./Undesignated																		
Other Sub-Total:	320			6			33,065			325			192			822,845		26
Non-Residential Sub-Total:	330		16	6		0	33,330		3,748	495		2,049	1,738		16,901	**824,899**		**23,685**
Study Area Totals																		
Total Acreage:	770			6			36,945			1,150			2,308			**831,221**	Total Acreage	
BLM Calculated Acreage:	n.a.			n.a.			n.a.			n.a.			n.a.			**831,221**	BLM Calculated Acreage	
Dwelling Unit Capacity:	22			0			296			35			29			**455**	Dwelling Unit Capacity	
Population Potential:	53			0			711			84			68			**1,093**	Potential Residents	
Implicit Job Base:	16			0			3,748			2,049			16,901			**23,685**	Job Base Capacity	

* Population coefficient drivers (Persons/Dwelling unit) were obtained form the California Department of Finance, January 2001.

** Employment coefficient drivers (Jobs/Acre) represent averages obtained form Building Owners Managers Association; Urban Land Institute, Southern California Real Estate Magazine.

Source: City of 29 Palm Plan, City of Yucca Valley, City of Adelanto, City of Barstow, City of Victorville, City of Hesperia, City of Victorville, Town of Apple Valley, County of San Bernardino; Alfred Gobar Associates

EXHIBIT C-5
GENERAL PLAN BUILD OUT CAPACITY - SELECTED WEMO AREAS
RIVERSIDE COUNTY

Land Use & Intensity	Unincorporated County			WEMO Sub-Area Total		
Residential	Acres	DU's	Pop.*	Acres	DU's	Pop.*
DU's/Ac: 0.00 - 0.20						
0.21 - 0.50						
0.51 - 0.99						
1.0 - 1.5						
1.5 - 1.8						
2.0 - 2.9						
3.0 - 3.9						
4.0 - 4.9						
5.0 - 7.9						
8.0 - 10.0						
12.0 - 15.0						
20.0 - 30.0						
Residential Sub-Total:	4616***	2,308	6,976	4,616	2,308	6,976
		Pop/Hshld:	3.02		Avg. Pop/Hshld:	3.02
Non-Residential	Acres	Jobs/Ac	Jobs	Acres	Jobs/Ac	Jobs
Office**						
Retail**						
Industrial**						
Institutional**						
Comm'l/Ind/Inst Sub-Total:	4616***	3	13,848	4,616		13,848
Other:						
Open Space - Mixed	2,784			2,784		
Open Space - City/County	10			10		
Open Space - Private						
Open Space - Other Govt	249,985			249,985		
Govt - Utilities/Infra./Circ.	57					
Govt - Military						0
Aviation						
Resource - Agg/Mineral						
Agricultural						
Conservation						
Misc./Undesignated						
Other Sub-Total:	252,836			252,836		193
Non-Residential Sub-Total:	257,452		13,848	**257,452**		**14,041**
Study Area Totals						
Total Acreage:	262,068			**262,068**	Total Acreage	
BLM Calculated Acreage:	262,066			**262,066**	BLM Calculated Acreage	
Dwelling Unit Capacity:	2,308			**2,308**	Dwelling Unit Capacity	
Population Potential:	6,976			**6,976**	Potential Residents	
Job Base Capacity:	13,848			**14,041**	Job Base Capacity	

* Population coefficient drivers (Persons/Dwelling unit) were obtained form the California Department of Finance, January 2001.

****** Employment coefficient drivers (Jobs/Acre) represent averages obtained form Building Owners Managers Association; Urban Land Institute, Southern California Real Estate Magazine.

******* Arbitrary division of 9,231 acres of private land divided 50/50 between commercial and residential.

Source: Bureau of Land Management; Alfred Gobar Associates.

D – Exhibits
WEMO Area Valuation

EXHIBIT D-1

WEMO AREA CITIES
2002 ASSESSED VALUE & SHARE OF BASIC LEVY

WEMO City	Fiscal Year	Assessment Value			Property Tax Revenue			Effective Share of Basic Levy
		Secured	Unsecured	Total	Secured	Unsecured	Total	
29 Palms	2002-2003	$ 399,944,945	$ 9,050,334	$ 408,995,279	$ 1,029,608	$ 30,392	$ 1,060,000	25.92%
Adelanto	2001-2002	339,118,762	4,148,596	343,267,358				2.04%
Apple Valley	2002-2003	2,299,327,916	57,061,103	2,356,389,019			1,275,000	5.41%
Barstow	2002-2003	521,250,305	51,186,602	572,436,907	69,082 1,244,125		69,927	12.68%
California City	2002-2003	307,806,285	1,504,910	309,311,195	661,000	855 30,875	725,910	27.35%
Hesperia	2002-2003	1,937,208,798	62,941,186	2,000,149,984		64,910		1.76%
Lancaster	2002-2003	859,545,344	191,563,900	1,051,109,244	841,864		846,000 351,047 2,600,000	24.74%
Palmdale	2002-2003	3,307,059,000	106,313,000	3,413,372,000	340,000 2,126,152	4,136 11,047	3,022,260	8.85%
Ridgecrest	2002-2003	453,349,118	23,311,494	476,660,612	2,928,129	473,848		8.39%
Victorville	2002-2003	2,440,373,562	121,800,522	2,562,174,084		94,131	5,181,148 400,000	20.22%
Yucca Valley	2002-2003	761,768,184	29,246,247	791,014,431	379,432 4,934,847	20,568		21.56%
	Total:	**$ 13,626,752,219**	**$ 658,127,894**	**$ 14,284,880,113**	**$ 16,193,899** 1,639,661	246,301 **$ 1,042,524**	1,705,121 **$ 17,236,413**	**12.07%**
						65,460		

Note: Indicated value and property tax collected is net of redevelopment project areas.

Source: City of 29 Palm Plan, City of Yucca Valley, City of Adelanto, City of Barstow, City of Victorville, City of Lancaster, City of Palmdale, City of Hesperia, City of Victorville, City of California City, Town of Apple Valley, County of San Bernardino, County of Los Angeles, County of Kern, County of Inyo; Alfred Gobar Associates.

EXHIBIT D-2
WEMO AREA CITIES 2002 ASSESSED VALUE

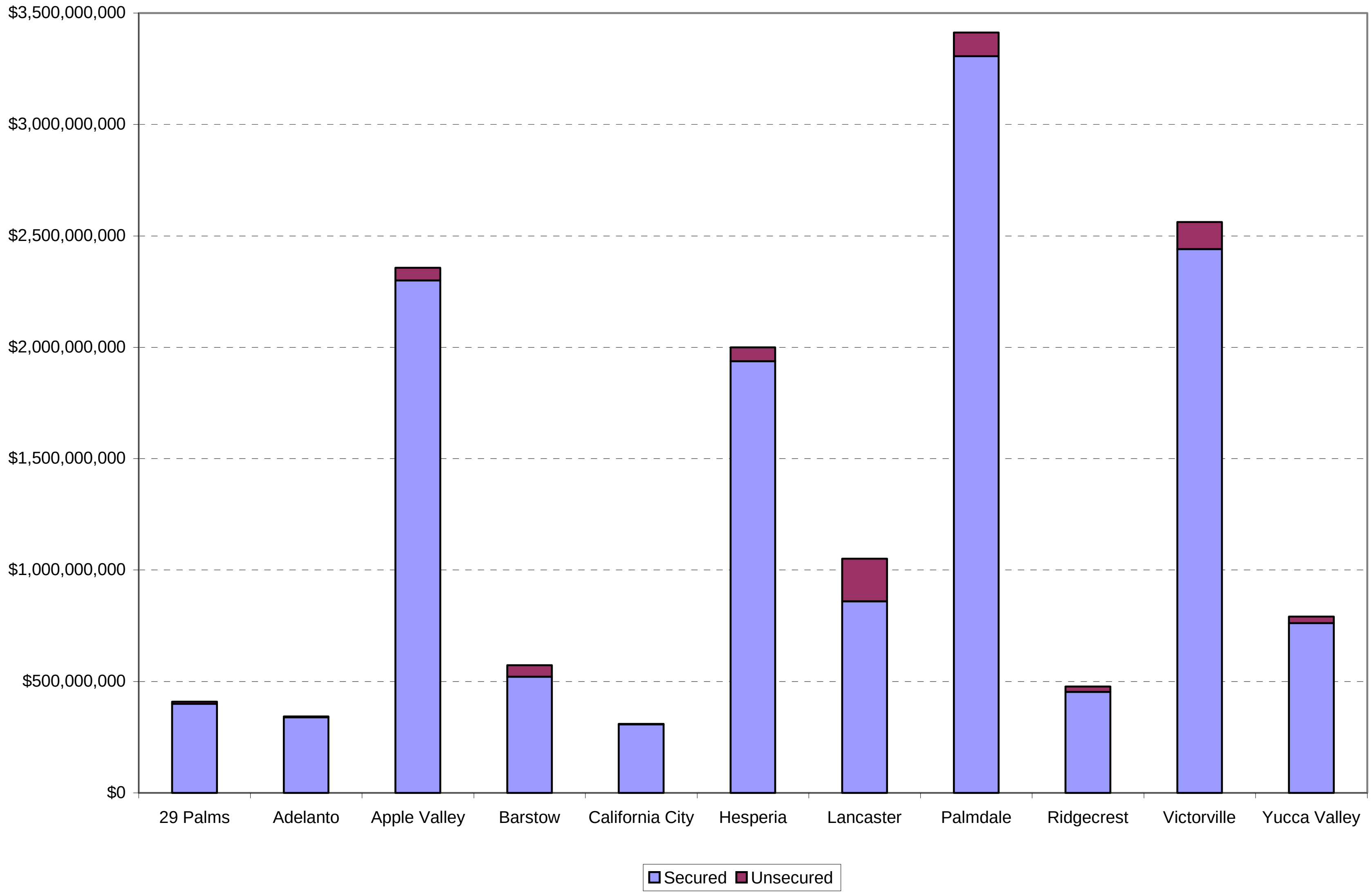


EXHIBIT D-3
WEMO AREA CITIES TAXES

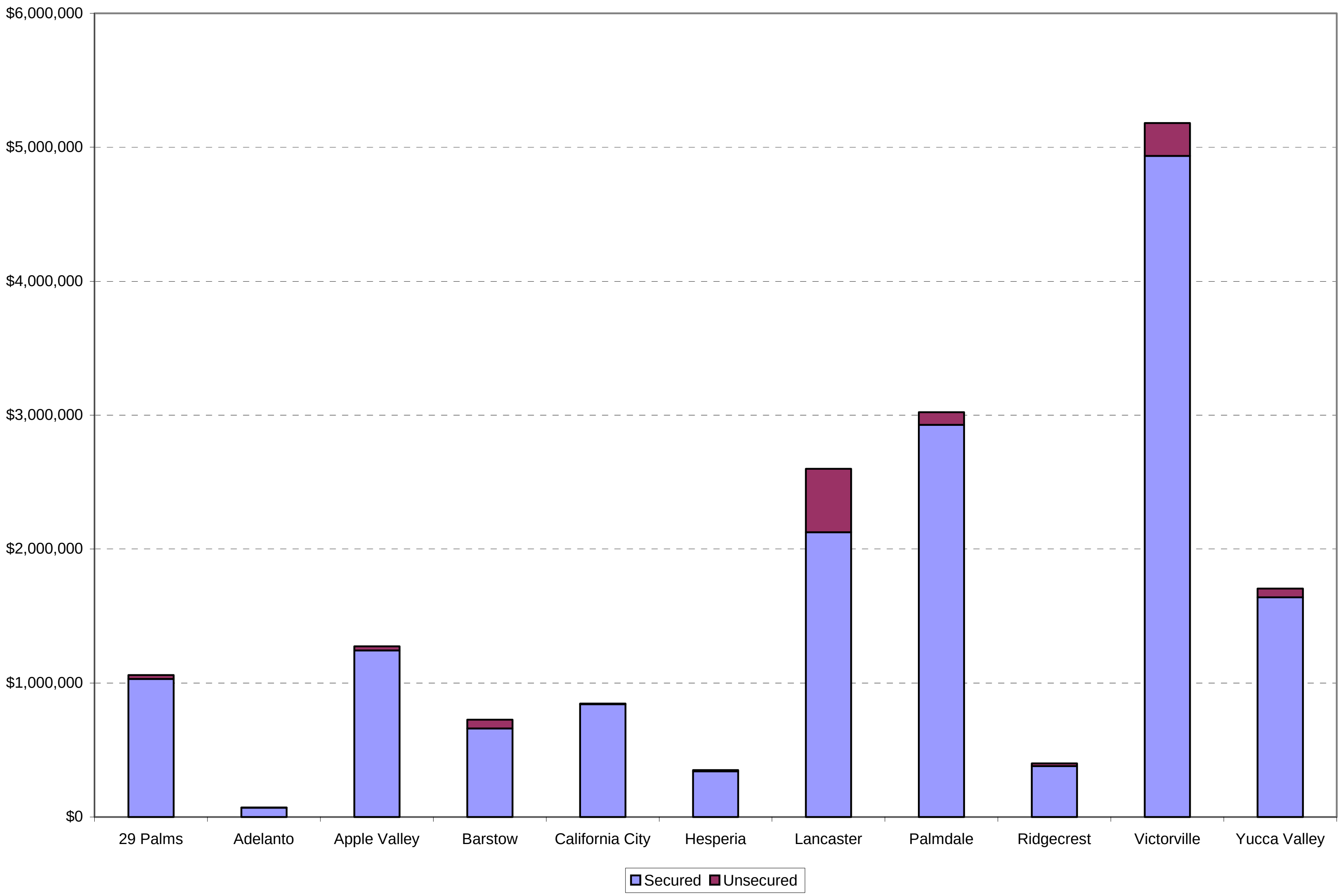


EXHIBIT D-4

AVERAGE LAND VALUE - UNIMPROVED PROPERTIES
WEMO STUDY AREA

AGA USE CODE	USE CODE DESCRIPTION	AVG. VAL. PER ACRE	NO. OF RECORDS
INYO SUBAREA			
1	Vacant	$13,336	2,890
2	Res-SF	58,286	1
3	Res-Other	49,201	25
4	Ret/Off/Mxd/Rec	175,445	62
5	Ind/Transp	2,149	186
6	Inst-Sch/Ch/Hsp	162,307	3
7	ResProd/Util//ROW	97,676	11
8	Agricultural	4,741	29
9	Open Space	1,079	551
10	Misc/Unsec	N/A	N/A
OVERALL		**$14,210**	**3,758**
KERN SUBAREA			
1	Vacant	$2,439	38,707
2	Res-SF	7,497	3
3	Res-Other	3,976	1
4	Ret/Off/Mxd/Rec	43,014	174
5	Ind/Transp	6,841	1,031
6	Inst-Sch/Ch/Hsp	3,113	393
7	ResProd/Util//ROW	2,581	328
8	Agricultural	743	452
9	Open Space	826	6,853
10	Misc/Unsec	781	2
OVERALL		**$2,441**	**47,944**
LOS ANGELES SUBAREA			
1	Vacant	$14,403	51,675
2	Res-SF	44,254	689
3	Res-Other	116,507	35
4	Ret/Off/Mxd/Rec	145,799	90
5	Ind/Transp	47,148	70
6	Inst-Sch/Ch/Hsp	12,080	561
7	ResProd/Util//ROW	2,359	78
8	Agricultural	8,159	656
9	Open Space	55,746	84
10	Misc/Unsec	3,061	7
OVERALL		**$15,058**	**53,945**

EXHIBIT D-4 (cont.)

AVERAGE LAND VALUE - UNIMPROVED PROPERTIES
WEMO STUDY AREA

AGA USE CODE	USE CODE DESCRIPTION	AVG. VAL. PER ACRE	NO. OF RECORDS
SAN BERNARDINO SUBREA			
1	Vacant	$11,291	79,389
2	Res-SF	59,648	256
3	Res-Other	17,090	185
4	Ret/Off/Mxd/Rec	119,768	42
5	Ind/Transp	84,721	29
6	Inst-Sch/Ch/Hsp	5,940	9
7	ResProd/Util//ROW	1,579	960
8	Agricultural	2,799	128
9	Open Space	N/A	N/A
10	Misc/Unsec	N/A	N/A
OVERALL		**$11,411**	**80,998**
WEMO STUDY AREA			
1	Vacant	$10,272	172,661
2	Res-SF	48,305	949
3	Res-Other	34,444	246
4	Ret/Off/Mxd/Rec	99,223	368
5	Ind/Transp	10,038	1,316
6	Inst-Sch/Ch/Hsp	8,841	966
7	ResProd/Util//ROW	2,629	1,377
8	Agricultural	4,888	1,265
9	Open Space	1,461	7,488
10	Misc/Unsec	2,554	9
OVERALL		**$10,217**	**186,645**

Source: cd data; Parcel Quest; Kern Data; Los Angeles County Planning Division; Alfred Gobar Associates

EXHIBIT D-5

AVERAGE TOTAL VALUE - IMPROVED PROPERTY
WEMO STUDY AREA

AGA USE CODE	USE CODE DESCRIPTION	AVG. VAL. PER ACRE	NO. OF RECORDS
INYO SUBAREA			
1	Vacant	$74,040	93
2	Res-SF	484,458	3,595
3	Res-Other	363,658	1,204
4	Ret/Off/Mxd/Rec	663,606	246
5	Ind/Transp	310,516	64
6	Inst-Sch/Ch/Hsp	533,057	48
7	ResProd/Util//ROW	328,252	15
8	Agricultural	23,320	35
9	Open Space	3,256	80
10	Misc/Unsec	N/A	N/A
OVERALL		**$446,295**	**5,380**
KERN SUBAREA			
1	Vacant	$32,110	850
2	Res-SF	268,551	5,641
3	Res-Other	280,069	302
4	Ret/Off/Mxd/Rec	456,647	221
5	Ind/Transp	146,009	155
6	Inst-Sch/Ch/Hsp	204,331	63
7	ResProd/Util//ROW	907,278	20
8	Agricultural	5,939	311
9	Open Space	3,272	97
10	Misc/Unsec	N/A	N/A
OVERALL		**$232,834**	**7,660**
LOS ANGELES SUBAREA			
1	Vacant	$265,072	185
2	Res-SF	636,677	60,268
3	Res-Other	421,334	1,519
4	Ret/Off/Mxd/Rec	574,195	935
5	Ind/Transp	400,872	298
6	Inst-Sch/Ch/Hsp	303,485	144
7	ResProd/Util//ROW	35,099	14
8	Agricultural	17,581	115
9	Open Space	4,710	2
10	Misc/Unsec	752,348	2
OVERALL		**$626,388**	**63,482**

EXHIBIT D-5 (cont.)

AVERAGE TOTAL VALUE - IMPROVED PROPERTY
WEMO STUDY AREA

AGA USE CODE	USE CODE DESCRIPTION	AVG. VAL. PER ACRE	NO. OF RECORDS
SAN BERNARDINO SUBREA			
1	Vacant	$123,273	897
2	Res-SF	356,236	76,743
3	Res-Other	241,074	11,856
4	Ret/Off/Mxd/Rec	455,706	1,502
5	Ind/Transp	220,654	480
6	Inst-Sch/Ch/Hsp	225,089	200
7	ResProd/Util//ROW	105,799	279
8	Agricultural	27,846	238
9	Open Space	N/A	N/A
10	Misc/Unsec	N/A	N/A
OVERALL		**$338,184**	**92,195**
WEMO STUDY AREA			
1	Vacant	$95,700	2,025
2	Res-SF	471,574	146,247
3	Res-Other	270,184	14,881
4	Ret/Off/Mxd/Rec	511,539	2,904
5	Ind/Transp	268,684	997
6	Inst-Sch/Ch/Hsp	279,514	455
7	ResProd/Util//ROW	161,825	328
8	Agricultural	16,184	699
9	Open Space	3,281	179
10	Misc/Unsec	752,348	2
OVERALL		**$445,289**	**168,717**

Source: cd data; Parcel Quest; Kern Data; Los Angeles County Planning Division; Alfred Gobar Associates

EXHIBIT D-6

COUNTY ASSESSOR PARCEL USE CODES
CLASSIFICATION AND CONVERSION FOR WEMO ANALYSIS

#	Land Use Classification	San Bernardino County Range 1		Range 2		Range 3	
	Vacant						
1	Undesignated	0	0				
1	Res	1	1				
1	Other	2	4				
	Residential						
2	Single Family	510	510				
3	All Other	511	650				
	Non-Residential						
4	Retail	251	347				
4	Office	210	236				
4	Mixed Use	812	888				
4	Recreation	370	399				
5	Indutstrial	100	119				
5	Transportation	350	365				
6	Institutional	400	483				
	Mineral/Agric/Etc.						
7	Resource Prod.	140	153				
7	Utility/R-O-W	160	180	903	999		
8	Agricultural	701	799				
9	**Open Space**	900	902				
10	**Misc/Unsecured Use**	1101	8888				

#	Land Use Classification	Kern County Range 1		Range 2		Range 3	
	Vacant						
1	Undesignated	0	0	4000	4000		
1	Res	1	49	90	91	2900	2990
1	Other	50	89	97	99		
	Residential						
2	Single Family	100	199				
3	All Other	200	602				
	Non-Residential						
4	Retail	1000	1502	1800	1890	2100	2890
4	Office	1600	1614				
4	Mixed Use	1690	1690				
4	Recreation	1900	1990	3950	3950		
5	Indutstrial	3000	3890				
5	Transportation	3900	3901				
6	Institutional	1700	1790	6000	6070	6200	7000
	Mineral/Agric/Etc.						
7	Resource Prod.	3960	3988	8100	8209	8400	8500
7	Utility/R-O-W	3902	3902	6100	6100	8300	8306
8	Agricultural	4100	4908				
9	**Open Space**	5000	5100				
10	**Misc/Unsecured Use**	8700	9999				

EXHIBIT D-6 (cont.)

COUNTY ASSESSOR PARCEL USE CODES
CLASSIFICATION AND CONVERSION FOR WEMO ANALYSIS

		Los Angeles County					
#	Land Use Classification	Range 1		Range 2		Range 3	
	Vacant						
1	Undesignated						
1	Res						
1	Other	10V	10V	30V	30V	880V	880V
	Residential						
2	Single Family	1	1				
3	All Other	2	9				
	Non-Residential						
4	Retail	10	16	18	18	21	29
4	Office	17	17	19	19		
4	Mixed Use						
4	Recreation	60	69				
5	Indutstrial	30	36				
5	Transportation	38	39				
6	Institutional	70	79	8800	8900	900	999
	Mineral/Agric/Etc.						
7	Resource Prod.	37	37	55	57	82	84
7	Utility/R-O-W	59	59	81	81	85	87
8	Agricultural	40	54				
9	**Open Space**	58	58				
10	**Misc/Unsecured Use**	80	80				

		Inyo County					
#	Land Use Classification	Range 1		Range 2		Range 3	
	Vacant						
1	Undesignated						
1	Res	190	194				
1	Other	330	332	470			
	Residential						
2	Single Family	110	111				
3	All Other	112	135	160	181		
	Non-Residential						
4	Retail	140	141	210	270	310	350
4	Office	220	222	284	291		
4	Mixed Use						
4	Recreation	280	283	610	621		
5	Indutstrial	410	460	480	496		
5	Transportation	923	931				
6	Institutional	640	640	710	794	991	999
	Mineral/Agric/Etc.						
7	Resource Prod.						
7	Utility/R-O-W	810	881	920	922		
8	Agricultural	510	551				
9	**Open Space**	624	632	650	652	940	990
10	**Misc/Unsecured Use**	910	912				

Source: cd data; Parcel Quest; Kern Data; Los Angeles County Planning Division; Alfred Gobar Associat

E – Exhibits
WEMO Market Share and Projected Growth

EXHIBIT E-1

LONG-TERM PROJECTED GROWTH
WEST MOJAVE PLAN AREA - HOUSEHOLD POPULATION

Projection Criteria	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	23,460	24,995	27,639	30,663	34,528	36,598	39,379	42,159	18,699	1.7%
Twentynine Palms	15,403	16,223	18,228	20,245	22,473	23,963	25,779	27,595	12,192	1.7%
Yucca Valley	18,512	19,424	20,834	21,766	22,793	23,937	25,027	26,118	7,606	1.0%
Adelanto	16,022	18,986	22,278	26,096	30,980	33,980	37,683	41,385	25,363	2.7%
Apple Valley	56,369	60,259	63,314	66,854	71,406	74,641	78,308	81,975	25,606	1.1%
Hesperia	66,785	76,011	87,108	100,008	116,536	126,339	138,689	151,039	84,254	2.4%
Victorville	68,386	78,698	91,551	106,522	125,700	136,907	151,152	165,397	97,011	2.6%
Subarea Cities:	264,937	294,596	330,952	372,154	424,416	456,366	496,017	535,669	270,732	2.0%
Unincorporated Area	109,706	120,110	131,501	143,972	157,625	172,573	188,939	206,857	97,151	1.8%
Subarea Total	**374,643**	**414,706**	**462,453**	**516,126**	**582,041**	**628,939**	**684,956**	**742,526**	**367,883**	**2.0%**
Los Angeles Subarea										
Lancaster	137,818	156,756	195,447	231,808	284,021	311,407	348,153	384,899	247,081	3.0%
Palmdale	129,161	150,948	174,133	195,695	226,275	246,935	270,832	294,730	165,569	2.4%
Subarea Cities:	266,979	307,704	369,580	427,503	510,296	558,342	618,986	679,629	412,650	2.7%
Unincorporated Area	72,355	79,217	86,729	94,954	103,959	113,818	124,612	136,429	64,074	2.0%
Subarea Total	**339,334**	**386,921**	**456,309**	**522,457**	**614,255**	**672,160**	**743,598**	**816,058**	**476,724**	**2.5%**
Kern Subarea										
California City	9,215	9,952	10,748	11,608	12,536	13,301	14,131	14,961	5,746	1.4%
Ridgecrest	25,233	27,756	30,531	33,585	36,943	39,584	42,509	45,434	20,201	1.7%
Subarea Cities:	34,448	37,708	41,279	45,193	49,479	52,886	56,640	60,395	25,947	1.6%
Unincorporated Area	45,973	50,333	55,106	60,332	66,054	72,318	79,176	86,685	40,712	1.1%
Subarea Total	**80,421**	**88,041**	**96,385**	**105,525**	**115,533**	**125,204**	**135,816**	**147,080**	**66,659**	**1.7%**
Inyo Subarea										
Subarea Total	**600**	**633**	**668**	**704**	**742**	**782**	**825**	**870**	**270**	**1.1%**
WEMO Study Area:	**794,998**	**890,301**	**1,015,815**	**1,144,812**	**1,312,571**	**1,427,085**	**1,565,195**	**1,706,534**	**911,536**	**2.2%**
WEMO Area Cities:	566,364	640,008	741,811	844,850	984,191	1,067,594	1,171,643	1,275,693	709,329	2.3%
WEMO Outlying Areas:	228,634	250,293	274,004	299,962	328,380	359,491	393,552	430,841	202,207	1.8%

Source: Alfred Gobar Associates

EXHIBIT E-2

LONG-TERM PROJECTED GROWTH
WEST MOJAVE PLAN AREA - HOUSING UNITS

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	8,710	8,950	9,900	10,900	12,180	12,630	13,360	14,030	5,320	1.4%
Twentynine Palms	6,350	7,160	7,920	8,820	9,770	10,570	11,400	12,220	5,870	1.9%
Yucca Valley	8,400	8,780	9,230	9,540	9,880	10,180	10,440	10,680	2,280	0.7%
Adelanto	5,640	6,310	7,590	8,960	10,790	11,620	12,810	13,970	8,330	2.6%
Apple Valley	19,700	20,310	21,970	23,820	26,360	27,380	29,010	30,640	10,940	1.3%
Hesperia	21,960	23,490	27,790	32,580	39,500	42,050	46,360	50,660	28,700	2.4%
Victorville	23,100	25,900	30,460	35,510	42,610	45,700	50,180	54,550	31,450	2.5%
Subarea Cities:	93,860	100,900	114,860	130,130	151,090	160,130	173,560	186,750	92,890	2.0%
Unincorporated Area	52,430	55,500	61,570	67,920	75,690	81,680	89,180	97,290	44,860	1.8%
Subarea Total	**146,290**	**156,400**	**176,430**	**198,050**	**226,780**	**241,810**	**262,740**	**284,040**	**137,750**	**1.9%**
Los Angeles Subarea										
Lancaster	44,530	49,500	65,170	81,660	98,140	111,180	126,720	142,750	98,220	3.4%
Palmdale	41,790	49,070	59,610	69,720	81,720	92,170	103,920	116,270	74,480	3.0%
Subarea Cities:	86,320	98,570	124,780	151,380	179,860	203,350	230,640	259,020	172,700	3.2%
Unincorporated Area	29,710	32,220	37,180	42,690	46,530	52,640	58,960	66,020	36,310	2.3%
Subarea Total	**116,030**	**130,790**	**161,960**	**194,070**	**226,390**	**255,990**	**289,600**	**325,040**	**209,010**	**3.0%**
Kern Subarea										
California City	4,030	4,310	4,610	4,930	5,280	5,510	5,760	5,990	1,960	1.1%
Ridgecrest	12,800	13,950	15,210	16,580	18,070	19,050	20,120	21,140	8,340	1.4%
Subarea Cities:	16,830	18,260	19,820	21,510	23,350	24,560	25,880	27,130	10,300	1.4%
Unincorporated Area	23,660	25,900	28,360	31,050	33,990	37,220	40,740	44,610	20,950	1.8%
Subarea Total	**40,490**	**44,160**	**48,180**	**52,560**	**57,340**	**61,780**	**66,620**	**71,740**	**31,250**	**1.6%**
Inyo Subarea										
Subarea Total	410	430	450	470	500	520	550	580	**170**	**1.0%**
WEMO Study Area:	**303,220**	**331,780**	**387,020**	**445,150**	**511,010**	**560,100**	**619,510**	**681,400**	**378,180**	**2.3%**
WEMO Area Cities:	197,010	217,730	259,460	303,020	354,300	388,040	430,080	472,900	275,890	2.5%
WEMO Outlying Areas:	106,210	114,050	127,560	142,130	156,710	172,060	189,430	208,500	102,290	1.9%

Source: Alfred Gobar Associates

EXHIBIT E-3

LONG-TERM PROJECTED GROWTH
WEST MOJAVE PLAN AREA - HOUSEHOLDS

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	8,004	8,222	9,100	10,018	11,196	11,610	12,273	12,895	4,891	1.4%
Twentynine Palms	5,833	6,581	7,282	8,105	8,979	9,711	10,475	11,230	5,397	1.9%
Yucca Valley	7,720	8,070	8,484	8,771	9,079	9,352	9,593	9,811	2,091	0.7%
Adelanto	5,179	5,801	6,976	8,238	9,912	10,679	11,771	12,835	7,656	2.6%
Apple Valley	18,108	18,661	20,193	21,886	24,222	25,158	26,656	28,159	10,051	1.3%
Hesperia	20,178	21,588	25,534	29,943	36,295	38,643	42,607	46,559	26,381	2.4%
Victorville	21,232	23,802	27,995	32,629	39,153	41,993	46,112	50,128	28,896	2.5%
Subarea Cities:	86,254	92,725	105,564	119,590	138,836	147,146	159,487	171,617	85,363	2.0%
Unincorporated Area	44,645	47,256	52,431	57,831	64,453	69,553	75,938	82,841	38,196	1.8%
Subarea Total	**130,899**	**139,981**	**157,995**	**177,421**	**203,289**	**216,699**	**235,425**	**254,458**	**123,559**	**1.9%**
Los Angeles Subarea										
Lancaster	41,450	46,075	60,662	76,011	91,346	103,491	117,950	132,878	91,428	3.4%
Palmdale	38,899	45,675	55,487	64,895	76,067	85,797	96,731	108,225	69,326	3.0%
Subarea Cities:	80,349	91,750	116,149	140,906	167,413	189,288	214,681	241,103	160,754	3.2%
Unincorporated Area	27,220	29,526	34,071	39,121	42,632	48,233	54,024	60,499	33,279	2.3%
Subarea Total	**107,569**	**121,276**	**150,220**	**180,027**	**210,045**	**237,521**	**268,705**	**301,602**	**194,033**	**3.0%**
Kern Subarea										
California City	3,605	3,857	4,127	4,416	4,725	4,931	5,154	5,362	1,757	1.1%
Ridgecrest	11,457	12,488	13,612	14,837	16,172	17,047	18,012	18,922	7,465	1.4%
Subarea Cities:	15,062	16,345	17,739	19,253	20,897	21,978	23,166	24,284	9,222	1.4%
Unincorporated Area	20,897	22,879	25,048	27,424	30,025	32,872	35,989	39,402	18,505	1.8%
Subarea Total	**35,959**	**39,224**	**42,787**	**46,677**	**50,922**	**54,850**	**59,155**	**63,686**	**27,727**	**1.6%**
Inyo Subarea										
Subarea Total	**301**	**316**	**333**	**351**	**368**	**387**	**408**	**429**	**128**	**1.0%**
WEMO Study Area:	**274,728**	**300,797**	**351,335**	**404,476**	**464,624**	**509,457**	**563,693**	**620,175**	**345,447**	**2.4%**
WEMO Area Cities:	181,665	200,820	239,452	279,749	327,146	358,412	397,334	437,004	255,339	2.5%
WEMO Outlying Areas:	93,063	99,977	111,883	124,727	137,478	151,045	166,359	183,171	90,108	2.0%

Source: Alfred Gobar Associates

EXHIBIT E-4

LONG-TERM PROJECTED GROWTH
WEST MOJAVE PLAN AREA - HOUSEHOLD SIZE

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	2.93	3.04	3.04	3.06	3.08	3.15	3.21	3.27	0.34	0.3%
Twentynine Palms	2.64	2.47	2.50	2.50	2.50	2.47	2.46	2.46	-0.18	-0.2%
Yucca Valley	2.40	2.41	2.46	2.48	2.51	2.56	2.61	2.66	0.26	0.3%
Adelanto	3.09	3.27	3.19	3.17	3.13	3.18	3.20	3.22	0.13	0.1%
Apple Valley	3.11	3.23	3.14	3.05	2.95	2.97	2.94	2.91	-0.20	-0.2%
Hesperia	3.31	3.52	3.41	3.34	3.21	3.27	3.26	3.24	-0.07	-0.1%
Victorville	3.22	3.31	3.27	3.26	3.21	3.26	3.28	3.30	0.08	0.1%
Subarea Cities:	3.07	3.18	3.14	3.11	3.06	3.10	3.11	3.12	0.05	0.0%
Unincorporated Area	2.46	2.54	2.51	2.49	2.45	2.48	2.49	2.50	0.04	0.0%
Subarea Total	**2.86**	**2.96**	**2.93**	**2.91**	**2.86**	**2.90**	**2.91**	**2.92**	**0.06**	**0.1%**
Los Angeles Subarea										
Lancaster	3.32	3.40	3.22	3.05	3.11	3.01	2.95	2.90	-0.43	-0.4%
Palmdale	3.32	3.30	3.14	3.02	2.97	2.88	2.80	2.72	-0.60	-0.6%
Subarea Cities:	3.32	3.35	3.18	3.03	3.05	2.95	2.88	2.82	-0.50	-0.5%
Unincorporated Area	2.66	2.68	2.55	2.43	2.44	2.36	2.31	2.26	-0.40	-0.5%
Subarea Total	**3.15**	**3.19**	**3.04**	**2.90**	**2.92**	**2.83**	**2.77**	**2.71**	**-0.45**	**-0.4%**
Kern Subarea										
California City	2.56	2.58	2.60	2.63	2.65	2.70	2.74	2.79	0.23	0.3%
Ridgecrest	2.20	2.22	2.24	2.26	2.28	2.32	2.36	2.40	0.20	0.2%
Subarea Cities:	2.29	2.31	2.33	2.35	2.37	2.41	2.44	2.49	0.20	0.2%
Unincorporated Area	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	0.00	0.0%
Subarea Total	**2.24**	**2.24**	**2.25**	**2.26**	**2.27**	**2.28**	**2.30**	**2.31**	**0.07**	**0.1%**
Inyo Subarea										
Subarea Total	**2.00**	**2.00**	**2.01**	**2.01**	**2.02**	**2.02**	**2.02**	**2.03**	**0.03**	**0.0%**
WEMO Study Area:	**2.89**	**2.96**	**2.89**	**2.83**	**2.83**	**2.80**	**2.78**	**2.75**	**-0.14**	**-0.1%**
WEMO Area Cities:	3.12	3.19	3.10	3.02	3.01	2.98	2.95	2.92	-0.20	-0.2%
WEMO Outlying Areas:	2.46	2.50	2.45	2.40	2.39	2.38	2.37	2.35	-0.10	-0.1%

Source: Alfred Gobar Associates

EXHIBIT E-5

LONG-TERM PROJECTED GROWTH
WEST MOJAVE PLAN AREA - CITY/SUBAREA SHARE OF HOUSING UNITS

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Share Chg	35 Year Trends Chg Share
San Bernardino Subarea										
Barstow	2.87%	2.70%	2.56%	2.45%	2.38%	2.25%	2.16%	2.06%	1.4%	-0.8%
Twentynine Palms	2.09%	2.16%	2.05%	1.98%	1.91%	1.89%	1.84%	1.79%	1.6%	-0.3%
Yucca Valley	2.77%	2.65%	2.38%	2.14%	1.93%	1.82%	1.69%	1.57%	0.6%	-1.2%
Adelanto	1.86%	1.90%	1.96%	2.01%	2.11%	2.07%	2.07%	2.05%	2.2%	0.2%
Apple Valley	6.50%	6.12%	5.68%	5.35%	5.16%	4.89%	4.68%	4.50%	2.9%	-2.0%
Hesperia	7.24%	7.08%	7.18%	7.32%	7.73%	7.51%	7.48%	7.43%	7.6%	0.2%
Victorville	7.62%	7.81%	7.87%	7.98%	8.34%	8.16%	8.10%	8.01%	8.3%	0.4%
Subarea Cities:	30.95%	30.41%	29.68%	29.23%	29.57%	28.59%	28.02%	27.41%	24.6%	-3.5%
Unincorporated Area	17.29%	16.73%	15.91%	15.26%	14.81%	14.58%	14.40%	14.28%	11.9%	-3.0%
Subarea Total	**48.25%**	**47.14%**	**45.59%**	**44.49%**	**44.38%**	**43.17%**	**42.41%**	**41.68%**	**36.4%**	**-6.6%**
Los Angeles Subarea										
Lancaster	14.69%	14.92%	16.84%	18.34%	19.21%	19.85%	20.45%	20.95%	26.0%	6.3%
Palmdale	13.78%	14.79%	15.40%	15.66%	15.99%	16.46%	16.77%	17.06%	19.7%	3.3%
Subarea Cities:	28.47%	29.71%	32.24%	34.01%	35.20%	36.31%	37.23%	38.01%	45.7%	9.5%
Unincorporated Area	9.80%	9.71%	9.61%	9.59%	9.11%	9.40%	9.52%	9.69%	9.6%	-0.1%
Subarea Total	**38.27%**	**39.42%**	**41.85%**	**43.60%**	**44.30%**	**45.70%**	**46.75%**	**47.70%**	**55.3%**	**9.4%**
Kern Subarea										
California City	1.33%	1.30%	1.19%	1.11%	1.03%	0.98%	0.93%	0.88%	0.5%	-0.4%
Ridgecrest	4.22%	4.20%	3.93%	3.72%	3.54%	3.40%	3.25%	3.10%	2.2%	-1.1%
Subarea Cities:	5.55%	5.50%	5.12%	4.83%	4.57%	4.38%	4.18%	3.98%	2.7%	-1.6%
Unincorporated Area	7.80%	7.81%	7.33%	6.98%	6.65%	6.65%	6.58%	6.55%	5.5%	-1.3%
Subarea Total	**13.35%**	**13.31%**	**12.45%**	**11.81%**	**11.22%**	**11.03%**	**10.75%**	**10.53%**	**8.3%**	**-2.8%**
Inyo Subarea										
Subarea Total	**0.14%**	**0.13%**	**0.12%**	**0.11%**	**0.10%**	**0.09%**	**0.09%**	**0.09%**	**0.0%**	**-0.05%**
WEMO Study Area:	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.0%**	**0.0%**
WEMO Area Cities:	64.97%	65.62%	67.04%	68.07%	69.33%	69.28%	69.42%	69.40%	73.0%	4.4%
WEMO Outlying Areas:	35.03%	34.38%	32.96%	31.93%	30.67%	30.72%	30.58%	30.60%	27.0%	-4.4%

Source: Alfred Gobar Associates

EXHIBIT E-6

LONG-TERM PROJECTED GROWTH
WEST MOJAVE PLAN AREA - CITY/SUBAREA SHARE OF POPULATION

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Share Chg	35 Year Trends Chg Share
San Bernardino Subarea										
Barstow	2.95%	2.81%	2.72%	2.68%	2.63%	2.56%	2.52%	2.47%	2.1%	-0.5%
Twentynine Palms	1.94%	1.82%	1.79%	1.77%	1.71%	1.68%	1.65%	1.62%	1.3%	-0.3%
Yucca Valley	2.33%	2.18%	2.05%	1.90%	1.74%	1.68%	1.60%	1.53%	0.8%	-0.8%
Adelanto	2.02%	2.13%	2.19%	2.28%	2.36%	2.38%	2.41%	2.43%	2.8%	0.4%
Apple Valley	7.09%	6.77%	6.23%	5.84%	5.44%	5.23%	5.00%	4.80%	2.8%	-2.3%
Hesperia	8.40%	8.54%	8.58%	8.74%	8.88%	8.85%	8.86%	8.85%	9.2%	0.4%
Victorville	8.60%	8.84%	9.01%	9.30%	9.58%	9.59%	9.66%	9.69%	10.6%	1.1%
Subarea Cities:	33.33%	33.09%	32.58%	32.51%	32.33%	31.98%	31.69%	31.39%	29.7%	-1.9%
Unincorporated Area	13.80%	13.49%	12.95%	12.58%	12.01%	12.09%	12.07%	12.12%	10.7%	-1.7%
Subarea Total	**47.13%**	**46.58%**	**45.53%**	**45.08%**	**44.34%**	**44.07%**	**43.76%**	**43.51%**	**40.4%**	**-3.6%**
Los Angeles Subarea										
Lancaster	17.34%	17.61%	19.24%	20.25%	21.64%	21.82%	22.24%	22.55%	27.1%	5.2%
Palmdale	16.25%	16.95%	17.14%	17.09%	17.24%	17.30%	17.30%	17.27%	18.2%	1.0%
Subarea Cities:	33.58%	34.56%	36.38%	37.34%	38.88%	39.12%	39.55%	39.83%	45.3%	6.2%
Unincorporated Area	9.10%	8.90%	8.54%	8.29%	7.92%	7.98%	7.96%	7.99%	7.0%	-1.1%
Subarea Total	**42.68%**	**43.46%**	**44.92%**	**45.64%**	**46.80%**	**47.10%**	**47.51%**	**47.82%**	**52.3%**	**5.1%**
Kern Subarea										
California City	1.16%	1.12%	1.06%	1.01%	0.96%	0.93%	0.90%	0.88%	0.6%	-0.3%
Ridgecrest	3.17%	3.12%	3.01%	2.93%	2.81%	2.77%	2.72%	2.66%	2.2%	-0.5%
Subarea Cities:	4.33%	4.24%	4.06%	3.95%	3.77%	3.71%	3.62%	3.54%	2.8%	-0.8%
Unincorporated Area	5.78%	5.65%	5.42%	5.27%	5.03%	5.07%	5.06%	5.08%	4.5%	-0.7%
Subarea Total	**10.12%**	**9.89%**	**9.49%**	**9.22%**	**8.80%**	**8.77%**	**8.68%**	**8.62%**	**7.3%**	**-1.5%**
Inyo Subarea										
Subarea Total	**0.08%**	**0.07%**	**0.07%**	**0.06%**	**0.06%**	**0.05%**	**0.05%**	**0.05%**	**0.0%**	**-0.02%**
WEMO Study Area:	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.0%**	**0.0%**
WEMO Area Cities:	71.24%	71.89%	73.03%	73.80%	74.98%	74.81%	74.86%	74.75%	77.8%	3.5%
WEMO Outlying Areas:	28.76%	28.11%	26.97%	26.20%	25.02%	25.19%	25.14%	25.25%	22.2%	-3.5%

Source: Alfred Gobar Associates

EXHIBIT E-7

LONG-TERM PROJECTED GROWTH
WEST MOJAVE PLAN AREA - CITY/SUBAREA SHARE OF HOUSEHOLDS

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Share Chg	35 Year Trends Chg Share
San Bernardino Subarea										
Barstow	2.91%	2.73%	2.59%	2.48%	2.41%	2.28%	2.18%	2.08%	1.4%	-0.8%
Twentynine Palms	2.12%	2.19%	2.07%	2.00%	1.93%	1.91%	1.86%	1.81%	1.6%	-0.3%
Yucca Valley	2.81%	2.68%	2.41%	2.17%	1.95%	1.84%	1.70%	1.58%	0.6%	-1.2%
Adelanto	1.89%	1.93%	1.99%	2.04%	2.13%	2.10%	2.09%	2.07%	2.2%	0.2%
Apple Valley	6.59%	6.20%	5.75%	5.41%	5.21%	4.94%	4.73%	4.54%	2.9%	-2.1%
Hesperia	7.34%	7.18%	7.27%	7.40%	7.81%	7.59%	7.56%	7.51%	7.6%	0.2%
Victorville	7.73%	7.91%	7.97%	8.07%	8.43%	8.24%	8.18%	8.08%	8.4%	0.4%
Subarea Cities:	31.40%	30.83%	30.05%	29.57%	29.88%	28.88%	28.29%	27.67%	24.7%	-3.7%
Unincorporated Area	16.25%	15.71%	14.92%	14.30%	13.87%	13.65%	13.47%	13.36%	11.1%	-2.9%
Subarea Total	**47.65%**	**46.54%**	**44.97%**	**43.86%**	**43.75%**	**42.54%**	**41.76%**	**41.03%**	**35.8%**	**-6.6%**
Los Angeles Subarea										
Lancaster	15.09%	15.32%	17.27%	18.79%	19.66%	20.31%	20.92%	21.43%	26.5%	6.3%
Palmdale	14.16%	15.18%	15.79%	16.04%	16.37%	16.84%	17.16%	17.45%	20.1%	3.3%
Subarea Cities:	29.25%	30.50%	33.06%	34.84%	36.03%	37.15%	38.08%	38.88%	46.5%	9.6%
Unincorporated Area	9.91%	9.82%	9.70%	9.67%	9.18%	9.47%	9.58%	9.76%	9.6%	-0.2%
Subarea Total	**39.15%**	**40.32%**	**42.76%**	**44.51%**	**45.21%**	**46.62%**	**47.67%**	**48.63%**	**56.2%**	**9.5%**
Kern Subarea										
California City	1.31%	1.28%	1.17%	1.09%	1.02%	0.97%	0.91%	0.86%	0.5%	-0.4%
Ridgecrest	4.17%	4.15%	3.87%	3.67%	3.48%	3.35%	3.20%	3.05%	2.2%	-1.1%
Subarea Cities:	5.48%	5.43%	5.05%	4.76%	4.50%	4.31%	4.11%	3.92%	2.7%	-1.6%
Unincorporated Area	7.61%	7.61%	7.13%	6.78%	6.46%	6.45%	6.38%	6.35%	5.4%	-1.3%
Subarea Total	**13.09%**	**13.04%**	**12.18%**	**11.54%**	**10.96%**	**10.77%**	**10.49%**	**10.27%**	**8.0%**	**-2.8%**
Inyo Subarea										
Subarea Total	**0.11%**	**0.11%**	**0.09%**	**0.09%**	**0.08%**	**0.08%**	**0.07%**	**0.07%**	**0.0%**	**-0.04%**
WEMO Study Area:	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.0%**	**0.0%**
WEMO Area Cities:	66.13%	66.76%	68.15%	69.16%	70.41%	70.35%	70.49%	70.46%	73.9%	4.3%
WEMO Outlying Areas:	33.87%	33.24%	31.85%	30.84%	29.59%	29.65%	29.51%	29.54%	26.1%	-4.3%

Source: Alfred Gobar Associates

EXHIBIT E-8

LONG-TERM PROJECTED GROWTH
WEMO CITY/SUBAREA SHARE OF WEMO COUNTIES HOUSEHOLDS (COG PROJECTED)

									35 Year Trends	
	2000	2005	2010	2015	2020	2025	2030	2035	Share Chg	Chg Share
San Bernardino Subarea										
Barstow	0.20%	0.20%	0.21%	0.21%	0.22%	0.22%	0.22%	0.22%	0.3%	0.0%
Twentynine Palms	0.15%	0.16%	0.17%	0.17%	0.18%	0.19%	0.19%	0.19%	0.3%	0.0%
Yucca Valley	0.20%	0.20%	0.19%	0.19%	0.18%	0.18%	0.17%	0.17%	0.1%	0.0%
Adelanto	0.13%	0.14%	0.16%	0.18%	0.20%	0.20%	0.21%	0.22%	0.4%	0.1%
Apple Valley	0.46%	0.46%	0.46%	0.47%	0.48%	0.48%	0.48%	0.49%	0.5%	0.0%
Hesperia		0.53%	0.58%	0.64%	0.73%	0.74%	0.77%	0.81%	1.4%	0.3%
Victorville	0.54%	0.58%	0.64%	0.70%	0.78%	0.80%	0.84%	0.87%	1.6%	0.3%
Subarea Cities0.52%	2.20%	2.26%	2.41%	2.56%	2.78%	2.81%	2.90%	2.97%	4.6%	0.8%
Unincorporated Area	1.14%	1.15%	1.20%	1.24%	1.29%	1.33%	1.38%	1.43%	2.1%	0.3%
Subarea Total	**3.34%**	**3.42%**	**3.61%**	**3.80%**	**4.07%**	**4.14%**	**4.28%**	**4.40%**	**6.6%**	**1.1%**
Los Angeles Subarea										
Lancaster	1.06%	1.12%	1.39%	1.63%	1.83%	1.98%	2.14%	2.30%	4.9%	1.2%
Palmdale	0.99%	1.11%	1.27%	1.39%	1.52%	1.64%	1.76%	1.87%	3.7%	0.9%
Subarea Cities:	2.05%	2.24%	2.65%	3.02%	3.35%	3.62%	3.90%	4.17%	8.6%	2.1%
Unincorporated Area	0.69%	0.72%	0.78%	0.84%	0.85%	0.92%	0.98%	1.05%	1.8%	0.4%
Subarea Total	**2.75%**	**2.96%**	**3.43%**	**3.86%**	**4.20%**	**4.54%**	**4.88%**	**5.22%**	**10.4%**	**2.5%**
Kern Subarea										
California City	0.09%	0.09%	0.09%	0.09%	0.09%	0.09%	0.09%	0.09%	0.1%	0.0%
Ridgecrest	0.29%	0.30%	0.31%	0.32%	0.32%	0.33%	0.33%	0.33%	0.4%	0.0%
Subarea Cities:	0.38%	0.40%	0.41%	0.41%	0.42%	0.42%	0.42%	0.42%	0.5%	0.0%
Unincorporated Area	0.53%	0.56%	0.57%	0.59%	0.60%	0.63%	0.65%	0.68%	1.0%	0.1%
Subarea Total	**0.92%**	**0.96%**	**0.98%**	**1.00%**	**1.02%**	**1.05%**	**1.07%**	**1.10%**	**1.5%**	**0.2%**
Inyo Subarea										
Subarea Total	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.0%**	**0.00%**
WEMO Study Area:	**7.01%**	**7.34%**	**8.03%**	**8.66%**	**9.30%**	**9.74%**	**10.24%**	**10.73%**	**18.6%**	**3.7%**
WEMO Area Cities:	4.64%	4.90%	5.47%	5.99%	6.55%	6.85%	7.22%	7.56%	13.7%	2.9%
WEMO Outlying Areas:	2.38%	2.44%	2.56%	2.67%	2.75%	2.89%	3.02%	3.17%	4.8%	0.8%

Source: Alfred Gobar Associates

EXHIBIT E-9

LONG-TERM PROJECTED GROWTH - ADJUSTED
WEST MOJAVE PLAN AREA - HOUSEHOLD POPULATION

Projection Criteria	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	23,460	23,970	25,690	27,880	30,390	31,470	33,110	34,720	11,260	1.1%
Twentynine Palms	15,400	15,560	16,940	18,410	19,780	20,610	21,670	22,730	7,330	1.1%
Yucca Valley	18,510	18,630	19,360	19,790	20,060	20,590	21,040	21,510	3,000	0.4%
Adelanto	16,020	18,210	20,710	23,730	27,260	29,220	31,680	34,080	18,060	2.2%
Apple Valley	56,370	57,790	58,850	60,800	62,840	64,190	65,840	67,510	11,140	0.5%
Hesperia	66,790	72,900	80,970	90,950	102,550	108,650	116,610	124,390	57,600	1.8%
Victorville	68,390	75,480	85,100	96,870	110,620	117,740	127,090	136,210	67,820	2.0%
Subarea Cities:	264,950	282,530	307,610	338,430	373,490	392,460	417,040	441,150	176,200	1.5%
Unincorporated Area	109,711	115,564	121,729	128,223	135,063	142,268	149,858	157,853	48,142	1.0%
Subarea Total	**374,661**	**398,094**	**429,339**	**466,653**	**508,553**	**534,728**	**566,898**	**599,003**	**224,342**	**1.3%**
Los Angeles Subarea										
Lancaster	137,830	150,340	181,660	210,800	249,940	267,800	292,720	316,980	179,150	2.4%
Palmdale	129,170	144,770	161,850	177,960	199,120	212,360	227,710	242,730	113,560	1.8%
Subarea Cities:	267,000	295,100	343,520	388,770	449,070	480,160	520,430	559,710	292,710	2.1%
Unincorporated Area	72,360	76,220	80,286	84,569	89,081	93,833	98,839	104,112	31,752	1.1%
Subarea Total	**339,360**	**371,320**	**423,806**	**473,339**	**538,151**	**573,993**	**619,269**	**663,822**	**324,462**	**1.9%**
Kern Subarea										
California City	9,220	9,540	9,990	10,560	11,030	11,440	11,880	12,320	3,100	0.8%
Ridgecrest	25,230	26,620	28,380	30,540	32,510	34,040	35,740	37,420	12,190	1.1%
Subarea Cities:	34,450	36,160	38,370	41,100	43,540	45,480	47,620	49,740	15,290	1.1%
Unincorporated Area	45,976	48,429	51,013	53,734	56,601	59,621	62,802	66,152	20,176	0.6%
Subarea Total	**80,426**	**84,589**	**89,383**	**94,834**	**100,141**	**105,101**	**110,422**	**115,892**	**35,466**	**1.0%**
Inyo Subarea										
Subarea Total	**600**	**619**	**638**	**658**	**678**	**699**	**721**	**743**	**143**	**0.6%**
WEMO Study Area:	**795,047**	**854,622**	**943,166**	**1,035,484**	**1,147,523**	**1,214,521**	**1,297,310**	**1,379,460**	**584,413**	**1.6%**
WEMO Area Cities:	566,400	613,790	689,500	768,300	866,100	918,100	985,090	1,050,600	484,200	1.8%
WEMO Outlying Areas:	228,647	240,832	253,666	267,184	281,423	296,421	312,220	328,860	100,213	1.0%

Source: Alfred Gobar Associates

EXHIBIT E-10

LONG-TERM PROJECTED GROWTH - ADJUSTED
WEST MOJAVE PLAN AREA - HOUSING UNITS

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	8,710	8,850	9,200	9,910	10,720	10,950	11,400	11,830	3,120	0.9%
Twentynine Palms	6,350	6,870	7,360	8,020	8,600	9,160	9,730	10,300	3,950	1.4%
Yucca Valley	8,400	8,420	8,580	8,680	8,690	8,820	8,910	9,000	600	0.2%
Adelanto	5,640	6,050	7,060	8,150	9,490	10,070	10,930	11,770	6,130	2.1%
Apple Valley	19,710	20,080	20,430	21,660	23,200	23,720	24,760	25,830	6,120	0.8%
Hesperia	21,960	22,530	25,830	29,630	34,760	36,440	39,570	42,710	20,750	1.9%
Victorville	23,110	24,840	28,320	32,290	37,490	39,600	42,830	45,990	22,880	2.0%
Subarea Cities:	93,880	97,640	106,780	118,340	132,950	138,760	148,130	157,430	63,550	1.5%
Unincorporated Area	52,440	53,880	57,010	60,480	64,860	67,860	71,800	76,000	23,560	1.1%
Subarea Total	**146,320**	**151,520**	**163,790**	**178,820**	**197,810**	**206,620**	**219,930**	**233,430**	**87,110**	**1.3%**
Los Angeles Subarea										
Lancaster	44,540	47,470	60,580	74,260	86,360	96,350	108,140	120,350	75,810	2.9%
Palmdale	41,800	47,060	55,410	63,400	71,910	79,880	88,690	98,020	56,220	2.5%
Subarea Cities:	86,340	94,530	115,990	137,660	158,270	176,230	196,830	218,370	132,030	2.7%
Unincorporated Area	29,710	31,000	34,420	38,020	39,870	43,730	47,470	51,580	21,870	1.6%
Subarea Total	**116,050**	**125,530**	**150,410**	**175,680**	**198,140**	**219,960**	**244,300**	**269,950**	**153,900**	**2.4%**
Kern Subarea										
California City	4,030	4,130	4,290	4,490	4,640	4,780	4,910	5,050	1,020	0.6%
Ridgecrest	12,800	13,380	14,140	15,070	15,900	16,500	17,180	17,820	5,020	0.9%
Subarea Cities:	16,830	17,510	18,430	19,560	20,540	21,280	22,090	22,870	6,040	0.9%
Unincorporated Area	23,660	24,920	26,250	27,650	29,130	30,680	32,320	34,040	10,380	1.0%
Subarea Total	**40,490**	**42,430**	**44,680**	**47,210**	**49,670**	**51,960**	**54,410**	**56,910**	**16,420**	**1.0%**
Inyo Subarea										
Subarea Total	410	420	430	440	450	470	480	490	**80**	**0.5%**
WEMO Study Area:	**303,270**	**319,900**	**359,310**	**402,150**	**446,070**	**479,010**	**519,120**	**560,780**	**257,510**	**1.8%**
WEMO Area Cities:	197,050	209,680	241,200	275,560	311,760	336,270	367,050	398,670	201,620	2.0%
WEMO Outlying Areas:	106,220	110,220	118,110	126,590	134,310	142,740	152,070	162,110	55,890	1.2%

Source: Alfred Gobar Associates

EXHIBIT E-11

LONG-TERM PROJECTED GROWTH - ADJUSTED
WEST MOJAVE PLAN AREA - HOUSEHOLDS

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	8,005	8,129	8,459	9,109	9,854	10,060	10,474	10,871	2,866	0.9%
Twentynine Palms	5,833	6,312	6,768	7,370	7,903	8,416	8,937	9,469	3,636	1.4%
Yucca Valley	7,720	7,740	7,885	7,975	7,990	8,106	8,186	8,272	552	0.2%
Adelanto	5,179	5,564	6,486	7,491	8,722	9,253	10,045	10,819	5,640	2.1%
Apple Valley	18,110	18,450	18,772	19,904	21,317	21,801	22,750	23,739	5,629	0.8%
Hesperia	20,182	20,705	23,738	27,230	31,939	33,487	36,363	39,252	19,070	1.9%
Victorville	21,236	22,829	26,026	29,672	34,456	36,391	39,355	42,259	21,023	2.0%
Subarea Cities:	86,265	89,729	98,134	108,751	122,181	127,514	136,110	144,681	58,416	1.5%
Unincorporated Area	44,651	45,878	48,543	51,504	55,229	57,780	61,137	64,712	20,061	1.1%
Subarea Total	**130,916**	**135,607**	**146,677**	**160,255**	**177,410**	**185,294**	**197,247**	**209,393**	**78,477**	**1.4%**
Los Angeles Subarea										
Lancaster	41,457	44,188	56,390	69,120	80,385	89,680	100,663	112,021	70,564	2.9%
Palmdale	38,905	43,805	51,579	59,012	66,938	74,349	82,554	91,240	52,335	2.5%
Subarea Cities:	80,362	87,993	107,969	128,132	147,323	164,029	183,217	203,261	122,899	2.7%
Unincorporated Area	27,224	28,409	31,543	34,841	36,530	40,068	43,495	47,261	20,037	1.6%
Subarea Total	**107,586**	**116,402**	**139,512**	**162,973**	**183,853**	**204,097**	**226,712**	**250,522**	**142,936**	**2.4%**
Kern Subarea										
California City	3,607	3,697	3,836	4,017	4,157	4,274	4,398	4,520	913	0.6%
Ridgecrest	11,457	11,977	12,655	13,492	14,232	14,772	15,372	15,953	4,496	1.0%
Subarea Cities:	15,064	15,674	16,491	17,509	18,389	19,046	19,770	20,473	5,409	0.9%
Unincorporated Area	20,898	22,013	23,188	24,425	25,728	27,100	28,546	30,069	9,171	1.0%
Subarea Total	**35,962**	**37,687**	**39,679**	**41,934**	**44,117**	**46,146**	**48,316**	**50,542**	**14,580**	**1.0%**
Inyo Subarea										
Subarea Total	**301**	**309**	**318**	**328**	**336**	**346**	**356**	**366**	**65**	**0.6%**
WEMO Study Area:	**274,765**	**290,005**	**326,186**	**365,490**	**405,716**	**435,883**	**472,631**	**510,823**	**236,058**	**1.8%**
WEMO Area Cities:	181,691	193,396	222,594	254,392	287,893	310,589	339,097	368,415	186,724	2.0%
WEMO Outlying Areas:	93,074	96,609	103,592	111,098	117,823	125,294	133,534	142,408	49,334	1.2%

Source: Alfred Gobar Associates

EXHIBIT E-12

LONG-TERM PROJECTED GROWTH - ADJUSTED
WEST MOJAVE PLAN AREA - HOUSEHOLD SIZE

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Tot. Chg.	35 Year Trends Avg Rate
San Bernardino Subarea										
Barstow	2.93	2.95	3.04	3.06	3.08	3.13	3.16	3.19	0.26	0.2%
Twentynine Palms	2.64	2.47	2.50	2.50	2.50	2.45	2.42	2.40	-0.24	-0.3%
Yucca Valley	2.40	2.41	2.46	2.48	2.51	2.54	2.57	2.60	0.20	0.2%
Adelanto	3.09	3.27	3.19	3.17	3.13	3.16	3.15	3.15	0.06	0.1%
Apple Valley	3.11	3.13	3.13	3.05	2.95	2.94	2.89	2.84	-0.27	-0.3%
Hesperia	3.31	3.52	3.41	3.34	3.21	3.24	3.21	3.17	-0.14	-0.1%
Victorville	3.22	3.31	3.27	3.26	3.21	3.24	3.23	3.22	0.00	0.0%
Subarea Cities:	3.07	3.15	3.13	3.11	3.06	3.08	3.06	3.05	-0.02	0.0%
Unincorporated Area	2.46	2.52	2.51	2.49	2.45	2.46	2.45	2.44	-0.02	0.0%
Subarea Total	**2.86**	**2.94**	**2.93**	**2.91**	**2.87**	**2.89**	**2.87**	**2.86**	**0.00**	**0.0%**
Los Angeles Subarea										
Lancaster	3.32	3.40	3.22	3.05	3.11	2.99	2.91	2.83	-0.50	-0.5%
Palmdale	3.32	3.30	3.14	3.02	2.97	2.86	2.76	2.66	-0.66	-0.6%
Subarea Cities:	3.32	3.35	3.18	3.03	3.05	2.93	2.84	2.75	-0.57	-0.5%
Unincorporated Area	2.66	2.68	2.55	2.43	2.44	2.34	2.27	2.20	-0.46	-0.5%
Subarea Total	**3.15**	**3.19**	**3.04**	**2.90**	**2.93**	**2.81**	**2.73**	**2.65**	**-0.50**	**-0.5%**
Kern Subarea										
California City	2.56	2.58	2.60	2.63	2.65	2.68	2.70	2.73	0.17	0.2%
Ridgecrest	2.20	2.22	2.24	2.26	2.28	2.30	2.33	2.35	0.14	0.2%
Subarea Cities:	2.29	2.31	2.33	2.35	2.37	2.39	2.41	2.43	0.14	0.2%
Unincorporated Area	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	0.00	0.0%
Subarea Total	**2.24**	**2.24**	**2.25**	**2.26**	**2.27**	**2.28**	**2.29**	**2.29**	**0.06**	**0.1%**
Inyo Subarea										
Subarea Total	**2.00**	**2.00**	**2.01**	**2.01**	**2.02**	**2.02**	**2.02**	**2.03**	**0.03**	**0.0%**
WEMO Study Area:	**2.89**	**2.95**	**2.89**	**2.83**	**2.83**	**2.79**	**2.74**	**2.70**	**-0.19**	**-0.2%**
WEMO Area Cities:	3.12	3.17	3.10	3.02	3.01	2.96	2.91	2.85	-0.27	-0.3%
WEMO Outlying Areas:	2.46	2.49	2.45	2.40	2.39	2.37	2.34	2.31	-0.15	-0.2%

Source: Alfred Gobar Associates

EXHIBIT E-13

LONG-TERM PROJECTED GROWTH - ADJUSTED
WEST MOJAVE PLAN AREA - CITY/SUBAREA SHARE OF HOUSING UNITS

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Share Chg	35 Year Trends Chg Share
San Bernardino Subarea										
Barstow	2.87%	2.77%	2.56%	2.46%	2.40%	2.29%	2.20%	2.11%	1.2%	-0.8%
Twentynine Palms	2.09%	2.15%	2.05%	1.99%	1.93%	1.91%	1.87%	1.84%	1.5%	-0.3%
Yucca Valley	2.77%	2.63%	2.39%	2.16%	1.95%	1.84%	1.72%	1.60%	0.2%	-1.2%
Adelanto	1.86%	1.89%	1.96%	2.03%	2.13%	2.10%	2.11%	2.10%	2.4%	0.2%
Apple Valley	6.50%	6.28%	5.69%	5.39%	5.20%	4.95%	4.77%	4.61%	2.4%	-1.9%
Hesperia	7.24%	7.04%	7.19%	7.37%	7.79%	7.61%	7.62%	7.62%	8.1%	0.4%
Victorville	7.62%	7.76%	7.88%	8.03%	8.40%	8.27%	8.25%	8.20%	8.9%	0.6%
Subarea Cities:	30.96%	30.52%	29.72%	29.43%	29.80%	28.97%	28.53%	28.07%	24.7%	-2.9%
Unincorporated Area	17.29%	16.84%	15.87%	15.04%	14.54%	14.17%	13.83%	13.55%	9.1%	-3.7%
Subarea Total	**48.25%**	**47.36%**	**45.58%**	**44.47%**	**44.35%**	**43.13%**	**42.37%**	**41.63%**	**33.8%**	**-6.6%**
Los Angeles Subarea										
Lancaster	14.69%	14.84%	16.86%	18.47%	19.36%	20.11%	20.83%	21.46%	29.4%	6.8%
Palmdale	13.78%	14.71%	15.42%	15.77%	16.12%	16.68%	17.08%	17.48%	21.8%	3.7%
Subarea Cities:	28.47%	29.55%	32.28%	34.23%	35.48%	36.79%	37.92%	38.94%	51.3%	10.5%
Unincorporated Area	9.80%	9.69%	9.58%	9.45%	8.94%	9.13%	9.14%	9.20%	8.5%	-0.6%
Subarea Total	**38.27%**	**39.24%**	**41.86%**	**43.69%**	**44.42%**	**45.92%**	**47.06%**	**48.14%**	**59.8%**	**9.9%**
Kern Subarea										
California City	1.33%	1.29%	1.19%	1.12%	1.04%	1.00%	0.95%	0.90%	0.4%	-0.4%
Ridgecrest	4.22%	4.18%	3.94%	3.75%	3.56%	3.44%	3.31%	3.18%	1.9%	-1.0%
Subarea Cities:	5.55%	5.47%	5.13%	4.86%	4.60%	4.44%	4.26%	4.08%	2.3%	-1.5%
Unincorporated Area	7.80%	7.79%	7.31%	6.88%	6.53%	6.40%	6.23%	6.07%	4.0%	-1.7%
Subarea Total	**13.35%**	**13.26%**	**12.43%**	**11.74%**	**11.14%**	**10.85%**	**10.48%**	**10.15%**	**6.4%**	**-3.2%**
Inyo Subarea										
Subarea Total	**0.14%**	**0.13%**	**0.12%**	**0.11%**	**0.10%**	**0.10%**	**0.09%**	**0.09%**	**0.0%**	**-0.05%**
WEMO Study Area:	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.0%**	**0.0%**
WEMO Area Cities:	64.98%	65.55%	67.13%	68.52%	69.89%	70.20%	70.71%	71.09%	78.3%	6.1%
WEMO Outlying Areas:	35.02%	34.45%	32.87%	31.48%	30.11%	29.80%	29.29%	28.91%	21.7%	-6.1%

Source: Alfred Gobar Associates

EXHIBIT E-14

LONG-TERM PROJECTED GROWTH - ADJUSTED
WEST MOJAVE PLAN AREA - CITY/SUBAREA SHARE OF POPULATION

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends Share Chg	35 Year Trends Chg Share
San Bernardino Subarea										
Barstow	2.95%	2.80%	2.72%	2.69%	2.65%	2.59%	2.55%	2.52%	1.9%	-0.4%
Twentynine Palms	1.94%	1.82%	1.80%	1.78%	1.72%	1.70%	1.67%	1.65%	1.3%	-0.3%
Yucca Valley	2.33%	2.18%	2.05%	1.91%	1.75%	1.70%	1.62%	1.56%	0.5%	-0.8%
Adelanto	2.01%	2.13%	2.20%	2.29%	2.38%	2.41%	2.44%	2.47%	3.1%	0.5%
Apple Valley	7.09%	6.76%	6.24%	5.87%	5.48%	5.29%	5.08%	4.89%	1.9%	-2.2%
Hesperia	8.40%	8.53%	8.58%	8.78%	8.94%	8.95%	8.99%	9.02%	9.9%	0.6%
Victorville	8.60%	8.83%	9.02%	9.36%	9.64%	9.69%	9.80%	9.87%	11.6%	1.3%
Subarea Cities:	33.33%	33.06%	32.61%	32.68%	32.55%	32.31%	32.15%	31.98%	30.1%	-1.3%
Unincorporated Area	13.80%	13.52%	12.91%	12.38%	11.77%	11.71%	11.55%	11.44%	8.2%	-2.4%
Subarea Total	**47.12%**	**46.58%**	**45.52%**	**45.07%**	**44.32%**	**44.03%**	**43.70%**	**43.42%**	**38.4%**	**-3.7%**
Los Angeles Subarea										
Lancaster	17.34%	17.59%	19.26%	20.36%	21.78%	22.05%	22.56%	22.98%	30.7%	5.6%
Palmdale	16.25%	16.94%	17.16%	17.19%	17.35%	17.49%	17.55%	17.60%	19.4%	1.3%
Subarea Cities:	33.58%	34.53%	36.42%	37.54%	39.13%	39.53%	40.12%	40.57%	50.1%	7.0%
Unincorporated Area	9.10%	8.92%	8.51%	8.17%	7.76%	7.73%	7.62%	7.55%	5.4%	-1.6%
Subarea Total	**42.68%**	**43.45%**	**44.93%**	**45.71%**	**46.90%**	**47.26%**	**47.73%**	**48.12%**	**55.5%**	**5.4%**
Kern Subarea										
California City	1.16%	1.12%	1.06%	1.02%	0.96%	0.94%	0.92%	0.89%	0.5%	-0.3%
Ridgecrest	3.17%	3.11%	3.01%	2.95%	2.83%	2.80%	2.75%	2.71%	2.1%	-0.5%
Subarea Cities:	4.33%	4.23%	4.07%	3.97%	3.79%	3.74%	3.67%	3.61%	2.6%	-0.7%
Unincorporated Area	5.78%	5.67%	5.41%	5.19%	4.93%	4.91%	4.84%	4.80%	3.5%	-1.0%
Subarea Total	**10.12%**	**9.90%**	**9.48%**	**9.16%**	**8.73%**	**8.65%**	**8.51%**	**8.40%**	**6.1%**	**-1.7%**
Inyo Subarea										
Subarea Total	**0.08%**	**0.07%**	**0.07%**	**0.06%**	**0.06%**	**0.06%**	**0.06%**	**0.05%**	**0.0%**	**-0.02%**
WEMO Study Area:	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.0%**	**0.0%**
WEMO Area Cities:	71.24%	71.82%	73.10%	74.20%	75.48%	75.59%	75.93%	76.16%	82.9%	4.9%
WEMO Outlying Areas:	28.76%	28.18%	26.90%	25.80%	24.52%	24.41%	24.07%	23.84%	17.1%	-4.9%

Source: Alfred Gobar Associates

EXHIBIT E-15

LONG-TERM PROJECTED GROWTH - ADJUSTED
WEST MOJAVE PLAN AREA - CITY/SUBAREA SHARE OF HOUSEHOLDS

	2000	2005	2010	2015	2020	2025	2030	2035	35 Year Trends: Share Chg	35 Year Trends: Chg Share
San Bernardino Subarea										
Barstow	2.91%	2.80%	2.59%	2.49%	2.43%	2.31%	2.22%	2.13%	1.2%	-0.8%
Twentynine Palms	2.12%	2.18%	2.07%	2.02%	1.95%	1.93%	1.89%	1.85%	1.5%	-0.3%
Yucca Valley	2.81%	2.67%	2.42%	2.18%	1.97%	1.86%	1.73%	1.62%	0.2%	-1.2%
Adelanto	1.88%	1.92%	1.99%	2.05%	2.15%	2.12%	2.13%	2.12%	2.4%	0.2%
Apple Valley	6.59%	6.36%	5.75%	5.45%	5.25%	5.00%	4.81%	4.65%	2.4%	-1.9%
Hesperia	7.35%	7.14%	7.28%	7.45%	7.87%	7.68%	7.69%	7.68%	8.1%	0.3%
Victorville	7.73%	7.87%	7.98%	8.12%	8.49%	8.35%	8.33%	8.27%	8.9%	0.5%
Subarea Cities:	31.40%	30.94%	30.09%	29.75%	30.11%	29.25%	28.80%	28.32%	24.7%	-3.1%
Unincorporated Area	16.25%	15.82%	14.88%	14.09%	13.61%	13.26%	12.94%	12.67%	8.5%	-3.6%
Subarea Total	**47.65%**	**46.76%**	**44.97%**	**43.85%**	**43.73%**	**42.51%**	**41.73%**	**40.99%**	**33.2%**	**-6.7%**
Los Angeles Subarea										
Lancaster	15.09%	15.24%	17.29%	18.91%	19.81%	20.57%	21.30%	21.93%	29.9%	6.8%
Palmdale	14.16%	15.10%	15.81%	16.15%	16.50%	17.06%	17.47%	17.86%	22.2%	3.7%
Subarea Cities:	29.25%	30.34%	33.10%	35.06%	36.31%	37.63%	38.77%	39.79%	52.1%	10.5%
Unincorporated Area	9.91%	9.80%	9.67%	9.53%	9.00%	9.19%	9.20%	9.25%	8.5%	-0.7%
Subarea Total	**39.16%**	**40.14%**	**42.77%**	**44.59%**	**45.32%**	**46.82%**	**47.97%**	**49.04%**	**60.6%**	**9.9%**
Kern Subarea										
California City	1.31%	1.27%	1.18%	1.10%	1.02%	0.98%	0.93%	0.88%	0.4%	-0.4%
Ridgecrest	4.17%	4.13%	3.88%	3.69%	3.51%	3.39%	3.25%	3.12%	1.9%	-1.0%
Subarea Cities:	5.48%	5.40%	5.06%	4.79%	4.53%	4.37%	4.18%	4.01%	2.3%	-1.5%
Unincorporated Area	7.61%	7.59%	7.11%	6.68%	6.34%	6.22%	6.04%	5.89%	3.9%	-1.7%
Subarea Total	**13.09%**	**13.00%**	**12.16%**	**11.47%**	**10.87%**	**10.59%**	**10.22%**	**9.89%**	**6.2%**	**-3.2%**
Inyo Subarea										
Subarea Total	**0.11%**	**0.11%**	**0.10%**	**0.09%**	**0.08%**	**0.08%**	**0.08%**	**0.07%**	**0.0%**	**-0.04%**
WEMO Study Area:	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.0%**	**0.0%**
WEMO Area Cities:	66.13%	66.69%	68.24%	69.60%	70.96%	71.26%	71.75%	72.12%	79.1%	6.0%
WEMO Outlying Areas:	33.87%	33.31%	31.76%	30.40%	29.04%	28.74%	28.25%	27.88%	20.9%	-6.0%

Source: Alfred Gobar Associates

EXHIBIT E-16

LONG-TERM PROJECTED GROWTH - ADJUSTED
WEMO CITY/SUBAREA SHARE OF WEMO COUNTIES HOUSEHOLDS (COG PROJECTED)

									35 Year Trends	
	2000	2005	2010	2015	2020	2025	2030	2035	Share Chg	Chg Share
San Bernardino Subarea										
Barstow	0.20%	0.20%	0.19%	0.20%	0.20%	0.19%	0.19%	0.19%	0.2%	0.0%
Twentynine Palms	0.15%	0.15%	0.15%	0.16%	0.16%	0.16%	0.16%	0.16%	0.2%	0.0%
Yucca Valley	0.20%	0.19%	0.18%	0.17%	0.16%	0.15%	0.15%	0.14%	0.0%	-0.1%
Adelanto	0.13%	0.14%	0.15%	0.16%	0.17%	0.18%	0.18%	0.19%	0.3%	0.1%
Apple Valley	0.46%	0.45%	0.43%	0.43%	0.43%	0.42%	0.41%	0.41%	0.3%	-0.1%
Hesperia	0.52%	0.51%	0.54%	0.58%	0.64%	0.64%	0.66%	0.68%	1.0%	0.2%
Victorville	0.54%	0.56%	0.59%	0.64%	0.69%	0.70%	0.71%	0.73%	1.1%	0.2%
Subarea Cities:	2.20%	2.19%	2.24%	2.33%	2.44%	2.44%	2.47%	2.50%	3.1%	0.3%
Unincorporated Area	1.14%	1.12%	1.11%	1.10%	1.10%	1.10%	1.11%	1.12%	1.1%	0.0%
Subarea Total	**3.34%**	**3.31%**	**3.35%**	**3.43%**	**3.55%**	**3.54%**	**3.58%**	**3.62%**	**4.2%**	**0.3%**
Los Angeles Subarea										
Lancaster	1.06%	1.08%	1.29%	1.48%	1.61%	1.71%	1.83%	1.94%	3.8%	0.9%
Palmdale	0.99%	1.07%	1.18%	1.26%	1.34%	1.42%	1.50%	1.58%	2.8%	0.6%
Subarea Cities:	2.05%	2.15%	2.47%	2.74%	2.95%	3.14%	3.33%	3.52%	6.6%	1.5%
Unincorporated Area	0.70%	0.69%	0.72%	0.75%	0.73%	0.77%	0.79%	0.82%	1.1%	0.1%
Subarea Total	**2.75%**	**2.84%**	**3.19%**	**3.49%**	**3.68%**	**3.90%**	**4.12%**	**4.34%**	**7.7%**	**1.6%**
Kern Subarea										
California City	0.09%	0.09%	0.09%	0.09%	0.08%	0.08%	0.08%	0.08%	0.0%	0.0%
Ridgecrest	0.29%	0.29%	0.29%	0.29%	0.28%	0.28%	0.28%	0.28%	0.2%	0.0%
Subarea Cities:	0.38%	0.38%	0.38%	0.38%	0.37%	0.36%	0.36%	0.35%	0.3%	0.0%
Unincorporated Area	0.53%	0.54%	0.53%	0.52%	0.51%	0.52%	0.52%	0.52%	0.5%	0.0%
Subarea Total	**0.92%**	**0.92%**	**0.91%**	**0.90%**	**0.88%**	**0.88%**	**0.88%**	**0.87%**	**0.8%**	**0.0%**
Inyo Subarea										
Subarea Total	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.01%**	**0.0%**	**0.00%**
WEMO Study Area:	**7.01%**	**7.08%**	**7.45%**	**7.83%**	**8.12%**	**8.33%**	**8.59%**	**8.84%**	**12.7%**	**1.8%**
WEMO Area Cities:	4.64%	4.72%	5.09%	5.45%	5.76%	5.94%	6.16%	6.38%	10.0%	1.7%
WEMO Outlying Areas:	2.38%	2.36%	2.37%	2.38%	2.36%	2.39%	2.43%	2.46%	2.7%	0.1%

Source: Alfred Gobar Associates

EXHIBIT E-17

RESIDENTIAL BUILDING PERMIT TRENDS
TOTAL UNITS AS A PERCENT OF WEST MOJAVE PLAN AREA
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	15.2%	15.2%	15.1%	12.2%	8.1%	5.6%	0.6%	0.0%	0.0%	2.7%	7.5%	8.1%
Apple Valley	4.5%	8.3%	5.8%	7.1%	11.4%	12.6%	20.4%	14.2%	12.6%	10.1%	10.7%	12.0%
Barstow	0.8%	1.0%	0.2%	0.2%	0.7%	0.5%	0.2%	0.0%	0.0%	0.0%	0.4%	0.2%
Hesperia	8.4%	6.3%	9.7%	9.7%	11.1%	12.7%	15.1%	8.3%	9.5%	15.4%	10.6%	10.0%
Twentynine Palms	11.4%	0.9%	1.1%	0.9%	0.5%	0.6%	0.3%	0.2%	0.1%	0.2%	1.6%	0.3%
Victorville	11.4%	22.6%	19.9%	17.0%	17.6%	8.9%	17.2%	15.5%	18.3%	17.8%	16.6%	21.6%
Yucca Valley	-	-	-	-	0.6%	0.5%	1.7%	2.1%	3.2%	2.3%	1.7%	3.7%
Unincorporated Area	3.8%	4.0%	3.8%	3.4%	3.6%	3.0%	4.0%	2.9%	3.2%	3.5%	3.5%	4.1%
Subarea Total	55.6%	58.3%	55.7%	50.6%	53.7%	44.4%	59.5%	43.2%	46.8%	52.0%	52.0%	60.0%
LOS ANGELES COUNTY												
Lancaster	15.5%	13.9%	12.8%	14.8%	15.2%	29.3%	16.8%	19.4%	18.7%	21.5%	17.8%	12.5%
Palmdale	21.3%	19.6%	24.3%	29.4%	27.4%	22.0%	20.4%	32.8%	30.0%	22.7%	25.0%	24.3%
Unincorporated Area	2.7%	2.4%	2.7%	3.2%	3.1%	3.7%	2.7%	3.8%	3.5%	3.2%	3.1%	2.7%
Subarea Total	39.4%	35.9%	39.8%	47.4%	45.7%	55.0%	39.8%	56.1%	52.2%	47.5%	45.9%	39.5%
KERN COUNTY												
California City	2.6%	2.4%	2.7%	1.2%	0.2%	0.0%	0.2%	0.3%	0.4%	0.2%	1.0%	0.2%
Ridgecrest	2.1%	2.9%	1.6%	0.7%	0.3%	0.5%	0.5%	0.4%	0.5%	0.3%	1.0%	0.3%
Unincorporated Area	0.3%	0.4%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%
Subarea Total	5.0%	5.7%	4.5%	2.0%	0.6%	0.6%	0.7%	0.7%	0.9%	0.6%	2.1%	0.5%
TOTAL AREA												
Subarea Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-18

RESIDENTIAL BUILDING PERMIT TRENDS
SINGLE FAMILY UNITS AS A PERCENT OF WEST MOJAVE PLAN AREA
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	19.6%	15.5%	15.1%	12.2%	8.1%	5.9%	0.7%	0.0%	0.0%	2.9%	8.0%	8.1%
Apple Valley	5.5%	8.2%	5.8%	7.1%	11.4%	13.2%	18.5%	17.1%	13.5%	10.8%	11.1%	12.0%
Barstow	1.1%	1.1%	0.2%	0.2%	0.7%	0.6%	0.2%	0.1%	0.0%	0.0%	0.4%	0.2%
Hesperia	9.3%	6.4%	9.8%	9.7%	11.1%	13.3%	12.5%	11.2%	10.3%	16.1%	11.0%	10.0%
Twentynine Palms	1.1%	0.9%	1.1%	0.9%	0.5%	0.6%	0.4%	0.3%	0.1%	0.2%	0.6%	0.3%
Victorville	14.7%	23.0%	20.0%	17.0%	17.6%	9.4%	13.3%	16.6%	19.1%	19.0%	17.0%	21.6%
Yucca Valley	-	-	-	-	0.6%	0.6%	2.1%	2.9%	3.4%	2.4%	2.0%	3.7%
Unincorporated Area	22.9%	19.2%	27.4%	42.3%	5.2%	40.5%	57.4%	49.4%	36.0%	24.2%	32.4%	24.3%
Subarea Total	54.9%	59.0%	55.7%	50.6%	53.7%	46.7%	51.3%	51.6%	49.7%	55.0%	52.8%	60.0%
LOS ANGELES COUNTY												
Lancaster	15.9%	14.0%	12.8%	14.8%	15.2%	26.0%	19.7%	18.0%	13.6%	17.2%	16.7%	12.5%
Palmdale	21.1%	18.8%	24.3%	29.4%	27.4%	23.2%	24.9%	26.2%	32.3%	24.2%	25.2%	24.3%
Unincorporated Area	2.7%	2.4%	2.7%	3.2%	3.1%	3.6%	3.3%	3.2%	3.3%	3.0%	3.1%	2.7%
Subarea Total	39.7%	35.2%	39.8%	47.4%	45.7%	52.7%	47.9%	47.4%	49.3%	44.4%	45.0%	39.5%
KERN COUNTY												
California City	2.3%	2.5%	2.6%	1.2%	0.2%	0.0%	0.2%	0.4%	0.4%	0.2%	1.0%	0.2%
Ridgecrest	2.6%	2.9%	1.6%	0.7%	0.3%	0.6%	0.6%	0.5%	0.5%	0.4%	1.1%	0.3%
Unincorporated Area	25.9%	26.7%	31.4%	2.9%	31.2%	34.0%	41.0%	31.9%	25.7%	16.4%	26.7%	26.5%
Subarea Total	5.3%	5.8%	4.5%	2.0%	0.6%	0.6%	0.9%	1.0%	1.0%	0.6%	2.2%	0.5%
TOTAL AREA												
Subarea Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-19

RESIDENTIAL BUILDING PERMIT TRENDS
MULTI FAMILY UNITS AS A PERCENT OF WEST MOJAVE PLAN AREA
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	0.0%	0.0%	0.0%	n.a.	n.a.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	n.a.
Apple Valley	0.7%	14.9%	0.0%	n.a.	n.a.	0.0%	28.6%	6.0%	0.0%	0.0%	6.3%	n.a.
Barstow	0.0%	0.0%	0.0%	n.a.	n.a.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	n.a.
Hesperia	5.4%	0.0%	0.0%	n.a.	n.a.	0.0%	26.5%	0.0%	0.0%	5.9%	4.7%	n.a.
Twentynine Palms	47.9%	0.0%	0.0%	n.a.	n.a.	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	n.a.
Victorville	0.0%	0.0%	0.0%	n.a.	n.a.	0.0%	34.5%	12.3%	7.8%	0.0%	6.8%	n.a.
Yucca Valley	n.a.	n.a.	n.a.	n.a.	n.a.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	n.a.
Unincorporated Area	3.9%	1.1%	0.0%	n.a.	n.a.	0.0%	6.5%	1.3%	0.6%	0.4%	1.7%	n.a.
Subarea Total	57.9%	16.0%	0.0%	n.a.	n.a.	0.0%	96.2%	19.6%	8.3%	6.3%	25.5%	n.a.
LOS ANGELES COUNTY												
Lancaster	14.0%	7.5%	0.0%	n.a.	n.a.	93.2%	3.6%	23.5%	85.4%	87.4%	39.3%	n.a.
Palmdale	21.7%	70.8%	0.0%	n.a.	n.a.	0.0%	0.0%	51.5%	0.0%	0.0%	18.0%	n.a.
Unincorporated Area	2.6%	5.7%	0.0%	n.a.	n.a.	6.8%	0.3%	5.5%	6.2%	6.4%	4.2%	n.a.
Subarea Total	38.3%	84.0%	0.0%	n.a.	n.a.	100.0%	3.8%	80.4%	91.7%	93.7%	61.5%	n.a.
KERN COUNTY												
California City	3.5%	0.0%	93.2%	n.a.	n.a.	0.0%	0.0%	0.0%	0.0%	0.0%	12.1%	n.a.
Ridgecrest	0.0%	0.0%	0.0%	n.a.	n.a.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	n.a.
Unincorporated Area	0.3%	0.0%	6.8%	n.a.	n.a.	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	n.a.
Subarea Total	3.8%	0.0%	100.0%	n.a.	n.a.	0.0%	0.0%	0.0%	0.0%	0.0%	13.0%	n.a.
TOTAL AREA												
Subarea Total	100.0%	100.0%	100.0%	n.a.	n.a.	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	n.a.

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-20

RESIDENTIAL BUILDING PERMIT TRENDS
TOTAL UNITS AS A PERCENT OF COUNTY
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	13.3%	9.4%	8.4%	5.3%	3.1%	1.7%	0.2%	0.0%	0.0%	1.1%	4.3%	3.1%
Apple Valley	3.9%	5.1%	3.2%	3.1%	4.4%	3.9%	6.1%	5.4%	4.3%	4.3%	4.4%	4.6%
Barstow	0.7%	0.6%	0.1%	0.1%	0.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.1%
Hesperia	7.3%	3.9%	5.4%	4.2%	4.3%	4.0%	4.5%	3.1%	3.2%	6.6%	4.7%	3.8%
Twentynine Palms	10.0%	0.6%	0.6%	0.4%	0.2%	0.2%	0.1%	0.1%	0.0%	0.1%	1.2%	0.1%
Victorville	10.0%	13.9%	11.1%	7.4%	6.8%	2.8%	5.2%	5.9%	6.2%	7.6%	7.7%	8.2%
Yucca Valley	-	-	-	-	0.2%	0.2%	0.5%	0.8%	1.1%	1.0%	0.6%	1.4%
Unincorporated Area	3.3%	2.4%	2.1%	1.5%	1.4%	0.9%	1.2%	1.1%	1.1%	1.5%	1.7%	1.5%
Subarea Total	48.6%	35.9%	31.0%	22.1%	20.6%	13.9%	17.8%	16.4%	15.9%	22.2%	24.4%	22.8%
San Bernardino County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
LOS ANGELES COUNTY												
Lancaster	8.2%	6.7%	4.4%	3.2%	3.6%	5.1%	2.7%	3.5%	2.4%	4.3%	4.4%	3.3%
Palmdale	11.3%	9.4%	8.4%	6.4%	6.6%	3.8%	3.3%	6.0%	3.9%	4.5%	6.4%	6.5%
Unincorporated Area	1.4%	1.2%	0.9%	0.7%	0.7%	0.6%	0.4%	0.7%	0.5%	0.6%	0.7%	0.7%
Subarea Total	20.9%	17.2%	13.7%	10.4%	11.0%	9.6%	6.5%	10.2%	6.8%	9.4%	11.6%	10.5%
Los Angeles County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
KERN COUNTY												
California City	3.8%	2.6%	2.3%	0.6%	0.1%	0.0%	0.1%	0.2%	0.3%	0.2%	1.0%	0.2%
Ridgecrest	3.0%	3.0%	1.3%	0.3%	0.2%	0.3%	0.3%	0.3%	0.4%	0.3%	1.0%	0.3%
Unincorporated Area	0.5%	0.4%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%
Subarea Total	7.2%	6.0%	3.9%	1.0%	0.4%	0.4%	0.4%	0.6%	0.7%	0.6%	2.1%	0.6%
Kern County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL AREA												
Subarea Total	26.9%	21.4%	17.1%	11.2%	12.1%	9.5%	8.8%	10.7%	8.3%	11.9%	13.8%	13.7%
Three-County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-21

RESIDENTIAL BUILDING PERMIT TRENDS
SINGLE FAMILY UNITS AS A PERCENT OF COUNTY
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	16.4%	10.2%	8.7%	5.5%	3.2%	1.9%	0.2%	0.0%	0.0%	1.4%	4.8%	3.4%
Apple Valley	4.7%	5.4%	3.3%	3.2%	4.5%	4.2%	5.0%	4.9%	4.8%	5.3%	4.5%	5.1%
Barstow	0.9%	0.7%	0.1%	0.1%	0.3%	0.2%	0.1%	0.0%	0.0%	0.0%	0.2%	0.1%
Hesperia	7.8%	4.2%	5.6%	4.4%	4.4%	4.2%	3.3%	3.2%	3.6%	7.9%	4.9%	4.3%
Twentynine Palms	0.9%	0.6%	0.6%	0.4%	0.2%	0.2%	0.1%	0.1%	0.0%	0.1%	0.3%	0.1%
Victorville	12.3%	15.2%	11.4%	7.7%	7.0%	3.0%	3.6%	4.8%	6.8%	9.4%	8.1%	9.2%
Yucca Valley	-	-	-	-	0.2%	0.2%	0.6%	0.8%	1.2%	1.2%	0.7%	1.6%
Unincorporated Area	3.1%	2.6%	2.2%	1.5%	1.5%	1.0%	0.9%	1.0%	1.2%	1.8%	1.7%	1.7%
Subarea Total	46.1%	39.0%	32.0%	22.8%	21.4%	14.8%	13.7%	15.0%	17.7%	27.1%	25.0%	25.5%
San Bernardino County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
LOS ANGELES COUNTY												
Lancaster	11.3%	10.9%	7.0%	5.2%	6.0%	6.6%	4.6%	4.4%	3.3%	6.9%	6.6%	6.1%
Palmdale	15.1%	14.5%	13.3%	10.3%	10.8%	5.9%	5.8%	6.3%	7.9%	9.7%	10.0%	11.8%
Unincorporated Area	1.9%	1.9%	1.5%	1.1%	1.2%	0.9%	0.8%	0.8%	0.8%	1.2%	1.2%	1.3%
Subarea Total	28.3%	27.3%	21.8%	16.7%	18.0%	13.5%	11.2%	11.5%	12.0%	17.8%	17.8%	19.2%
Los Angeles County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
KERN COUNTY												
California City	3.0%	2.8%	2.5%	0.7%	0.2%	0.0%	0.1%	0.2%	0.3%	0.2%	1.0%	0.2%
Ridgecrest	3.4%	3.3%	1.5%	0.4%	0.3%	0.4%	0.3%	0.3%	0.4%	0.4%	1.1%	0.3%
Unincorporated Area	0.5%	0.4%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%
Subarea Total	6.9%	6.6%	4.3%	1.2%	0.4%	0.4%	0.5%	0.6%	0.7%	0.6%	2.2%	0.6%
Kern County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL AREA												
Subarea Total	29.6%	27.2%	21.8%	14.9%	15.8%	11.7%	10.1%	11.0%	12.0%	18.1%	17.2%	18.8%
Three-County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-22

RESIDENTIAL BUILDING PERMIT TRENDS
MULTI FAMILY UNITS AS A PERCENT OF COUNTY
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Apple Valley	0.7%	1.7%	0.0%	0.0%	0.0%	0.0%	18.8%	16.7%	0.0%	0.0%	3.8%	0.0%
Barstow	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Hesperia	5.5%	0.0%	0.0%	0.0%	0.0%	0.0%	17.4%	0.0%	0.0%	0.8%	2.4%	0.0%
Twentynine Palms	49.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	0.0%
Victorville	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.7%	34.3%	1.7%	0.0%	5.9%	0.0%
Yucca Valley	-	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unincorporated Area	4.0%	0.1%	0.0%	0.0%	0.0%	0.0%	4.3%	3.7%	0.1%	0.1%	1.2%	0.0%
Subarea Total	59.3%	1.8%	0.0%	0.0%	0.0%	0.0%	63.2%	54.8%	1.8%	0.9%	18.2%	0.0%
San Bernardino County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
LOS ANGELES COUNTY												
Lancaster	3.9%	0.1%	0.0%	0.0%	0.0%	2.2%	0.2%	2.5%	1.5%	2.0%	1.3%	0.0%
Palmdale	6.0%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	5.5%	0.0%	0.0%	1.3%	0.0%
Unincorporated Area	0.7%	0.1%	0.0%	0.0%	0.0%	0.2%	0.0%	0.6%	0.1%	0.1%	0.2%	0.0%
Subarea Total	10.6%	1.5%	0.0%	0.0%	0.0%	2.4%	0.3%	8.6%	1.6%	2.1%	2.7%	0.0%
Los Angeles County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
KERN COUNTY												
California City	9.5%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%
Ridgecrest	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Unincorporated Area	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
Subarea Total	10.2%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%
Kern County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL AREA												
Subarea Total	20.2%	1.4%	0.1%	0.0%	0.0%	2.0%	5.7%	10.0%	1.6%	1.9%	4.3%	0.0%
Three-County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-23

RESIDENTIAL BUILDING PERMIT TRENDS
TOTAL AVERAGE VALUE PER UNIT
WEST MOJAVE PLAN AREA

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	$52,203	$56,681	$59,324	$58,495	$63,751	$75,133	$82,737	-	-	$54,611	$62,867	$64,175
Apple Valley	$107,377	$100,856	$99,599	$122,792	$120,835	$125,353	$107,916	$128,805	$150,042	$138,335	$120,191	$133,654
Barstow	$91,735	$90,681	$97,870	$100,736	$85,270	$117,275	$178,645	$196,217	-	-	$119,804	$98,267
Hesperia	$103,775	$101,962	$99,471	$106,615	$102,111	$107,766	$91,775	$119,323	$130,298	$128,507	$109,160	$142,930
Twentynine Palms	$40,391	$77,344	$77,748	$74,348	$81,750	$84,977	$110,935	$99,281	$62,938	$135,918	$84,563	$79,526
Victorville	$94,167	$98,016	$97,551	$104,069	$100,774	$101,057	$92,895	$108,941	$126,170	$157,842	$108,148	$163,763
Yucca Valley	-	-	-	-	$91,965	$99,188	$94,400	$94,687	$102,668	$105,268	$98,029	$107,939
Unincorporated Area	$99,402	$103,093	$109,172	$105,164	$117,888	$120,777	$108,877	$119,723	$130,702	$143,907	$113,578	$142,584
Subarea Total	$74,454	$87,944	$88,137	$95,725	$100,396	$107,912	$99,115	$117,514	$132,014	$136,709	$103,992	$135,296
San Bernardino County Total	$99,432	$106,784	$122,475	$124,693	$130,097	$139,009	$148,806	$172,409	$161,184	$159,705	$136,459	$160,991
LOS ANGELES COUNTY												
Lancaster	$97,996	$112,432	$118,719	$123,299	$124,553	$126,735	$138,922	$111,329	$98,796	$110,224	$116,301	$149,181
Palmdale	$91,765	$105,355	$115,992	$113,183	$124,417	$124,838	$118,108	$104,251	$158,762	$173,836	$123,051	$171,020
Unincorporated Area	$157,446	$185,253	$128,371	$117,179	$198,441	$119,825	$168,166	$111,711	$217,713	$155,184	$155,776	$158,037
Subarea Total	$98,673	$113,522	$117,708	$116,606	$129,489	$125,506	$130,269	$107,213	$141,335	$143,691	$122,401	$163,244
Los Angeles County Total	$134,405	$140,309	$120,758	$131,000	$152,423	$150,731	$137,103	$135,155	$139,344	$135,610	$137,684	$169,118
KERN COUNTY												
California City	$73,326	$86,688	$87,828	$92,853	$94,822	-	$102,396	$140,600	$124,632	$120,243	$102,598	$115,883
Ridgecrest	$79,857	$85,104	$98,030	$92,926	$122,265	$112,485	$113,572	$113,355	$113,414	$113,399	$104,441	$113,403
Unincorporated Area	$82,427	$97,430	$102,334	$122,383	$121,275	$121,357	$126,800	$123,984	$140,511	$159,535	$119,804	$122,086
Subarea Total	$76,627	$86,617	$92,347	$94,883	$111,966	$113,088	$111,866	$124,533	$119,657	$118,882	$105,047	$115,060
Kern County Total	$84,091	$92,050	$93,163	$91,925	$96,717	$96,226	$96,134	$107,636	$120,880	$126,752	$100,557	$126,594
TOTAL AREA												
Subarea Total	$84,112	$97,058	$100,092	$105,608	$113,763	$117,624	$111,615	$111,790	$136,769	$139,920	$111,835	$146,224
Three-County Total	$114,336	$118,775	$115,789	$120,364	$135,335	$139,090	$133,801	$142,100	$142,537	$141,320	$130,345	$160,854

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-24

RESIDENTIAL BUILDING PERMIT TRENDS
SINGLE FAMILY AVERAGE VALUE PER UNIT
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	$52,203	$56,681	$59,324	$58,495	$63,751	$75,133	$82,737	-	-	$54,611	$62,867	$64,175
Apple Valley	$109,345	$101,863	$99,599	$122,792	$120,835	$125,353	$132,542	$140,884	$150,042	$138,335	$124,159	$133,654
Barstow	$91,735	$90,681	$97,870	$100,736	$85,270	$117,275	$178,645	$196,217	-	-	$119,804	$98,267
Hesperia	$111,326	$101,962	$99,471	$106,615	$102,111	$107,766	$109,272	$119,323	$130,298	$130,674	$111,882	$142,930
Twentynine Palms	$87,345	$77,344	$77,748	$74,348	$81,750	$84,977	$110,935	$99,281	$62,938	$135,918	$89,258	$79,526
Victorville	$94,167	$98,016	$97,551	$104,069	$100,774	$101,057	$108,629	$120,829	$127,833	$157,842	$111,077	$163,763
Yucca Valley	-	-	-	-	$91,965	$99,188	$94,400	$94,687	$102,668	$105,268	$98,029	$107,939
Unincorporated Area	$109,756	$103,267	$109,172	$105,164	$117,888	$120,777	$111,324	$135,774	$132,354	$144,522	$143,399	$142,584
Subarea Total	$84,523	$88,041	$88,137	$95,725	$100,396	$107,912	$116,959	$126,672	$132,833	$137,437	$107,864	$135,296
San Bernardino County Total	$110,327	$111,913	$123,544	$125,663	$132,273	$144,160	$157,526	$176,716	$173,077	$178,795	$143,399	$171,619
LOS ANGELES COUNTY												
Lancaster	$109,009	$112,843	$118,719	$123,299	$124,553	$138,751	$141,453	$138,401	$142,957	$141,469	$129,145	$149,181
Palmdale	$104,190	$107,166	$115,992	$113,183	$124,417	$124,838	$118,108	$137,926	$158,762	$173,836	$127,842	$171,020
Unincorporated Area	$181,986	$189,377	$128,371	$117,179	$198,441	$125,774	$170,107	$141,629	$241,426	$166,784	$183,732	$158,037
Subarea Total	$111,403	$115,009	$117,708	$116,606	$129,489	$131,760	$131,252	$138,357	$160,002	$160,825	$131,241	$163,244
Los Angeles County Total	$172,462	$172,664	$150,503	$168,044	$202,112	$183,835	$187,023	$189,092	$215,776	$195,811	$183,732	$217,440
KERN COUNTY												
California City	$86,479	$86,688	$89,045	$92,853	$94,822	-	$102,396	$140,600	$124,632	$120,243	$104,195	$115,883
Ridgecrest	$79,857	$85,104	$98,030	$92,926	$122,265	$112,485	$113,572	$113,355	$113,414	$113,399	$104,441	$113,403
Unincorporated Area	$90,727	$97,430	$103,257	$122,383	$121,275	$121,357	$126,800	$123,984	$140,511	$159,535	$115,128	$122,086
Subarea Total	$83,506	$86,617	$93,179	$94,883	$111,966	$113,088	$111,866	$124,533	$119,657	$118,882	$105,818	$115,060
Kern County Total	$88,598	$96,028	$99,070	$98,082	$102,742	$102,092	$103,911	$111,831	$125,016	$128,416	$105,579	$126,895
TOTAL AREA												
Subarea Total	$95,149	$97,449	$100,135	$105,608	$113,763	$120,521	$123,760	$132,196	$146,087	$147,706	$118,238	$146,224
Three-County Total	$131,137	$129,417	$128,793	$136,756	$154,198	$155,078	$160,022	$171,469	$186,013	$177,204	$153,009	$181,634

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-25

RESIDENTIAL BUILDING PERMIT TRENDS
MULTI FAMILY AVERAGE VALUE PER UNIT
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	-	-	-	-	-	-	-	-	-	-	-	-
Apple Valley	$53,449	$64,869	-	-	-	-	$36,603	$31,270	-	-	$46,548	-
Barstow	-	-	-	-	-	-	-	-	-	-	-	-
Hesperia	$57,760	-	-	-	-	-	$54,815	-	-	$38,659	$50,411	-
Twentynine Palms	$36,676	-	-	-	-	-	-	-	-	-	$36,676	-
Victorville	-	-	-	-	-	-	$65,768	$63,273	$72,120	-	$67,054	-
Yucca Valley	-	-	-	-	-	-	-	-	-	-	-	-
Unincorporated Area	$64,736	$61,264	-	-	-	-	$103,049	-	-	$62,372	$66,710	-
Subarea Total	$40,741	$64,624	-	-	-	-	$56,610	$49,196	$67,223	$40,269	$53,111	-
San Bernardino County Total	$52,536	$50,424	$88,094	$95,946	$67,511	$63,294	$52,972	$54,755	$63,761	$77,808	$66,710	$70,162
LOS ANGELES COUNTY												
Lancaster	$53,829	$62,000	-	-	-	$60,883	$76,500	$52,529	$5,455	$17,296	$46,927	-
Palmdale	$49,135	$74,000	-	-	-	-	-	$55,697	-	-	$59,611	-
Unincorporated Area	$67,681	$72,441	$66,557	$59,098	$67,966	$58,171	$59,785	$61,728	$48,844	$72,132	$76,472	$172,704
Subarea Total	$52,110	$72,829	-	-	-	$60,699	$75,365	$55,181	$8,401	$21,019	$49,372	-
Los Angeles County Total	$82,078	$90,004	$70,308	$69,896	$75,414	$90,227	$70,344	$67,445	$64,904	$84,103	$76,472	$110,884
KERN COUNTY												
California City	$42,188	-	$45,822	-	-	-	-	-	-	-	$44,005	-
Ridgecrest	-	-	-	-	-	-	-	-	-	-	-	-
Unincorporated Area	$40,758	$54,384	$51,123	$46,837	$49,693	$42,589	$71,622	$54,873	$59,860	$65,626	$55,965	$129,100
Subarea Total	$42,091	-	$46,182	-	-	-	-	-	-	-	$44,137	-
Kern County Total	$50,388	$53,006	$51,140	$65,760	$58,520	$42,553	$58,301	$55,199	$63,976	$60,802	$55,965	$52,330
TOTAL AREA												
Subarea Total	$45,151	$71,516	$46,182	-	-	$60,699	$57,329	$54,009	$13,303	$22,228	$46,302	-
Three-County Total	$73,884	$81,719	$68,899	$70,045	$73,272	$84,882	$67,647	$66,570	$64,799	$83,055	$73,477	$105,124

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-26

RESIDENTIAL BUILDING PERMIT TRENDS
TOTAL UNITS
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	966	542	404	207	151	95	11	0	0	96	247	218
Apple Valley	284	294	156	121	212	215	374	363	277	362	266	323
Barstow	53	37	5	3	13	9	3	1	0	0	12	5
Hesperia	532	225	261	165	205	216	277	212	210	552	286	270
Twentynine Palms	723	32	30	16	9	10	6	5	2	6	84	9
Victorville	725	804	534	289	327	152	316	397	402	637	458	583
Yucca Valley	0	0	0	0	11	9	31	54	70	81	26	100
Unincorporated in Subarea	239	141	101	58	68	51	74	75	70	126	100	110
Subarea Total	3,522	2,075	1,491	859	996	757	1,092	1,107	1,031	1,860	1,479	1,618
San Bernardino County Total	7,251	5,778	4,809	3,892	4,822	5,448	6,127	6,767	6,471	8,395	5,976	7,093
LOS ANGELES COUNTY												
Lancaster	982	495	342	251	282	499	308	498	411	771	484	336
Palmdale	1,347	696	651	500	508	376	374	840	661	812	677	656
Unincorporated in Subarea	170	87	72	55	58	64	50	97	78	115	85	72
Subarea Total	2,499	1,278	1,065	806	848	939	732	1,435	1,150	1,698	1,245	1,064
Los Angeles County Total	11,965	7,432	7,754	7,763	7,731	9,829	11,226	14,060	16,968	18,118	11,285	10,148
KERN COUNTY												
California City	165	87	71	20	4	0	3	7	8	7	37	6
Ridgecrest	130	103	42	12	6	9	9	10	11	12	34	7
Unincorporated in Subarea	21	14	8	2	1	1	1	1	1	1	5	1
Subarea Total	316	204	121	34	11	10	13	18	20	20	77	14
Kern County Total	4,366	3,396	3,124	3,496	2,767	2,659	3,425	3,118	3,070	3,494	3,292	2,476
TOTAL AREA												
Subarea Total	6,337	3,556	2,678	1,699	1,854	1,706	1,837	2,561	2,201	3,579	2,801	2,696
Three-County Total	23,582	16,606	15,687	15,151	15,320	17,936	20,778	23,945	26,509	30,007	20,552	19,717

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-27

RESIDENTIAL BUILDING PERMIT TRENDS
SINGLE FAMILY UNITS
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	966	542	404	207	151	95	11	0	0	96	247	218
Apple Valley	274	286	156	121	212	215	278	323	277	362	250	323
Barstow	53	37	5	3	13	9	3	1	0	0	12	5
Hesperia	457	225	261	165	205	216	188	212	210	539	268	270
Twentynine Palms	53	32	30	16	9	10	6	5	2	6	17	9
Victorville	725	804	534	289	327	152	200	315	390	637	437	583
Yucca Valley	-	-	-	-	11	9	31	54	70	81	43	100
Unincorporated in Subarea*	184	140	101	58	68	51	52	66	69	125	92	110
Subarea Total	2,712	2,066	1,491	859	996	757	769	976	1,018	1,846	1,349	1,618
San Bernardino County Total	5,884	5,296	4,664	3,765	4,660	5,101	5,616	6,528	5,767	6,808	5,409	6,350
LOS ANGELES COUNTY												
Lancaster	786	491	342	251	282	422	296	341	279	577	407	336
Palmdale	1,043	658	651	500	508	376	374	496	661	812	608	656
Unincorporated in Subarea*	133	84	72	55	58	58	49	61	68	101	74	72
Subarea Total	1,962	1,233	1,065	806	848	856	719	898	1,008	1,490	1,089	1,064
Los Angeles County Total	6,927	4,523	4,878	4,833	4,699	6,353	6,423	7,826	8,372	8,354	6,319	5,546
KERN COUNTY												
California City	116	87	69	20	4	0	3	7	8	7	32	6
Ridgecrest	130	103	42	12	6	9	9	10	11	12	34	7
Unincorporated in Subarea*	18	14	8	2	1	1	1	1	1	1	5	1
Subarea Total	264	204	119	34	11	10	13	18	20	20	71	14
Kern County Total	3,851	3,082	2,739	2,830	2,390	2,397	2,841	2,887	2,862	3,408	2,929	2,466
TOTAL AREA												
Subarea Total	4,938	3,503	2,676	1,699	1,854	1,623	1,501	1,893	2,047	3,357	2,509	2,696
Three-County Total	16,662	12,901	12,281	11,428	11,749	13,851	14,880	17,241	17,001	18,570	14,656	14,362

*Estimate based on City permits and 1990-2000 City to Unincorporated growth ratio.

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-28

RESIDENTIAL BUILDING PERMIT TRENDS
MULTI-FAMILY UNITS
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02- Aug 02
SAN BERNARDINO COUNTY												
Adelanto	0	0	0	0	0	0	0	0	0	0	0	0
Apple Valley	10	8	0	0	0	0	96	40	0	0	15	0
Barstow	0	0	0	0	0	0	0	0	0	0	0	0
Hesperia	75	0	0	0	0	0	89	0	0	13	18	0
Twentynine Palms	670	0	0	0	0	0	0	0	0	0	67	0
Victorville	0	0	0	0	0	0	116	82	12	0	21	0
Yucca Valley	-	-	-	-	0	0	0	0	0	0	0	0
Unincorporated in Subarea*	55	1	0	0	0	0	22	9	1	1	9	0
Subarea Total	810	9	0	0	0	0	323	131	13	14	130	0
San Bernardino County Total	1,367	482	145	127	162	347	511	239	704	1,587	567	743
LOS ANGELES COUNTY												
Lancaster	196	4	0	0	0	77	12	157	132	194	77	0
Palmdale	304	38	0	0	0	0	0	344	0	0	69	0
Unincorporated in Subarea*	36	3	0	0	0	6	1	36	10	14	11	0
Subarea Total	536	45	0	0	0	83	13	537	142	208	156	0
Los Angeles County Total	5,038	2,909	2,876	2,930	3,032	3,476	4,803	6,234	8,596	9,764	4,966	4,602
KERN COUNTY												
California City	49	0	2	0	0	0	0	0	0	0	5	0
Ridgecrest	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated in Subarea*	4	0	0	0	0	0	0	0	0	0	0	0
Subarea Total	53	0	2	0	0	0	0	0	0	0	5	0
Kern County Total	515	314	385	666	377	262	584	231	208	86	363	10
TOTAL AREA												
Subarea Total	1,399	54	2	0	0	83	336	668	154	222	292	0
Three-County Total	6,920	3,705	3,406	3,723	3,571	4,085	5,898	6,704	9,508	11,437	5,896	5,355

*Estimate based on City permits and 1990-2000 City to Unincorporated growth ratio.

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-29

RESIDENTIAL BUILDING PERMIT TRENDS
TOTAL VALUES (IN THOUSANDS)
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02- Aug 02
SAN BERNARDINO COUNTY												
Adelanto	$50,428	$30,721	$23,967	$12,108	$9,626	$7,138	$910	-	-	$5,243	$17,518	$13,990
Apple Valley	$30,495	$29,652	$15,537	$14,858	$25,617	$26,951	$40,361	$46,756	$41,562	$50,077	$32,187	$43,170
Barstow	$4,862	$3,355	$489	$302	$1,109	$1,055	$536	$196	-	-	$1,488	$491
Hesperia	$55,208	$22,942	$25,962	$17,591	$20,933	$23,277	$25,422	$25,296	$27,362	$70,936	$31,493	$38,591
Twentynine Palms	$29,202	$2,475	$2,332	$1,190	$736	$850	$666	$496	$126	$816	$3,889	$716
Victorville	$68,271	$78,805	$52,092	$30,076	$32,953	$15,361	$29,355	$43,249	$50,720	$100,545	$50,143	$95,474
Yucca Valley	-	-	-	-	$1,012	$893	$2,926	$5,113	$7,187	$8,527	$4,276	$10,794
Unincorporated Area	$23,773	$14,524	$11,054	$6,136	$7,969	$6,212	$8,074	$9,001	$9,150	$18,178	$11,407	$15,663
Subarea Total	$262,240	$182,474	$131,435	$82,262	$99,954	$81,736	$108,249	$130,108	$136,107	$254,321	$146,889	$218,890
San Bernardino County Total	$720,983	$616,997	$588,981	$485,307	$627,330	$757,323	$911,734	$1,166,691	$1,043,021	$1,340,721	$825,909	$1,141,910
LOS ANGELES COUNTY												
Lancaster	$96,232	$55,654	$40,602	$30,948	$35,124	$63,241	$42,788	$55,442	$40,605	$84,983	$54,562	$50,125
Palmdale	$123,607	$73,327	$75,511	$56,592	$63,204	$46,939	$44,173	$87,571	$104,941	$141,155	$81,702	$112,189
Unincorporated Area	$26,712	$16,073	$9,286	$6,411	$11,420	$7,638	$8,355	$10,888	$17,002	$17,895	$13,168	$11,420
Subarea Total	$246,551	$145,054	$125,399	$93,950	$109,748	$117,818	$95,315	$153,901	$162,548	$244,033	$149,432	$173,735
Los Angeles County Total	$1,608,154	$1,042,780	$936,359	$1,016,953	$1,178,380	$1,481,535	$1,539,114	$1,900,284	$2,364,387	$2,456,986	$1,552,493	$1,716,212
KERN COUNTY												
California City	$12,099	$7,542	$6,236	$1,857	$379	-	$307	$984	$997	$842	$3,471	$695
Ridgecrest	$10,381	$8,766	$4,117	$1,115	$734	$1,012	$1,022	$1,134	$1,248	$1,361	$3,089	$794
Unincorporated Area	$1,771	$1,349	$842	$285	$88	$80	$111	$154	$194	$221	$510	$116
Subarea Total	$24,252	$17,656	$11,195	$3,257	$1,201	$1,092	$1,440	$2,271	$2,439	$2,423	$6,723	$1,605
Kern County Total	$367,140	$312,603	$291,041	$321,369	$267,616	$255,864	$329,260	$335,608	$371,103	$442,872	$329,448	$313,446
TOTAL AREA												
Subarea Total	$533,042	$345,184	$268,029	$179,469	$210,904	$200,646	$205,005	$286,281	$301,094	$500,778	$303,043	$394,229
Three-County Total	$2,696,277	$1,972,380	$1,816,381	$1,823,629	$2,073,325	$2,494,722	$2,780,109	$3,402,583	$3,778,511	$4,240,579	$2,707,849	$3,171,567

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-30

RESIDENTIAL BUILDING PERMIT TRENDS
SINGLE FAMILY VALUES (IN THOUSANDS)
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	$50,428	$30,721	$23,967	$12,108	$9,626	$7,138	$910	-	-	$5,243	$17,518	$13,990
Apple Valley	$29,961	$29,133	$15,537	$14,858	$25,617	$26,951	$36,847	$45,505	$41,562	$50,077	$31,605	$43,170
Barstow	$4,862	$3,355	$489	$302	$1,109	$1,055	$536	$196	-	-	$1,488	$491
Hesperia	$50,876	$22,942	$25,962	$17,591	$20,933	$23,277	$20,543	$25,296	$27,362	$70,433	$30,522	$38,591
Twentynine Palms	$4,629	$2,475	$2,332	$1,190	$736	$850	$666	$496	$126	$816	$1,432	$716
Victorville	$68,271	$78,805	$52,092	$30,076	$32,953	$15,361	$21,726	$38,061	$49,855	$100,545	$48,775	$95,474
Yucca Valley	-	-	-	-	$1,012	$893	$2,926	$5,113	$7,187	$8,527	$4,276	$10,794
Unincorporated Area	$20,212	$14,489	$11,054	$6,136	$7,969	$6,212	$5,815	$9,001	$9,150	$18,119	$13,137	$15,663
Subarea Total	$229,240	$181,919	$131,435	$82,262	$99,954	$81,736	$89,968	$123,669	$135,242	$253,760	$140,918	$218,890
San Bernardino County Total	$649,166	$592,693	$576,207	$473,121	$616,393	$735,360	$884,666	$1,153,604	$998,133	$1,217,240	$789,658	$1,089,779
LOS ANGELES COUNTY												
Lancaster	$85,681	$55,406	$40,602	$30,948	$35,124	$58,553	$41,870	$47,195	$39,885	$81,628	$51,689	$50,125
Palmdale	$108,670	$70,515	$75,511	$56,592	$63,204	$46,939	$44,173	$68,411	$104,941	$141,155	$78,011	$112,189
Unincorporated Area	$24,247	$15,851	$9,286	$6,411	$11,420	$7,312	$8,303	$8,636	$16,532	$16,876	$13,580	$11,420
Subarea Total	$218,598	$141,772	$125,399	$93,950	$109,748	$112,804	$94,345	$124,241	$161,358	$239,658	$142,187	$173,735
Los Angeles County Total	$1,194,645	$780,959	$734,152	$812,158	$949,724	$1,167,906	$1,201,251	$1,479,835	$1,806,473	$1,635,801	$1,176,290	$1,205,925
KERN COUNTY												
California City	$10,032	$7,542	$6,144	$1,857	$379	-	$307	$984	$997	$842	$3,232	$695
Ridgecrest	$10,381	$8,766	$4,117	$1,115	$734	$1,012	$1,022	$1,134	$1,248	$1,361	$3,089	$794
Unincorporated Area	$1,626	$1,349	$835	$285	$88	$80	$111	$154	$194	$221	$558	$116
Subarea Total	$22,039	$17,656	$11,096	$3,257	$1,201	$1,092	$1,440	$2,271	$2,439	$2,423	$6,492	$1,605
Kern County Total	$341,190	$295,959	$271,352	$277,573	$245,554	$244,715	$295,212	$322,857	$357,796	$437,643	$308,985	$312,922
TOTAL AREA												
Subarea Total	$469,877	$341,348	$267,930	$179,469	$210,904	$195,632	$185,754	$250,182	$299,039	$495,841	$289,598	$394,229
Three-County Total	$2,185,001	$1,669,611	$1,581,711	$1,562,852	$1,811,670	$2,147,980	$2,381,129	$2,956,296	$3,162,402	$3,290,684	$2,274,934	$2,608,626

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-31

RESIDENTIAL BUILDING PERMIT TRENDS
MULTI-FAMILY VALUES (IN THOUSANDS)
WEST MOJAVE PLAN

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	-	-	-	-	-	-	-	-	-	-	-	-
Apple Valley	$534	$519	-	-	-	-	$3,514	$1,251	-	-	$1,455	-
Barstow	-	-	-	-	-	-	-	-	-	-	-	-
Hesperia	$4,332	-	-	-	-	-	$4,879	-	-	$503	$3,238	-
Twentynine Palms	$24,573	-	-	-	-	-	-	-	-	-	$24,573	-
Victorville	-	-	-	-	-	-	$7,629	$5,188	$865	-	$4,561	-
Yucca Valley	-	-	-	-	-	-	-	-	-	-	-	-
Unincorporated Area	$3,560	$36	-	-	-	-	$2,260	-	-	$59	$589	-
Subarea Total	$33,000	$555	-	-	-	-	$18,281	$6,439	$865	$562	$9,950	-
San Bernardino County Total	$71,817	$24,305	$12,774	$12,185	$10,937	$21,963	$27,069	$13,087	$44,888	$123,481	$36,250	$52,131
LOS ANGELES COUNTY												
Lancaster	$10,551	$248	-	-	-	$4,688	$918	$8,247	$720	$3,355	$4,104	-
Palmdale	$14,937	$2,812	-	-	-	-	-	$19,160	-	-	$12,303	-
Unincorporated Area	$2,465	$222	-	-	-	$326	$52	$2,253	$470	$1,019	$812	$0
Subarea Total	$27,953	$3,282	$0	$0	$0	$5,014	$970	$29,660	$1,190	$4,375	$7,244	$0
Los Angeles County Total	$413,509	$261,820	$202,207	$204,795	$228,656	$313,629	$337,863	$420,449	$557,914	$821,185	$376,203	$510,287
KERN COUNTY												
California City	$2,067	-	$92	-	-	-	-	-	-	-	$1,079	-
Ridgecrest	-	-	-	-	-	-	-	-	-	-	-	-
Unincorporated Area	$145	-	$7	-	-	-	-	-	-	-	$21	$0
Subarea Total	$2,213	$0	$99	$0	$0	$0	$0	$0	$0	$0	$231	$0
Kern County Total	$25,950	$16,644	$19,689	$43,796	$22,062	$11,149	$34,048	$12,751	$13,307	$5,229	$20,463	$523
TOTAL AREA												
Subarea Total	$63,166	$3,836	$99	$0	$0	$5,014	$19,251	$36,099	$2,055	$4,936	$13,446	$0
Three-County Total	$511,276	$302,769	$234,670	$260,777	$261,655	$346,742	$398,980	$446,287	$616,109	$949,895	$432,916	$562,941

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Residential Construction Branch.

EXHIBIT E-32

RETAIL BUILDING PERMIT VALUATION (IN THOUSANDS)
WEST MOJAVE PLAN SUBAREA CITIES

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	-	-	-	$300	$2,960	$350	$1,538	$1,029	$5,633	$2,030	$1,977	$984
Apple Valley	$478	$402	$4,068	-	$4,597	$734	$3,407	$2,518	$303	$3,463	$2,219	$925
Barstow	$10,965	$5,559	$5,728	$166	$894	$251	$1,361	$3,781	$1,128	$1,812	$3,164	$190
Hesperia	$503	$1,271	$2,371	$1,461	$11,920	$995	$3,375	$764	$1,666	$3,407	$2,773	-
Twentynine Palms	$607	$43	-	-	$40	-	-	$250	$768	-	$342	-
Victorville	$10,982	$8,817	$5,096	$4,149	$4,895	$4,624	$1,188	$3,248	$32,814	$23,337	$9,915	$4,907
Yucca Valley	-	-	-	$300	$172	$620	$381	$310	-	-	$357	-
Subarea Total	$23,535	$16,092	$17,263	$6,375	$25,478	$7,573	$11,251	$11,900	$42,312	$34,049	$19,583	$7,007
San Bernardino County Total	$82,529	$94,388	$98,432	$149,353	$101,937	$112,255	$162,472	$185,840	$134,185	$184,602	$130,599	$84,575
LOS ANGELES COUNTY												
Lancaster	$3,621	$1,684	$5,490	$6,131	$620	$16,868	$33,133	$1,175	$10,472	$22,337	$10,153	$10,683
Palmdale	$10,210	$5,515	$9,934	$1,079	$2,073	$2,230	$1,317	$22,989	$6,676	$12,051	$7,407	$3,503
Subarea Total	$13,831	$7,199	$15,424	$7,210	$2,693	$19,098	$34,450	$24,164	$17,148	$34,388	$17,560	$14,185
Los Angeles County Total	$231,549	$261,620	$281,419	$221,129	$329,327	$304,297	$366,064	$418,226	$456,702	$440,290	$331,062	$359,429
KERN COUNTY												
California City	-	$378	$280	$313	$99	$659	$331	$263	-	$300	$328	-
Ridgecrest	$2,342	$46	$171	$221	-	-	$1,064	$215	-	-	$676	$878
Subarea Total	$2,342	$424	$451	$534	$99	$659	$1,394	$478	-	$300	$743	$878
Kern County Total	$48,934	$37,508	$20,083	$12,056	$31,806	$19,774	$40,478	$29,995	$19,375	$56,119	$31,613	$73,249
TOTAL AREA												
Subarea Total	$39,708	$23,715	$33,138	$14,119	$28,270	$27,331	$47,095	$36,542	$59,460	$68,737	$37,811	$22,070
Three-County Total	$363,012	$393,516	$399,934	$382,538	$463,071	$436,325	$569,015	$634,061	$610,262	$681,011	$493,274	$517,253

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Construction Statistics; Construction Industry Research Board.

EXHIBIT E-33

RETAIL BUILDING PERMIT VALUATION AS A PERCENT OF COUNTY
WEST MOJAVE PLAN SUBAREA CITIES

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	-	-	-	0.2%	2.9%	0.3%	0.9%	0.6%	4.2%	1.1%	1.5%	1.2%
Apple Valley	0.6%	0.4%	4.1%	-	4.5%	0.7%	2.1%	1.4%	0.2%	1.9%	1.8%	1.1%
Barstow	13.3%	5.9%	5.8%	0.1%	0.9%	0.2%	0.8%	2.0%	0.8%	1.0%	-	0.2%
Hesperia	0.6%	1.3%	2.4%	1.0%	11.7%	0.9%	2.1%	0.4%	1.2%	1.8%	2.3%	-
Twentynine Palms	0.7%	0.0%	-	-	0.0%	-	-	0.1%	0.6%	-	-	-
Victorville	13.3%	9.3%	5.2%	2.8%	4.8%	4.1%	0.7%	1.7%	24.5%	12.6%	7.9%	5.8%
Yucca Valley	-	-	-	0.2%	0.2%	0.6%	0.2%	0.2%	-	-	-	-
Subarea Total	28.5%	17.0%	17.5%	4.3%	25.0%	6.7%	6.9%	6.4%	31.5%	18.4%	16.2%	8.3%
San Bernardino County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
LOS ANGELES COUNTY												
Lancaster	1.6%	0.6%	2.0%	2.8%	0.2%	5.5%	9.1%	0.3%	2.3%	5.1%	2.9%	3.0%
Palmdale	4.4%	2.1%	3.5%	0.5%	0.6%	0.7%	0.4%	5.5%	1.5%	2.7%	2.2%	1.0%
Subarea Total	6.0%	2.8%	5.5%	3.3%	0.8%	6.3%	9.4%	5.8%	3.8%	7.8%	5.1%	3.9%
Los Angeles County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
KERN COUNTY												
California City	-	1.0%	1.4%	2.6%	0.3%	3.3%	0.8%	0.9%	-	0.5%	1.4%	-
Ridgecrest	4.8%	0.1%	0.9%	1.8%	-	-	2.6%	0.7%	-	-	1.8%	1.2%
Subarea Total	4.8%	1.1%	2.2%	4.4%	0.3%	3.3%	3.4%	1.6%	-	0.5%	2.4%	1.2%
Kern County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL AREA												
Subarea Total	10.9%	6.0%	8.3%	3.7%	6.1%	6.3%	8.3%	5.8%	9.7%	10.1%	7.5%	4.3%
Three-County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Construction Statistics; Construction Industry Research Board.

EXHIBIT E-34

RETAIL BUILDING PERMIT VALUATION AS SHARE OF SELECTED LOCATIONS
WEST MOJAVE PLAN SUBAREA CITIES

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	-	-	-	2.1%	10.5%	1.3%	3.3%	2.8%	9.5%	3.0%	4.6%	4.5%
Apple Valley	1.2%	1.7%	12.3%	-	16.3%	2.7%	7.2%	6.9%	0.5%	5.0%	6.0%	4.2%
Barstow	27.6%	23.4%	17.3%	1.2%	3.2%	0.9%	2.9%	10.3%	1.9%	2.6%	-	0.9%
Hesperia	1.3%	5.4%	7.2%	10.3%	42.2%	3.6%	7.2%	2.1%	2.8%	5.0%	8.7%	-
Twentynine Palms	1.5%	0.2%	-	-	0.1%	-	-	0.7%	1.3%	-	-	-
Victorville	27.7%	37.2%	15.4%	29.4%	17.3%	16.9%	2.5%	8.9%	55.2%	34.0%	24.4%	22.2%
Yucca Valley	-	-	-	2.1%	0.6%	2.3%	0.8%	0.8%	-	-	-	-
Subarea Total	59.3%	67.9%	52.1%	45.2%	90.1%	27.7%	23.9%	32.6%	71.2%	49.5%	51.9%	31.7%
LOS ANGELES COUNTY												
Lancaster	9.1%	7.1%	16.6%	43.4%	2.2%	61.7%	70.4%	3.2%	17.6%	32.5%	26.4%	48.4%
Palmdale	25.7%	23.3%	30.0%	7.6%	7.3%	8.2%	2.8%	62.9%	11.2%	17.5%	19.7%	15.9%
Subarea Total	34.8%	30.4%	46.5%	51.1%	9.5%	69.9%	73.2%	66.1%	28.8%	50.0%	46.0%	64.3%
KERN COUNTY												
California City	-	1.6%	0.8%	2.2%	0.4%	2.4%	0.7%	0.7%	-	0.4%	1.2%	-
Ridgecrest	5.9%	0.2%	0.5%	1.6%	-	-	2.3%	0.6%	-	-	1.8%	4.0%
Subarea Total	5.9%	1.8%	1.4%	3.8%	0.4%	2.4%	3.0%	1.3%	-	0.4%	2.3%	4.0%
TOTAL AREA												
Subarea Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Construction Statistics; Construction Industry Research Board.

EXHIBIT E-35

OFFICE BUILDING PERMIT VALUATION (IN THOUSANDS)
WEST MOJAVE PLAN SUBAREA CITIES

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	$34	-	-	-	-	$157	-	-	-	$624	$272	-
Apple Valley	-	$1,364	$324	$179	-	-	-	-	-	-	$622	-
Barstow	-	-	-	-	$227	$259	$100	$301	$200	$352	$240	-
Hesperia	$2,039	$385	$2,128	-	$990	-	$215	-	-	$1,601	$1,226	-
Twentynine Palms	-	-	-	-	$20	-	-	-	-	-	$20	-
Victorville	$4,913	$46	$1,143	$240	$1,414	$1,708	$3,268	$1,728	$1,987	$480	$1,692	$1,753
Yucca Valley	-	-	-	-	-	-	-	-	-	-	-	-
Subarea Total	$6,985	$1,795	$3,595	$419	$2,651	$2,124	$3,582	$2,028	$2,187	$3,057	$2,842	$1,753
San Bernardino County Total	$22,294	$16,080	$23,436	$31,789	$9,445	$12,414	$21,810	$15,838	$15,369	$20,208	$18,868	$18,232
LOS ANGELES COUNTY												
Lancaster	$1,835	$389	$1,393	$612	$624	$3,421	$149	$2,006	$1,558	$15,237	$2,722	-
Palmdale	$1,780	$14,893	-	-		$735	$696	$2,795	$2,627	$2,247	$3,682	$3,879
Subarea Total	$3,615	$15,282	$1,393	$612	$624	$4,156	$845	$4,801	$4,185	$17,484	$5,300	$3,879
Los Angeles County Total	$134,721	$153,822	$117,264	$87,910	$132,518	$161,409	$285,397	$393,158	$273,639	$546,580	$228,642	$118,876
KERN COUNTY												
California City	$71	$75	-	-	-	-	$141	-	-	-	$96	-
Ridgecrest	-	$232	$182	$262	-	-	-	-	-	-	$225	$400
Subarea Total	$71	$307	$182	$262	-	-	$141	-	-	-	$192	$400
Kern County Total	$9,123	$58,739	$10,335	$7,712	$7,963	$8,856	$32,922	$11,612	$18,265	$47,118	$21,265	$17,050
TOTAL AREA												
Subarea Total	$10,670	$17,384	$5,169	$1,293	$3,275	$6,280	$4,569	$6,829	$6,372	$20,541	$8,238	$6,032
Three-County Total	$166,137	$228,641	$151,034	$127,411	$149,927	$182,679	$340,130	$420,608	$307,274	$613,906	$268,775	$154,158

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Construction Statistics; Construction Industry Research Board.

EXHIBIT E-36

OFFICE BUILDING PERMIT VALUATION AS A PERCENT OF COUNTY
WEST MOJAVE PLAN SUBAREA CITIES

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02- Aug 02
SAN BERNARDINO COUNTY												
Adelanto	0.2%	-	-	-	-	1.3%	-	-	-	3.1%	1.5%	-
Apple Valley	-	8.5%	1.4%	0.6%	-	-	-	-	-	-	3.5%	-
Barstow	-	-	-	-	2.4%	2.1%	0.5%	1.9%	1.3%	1.7%	-	-
Hesperia	9.1%	2.4%	9.1%	-	10.5%	-	1.0%	-	-	7.9%	6.7%	-
Twentynine Palms	-	-	-	-	0.2%	-	-	-	-	-	-	-
Victorville	22.0%	0.3%	4.9%	0.8%	15.0%	13.8%	15.0%	10.9%	12.9%	2.4%	9.8%	9.6%
Yucca Valley	-	-	-	-	-	-	-	-	-	-	-	-
Subarea Total	31.3%	11.2%	15.3%	1.3%	28.1%	17.1%	16.4%	12.8%	14.2%	15.1%	16.3%	9.6%
San Bernardino County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
LOS ANGELES COUNTY												
Lancaster	1.4%	0.3%	1.2%	0.7%	0.5%	2.1%	0.1%	0.5%	0.6%	2.8%	1.0%	-
Palmdale	1.3%	9.7%	-	-	0.0%	0.5%	0.2%	0.7%	1.0%	0.4%	1.7%	3.3%
Subarea Total	2.7%	9.9%	1.2%	0.7%	0.5%	2.6%	0.3%	1.2%	1.5%	3.2%	2.4%	3.3%
Los Angeles County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
KERN COUNTY												
California City	0.8%	0.1%	-	-	-	-	0.4%	-	-	-	0.4%	-
Ridgecrest	-	0.4%	1.8%	3.4%	-	-	-	-	-	-	1.8%	2.3%
Subarea Total	0.8%	0.5%	1.8%	3.4%	-	-	0.4%	-	-	-	1.4%	2.3%
Kern County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL AREA												
Subarea Total	6.4%	7.6%	3.4%	1.0%	2.2%	3.4%	1.3%	1.6%	2.1%	3.3%	3.2%	3.9%
Three-County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Construction Statistics; Construction Industry Research Board.

EXHIBIT E-37

OFFICE BUILDING PERMIT VALUATION AS SHARE OF SELECTED LOCATIONS
WEST MOJAVE PLAN SUBAREA CITIES

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	0.3%	-	-	-	-	2.5%	-	-	-	3.0%	2.0%	-
Apple Valley	-	7.8%	6.3%	13.8%	-	-	-	-	-	-	9.3%	-
Barstow	-	-	-	-	6.9%	4.1%	2.2%	4.4%	3.1%	1.7%	-	-
Hesperia	19.1%	2.2%	41.2%	-	30.2%	-	4.7%	-	-	7.8%	17.5%	-
Twentynine Palms	-	-	-	-	0.6%	-	-	-	-	-	-	-
Victorville	46.0%	0.3%	22.1%	18.6%	43.2%	27.2%	71.5%	25.3%	31.2%	2.3%	28.8%	29.1%
Yucca Valley	-	-	-	-	-	-	-	-	-	-	-	-
Subarea Total	65.5%	10.3%	69.5%	32.4%	80.9%	33.8%	78.4%	29.7%	34.3%	14.9%	45.0%	29.1%
LOS ANGELES COUNTY												
Lancaster	17.2%	2.2%	27.0%	47.3%	19.1%	54.5%	3.3%	29.4%	24.5%	74.2%	29.9%	-
Palmdale	16.7%	85.7%	-	-	0.0%	11.7%	15.2%	40.9%	41.2%	10.9%	27.8%	64.3%
Subarea Total	33.9%	87.9%	27.0%	47.3%	19.1%	66.2%	18.5%	70.3%	65.7%	85.1%	52.1%	64.3%
KERN COUNTY												
California City	0.7%	0.4%	-	-	-	-	3.1%	-	-	-	1.4%	-
Ridgecrest	-	1.3%	3.5%	20.3%	-	-	-	-	-	-	8.4%	6.6%
Subarea Total	0.7%	1.8%	3.5%	20.3%	-	-	3.1%	-	-	-	5.9%	6.6%
TOTAL AREA												
Subarea Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Construction Statistics; Construction Industry Research Board.

EXHIBIT E-38

INDUSTRIAL BUILDING PERMIT VALUATION (IN THOUSANDS)
WEST MOJAVE PLAN SUBAREA CITIES

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	$6,213	$1,442	$4,445	$1,101	-	$1,844	-	-	-	-	$3,009	-
Apple Valley	$20	-	-	-	-	-	-	-	-	-	$20	-
Barstow	-	-	$1,152	-	-	$3,634	$2,427	$1,195	-	$760	-	$4,363
Hesperia	-	$1,684	-	$567	$214	$1,192	$889	$1,331	$1,952	$1,798	$1,204	$405
Twentynine Palms	-	-	-	-	-	-	-	-	-	-	-	-
Victorville	-	-	$59	-	-	$51	$1,798	$127	-	$643	$536	-
Yucca Valley	-	-	-	-	-	-	-	-	-	-	-	-
Subarea Total	$6,233	$3,126	$5,656	$1,668	$214	$6,722	$5,114	$2,653	$1,952	$3,201	$3,654	$4,768
San Bernardino County Total	$38,522	$36,040	$71,848	$68,560	$86,707	$188,716	$209,002	$331,039	$404,568	$330,928	$176,593	$144,055
LOS ANGELES COUNTY												
Lancaster	$5,442	$101	$2,709	$4,460	$524	-	-	$1,313	$3,124	$1,584	$2,407	$469
Palmdale	$20,167	$1,405	-	$339	$1,259	$7,246	$3,233	$400	-	$6,438	$5,061	$116
Subarea Total	$25,609	$1,506	$2,709	$4,799	$1,783	$7,246	$3,233	$1,713	$3,124	$8,022	$5,974	$584
Los Angeles County Total	$81,228	$49,260	$46,767	$74,076	$124,207	$108,726	$307,571	$361,114	$359,633	$201,927	$171,451	$112,214
KERN COUNTY												
California City	-	-	-	-	-	-	-	-	-	$220	$220	$1,932
Ridgecrest	-	-	$177	-	-	-	-	-	-	-	$177	-
Subarea Total	-	-	$177	-	-	-	-	-	-	$220	$198	$1,932
Kern County Total	$14,979	$13,328	$12,001	$1,813	$9,724	$21,680	$23,105	$13,087	$11,696	$18,251	$13,966	$11,798
TOTAL AREA												
Subarea Total	$31,842	$4,632	$8,542	$6,467	$1,997	$13,968	$8,347	$4,366	$5,076	$11,443	$9,668	$7,284
Three-County Total	$134,729	$98,628	$130,617	$144,449	$220,638	$319,121	$539,678	$705,239	$775,897	$551,106	$362,010	$268,067

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Construction Statistics; Construction Industry Research Board.

EXHIBIT E-39

INDUSTRIAL BUILDING PERMIT VALUATION AS A PERCENT OF COUNTY
WEST MOJAVE PLAN SUBAREA CITIES

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	16.1%	4.0%	6.2%	1.6%	-	1.0%	-	-	-	-	5.8%	-
Apple Valley	0.1%	-	-	-	-	-	-	-	-	-	0.1%	-
Barstow	-	-	1.6%	-	-	1.9%	1.2%	0.4%	-	0.2%	-	3.0%
Hesperia	-	4.7%	-	0.8%	0.2%	0.6%	0.4%	0.4%	0.5%	0.5%	1.0%	0.3%
Twentynine Palms	-	-	-	-	-	-	-	-	-	-	-	-
Victorville	-	-	0.1%	-	-	0.0%	0.9%	0.0%	-	0.2%	0.2%	-
Yucca Valley	-	-	-	-	-	-	-	-	-	-	-	-
Subarea Total	**16.2%**	**8.7%**	**7.9%**	**2.4%**	**0.2%**	**3.6%**	**2.4%**	**0.8%**	**0.5%**	**1.0%**	**4.4%**	**3.3%**
San Bernardino County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
LOS ANGELES COUNTY												
Lancaster	6.7%	0.2%	5.8%	6.0%	0.4%	-	-	0.4%	0.9%	0.8%	2.6%	0.4%
Palmdale	24.8%	2.9%	-	0.5%	1.0%	6.7%	1.1%	0.1%	-	3.2%	5.0%	0.1%
Subarea Total	**31.5%**	**3.1%**	**5.8%**	**6.5%**	**1.4%**	**6.7%**	**1.1%**	**0.5%**	**0.9%**	**4.0%**	**6.1%**	**0.5%**
Los Angeles County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
KERN COUNTY												
California City	-	-	-	-	-	-	-	-	-	1.2%	1.2%	16.4%
Ridgecrest	-	-	1.5%	-	-	-	-	-	-	-	1.5%	-
Subarea Total	**-**	**-**	**1.5%**	**-**	**-**	**-**	**-**	**-**	**-**	**1.2%**	**1.3%**	**16.4%**
Kern County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL AREA												
Subarea Total	**23.6%**	**4.7%**	**6.5%**	**4.5%**	**0.9%**	**4.4%**	**1.5%**	**0.6%**	**0.7%**	**2.1%**	**5.0%**	**2.7%**
Three-County Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Construction Statistics; Construction Industry Research Board.

EXHIBIT E-40

INDUSTRIAL BUILDING PERMIT VALUATION AS SHARE OF SELECTED LOCATIONS
WEST MOJAVE PLAN SUBAREA CITIES

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Average 1992-2001	Jan 02-Aug 02
SAN BERNARDINO COUNTY												
Adelanto	19.5%	31.1%	52.0%	17.0%	-	13.2%	-	-	-	-	26.6%	-
Apple Valley	0.1%	-	-	-	-	-	-	-	-	-	0.1%	-
Barstow	-	-	13.5%	-	-	26.0%	29.1%	27.4%	-	6.6%	-	59.9%
Hesperia	-	36.4%	-	8.8%	10.7%	8.5%	10.7%	30.5%	38.5%	15.7%	20.0%	5.6%
Twentynine Palms	-	-	-	-	-	-	-	-	-	-	-	-
Victorville	-	-	0.7%	-	-	0.4%	21.5%	2.9%	-	5.6%	6.2%	-
Yucca Valley	-	-	-	-	-	-	-	-	-	-	-	-
Subarea Total	**19.6%**	**67.5%**	**66.2%**	**25.8%**	**10.7%**	**48.1%**	**61.3%**	**60.8%**	**38.5%**	**28.0%**	**42.6%**	**65.5%**
LOS ANGELES COUNTY												
Lancaster	17.1%	2.2%	31.7%	69.0%	26.2%	-	-	30.1%	61.5%	13.8%	31.5%	6.4%
Palmdale	63.3%	30.3%	-	5.2%	63.0%	51.9%	38.7%	9.2%	-	56.3%	39.7%	1.6%
Subarea Total	**80.4%**	**32.5%**	**31.7%**	**74.2%**	**89.3%**	**51.9%**	**38.7%**	**39.2%**	**61.5%**	**70.1%**	**57.0%**	**8.0%**
KERN COUNTY												
California City	-	-	-	-	-	-	-	-	-	1.9%	1.9%	26.5%
Ridgecrest	-	-	2.1%	-	-	-	-	-	-	-	2.1%	-
Subarea Total	**-**	**-**	**2.1%**	**-**	**-**	**-**	**-**	**-**	**-**	**1.9%**	**2.0%**	**26.5%**
TOTAL AREA												
Subarea Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Alfred Gobar Associates; U.S. Bureau of the Census - Construction Statistics; Construction Industry Research Board.

APPENDIX O

LIVESTOCK GRAZING

Appendices

APPENDIX O
LIVESTOCK GRAZING

O.1 SHEEP GRAZING PERMITS AND LEASES

Antelope Valley: This is an ephemeral allotment consisting of 7,871 acres comprised of 510 acres of private land and 7,361 acres of public lands. The allotment has 1,048 acres of non-critical desert tortoise habitat. In years of adequate ephemeral forage production, sheep grazing is authorized. Ephemeral forage is found on large flats. Water is hauled to temporary locations and can be moved as sheep are herded through the allotment.

Bissell: This is an ephemeral allotment consisting of 48,889 acres comprised of 43,293 acres of private land and 5,596 acres of public lands. This allotment has 5,596 acres of non-critical desert tortoise habitat. In years of adequate ephemeral forage production, sheep grazing is authorized. Ephemeral forage is found on large flats. Water is hauled to temporary locations and can be moved as sheep are herded through the allotment.

Boron: This is an ephemeral allotment consisting of 82,892 acres comprised of 72,024 acres of private land and 10,868 acres of public lands. This allotment has 10, 868 acres of non-critical desert tortoise habitat. In years of adequate ephemeral forage production, sheep grazing is authorized. Ephemeral forage is found on large flats. Water is hauled to temporary locations and can be moved as sheep are herded through the allotment.

Buckhorn Canyon: This is an ephemeral allotment consisting of 27,053 acres comprised of 14,689 acres of private land, and 12,364 acres of public land. Most of this allotment is within designated critical habitat for the desert tortoise, and has not been grazed by sheep since 1987. In years of adequate ephemeral forage production, sheep grazing is authorized in non-critical habitat, however due to the lack of contiguous public land outside of critical habitat it is unlikely that future sheep grazing would occur.

Cantil Common: This is an ephemeral allotment consisting of 555,421 acres comprised of 236,472 acres of private land and 318,949 acres of public lands. This allotment has 240,913 acres of non-critical desert tortoise habitat, and 78,035 acres of desert tortoise critical habitat. In years of adequate ephemeral forage production, sheep grazing is authorized in non-critical habitat. Ephemeral forage is found on large flats. Water is hauled to temporary locations and can be moved as sheep are herded through the allotment.

Goldstone: This is an ephemeral allotment consisting of 11,061 acres of public lands. This allotment has 11,061 acres of critical desert tortoise habitat. This allotment is currently an inactive, vacant ephemeral sheep allotment and has not been grazed by sheep since 1987. The 1991 Biological Opinion and extensions disallowed ephemeral sheep grazing in critical desert tortoise habitat. The entire allotment is on lands transferred by Congress to the Department of the Army in December 2001 (within the Fort Irwin expansion area).

Gravel Hills: This is an ephemeral allotment consisting of 230,165 acres comprised of 94,621 acres of private land and 135,544 acres of public lands. This allotment has 0 acres of non-critical desert tortoise habitat and 135,544 acres of critical desert tortoise habitat. This allotment is currently inactive and has not been grazed by sheep since 1988. The 1991 biological opinion and extensions disallowed ephemeral sheep grazing in critical desert tortoise habitat.

Hansen Common: The CDCA Plan authorizes both cattle grazing and sheep grazing and/or trailing on the stock driveway. In areas of the allotment where ephemeral sheep grazing is authorized, ephemeral cattle grazing is not authorized. Sheep grazing occurs on this allotment during ephemeral years only. (See also discussion below for cattle allotments.)

Johnson Valley: This is an ephemeral allotment consisting of 118,320 acres comprised of 9,134 acres of private land and 109,186 acres of public lands. This allotment has 118,320 acres of non-critical desert tortoise habitat and 0 acres of critical desert tortoise habitat. In years of adequate ephemeral forage production, sheep grazing is authorized. Ephemeral forage is found on large flats. Water is hauled to temporary locations and can be moved as sheep are herded through the allotment. This allotment is currently inactive, vacant, and has not been grazed by sheep since 1992.

Lava Mountains: This is an ephemeral allotment consisting of 20,902 acres of public lands. This allotment has 18,757 acres of non-critical and 2,145 acres of critical desert tortoise habitat. In years of adequate ephemeral forage production, sheep grazing is authorized in both non-critical and a small portion of critical habitat. Ephemeral forage is found on large flats. Water is hauled to temporary locations and can be moved as sheep are herded through the allotment.

Monolith Cantil: This is an ephemeral allotment consisting of 47,553 acres comprised of 9,782 acres of private land and 37,771 acres of public lands. This allotment has 7,939 acres of non-critical and 29,846 acres of critical desert tortoise habitat. In years of adequate ephemeral forage production, sheep grazing is authorized in non-critical habitat. Ephemeral forage is found on large flats. Water is hauled to temporary locations and can be moved as sheep are herded through the allotment.

Rudnick Common: The CDCA Plan authorizes both cattle grazing and sheep grazing and/or trailing on the stock driveway. In areas of the allotment where ephemeral sheep grazing is authorized, ephemeral cattle grazing is not authorized. Sheep grazing occurs on this allotment during ephemeral years only. (See discussion below regarding cattle allotments.)

Shadow Mountain: This is an ephemeral allotment consisting of 121,677 acres comprised of 69,419 acres of private land and 52,258 acres of public lands. This allotment has 86,664 acres of non-critical desert tortoise habitat and 35,013 acres of critical desert tortoise habitat. In years of adequate ephemeral forage production, sheep grazing is authorized in non-critical habitat. Ephemeral forage is found on large flats. Water is hauled to temporary locations and can be moved as sheep are herded through the allotment.

Spangler Hills: This is an ephemeral allotment consisting of 69,141 acres comprised of 11,446 acres of private land and 57,695 acres of public lands. This allotment has 54,143 acres of non-critical desert tortoise habitat. In years of adequate ephemeral forage production, sheep grazing is authorized. Ephemeral forage is found on large flats. Water is hauled to temporary locations and can be moved as sheep are herded through the allotment.

Stoddard Mountain: This is an ephemeral allotment consisting of 312,045 acres comprised of 121,859 acres of private land and 190,186 acres of public lands divided into three use areas. This allotment has 126,202 acres of non-critical desert tortoise habitat and 112,772 acres of critical desert tortoise habitat. The West Stoddard Use Area is entirely within critical habitat and sheep grazing is not authorized. In years of adequate ephemeral forage production, sheep grazing is authorized in non-critical habitat located in the Middle and East Use Areas. Ephemeral forage is found on large flats and foothills. Water is hauled to temporary locations and can be moved as sheep are herded through the allotment.

Superior Valley: This is an ephemeral allotment consisting of 236, 316 acres comprised of 67,116 acres of private land and 169,200 acres of public lands. This allotment has 0 acres of non-critical desert tortoise habitat and 169,200 acres of critical desert tortoise habitat. This allotment is currently an inactive and has not been grazed by sheep since 1988. The 1991 biological opinion and extensions disallowed ephemeral sheep grazing in critical desert tortoise habitat. In December 2001, Congress transferred about one third of the allotment to the Department of the Army as part of the Fort Irwin expansion.

Tunawee Common: The CDCA Plan authorizes both cattle grazing and sheep grazing and/or trailing on the stock driveway. In areas of the allotment where ephemeral sheep grazing is authorized, ephemeral cattle grazing is not authorized. Sheep grazing occurs on this allotment during ephemeral years only. (See discussion below regarding cattle grazing allotments.)

Warren: This is a perennial allotment consisting of 556 acres of public land. The season of use is February 15 through May 31. The grazing that occurs on this allotment consists mostly of drift from the surrounding private land around the allotment.

O.2 CATTLE GRAZING PERMITS AND LEASES

Cady Mountain: The Cady Mountain Allotment is located between I-15 and I-40 in the western Mojave Desert and the allotment comprises 231,897 acres. The period for grazing is yearlong. The Mojave River runs through the extreme northern portion of the allotment and contains extensive areas of riparian habitat. The majority of grazing use occurs in the western and central portions of the allotment in association with the active wells, and in the Afton Canyon area. The allotment is within 160,104 acres of desert tortoise non-critical habitat. An AMP was approved for this allotment in 1983, and a Rangeland Health Assessment was completed in 2000.

Cronese Lake: The Cronese Lake Allotment is located approximately 30 miles northeast of Barstow and just north of I-15. The season of use is yearlong. Water is supplied by one well on public land. Approximately 55 percent of the allotment is within critical habitat for the desert tortoise. This allotment has an AMP approved in 1983. A Rangeland Health Assessment was completed for this allotment in 2000.

Darwin: The Darwin allotment is entirely located inside the Lacey-Cactus-McCloud Allotment. It is classified as a horse allotment. The allotment has been vacant since 1993, and it is unlikely that it will be grazed again.

Double Mountain: This allotment has not been grazed since 1990, and has been vacant since 1992. It is unlikely that this allotment will be grazed again. It is bordered on all sides by private land.

Hansen Common: The Hansen Common Allotment consists of 72,102 acres comprised of 37,254 private land and 34,848 acres of BLM lands. Approximately 3,549 acres of the allotment is non-critical habitat for desert tortoise. This allotment does not have a grazing system based on pasture rotation. Most grazing occurs on private land with cattle drifting onto BLM land at various periods, depending on available forage and water. Cattle use is authorized on BLM land for 10 months. Ephemeral forage on this allotment is located in areas typically grazed by sheep rather than cattle when adequate ephemeral forage production occurs.

Harper Lake: The Harper Lake Allotment is located 15 miles northwest of Barstow. Cattle use occurs all yearlong. Approximately 65 percent (21,194 acres) of this allotment is within desert tortoise critical habitat and in the northern pasture while the remaining 35 percent (5,120 acres) of desert tortoise non-critical habitat is located in the southern pasture. In the past, there has been a lack of developed water and boundary fencing in the northern pasture resulting in cattle drift off the allotment. The recent development of stock water on private land in the northern pasture has more evenly distributed grazing use. Until development of water in the northern pasture, past grazing use has been confined to the southern pasture. An AMP was approved for this allotment in 1984, and a Rangeland Health Assessment was completed in 1999.

Lacey-Cactus-McCloud: The Lacey-Cactus-McCloud allotment consists of 421,791 acres, comprised of 2,375 acres of private land, 257,696 acres of Military land, and 7,644 acres of State land, and 158,532 acres of public land. The Lacey-Cactus-McCloud allotment utilizes a rotational grazing system comprised of pastures that utilize fences and topographic barriers as boundaries. Several of the pastures located on the China Lake NAWS have been closed to grazing for many years. In addition, China Lake NAWS canceled grazing use on their portion of the allotment in June 2000. There is approximately 18,025 acres of non-critical habitat for desert habitat.

Oak Creek: The Oak Creek allotment has been vacant for more than ten years, and it is unlikely that it will be used again.

Olancha Common: The Olancha Common Allotment consists of 15,877 acres comprised of 1,410 acres of private land and 391 acres of State land, 18 acres of United States Forest Service (USFS) land and 13,900 acres of public land. The allotment utilizes a two pasture rotational grazing system.

Ord Mountain: The Ord Mountain Allotment is located south of I-40, approximately 8 miles southeast of Barstow. The season of use is yearlong. The allotment is 154,848 acres in size of which 102,141 acres is in desert tortoise critical habitat and 34,047 acres is in desert tortoise non-critical habitat. A small number of domestic horses are authorized to graze this allotment. Most of the grazing use on public land occurs in the western portion of the allotment where most of the developed water is located. An AMP was approved for this allotment in 1985, and a Rangeland Health Assessment was completed in 1999.

Pilot Knob: The Pilot Knob Allotment consists of 45,498 acres comprised of 1,720 acres of private land, 146 acres of State land, 4,727acres of military land, and 38,906 acres of public land. The allotment has been in non-use since 1996. It is unlikely that it will be grazed again.

Rattlesnake Canyon: The Rattlesnake Canyon Allotment is located at the base of and within the Bighorn Mountain Range. The season for cattle use is yearlong. The allotment is topographically divided into the desert pasture, Rattlesnake Canyon, and the mountain pasture. Pasture use is primarily seasonal, with most of the grazing use in the winter and spring occurs in the desert pasture while summer and fall grazing use occurs in the mountain pasture. Rattlesnake Canyon is primarily used to trail cattle between the desert and mountain pastures. The desert pasture has 12,800 acres of desert tortoise non-critical habitat, where desert tortoise densities are probably low. Rattlesnake Canyon within the allotment is a wide, five-mile long canyon with steep walls and a rocky to sandy bottom. The canyon stretches from the desert floor and rises in elevation to over 5,500 feet. Several populations of Parish's daisy have been identified within the allotment boundaries. This allotment has no approved AMP. A Rangeland Health Assessment was completed for this allotment in 1999.

Round Mountain: The Round Mountain Allotment is located on the north face of the San Bernardino Mountains, approximately 30 miles south of Barstow. There are 15,565 acres of public land and 2,525 acres of private land within the allotment. There are no known listed species on this allotment. There has been no grazing on this allotment since 1998 due a wildfire in 1999. The stocking rate for this allotment has averaged 100 head. This allotment has no approved AMP, nor has a Rangeland Health Assessment been completed.

Rudnick Common: The Rudnick Common allotment consists of 236,184 acres, comprised of 86,030 acres of private land and 150,154 acres of public land. There is 62,503 acres of non-critical habitat for desert tortoise. There are two lessees in the Rudnick Common Allotment. One lessee grazes only in the Cane Canyon and Pinyon Well pastures. These pastures have no desert tortoise habitat and the lessee is not affected by the proposed action or alternatives. The second lessee grazes in the rest of the allotment, which has 62,503 acres of non-critical habitat for desert tortoise. This allotment utilizes a rotational grazing system comprised of pastures that utilize fences and topographic barriers as boundaries. Choice, timing, and duration of use for each pasture are dependent on several factors including plant phenology, climatic conditions, and past use.

Tunawee Common: The Tunawee Common allotment consists of 55,931 acres comprised of 4,202 private land and 51,729 acres of public land. Approximately 1,800 acres of the allotment is non-critical habitat for desert tortoise. Cattle have not grazed the allotment since 1993. From 1994 to the present, sheep have grazed the allotment.

Walker Pass: The Walker Pass Common Allotment consists of 96,974 acres, comprised of 8,816 acres of private land and 88,158 acres of public land. Approximately 32,058 acres of the allotment is non-critical habitat for desert tortoise. Three lessees graze cattle on the Walker Pass Common Allotment. The lessees can graze on the allotment for an eight-month period. The southern use area consists of 14,791 acres, comprised of 847 acres of private land and 13,941 acres of BLM land. There is 6,865 acres of non-critical habitat for desert tortoise. The lessee of the southern use area (lessee 1) uses water availability to promote proper distribution and movement of cattle in the use area. Lessee 1 typically removes cattle from the allotment by February 28.

The middle use area consists of 48,163 acres, comprised of 5,626 acres of private land, 47 acres of state land, and 42,702 acres of public land. There is 6,387 acres of non-critical habitat for desert tortoise. The lessee of the middle use area (lessee 2) uses fences, and topographic features to distribute cattle in this use area. Lessee 2 typically removes cattle from the allotment around June 30. When ephemeral forage is sufficient the lessee typically make use of the eastern portion of the allotment where the ephemeral forage is most productive.

The northern use area consists of 33,635 acres, comprised of 950 acres of private land, 385 acres of state land, and 32,300 acres of public land. There is 15,885 acres of non-critical habitat for desert tortoise. The lessee of the northern use area (lessee 3) typically removes cattle from the allotment around June 30. When ephemeral forage is sufficient the lessee typically make use of the eastern portion of the allotment where the ephemeral forage is most productive.

Whitewater Canyon: This allotment is discussed in detail in the Coachella Valley

Habitat Conservation Plan.

Table O-1 lists past livestock use for all the grazing allotments in the Planning Area:

Table O-1
Past Livestock Use

GRAZING YEAR	AUM'S CONSUMED	GRAZING PERIOD	AVERAGE NUMBER OF CATTLE & SHEEP
BLM Barstow Field Office			
Buckhorn Canyon			
1980	526	3/01 to 6/30	1,500 (S)
1982	218	4/03 to 5/31	700
1983	291	3/23 to 5/31	800
1986	472	3/27 to 5/31	1,400
1987	257	3/16 to 5/16	800
Goldstone			
1987	250	3/23 to 5/08	815
Gravel Hills			
1980	1,632	4/01 to 6/01	8,000
1981	139	4/11 to 5/31	800
1982	1,855	3/26 to 6/15	8,800
1983	4,441	3/15 to 6/15	14,790
1985	975	3/19 to 5/31	3,040
1986	1,450	3/15 to 5/15	5,315
1987	3,297	3/18 to 5/31	9,610
1988	957	3/09 to 5/31	3,750
Johnson Valley			
1992	75	4/27 to 5/15	600
Shadow Mountain			
1992	234	3/28 to 5/09	800
1993	379	3/30 to 5/09	1,600
1995	295	3/23 to 4/25	1,443
1998	958	3/09 to 6/11	2,100
Stoddard Mountain			
1988	288	3/13 to 5/06	800
1991	2,575	4/13 to 6/21	7,935
1992	1,405	3/25 to 6/15	4,000
1993	1,392	3/28 to 6/18	3,200
1995	1,389	3/21 to 6/17	3,931
1998	1,976	3/12 to 6/19	3,100
2001	736	3/27 to 5/09	2,800
Superior Valley			
1980	2,264	3/22 to 6/09	6,095
1982	1,465	3/13 to 6/01	13,390
1983	1,855	2/12 to 6/11	12,625
1985	1,835	3/17 to 6/01	15,450
1986	1,699	3/09 to 5/19	6,225

GRAZING YEAR	AUM'S CONSUMED	GRAZING PERIOD	AVERAGE NUMBER OF CATTLE & SHEEP
1987	2,887	3/21 to 5/31	7,725
1988	570	3/15 to 5/31	1,350
Cady Mountain			
1993	98	3/01 to 2/28	10 (C)
1994	300	3/01 to 2/28	25
1995	360	3/01 to 2/29	30
1996	393	3/01 to 2/28	33
1997	800	3/01 to 2/28	66
1998	1,372	3/01 to 2/28	114
1999	1,831	3/01 to 2/28	152
2000	1,274	3/01 to 2/28	106
2001	1,374	3/01 to 2/28	114
Cronese Lake			
1995	283	3/01 to 2/29	23
1996	365	3/01 to 2/28	30
1997	365	3/01 to 2/28	30
1998	365	3/01 to 2/28	30
1999	418	3/01 to 2/28	40
2000	419	3/01 to 2/28	40
2001	403	3/01 to 2/28	34
Harper Lake			
1989	69	3/01 to 2/28	50
1990	69	3/01 to 2/28	50
1991	224	5/19 to 2/28	25
1992	72	3/01 to 5/31	25
1993	170	6/01 to 2/28	20
1994	285	3/01 to 2/28	25
1995	242	3/01 to 2/28	21
1996	228	3/01 to 11/30	25
1997	456	3/01 to 2/28	40
1998	571	3/01 to 2/28	50
1999	571	3/01 to 2/28	50
2000	571	3/01 to 2/28	50
2001	571	3/01 to 2/28	50
Ord Mountain			
1990	2,883	3/01 to 2/28	308
1991	2,892	3/01 to 2/28	309
1992	3,285	3/01 to 2/28	345
1993	3,630	3/01 to 2/28	385
1994	3,047	3/01 to 2/28	279
1995	2,706	3/01 to 2/28	259
1996	2,889	3/01 to 2/28	280
1997	1,808	3/01 to 2/28	170
1998	1,875	3/01 to 2/28	182
1999	1,307	3/01 to 2/28	145
2000	2,854	3/01 to 2/28	232

GRAZING YEAR	AUM'S CONSUMED	GRAZING PERIOD	AVERAGE NUMBER OF CATTLE & SHEEP
2001	3,906	3/01 to 2/28	326
Rattlesnake Canyon			
1990	1,037	3/01 to 2/28	96
1991	1,037	3/01 to 2/28	96
1992	1,040	3/01 to 2/29	96
1993	432	3/01 to 2/28	40
1994	1,037	3/01 to 2/28	96
1995	1,037	3/01 to 2/28	96
1996	1,035	3/01 to 2/28	96
1997	1,044	3/01 to 2/28	87
1998	1,044	3/01 to 2/28	87
1999	1,044	3/01 to 2/28	87
2000	1,044	3/01 to 2/28	87
2001	536	3/01 to 2/28	46
Round Mountain			
1992	398	12/01 to 3/31	100
1993	398	12/01 to 3/31	100
1994	454	12/01 to 4/17	100
1995	398	12/01 to 3/31	100
1996	298	12/01 to 3/31	75
1997	605	12/01 to 6/02	100
1998	1,192	12/01 to 7/15	150
Valley Well			
1990	24	3/01 t0 2/28	2
1991	24	3/01 to 2/29	2
1992	24	3/01 to 2/28	2
1993	24	3/01 to 2/28	2
1994	24	3/01 to 2/28	2
1995	24	3/01 to 2/28	2
1996	24	3/01 to 2/28	2
1998	12	3/01 to 8/31	2
2001	6	3/25 to 6/28	2
BLM Ridgecrest Field Office			
Antelope Valley			
1980	278	3/1 to 7/31	4300
1981	278	3/1 to 7/31	4300
1982	519	3/25 to 6/30	3000
1985	74	4/1 to 5/20	820
1991	109	9/11 to 9/21	1500
1992	164	4/20 to 9/1	2400
1998	60	4/15 to 4/26	1400
Bissell			
1983	324	3/20 to 5/20	800
1986	165	3/15 to 4/15	800
1988	453	3/7 to 5/31	800
1991	118	4/13 to 6/15	800

GRAZING YEAR	AUM'S CONSUMED	GRAZING PERIOD	AVERAGE NUMBER OF CATTLE & SHEEP
1992	683	3/30 to 6/1	1650
1993	149	3/25 to 6/3	800
1995	452	3/22 to 6/15	800
1996	7	3/20 to 5/20	800
1998	389	3/18 to 5/30	800
2001	479	4/10 to 5/30	1600
Boron			
1988	603	3/19 to 5/1	1550
Cantil Common			
	Not Available		
Darwin			
	Not Available		
Double Mountain			
	Not Available		
Hansen Common			
1980	354	3/1 to 2/28	38
1981	354	3/1 to 2/28	38
1982	354	3/1 to 2/28	38
1983	45	3/1 to 2/28	35
1984	31	3/1 to 2/28	30
1985	65	3/1 to 2/28	68
1991	77	6/5 to 12/15	50
1992	127	3/1 to 2/28	40
1994	93	4/5 to 10/25	58
1995	100	3/30 to 8/30	79
1996	159	3/2 to 1/15	90
1997	180	3/10 to 10/2	106
1998	53	12/1 to 2/28	72
1999	195	3/1 to 2/28	92
2000	244	3/1 to 9/30	111
2001	195	3/1 to 9/30	111
Lacey-Cactus-McCloud	Not Available		
Lava Mountain			
Monolith-Cantil			
Oak Creek			
Olancha			
Pilot Knob			
Rudnick Common			
Spangler Hills			
Tunawee Common			
Walker Pass Common			
Warren			

O.3 EXISTING BIOLOGICAL OPINION MEASURES

O.3.1 Measures for Cattle Grazing Activities in Desert Tortoise Habitat

1. Utilization of key perennial forage species shall not be exceed 40 percent from February 15 to October 14. No averaging of utilization data among perennial key forage species or key areas shall occur. When utilization approaches authorized limits in any key area, steps shall be taken to redistribute or reduce cattle use for that key area. Monitoring of perennial vegetation such as utilization and trend would occur with methods detailed and prescribed in BLM manuals, handbooks, and plans. Grazing use shall be curtailed to protect perennial plants during severe or prolonged drought. These steps may include removal of cattle or, where feasible, turning off water at troughs (especially when livestock are not present) to reduce adjacent grazing use.

2. Cattle shall be evenly dispersed throughout their area of use, and herding shall be limited to shipping and animal husbandry practices. Grazing use shall be managed according to grazing regulations, allotment management plans, CDCA Plan, and current biological opinions. Grazing use would be managed to improve trends for native perennial and annual plants where site potential permits. Galleta grass shall be a key forage species wherever it is found. Feeding of roughage, such as hay, hay cubes, or grains to supplement forage quantity, is prohibited.

3. All cattle carcasses found within 300 feet of any road shall be removed and disposed of in an appropriate manner, and no prior notification to the BLM is necessary if off-road vehicle use is required, but permission from the authorized officer is required to remove animals within wilderness. The authorization to use temporary, non-renewable perennial forage above permitted use shall be for no longer than three-month increments in non-DWMA desert tortoise habitat.

4. Authorization for ephemeral forage (annual grasses and forbs) in non-DWMA desert tortoise habitat shall occur when 230 pounds or more by air dry weight per acre of ephemeral forage is available. Ephemeral production data shall be collected when necessary if requests are made for ephemeral grazing use. Any cattle authorized to use ephemeral forage shall be removed whenever the threshold~~s~~ for curtailing ephemeral grazing is reached. The authorization to use temporary, non-renewable perennial forage above permitted grazing use shall be authorized for no longer than three-month increments in non-DWMA desert tortoise habitat.

5. All proposed range improvements would receive NEPA and FWS review as needed. For all construction, operation, and maintenance of range improvements involving land disturbance in desert tortoise habitat the following requirements apply:

A. Surface disturbance during construction of range improvements shall occur on previously disturbed sites and disturbing soil in habitat shall be minimized whenever possible. Routine vehicle use shall be limited to existing roads and disturbed areas, and off-road vehicle activity shall be held to a minimum. Construction of new roads shall be minimized. After completion of the project, the disturbed soil shall be blended and contoured into the surrounding soil surface. To reduce attraction of desert tortoise predators, debris and trash created during construction or maintenance of a facility will be removed immediately.
B. Range improvement construction, operation, and maintenance shall be modified as

necessary to avoid direct impacts to desert tortoises and their burrows e.g., construction of fences or pipelines near tortoise burrows shall be avoided. All proposed range improvement projects shall be designed and flagged to avoid impacts to tortoises and their burrows. Pre-construction desert tortoise surveys of project sites shall be conducted by a qualified biologist. Existing access and areas of disturbance shall be utilized when trenching a section of new pipe or during performance of maintenance. Any hazards to desert tortoises that may be created, such as auger holes and trenches, shall be monitored by biological monitor at least twice daily for desert tortoises that become trapped. These hazards will be eliminated before workers leave the site.

C. Prior to land-disturbing activities, a field contact representative (FCR) will be designated to ensure compliance with protective measures stipulations for the desert tortoise and will be responsible for coordinating with the Service. A FCR will have the authority and responsibility to halt activities in violation of the Service stipulations.

D. Only authorized personnel are permitted to handle desert tortoises. If construction or maintenance of a range improvement endangers the life of a desert tortoise then authorized persons may move the animal a short distance away or hold the animal overnight to release it in the same area the next day.

E. All construction and maintenance workers shall strictly limit their activities and vehicles to areas flagged or cleared by persons authorized by the Service. When off-road use with equipment is required, the lessee is to notify the BLM two working days prior to construction or maintenance of a facility.

O.3.2 Measures for Sheep Grazing Activities in Desert Tortoise Habitat

1. Turnout of sheep shall not occur until production of 230 pounds air dry weight (ADW) per acre of ephemeral forage is available. The lessee shall remove sheep from an area of use or the entire allotment if ephemeral forage production falls below 230 pounds ADW per acre.

2. Sites where sheep are bedded and watered shall be changed daily. Bedding or watering sites are to be at least ¼ mile from any previous site. Sheep are to be watered on or adjacent to existing dirt roads (within 25 feet) or existing disturbed or open areas cleared of shrubs from past uses.

3. No grazing is authorized except as approved through grazing application. All herders shall have a copy of the current use authorization in their possession and a copy posted at the herder's camp site. When sheep are trailed outside of the allotment, all herders are required to have a copy of the trailing authorization in their possession.

4. When lambs are with ewes, a band of sheep is limited to no larger than 1,000 adult sheep with an approximately equal number of lambs.

5. Sheep are to be widely scattered or in a loose pattern when grazing through an area, and grazing sheep are to graze/move through an area only once during the grazing season.

6. Stopping and parking of vehicles, and vehicular camping along routes of travel, is limited to within 50 feet of all routes, except in OHV open areas, in multiple-use Class “L” and ”M” as described in the California Desert Conservation Area Plan.

7. A herder’s camp site or camp trailer shall not remain in the same location for more than seven days. Establishment of a camp shall be at least one mile from any previous camp location. To eliminate or reduce scavenging of trash by desert tortoise predators, trash and garbage shall be removed from each camp site each day and no trash or garbage shall be buried at the camp site. All sheep carcasses within 300 feet of a road would be removed and disposed of in an appropriate manner as soon as discovered and/or livestock operator is notified. Cross-country vehicle travel to gather sheep carcass(es) must have prior approval from the BLM except in designated Open Areas for OHV use.

8. Within 15 days of the close of the authorized grazing period, the lessee shall submit to the field office a BLM-supplied map to delineate areas of daily grazing use within the allotment.

Appendices

APPENDIX P

MINERALS

Appendices

APPENDIX P
MINERALS

P.1 IMPORTANCE OF MINERAL DEVELOPMENT TO SOUTHERN CALIFORNIA

Both the current and past history of mining within the California Desert provide ample evidence of its importance as a source of mineral resources that are necessary for the State and national needs along with its contribution to the world market as well. Several factors indicate that this area will play a much more important role than it has in the past in supplying mineral resources for future needs which include: the need to replenish diminishing reserves currently being depleted; the necessity to find nearby sources of low-value mineral resources to supply local industry; a necessity to provide the mineral resources required for an expanding local and national population; the need to identify raw material sources that will satisfy the increasingly stringent specifications which industry demands; and to meet the new demands imposed by technological changes which are rapidly occurring. (Davis, J.F. & Anderson, T.P., 1980, "Mineral Resources of the California Desert-An Overview" in Geology and Mineral Wealth of the California Desert, Sough Coast Geological Society, p. 122-127).

Many of the desert's mineral commodities, such as cement and gypsum, are needed in the local California economy, especially in the greater Los Angeles and southern California area. Boron and rare earth elements produced from the desert are considered "world class" deposits. Other important commodities are zeolites and specialty clays used in sewer filtration systems, chemical refining, ceramics, drill mud, and specialized chemical research.

In recent years, there has been a dramatic increase in gold exploration and production from the desert area. Annual production has accelerated immensely from 5,000 ounces of gold in 1980 to 400,000 ounces by 1990. At 1990 gold prices ($385 per ounce) the gross value of this production is $154 million per year. This compares with a value of $396 million for the state.

Sand and gravel, cement and other mineral commodities used for construction materials are the very foundation of our standard of living. The demand for industrial minerals, particularly sand and gravel, from the California Desert is tremendous because of the needs of over 18 million people in southern California. The metropolitan areas of southern California recently experienced a growth rate estimated at 10 percent and, as the sand and gravel deposits in urban areas are depleted, BLM expects a large increase in demand for the desert's undeveloped resources. During fiscal year 1990 alone, sales contracts and free-use permits for nearly 60 million tons of mineral materials with an estimated royalty value to the U.S. of $29 million were processed by BLM from public lands in the California Desert District. (Free-use permits are granted to nonprofit organizations and certain government agencies without charge.)

The desert's mineral commodities support local industries that employ thousands of people in southern California, generate millions of dollars in wages and taxes, and support other industries, e.g. construction, agriculture, and chemical plants. According to the California Department of Economic Development, in 1989 there were 41,600 persons employed in mining jobs within the state, of which an estimated 20,000+ were in the five county area comprising the CDCA. These figures do not include those jobs that provide support services to the mining industry, nor those jobs which provide support services to employees of the mining industry, or jobs that result from manufacturing or fabrication of product refined from minerals. As with any industry, mining supports an economic base broader than just the individuals that it employs. There are both direct and indirect effects.

In late 1987, Dr. Shirley C. Anderson of California State University, School of Business Administration & Economics, conducted a study ("Mineral Resources of the California Desert and Their Significance to California's Economy" in Compendium, The California Desert Mineral Symposium, 1989, BLM, p. 7-46) to determine the actual economic impact of the then $1.3 billion mineral industry of the CDCA. In her study, Dr. Anderson solicited information from mineral producers. This data was then statistically analyzed by the Regional Science Research Institute of Rhode Island with a computer based input-output model to determine the total economic impacts of mining across 82 sectors of the local economy. Mineral receipts pay for products and services provided to the mining industry. These sales create jobs and the need for other products and services. Wages paid to miners are in turn spent on other goods and services that create additional jobs. Manufactures that use minerals produced from the CDCA provide jobs and need still other products and services from other businesses.

Assuming that the `multiplier' is accurate for 1989, the mining industry operating within the CDCA produced an estimated $1.75 billion worth of mineral commodities contributing to a net benefit of $3.09 billion to the southern California economy. These figures are based upon production values reported by the U.S. Bureau Of Mines. In the last official estimate (1986), the U.S. Bureau of Economic Analysis determined a direct contribution of $5.93 billion from mining to the $533.8 billion Gross State Product for California.

According to the late U.S. Bureau of Mines, California has ranked first in the Nation in the production of non-fuel mineral resources since 1989. In 1986, approximately $1.1 billion of the $2.3 billion California non-fuel mineral commodities came from production within the California Desert. Over 65 mineral commodities are known to occur in the desert, some of which are vitally important in national and international markets. According to the late Bureau of Mines, these include 100 percent of nation's borates, about 97 percent of the domestic rare earth metals, 15 percent of the talc, 10 percent of the gypsum, and 6 percent of the metallic minerals.

California also leads the nation in the production of geothermal energy. Production at Coso benefits the NWC by offsetting the need to produce energy using fossil fuels, thereby decreasing noxious emissions and “greenhouse gases.”

P.2 PUBLIC LANDS MINERAL PROGRAM MANAGEMENT

Federal laws and regulations allow access and development of minerals on public lands managed by the United States. In the planning area, approximately 160 exploration and mining plans of operation are active. Activity under these authorizations is limited to approximately 25 mining operations and one to two significant exploration operations at any one time.

Locatable Minerals: In the CDCA, minerals are disposed from public lands under federal laws, and guided by regulations promulgated pursuant to those laws. In the planning area, most exploration and development activity on public lands, and associated with occupation and use of the surface resources are guided and authorized under the General Mining Law of 1872 (30 U.S.C. 22 et seq). This law allows prospecting and development of valuable mineral deposits through a location/appropriation system. The law allows use of surface resources, qualified by compliance with appropriate Federal and state laws and rules. Regulations developed pursuant to FLPMA and contained in Title 43, Code of Federal Regulations (CFR) Subparts 3802 and 3809, guide the Bureau in managing surface operations under the mining laws for purposes of preventing undue or unnecessary degradation to public land.

Introduction and definitions: Earth-disturbing operations authorized by the Mining Law of 1872 are managed under the "Surface Management" regulations of Title 43, Subpart 3809 of the Code of Federal Regulations (43 CFR 3809). In essence, these regulations distinguish 3 levels or categories of operation. These include:

- (1) *Casual use* operations are those activities having no or negligible effect on public resources, such as mineral-collecting or small-scale placer operations. "Casual use" operations do not require notification to, or approval from the BLM.

- (2) *Notice*-level operations are those surface-disturbing exploration activities, disturbing 5 acres or less, which require prior notification to the BLM, but do not require BLM approval. A Notice is not a federal undertaking for purposes of NEPA review. The liability for compliance with these Acts rests with the party that submits the Notice.

- (3) An approved *Plan of Operations* is required for mining operations and those activities that do not meet the requirements for casual use or notice level operation. The BLM's approval of such Plans is subject to FESA, the Archaeological Protection Act, and other pertinent federal laws. All operators are required to conduct activities to prevent unnecessary or undue degradation to public lands or resources, and must perform reclamation, whatever the size of their operation. A financial guarantee (a reclamation bond) is required for any operation greater than casual use to ensure that reclamation has been completed (43 CFR 3809.500).

The 1980 CDCA plan and subsequent amendments were developed under the surface management regulations effective January 1, 1981. On January 20, 2001 (amended in October 2001), the surface management regulations were amended to improve, clarify, and better organize the regulations. The West Mojave plan is being developed under the amended regulations.

Casual use activities commonly occur on all BLM-administered public lands within the planning area. However, the surface management regulations specify that a prior-approved plan of operations (not merely a Notice) is required for any activity greater than casual use that removes more than 1,000 tons of presumed ore for testing, disturbs over five acres of public lands, or is within any of the following:

- Lands classified as Multiple Use Classes C or L under the CDCA Plan;
- Areas of Critical Environmental Concern;
- Lands known to contain Federally proposed or listed threatened or endangered species or their proposed or designated critical habitat, *unless* BLM allows for other action under a formal land-use plan or endangered species recovery plan;
- National Wilderness Preservation System lands;
- Lands designated "closed" to off-road vehicle use per 43 CFR 8340.0-5; and,
- National Monuments or National Conservation Areas.

All Notices filed with the BLM prior to January 20, 2001, expire on January 20, 2003. Any operator can renew his/her operation at that point, but any renewal must now be subject to the current regulations. This renewal includes a reclamation bond (the BLM did not bond Notices prior to January 20, 2001). The current regulations also state that the BLM may no longer accept Notices in areas identified by USFWS as critical tortoise habitat (43 CFR 3809.11), unless or until a land-use plan specifically allows it. Under part 3809.332, a notice filed after January 20, 2001 remains in effect for 2 years unless extended under part 3809.333.

Currently, several notice-level operations still exist in the Multiple Use Class M portions of the planning area already designated as critical tortoise habitat (such as Fremont-Kramer). After January 2003 these operators must either submit a Plan of Operations for BLM approval to continue operations, or complete and reclaim their operation(s).

Leasable Minerals: Oil and gas, coal, sodium and potassium minerals, phosphate, asphalt, and geothermal resources located on public land were made subject to permit and lease under the Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq) and the Geothermal Steam Act of 1970 (30 U.S.C. 1001 et seq). Exploration and development is guided by approved operating plans under the direction of regulations at 43 CFR 3100 to 3500. Most of the exploration and development of leasable minerals in the CDCA are within dry lake basins for solid leasable minerals, and geothermal development in steam fields in the northwestern China Lake area. BLM field offices review applications for mineral leases and if issuance will not cause unnecessary or undue degradation, recommendations to lease are made to the BLM's California State Office for issuance. A lessee must submit a notice or application to the appropriate field manager prior to conducting operations on the ground. BLM staff analyzes the proposed action and prepares an environmental document as required by NEPA. Approvals consider impacts to endangered species, cultural resources, and other public land resources. Other environmental issues are considered as appropriate. The field manager includes reclamation and mitigation measures in his/her approval of the proposed action.

The Geothermal Steam Act of 1970, as amended, (84 Stat, 1566; 30 U.S.C. 1001-1025) provides the Secretary of the Interior with the authority to lease public lands and other federal lands, for geothermal exploration and development. This authority has been delegated to the Bureau of land Management. Geothermal leases are issued through competitive bidding for federal lands within a Known Geothermal Resource Area (KGRA), or noncompetitively for federal lands outside of a KGRA. Two KGRA areas are identified within the plan boundaries, both of which are in Inyo County - one at Coso, and the other at Randsburg. Energy production from geothermal resources is currently taking place in the Coso area where approximately 240 MW are currently online.

Wilderness or wilderness study areas are withdrawn from leasing. No current leases exist in any wilderness in the planning area. If any public lands were already leased at the time of inclusion, such leases would be accorded valid existing rights, as appropriate. Mineral leases can be issued in lands classified as L, M and I by the CDCA Plans, or for unclassified lands.

Mineral Material Disposals (Sales or Permits for Construction Material): Common mineral materials on public lands, such as sand and gravel, clays, cinders, pumice, and building stone, are disposed of by BLM by contract or permit under the authority of the Materials Act of 1947, as amended (30 U.S.C. 701 et seq). Activities are guided by the regulations at 43 CFR 3600, and include requirements for authorization of exploration and approval of mining plans of operation. Activities are conducted to prevent undue or unnecessary degradation. Contracts or permits can only be issued if the disposal is in the public interest and the net benefits of disposal outweigh the net aggregate damage from activity, as examined through NEPA review and directed by regulation. In the CDCA, about one current operation out of eight is over 10 acres in size. These operations are most likely to occur in habitat areas. Because the value of the deposit is related to proximity to market demand, many areas where these deposits occur have or are being disturbed by other activity (e.g., existing roads, residential or commercial development).

A BLM Field Manager may dispose of mineral materials upon receipt of a written request, or upon his/her own initiative. Sale Contracts, Free Use Permits (to public agencies or non-profit organizations) and Community Pits (for small sales to the general public) are the means by which such disposals are accomplished. A written request includes a mining plan that describes how the material will be removed and how the site will be reclaimed.

After a request is received, BLM staff prepares a NEPA document. All such actions are subject to FESA, the Archaeological Protection Act, and pertinent environmental laws.

Reclamation and bonding may be required as conditions of the contract or permit. Mineral material disposals are discretionary. That is, the field manager has discretion to decide whether a sale or permit serves the public good. All such sales or permits are subject to the pertinent BLM land use plan (43 CFR 3601.11).

No mineral material disposals are allowed in wilderness or wilderness study areas. The CDCA Plan allows disposal of mineral materials from lands outside wilderness area, subject to federal regulations. Disposals may be permitted from ACECs if the ACEC land management plan does not prohibit it.

P.3 PRIVATE LAND OPERATIONS

Private land development, whether stand alone or in conjunction with public land authorizations, are developed through permits issued by the state lead agency, usually the county, as authorized by the Surface Mining and Reclamation Act (SMARA) of 1975 (California Public Resources Code, Chapter 4, Division 2nd, Section 2710). Where combined private and public land operations are proposed, the BLM may coordinate review of the operation with the state lead agency under an existing 1992 Memorandum of Understanding (MOU), or by a site specific MOU or agreement. Under SMARA the threshold for filing a Reclamation Plan (for operations on federal lands) or a Site Approval (for private land) is 1,000 cubic yards of removal or disturbance over one acre. In most cases the county is the lead agency. However, if the activity is within city limits, the city becomes the lead agency.

P.4 COOLGARDIE MESA MINING CLUBS

Members of at least four recreational prospecting and mining clubs frequent the area, with most activity conducted on weekends in the late spring and fall when the weather is not overly hot and the soil is fairly dry. The larger clubs may have a membership of 400 families. On an average day during the dry-washing season the number of club members at the site may vary from three to thirty persons. Activity includes the use of both battery and gasoline-powered dry washers. Air from a bellows powered by a hand crank or small motor blows the lighter material up, leaving gold trapped on the board's ridges. Occasionally, someone will recirculate water in a large tub for operating a wet sluice operation.

Club members refer to themselves as "small-scale miners" and seek an escape from the city to a desert environment where they can pursue their hobby of gold prospecting and recovery. The activity brings with it the opportunity to make a little money, sometimes more than a little. The recovered gold varies from "dust" or "colors" to nuggets generally up to the size of a match-head. It has been reported that the small-scale miners find up to a quarter of an ounce of gold per day. Recovery is believed to be about 50 percent, which explains why there is still some gold left after over a hundred years of activity. Most of these individuals are operating under casual use and may continue to do so as long as they reclaim their hand-dug pits and the cumulative disturbance does not cause more than "negligible" disturbance. Club members police themselves so as to not to cause unnecessary or undue degradation. One person lives at the site in a trailer and is operating under a plan of operations. Another operator at Williams Well, to the northeast and outside of the proposed conservation area, uses a backhoe and is also under a plan of operations.

Appendices

APPENDIX Q

UTILITIES:
EXISTING BIOLOGICAL OPINIONS

Appendices

UTILITIES: EXISTING BIOLOGICAL OPINIONS

Q.1 PIPELINES

U.S. Fish and Wildlife Service. 1995. Biological opinion for ***on-going maintenance*** *activities on Four Corners Pipeline Company's* ***crude oil pipelines*** *in California (2880/6840 CA-060.27 (CA-932)) (1-8-94-F-27). Memorandum from Acting Field Supervisor, Ecological Services - Ventura Field Office, Ventura, CA to State Director, Bureau of Land Management, Sacramento, CA.*

Incidental Take: (a) Two (2) desert tortoises per year in the form of direct mortality or injury through accidental death or injury during pipeline **maintenance** and **repair** activities, including use of access roads.

Terms and Conditions:

- *Class I - Regular operation and maintenance with no habitat disturbance.* (a) Reporting foreseeable projects at beginning of each year. (b) Education program. (c) Use only existing rights of travel. (d) Speed limit of 10 mph. (e) Check under vehicles. (f) Litter free work place. (g) No firearms. (h) Remove equipment at end of activity. (i) Alert supervisor and/or biologist to any tortoise sign; personnel not to handle tortoises.

- *Class II - Activities resulting in minimal surface disturbance.* (a) Designate Field Contact Representative. (b) Confine activities to ROW. (c) Survey areas for tortoises ahead of maintenance activities. (d) Hire biologist if take is possible. (e) Maintain biologist with each maintenance crew where tortoises may be affected; biologist maintains records; follows protocols. (f) Expanded work areas need pre-activity surveys. (g) Personnel report all tortoise sightings to biologist. (h) Avoid tortoise entrapment in pits and other excavations. (i) Cap pipes to prevent tortoise entry. (j) Report dead or injured tortoises. (k) Complete restoration to □...assist in the re-establishment of original native plant communities within the disturbed ROW.□ (l) Avoid creating new raven nesting sites; secure salvage permits if nest found.

- *Class III - Activities that result in major surface disturbance.* (a) Prior authorization before expanding the ROW. (b) Reporting.

- *Class IV - Activities that extend outside existing ROWS.* (a) Require independent review by BLM; new construction beyond scope of BO. (b) Measures for emergency spills, including reporting. (c) BLM suspends ROW permit if terms and conditions not implemented.

U.S. Fish and Wildlife Service. 1993. Biological opinion for the ***construction*** *and* ***maintenance*** *of an underground **crude oil pipeline** extending from the Western Mojave Desert to the Los Angeles basin, San Bernardino and Los Angeles counties, California (6840/2880 CDD-00-F-93-6 (CA-060.27)) (1-8-93-F-9). Memorandum from Field Supervisor, Ecological Services - Ventura Field Office, Ventura, CA to State Director, Bureau of Land Management, Sacramento, CA.*

Incidental Take: (a) Eight (8) desert tortoises in the form of direct mortality or injury through accidental death or injury during pipeline **maintenance** and **repair** activities, including use of access roads. (b) An unknown number of desert tortoises in the form of harassment through the excavation of active burrows or the moving of desert tortoises out of harm□s way during **construction** activities. (c) Two (2) desert tortoises per year in the form of direct mortality or injury through accidental death or injury during pipeline **maintenance** activities, including use of access roads. (d) Four (4) desert tortoises per year in the form of harassment through the excavation of active burrows or the moving of desert tortoises out of harm□s way during **maintenance** activities.

Terms and Conditions: (a) Provide authorized biologist; authority to halt activities. (b) Maintain litter free workplace. (c) No firearms. (c) Check under vehicles for tortoises. (d) Pre-activity surveys within 48 hours; unavoidable burrows excavated and tortoises moved out of harm□s way. (e) 50-foot buffer from tortoise burrows outside the ROW; erect temporary tortoise-proof fence, removed at the end of the activity. (f) Education program. (g) Stake boundaries and restrict activities to that area. (h) Minimize unauthorized personnel by using fences or gates. (i) Clear minimum ROW width possible. (j) Stockpile soils and brush for revegetation; salvage spoil materials separately. (j) Biological guidance on handling tortoises. (k) Proper disposal of dead or injured tortoises. (l) Insofar as possible, restrict construction and maintenance activities to between October 15 and February 28. (m) Speed limit of 20 mph. (n) Avoid entrapping tortoises in excavations. (o) Revegetate all disturbed desert tortoise habitat to pre-disturbance conditions, implementing site-specific revegetation plans approved by the USFWS, BLM, and CDFG. Subject to the owners approval, a site-specific revegetation plan shall also be used on private lands. (p) Guidelines for seeding; only native species used. (q) Biologist present during revegetation activities. (r) Reporting.

*U.S. Fish and Wildlife Service. 1993. Biological opinion for the **maintenance** of a right-of-way for an underground **gas transmission pipeline** in the Eastern Mojave Desert, San Bernardino County, California (6840/2880 CDD-00-F-93-02 (CA-060.27)) (1-8-93-F-9). Memorandum from Field Supervisor, Ecological Services - Ventura Field Office, Ventura, CA to State Director, Bureau of Land Management, Sacramento, CA.*

Incidental Take: (a) One (1) desert tortoise in the form of direct mortality or injury through accidental death or injury during line **maintenance** activities, including use of access roads. (b) An unknown number of desert tortoises in the form of harassment through the excavation of active burrows or the moving of desert tortoises out of the project area.

Terms and Conditions: (a) Biologists performs pre-activity survey; present during all ground disturbing activities. (b) Place water bars so as to avoid impacts to tortoises. (c) Guidance for handling tortoises. (d) Speed limit of 20 mph, and restrict travel to existing roads. (e) Litter free workplace. (f) No surface disturbance outside ROW; storage and parking restricted to ROW. (g) Fill for washouts obtained from appropriate offsite location. (h) Education program. (i) Check under vehicle. (j) No firearms or pets. (k) Procedures for reporting tortoise mortality. (l) Biologist maintains records of tortoises; authority to halt activities; close-out report. (m) BLM revoke Southern California Gas Company□s ROW permit if terms and conditions not being implemented.

*U.S. Fish and Wildlife Service. 1992. Biological opinion for the **maintenance** of an **underground gas transmission pipeline** in the Eastern Mojave Desert, San Bernardino County, California (6840/2880 CDD-00-F-93-01 (CA-060.27)) (1-8-93-F-6). Memorandum from Acting Field Supervisor, Ecological Services - Ventura Field Office, Ventura, CA to State Director, Bureau of Land Management, Sacramento, CA.*

Incidental Take: (a) Two (2) desert tortoises per year in the form of direct mortality or injury through accidental death or injury during line **maintenance** activities on all three segments, including use of access roads. (b) Four (4) desert tortoises in the form of harassment through the excavation of active burrows or the moving of desert tortoises out of the project area.

Terms and Conditions: During pipeline maintenance the following measures shall be implemented to minimize disturbance to native habitats and the desert tortoise: (a) Flag and stay with ROW. (b) Stockpile in disturbed areas. (c) Erect temporary fencing or gates to minimize unauthorized use. (d) Vehicle travel restricted to existing routes. (e) Litter free workplace. (f) Speed limit of 20 mph. (g) Avoid entrapment. (h) No firearms. (i) No pets. (j) Check under vehicles. (k) Report sightings to biologist. (l) Pre-activity surveys; biologist present at all times take may occur; maintain records; personnel do not handle tortoises; minimum of one biologist per maintenance activity; handling guidelines; authority to halt project. (m) Education program. (n) Off-site compensation for lost habitat. (o) Post project assessment.

*U.S. Fish and Wildlife Service. 1991. Biological opinion for the **repair** of a **natural gas pipeline**, Edwards Air Force Base, California (XAE) (1-6-91-F-26). Memorandum from Field Supervisor, Southern California Field Station, Laguna Niguel, CA to Gregory Spencer, P.E., Ames Research Center, Dryden Flight Research Facility, Edwards, CA.*

Incidental Take: (a) One (1) desert tortoise in the form of direct mortality through accidental death during **construction**. (b) Ten (10) desert tortoises in the form of harassment through the excavation of burrows occupied by desert tortoises and the removal of desert tortoises found above ground in the project area during **construction** activities. (c) Approximately 1.5 acres of desert tortoise habitat will be permanently or temporarily disturbed.

Terms and Conditions: (a) Authorized biologists can handle tortoises only. (b) Preconstruction and construction activities monitored. (c) Avoid entrapment. (d) 10 mph speed limit. (e) Stake boundary, restrict impacts to ROW. (f) Education program. (g) Construction restricted to between October and February. (h) Litter free workplace. (i) Escape ramps in trenches every 150 meters apart. (j) Revegetate pipeline ROW. (k) Preconstruction surveys. (l) Guidance for burrow avoidance and excavation, and tortoise handling. (m) No construction between dusk and dawn in native vegetation.

Q.2 ELECTRICAL TRANSMISSION LINES

*U.S. Fish and Wildlife Service. 1994. Biological opinion for **minor electrical utility actions** in Imperial, Kern, Los Angeles, Riverside, and San Bernardino counties, California (6840 CA-063.50) (1-8-94-F-53). Memorandum from Acting Field Supervisor, Ecological Services - Ventura Field Office, Ventura, CA to State Director, Bureau of Land Management, Sacramento, CA.*

Incidental Take: (a) Two (2) desert tortoises per year in the form of direct mortality or injury resulting from **maintenance** and **construction** activities. (b) Twenty (20) desert tortoise per year in the form of harassment through moving desert tortoises from harm□s way during **construction** and **maintenance** activities.

Terms and Conditions: (a) Designate FCR. (b) Education program. (c) Authorized biologists handle tortoises, only. (d) Survey and monitor all construction activities. (e) Guidance for handling tortoises, marking them, and recording data. (f) Stockpile in existing disturbed areas. (g) Existing routes of travel. (h) Check under vehicles. (i) No firearms or pets. (j) Litter free workplace. (k) Salvage permits for removing raven nests. (l) Annual reporting. (m) Habitat disturbance is limited to no more than five acres per year.

*U.S. Fish and Wildlife Service. 1991. Biological opinion for the proposed Meade/McCullough-Victorville/Adelanto **transmission line** (CA-932.5) (1-6-90-F-46). Memorandum from Field Supervisor, Southern California Field Station, Laguna Niguel, CA to State Director, Bureau of Land Management, Sacramento, CA.*

Incidental Take: (a) Five (5) tortoises in the form of direct mortality through accidental death during **construction**. (b) One hundred (100) tortoises in the form of harassment through the excavation of active burrows or through the removal of tortoises found above ground in the **construction** area during construction activities [Note: This 100-animal harassment level was exceeded, and the BO amended to allow for more animals to be handled.]. (c) Approximately 1,100 acres of habitat. (d) Five (5) tortoises in the form of direct mortality through accidental death by crushing during **routine inspection** and **emergency situations** for the life of the project.

Terms and Conditions: (a) Suspend ROW grant if terms and conditions not followed. (b) Designate FCR. (c) Biological monitoring; avoid entrapment. (d) No permanent widening or upgrading of existing access roads will be undertaken in areas of biological concern. (e) New access roads follow landform contours. (f) Close all access roads not needed for maintenance.

(g) Place towers to minimize ground disturbance. (h) Education program. (i) Preconstruction surveys; handling guidelines; tortoise relocation and burrow excavation; personnel report sightings. (j) Park in previously disturbed areas. (k) Existing routes. (l) Blade only where necessary. (m) Litter free workplace. (n) No firearms. (o) 25 mph speed limit. (p) Close-out report. (q) 1,603 acres in California (Category I or II habitats) and 274 acres in Nevada. (r) Construct tortoise-proof fence around substation. (s) Pay $63,224.40 in compensation funds to Clark County, prior to initiating construction.

Fish and Wildlife Service. 1991. Biological opinion for the proposed Kramer-Victor 220 kV ***transmission line*** *project by Southern California Edison, San Bernardino County, California (CART 310 2800 (CA-068.23)) (1-6-91-F-8). Memorandum from Field Supervisor, Southern California Field Station, Laguna Niguel, CA to State Director, Bureau of Land Management, Sacramento, CA.*

Incidental Take: (a) One (1) tortoise in the form of direct mortality through accidental death during **construction** of the transmission line. (b) Ten (10) tortoises in the form of harassment through the excavation of active burrows or through the removal of tortoises found above ground within the right-of-way during **construction** activities for the transmission line. (c) Five (5) tortoises in the form of direct mortality through collisions with vehicles during routine **maintenance** activities for the life of the project (30 years). (d) Approximately 111 acres of habitat (107 acres of temporary impact and 4 acres permanent).

Terms and Conditions: (a) Suspension of permit if conditions not implemented. (b) Biological preconstruction surveys and monitoring. (c) No tower placement or permanent widening of existing access roads in areas with biological concerns. (d) Follow landform contours for new access roads. (e) Minimize impacts. (f) Education program. (g) Designate FCR. (h) Handling and excavation guidelines. (i) Park in previously disturbed areas. (j) Flag designated areas, restrict activities to flagged areas. (k) Construct routes of travel without blading to promote resprouting of native shrubs. (l) 25 mph speed limit. (m) Monitoring plan to evaluate raven use along Highway 395. (n) Close-out report. (o) Compensation for 107 acres temporary and 4 acres permanent impacts. (p) Develop road closure plan. (q) No firearms or dogs.

Q.3 FIBER OPTIC CABLES

U.S. Fish and Wildlife Service. 1993. Biological opinion for an American Telephone and Telegraph Victorville to Bakersfield ***fiber optic cable line*** *(1-8-93-F-12). Memorandum from Field Supervisor, Ecological Services - Ventura Field Office, Ventura, CA to State Director, Bureau of Land Management, Sacramento, CA.*

Incidental Take: (a) Four desert tortoises in the form of direct mortality resulting from project **construction**, **operation**, and **maintenance**.

Terms and Conditions: (a) Stockpile in disturbed areas. (b) Confine impact to smallest practical area, flag boundaries, restrict activities. (c) Existing routes of travel. (d) Litter free workplace. (e) Avoid post-construction erosion. (f) No domestic dogs, unless restrained. (g) Stabilize soils. (h) No firearms. (i) Escape ramps in trenches at intervals of no more than a quarter mile. (j) Education program. (k) Minimize blading to promote resprouting; revegetate all impact areas off of roads. (l) Designate FCR. (m) Authorize handling only. (n) Monitors with each construction crew; maintain records. (o) Remove flagging and other markers upon completion. (p) Post-construction report. (q) On-site inspection by regulatory agencies, if requested by the USFWS. (r) Preconstruction surveys; avoid burrows; handling guidelines; records and data. (s) Check under vehicles. (t) Acquire compensation lands (281.4 acres) in BLM Category I Habitat.

U.S. Fish and Wildlife Service. 1991. Biological opinion for the proposed Contel ***fiber optics line*** *from Bishop to Inyokern, California (6840 (CA-063.50)) (1-6-91-F-13). Memorandum from Field Supervisor, Southern California Field Station, Laguna Niguel, CA to State Director, Bureau of Land Management, Sacramento, CA.*

Incidental Take: (a) One (1) desert tortoise in the form of direct mortality through accidental death during **installation** of the fiber optic cable. (b) Five (5) desert tortoises in the form of harassment through the removal of desert tortoises found above ground within the right-of-way during **installation** activities for the fiber optic cable. (c) One (1) desert tortoise in the form of excavation of its burrow in the event it cannot be avoided during **construction**. (d) One (1) desert tortoise in the form of direct mortality through collision with a vehicle during routine **maintenance** activities for the life of the project. (e) Approximately 16 acres of habitat lost.

Terms and Conditions: (a) BLM suspends ROW permit if terms and conditions not followed. (b) Construction monitored by biologist. (c) Confine vehicles and equipment to previously disturbed areas. (d) Bury cable in center of unpaved roads and along bare shoulders of paved roads. (e) Will be patrolled periodically to repair eroded areas. (f) Preconstruction surveys. (g) Education program. (h) Designate FCR. (i) Avoid entrapment. (j) Tortoise handling guidelines; burrow excavation. (k) Park in disturbed areas. (l) Existing routes of travel. (m) Litter free workplace. (n) 20 mph speed limit. (o) Avoid tortoises and burrows during maintenance; surveys prior to maintenance and repair activities by biologist. (o) Close-out report.

APPENDIX R

MOTORIZED VEHICLE ACCESS ROUTE DESIGNATION

Appendices

APPENDIX R
MOTORIZED VEHICLE ACCESS
ROUTE DESIGNATION

R.1 DATA MANAGEMENT

In order to establish a record of each recommendation that was reached during the off road vehicle designation process, a system to track the process was developed. This system employed several steps, which are listed below:

- Each route was tracked by assigning to it a specific alphanumeric code. This code employed a standardized numbering convention that included one or two letters followed by 4 digits. The letters would represent the first letter of the sub region (e.g. Middle Knob = MK, Superior = S). The four digits that followed were broken down into the first digit represent the MAZ in which the route either began or ended, followed by next three digits that actually represented the route number in that MAZ.

- As each route was evaluated for designation, an electronic record with a number of variables specific to that route was established (See Appendix fff for a copy of the record form). The variables included information such as the following:

    - UTM coordinates indicating the approximate location of the rout
    - The Decision Tree code denoting recommended designation, which as mentioned above would indicate the “leg” or “branch” of the Decision Tree which was followed in arriving at the decision.
    - A short note on the reason(s) for the final decision
    - The final recommendation of open or closed
    - The date
    - The persons responsible for the final recommendation

- These electronic records were entered utilizing ACCESS software, which established a database (See Appendix fff for the database) that allowed the recommended designations to be collectively integrated or joined with the existing route inventory GIS database. This “joining” of the two databases then allowed for the production of maps that integrated the recommended decisions with the route inventory.

R.2 OFF ROAD VEHICLE DESIGNATION SUBREGIONS

One of the first steps in the off road vehicle designation process for the West Mojave was the identification of 20 “subregions” (see also Tables 2-20 and 2-21), which were geographic subdivisions of lands outside of wilderness areas, open areas and ACECs. With the exception of certain BLM Class M lands in Inyo County and in and around the Cady Mountains, and scattered parcels elsewhere, all public lands for which route designations have been recommended are within one of the subregions. The subregions, therefore, constitute the “building block” of the motorized vehicle access network. The following discussion provides a general overview of each subregion, and describes the recreational values present in each.

R.2.1 Bighorn Subregion

General description: The Bighorn subregion consists of public and private lands found to the southwest of State Highway 247 as it makes a wide arc roughly between its intersection with Camp Rock Road and the community of Yucca Valley, California. The subregion is composed mainly of BLM-managed public lands, with private lands and the San Bernardino National Forest to the west, and primarily private lands to the south. The Bighorn Mountains Wilderness is located within and to the west of the subregion.

The rugged Bighorn Mountains are the eastern foothills of the San Bernardino Mountains. Visitors can experience the rare ecological transition that occurs here, going from yucca and Joshua trees on the desert floor to stands of Jeffrey pine at higher elevations. Mule deer, mountain lions, bobcats, and golden eagles are prominent wildlife of the area. Resident and migratory birds rest along Rattlesnake Canyon Creek, which flows through the wilderness and northward to Johnson Valley. Elevations within the Bighorn subregion range from 3,100 to 6,600 feet.

Recreation Activities/Resource Uses Overview: Primary recreation activities and resource uses occurring in the subregion are cattle grazing, powerline and pipeline rights-of-way, communication sites, wildlife habitat, mining and recreational mining, hunting, and off-highway vehicle use restricted to open routes of travel. The area is a popular destination for National Forest-related recreation to the west, and has been an historical off-highway vehicle destination on the south side.

The designated routes provide for vehicle access to the following subregion features: Rattlesnake Canyon and the San Bernardino National Forest, to the south and east. In addition, the designated routes provide for access to the boundary of the Bighorn Mountains wilderness. Vehicles are not permitted in wilderness, but hiking, camping, and horseback riding are encouraged.

R.2.2 Coyote Subregion

General Description: The Coyote subregion, located approximately 20 miles northeast of Barstow, California, is defined by the Fort Irwin Military Reservation (National Training Center) on the north, Interstate-15 on the south, the Calico Mountains on the southwest, and the Soda Mountains Wilderness Study Area (WSA) on the east. The extensions of this subregion consist primarily of public lands on either side of the Soda Mountains WSA.

Coyote Dry Lake, Alvord Mountain, and a portion of the Calico Mountains are found within the subregion. Elevations range from 1,700 to 3,600 feet.

The Calico Early Man Site is found at the south end of the subregion. This National Register Property was designated as an ACEC by the 1980 CDCA Plan. A management plan was prepared in 1984. The plan designated a network of vehicle access routes, a network designed to protect the evidence of ancient human occupation. This ACEC is located within the Superior-Cronese tortoise DWMA

Recreation Activities/Resource Uses Overview: Primary recreation activities and resource uses occurring in the area are powerline and pipeline rights-of-way, wildlife habitat, cattle grazing, recreational mining, rockhounding, hiking, upland gamebird hunting, and off-highway vehicle use restricted to open routes of travel. The recommended route network provides vehicle access for all of these, as well as for access to each block of non-federal land within the area.

R.2.3 East Sierra Subregion

General Description: The East Sierra subregion, located approximately 10 miles west of Ridgecrest, is defined by Highway 14 on the east; Highway 178 on the south; the Bakersfield BLM Field Office and Sequoia National Forest boundaries on the west; and the Class L and Class M boundary in the Coso Junction and Rose Valley area on the north. The Owens Peak and Sacatar Trail wilderness areas (49,009 and 33,132 acres) are located within this sub-region.

All or parts of three ACECs are found within the East Sierra subregion: Fossil Falls, Sand Canyon and Last Chance Canyon. Route designation for Fossil Falls and Sand Canyon was designated by their management plans and is not changed by the West Mojave Plan. For the Last Chance Canyon ACEC, Alternative A would adopt the 1985-87 route designations, except for the east access to Mesa Springs, which was recommended for closure by the 1982 ACEC management plan. This network would be effective on an interim basis, until the completion of a collaborative and community-based program to develop a revised motorized vehicle access network for the El Paso Mountains, including all of the Last Chance Canyon ACEC outside wilderness. Participants in this effort would include the City of Ridgecrest, Kern County, BLM and interested stakeholders. When completed, the revised network for the El Paso Mountains would be incorporated into the CDCA and West Mojave Plans through an amendment.

The region consists primarily of the eastern face of the southern Sierra Nevada. Elevations range from 2,400 feet along Highway 14 to 8,453 feet above sea level on top of Owens Peak. The mountainous terrain has deep, winding, open and expansive canyons, many of which contain springs with extensive riparian vegetation. This area is a transition zone between the Great Basin, Mojave Desert and Sierra Nevada ecoregions. Vegetation varies considerably with a creosote bush scrub and Joshua tree woodland community on the bajadas, and cottonwood and willow riparian vegetation in the canyons at lower elevations. Above 5,000 feet, the canyons and ridges are dominated by pinyon-juniper woodland with sagebrush and grey pine.

Recreation Activities/Resource Uses Overview: Primary recreation activities and resource uses occurring in the area are: domestic sheep and cattle grazing, mineral exploration, utility and aqueduct corridor maintenance, communication site maintenance, recreational vehicle touring/sightseeing, dispersed hiking and camping, rock climbing, upland gamebird and deer hunting, bird watching, wildflower viewing, rock hounding, mountain biking and equestrian use. Much of this sub-region is designated as wilderness.

Biological values of special concern include habitat for desert tortoises, bats, Mohave ground squirrels, special status plants, and raptors (both nesting and foraging areas). The area has a number of special habitats (extensive riparian corridors and desert washes and springs). Cultural resources are significant in the area, especially in the canyon bottoms.

The proposed route designations provide for vehicle access to the following features: Owens Peak Wilderness, Sacatar Trail Wilderness, Short Canyon, Sand Canyon, Ninemile Canyon, the LADWP Aqueduct, No Name Canyon, and Indian Wells Canyon. They also provide for vehicle access to dispersed camping throughout the Eastern Sierra. The designations provide access to hiking trailhead opportunities along the boundary of the Owens Peak and Sacatar Trail Wildernesses, Short Canyon, Sand Canyon and No Name Canyon. The designations provide access to staging areas for mountain bike and equestrian recreation throughout the subregion.

The proposed designations provide for vehicle access to and through the subregion's prime chukar, Gambel's quail, and deer hunting areas. Vehicle access to popular rock hounding sites and historic Depression-Era mining sites in Indian Wells Canyon are provided. Also, vehicle access for livestock operations is provided.

The proposed designations provide for vehicle access to every known active mineral exploration area, and provide access along each authorized utility and aqueduct corridor within the area. Vehicle access to all authorized communication sites are also provided for.

R.2.4 El Mirage Subregion

General Description: The El Mirage subregion, located northwest of the community of Adelanto and due north of BLM's El Mirage Off-Highway Vehicle Area is defined by Edwards Air Force Base to the north and west, State Highway 395 to the east, and the El Mirage Off-Highway Vehicle Area immediately to the south. The western boundary is not well defined, consisting of private and Federal lands. The subregion is located in both Los Angeles and San Bernardino Counties.

The Shadow Mountains, in the southwestern corner, trend northwest-to-southeasterly, and have a maximum elevation of 3,996 feet. The greater area is characterized by bajadas, dry lakebeds, washes, rugged hills, and desert mountains. Vegetation consists of three basic types, creosote bush scrub, saltbush scrub and alkali sink scrub, all of which are typical of the western Mojave Desert. Creosote bush scrub is by far the dominant vegetative type.

Recreation Activities/Resource Uses Overview: Primary recreation activities and resource uses occurring in the area are powerline and pipeline rights-of-way, rockhounding, cattle grazing, recreational mining, upland gamebird hunting, hiking and camping, wildlife habitat, and off-highway vehicle use restricted to open routes of travel.

Particular designated routes provide access to various blocks of non-federal land within the area.

R.2.5 El Paso Subregion

General Description: The El Paso subregion, located approximately 10 miles southwest of Ridgecrest, is defined by the El Paso Mountains wilderness area and “old” U. S. 395 to Inyokern on the north, U.S. Highway 395 on the east, the Garlock Road and Red Rock Canyon State Park on the south, and Highway 14 on the west. The subregion is 83,474 acres in size, with 92% federal land (76,998 acres) managed by the BLM and 8% private and state land (6,475 acres). Numerous landowners own the private lands. The El Paso Mountains wilderness is surrounded by this subregion on three sides.

The region consists of prominent volcanic peaks (El Paso Mountains), broad valleys, rolling foothills, badlands, sloping bajadas, braided washes, and narrow canyons. Elevations range from 2,000 feet on the southern boundary to 5,244 feet above sea level on top of Black Mountain. Creosote bush scrub and saltbush acrub are the predominant plant communities in the lowlands, with numerous desert washes, remnant stands of native perennial bunchgrasses on the mountain tops, scattered Joshua tree woodland, and small riparian plant communities at a few of the widely spaced springs.

The El Paso Mountains contain three West Mojave endemic plants: Red Rock poppy, Red Rock tarplant and Charlotte’s phacelia. They are well known as a raptor nesting area and support abundant populations of upland game birds.

Recreation Activities/Resource Uses Overview: Primary resource uses occurring in this subregion are: domestic sheep grazing, mineral exploration, utility corridor maintenance, communication site maintenance, and various recreational activities. The BLM’s CDCA Plan identified four sites within the subregion with excellent potential for interpretation and education: Burro Schmidt’s Tunnel; the El Paso Mountains; the Garlock Fault; and the Goler Grabben.

In particular, the El Paso Mountains are heavily used for a variety of recreational activities. The area contains excellent opportunities for upland game bird hunting (chukar and Gambel's quail) and rock and mineral collecting. Other activities include recreational vehicle touring/sightseeing, dispersed hiking and camping, mountain biking, and equestrian recreation. The subregion is also used for commercial 4-wheel drive and dual sport motorcycle tours and competitive equestrian endurance rides.

R.2.6 Fremont Subregion

General Description: The Fremont subregion is located approximately 30 miles northwest of Barstow, California. U.S. Highway 395 provides access to the Fremont subregion from the west, and State Highway 58 from the south. Several public roads are located within the subregion including Harper Lake Road, Santa Fe Avenue, and Lockhart Road. The Grass Valley Wilderness and the Red Mountain subregion (within BLM's Ridgecrest Resource Area) bound the subregion to the north, State Highway 58 to the south, the Black Mountain Wilderness and Superior subregion to the east, and U.S. Highway 395 to the west. The Fremont subregion encompasses a total of approximately 222,750 acres, which includes 52% (116,274 acres) Federal land managed by the BLM, and 47% (105,494 acres) private and State land.

The southern portion of the Fremont subregion includes Water Valley, a relatively large, open and flat area with scattered low rolling hills. This area also includes about half of Harper Dry Lake, which is the lowest point of the subregion at 2,018 feet. A portion of Harper Lake is within a BLM Area of Critical Environmental Concern (ACEC), in support of the birds and wildlife in that area. Vegetation in the Water Valley consists mainly of creosote bush scrub and saltbush scrub, and some scattered Joshua trees. A large number of unimproved roads cross the valley along with public infrastructure facilities that include high voltage transmission lines, wood pole power lines, and telephone lines. In addition, the valley includes intermixed grazing and ranching lands with associated fences and structures.

The northwest portion of the subregion includes primarily flat terrain, undulating slightly with some prominent rocky buttes. Vegetation is limited to creosote bush scrub, typical of that found throughout the Western Mojave. U.S. Highway 395 bounds this area to the west, and Fremont Peak to the east. Fremont Peak is located within the northern portion of the subregion, and rises abruptly to 4,584 feet above the flat valley surrounding it. The creosote bush scrub community in this area is limited to the bajada and foothills, extending only about one-third of the way to the top of Fremont Peak. The higher elevations of Fremont Peak are rocky hillsides with widely scattered plants of the Mojave mixed woody scrub community. Old mines and OHV tracks are located throughout the Fremont Peak area.

East of Fremont Peak, the northern portion of the subregion includes the Gravel Hills. This topographically varied area consists of low rolling mountains with vegetation limited to typical low desert shrubs found throughout the West Mojave. The far northeast portion of the subregion borders the Black Mountain Wilderness Area, and includes a portion of the Black Mountain ACEC, established for the protection of sensitive cultural resources. The foothills surrounding Black Mountain provide varying topography and areas of sharp relief.

The Barstow woolly sunflower ACEC is located within the Fremont subregion. This ACEC protects a rare West Mojave endemic plant which is found on shallow soils throughout the subregion.

Recreation Activities/Resource Uses Overview: Primary resource uses occurring in the subregion include cattle grazing, power line and pipeline rights-of-way, wildlife habitat, mining and recreational mining, hunting, and off-highway vehicle use restricted to open routes of travel.

The Fremont subregion includes all or portions of four grazing allotments. These include the following:

- Gravel Hills Allotment (ephemeral designation)
- Harper Dry Lake Allotment (ephemeral/perennial designation)
- Superior Valley Allotment (ephemeral designation)
- Monolith Cantil Allotment (ephemeral designation)

Mineral resources in the subregion include leaseable economic mineral resources (energy, geothermal, oil and gas), primarily at the southeast portion. Small areas in the northern portion of the subregion have the potential for locatable energy and other strategic mineral resources.

Limited areas of known high and very high cultural resource sensitivity occur within the western portion of the subregion. These mostly represent the remains of mining activity and historic travel. The prehistoric remains include a wide range of site types. Areas within the eastern portion of the subregion include known locations of high and very high cultural resource sensitivity/significance, located primarily within the Black Mountain ACEC (established for the protection of prehistoric and Native American resources). The extremely high diversity of site types in this area range from complex to simple, as well as a number of sites listed within a National Register District. Many of the sensitive resources in this area represent historic activities, mostly mining and travel. The prehistoric resources represent habitation, extractive activities, and lakeside adaptations.

The suggested vehicle route network provides recreational OHV enthusiasts access to popular OHV areas at Cuddeback Lake and the Fremont Valley, and also maintains a substantial portion of the dual-sport network that runs throughout the subregion. The suggested routes also provide motorized access for rockhounding, recreational mining, equestrian recreation, recreational vehicle touring/sightseeing, and game bird hunting.

R.2.7 Granite Subregion

General Description: The Granite subregion, is defined by State Highway 247 on the east, the Stoddard Valley Off-Highway Vehicle Area on the north, private lands on the west, and private lands on the south. The Granite Mountains, Sidewinder Mountain, North Lucerne Valley, and Stoddard Ridge are all found within this subregion. Elevations range from 3,000 feet to 4,900 feet.

Recreation Activities/Resource Uses Overview: Primary recreation activities and resource uses occurring in the area are cattle and sheep grazing, powerline and pipeline rights-of-way, rockhounding, communication sites, hiking, camping, wildlife habitat, mining and recreational mining, hunting, and off-highway vehicle use restricted to open routes of travel.

Some designated routes provide access to many blocks of non-federal land within the area.

R.2.8 Juniper Subregion

General Description: The Juniper subregion, located east of Hesperia and south of Apple Valley, is defined by a large block of BLM-managed public lands with the San Bernardino National Forest on the south and private lands on the east, west, and the north. Juniper Flats is a diverse landscape of mountains, canyons, impressive boulder fields and washes. Elevations range from 3,000 feet to 6,000 feet.

Within the subregion is an ACEC for the Juniper Flats Cultural Area. The ACEC contains springs and riparian habitat in a dense stand of junipers and was an important Native American habitation and special use site.

The Willow fire in 2000 burned over the entire region, leading to a temporary closure of the ACEC until vegetative recovery had begun. This closure has expired.

Recreation Activities/Resource Uses Overview: Primary recreation activities and resource uses occurring in the area are cattle grazing, powerline and pipeline rights-of-way, equestrian riding, wildlife habitat, recreational mining, hiking, hunting, and off-highway vehicle use restricted to open routes of travel. Within Juniper Flats ACEC, open recreational travel routes are posted with markers installed at intervals. Off-highway vehicle touring is appropriate here. Several routes in the Juniper subregion have been closed to vehicle travel to protect riparian habitat and cultural sites.

There are equestrian riding opportunities in the subregion as well as hiking opportunities. Equestrian use is extensive, though staging areas and parking areas for horse trailers are limited. The washes provide good hiking trails for experiencing natural conditions and for bird watching. A BLM-contracted bird survey in 2001 detected 61 species in Grapevine Canyon and 73 species in Arrastre Canyon. Mountain and California quail were abundant breeding gamebirds, and the canyons were used extensively by neotropical migrants. Tracks were seen of mountain lions in upper Arrastre Canyon, and badger, deer and bobcat were observed in the two canyons. Several species of reptiles were also observed (Laymon, 2001). The Juniper subregion also provides habitat for the San Diego horned lizard and the gray vireo, two unlisted species proposed for protection in the West Mojave Plan.

Visitors can camp at Bowen Ranch, a private facility, and at locations throughout the National Forest to the south. Many visitors access Deep Creek Hot Springs in the National Forest from the Juniper Flats area. Equestrians access other areas of the National Forest from Grapevine Canyon and utilize a network of trails near Arrastre Canyon and Round Mountain.

Route designations for the Juniper subregion were revised from the draft EIR/S as a result of public comment. The recommended network adopts and modifies designations done in 1988 for the Juniper Flats ACEC and in 1985 and 1987 for the entire Barstow Resource Area. It also incorporates the on-the-ground inventory performed in 2003. The resulting network is intended to provide additional protection for the riparian area in Arrastre Canyon, elimination of noise and nuisance around the Milpas Highlands community and increased single track loop routes which can connect to the Forest Service system routes.

R.2.9 Kramer Subregion

General Description: The Kramer subregion is located south of State Highway 58, between the cities of Hinkley and Kramer Junction. State Highway 58 and Edwards Air Force Base bound the subregion on the north, State Highway 395 on the west, and private lands to the east and south. The Kramer subregion encompasses a total of approximately 133,129 acres, which consists of 84,020 acres (63 percent) federal land managed by the BLM, and 49,109 acres (37 percent) private and State land.

The Kramer subregion is largely an area of alluvial soils and low rolling hills incised by braided, seasonal washes draining toward the Mojave River. Elevations range from 2,273 feet to 3,021 feet. The Kramer Hills, Iron Mountain, and Buckthorn Wash are found within the subregion. The Kramer Hills provide the most topographically varied portion of the subregion, and consist of low-lying, rolling hills composed of a complex of sedimentary and volcanic rocks. Iron Mountain, located in the northeastern portion of the subregion, also provides prominent areas of topographic relief. Most of the subregion is covered with creosote bush scrub and saltbush scrub plant communities. Joshua trees are scattered throughout the Kramer Hills and upper washes, in association with creosote and cholla.

State Highway 58 on the north and U.S. Highway 395 on the west provide access to the subregion. Several public roads are located within the subregion including Shadow Mountain Road, Harper Lake Road, and Helendale Road.

Recreation Activities/Resource Uses Overview: Current land uses include routes for several power lines and gas pipelines, as well as scattered homesteads. Recreational uses within the subregion include primarily OHV activity, and rockhounding in the Kramer Hills. Primary recreation activities and other resource uses occurring in the subregion are power line and pipeline rights-of-way, wildlife habitat, mining, hunting, and off-highway vehicle use restricted to open routes of travel.

The Kramer subregion includes portions of two grazing allotments. The majority of the subregion falls within the Stoddard Mountain grazing allotment. The southernmost portion of the subregion includes a small portion of the Buckhorn Canyon Allotment.

Mineral resources within the subregion are located primarily within Iron Mountain and the Kramer Hills. Gold has been produced at the Kramer Hills, which also includes occurrences of uranium, magnesite and feldspar. Considerable exploration of uranium occurred in the Kramer Hills during the 1970s. At Iron Mountain, limestone, marl, quartzite, and asbestos have been produced. In addition, there are occurrences of clay, copper, and mica in this area. The U.S. Geological Survey has classified the subregion as prospectively valuable for sodium, potassium, oil, and gas. Mining and homestead sites established in the late 19th and early 20th century exist in the area, some of which may have historical significance.

The suggested route network provides for vehicle access to the Kramer Hills, Iron Mountain, and other areas located throughout the Kramer subregion; provides access to sites appropriate to recreational target shooting; provides opportunities for general dispersed camping and back country touring; provides access through each of the primary upland gamebird hunting areas; provides access to popular rockhounding locations; provides access to known areas important for recreational mining; provides motorized access facilitating mountain bike recreation throughout the subregion; maintains vehicle access for a variety of terrain, a variety of trip lengths and access to remote areas for the equestrian community; provides the recreational OHV enthusiasts a variety of opportunities from which to choose, and it maintains a substantial portion of the dual-sport network (for on-street/off-street motorcycles) which runs throughout the subregion.

R.2.10 Middle Knob Subregion

General Description: The Middle Knob Subregion, located approximately 40 miles southwest of Ridgecrest, is defined by Highway 14 on the east; Highway 58 on the south; the CDCA boundary on the west; and the Jawbone Butterbredt ACEC on the north. Numerous landowners own the private lands.

Recreation Activities/Resource Uses Overview: Primary recreation activities and resource uses occurring in the subregion are recreational vehicle touring/sightseeing (such as in the proposed Middle Knob ACEC), camping and hiking (such as within the proposed Middle Knob ACEC and the Pacific Crest National Scenic Trail), hunting, domestic sheep and cattle grazing, utility corridor maintenance, communication site maintenance, wind energy, and mineral exploration.

In addition, the subregion has a variety of special habitats (pavement plains, vernal pool, springs and grey pine woodland) and artificial waters (small game guzzlers). Biological values of special concern include habitat for desert tortoises, Mohave ground squirrels, raptors (nesting and foraging areas), and special status plants. Further, cultural resources are significant in the subregion.

R.2.11 Morongo Subregion

General Description: The Morongo Subregion is located east of Highway 62 and west of Joshua Tree National Park. Much of the subregion is located in the Little San Bernardino Mountains. Elevations in the area range from 1700 feet on the canyon floor to 5000 feet at the ridge tops.

The area is noted as a breeding location for many riparian birds, the site of the endangered triple-ribbed milkvetch, and a critical watering area for bighorn sheep and mule deer that live in the region.

The subregion has a desert climate with hot, dry summers and moderate winters. Rainfall is scarce, with an average annual total of only 8 inches. Big Morongo Creek emerges from the mountains northwest of Morongo Valley and flows intermittently on the surface of the creek bed. The water percolates quickly into sandy soils as it crosses the Morongo Basin, but as it enters Big Morongo Canyon it encounters alternating layers of sandy and cemented rock. The harder layers bring the water to the surface in a series of perennial springs, whose waters disappear into the sandy layers farther downstream. Within the Subregion are some of the oldest rocks in the state of California, dated at almost two billion years. They consist of former granitic rocks that have been altered by heat and pressure to form gneisses and schists.

Recreation Activities/Resource Uses Overview: Within the subregion there exists habitat qualities which have earned much of the area both national and international reputation among bird watchers. Big Morongo Canyon is a desert oasis with perennial surface water in springs and streams that support an extensive willow and cottonwood forest.

Big Morongo Canyon ACEC, located within the subregion, is a 28,274 acre wildlife refuge and National Watchable Wildlife Site. Preserve programs and displays seek to provide educational opportunities for children, youth, and adults to further their understanding of desert and marsh ecosystems, and the function and importance of a preserve on local, regional, and global levels. Numerous trails, including boardwalk trails through the marsh and stream habitats, meander through the Preserve, which is managed by the BLM.

R.2.12 Newberry-Rodman Subregion

General description: The Newberry/Rodman subregion, located just south of Newberry Springs, California, is defined by Interstate-40 on the north, the Twentynine Palms Marine Corps Base and the Johnson Valley Off-Highway Vehicle Area on the south, and Camp Rock Road on the west. The subregion is 81,585 acres in size, with 73.6% Federal land (60,012 acres) managed by the BLM and 26.3% private and State land (21,481 acres). Catellus Development Corporation is the primary private landowner.

The general region consists of two small rugged mountain ranges and the surrounding foothills, valleys, sloping alluvial fans, washes, lava flows, and canyons. The entire area shows evidence of volcanic geologic activity, which provides for dramatic views. Elevations range from 1,800 feet to 5,100 feet in the Newberry Mountains. Creosote bush scrub is the predominant plant community in the lower elevations, with a desert willow-dominated plant community found in the dry desert washes, and remnant stands of perennial bunchgrasses in the higher elevations. Joshua tree woodland and small, riparian plant communities may also be found here in select locations. Many raptor nesting sites are found in the region. Kane Wash, which runs in a southwesterly to northeasterly direction, bisects the subregion, separating the Newberry Mountains wilderness and the Rodman Mountains wilderness. Access to this subregion is from Interstate-40, a power line road to the southeast, and Camp Rock Road on the west side.

A wide diversity of cultural site types are found here, some of which are associated with a National Register District. The Serrano tribe lived in the region, resulting in rock art and other cultural sites. Parts of the Rodman Mountains are designated as an ACEC to protect cultural resources. Most of this area is within the Rodman Mountains Wilderness. In addition to the desert tortoise, the prairie falcon and the golden eagle are found in the subregion, and the area is a potential reintroduction area for bighorn sheep. The Ord Mountain grazing allotment is located in the subregion. Much of the area is highly scenic in character, and both hiking/backpacking and upland gamebird hunting opportunities are plentiful.

Recreation Activities/Resource Uses Overview: Primary recreation activities and other resource uses occurring in the subregion are cattle grazing, mineral exploration/production, utility corridor maintenance (2 major utility corridors), communication site maintenance, recreational vehicle touring/sightseeing, dispersed hiking and camping, equestrian recreation, upland gamebird hunting, and rockhounding.

The Ord grazing allotment is located within this subregion. This allotment consists of 154,848 acres, of which 14,820 are private.

In regards to mineral values in the subregion, construction materials (crushed rock, sand and gravel) are being produced from the northwest area of the Newberry Mountains (Cal West Quarry). There has been production of placer gold at the Camp Rock mine. Cinders have and are being produced from Pipkin cinder cone (Malpais Crater) in the south-central part of the subregion. Borates (Fort Cady Minerals) and specialty clays (Rheox) are being produced in the eastern part of the subregion. BLM classified the western portion of the subregion as having a moderate to high potential for the occurrence of copper, silver, lead, tungsten and gold based on past exploration and production. The eastern portion of the subregion has a high potential for borate minerals and clay deposits.

A utility corridor runs along the northern boundary of the subregion, while another utility corridor crosses from north to south.

Excellent hiking/backpacking and upland game hunting opportunities exist in the Newberry and Rodman Mountains. There are three highly rated interpretive sites within the subregion, the Newberry Mountain Caves, Pipkin Cinder Cone, and the Rodman Mountain petroglyphs**.** Other federal plans relating to this subregion include the Johnson Valley Off-Highway Vehicle Area Management Plan.

The suggested route network provides for vehicle access for these resource uses and recreational activities. Further, they provide access to each block of non-federal land within the subregion.

R.2.13 North Searles Subregion

General Description: The North Searles subregion, is located approximately 28 miles northeast of Ridgecrest, immediately north of Pioneer Point and the community of Trona. Slate Range Crossing on the north, the crest of the Slate Range on the east, the Inyo-San Bernardino County line on the south, and the China Lake Naval Air Weapons Station (NAWS) boundary on the west define the subregion. Numerous landowners own the private lands. The Great Falls Basin ACEC, Argus Mountains wilderness and the Great Falls Basin Wilderness Study Area are surrounded by this subregion on three sides.

The general region consists of the upper part of Searles Valley, part of the ancient lakebed above Searles Lake. It is encircled by two prominent mountain ranges on the west, and east and north - the Argus and Slate ranges, respectively. The area is made up almost entirely of gravel, sand, and silt lakebed sediments. Elevations start as low as 1600 feet on the southern Inyo-San Bernardino County boundary, climbing to more than 5300 feet above sea level to the west in the Argus Range and to 4950 feet above sea level in the east along the crest of the Slate Range. Due to its location along the highway to Death Valley National Park (Highway 178) and close proximity to the community of Trona, visitation is generally high throughout the year, especially in the cooler months. Mojave saltbush and creosote bush scrub are the predominant plant communities in the lowlands, with rabbitbrush dominating communities in the washes. Joshua trees are found in sparse stands at a few locations at upper elevations in the Argus and Slate ranges. Small riparian communities exist at isolated seeps and springs throughout the Argus Range. These communities, made up mostly of willow and baccharis, comprise the sole critical habitat for a threatened species, the Inyo California towhee. This is a subspecies of towhee endemic only to the southern Argus Range. The many small seeps and springs also attract upland game hunters, as well as more casual visitors from the surrounding local area.

In the fall of 1999, the BLM initiated a series of yearly cleanups of a popular party place at the base of the falls in Great Falls Basin with volunteers from several Trona community service organizations and local businesses. Volunteers picked up trash, sifted for glass, dispersed fire rings, sandblasted graffiti, rehabilitated hill climbs, and donated more than $20,000 worth of boulders, heavy equipment and equipment operators to block off further vehicle trespass to Austin Springs, the base of the falls, and to various unauthorized hill climbs in the immediate vicinity. To date, the project has been very successful in implementing the many provisions of the ACEC plan for the area. Vehicle access also has been restricted at several other springs in the area, notably North Ruth, Nadeau, and Christmas to prevent overnight camping within 200 yards of a wildlife watering source per California State Fish and Game regulations (California Administrative Code 730(6)(b)). Fence exclosures have been built around other springs in the area to protect towhee critical habitat from damage by wild burros.

The subregion contains the Indian Joe Canyon Ecological Reserve, a Department of Fish and Game property protecting significant riparian habitat.

Access to this subregion is from Highway 178 and its extension, the Trona-Wildrose road.

Recreation Activities/Resource Uses Overview: Casual OHV recreational use involving dune buggies, quads, and motorcycles takes place within the subregion. The majority of these users are local residents. They come from Trona and the associated communities of West End, Argus, and Pioneer Point, or from Homewood Canyon. Gem and mineral collecting also occurs throughout the Argus and Slate Ranges. In October, the Searles Valley Gem and Mineral Society puts on a Gem and Mineral Show. The subregion is also used for interpretative museum and commercial 4-wheel drive, dual sport motorcycle and equestrian tours, as well as for equestrian competitive endurance rides.

Numerous dispersed camping opportunities exist along the route network. Vehicles are generally permitted to pull off within 300 feet of any route in the area to make camp with one exception. California State Fish and Game Code regulations specifically prohibit overnight camping within 200 yards of a wildlife-watering source. While some staging areas off of Highway 178 exist, most off road vehicle enthusiasts stage from their own homes in the adjacent communities of West End, Argus, Trona, Pioneer Point, and Homewood Canyon. There are many unmaintained dirt roads that directly connect these communities to the route system in the area. For these users, there is no need to go on pavement except to cross the Trona-Wildrose road occasionally to access routes on the opposite (east) side of Highway 178. Virtually all trails in this subregion are full-size 4x4 as opposed to single-track routes. Many of these trails offer challenges requiring strong 4x4 driving skills, particularly in rocky and mountainous stretches of the Slate and Argus Ranges.

Other uses occurring within the subregion are birdwatching, climbing, equestrian rides, hiking, target shooting, hunting, and rockhounding. The Kerncrest Audubon Society participates in regular bird censuses of Indian Joe Canyon and the Great Falls Basin is popular with backpackers, including the Sierra Club and Desert Survivors.

R.2.14 Ord Subregion

General Description: The Ord subregion, located southeast of Barstow, California, is defined by State Highway 247 on the west, the U.S. Marine Corps Firing Range on the north, Camp Rock Road on the east, and greater Lucerne Valley on the south. The Newberry

Mountains Wilderness lies immediately to the northeast, the Johnson Valley and Stoddard Valley Off-Highway Vehicle Areas to the southeast and northwest respectively, and private land of Lucerne Valley to the south.

Apart from the portion north of Power Line Road and a small portion to the south, the subregion consists of the BLM's Ord Mountain Route Designation Pilot Planning Unit. The Planning Unit consists of approximately 126,000 acres, located between the Stoddard Valley and Johnson Valley Off-Highway Vehicle Areas. As such, it is a popular connector between the two. In early 1995, the Ord Mountain Pilot Project was initiated as an opportunity to conduct OHV route planning and vehicle access planning for the West Mojave Plan.

The subregion includes three important desert peaks in close proximity to one another, Ord Mountain, East Ord Mountain, and West Ord Mountain; as well as Daggett Ridge and portions of East Stoddard Valley and North Lucerne Valley. Elevations in the area range from 2,500 feet to 6,309 feet above sea level.

The Ord Mountain area consists of valleys, rolling and jagged hills, sloping bajadas, braided washes, and barren playas.
The creosote brush scrub plant community is the dominant vegetative assemblage found within the subregion. Plant species within this community include creosotebush, burrobush, Mormon tea, allscale saltbush, golden cholla, and beavertail cactus. A BLM sensitive species, the Mojave monkeyflower, is found here.

Reptile fauna found in the area include desert tortoise, desert banded gecko, desert horned lizard, rosy boa, and Mojave rattlesnake. Notable avian species include golden eagle, prairie falcon, roadrunner, burrowing owl, and loggerhead shrike. Mammalian fauna include desert woodrat, antelope ground squirrel, black-tailed jackrabbit, kit fox, and coyote.

Recreation Activities/Resource Uses Overview: Primary recreation activities and resource uses occurring in the area are cattle grazing, powerline and pipeline rights-of-way, rockhounding, rock climbing, communication sites, camping, hiking, wildlife habitat, mining and recreational mining, hunting, and off-highway vehicle use restricted to open routes of travel.

The Ord Planning Unit consists of a precise vehicle network, restricting access to only essential routes of travel; all other historical routes are either closed or are limited to access by certain individuals for specific reasons, such as maintenance crews and ranch operators.

The recommended route network provides for vehicle access to the following features. Stoddard Valley Off-Highway Vehicle Area, to the west, and Johnson Valley Off-Highway Vehicle Area, to the southeast. In addition to these, the historic Ord Mountain Road and the Daggett Wash Road are accessible by four-wheel-drive vehicles and motorcycles. Mining operators used these two historic roads to haul their ore to the railhead in Daggett, California. Hercules Rock, on the south of the subregion, is a popular destination for rock climbers.

In addition, the network provides for access to the boundary of the Newberry Mountains wilderness, to the east; vehicular travel is not permitted within wilderness, but hiking, camping, and horseback riding are encouraged.

Many visitors to this area take advantage of the many hunting opportunities for small game birds found here. Hunting is enhanced in the region by a variety of water sources to be found here, including springs and guzzlers.

The recommended route network also provides access to various blocks of non-federal land within the area.

R.2.15 Pinto Subregion

General Description: The Pinto Mountain subregion, located immediately southeast of Twentynine Palms and north of Joshua Tree National Park, is defined by State Highway 62 to the north, and Joshua Tree National Park, to the east, west, and south.

The smaller, north-south-trending Twentynine Palms Mountains are located in the western portion of the region and the larger, east-west-trending Pinto Mountains cover its southern half. Historic mines associated with the Old Dale Mining District cover the eastern half of the area. Sand dunes are found to the northeast of the subregion, the greater part of which is within the Sheephole Valley Wilderness. The Bullion Mountains are located directly to the north.

Most of the area is dominated by steep but generally routed hills, vegetated with the creosote bush scrub community. Vegetation becomes more diverse in the washes, consisting of smoke tree, catclaw and desert willow. Stands of Mojave yucca exist within many of the interior valleys. Elevations range from 1,300 to 4,500 feet.

Recreation Activities/Resource Uses Overview: Primary recreation activities and resource uses occurring in the area are cattle grazing, powerline and pipeline rights-of-way, wildlife habitat, rockhounding, mining and recreational mining, hunting, and off-highway vehicle use restricted to open routes of travel.

Some of the designated routes provide access to each block of non-federal land within the area.

R.2.16 Red Mountain Subregion

General Description: The Red Mountain subregion, located approximately 20 miles southeast of Ridgecrest, is defined by U.S. Highway 395 and the Kern County line on the west; the Spangler Hills Off-Highway Vehicle Management Area on the north; the China Lake Naval Air Weapons Station B Range on the east; and the Barstow Field Office management boundary on the south. 120,199 acres in size, the area is 82% (98,043 acres) Federal land managed by the BLM and 18% (22,156 acres) private and State land. Numerous landowners own the private lands. The subregion borders the Golden Valley and Grass Valley wilderness areas.

Elevations in the subregion range from 2,568 feet on the Cuddeback Playa to 5,260 feet on Red Mountain. Creosote bush and Mojave saltbush are the predominant plant communities in the lowlands, with cheesebush-dominated plant communities found in the washes, remnant stands of native perennial bunch grasses on the mountaintops and scattered Joshua tree woodland.

Recreation Activities/Resource Uses Overview: The subregion is used for commercial 4-wheel drive and dual sport motorcycle tours and competitive equestrian endurance rides. Further, additional activities in the subregion include commercial filming, mineral exploration, utility corridor maintenance, recreational vehicle touring/sightseeing, dispersed hiking and camping, and upland game bird hunting.

Superior Valley, Monolith Cantil, Lava Mountains, and Pilot Knob are grazing allotments located within the subregion. The first three are ephemeral sheep allotments, and the Pilot Knob Allotment is an ephemeral cattle allotment, which is currently leased to the Desert Tortoise Preserve Committee. Sheep grazing is not currently allowed in the majority of tortoise critical habitat.

The BLM's mineral resource potential classification shows a moderate potential for the occurrence of placer gold deposits in the Randsburg and Atolia mining districts. A high potential for lode and placer gold occurs immediately outside the south boundary of the subregion. There are no active mining operations in the Red Mountain Subregion based on reports from the California Division of Mines and Geology filed under the California Surface Mining and Reclamation Act of 1975 (SMARA). BLM records show, as of March 2001, there are eight lode-mining claims north and west of Randsburg, and two lode claims located on some older workings on a small hill west of the Black Hills.

There are approximately 246 placer mining claims in the subregion. The placer claims are clustered in the center of the subregion, with dense clusters in the Atolia mining district and at the Summit Diggings area south of the Summit Range. Small clusters of placer claims are also located in the center of the subregion near Blackhawk Well. Most of the placer mining claims are association placers, each aggregating about 160 acres. As of March 2001, there were five plans of operation and eleven notice level operations authorized by BLM in the subregion pursuant to 43 CFR 3809. Most were approved for small placer operations in the Summit Diggings area or assessment work in the remaining area of the subregion.

A utility corridor crosses the western portion of the subregion, running parallel to Highway 395. The corridor contains existing facilities.

Various opportunities for outdoor recreation are present in the subregion. Some of the best upland game bird hunting in the eastern Kern and San Bernardino Counties is available in the Lava Mountains, Red Mountain and Blackwater Well areas. During years when winter rainfall is suitable, seasonal wildflower displays are exceptional in the Golden Valley and Grass

Valley areas. Red Mountain Spring (formerly called Squaw Spring) and Steam Well are two cultural heritage sites in the subregion. Both of these sites contain rock art. A route proposed for the California Statewide Discovery Trail crosses from south to north.

Other recreational opportunities and experiences available in the Red Mountain subregion include dispersed camping; four wheel drive and motorcycle touring; target shooting; rock hounding; hiking in the Golden Valley wilderness and climbing Red Mountain; mountain biking and equestrian recreation; and land sailing on Cuddeback Dry Lake. Several outfitters also use the area for recreational activities operated under recreation use permits including equestrian endurance rides, dual sport events and jeep tours.

Commercial filming in the subregion occurs primarily on \Cuddeback Dry Lake where an average of 15 permits a year is issued for advertising and motion picture projects.

R.2.17 Ridgecrest Subregion

General description: The Ridgecrest subregion, located south and east of the city of Ridgecrest, is defined by U.S. Highway 395 and the boundary of the Spangler Hills Open Area on the south; the city of Ridgecrest and the China Lake Naval Air Weapons Station on the north and west; and BLM Route RM 138 on the east. 22,465 acres in size, the area is 94% (21,115 acres) Federal land managed by the BLM and 6% (1,350 acres) private land. Numerous landowners own the private lands.

The general region consists of the rolling Rademacher and Spangler Hills. Sloping bajadas, braided washes, and narrow canyons characterize the general topography. Elevations range from 1,900 feet at the northeastern point of the subregion, to over 3,400 feet above sea level in the hills directly south of the City of Ridgecrest in the western portion of the subregion. Creosote bush scrub is the predominant plant community in the subregion, with cheesebush-dominated plant communities found in the washes, remnant stands of native perennial bunch grasses on the mountain tops and scattered Joshua trees.

Recreation Activities/Resource Uses Overview: The subregion contains two livestock grazing allotments. The Spangler Hills Allotment is located in the eastern-most portion of the subregion. This allotment is identified by the 1980 Desert Plan as an ephemeral allotment requiring a minimum of 200 pounds of dry vegetation per acre before the livestock are turned out to graze. The Cantil Common Allotment, an ephemeral grazing allotment, covers the remainder of the subregion. Sheep grazing occurs in the area in the spring when the annual vegetation meets the minimum requirements. The northern portion of the subregion contains a portion of the Centennial Wild Horse and Burro Herd Management Area.

The BLM's Mineral Resource Potential Classification identifies most of the subregion as having a moderate potential for the occurrence of placer and lode gold deposits, with a high potential for placer, principally hydrothermal lode gold deposits, identified in the western area of the subregion (Rademacher Mining District). In addition, there is a high potential for construction aggregates (sand and gravel) in the western portion of the subregion, with aggregates mined at the Bowman and Inyokern pits outside the western boundary. There are no active mining operations in the subregion filed under the California Surface Mining and Reclamation Act of 1975 (SMARA), based on reports from the California Division of Mines and Geology. Some interest has been expressed in the far western portion of the subregion as evidenced through mining claim locations. BLM records show, as of March 2001, that there are six lode-mining claims and six placer mining claims in this portion of the subregion in the Rademacher Hills. There is one plan of operation and one pending (April 2001) notice level operation in the Rademacher Hills area of the subregion filed pursuant to the regulations at 43 CFR 3809. There are no aggregate resources being developed within the subregion, and the subregion is not valuable, prospectively or otherwise, for Leasing Act minerals.

A utility corridor crosses the northern portion of the subregion, in an east/west direction. This corridor contains existing facilities.

The Ridgecrest Subregion supports a wide variety of recreation opportunities and experiences including, but not limited to, four wheel drive and motorcycle touring, hunting and target shooting, paintball, stargazing, photography, exploring mining sites, social gatherings, rockhounding, hiking and running, limited dispersed camping, mountain biking and equestrian recreation.

The most prominent recreation feature in the subregion is the Rademacher Hills, located south of the City of Ridgecrest. The Rademacher Hills offer a 12.5-mile network of trails open to hiking, jogging, horseback riding and mountain biking. This area forms the backdrop for the City of Ridgecrest and provides an urban-public land interface that is fast becoming a popular recreation site for local residents. Motorized trails through the Rademacher Hills provide access from the City of Ridgecrest to the 57,000 acre Spangler Hills OHV Area. A link to the Statewide Motorized Discovery Trail is proposed to connect the trail to the City of Ridgecrest through the Rademacher Hills.

The subregion is also used by a variety of recreation permit holders who use the public lands for mountain bike races, ultra-marathon running events, high school cross country running competitions, equestrian trail rides and endurance events, dual sport motorcycle tours, jeep tours, and other activities.

The area is used for commercial 4-wheel drive and dual sport motorcycle tours and competitive equestrian endurance and mountain bike events.

R.2.18 Sleeping Beauty Subregion

General Description: The Sleeping Beauty subregion, located approximately 3 miles west of Ludlow, California, is defined by Interstate-40 on the south by the northern edge of the public land Multiple Use Class L (limited) boundary on the north

The northern half of the subregion includes Sleeping Beauty Mountain, a part of the southern Cady Mountains. The southern half is a large, sweeping bajada sloping southward to Interstate 40. The larger washes draining the southern Cady Mountains support disjunctr occurrences of white-margined beardtongue, a rare plant. Elevations within the subregion range from 1,300 to 3,980 feet. Access to this subregion is generally from Interstate 40, via Lavic off-ramp.

Recreation Activities/Resource Uses Overview: Primary recreation activities and resource uses occurring in this subregion are cattle grazing, power line and pipeline rights-of-way, wildlife habitat, hiking and camping, recreational prospecting and mining, vehicle touring, utility corridor maintenance, and mineral exploration.

R.2.19 South Searles Subregion

General Description: The South Searles subregion, is located approximately 8 miles northeast of Ridgecrest, immediately north of Randsburg Wash Road and the Spangler Hills Open Area. Randsburg Wash Road defines the subregion on the south, the China Lake Naval Air Weapons Station (NAWS) boundaries on both its east and west sides, and by the Inyo-Kern County line on the north. Numerous landowners own the private lands. The Trona Pinnacles National Natural Landmark and ACEC is surrounded by the subregion on all four sides.

The general region consists of the lower part of Searles Valley surrounding Searles Lake It is encircled by two prominent mountain ranges, the Argus and Slates, on the west and east, and by the Spangler Hills on the south. The area abuts the upper half of Searles Valley above Searles Lake to the north - an area covered by the North Searles Subregion. The area is made up almost entirely of gravel to sandy to silty lakebed sediments. Elevations within this subregion are generally quite low, keeping to within 1600-2500 feet on the valley floor, to more than 2800 feet at selected high points in the Argus Range. Visitation is generally high, particularly in cooler, winter months, due to the presence of the Trona Pinnacles, and the subregion's general location along a highway to Death Valley National Park (Highway 178) and close proximity to the communities of Trona and Ridgecrest. Mojave saltbush and creosote bush scrub are the predominant plant communities on the valley floor, with rabbitbrush dominating plant communities in upper elevation washes.

Access to this subregion is primarily from Highway 178 and its Trona-Wildrose extension. The subregion can also be accessed from the Randsburg-Wash road, north of the Spangler Hills Open Area.

Recreation Activities/Resource Uses Overview: In general, the area absorbs a lot of casual OHV recreational use involving dune buggies, quads, and motorcycles. Most of these users are local residents. They come from Trona and the associated communities of West End, Argus, and Pioneer Point, or from Homewood Canyon. Some gem and mineral collecting also occurs, primarily in the foothills of the Argus Range on the western edge of the subregion. In October, the Searles Valley Gem and Mineral Society put on a Gem and Mineral Show. The subregion is also used for interpretative museum and commercial 4-wheel drive, dual sport motorcycle and equestrian tours.

Vehicles are permitted to pull off within 300 feet of a route to make camp in the subregion, except in the vicinity of the Pinnacles where visitors are asked to camp only in already impacted sites. Laws and regulations prohibit camping or staying within 200 yards of waters, which includes the natural seeps and springs in the Argus Range. Currently, all access routes on public land in this subregion comply with applicable law.

Most trails in the subregion are full-size 4x4 as opposed to quad or single-track routes, which exist only in the extreme southwestern corner of the subregion. While some staging areas off of Highway 178 exist, most off-road vehicle enthusiasts probably stage from campsites within the Trona Pinnacles or from various campsites within the Spangler Open Area just outside the subregion. Local people most likely enter this area directly from their homes in West End, South Trona, and Argus. For access to good riding areas, they must cross highway 178, traveling approximately 7 miles south of town to reach the Pinnacles or more than 12 miles to reach the Spangler Open Area.

The area offers very few opportunities for backcountry touring and sightseeing outside of the Trona Pinnacles National Natural Landmark. Climbers have not been observed in great numbers within the subregion. Equestrian use is tied to spring sources or in the case of organized, commercial and/or competitive events to regular vehicle routes for staging the necessary water and periodic veterinarian checks. Most people who hike in the area are locals who are simply exploring their own backyards.

Access to hunting areas is limited within the subregion. Hunting thus requires a good deal of hiking in the subregion. Hunters are known to pursue chukar over steep rocky terrain for long distances. Chukar and California quail are the primary targets although jackrabbits and mourning dove are hunted as well.

Non-motorized trails for mountain bikers do not exist in the area. However, mountain biking is popular along Highway 178 and with campers at the Pinnacles.

Rockhounding occurs throughout the area, in specific localities, mostly in the foothills of the Argus and Slate Ranges. During October's Gem and Mineral Show, the Searles Valley Gem and Mineral Society offers information about and several tours to various collecting and other sites of local interest in the valley.

Target shooting occurs throughout the area and is generally permitted wherever the terrain offers a safe backstop. However, the ACEC Plan for The Trona Pinnacles specifically prohibits target shooting anywhere within the vicinity of the National Landmark.

R.2.20 Superior Subregion

General Description: The Superior subregion, located north of Barstow, is bounded by Fort Irwin (National Training Center) and China Lake Naval Weapons Center on the north, the Fremont subregion and Black Mountain Wilderness on the west, and private lands and Interstate-15 on the south. The subregion is 271,528 acres in size, with 192,877 acres (72 percent) of Federal land managed by the BLM, and approximately 77,359 acres (28 percent) either private or State owned land. The major private landowner is the Catellus Development Corporation.

The Superior subregion encompasses numerous features that include Mount General, the Waterman Hills, Mud Hills, Fossil Canyon, Owl Canyon, and the Inscription Canyon area, known for its great quantity of rock art. The northern portion of the Superior subregion includes the Superior Valley, an area characterized by low-lying, flat open areas containing two dry lakes: an unnamed, small dry lake at the western edge and the larger Superior Dry Lake at the eastern boundary. The central portion of the subregion includes the Black Mountain Lava Flows, Lane Mountain, and the Paradise Range.

The Rainbow Basin, located in the south-central portion of the subregion, is an ACEC and is not included in the Superior subregion. Access to areas within the Rainbow Basin (which include the Mud Hills, Fossil Canyon, Owl Canyon campground, and the Rainbow Basin National Natural Landmark) is obtained via the Superior subregion. The southern portion of the subregion encompasses Mud-Water Valley, Waterman Hills, and outlying areas of Barstow. Elevations range from approximately 2000 feet in the southeast to 4,522 feet at the peak of Lane Mountain in the central-eastern portion of the subregion.

Vegetation in the northern portion of the subregion is similar to other areas in the West Mojave. In the Lane Mountain area, vegetation consists of creosote/mixed desert scrub association with scattered Joshua Trees and golden cholla. The Paradise Range in the northeast include a series of volcanic, rocky hills that exhibit little vegetation on the slopes, with the exception of scattered creosote. Vegetation is similarly sparse within the Black Mountain Lava Flows at the central portion of the subregion. The vegetative cover in the southern portion of the subregion generally is sparse, and includes occasional Joshua Trees.

The Superior subregion is criss-crossed by a number of roads, mainly unimproved. Access from population centers to the Superior Valley in the north is provided via Copper City Road, an improved road via Fort Irwin Road, and a paved highway. Due to these access routes, the Superior Valley is easily reached, as demonstrated by the noticeable presence of recreational visitors in this portion of the subregion. Access to the subregion from the south is obtained from Interstate 15, State Route 58, and Irwin Road.

Recreation Activities/Resource Uses Overview: Primary recreation activities and other resource uses occurring in the subregion are rockhounding, camping, picnicking, powerline and pipeline rights-of-way, mining and recreational mining, hunting, and off-highway vehicle use.

Excellent opportunities for both hiking and backpacking exist in the Black Mountains, Opal Mountains, and Calico Mountains. Major activities include camping, rockhounding, hunting, and motorcycle free play. The hard, smooth surfaces of two dry lakes in the Superior Valley provide excellent conditions for land sailing. The OHV community also utilizes this portion of the subregion, although the flat terrain is less than ideal for their activities.

The suggested vehicle route network provides the recreational OHV enthusiast an expansive variety of opportunities from which to choose. Routes vary from long, flat graded utility corridor routes or the flats of Superior Valley; technical jeep routes in the Calico Mountains; technical single-track motorcycle routes in the Mud Hills; lengthy remote touring routes around the Black Mountain wilderness or through the Grass Valley wilderness corridor; short quickly accessible routes into the Mitchell Range or Waterman Hills; and those that provide a loop opportunity to those that are "dead-ends".

Additionally, the suggested route network provides access to a variety of destinations ranging from historic mining sites (e.g. Calico Mountains), prehistoric cultural zones (e.g. Inscription Canyon), upland springs (e.g. Sweet Water Spring), geologically unusual areas (e.g. Rainbow Basin), rock-hounding areas (e.g. Opal Mountain), recreational mining (e.g. Coolgardie area); and mountain bike recreation throughout the subregion.

R.3 ROUTE DESIGNATION MAPS

Maps of the route network can be found on the attached compact disk (CD Rom). Maps are full color, 1:24,000 scale USGS topographic quads; where applicable, the route number is attached for easy cross-referencing to the tables presented in Section R.5. Maps can be viewed using the Adobe reader on your home or local library computer. You will find that this will enable you to view any section of the route network at a variety of scales, and to print your own maps from the attached files. Subregion and motorized access zone boundaries are indicated.

There are two complete sets of maps on the CD Rom, each consisting of approximately 90 quads. One set is for the Proposed Action (Alternative A) and the other set is for the No Action alternative (Alternative G). Each set presents a complete set of quads for all of the public lands within the western Mojave Desert. Maps are numbered sequentially. Thus, proposed action map 25 can be found in the file labeled “FEIS_pr_25.pdf”, while No Action Alternative map 44 can be found in the file labeled “6.30.03_44.pdf”.

Please note that two index maps are provided. Each index map presents a map of the western Mojave Desert, together with the location of each numerically labeled quad map. The proposed action index map is labeled “FEIS_pr_index_map.pdf”, while the No Action Alternative index map is labeled “6.30.03_index_map.pdf”. Also note that a composite map for the proposed Juniper subregion is provided, labeled “FEIS_pr_juniper.pdf”.

R.4 DECISION TREE

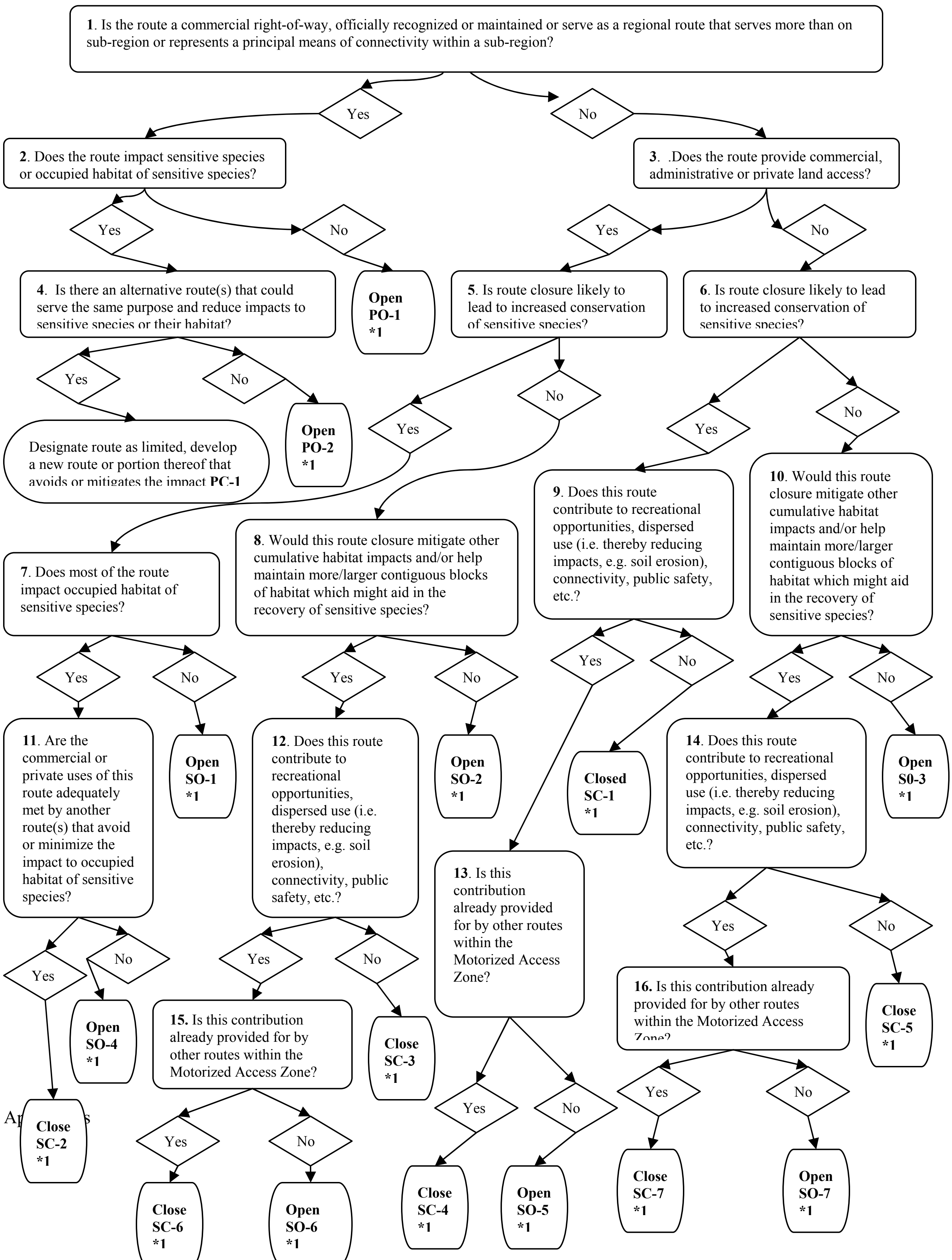
The route designation decision tree is presented on the next page, followed by tables showing changes from the draft West Mojave Plan and EIR/S.

R.5 ROUTE DESIGNATION TABLES

The tables presented on the following pages address each of the changes made in the route network from the draft West Mojave Plan and EIR/S. The most extensive changes were made in the Juniper subregion. The tables identify, for each route, the following:

- The route subregion,
- The route number,
- The original decision tree code (when the decision tree process was applied to a particular route, and the decision branch followed to its end, a distinctive code was assigned to that end point, allowing the documentation of the thought process that led to the final recommendation.) (some of these designations were changed in response to comments received on the draft West Mojave Plan and EIR/S),
- Whether the route is recommended as open or closed, and
- Reasons for the open or closed recommendation.

Route Designation Decision Tree



West Mojave Route Designation Tree Footnotes

1. **Question 2**: Evaluate and take into account:
- both season and intensity of use as it relates to impacts to sensitive species or their habitat;
- the number of sensitive species and/or the amount of sensitive habitat potentially impacted;
- Other areas already designated or set aside or other measures that may be already contributing to the conservation of these species (e.g. Wilderness Areas and raptor nests, bat grates, etc.)
2. **Question 3**: E.g. utility, military, mining, ranching facilities; monitoring sites; guzzlers).
3. **Questions 8, 10**: I.e. Would this route closure likely lead to a reduction of those indirect impacts suspected of leading to a significant decline in habitat quality (e.g. litter, poaching, harassment, plinking, etc.) or lead to a decline in impacts that directly negatively impact sensitive species?
4. **Questions 11, 13, 15, 16**: When evaluating the duplicity of this route take into consideration the quality of this route, particularly as it relates to public safety.
5. ***1**:
    - Are there any other special circumstances that would warrant reconsideration? (e.g. unusual public safety issues, Section 106 considerations, current or future community growth/zoning issues, current or reasonably foreseeable land acquisitions or trades (e.g. for mitigation as part of this planning effort or by other resource organizations/agencies), special permits (e.g. Mining Plan of Operations), environmental benefits of a route (e.g. facilitating the maintenance of a guzzler), legal easements, user conflicts, neighboring uses, etc.).
    - Should a limited designation be used in lieu of either an open or closed designation in order to mitigate for impacts?

Juniper Subregion Route Designation Table

Route Number	Designation	Original Decision Tree	Comments
RJ1001	O	PO2	Japatul Rd from A.V. to Powerline
RJ1002	O	SO7	Loop rt provides access to scenic views and hang gliding areas
RJ1003	O	SO7	MC access to JF area from residential area
RJ1004	O	PO2	Connection from 1001 to 1002 and quarry
RJ1005	O	SO5	MC rt will replace the use that was formerly on 1057 through Cottonwood Sp.
RJ1006	O	SO3	Access to overlook and camping
RJ1007	O	SO7	Provides access to hang gliding areas
RJ1008	O	SO7	Provides access to hang gliding areas
RJ1009	O	SO7	Provides access to hang gliding areas
RJ1010	O	SO7	Provides access to hang gliding areas
RJ1011	O	SO3	Spur rt provides access to mining area and camping
RJ1012	O	SO7	Spur rt provides access to Cottonwood Spr parking
RJ1013	O	SO7	Short connector improves accessibility of rt system
RJ1014	C	SC5	Parallel to 1002
RJ1015	C	SC5	Connector rt duplicates access provided by 1002 and 1004
RJ1016	C	SC5	Duplicate rt parallel to 1006
RJ1017	C	SC5	Duplicate rt parallel to 1005 and offers similar rec opp
RJ1018	C	SC5	Duplicate rt parallel to 1005
RJ1019	O	PO2	Powerline rd from Bowen Ranch to west
RJ1020	C	SC1	Parallel rt to 1019 and 2010
RJ1021	C	SC1	MC rt parallels Bowen Ranch Rd and promotes trespass on private property
RJ1022	C	SC1	Parallel MC provides no additional rec opp
RJ1023	C	SC1	MC rt promotes trespass onto private property
RJ1024	C	SC5	Unnecessary short rt connects parallel rts and crosses private land
RJ1025	C	SC5	Unnecessary short rt connects parallel open rts
RJ1026	C	SC1	Rt proliferation behind fence in unstable soils. Provides no access or connectivity
RJ1027	C	SC1	Rt proliferation behind fence in unstable soils. Provides no access or connectivity
RJ1028	C	SC1	Rt behind locked gate with no other access
RJ1029	C	SC1	Rt proliferation behind fence in unstable soils. Provides no access or connectivity
RJ1030	C	SC1	Short rt from private land. Access provided by 1001
RJ1031	C	SC4	Short mc rt provides little rec opp
RJ1032	C	SC4	MC rt with similar access to 1003
RJ1033	C	SC4	Infrequently used mc rt onto private land
RJ1034	C	SC4	Provides similar access as 1003
RJ1035	C	SC4	Access is provided by rts 1001 and 1003. Erosion prone area
RJ1036	C	SC4	Short mc rt is redundant with 1001
RJ1037	C	SC4	Short mc rt is redundant with 1001
RJ1038	C	SC1	Dead end rt provides no apparent rec opp
RJ1039	C	SC5	Short secondary single track dead ends

Juniper Subregion Route Designation Table (cont.)

Route Number	Designation	Original Decision Tree	Comments
RJ1040	L	NA	Access to county water tank
RJ1041	C	SC7	Parallel to 1042
RJ1042	O	SO6	Provides scenic views along the length of the rt
RJ1043	C	SC5	Short, dead end rt provides little rec opp
RJ1044	O	SO2	Continuation of public rd to scenic view
RJ1045	C	SC5	Very short redundant rt
RJ1046	C	SC5	Short dead end rt parallel to a similar rt
RJ1047	C	SC5	Short dead end rt parallel to a similar rt
RJ1048	C	SC5	Short loop off 1011 provides little rec and no access
RJ1049	L	NA	Access to private property
RJ1050	L	NA	Access to guzzler
RJ1052	C	SC4	Gated rt to trespass dwelling
RJ1053	O	SO7	Series of short rts around quarry
RJ1054	C	SC1	Rt accesses Stone Spring. Foot access from nearby rt is possible
RJ1055	C		Rt does not exist
RJ1056	O	SO5	Rt will help preserve a single track network in this area
RJ1057	O	SO5	Part of MC network helps provide access from AV to FS
RJ1058	C	SC4	New rt endangers riparian areas, sensitive species, and cultural sites.
RJ1059	O	SO5	Part of MC network helps proved access from AV to FS
RJ1060	C	SC4	Rt accesses Cottonwood Spring. Increased use or misuse of this rt would result in unacceptabl
RJ2001	C	SC1	Short cut MC route cuts corner on powerline road (1019)
RJ2002	C	SC4	Rough light, infrequently used rd provides access off powerline road to hill climbs.
RJ2003	O	SO5	Route provides MC access between RJ1019 and RJ2004
RJ2004	O	SO7	Graded road provides access to scenic vista S of powerline road
RJ2005	C	SC1	MC Route in parallel to 2004
RJ2006	C	SC1	MC route is parallel to 2004, 5,7 and promotes access to a closed rd in SBNF
RJ2007	C	SC1	MC route is parallel to 2004,5,6 and promotes access to a closed rd in SBNF
RJ2008	C	SC1	Three short routes provide access to closed portion of SBNF
RJ2009	C	SC1	Short spur route leads to hill climb
RJ2010	C	SO5	Bowen Ranch Road
RJ2011	C	SC1	Short loop rt provides access to no rec opp and enters closed portion of SBNF
RJ2012	C	SC1	Short route provides access to Closed portion of SBNF
RJ2013	C	SC1	Short duplicative route
RJ2014	C	SC1	Duplicative route provides access to closed portion of SBNF
RJ2015	O	SO5	MC Route provides rec access to Warm Springs Parking Area.
RJ2016	C	SO5	Long distance backcountry vehicle rt also provides vehicle access to the Warm Springs lower pa
RJ2017	C	SC1	Short short cut route
RJ2018	C	SC1	Short route provides access to two hill climb locations
RJ2019	C	SC1	Short cut route between 2024 and 2016
RJ2020	C	SC1	Cuts corner
RJ2021	C	SC7	Rt is parallel to major rt 2024

Juniper Subregion Route Designation Table (cont.)

Route Number	Designation	Original Decision Tree	Comments
RJ2023	O	SO5	MC rt contributes to a larger single track network in the area
RJ2024	O	SO5	Rt provides connectivity through area
RJ2025	O	SO7	MC rt is redundant and unnecessary
RJ2026	O	SO5	Rt from Bowen Ranch to camping area
RJ2027	C	SC1	Access to closed FS land
RJ2027	C	SC1	Access to closed FS land
RJ2028	O	SO5	Access to cattle water at Round Mtn Spring
RJ2029	O	SO5	Route provides MC access from Round Mtn Spring to RJ2031 and connectivity to route system
RJ2030	O	PO1	Loop through area provides private prop access and connectivity
RJ2031	O	SO5	MC rt provides large loop for rec
RJ2032	C	SC4	Leads to spring complex and private prop, dead ends
RJ2033	C	SC5	Rt cuts a corner short. Other access available
RJ2033A	C	SC5	Rt cuts a corner short. Other access available
RJ2034	C	SC5	Parallel rt unnecessary
RJ2035	C	SC5	Rt cuts a corner short. Other access available
RJ2036	O	SO5	Provides connectivity through area for 4X4 vehicles
RJ2037	C	SC7	Rt complex is redundant with 2031/36
RJ2038	C	SC1	Rt dead ends and offers no apparent rec opp
RJ2039	C	SC4	MC rt leads onto private property
RJ2040	C	SC7	Rt dead ends on one side and leads to private property on other
RJ2041	C	SC4	Rt to spring and riparian area. Parking area and trailhead should be est. on 2030
RJ2042	C	SC4	Short loop route provides no unique rec experience
RJ2043	C		
RJ2044	C	SC7	Dead end MC rt
RJ2045	O	SO5	Rt provides connectivity to network between RJ2030 and Coxey Truck Trail
RJ2046	C	SC4	Rt does not provide unique rec exp or connectivity
RJ2047	C	SC4	Redundant with Coxey
RJ2048	O	SO5	Access to FS open rt
RJ2049	O	SO5	Long distance backcountry vehicle rt also provides vehicle access to the Warm Springs lower parking lot
RJ2050	C	SC5	Short rt is redundant with 2024
RJ2051	C	SO5	Rec loop for vehicular touring
RJ2052	C	SC1	Dead end off of powerline rd
RJ2053	L	NA	Access to powerline tower
RJ2054	C	SC4	Short redundant rt onto private property
RJ2055	O	SO5	Short dead end rt to scenic overlook
RJ2056	O	SO7	Both ends of rt on private proterty. Powerline access
RJ2057	O		
RJ2058	C		
RJ2059	C		
RJ2060	C		

Juniper Subregion Route Designation Table (cont.)

Route Number	Designation	Original Decision Tree	Comments
RJ2062	C	SO5	Long distance backcountry vehicle rt also provides vehicle access to the Warm Springs lower pa
RJ2063	C	SO5	Provides connectivity through area for 4X4 vehicles
RJ2064	C	SO5	Long distance backcountry vehicle rt also provides vehicle access to the Warm Springs lower pa
RJ2065	C		
RJ3001	O	PO2	Coxey Truck Trail
RJ3002	C	PO2	Powerline road will provides primary east/west access through front country area. Access rts t
RJ3003	C	SC1	Secondary mc rt begins on private property N of powerline terminating under powerline.
RJ3004	C	SC1	Shortcut rt leaves powerline at private property and re-enters public just before private property
RJ3005	C	SC1	MC route is closed to protect unique riparian values.
RJ3006	C	SC1	MC route is closed to protect unique riparian values.
RJ3007	C	SC1	MC route is closed to protect unique riparian values.
RJ3008	C	SC1	MC route is closed to protect unique riparian values.
RJ3009	O	SO5	Part of MC network provide connectivity in Maz 3
RJ3010	C	SC1	MC route is closed to protect unique riparian values.
RJ3011	C	SC1	MC route is closed to protect unique riparian values.
RJ3012	O	SO5	MC touring route begins on Coxey Truck Tr and ends at powerline.
RJ3012A	C	SO5	Protection of riparian habitat
RJ3013	C	SC1	MC route is closed to protect unique riparian values.
RJ3014	C	SC1	MC route is closed to protect unique riparian values.
RJ3015	C	SC1	MC route is closed to protect unique riparian values.
RJ3016	C	SC1	MC route is closed to protect unique riparian values.
RJ3017	C	SO5	Dead end into closed route
RJ3018	C	SC1	MC route is closed to protect unique riparian values.
RJ3019	C	SC1	MC route is closed to protect unique riparian values.
RJ3020	C	SC1	Short MC routes is redundant with 3012
RJ3021	C	SC1	MC route is closed to protect unique riparian values.
RJ3022	C	SC1	MC route is closed to protect unique riparian values.
RJ3023	C	SC1	MC route is closed to protect unique riparian values.
RJ3024	C	SC1	MC route is closed to protect unique riparian values.
RJ3025	O	SC1	MC touring route.
RJ3026	C	SC1	MC route leads to the USFS in a closed area
RJ3027	C	SC1	MC route leads to the USFS in a closed area
RJ3028	O	SO5	MC route connects northern system with southern system.
RJ3029	O	SO5	Access to VP Mine
RJ3030	O	SO5	Rt provides unique rec opportunity
RJ3031	C	SC4	Infrequently used mc rt is parallel to 4002
RJ3032	C	SC1	Parallel rt to 3012 is unnecessary
RJ3033	C	SC5	Short loop off 3033
RJ3034	O	S07	Rt provides connectivity and mc rec opportunity

Juniper Subregion Route Designation Table (cont.)

Route Number	Designation	Original Decision Tree	Comments
RJ3035	C	SC1	Rt would encourage unauthorized hillclimbs
RJ3036	O	SO7	Steep mc rt allows for access. MUST BE MONITORED FOR EROSION
RJ3037	C	SC1	Semi-hillclimb not on suitable soils
RJ3038	C	SC4	Similar rec opp provided on nearby rts
RJ3039	C	SC4	Rt accesses mine that is limited use
RJ3040	C	SC1	Short rt leads to other closed rts that access mine and springs
RJ3041	C	SC4	Rt is a short loop parallel to 3012
RJ3042	C	SC1	Unwanted rt through private property
RJ3043	O	SO7	Access to public lands for local residents
RJ3044	C	SC1	Rt provide no unique rec opp or connectivity. Cuts corner short
RJ3045	C	SC1	All rts that cut powerline rd short are unnecessary (9 rts)
RJ3046	L	NA	Limited access to power lines
RJ3047	L	NA	Rt is behind locked gate. Access to limited to claimholder
RJ3048	L	SC1	Rt begins on private prop and accesses county water tank
RJ3049	C	SC1	Rt begins on private prop and accesses county water tank
RJ3050	C	SC4	Rt is redundant with open rt 3034
RJ3051	C	SC1	Rt begins on private property
RJ3052	C	SC1	Rt begins on private property
RJ3053	C	SC1	Rt begins on private property
RJ3054	C	SC1	Secondary motorcycle route begins on private property north of powerline
RJ3055	C	SC2	Secondary motorcycle route begins on private property north of powerline
RJ3056	C	SC1	Rt begins on private property
RJ3057	C	SC1	MC route is closed to protect unique riparian values.
RJ3058	O	SO5	Part of MC network provide connectivity in Maz 3
RJ3059	C	SC1	MC route is closed to protect unique riparian values.
RJ3060	O	SO5	Part of MC network provide connectivity in Maz 3
RJ3061	O	SO5	Connects MC network to primary route network
RJ3062	C	SC1	MC route is closed to protect unique riparian values.
RJ3063	C	SC1	MC route is closed to protect unique riparian values.
RJ3064	C	SC1	MC route is closed to protect unique riparian values.
RJ3065	C	SC1	MC route is closed to protect unique riparian values.
RJ3066	C	SC1	MC route is closed to protect unique riparian values.
RJ4001	O	PO1	Grapevine Cyn Rd. Provides access to comm. sites and FS land
RJ4002	O	SO5	Provides rec connection to MAZ 3 (upper Rattlesnake area)
RJ4004	C	SC1	Grapevine Canyon trailhead, closed after parking area
RJ4005	C	SC1	Short rt is parallel and redundant to 4001
RJ4006	C	SC4	Short mc rt leads to hillclimbs
RJ4007	C	SC4	Rt up drainage has no rec opp; dead end
RJ4008	O	SO5	Leads to scenic overlook
RJ4009	C	SC4	MC rt is parallel and redundant to 4001
RJ4010	C	SC4	Steep and eroded rt leads into sensitive riparian habitat

Route Number	Designation	Original Decision Tree	Comments
RJ4011	C	SC1	Dead end rt leads to hill climbs
RJ4012	C	SC1	Short rt offers no unique rec opp
RJ4014	C	SC4	Rt shortcuts 4001
RJ4015	C	SC4	Rt is parallel to 4001 and reaches hilltops that can easily be reached on foot
RJ4016	C	SC1	Minute two pronged rt dead ends
RJ4017	C	SC4	Rt cuts the corner of 4019 and 4023
RJ4018	C	SC1	Rt is impassible after short distance
RJ4019	O	SO5	Leads to scenic overlook
RJ4020	C	SC4	Impassible mc rt leads into Grapevine Cyn and is on unstable soil
RJ4021	C	SC1	Minute rt shortcuts corner
RJ4022	C	SC4	Rt dead ends quickly and offers no apparent rec opp
RJ4023	O	SO5	Rt provides access to scenic drive and overlook
RJ4024	C	SC4	Enters USFS land in an unauthorized location
RJ4025	C	SC1	Accesses spring with riparian habitat
RJ4026	C	SC4	Access is provided by other nearby rts
RJ4027	C	SC4	Rt access springs with riparian habitat
RJ4028	C	SC1	Short connector rt is unnecessary
RJ4029	O	SO5	Rt provides access from private land
RJ4030	O	PO1	Paved road access large mine
RJ4031	C		
RJ4032	C	SC4	Access is provided by other nearby rts. Near cultural areas
RJ4033	O	SO5	Tech 4WD rt provide scenic rec opp
RJ4034	C	SC4	Rt is redundant with 4033
RJ4035	C	SC4	Short rt accesses spring
RJ4036	C	SC4	Enters USFS land in an unauthorized location
RJ4037	C	SC4	Enters USFS land in an unauthorized location
RJ4038	C	SC4	Tech 4WD rt dead ends
RJ4039	C	SC4	Enters USFS land in an unauthorized location
RJ4040	O	SO5	Provides rec access from private land
RJ4041	O	SO5	Scenic driving rt
RJ4042	O	SO1	Access to private land
RJ4043	C	SC4	Enters private land at unwanted location through unstable soils (hillclimb)

Coyote, Fremont, Red Mountain and Superior Subregions
Route Designation Table
Routes Changed from Draft Plan and EIR/S

Route Number	Designation	Original Decision Tree	Comment (Reason for Change)
C1072	0	SO4	Connector route serving BLM and private land.
F2053	C	SO5	Response to 190-SS
RM1005	C	SO3	Redundant and ends at a closed gate.
RM1021A	C	SO7	Redundant routes
RM1069A	C	PO2	Redundant route
RM1127	C	SO5	Redundant route, partly in a wash
RM1206	C	SO7	Redundant route
RM1215	C	SO7	Redundant route, high TCS area
RM1241A	C	SO5	redundant; formerly RM1241
RM1263	C	SO7	Redundant route
RM1337	C	SO5	Redundant route, partly in a wash
RM1339	C	SO7	Redundant route
RM2002	C	SO7	Redundant, ends in wilderness, lightly used
RM2005	C	SO7	Redundant, ends in wilderness, lightly used
RM2006	C	SO7	Redundant, ends in wilderness, lightly used
RM2007	C	SO7	Barely there (not a route)
RM2016	C	SO4	Redundant route
RM2018G	C	PO2	Redundant route
RM2034	C	SO7	Not really a route
RM2035	O	SO4	Recreation opportunity
RM2047A	C	SO5	High TCS, sensitive cultural area
RM2047C	C	SO7	High TCS, sensitive cultural area
RM2048	C	SO5	Redundant route
RM2049	C	SO7	High TCS, redundant to RM2047
RM2051	C	SO7	Access to culturally sensitive area (National Register D
RM2051B	C	SO7	High TCS, sensitive cultural area
RM2051C	C	SO7	Access to culturally sensitive area (National Register D
RM2051D	C	SO7	Access to culturally sensitive area (National Register D
RM2052	C	SO5	Redundant route
RM2056	C	SO7	Not really a route, on fall line of hill
RM2056A	C	SO7	Not really a route, on fall line of hill
RM2067	C	SO3	Dead end route
RM2080	C	SO5	Lightly used; high TCS area
RM2080A	C	SO5	Lightly used; high TCS area
RM2080B	C	SO5	Lightly used; high TCS area
RM2080C	C	SO5	Lightly used; high TCS area
RM2135	C	SO7	
RM2137	C	SO7	
RM2158C	C	SO5	Dead end into Closed route
RM3168	O	SO5	Important connectivity
RM3190	O	SO5	Important connector route

Route Number	Designation	Original Decision Tree	Comment (Reason for Change)
RM3250	O	SO5	Good connectivity
RM6123	O	SC5	Offers loop touring opportunity
SU3084A	C	SO4	LMM habitat
SU5023	C	SO4	LMM habitat
SU5042	C	SO7	LMM habitat; response to 190
SU5048	C	SO7	LMM habitat; response to 190
SU5061	C	SO7	LMM habitat; response to 190
SU5071A	C	SO7	LMM habitat
SU5072 A	C	SO7	LMM habitat, no connectivity
SU5073 A	C	SO7	LMM habitat
SU5076 A	C	SO7	LMM habitat
SU5077	C	SO7	LMM habitat
SU5077 A	L	SO7	LMM habitat, mining access
SU5096	C	SO4	LMM habitat; other access to
SU5200	L	SO5	LMM habitat, access to mining
SU5200 A	C	SO5	LMM habitat

Routes Outside Subregions
Route Designation Table
Routes Changed from Draft Plan and EIR/S

Route Number	Designation	Comment (Reason for Change)
U	C	Carb. ACEC; changed from Open
0 (Trona area)	L	Part of IMCC Mining Area; formerly Public
AM12	L	
AM15	L	
AM17	L	
AM19	O	
AM20	O	Utility road
AM3	L	
AM8	L	
C-1	O	Enhanced loop touring opportunities
C-3	O	Enhanced loop touring opportunities
C-4	O	Enhanced loop touring opportunities
C-5	O	Enhanced loop touring opportunities
C-6	O	Enhanced loop touring opportunities
CS1001	O	Provides access from Trona to Spangler Open
CS1002	O	Provides access between railway and borrow pit
CS1002A	O	Provides access between railway and borrow pit
MP0430	L	allows access to claims
MP091	C	Occupied habitat for Little SB Mtns. Gilia;
MP2021	L	Habitat for Little SB Mtns. Gilia
MP232	L	Barstow Field Office request
MP363	C	Carb. ACEC; formerly Open
MP371	L	Carb. ACEC; formerly Open
MP3710	L	Carb. ACEC; formerly Open
MP3712	L	Carb. ACEC; formerly Open
MP3713	C	Carb. ACEC; formerly Open
MP3714	L	Carb. ACEC; formerly Open
MP3716	C	Carb. ACEC; formerly Open
MP3720	L	Carb. ACEC; formerly Open
MP3721	L	Carb. ACEC; formerly Open
MP3722	C	Carb. ACEC; formerly Open
MP3723	L	Carb. ACEC; formerly Open
MP3724	C	Carb. ACEC; formerly Open
MP373	L	Carb. ACEC; formerly Open
MP441	L	Carb. ACEC; formerly Open
MP443	L	Carb. ACEC; formerly Open
MP455	O	BFO request
MP456	O	BFO request

Route Number	Designation	Comment (Reason for Change)
NS1001	L	Route serves active permitted mines
RM01158	U	Part of IMCC Mining Area; formerly Open
RM01159	U	Part of IMCC Mining Area; formerly Public
RM01161	U	Part of IMCC Mining Area; formerly Open
RM01162	U	Part of IMCC Mining Area; formerly Open
RM02130	U	Part of IMCC Mining Area; formerly Open
RM02131	U	Part of IMCC Mining Area; formerly Open
RM02132	O	Provides mining access
RM02160	U	Part of IMCC Mining Area; formerly Open
RM02163	U	Part of IMCC Mining Area; formerly Open
RM02164	U	Part of IMCC Mining Area; formerly Open
RM02165	L	Part of IMCC Mining Area; formerly Open
RM02166	U	Part of IMCC Mining Area; formerly Open
RM02167	L	Part of IMCC Mining Area; formerly Open
RM02167	L	Part of IMCC Mining Area; formerly Open
RM02168	L	Part of IMCC Mining Area; formerly Open
RM02169	U	Part of IMCC Mining Area; formerly Open
RM03147	U	Part of IMCC Mining Area; formerly Open
RM03151	U	Part of IMCC Mining Area; formerly Open
RM03152	U	Part of IMCC Mining Area; formerly OPen
RM04155	U	Part of IMCC Mining Area; formerly OPen
RM06174	L	Part of IMCC Mining Area; formerly Open
RM06176	L	Part of IMCC Mining Area; formerly Open
RM06177	L	Part of IMCC Mining Area; formerly Open
RM1116	O	Offers loop touring opportunity
RM1117	O	Offers loop touring opportunity
RM11210	C	Offers loop touring opportunity
RM1122	O	Offers loop touring opportunity
RM118	O	Offers loop touring opportunity
RM1272	C	Optional loop touring opportunity
RM6123	O	Offers loop touring opportunity
RM6124	O	Offers loop touring opportunity
RM6125	C	Offers loop touring opportunity
RM6126	O	Offers loop touring opportunity
RM6127	C	optional - offers loop touring opportunity
RM6128	C	optional - offers loop touring opportunity
RM6129	C	optional loop touring opportunity
RM6130	C	Optional loop touring opportunity
RM6131	C	Offers loop touring opportunity
RM6132	C	Optional loop touring opportunity
RM6133	C	Optional loop touring opportunity
RM6134	C	Optional loop touring opportunity
RM6271	C	Optional loop touring opportunity
RMO1161	U	Part of IMCC Mining Area; formerly Public
RMO8229	O	
SV0610	L	Carbonate habitat; formerly Open
SV0611	C	Carbonate habitat; formerly Open

Route Number	Designation	Comment (Reason for Change)
SV0621	L	Carbonate habitat; formerly Open
SV0622	L	Carbonate habitat; formerly Open
SV0623	L	Carbonate habitat; formerly Open
SV063	L	Carbonate habitat; formerly Open
SV065	L	Carbonate habitat; formerly Open
SV069	L	Carbonate habitat; formerly Open
SV069	L	Carbonate habitat; formerly Open
SVO6022	L	Carbonate habitat; formerly Open
UK	C	BFO request
UK (Trona area)	L	On IMCC Mining Area; formerly Public
UK(Trona area)	L	Part of IMCC Mining Area; formerly Open

Appendices

APPENDIX S

CARBONATE HABITAT RECLAMATION AND REVEGETATION STANDARDS

The Carbonate Habitat Management Strategy is included with the Proposed West Mojave Plan and Final EIR/S

Appendices

Guidelines and Success Criteria for Revegetation and Carbonate Plant Introductions

The following guidelines and success criteria have been developed to provide consistency in revegetating lands disturbed by mining activities in carbonate habitat within the Carbonate Habitat Management Zone. The intent is to provide specific guidelines and success criteria for revegetation of native plants and habitats and introduction of Carbonate Plants in conjunction with mining reclamation. These guidelines and success criteria were prepared for incorporation into the CHMS, and would also be incorporated into the West Mojave Plan. "Carbonate Plants" means any or all of the four threatened or endangered plant species: Cushenbury buckwheat, Cushenbury milkvetch, Cushenbury oxytheca and Parish's daisy.

(a) Collection and salvage requirements. Where revegetation includes introduction of Carbonate Plants to mining-reclamation surfaces, the following requirements pertaining to the collection of listed species must be followed. Where collection, salvage, and/or planting of these species occurs as part of a mining plan, additional standards will apply, as specified under the ESA section 10(a)(1)(A) permits issued for this purpose.

(i) Seed collection. Seed collections of listed species from public land will be at the discretion of the USFWS. Unless other arrangements are made, collections on BLM or Forest Service land will be made under the authority of the 10(a)(1)(A) permit and all conditions in the permit will apply. Collection methods will be designed to capture the majority of the genetic variation found in the sampled populations, by collecting seed systematically throughout the site and avoiding focusing only on certain plants due to size or location. Collections must avoid harming the source population's long-term viability. At no time will seeds derived from different natural populations be intermingled in revegetation activities. Detailed field information will be recorded at the time of seed collection, including estimated population size, number of individuals sampled, collecting strategy employed, apparent viability of the seed, global positioning satellite ("GPS") coordinates of the collecting location, California Natural Diversity Database element occurrence number (if any), and a photocopy of a USGS topographic map with the collection site identified. Seed collection data will be kept in permanent files and duplicated on the package where the seed is stored.

(ii) Collection of cuttings. No more than five percent of any individual plant will be collected. No more than five percent of any individuals within a population will be sampled from. Collections will be made systematically throughout the site to capture the majority of the genetic variation found in the sampled populations. At no time will seeds or plants collected from different natural populations be intermingled in revegetation activities. Individual cuttings will be labeled with numbered metal tags corresponding to collection sites, as described above for seed collections. The tag numbers will be kept in permanent records and will be kept with the cuttings as they are incorporated into an off-site nursery or on-site revegetation sites for long-term monitoring. Tags need not identify every individual cutting, but should identify the source.

(iii) Plant salvage. On sites where plants and seeds will be disturbed or destroyed by authorized activities, the limitations above will not apply. Up to 100% of plants or seed may be salvaged for use in concurrent or future reclamation. Maximum effort should be made to salvage

listed carbonate plants from sites where mining or other disturbance is approved, and initial clearing and soil removal should be scheduled to allow for seed salvage at the end of at least one growing season.

(iv) Plant and seed return. Plants and seeds will be returned to the same general vegetation zone where they were collected (e.g. blackbush scrub), within no more than 1000 ft. elevation and 5 miles of the collection site, in order to ensure gene pool and ecotype integrity. Where individual plants are introduced onto a reclamation site (e.g., salvaged plants, or plants grown from seed or cuttings off-site), they will be labeled with metal tags for future growth and survival monitoring. The tag numbers will be kept in permanent records. Tag numbers need not identify every individual plant, but will identify their original source and the year they are planted. Where seed is introduced onto a reclamation site, the amount (weight) and seed collection data (above) will be kept in similar records.

(v) Documentation. Methods of Carbonate Plant introduction and progress of the introduction effort must be monitored and reported to the BLM, Forest Service or County in accordance with the monitoring requirements of Section (c), below. Operators are encouraged to enhance the introduction sites (e.g. irrigation, fertilization, weeding, supplemental planting, or seeding; collectively, "manipulation") during the first few years after planting. As provided in Section (b) below, however, revegetation success criteria will not be deemed to have been met until the end of a minimum 3-year period *without* manipulation.

(b) Carbonate Plant success criteria. At the end of a minimum 3-year period without manipulation, the introduced Carbonate Plants occurrences must be documented to show:

(i) Successful reproduction, indicated by seed production, seedling establishment, and survival of seedlings to reproductive state so that the total number of living and reproductively mature plants is at least two times the number originally planted;

(ii) A demographic pattern over the minimum 3-year period in which recruitment to reproductive maturity is greater than or equal to mortality, indicating a stable or growing population;

(iii) Expansion of the introduction area, indicated by the presence of progeny of the introduced plants at least 10 meters beyond the bounds of the original seeded or planted area;

(iv) Within the introduction area, density (plants/acre) of the Carbonate Plants no less than one standard deviation below the mean density of the same species in natural populations, as documented in BLM, Forest Service or County data; and

(v) Demonstration of least one quantitative measure of ecosystem function; applicable measures include, but are not limited to, soil respiration, mycorrhizal hyphal mass in soil, glomilin assays, pollinator visitation, and wildlife utilization.

(c) Monitoring. The following monitoring and associated documentation are required annually to determine successful introduction of Carbonate Plants. Introduction sites will also be subject to the revegetation monitoring described in Section (e)(iv) below. Under this Section, for the first 3 years following planting, introduction sites shall be monitored at least annually to document survivorship and reproduction. After the initial 3-year period, qualitative monitoring and reporting will be done on 3-year intervals.

(i) Marking: Parish's daisy and Cushenbury buckwheat. These are perennial plants, woody at their bases, and therefore capable of being tagged. Each monitoring cycle, each new plant will be tagged and numbered to indicate the year it was detected. Each previously-existing plant will be examined, and its tag number (if present) and condition will be recorded using the following categories:

(A) Healthy/reproductive (i.e., flower or seed);

(B) Healthy/non-reproductive;

(C) Living but evidently unhealthy;

(D) Dead; or

(E) Missing.

After the first monitoring cycle, new plants (not previously tagged) will be considered "progeny" of the plants initially introduced onto the site. Plants will not be tagged if they are too small to physically support the tags or if tagging is likely to damage them. Plants will be considered "established" when they are large enough to tag.

(ii) Marking: Cushenbury milk vetch and Cushenbury oxytheca. These species cannot be tagged due to their life histories. Instead, areas of occupied habitat will be identified using GPS and markers on the ground to define polygons containing a specified number of individual Carbonate Plants. For these species, parents and progeny will not be distinguished, and demographics will be inferred by total counts of individuals within the defined polygons.

(iii) Mapping, all four species. The bounds of occupied habitat will be marked with colored flagging and recorded with a GPS unit. These data will be collected and recorded following the SBNF data and mapping standards. During the monitoring period or later in the year, as appropriate, a small sample of seed from introduced plants on the site will be collected and examined for apparent viability ("fill").

(e) Reporting. Following each monitoring period, a report will be prepared to include data tables of all plants examined, GPS coordinates of the occupied habitat's boundaries, representative photographs of the overall site and selected individual plants, and (after 6 years) demographic analysis of the occurrence. The demographic analysis shall consist of *(i)* assembly and graphing of monitoring data to show survivorship rates of plants initially introduced onto the site and their progeny; *(ii)* calculation of the estimated half-life for each cohort; and *(iii)* calculation and comparison of recruitment rates and death rates.

In addition to the formal monitoring and reporting described here, introduction sites should be qualitatively monitored at least annually. Qualitative monitoring should document general survival and reproductive success of the Carbonate Plants and should document potential problems, such as erosion, excessive herbivory, or damaged irrigation systems.

(d) Reclamation guidelines. The following revegetation guidelines are in addition to, or more specific than, the revegetation requirements of the Plan of Operations or Reclamation Plan.

The specific objectives of revegetation as addressed here are to approximate the target vegetation (defined below) as closely as practicable and to promote the reintroduction of listed plant species to reclaimed sites (where applicable). Because revegetation practice continues to evolve, practitioners should remain current with the literature and advances in the field. They also should contact BLM, the Forest Service or County for recommendations on revegetation practice.

(i) Target vegetation. The "target vegetation" for each revegetation site will be selected based on existing reference data for the appropriate vegetation zone or site-specific sampling (collectively, the "Baseline Data"), at the agreement of the applicant and the applicable permitting jurisdiction. Reference data within the carbonate habitat management zone were derived from plot-based vegetation sampling taken across more than 600 plots between 1990 and 1998. Future sampling may result in an update and revision to these data. These data will be made available upon request by the Mountaintop District Botanist on the SBNF.

(ii) Soil inventory. Soil resources (all available topsoil or "growth medium") will be inventoried for volume and reclamation suitability during the planning stages, and soils inventory results will be included in the revegetation plan. To avoid the need for extended soil stockpiling, the use of soil salvaged from a new quarry site for reclamation of another (closed) quarry or waste dump will be encouraged.

(iii) Success criteria. All reclamation plans will be required to meet the success criteria required under the Plan of Operations or Reclamation Plan and provide documentation. The following additional criteria must be met to meet the standards of the West Mojave Plan for the carbonate habitat management zone. Success thresholds for quantitative measures *(B)—(E)* will be based on the Baseline Data for each site.

(A) Reclamation. Meet or exceed all reclamation requirements under the mining and reclamation plan for the site and under the applicable reclamation regulations, and maintain the mining operation in full compliance with the mining plan.

(B) Cover. Achieve a mean native vegetation cover percentage of at least 50% of the mean native cover value specified in the Baseline Data.

(C) Density. Achieve a mean density of each of three climax/dominant species for that vegetation zone that is at least 50% of the specified mean densities for those species in the Baseline Data.

(D) Richness. Achieve a mean species richness (average species count per 0.1 acre sample plot or other unit area as applicable, depending on sample methods) that is at least 50% that of the value specified in the Baseline Data.

(E) Non-native species cover. Non-native species cover will be no more than (3× its cover in the Baseline Data, and annual monitoring data will show a downward trend, documented by a declining regression coefficient (negative *b value*) over the monitoring period.

(F) Aggressive/invasive weeds. On the date of approval by the applicable jurisdiction, no species identified on the SBNF list of highly invasive exotic species (below), will occur within the revegetated site. These species must be documented and removed upon detection, and the reports required in Section (f)(iv)(B) below must document any removal and confirm that all these species are absent from the site. Such removal may be performed at any time without being regarded as manipulation that is otherwise prohibited during certain periods. The list of particularly aggressive or invasive non-native weeds will be prepared and maintained by the SBNF in cooperation with BLM, the County and appropriate stakeholders, including the mining industry. It will be limited to non-native species which show the potential to spread rapidly and will exclude native vegetation in some or all habitats of the carbonate habitat management zone, but which have not yet become broadly established within the zone. Thus, tamarisk (*Tamarix* spp.), castor bean (*Ricinus communis*), giant reed (*Arundo donax*), and Spanish broom (*Spartium junceum*) would be appropriate for inclusion on the list. Brome grasses (*Bromus* spp.), weedy mustards (*Brassica* spp., *Sisymbrium* spp., *Hirschfeldia incana*), and Russian thistle (or tumbleweed, *Salsola* spp.) would not be appropriate.

In applying the foregoing criteria, only the habitat patches that meet the criteria shall be regarded as revegetated. The operator's final monitoring report will provide quantitative data that will determine whether or not the foregoing success criteria have been met. The final monitoring data will generally be submitted ten years following initiation of revegetation, though an operator may choose to finalize the work earlier or later, depending on individual circumstances. Regardless of the date of final monitoring, the revegetated site shall not be subject to manipulation (subject to the exception specified under criterion *(F)*) during a minimum three years prior to the final data collection.

(iv) Monitoring and revegetation reporting requirements. Each mining reclamation plan must include a revegetation plan. This plan will specify target vegetation, reference data, acres that will undergo active revegetation, and a revegetation schedule. To document progress under the revegetation plan, annual monitoring and periodic reporting will be required. Phased plans may compile these reports into a combined report where an area covered under a single mine plan has revegetation ongoing at different stages.

(A) Annual monitoring. Operators will monitor revegetation sites annually, making each of the following observations and measures, which will be recorded and provided to the applicable permitting jurisdiction in periodic monitoring reports (*see* subsection *(B)* below):

(1) Survival of container plantings (where applicable);

(2) Germination of seeded species, noting distribution and abundance;

(3) List of native "volunteer" species, noting distribution and abundance;

(4) Measurements of vegetation cover, target species density, total species richness (list), and wildlife observations;

(5) Signs of erosion/soil loss;

(6) List of non-native species, with descriptions of abundance, distribution, and measures to control/eradicate; and

(7) Recommendations for any other needed remedial action (e.g., repairs to irrigation system, re-seeding, erosion control, or other).

(B) Reporting. On large revegetation sites, quantitative data collected and presented in the "threshold" and final monitoring reports must be randomly sampled with sufficient replication to analyze and document the data with 90% confidence intervals about the mean values, and with a maximum confidence interval width of 20% of the mean value. For smaller sites, an alternate sampling protocol may be used so that the total sampling area is at least 50% of the area revegetated.

The following three reports, to be submitted to the BLM or County, with a copy provided to the Forest Service, are required to document the monitoring and status of revegetation:

(1) Initial report. This report shall include: *(aa)* detailed site plan, *(bb)* planting palette, *(cc)* propagule (seed, cutting, and container plant) inventory, and *(dd)* soil inventory (where applicable). This report must be prepared and submitted within one year of initiating revegetation.

(2) Final minus 3 report. This report shall be made at the initiation of the final 3-year no-manipulation period and shall mark the initiation of that period. This report shall summarize the monitoring data that is collected annually. It must include status of revegetation and qualitative and quantitative measures each success criterion, and it must specify any remediation prescribed. It shall also include a propagule and soil inventory update. This report is generally prepared during year 7, although may be earlier or later, depending on individual circumstances. If the operator prefers to delay initiating the 3-year period without manipulation beyond year 7 of the revegetation effort, then a substitute "Year 7" report should be submitted, to include the contents described above and an explanation of the operator's plans for remediation and eventual completion of the revegetation.

(3) Final report. This report shall be prepared and submitted with the application for bond release. It shall have the same format and content requirements as the "final minus 3 report" described in subsection *(2)* above. Regardless of the date of final monitoring, the revegetated site shall have had no manipulation during a minimum three years prior to the final data collection (subject to the exception specified under subsection *(iii)(F)* above for weed control). This report shall document the extent to which the revegetation is successful and shall be used, along with field checks, by the applicable permitting jurisdiction to determine whether or not the success criteria set forth in subsection *(iii)* above have been met.

(e) Authorized loss of revegetated areas. Upon issuance of a favorable CHMS Biological Opinion, losses of Carbonate Plants within the management zone where Carbonate Plants have been introduced by operators or claimholders shall be authorized under the terms and conditions described below. The authorization provided pursuant to this Section provides relief only from the provisions of the ESA and does not relieve an owner or claim holder from any requirements of the reclamation regulations with respect to reclaimed or revegetated areas. This authorization also does not relieve the applicant from NEPA, CEQA, or other environmental review of any proposed new land use.

(i) Conditions to authorized loss. Occupied habitat that occurs as a result of revegetation efforts on reclaimed land within the management zone may be taken as necessary to carry out mining activities without any compensation requirement if the following conditions are met:

(A) The introduction effort, including a precise description of the location, has been reported to the applicable permitting jurisdiction in advance of the introduction work itself.

(B) The introduction effort proposed to be lost has complied with all of the seed collection and salvage requirements described in Section (a) above.

(C) The introduction site to be lost must not be the only remaining living material salvaged (as seed, cuttings, or whole plants) from an occurrence lost to previous land use changes unless a second salvage effort (from the introduced occurrence proposed to be lost) has been approved by the applicable permitting jurisdiction. Where operators salvage plant material from sites to be developed as quarries, waste areas, or other facilities, they should carefully plan the locations where these salvaged materials are introduced.

(ii) Coverage provided When all of the conditions set forth in subsection *(i)* above are satisfied, the following coverage under the CHMS Biological Opinion shall apply:

(A) Any future impacts or proposed impacts to the Carbonate Plants occurring as a consequence of introductions carried out in compliance with this Section (f) will not be subject to review or enforcement action under the ESA and will not be subject to any compensation requirement.

(B) Collection of seed from living plants for purposes of revegetation activities will be permitted on public or private land, in compliance with USFWS permits, as applicable.

(C) All occurrences of Carbonate Plants discovered within a revegetation site shall be treated as resulting from the introduction.

Appendices

Carbonate Habitat Management Strategy

April 29, 2003

Flowers of the plant species addressed by this strategy, from left to right: Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*), Cushenbury milk-vetch (*Astragalus albens*), Cushenbury oxytheca (*Oxytheca parishii* var. *goodmaniana*), Parish's daisy (*Erigeron parishii*)

Prepared by Todd G. Olson *for*
San Bernardino National Forest Association

SAN BERNARDINO
NATIONAL FOREST ASSOCIATION

Acknowledgments

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Plant illustrations are by Fred M. Roberts, Jr., and plant photographs are by Scott Eliason, all used with permission.

The following organizations and their representatives actively participated in the working group that developed this strategy (listed alphabetically): BLM California Desert District; Butterfield family; California Native Plant Society; County of San Bernardino; Cushenbury Mine Trust; Gresham, Savage, Nolan & Tilden, LLP; McKay & McKay; Mitsubishi Cement Corporation; OMYA California Inc.; San Bernardino National Forest; Sentinel Mining; Specialty Minerals Inc.; United States Fish and Wildlife Service; White & Leatherman BioServices.

Carbonate Habitat Management Strategy

Contents

Carbonate Habitat Management Strategy

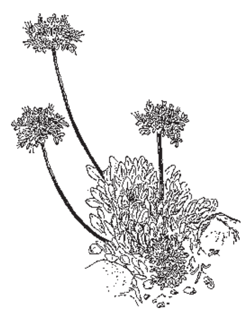
I. Introduction

On August 24, 1994, five plants that are associated with the carbonate geology of the northeastern San Bernardino Mountains and adjacent Lucerne Valley were listed as threatened or endangered under the federal Endangered Species Act of 1973, as amended (the "ESA"). Four of these plants occur on commercially valuable limestone deposits. The public interest in protecting these plant species is thus in conflict with the public and private interest in mining the coincident limestone deposits.

This Carbonate Habitat Management Strategy (the "CHMS," referring both to this document and the program it describes) is the product of years of effort by interested mining companies, claim holders, landowners, conservation interests, and government agencies to develop a strategy to resolve this conflict in a mutually-agreeable manner with an approach that can also be utilized by other parties in the future on a voluntary basis.

1. Background

From the 1950s, various claim holders and mining companies have been extracting limestone from the northeastern San Bernardino mountains. In recent years, annual production has been running at about three million tons of cement-grade limestone, at a value of about $100 million, and 1.5 million tons of high-brightness limestone, at a value of about $75 million. Much of this mining activity is occurring on mining claims established under the Mining Law of 1872, as amended (the "Mining Law") on federal land under the jurisdiction of the U. S. Department of Agriculture Forest Service (the "Forest Service") or the U. S. Department of Interior Bureau of Land Management (the "BLM"). Collectively, the Forest Service and the BLM shall be referred to as the "Resource Management Agencies," each with respect to land under its jurisdiction. A portion of the mining activity also occurs on privately-owned land under the jurisdiction of the County of San Bernardino (the "County").



Eriogonum ovalifolium

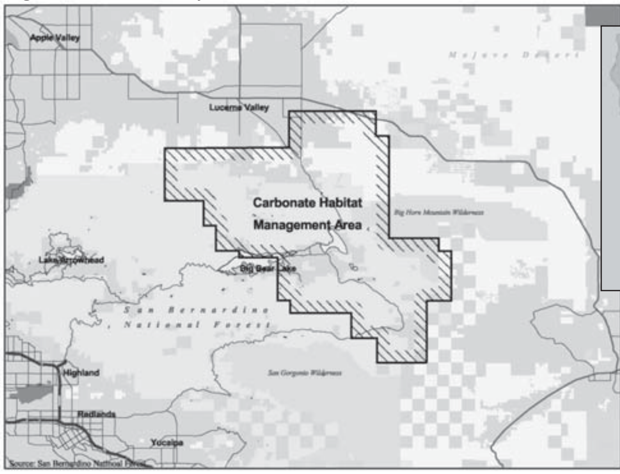
In 1994, the four plant species shown in the box on this page (the "Carbonate Plants") were listed under the ESA. Each of these species occurs only in the vicinity of the northeastern San Bernardino mountains, and each occurs almost exclusively on carbonate soils that often coincide with economically valuable limestone deposits. (A fifth carbonate plant species, the San Bernardino Mountains bladderpod, *Lesquerella kingii* var. *bernardina*, was listed as endangered at the same time that the other four were listed, but the bladderpod does not coincide with economic limestone deposits, so it is not addressed by the CHMS.)

Astragalus albens

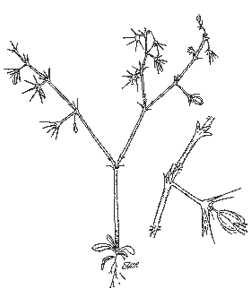
Carbonate Plants

- Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*) (federal endangered)
- Cushenbury milk-vetch (*Astragalus albens*) (federal endangered)
- Cushenbury oxytheca (*Oxytheca parishii* var. *goodmaniana*) (federal endangered)
- Parish's daisy (*Erigeron parishii*) (federal threatened)

Figure 1: Location of CHMA



Absent a regional strategy for the preservation of the Carbonate Plants, ongoing limestone mining activities could come into direct conflict with the ESA. *Map 1* and *Map 2* in *Appendix I* illustrate the potential conflict by showing the locations of the carbonate soils, the Carbonate Plants, existing mining claims, and existing mining activity. Being aware of this situation, certain mining interests, conservation interests, and government agencies (collectively, the "Working Group") began to develop the CHMS in October 1999 to resolve this potential conflict. For purposes of planning and analysis, the Working Group identified an area of approximately 160,000 acres in the northeast San Bernardino Mountains, which encompasses nearly all of the habitat for the Carbonate Plants, as the Carbonate Habitat Management Area (the "CHMA"; *see Figure 1*). The CHMA is characterized by substantial limestone deposits and encompasses nearly the entire known geographic range of the Carbonate Plants (except one occurrence of Parish's daisy habitat near Pioneertown, approximately ten miles east of the CHMA boundary). The majority of the CHMA is within the San Bernardino National Forest (the "SBNF"), but large and important portions occur on federal lands managed by the BLM and on private lands.



Oxytheca parishii

The CHMS, as set forth in this document, is the culmination of the efforts of the Working Group. It provides a means for forming a reserve system for the Carbonate Plants (the "Habitat Reserve" or the "Reserve") while allowing mining activities to proceed under a streamlined and expedited ESA compliance process. The CHMS is voluntary as to private mining interests; it imposes no regulatory burden on existing claims or privately owned property, but it provides a clear recipe for ESA compliance for those who desire to avail themselves of it. Mining interests remain free to seek any required ESA compliance without utilizing or complying with the CHMS. Governmental authorities may also use the CHMS as a framework for establishing land use regulations or policies within the CHMA but, except for any commitments made by the Resource Management Agencies in consultation with the United States Fish and Wildlife Service (the "USFWS"), they are not required to do so.

Erigeron parishii

The time scale over which limestone reserves are mined is measured in decades. In order to be useful, the CHMS is intended to be operational for fifty years or more, and the Habitat Reserve is intended to be in place in perpetuity. Although the CHMS is subject to amendment over time in accordance with its terms (*see* Section 17(b)), it has no established date of termination.

The following section describes the objectives of the CHMS in some detail.

2. Objectives

The goals of the CHMS are to facilitate economic limestone mining activity while conserving the Carbonate Plants under a sensible and efficient regulatory regime. Each of these three goals may be regarded as in the public interest, though different members of the public will have different degrees of interest in each of them. The specific objectives of the CHMS can be categorized by the three types of goals: economic, conservation, and regulatory.

(a) Economic objectives. The economic objectives of the CHMS are as follows:

(i) To increase the regulatory certainty that the most valuable mineral deposits within the CHMA may be mined in the future.

(ii) To protect the availability of limestone resources that are vital to the construction industry in the southwestern region of the United States.

(iii) To protect the viability of the mining-based economy of the northeastern San Bernardino Mountains and Lucerne Valley region.

(iv) To provide a definitive, streamlined process for future mining activities within the CHMA to comply with ESA regulation of the Carbonate Plants.

(v) To provide a framework for streamlining National Environmental Policy Act ("NEPA") requirements for future mining activities. Such streamlining would not be available unless and until the CHMS is incorporated into future land use plans for lands managed by the Resource Management Agencies within the CHMA ("Federal Land Plans").

(vi) To reduce the costs and time associated with County processing of mining-related land use applications by providing a comprehensive approach to addressing impacts to the Carbonate Plants under the California Environmental Quality Act ("CEQA").

(vii) To help avoid the need for future ESA listings of species that occur within the CHMA and to provide a process for addressing such listings if they are proposed or occur.

(b) Conservation objectives. The conservation objectives of the CHMS are as follows:

(i) To maintain and manage the geomorphic and ecological processes of the landscape in large, well-placed blocks of habitat where the Carbonate Plants are found within the CHMA such that the Carbonate Plants are likely to persist indefinitely.

(ii) To avoid "jeopardy" to the continued existence of the Carbonate Plants (as defined in Section 7 of the ESA and its regulations).

(iii) To avoid "destruction or adverse modification" of critical habitat for the Carbonate Plants (as defined in Section 7 of the ESA and its regulations).

(iv) To contribute to the recovery and ultimate de-listing of the Carbonate Plants under the ESA.

(v) To help avoid the need for future ESA listings of species that occur within the CHMA.

(vi) If other species that occur within the CHMA are listed under the ESA in the future, to avoid jeopardy to those species (as defined in Section 7 of the ESA and its regulations).

(vii) To provide a mechanism for tracking both the loss and conservation of habitat for the Carbonate Plants over time.

(c) Regulatory objectives. The regulatory objectives of the CHMS are as follows:

(i) To streamline the application of the ESA to mining activities within the CHMA.

(ii) To provide a biological basis for addressing the Carbonate Plants in future Federal Land Plans.

(iii) To streamline the County's CEQA review of the biological impacts of mining projects on private land within the CHMS.

(iv) To streamline the County's implementation of the California Surface Mining and Reclamation Act of 1975, as amended ("SMARA") within the CHMA.

(v) To provide a means for the BLM to comply with certain stipulations with respect to the CHMS in *Center for Biological Diversity* vs. *BLM*, Case No. C-00-0927 WHA (JCS) in the United States District Court, Northern District of California, San Francisco Division.

(vi) To provide a means for the Forest Service to comply with certain stipulations in *Southwest Center for Biological Diversity* vs. *Sprague*, Case No. C 98-2434 SC in the United States District Court, Northern District of California.

The CHMS attempts to provide an integrated approach to reconciling and achieving the economic, conservation, and regulatory objectives listed above.

The following section develops the strategy further by describing the scope of the CHMS.

3. Scope

The scope of the CHMS can be described in terms of the regulated activities that it addresses, the governmental regulations that it addresses, the biological species that it addresses, and the geographical plan area within which it applies.

CHMS Scope Summary

- *Activities:* covers mining activities
- *Regulation:* offers compliance with the ESA and potential streamlining under NEPA, SMARA, County land use regulations, and related CEQA requirements
- *Species:* addresses the four Carbonate Plants
- *Plan area:* applies within the CHMA

(a) Activities. The CHMS provides a procedure for surface and subsurface mining activities (the "Covered Activities") to comply with certain environmental regulations (*see* subsection *(b)* below). All activities that are incidental to mining activities are included as Covered Activities, including, without limitation, *(i)* exploration, *(ii)* overburden removal, *(iii)* extraction, *(iv)* keeping of waste piles, *(v)* reclamation, *(vi)* milling and other processing of extracted material, *(vii)* transportation of extracted material, and *(viii)* construction of facilities and infrastructure related to the above activities.

(b) Regulations. The regulatory framework for the CHMS is summarized in the box to the right. The regulations addressed by the CHMS are as follows:

(i) ESA. The primary regulatory focus of the CHMS is to provide mining interests with a means of obtaining compliance with the ESA ("ESA Compliance"; *see* Section 11) for Covered Activities with respect to the Carbonate Plants and any other species addressed by the CHMS in the future (*see* subsection *(c)* below). More specifically, the CHMS is intended to be attached to a biological assessment as the basis for a consultation between the Resource Management Agencies and the USFWS under Section 7 of the ESA (the "CHMS Section 7 Consultation"). The biological assessment required by Section 7 of the ESA shall be prepared by the Forest Service in cooperation with the BLM for submission to the USFWS. It is intended that on the strength of the CHMS, the USFWS will be able to issue a programmatic biological opinion (the "CHMS Biological Opinion") that will authorize activities on federal land that comply with the CHMS as being in compliance with the ESA, even if such activities result in the loss of species or habitat addressed by the CHMS. Because it will be mining interests who provide compensation under the CHMS and who are the ultimate beneficiaries of ESA Compliance under the CHMS, this document refers to the mining interests as the parties who "obtain" ESA Compliance, even though it is actually the Resource Management Agencies who are complying with the ESA by means of the CHMS. The CHMS Biological Opinion shall specifically address any of the "Initial Furnace Transactions" (defined in Section 9(d) below) that require ESA Compliance and that have been well-defined by the time that a biological assessment is submitted to the USFWS. Activities that receive ESA Compliance through the CHMS shall not be required to undergo a separate consultation with the USFWS under Section 7 of the ESA.

(ii) NEPA. No NEPA analysis will be performed on the CHMS directly because the CHMS involves no present "federal decision," as defined under NEPA. However, the CHMS may indirectly facilitate regulatory streamlining under NEPA. By providing a strategy for addressing impacts to the Carbonate Plants and

Summary of CHMS Regulatory Framework

- CHMS will exist independent of any other public or private plan
- The CHMS Biological Opinion will be issued on the CHMS alone
- The CHMS and the CHMS Biological Opinion will be available for incorporation into individual mining plans and Federal Land Plans
- No independent NEPA analysis will be done on the CHMS
- Individual mining plans may use the CHMS prior to the completion of revised Federal Land Plans, but such federal plans may result in streamlining of the NEPA process for subsequent mining plans

their habitats, future Federal Land Plans may be able to incorporate the CHMS into their NEPA compliance strategy such that project compliance with the CHMS satisfies certain project-level requirements of NEPA. Then, the NEPA compliance documents for individual projects could address impacts to those species by cross-referencing the applicable Federal Land Plan and its associated NEPA documentation. The availability of such streamlining under NEPA is not automatic; it will depend upon how the Resource Management Agencies write their Federal Land Plans and associated NEPA documentation.

(iii) County land use regulations and implementation of SMARA. The County is the land use jurisdiction for mining activities on private land within the CHMA. It also administers SMARA within the CHMA. The County shall adopt standardized conditions of approval that are consistent with the CHMS to potentially streamline the processing of mining and reclamation applications (and the associated CEQA review) that it administers. See Section 13(c) for a more detailed description of the County's commitments under the CHMS.

(c) Species. Initially, the CHMS directly addresses only the Carbonate Plants and their habitats, so ESA Compliance is only with respect to those four species. The CHMS provides a process, however, for applying to the USFWS to have the CHMS address additional species that may be proposed for listing or listed under the ESA in the future (*see* Section 17(c)). In the event that such additional species become addressed by the CHMS, ESA Compliance will be regarded as addressing such additional species as well.

(d) Plan area. The CHMS applies only to Covered Activities that occur within the CHMA. See paragraph 3 of Section 1 for a description of the CHMA.

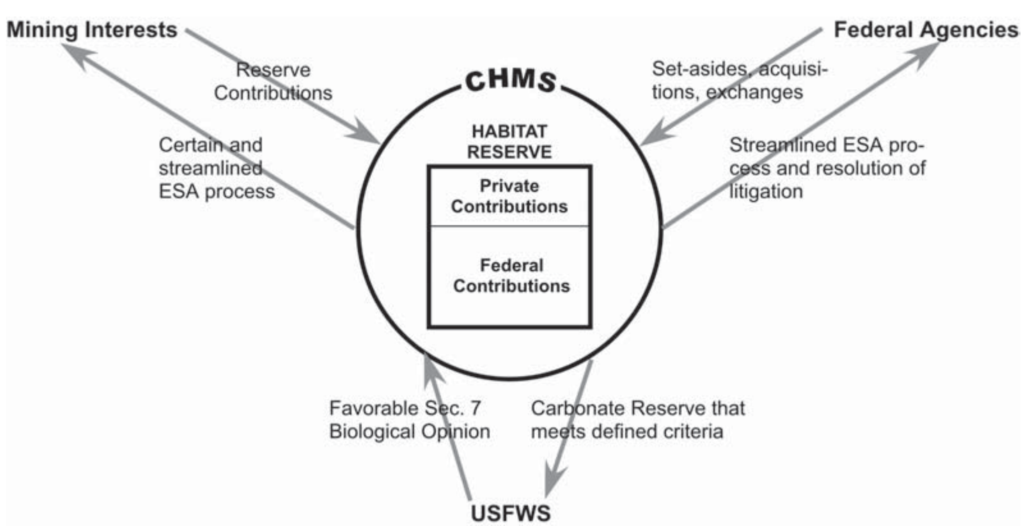
A Covered Activity within the CHMA *may*, but *is not required to,* utilize the CHMS to obtain ESA Compliance and other regulatory streamlining that may be offered by the Resource Management Agencies or the County through the CHMS in the future.

4. Strategy Overview

The CHMS is essentially a strategy for streamlining ESA compliance for mining activities and building a reserve for the Carbonate Plants over time that is designed to provide for their long-term survival and recovery. This section summarizes this strategy, which is described in much greater detail in the balance of this document. This section is not intended to summarize the overall document, but rather to highlight how the CHMS is designed to meet the competing interests of the mining industry and conservation of the Carbonate Plants. For more detailed descriptions of the concepts summarized in this section, see the sections cross-referenced in this section. In the event of a conflict between the summary information provided in this section and the more detailed provisions of the following sections, the latter shall control.

(a) Meeting competing objectives. The CHMS attempts to meet its competing economic, conservation, and regulatory objectives by improving the prospects of achieving each of the three types of objective. The key pieces of the strategy, as depicted in *Figure 2*, are

Figure 2: CHMS Strategy Overview



that *(i)* mining interests will make contributions to the reserve and obtain increased regulatory certainty and permit streamlining (*see* Sections 8(c), 11), *(ii)* the Resource Management Agencies will make contributions to the reserve (*see* Sections 8(a)–(b), (e)) and obtain the streamlining of their compliance process under Section 7 of the ESA (*see* Section 11), as well as the means to resolve litigation against them, and *(iii)* the USFWS will issue a favorable CHMS Biological Opinion (*see* Section 3(b)(i)) and obtain increased certainty that a Habitat Reserve will be achieved that meets the survival and recovery needs of the Carbonate Plants (*see* Section 9).

Currently within the CHMA, some land is being mined and a limited amount of land has been set aside for permanent conservation, but most of the land is neither being mined nor is dedicated to conservation (*see Map 1* and *Map 2* in *Appendix I*). The CHMS will, in an orderly fashion, allow certain lands to be added to the mining category so long as a sufficient amount of land is being contributed to the Habitat Reserve for permanent conservation (*see* Sections 8(c), 11). To provide a means of tracking these different land uses over time, the CHMS uses the land category designations shown in the box below, which are grouped based upon whether they are mining uses, conservation uses, or not yet committed to any particular use (*see* Section 5).

Over time, some of the uncommitted category lands (D, P, and X) will be systematically converted to the mining categories (M1, M2, and F), on the one

Land Use Categories

Mining Uses

M1: Approved under Mining Plan

M2: ESA compliant, not yet subject to a mining plan

F: Auxiliary mining use (minor amount of land)

Conservation Uses

E: Established reserve (Habitat Reserve)

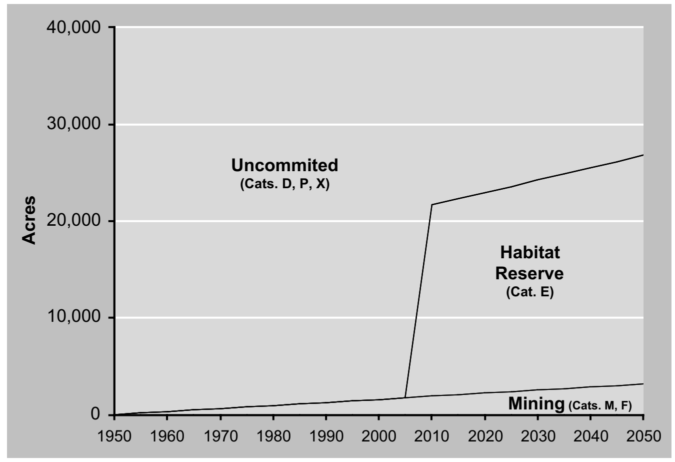
Uncommitted

D: Default (federal)

P: Private

X: Transfer (fed. land earmarked for exchange)

Figure 3: Land Use Shift over Time



The data reflected here are based upon rough estimates of historical and projected changes in land use over time assuming that the CHMS goes into effect. To be conservative, no federal land exchanges or acquisitions and no reintroductions of Carbonate Plants on reclaimed land are assumed, but the federal contributions comprising the Initial Habitat Reserve are *assumed.*

hand, and to the Habitat Reserve (E), on the other hand. This progression is depicted in *Figure 3*. The following subsections explain in more detail how this will occur.

(b) Conservation toolbox. A number of different tools are available to build the Habitat Reserve and achieve the objectives of the CHMS, as listed in the "toolbox" shown on page 12 and described in detail in Section 8. The CHMS provides the mechanisms needed to coordinate the use of many different conservation tools. One key mechanism provided under the CHMS is a method of measuring Conservation Value for the Carbonate Plants in terms of "Conservation Units" (*see* Section 7(a)). The Conservation Value of any parcel of land can be measured in terms of Conservation Units using only a geographical information system ("GIS") database developed by the Forest Service and without the need for new field surveys (Section 7(b)–(f)). Conservation Units provide the CHMS with a common way to measure both conservation and loss of habitat values, facilitating the use of various conservation tools in many different combinations.

The CHMS takes the further step of creating a Conservation Value commodity known as "Conservation Credits" (Section 7(a)). Any landowner or claim holder within the CHMA may contribute land or claims to the Habitat Reserve and receive Conserva-

CHMS "Toolbox"

- **Federal designations—**dedication of existing unclaimed federal land to the Habitat Reserve
- **Federal purchases—**purchase of private land and mining claims using federal funds
- **Project compliance—**contributions to the Habitat Reserve (of land or claims) by mining interests in exchange for ESA Compliance
- **Conservation banking—**contributions to the Habitat Reserve (of land or claims) by private parties in exchange for tradable Conservation Credits
- **Federal land exchanges—**exchanges of federal land for private land or claims with high habitat value for contribution to the Habitat Reserve
- **Revegetation—**voluntary contribution of revegetated reclaimed mining land in exchange for ESA Compliance or Conservation Credits

tion Credits (Section 10 introduction and (b)–(c)). Those Conservation Credits may be used to obtain ESA Compliance (*see* subsection *(c)* below and Sections 10(a) and 11) or "banked," that is, held for future use or sale to another private party (Sections 8(d) and 10(a)). *Figure 4* on page 12 depicts the creation and use of Conservation Credits. The Forest Service will administer the processes of *(i)* giving private parties Conservation Credits for making Reserve Contributions; *(ii)* processing applications for ESA Compliance; and *(iii)* tracking the ownership and transfer of Conservation Credits (*see* Section 10(f)).

(c) Permit streamlining. The primary benefit to mining interests under the CHMS is that their ESA Compliance requirements are easy to determine, and the ESA Compliance process is streamlined, simple, and quick (*see* Section 11). A party wishing to obtain ESA Compliance undertakes a three-step process, as shown in the box below.

Definitions

"Conservation Value" means the value of land for the conservation of the Carbonate Plants, as measured in "Conservation Units" (*see* Section 7 introduction and Section 7(a))

"Reserve Contribution" means a contribution to the Habitat Reserve in the form of either *(i)* granting privately owned land, *(ii)* relinquishing a mining claim, *(iii)* restricting a mining claim or privately owned land for conservation purposes subject to later redemption by offering equivalent Conservation Value in another form, or *(iv)* granting or relinquishing the surface rights of privately-owned land or a mining claim while retaining the right to conduct subsurface mining (*see* Section 10(b))

The CHMA is divided into five "Administrative Units" (*see* Section 6; also referred to as simply a "Unit"). As soon as certain conservation objectives are satisfied within a Unit (*see* subsection *(d)(ii)* below and Section 9(b)(i)), mining projects within that Unit may use the process described above to obtain ESA Compliance.

(d) Conservation measures. The permit streamlining described above is possible under the ESA because of the CHMS's provision of the Habitat Reserve as a means of conserving large, well-placed blocks of high-quality habitat for the Carbonate Plants in perpetuity (*see* Section 9). The coordinated implementation of the CHMS can provide a much more cohesive and significant reserve for these species than would occur in the absence of such a coordinated conservation strategy. The CHMS provides the following measures to ensure that the Habitat Reserve will provide sufficient conservation of the Carbonate Plants:

The Streamlined ESA Compliance Process

1 Calculate the number of Conservation Credits required to obtain ESA Compliance for the project (3 × the Conservation Value of the land to be mined)

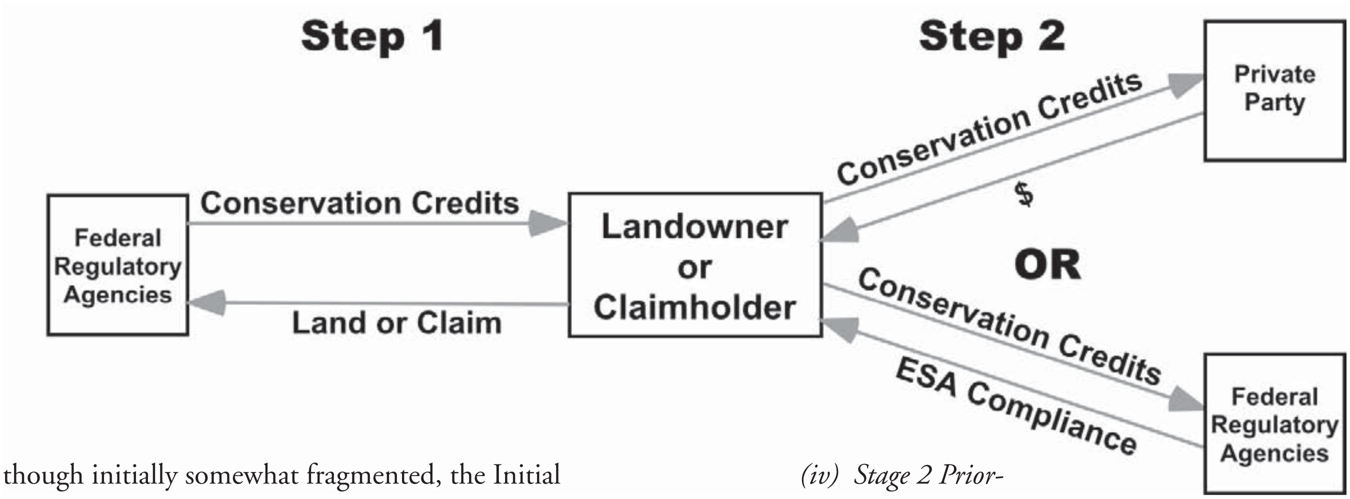
2 Obtain the required Conservation Credits by making Reserve Contributions *or* by purchasing Conservation Credits from another party

3 Submit the required Conservation Credits and sign the CHMS Memorandum of Understanding

The Forest Service processes the paperwork and issues a concurrence letter to the applicant which serves as evidence that the project has satisfied the requirements of the ESA for the Carbonate Plants

(i) Initial Habitat Reserve. The "Initial Habitat Reserve" shown on *Map 3* in *Appendix I* (*see* Section 9(a)) consists of lands to be managed by the Resource Management Agencies as part of the Habitat Reserve from the outset of CHMS implementation. It provides 19,264 acres of permanently preserved habitat at the very outset—about 30% of the Conservation Value contained in the entire CHMA—before any loss of Carbonate Plants will occur under the CHMS. Al-

Figure 4: Creation and Use of Conservation Credits



though initially somewhat fragmented, the Initial Habitat Reserve provides a core conservation area across the entire CHMA from the very outset.

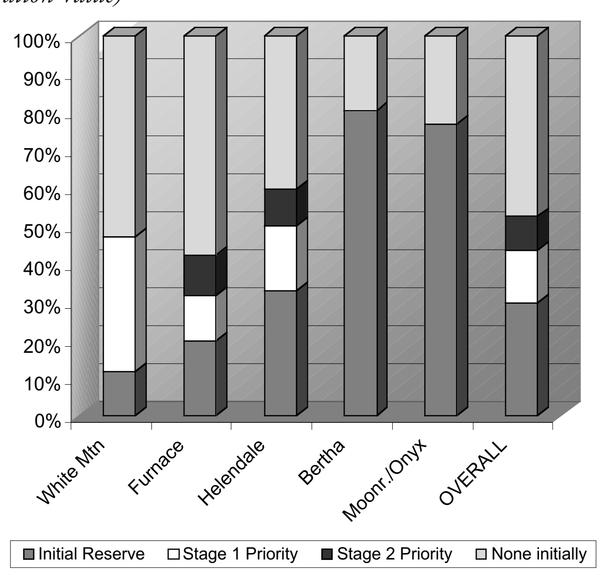
(ii) Stage 1 Priority Areas. No loss of habitat for Carbonate Plants may occur under the CHMS within any Administrative Unit until most of the valuable Carbonate Plant habitat in the "Stage 1 Priority Areas" within such Unit (*see Map 3* in *Appendix I*) has been added to the Habitat Reserve (*see* Section 9(b)(i)). Such habitat in the Stage 1 Priority Areas plus the portion of the Initial Habitat Reserve within each Unit provide a solid base of conservation within each Administrative Unit *that must be part of the Reserve before any loss of Carbonate Plants can occur within that Unit under the CHMS.*

(iii) Furnace Unit Stage 1 Priority Areas. Much preliminary work has been done so that the Furnace Unit Stage 1 Priority Areas can be added to the Reserve as soon after the adoption of the CHMS as possible. Specifically, a series of transactions that utilizes nearly the entire "toolbox" of conservation tools is being assembled (Section 9(d)). *Map 6* in *Appendix I* shows how the Habitat Reserve may be configured if all such transactions were to occur. These transactions will be prepared to close simultaneously after adoption of the CHMS and upon the closing of any federal land exchanges or purchases necessary to complete the transactions. Federal legislation may be sought to give the Resource Management Agencies authority to complete land transactions on an expedited basis (*see* Section 16).

(iv) Stage 2 Priority Areas. The Stage 2 Priority Areas shown on *Map 3* in *Appendix I* are also targeted for addition to the Habitat Reserve utilizing the "toolbox" described above (*see* Section 9(b)(ii)). No loss of habitat for Carbonate Plants may occur under the CHMS *at any time* within any Stage 2 Priority Area. Furthermore, the CHMS provides incentives for land within Stage 2 Priority Areas to be added to the Reserve (*see* Section 9(b)(iii)).

The Initial Habitat Reserve and the Stage 1 and Stage 2 Priority Areas together form the basis for securing a core of Habitat Reserve within each Administrative Unit. *Figure 5* shows the percentage of the Conservation Value in each of these categories by Unit, and *Table 5* on page 24 provides more detailed data on

Figure 5: Types of Habitat Protection by Unit (by % of Conservation Value)



these categories. Note, however, that the CHMS does not prevent private parties from seeking compliance with the ESA apart from the CHMS in any portion of the CHMA, including within Priority Areas. Initially, only the Initial Habitat Reserve areas are completely protected from mining activity.

(v) Compensation Ratio. A "Compensation Ratio" of 3:1 is required for any loss of Carbonate Plant habitat that is allowed under the CHMS (*see* Section 11(a)). This ratio is measured in terms of Conservation Value. Before a mining activity can be allowed under the CHMS, the applicant must add land worth 3 units of Conservation Value to the Habitat Reserve for each unit of Conservation Value to be lost to the proposed mining activity. Adjustments are made to the Conservation Value calculations to encourage both reserve formation and mining in compact formations with a minimum of perimeter (*see* Section 7(e)). Also, compensation must be provided *in advance* of the loss of habitat, so *preservation of habitat will necessarily stay ahead of loss of habitat at a minimum of a 3:1 ratio* under the CHMS (as measured in Conservation Value). Within each Unit, a substantial portion of such project compensation may initially occur in the Priority Areas.

(vi) Federal land contributions. Federal land contributions made to the Habitat Reserve are *in addition to* project compensation that occurs under the CHMS (*see* Section 8(a)–(b), (e)–(f)). All federal land exchanges and purchases that add to the Habitat Reserve therefore increase the ratio of preservation to habitat loss to be *in excess of 3:1.* Major initial acquisitions of rich habitat for Carbonate Plants are targeted under the CHMS, (primarily in the Furnace Unit Priority Areas), which would add significant value to the Reserve.

(vii) Private land contributions. There is currently no federal protection of plant species listed under the ESA that occur on privately-owned lands. The CHMS provides incentives for the contribution of private land with high Conservation Value to the Habitat Reserve, thus providing permanent protection of habitat for Carbonate Plants on lands that are not currently subject to the ESA.

The following parts provide a complete description of all of the matters introduced in this overview section. ❀

Carbonate Habitat Management Strategy

II. Components

The CHMS is built on a framework of four key components: Land use categories *are established for purposes of tracking the status of land within the CHMA as committed for mining activities, committed for conservation, or uncommitted.* Administrative Units *have been identified as logical administrative subareas within the CHMA. A method is established for measuring* Conservation Value *for the Carbonate Plants. Finally,* conservation tools *are set forth as the various means by which the Reserve Criteria can be satisfied. The four sections of this Part II provide a detailed description of each of these four components.*

5. Land Use Categories

All land within the CHMA is classified into seven land use categories, which are described in this section and summarized in the box on page 16. The CHMS is fundamentally a matter of shifting lands of relatively high mineral value into categories that permit mining activities and shifting other lands of relatively high Conservation Value into the Habitat Reserve. The land use categories are established to provide a means of describing and tracking the shifting of land uses over time.

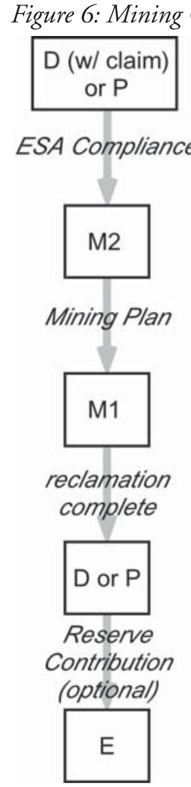
Two key points are critical to understanding the land use categories. First, because the CHMS is a voluntary program, the land use categories do not affect the rights of landowners or claims holders on land that has not been voluntarily subjected to the CHMS. Second, the categorization of land is dynamic; it *will* change over time. Only lands in "Category E," the conservation category (*see* subsection *(b)* below), cannot change once they are in that category, as Category E represents land permanently set aside as part of the Habitat Reserve.

Map 3 in *Appendix I* shows the expected status of land categories within the CHMA at the commencement of CHMS implementation. The progression of lands through the mining cycle is depicted in *Figure 6*; and the various categories are described in detail in the following paragraphs.

(a) Mining Category lands. The following three land use categories are mining-related categories; lands in these categories may be referred to as "Mining Category" lands.

(i) Category M1: Fully Permitted. This category represents land that either *(a)* has been mined in the past and has not yet been reclaimed (including receiving approval and release for completed reclamation); or *(b)* has been approved under a Mining Plan (as defined in this subsection). Once a Category M1 parcel has been successfully reclaimed in accordance with its Mining Plan, the parcel reverts to Category D or Category P (*see* subsection *(c)* below) and can be re-categorized again in the future. The Conservation Value associated with such a reclaimed parcel is not changed automatically, but may be changed by changing the "Habitat Inventory" in accordance with Section 14(d). A "Mining Plan" is defined as a mining plan of operations (in the case of a claim on federal land) or a mining and reclamation plan (in the case of mining on private land)

Figure 6: Mining Cycle



Land Use Categories Summary

Mining Categories:

M1: Fully Permitted
Land that either *(i)* has been approved under a Mining Plan or *(ii)* is currently impacted by mining activity.

M2: CHMS Compliant
Land with ESA Compliance under the CHMS, but no Mining Plan.

F: Auxiliary Use
Federal lands made available to private mining operations for uses that are auxiliary to mining activities, such as haul roads, utility corridors, and water wells; little land will be in this category.

Conservation Category:

E: Established Reserve
Land permanently committed to the Habitat Reserve.

Uncommitted Categories:

D: Default
All federal land not otherwise designated; includes any claimed federal land contributed as a "Relocatable Contribution."

P: Private
Privately-owned land that has not been categorized as M1, M2, or E; includes any private land contributed as a "Relocatable Contribution."

X: Transfer
Federal lands having little or no habitat value for the Carbonate Plants that have been designated for transfer out of federal ownership.

that has been approved by the requisite federal or County authorities.

(ii) Category M2: CHMS Compliant. This category represents land that has obtained ESA Compliance under the CHMS, but is not yet subject to a Mining Plan. Once Category M2 land comes under a Mining Plan, it will be automatically redesignated as M1.

Categories M1 and M2 may be referred to collectively as "Category M."

(iii) Category F: Auxiliary Use. This category includes small acreages of federal land needed for a mining operation, such as haul roads, utility corridors, and well sites, that are not under private ownership or claim by the mining operator. Under Section 11(b) below, the Resource Management Agencies may create such Category F lands as an inducement for a landowner or claim holder to place lands in Category E.

(b) Conservation Category lands. The following land use category is for land committed to conservation; lands in this category may be referred to as "Conservation Category" lands:

Category E: Established Reserve. This category includes all land that has been permanently committed to the Habitat Reserve. Land in this category cannot be changed to any other category. Category E includes some private land within the CHMA that was under permanent conservation easement at the commencement of the CHMS. The methods of protecting additions to Category E lands are described in Section 9(f).

(c) Uncommitted Category lands. The following three land use categories are not committed to either mining activities or the Habitat Reserve; lands in these categories may be referred to as "Uncommitted Category" lands.

(i) Category D: Federal Default. This category is the default category and includes all federal lands within the CHMA that are not otherwise designated. Category D land can become Category M2 by obtaining ESA Compliance. It can become Category E land if it is made part of the Habitat Reserve as described in Section 10 below. It can also be shifted into Category F, P, or X if it later meets the qualifications for inclusion in one of those categories. Category D will also include federal land contributed as a "Relocatable Contribution" under Section 10(b)(ii). The Resource Management Agencies shall manage Category D lands in accordance with the applicable Federal Land Plans, which may, but are not required by the CHMS, to provide protections for Carbonate Plants.

(ii) Category P: Private Default. This category includes all privately-owned land within the CHMA that has not been designated in Categories M or E.

Category P will also include private land contributed as a Relocatable Contribution under Section 10(b)(ii).

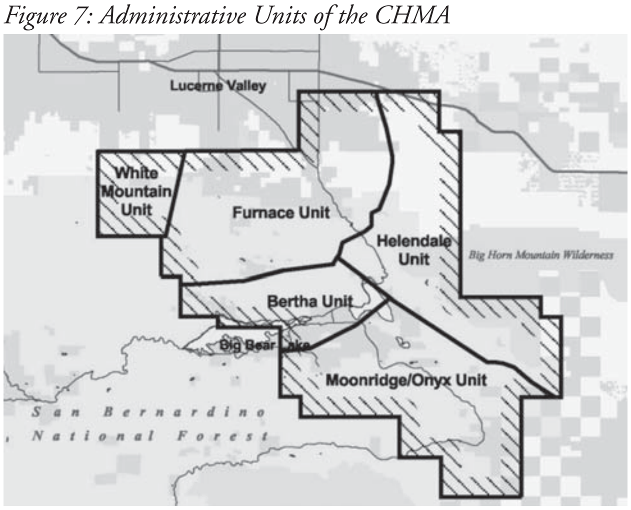
(iii) Category X: Transfer. This category includes federal lands that have been designated for transfer out of federal ownership. It is intended that the Resource Management Agencies will select parcels for Category X because they have commercial value but no significant habitat value for the Carbonate Plants or other public use value (the commercial value may be for uses other than mining). Once Category X parcels are transferred to private ownership, they become Category P. If such parcels subsequently obtain ESA Compliance, they convert to Category M2.

6. Administrative Units

For purposes of administering the CHMS across the 160,000-acre CHMA, the CHMA has been divided into five subareas ("Administrative Units" or "Units"): White Mountain, Furnace, Helendale, Bertha, and Moonridge/Onyx. The general location of these Administrative Units is shown on *Figure 7*.

Of the five Units, only White Mountain, Furnace, and Helendale have any expected potential for conflict between mining activity and the Carbonate Plants. The other two Units, Bertha and Moonridge/Onyx, encompass 61,751 acres of land, but contain only about 88 acres of known habitat for Carbonate Plants

Figure 7: Administrative Units of the CHMA



(exclusively Cushenbury buckwheat), all of which is part of the Initial Habitat Reserve. The Bertha and Moonridge/Onyx Units are included in the CHMA in order to strengthen the basis of analysis for the CHMS Biological Opinion by including most of the range of the Carbonate Plants in the area analyzed.

In order to assure that the conservation of habitat under the CHMS is broadly distributed across the CHMA, Reserve "Priority Areas," as defined in Section 9(b), have been identified for each of the three Units with existing or expected mining activity. The Priority Areas include a good representation of important habitat for Carbonate Plants that exist in each Unit, and both rules and incentives have been established for the addition of the Priority Areas to the Habitat Reserve (*see* Section 9(b)).

7. Conservation Value

Mining interests obtain ESA Compliance under the CHMS by contributing a certain amount of land to the Habitat Reserve to offset impacts to habitat on land to be mined. But because the Conservation Value (or "CV") of various parcels of land varies dramatically within the CHMA, the trade-off cannot be measured in raw acres of land, lest land of low Conservation Value be used to compensate for the mining of land of high Conservation Value. The CHMS addresses this problem by providing a means for evaluating land within the CHMA in terms of its Conservation Value per acre for the Carbonate Plants. This section describes how the Conservation Value of any parcel of land within the CHMA may be evaluated using a common method of measurement.

(a) Conservation Units and Conservation Credits. The unit of measurement of Conservation Value is referred to as a "Conservation Unit," and may be abbreviated, "CU." The "currency" of the CHMS is "Conservation Credits"; a Conservation Credit represents one Conservation Unit of value. Measuring Conservation Value in terms of Conservation Units is used in a variety of ways under the CHMS, including:

- As a basis for determining the number of Conservation Credits that will be given to a party who makes a Reserve Contribution of a particular parcel of land (*see* Section 10(c));
- As a basis for determining the Reserve Contribution or the number of Conservation Credits that will be required in order to obtain ESA Compliance for a particular parcel of land under the CHMS (*see* Section 11(a)); and
- As a basis for monitoring the growth of the Habitat Reserve (*see* Section 14(b)–(c) below).

The balance of this section describes how a parcel of land is evaluated in terms of Conservation Units.

Definitions

"Occupied Habitat" means land designated on the Habitat Inventory as occupied habitat for one or more of the Carbonate Plants; excludes Revegetated Habitat

"Suitable Habitat" means land designated on the Habitat Inventory as suitable habitat for one or more of the Carbonate Plants, but not occupied; excludes Revegetated Habitat

"Revegetated Habitat" means mining land that has been revegetated and meets all of the requirements for obtaining conservation credit set forth in Exhibit E; different amounts of conservation credit are available depending upon what revegetation success criteria are met

"Other Beneficial Habitat" means land that is designated on the Habitat Inventory as undisturbed natural land that provides some geomorphological, hydrological, or habitat configuration benefit to the Carbonate Plants; excludes land in any of the other habitat categories listed above

(b) Application of multipliers. The Conservation Value, in terms of Conservation Units, of any parcel of land within the CHMA can be determined by dividing the parcel into parts based upon the type of habitat on each part (*see* box above for definitions of habitat types), and multiplying the acreage of each part by the applicable multiplier from *Table 1*. In addition, the Resource Management Agencies shall apply a minimum 1.0 CV/acre to any land required for the "Priority Areas" in accordance with Section 9(b)(iii).

(c) Source of data. The data to be used to evaluate the Conservation Value of land for purposes of the CHMS is the Forest Service's official GIS database for the CHMS that identifies all land within the CHMA by the habitat categories shown in the definitions box in the left column (the "Habitat Inventory"). Accordingly, *no new field surveys shall be required* to evaluate the Conservation Unit value of a parcel, although a party may seek to have the Habitat Inventory revised under Section 14(d)(iv). The initial Habitat Inventory is depicted on *Map 4* in *Appendix I*, and statistics from the Habitat Inventory are presented in *Appendix D*. The Habitat Inventory will be updated periodically in accordance with Section 14(d). The basis for the development of the initial Habitat Inventory and the criteria for modifying the Habitat Inventory are described in *Appendix C*. The Forest Service shall make the initial Habitat Inventory and each update available to the public by such digital and/or hard copy methods as it deems appropriate from time to time.

Table 1: Conservation Value Multipliers

1.75	×	acres containing Occupied Habitat for *all four* Carbonate Plants
1.50	×	acres containing Occupied Habitat for *any three* of the Carbonate Plants
1.25	×	acres containing Occupied Habitat for *any two* of the Carbonate Plants
1.00	×	acres containing Occupied Habitat for *any one* of the Carbonate Plants
0.50	×	acres containing Suitable Habitat for any one or more of the Carbonate Plants
0.25–1.00	×	acres containing Revegetated Habitat (depending on the success criteria met; *see Table 2*)
0.25	×	acres containing Other Beneficial Habitat
0.00	×	all other acres (acres containing no habitat benefiting the Carbonate Plants)

Table 2: Conservation Value Multipliers for Revegetated Habitat

A conservation multiplier of between 0.25 and 1.00 per acre will apply to Revegetated Habitat as follows (see Section (a) of the Revegetation Guidelines for a more complete description):

0.25 per acre of Revegetated Habitat without Carbonate Plants

0.50 per acre of Revegetated Habitat with at least one Carbonate Plant

An additional 0.20 per acre of Revegetated Habitat that meet enhanced success criteria

An additional 0.10 per acre for each additional Carbonate Plant species occurring (for an addition to the multiplier of up to 0.30 per acre)

Table 3: Conservation Value Totals

Unit	Total Acres	Total Cons. Value*
White Mountain	10,573	922 CU
Furnace	47,578	10,544 CU
Helendale	40,560	8,865 CU
Bertha	17,474	827 CU
Moonridge/Onyx	44,277	1,072 CU
TOTAL	**160,462**	**22,230 CU**

*Excludes the 1.0 CU/acre minimum CV potential in the final configuration of the Priority Areas

(d) Initial Conservation Values within the CHMA. The Conservation Values of land within the CHMA as of the commencement of the CHMS are depicted on *Map 5* in *Appendix I*. *Table 3* provides a statistical breakdown of the total Conservation Value existing within each Administrative Unit within the CHMA.

(e) Adjusted Conservation Value. Conservation Value takes into account the inherent habitat characteristics of any given parcel within the CHMA, but it does not take into account the *configuration* in which the habitat lies. Generally speaking, when habitat is more connected and has fewer edges where human activities could disrupt reserve function, it is of greater value to the species that it supports. To take this into account, the CHMS uses the concept of "Adjusted Conservation Value" or "ACV."

Adjusted Conservation Value takes into account the net increase or net decrease in edge (*see* the definition of "edge" in the box below) resulting from both new Reserve Contributions and new mining activities. When a Reserve Contribution is made, net increases in reserve edge will result in a discount in Conservation Value, and net decreases in Reserve edge will result in a bonus in Conservation Value. Conversely, when a new mining activity receives ESA Compliance under the CHMS, net increases in mining edge will result in an increase in required habitat compensation, and net decreases in mining edge will result in a decrease in required habitat compensation. In making these edge adjustments, edges creating an interface between Conservation Category lands and Mining Category lands are deemed to have a greater negative impact than edges that create an interface either between Conservation Category lands and Uncommitted Category lands or between Mining Category lands and Uncommitted Category lands.

Definition

"edge" means the line where land of one of the three types of land use categories (Mining Category, Reserve Category, or Uncommitted Category) meets another of the three types; for purposes of determining whether Mining Category land shares an edge with Reserve Category land, any Reserve Category land that is within one-fifth (1/5) mile of Mining Category land shall be deemed to share an edge with the Mining Category land

Specifically, Adjusted Conservation Value is calculated as follows:

(i) For the newly proposed Conservation Category or Mining Category lands, multiply the lineal mileage of *new edge* (that is, *excluding* the edge where the new Conservation Category land meets existing Conservation Category land or where the new Mining Category land meets existing Mining Category land) of the proposed land area by the corresponding CU/mile factors in *Table 4*.

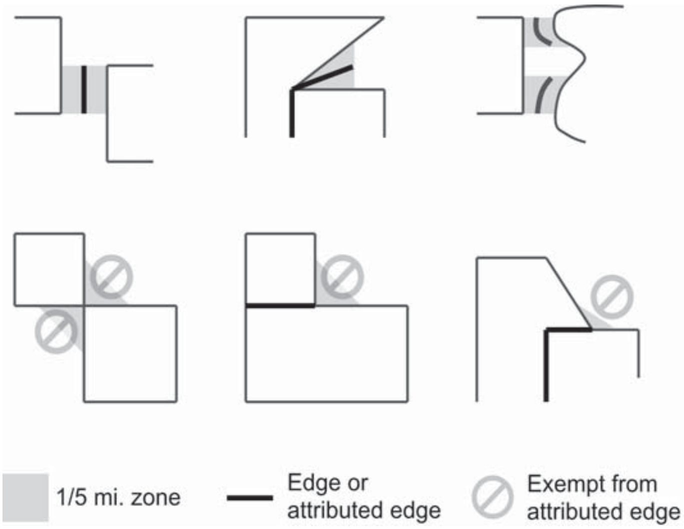
Table 4: Edge Adjustments by Land Use Category

Edge Interface by Land Use Category			Adjustment per Lin. Mile
New Cat.		***Exist. Adj. Cat.***	
E	*vs.*	M or F	24 CU
E	*vs.*	D, P, or X	12 CU
M or F	*vs.*	D, P, or X	12 CU
M or F	*vs.*	E	24 CU

(ii) For any existing edge *eliminated* by the new proposed Conservation Category or Mining Category lands (that is, the edge where the new Conservation Category land meets existing Conservation Category land or where the new Mining Category land meets existing Mining Category land), multiply the lineal mileage of such edge as it existed before the proposed change by the corresponding CU/mile factors in *Table 4*.

Note that for purposes of determining whether Mining Category land shares an edge with Conservation Category land, a shared edge will be attributed in cases where a Conservation Category boundary is within one-fifth (1/5) mile of Mining Category land, though the two boundaries do not physically touch.

Figure 8: Illustrations of Attributed Edges



The length of the attributed edge shall be the length of an imaginary line that is half way between the two parcels for the distance that such line is in the 1/5-mile zone between the two parcels. Such 1/5-mile proximities that are formed by parcel lines that meet at angles of ninety (90) degrees or more shall be exempt from this attributed edge treatment. The attributed edge concept is illustrated in *Figure 8*.

(iii) Subtract the result in *(ii)* above from the result in *(i)* above to arrive at the "Net Edge Adjustment."

(iv) In the case of a Reserve Contribution, *subtract* the Net Edge Adjustment from the Conservation Value of the parcel to obtain the Adjusted Conservation Value; in the case of an area of proposed mining activity, *add* the Net Edge Adjustment to the Conservation Value of the parcel to obtain the Adjusted Conservation Value (note that the Net Edge Adjustment can be a positive or a negative number and can therefore result in an ACV that is either greater or less than the unadjusted Conservation Value).

The following formulae summarize the calculation of Adjusted Conservation Value:

$$ACV_{\text{Reserve Contribution}} = CV - (\text{Net Edge Adjustment})$$

$$ACV_{\text{Mining Proposal}} = CV + (\text{Net Edge Adjustment})$$

A positive Net Edge Adjustment value is always regarded as a detriment to the habitat for Carbonate Plants. As reflected in the formulas above, that detriment is translated into a *decrease* in the Conservation Value recognized for Reserve Contributions and as an *increase* in the Conservation Value for which compensation would be required for a mining proposal.

The examples shown in *Appendix G* demonstrate how this calculation is made and how it operates as an incentive to configure both Reserve Contributions and mining activities so as to keep habitat connected and minimize edge effects. *Appendix F* includes worksheets for valuing Reserve Contributions and ESA Compliance requirements; these worksheets incorporate the procedure for calculating Adjusted Conservation Value and Net Edge Adjustment.

(f) Application of Adjusted Conservation Value. Adjusted Conservation Value, measured in Conservation Units, is a concept of measurement. When determining the number of Conservation Credits to be given for a particular Reserve Contribution, the permanence of the contribution must also be taken into account (*see* Section 10(c)(iii)). To determine the number of Conservation Credits that will be required to obtain ESA Compliance for a particular mining activity, the "Compensation Ratio" must be applied (*see* Section 11(a)).

The following section concludes this part on "components" by describing the key tools that are available to form the Habitat Reserve.

8. Conservation Tools

Several different tools can be used to assemble a Habitat Reserve that meets the CHMS objectives. This section describes some of the key tools, roughly in order of their expected importance. These tools are catalogued in this section without suggesting how they might work together to implement the CHMS. The purpose of having a variety of tools available is to make it possible to choose the best tool or tools for a given situation; not all of the tools are appropriate for all circumstances. Part III: Implementation, which follows this section, shows how the various tools are put to use to form the Habitat Reserve.

(a) Federal designations. Most of the habitat for the Carbonate Plants is located on federal lands managed by the Resource Management Agencies. Much of that habitat is under mining claim and is therefore not within the control of the federal agencies to provide full protection from future mining. The Initial Habitat Reserve land shown on *Map 3* in *Appendix I* is not, however, under existing claim and shall be designated by the Resource Management Agencies as Habitat Reserve. The means by which federal land is designated Habitat Reserve is by protecting it in the manner described in Section 9(f), which may allow for public use that is compatible with the intended purpose of the Habitat Reserve.

(b) Federal purchase. Since much of the habitat for the Carbonate Plants is on privately-owned land or federal land that is subject to mining claims, tools are needed to induce private parties to sell (or exchange; *see* subsections *(e)* and *(f)* below) their privately-owned land or mining claims for the Habitat Reserve, as follows:

(i) Types of purchase. The federal government may purchase two types of interest under the CHMS. Such purchases must be made in accordance with all applicable federal laws and regulations. Also, protections against third-party claims, as provided in Section 9(f), must be in place prior to or concurrent with such acquisitions. The two types of interest that the federal government may purchase are :

(A) Private property in fee, including patented mining claims.

(B) Mining claims on federal lands (by paying for the relinquishment of such claims); purchases of unpatented claims may require special federal legislation.

(ii) Willing sellers. Because the CHMS is a voluntary program, any purchases pursuant to the CHMS will be between the federal agencies and willing private sellers. The use of eminent domain is not a tool for implementing the CHMS.

(iii) Prioritization. When funds are available, purchases will be prioritized under the CHMS so as to obtain the greatest contribution to the Habitat Reserve for the dollar spent. The definition of Conservation Unit can be valuable for this purpose, because it allows potential purchases to be ranked based upon Conservation Units/dollar (or, "CU/$")—a direct measure of conservation value preserved for each dollar spent. A direct purchase component of the CHMS also provides the opportunity to obtain some parcels whose value to the Habitat Reserve is not fully reflected by the CU /$ measure. Such parcels may include, for example, ones that provide key linkages between other conserved parcels or important habitat that is particularly susceptible to loss to mining activities.

(c) Project compliance. A core feature of the CHMS is that it provides a procedure for obtaining ESA Compliance for new mining activities, as detailed in Section 11. The compensation required for obtaining ESA Compliance is the offering of Conservation Credits that represent Reserve Contributions. The effect is that land is added to the Habitat Reserve, and private parties obtain ESA Compliance. Project compliance represents the mining industry's primary contribution to the CHMS and is a primary means of building the Habitat Reserve by adding to the Initial Habitat Reserve.

(d) Conservation banking. Private parties who hold claims or land within the CHMA with Conservation Value may obtain Conservation Credits—either by making Reserve Contributions or by purchasing them from other private parties—and hold them for future use or sale rather than immediately use them to obtain ESA Compliance. This practice may be referred to as "conservation banking" because it results in a "bank" of credits for the party who makes the Reserve Contribution, which may be held, sold, or used in the future, as detailed in Section 10(a). Regardless of how the Conservation Credits are used, when a party makes a Reserve Contribution and obtains credits, the size of the Habitat Reserve is immediately increased.

(e) Exchanges for federal lands. The Resource Management Agencies may hold certain lands that have commercial value, but little or no Conservation Value or other public use value. An additional way to increase the Habitat Reserve is for the federal government to exchange such lands for privately owned land that has substantial Conservation Value and set aside the land received for the Habitat Reserve, as discussed in subsection *(a)* above. The federal land being traded to a private party need not be located within the CHMA. Such exchanges must be made in accordance with all applicable federal laws and regulations. Also, protections against third-party claims, as provided in Section 9(f), must be in place prior to or concurrent with such acquisitions.

(f) Fee-for-claims swaps. The Forest Service and the BLM could also exchange surplus lands for mining claims that have substantial Conservation Value and designate the land received as Habitat Reserve, as discussed in subsection *(a)* above. As with exchanges for fee-owned land, federal land being traded to a private party need not be located within the CHMA. Such exchanges must be made in accordance with all applicable federal laws and regulations. Protections against third-party claims, as provided in Section 9(f), must be in place prior to or concurrent with such acquisitions. Such exchanges may also require special federal legislation.

(g) Revegetation. Land that has been mined need not result in a permanent biological loss. Once a mining operation is complete in a particular location, SMARA and federal regulations require that the land be reclaimed, including that it be revegetated. Furthermore, the CHMS provides incentives to meet revegetation success criteria included in the "Guidelines and Success Criteria for Revegetation and Carbonate Plant Introductions" set forth in *Appendix E* (the "Revegetation Guidelines"). When land has been successfully revegetated, the landowner or claim holder may, but is not required to, make a Reserve Contribution of such land and receive either ESA Compliance or Conservation Credits (*see* Section 12(b) and *Table 2* on p. 18). Such contributions are yet another way that the Habitat Reserve can be increased over time.

(h) Other contributions. Land may also be added to the Habitat Reserve by means of contributions for regulatory compliance other than ESA Compliance under the CHMS, such as for CEQA compliance or NEPA compliance that is not related to the Carbonate Plants.

Special legislation may be sought to appropriate funds for the types of transactions described in subsections (b), (e), and (f) above and possibly to assist in the implementation of various transactions. Special legislation is discussed in more detail in Section 16.

The following part describes how the conservation tool kit described in this section, as well as each of the other elements or components described in this *Part II,* are to be used to implement the CHMS.

Carbonate Habitat Management Strategy

III. Implementation

This part describes the implementation of the CHMS—the nuts and bolts of how it will operate to meet the objectives set forth in Section 2. It begins with an overview of how the Habitat Reserve will be formed over time. It then details both how private parties will make Reserve Contributions toward the formation of the Habitat Reserve and how mining interests may obtain ESA Compliance under the CHMS. It concludes by describing the role that revegetating reclaimed mining areas can play in building the Habitat Reserve and helping mining interests obtain ESA Compliance.

9. Reserve Formation

Forming the Habitat Reserve over time is how the CHMS meets its conservation objectives. This section describes how the Habitat Reserve is formed under the CHMS and how the CHMS becomes fully operational within each Administrative Unit as specified reserve formation objectives are met. *Table 5* on page 24 summarizes the acreage and Conservation Value of the various components of the Reserve.

(a) Initial Habitat Reserve. The Habitat Reserve is seeded by the Initial Habitat Reserve (*see* Section 4(d)(i)) prior to any private Reserve Contributions under the CHMS. The Resource Management Agencies have agreed to designate these lands as Habitat Reserve in accordance with Section 8(a) because they are able to do so without interfering with the interests of private parties.

(b) Priority Areas. The CHMS gives high priority to the acquisition of land for the Habitat Reserve within the areas designated on *Map 3* of *Appendix I* as "Stage 1 Priority Areas" and "Stage 2 Priority Areas" (collectively, the "Priority Areas"). These areas include important habitat for the Carbonate Plants as well as the potential for preserving large contiguous blocks of habitat and connecting land. The following tools, which include both incentives and rules, shall be in effect under the CHMS to facilitate the addition of land within the Priority Areas to the Reserve:

(i) Stage 1 Priority Area requirement. Within any Administrative Unit, the following must be added to the Habitat Reserve before any loss of habitat may be authorized under the CHMS within that Unit: *(A)* 100% of the Occupied Habitat that occurs in the Stage 1 Priority Areas; *(B)* 85% of the Suitable Habitat that occurs within the Stage 1 Priority Areas; and *(C)* sufficient additional land to preserve such Occupied and Suitable Habitat in one contiguous patch ("Connective Land"). The determination of the sufficiency of the Connective Land shall be in the discretion of the applicable Resource Management Agency. Upon the addition of all such lands to the Habitat Reserve, ESA Compliance may be obtained in the Unit, and the Unit is deemed to be "Activated." This provision assures a substantial amount of important habitat will be included in the Habitat Reserve within a Unit in advance of any habitat loss within that Unit under the CHMS. No Stage 1 Priority Areas are designated for the Bertha or Moonridge Onyx Units because mining activity is not expected to occur there.

(ii) Stage 2 Priority Area loss prohibition. Even after a Unit has been Activated, no loss of habitat may be authorized under the CHMS within any Stage 2 Priority Area until the following are added to the Habitat Reserve *within that Stage 2 Priority Area: (A)* 100% of the Occupied Habitat; *(B)* 85% of the Suitable Habitat; and *(C)* sufficient Connective Land to preserve such Occupied and Suitable Habitat in one contiguous patch. The determination of the sufficiency

of the Connective Land shall be in the discretion of the applicable Resource Management Agency.

(iii) Conservation Value enhancement. Ordinarily, only Occupied Habitat has a Conservation Value of 1.0 CV/acre or more. In order to assist the meeting of the Stage 1 and Stage 2 Priority Area requirements described in subsections *(i)* and *(ii)* above, the applicable Resource Management Agency may, in negotiations with a prospective contributor of land to the Reserve, assign a minimum Conservation Value of 1.00 CU/acre to any portion of land within the Priority Area that is contributed to the Reserve. Although such minimum value assignments shall be in the discretion of the Resource Management Agency, the agency *must* make such minimum value assignments as to any land that it determines is *necessary* to meet the requirements of subsection *(i)* or *(ii)* above. This provision is intended to provide significant incentive for private parties to make Reserve Contributions in the Priority Areas in configurations that will help meet CHMS objectives.

Table 5: Reserve Formation Statistics

	Occ. Hab. (acres)	Cons. Val. (CU)	Occ. Hab. (% of Unit)	Cons. Val. (% of Unit)
White Mountain	*99*	*922*		
Initial Reserve	10	109	10%	12%
Stage 1 Prior.	57	326	58%	35%
Stage 2 Prior.	-		0%	0%
Total IR + S1 + S2	67	435	68%	47%
Furnace	*1,545*	*10,544*		
Initial Reserve	202	2,094	13%	20%
Stage 1 Prior.	452	1,234	29%	12%
Stage 2 Prior.	418	1,125	27%	11%
Total IR + S1 + S2	1,072	4,453	69%	42%
Helendale	*1,460*	*8,865*		
Initial Reserve	218	2,934	15%	33%
Stage 1 Prior.	633	1,513	43%	17%
Stage 2 Prior.	335	842	23%	9%
Total IR + S1 + S2	1,186	5,289	81%	60%
Bertha	*73*	*827*		
Initial Reserve	73	663	100%	80%
Stage 1 Prior.	-	-	0%	0%
Stage 2 Prior.	-	-	0%	0%
Total IR + S1 + S2	73	663	100%	80%
Moonridge/Onyx	*15*	*1,072*		
Initial Reserve	15	824	100%	77%
Stage 1 Prior.	-	-	0%	0%
Stage 2 Prior.	-	-	0%	0%
Total IR + S1 + S2	15	824	100%	77%
Total	*3,192*	*22,230*		
Initial Reserve	518	6,624	16%	30%
Stage 1 Prior.	1,142	3,073	36%	14%
Stage 2 Prior.	753	1,967	24%	9%
Total IR + S1 + S2	2,413	11,664	76%	52%

(c) Means of Adding Priority Areas to the Reserve. It is left to the various interested parties to engage in activities that will help add the Priority Areas to the Habitat Reserve. Drawing from the conservation tools described in Section 8, the three primary activities that are likely to be used to add Priority Areas to the Reserve are as follows:

(i) Federal acquisitions. The Resource Management Agencies may enter into purchase and sale agreements and exchanges to acquire land and claims from private parties for addition to the Habitat Reserve (*see* Sections 8(b), (e), and (f)). Some such purchases may require a congressional appropriation (*see* Section 16(a)), and both purchases and exchanges may be benefited by special streamlining legislation (*see* Section 16(b)).

(ii) Contingent Contributions. Private parties may make "Contingent Contributions" (*see* Section 10(d))—contingent offers of Reserve Contributions

that are not effective until the completion of the contribution of a Stage 1 Priority Area to the Habitat Reserve. Several parties could make such Contingent Contributions, and each of their Reserve Contributions would become effective simultaneously when transactions that would complete the addition of the Stage 1 Priority Area are all prepared to close. This tool can help resolve the "chicken and egg" problem that would otherwise exist before a Unit is Activated by the addition of its Stage 1 Priority Areas to the Habitat Reserve.

(iii) Ordinary Reserve Contributions. Priority Areas may also be added to the Habitat Reserve by means of direct Reserve Contributions for Conservation Credits.

(d) Furnace Unit Stage 1 Priority Areas. A series of transactions for the addition of the Furnace Unit Stage 1 Priority Areas to the Reserve (the "Initial Furnace Transactions") is well along in development. It is anticipated that some or all of these transactions shall be described in the biological assessment that is submitted to the USFWS to initiate the CHMS Section 7 Consultation. *Map 6* in *Appendix I* shows how the Habitat Reserve may be configured if all such transactions were to occur.

(e) Incremental Reserve growth. After the Initial Habitat Reserve is established, the Habitat Reserve will continue to grow as parties voluntarily make Reserve Contributions to obtain ESA Compliance or to bank Conservation Credits. Because of the requirements of subsection *(b)* above, much of this incremental growth is likely to occur in the Priority Areas initially. Because the "Compensation Requirement" (*see* Section 11(a)) for obtaining ESA Compliance is based on a 3:1 "Compensation Ratio," the overall pace of growth of the Habitat Reserve beyond the Initial Habitat Reserve will be at least three times the pace of loss of habitat caused by mining activity (in terms of Conservation Value).

(f) Means of protecting Habitat Reserve lands. It is the intention of the CHMS that all Habitat Reserve lands be protected from mining activity in perpetuity and be subjected only to public uses that are compatible with management of the Reserve for its intended purpose. The Resource Management Agencies shall manage the Habitat Reserve lands consistent with this intent within the bounds of their existing regulatory authority. The Forest Service shall also manage Category D lands containing habitat for Carbonate Plants in the same manner as for Habitat Reserve lands until such time, if any, that a Mining Plan is approved over such habitat.

When an interest in land is contributed to the Reserve, it shall be relinquished to the Resource Management Agency in the manner required by Section 10(b), which varies depending on the type of Reserve Contribution made. Regardless of the type of Reserve Contribution, however, the land interest must also be immediately protected from new mining claims in a manner that is satisfactory to the Resource Management Agency. The following are examples of alternative means by which land may be protected from new mining claims, some of which require an intermediate step before the interest is finally conveyed to the Resource Management Agency:

(i) If the land had been previously or concurrently "withdrawn from mineral location," then new claims would be precluded by federal law once the contributor relinquished a claim on the land.

(ii) The land or claim could be transferred to an intermediary in trust for the Resource Management Agency until the land is made subject to a mineral withdrawal.

(iii) The party making the Reserve Contribution could retain title to the land or mining claim and attach a surface use restriction to the land. This would protect the land from surface use and occupancy by the owner and also avoid exposing the land to new third-party claims. Once the underlying area has been subjected to a mineral withdrawal, the contributor would relinquish the interest to the Resource Management Agency. Note that this kind of temporary surface use restriction should not be confused with the "Surface Entry Restriction" mentioned under Section 10(b)(iii).

(iv) Special legislation could be sought to provide an efficient and permanent means of protecting

lands contributed to the Habitat Reserve (*see* Section 16(c)).

The mechanisms described in subsections *(ii)* and *(iii)* above could be used to batch lands for mineral withdrawal so that withdrawals can be processed in bulk rather than in a piecemeal fashion. Note that a small portion of the Habitat Reserve consists of privately-owned land subject to permanent conservation easement.

(g) Adaptivity of reserve design. The CHMS has mechanisms that allow the design of the Habitat Reserve to adapt to new information over time, as follows:

(i) First, the Habitat Inventory is subject to regular revision based upon the best available biological information at a given time (*see* Section 14(d)). As the Habitat Inventory will drive both incentives to preserve appropriate areas and the required portions of the Priority Areas to be preserved, revision of the Habitat Inventory is an important tool of adaptive reserve design.

(ii) Second, because of the revegetation requirements of the "Reclamation Regulations" (*see* Section 11(c)), combined with the incentives of the CHMS to introduce or reintroduce Carbonate Plants when revegetating (*see* Section 12 and the Revegetation Guidelines), most land within the CHMA that is currently habitat for the Carbonate Plants will be available to be managed for the Carbonate Plants in the long run, including land that is mined in the shorter run. So eventually all current habitat for the Carbonate Plants effectively becomes available for the Reserve, providing ultimate flexibility to manage for the benefit of the Carbonate Plants.

(iii) Third, if changed conditions or unforeseen circumstances could mean that continued operation of mining activities pursuant to the CHMS would result in jeopardy to the Carbonate Plants, then the Resource Management Agencies must re-initiate the CHMS Section 7 Consultation and limit or suspend operations under the CHMS until a solution is adopted that meets the needs of the Carbonate Plants (*see* Section 14(e)). Although the CHMS contains many provisions to avoid re-initiation, this tool is available if necessary to protect the Carbonate Plants. This is a last-resort adaptive management and reserve design tool.

10. Conservation Credits

Private parties may make Reserve Contributions by relinquishing mining claims or transferring ownership to the Resource Management Agency for inclusion in the Habitat Reserve. Such parties will receive Conservation Credits for making such Reserve Contributions. The number of Conservation Credits that a party receives for making a reserve contribution is based upon the Conservation Value, measured in Conservation Units, of the land contributed, subject to certain adjustments that are described in this section. The reason a private party would want to make a Reserve Contribution is that the Conservation Credits can be used to obtain ESA Compliance and therefore have economic value.

(a) Use of Conservation Credits. A party may make a Reserve Contribution and immediately use the resulting Conservation Credits to obtain ESA Compliance. Alternatively, a party may hold the resulting credits, thereby "banking" them for future use. A party holding Conservation Credits (a "Credit Holder") may do any of the following with them:

- Use them ("spend" them) to obtain ESA Compliance;
- Sell them to another party for whatever price the market will bear; or
- Hold them for future ESA Compliance or sale.

One advantage of receiving Conservation Credits to use for ESA Compliance rather than making a direct contribution of land is that the payments in Conservation Credits can precisely match the compliance requirement, avoiding overcompensating to obtain ESA Compliance. For example, if ESA Compliance on a particular parcel requires 500 Conservation Credits, but the parcel that the landowner has to offer would yield 700 Conservation Credits, the landowner or claim holder could make a Reserve Contribution of the whole parcel and receive ESA Compliance *plus* *"change" in the amount of 200 Conservation Credits,* which may be used later or sold to another party. Conversely, if the party seeking ESA Compliance needed 500 Conservation Credits, but had a parcel that would yield only 400 Conservation Credits, that party could make up the difference by purchasing 100 Conservation Credits from another private party that was banking some credits. The use of Conservation Credits thereby makes the compliance process more efficient.

(b) Types of Reserve Contribution. There are two basic types of Reserve Contribution: a "Permanent Contribution" and a "Relocatable Contribution." Either of these basic types could also be a "surface rights contribution."

(i) Permanent Contributions. A Permanent Contribution is an absolute, permanent grant of private land or relinquishment of a mining claim. To make a Permanent Contribution is to relinquish a parcel or a claim and receive Conservation Credits in exchange. Permanent Contributions receive the full number of Conservation Credits with no deduction for lack of permanence.

(ii) Relocatable Contributions. Relocatable Contributions leave some flexibility with the contributor. Rather than making a grant of land or relinquishment of a claim, a Relocatable Contribution is made by entering into an agreement whereby the contributor agrees not to disturb the land during the term of the agreement (a "Use Restriction Agreement"). Use Restriction Agreements are for a term of twenty (20) years each. The form of and procedure for engaging in Use Restriction Agreements shall be at the discretion of the respective Resource Management Agencies. Use Restriction Agreements must be recorded against the subject land or mining claim.

At any time during the term, the contributor may replace the land covered by the Use Restriction Agreement with a different Reserve Contribution of equal value. Because a Relocatable Contribution necessarily limits what can be done on the parcel from a conservation management perspective, the Conservation Credits given for a Relocatable Contribution will be reduced by 50% of what would have been received for a Permanent Contribution of the same land. Only Permanent Contributions shall be regarded as adding land to the Habitat Reserve, so only Permanent Contributions will be counted in determining whether a Priority Area has been added to the Reserve. Land under a Relocatable Contribution shall be regarded as Category D if on public land and Category P if on private land.

A replacement contribution during the term of the Use Restriction Agreement may be either a Permanent Contribution or a different parcel of land as a Relocatable Contribution, but the replacement contribution must yield at least the same number of Conservation Credits as the original contribution (the contributor would receive "change" in the form of additional Conservation Credits if the replacement contribution yields a greater number of Conservation Credits than the original Relocatable Contribution). Making a replacement contribution *does not* reset the 20-year term of the Use Restriction Agreement. One option the contributor would always have would be to make a Permanent Contribution of the same land included in the Relocatable Contribution and receive additional Conservation Credits (the number of Conservation Credits that the land would yield as a Permanent Contribution at the time the contribution is converted *less* the number of Conservation Credits previously received for the Relocatable Contribution). The Use Restriction Agreement shall provide that, if by the end of the term of such agreement the contributor has not converted to a Permanent Contribution of land, then the land then under the Use Restriction Agreement shall automatically be converted to a Permanent Contribution, and the contributor will receive the excess Conservation Credits for doing so.

For purposes of calculating the Conservation Value of land contributed under a Use Restriction Agreement, the Habitat Inventory at the time of the contribution shall control for the life of the Use Restriction Agreement, but the Conservation Value of any replacement contribution shall be measured based upon the Habitat Inventory as of the time of the replacement contribution. When a permanent contribution is made of land already under a Use Restriction Agreement, the Habitat Inventory at the time of the permanent contribution shall control.

The availability of the Relocatable Contribution option gives mining interests some flexibility in the management of their holdings. Even though fewer Conservation Credits would be received by the contributor, the party may choose to make a Relocatable Contribution, for example, because:

- The mineral value of the land is not certain at the time of the contribution, so the contributor wants to reserve the right to replace the contribution with other land if the mineral value is determined to be high; or
- The contributor believes that the Conservation Value of the land may increase in the future—either because of discovery of additional Occupied Habitat on the land, because revegetation activities (*see* Section 12) may increase the Conservation Value, or because the contribution of adjacent lands may improve the Adjusted Conservation Value (*see* Section 7(e)) in the future—and the contributor therefore wants to wait until the Conservation Value is increased before making a Permanent Contribution of the land.

Providing such flexibility is a benefit to the contributor, but it is also of value from a conservation standpoint. The relocation feature temporarily limits conservation management options, but it effectively provides double the amount of land as long as the relocation option remains open (because only 50% of the normal number of Conservation Credits is given for Relocatable Contributions). In any event, no later than the end of the term of the agreement, the Relocatable Contribution must be replaced by a Permanent Contribution, which could be a portion of the original Relocatable Contribution.

(iii) Surface rights contributions. The surface rights to land, whether in the form of a claim or fee title, may be offered as either a Permanent or Relocatable Contribution, even if the subsurface is subject to mining. In such cases, the right of surface entry would be restricted on the portion of land comprising the Reserve Contribution. Such restriction shall be documented using an instrument that is recorded against the subject land or mining claim (a "Surface Entry Restriction"). The form of Surface Entry Restrictions shall be at the discretion of the respective Resource Management Agencies. The Conservation Credits available for such surface rights shall be calculated in the same manner as for other Reserve Contributinos. See Section 11(d) below regarding obtaining ESA Compliance for subsurface mining.

(c) Receiving Conservation Credits for Reserve Contributions. Parties making Reserve Contributions receive "payment" in the form of Conservation Credits. The number of Conservation Credits that will be given for a specified contribution shall be calculated as follows:

(i) Start with the *Conservation Value* of the land contributed, measured in Conservation Units in accordance with Section 7(b)–(c);

(ii) Subtract the Net Edge Adjustment to arrive at the Adjusted Conservation Value in accordance with Section 7(e); and

(iii) Multiply the result in *(ii)* by a *permanence factor*, which is 1.00 for Permanent Contributions and 0.50 for Relocatable Contributions.

The formula for determining the number of Conservation Credits that will be given for a Reserve Contribution can be summarized as:

Conservation Credits = (CV – Net Edge Adjustment) × permanence factor

Appendix G provides several examples of Conservation Credit calculations; *Appendix F* includes a worksheet for valuing the Reserve Contribution of a given parcel.

(d) Contingent Contributions. Private parties may make a Reserve Contribution *contingent* on either *(i)* Activation of a particular Administrative Unit (based upon the completion of the addition of the entire Stage 1 Priority Area to the Habitat Reserve) or *(ii)* approval of a Mining Plan for a particular project (a "Contingent Contribution"). Contingent Contributions shall be documented by an escrowed contribution agreement between the contributor and the applicable Resource Management Agency. Once the specified contingency(ies) are satisfied, the Reserve Contribution escrow shall close, the subject land shall be transferred to the Resource Management Agency, and the contributor shall receive Conservation Credits. Conservation Credits obtained in this way may be freely used for any purpose listed in Section 10(a). Applicants may, but are not required to, specify in the contribution agreement particular mining lands that may be covered using the Conservation Credits obtained by means of a particular Contingent Contribution. The Compensation Requirement for lands so specified are locked in so long as the Conservation Credits that are obtained from the Contingent Contribution are applied to obtain ESA Compliance for the specified lands.

(e) Land and claims qualifying for contribution. Generally, any land or mining claim within the CHMA may be contributed to the Habitat Reserve for the requisite number of Conservation Credits calculated in accordance with subsection *(c)* above; *provided, however,* that *(i)* the land or claim must meet any land acceptance criteria established by the applicable Resource Management Agency with respect to the physical condition or title to the land or claim and *(ii)* any claim made after October 1, 1999 must be a valid claim under the Mining Law before it may be contributed (there is no validation requirement for earlier claims). October 1, 1999 coincides with the time when the Working Group began to develop the notion of accepting relinquishment of claims for conservation credit; the purpose of accepting only validated claims made after that date is to avoid any possibility or appearance of parties making claims of questionable mineral value just to obtain conservation credit.

(f) Credit Registration. The Forest Service shall record the *creation*, *use*, and *transfer* of Conservation Credits (*see* box below) in a database to be referred to as the "Credit Registry." The Forest Service shall maintain the Credit Registry either through a person or office within the Forest Service or by contracting with and overseeing an outside party to fulfill all or part of that function. The Forest Service may delegate some or all of its administrative functions, including any collection of credit registration fees, to another agency or to a private party. Each creation of Conservation Credits shall be evidenced by a concurrence letter issued by the Forest Service that establishes the number of Conservation Credits created and identifies the party who holds them (a "Credit Verification Letter"). The Conservation Credits evidenced by a Credit Verification Letter may be sold or traded until used to obtain ESA Compliance. Any such transfer shall be evidenced by a new Credit Verification Letter issued in the name of the transferee. The Forest Service may adopt more detailed procedures for credit registration and may revise them from time to time as it deems appropriate. An example of such procedures is set forth in *Appendix H*, but the Forest Service may choose, for example, to adopt simplified procedures for situations in which a mining interest does not wish to hold Conservation Credits, but rather desires to apply them immediately to obtain ESA Compliance (combining the *creation* and *use* of credits into one step).

Types of Conservation Credit Transactions

- *Creation:* When a private party makes a Reserve Contribution, Conservation Credits are created and given to that party
- *Use:* Parties seeking ESA Compliance must use or "spend" Conservation Credits as compensation for the habitat loss to be caused by the complying project
- *Transfer:* Conservation Credits may be freely bought, sold, and traded at whatever price the market will bear

11. ESA Compliance

Mining activities within the CHMA may, but are not required to, obtain ESA Compliance under the CHMS Biological Opinion by complying with the terms of the CHMS. As explained in Section 9(b)(i), ESA Compliance through the CHMS is available within an Administrative Unit only after the Unit has been Activated. This section describes the requirements for obtaining ESA Compliance for a proposed mining activity under the CHMS.

(a) Compensation Requirement. The basic requirement for obtaining ESA Compliance is that Conservation Credits must be given to compensate for the habitat loss that would occur as a result of the proposed mining activity (the "Compensation Requirement"). The amount of the Compensation Requirement for a given parcel is 3 × the Adjusted Conservation Value of the land whose surface is to be disturbed as a result of the proposed mining activity. Compensation is not required for portions of a claim whose surface is not to be disturbed. The ratio of Reserve Contribution requirement to the amount of habitat loss shall be referred to as the "Compensation Ratio." The Compensation Ratio of 3:1 was selected as a ratio that would result in a sufficient contribution from project compliance to meet the biological objectives of the CHMS when combined with Reserve contributions from other sources (*see* Section 8). *Appendix F* includes a worksheet for calculating the Compensation Requirement for a given parcel.

(b) Auxiliary use areas (Category F lands). In order to make it feasible for a landowner or claim holder to make a Reserve Contribution of certain lands and proceed with a mining activity, the Resource Management Agency may offer right-of-way, well access, or other special use of land not under the ownership or claim of the private party. Such areas are designated as Category F lands under the CHMS. The creation of Category F lands is in the discretion of the Resource Management Agencies with jurisdiction over the underlying land and may traverse Category D or Category E lands, so long as the allowed use is determined by the Resource Management Agency to be compatible with the Habitat Reserve. There shall be no Compensation Requirement for the use of any Category F lands over which the applicant is given access or use rights.

As an example, a mining operator may control land that has substantial conservation value, but which must be traversed to obtain access to an operational area. The Resource Management Agency may be able to induce such operator to make a Reserve Contribution of the parcel if the landowner can retain a right-of-way across the contributed land. Such right-of-way would be managed by the Resource Management Agency as part of the Reserve, subject to the right-of-way retained by the operator. The bulk of the contributed parcel would be designated as Category E, and the right-of-way portion would be designated as Category F.

(c) Mining Plan and reclamation compliance. Most mining activities will be subject to a Mining Plan issued by the applicable Resource Management Agency. In addition, mining operations within the CHMA are subject to certain preexisting reclamation requirements, which may include, depending on location and other factors, reclamation standards under SMARA; a Memorandum of Understanding between the Forest Service, BLM, and the State of California signed October 1992 regarding the application of SMARA on federal lands in California; the Forest Service regulations under 36 CFR 228; and the 1991 Big Bear District Mining Reclamation Standards (all such reclamation regulations that exist from time to time shall be referred to collectively as the "Reclamation Regulations"). A party which has obtained ESA Compliance under the CHMS must remain in substantial compliance with all applicable Reclamation Regulations in all respects in order to maintain ESA Compliance under the CHMS.

(d) Compliance for subsurface mining. Covered Activities that involve subsurface mining may obtain ESA Compliance through the CHMS. In such cases, the Compensation Requirement will be measured according the area of surface disturbance, calculated in the manner set forth in subsection *(a)* above. No compensation will be required for subsurface activities that do not have direct surface impacts. The ESA Compliance obtained for the surface impacts of subsurface mining activities does not cover impacts from surficial failure or other unexpected surface disturbances. Such types of disturbance will not be addressed by the CHMS Biological Opinion and must therefore be separately addressed outside of the CHMS if they occur. See Section 10(b)(iii) above regarding the ability to offer the surface as a Reserve Contribution.

(e) Compliance Verification Letter. Upon meeting all of the requirements for obtaining ESA Compliance under the CHMS with respect to a parcel, the Forest Service shall issue to the applicant a concurrence letter acknowledging the satisfaction of the requirements for obtaining ESA Compliance with respect to such parcel (a "Compliance Verification Letter.") Note that the project may also require a concurrence letter from the USFWS as part of the NEPA compliance process for the project for the USFWS to verify that the project is in compliance with the ESA in accordance with the CHMS.

(f) Credit for avoidance of areas approved for mining. If at any time after obtaining ESA Compliance for an area, the landowner or claim holder determines that certain portions of that area need not be disturbed, then the landowner or claim holder may, in its discretion, have the area removed from the ESA Compliance area. Upon application for such removal, the Forest Service shall issue a revised Compliance Verification Letter removing such area from ESA Compliance and a Credit Verification Letter to return to the applicant the number of Conservation Credits previously given by the applicant as compensation for prospective habitat loss on the subject land area. If a Mining Plan had already been issued covering such area, then the applicant must present to the Resource Management Agency a revised Mining Plan or an amendment to the Mining Plan showing the subject area removed from mining. Upon issuance of the revised Compliance Verification Letter, the Forest Service shall automatically update the Habitat Inventory to show the type of habitat existing on the removed area. The applicant may also, in its discretion, take the further step of making a Reserve Contribution of the subject area in exchange for additional Conservation Credits, using the normal contribution procedure set forth in Section 10. The process set forth in this subsection may be employed at any time in the mining and reclamation process so long as the area to be removed from ESA Compliance has not been disturbed.

(g) Effect of ESA Compliance. Once a mining activity has obtained ESA Compliance:

- Covered Activities on the subject land are deemed to be in compliance with the CHMS Biological Opinion, and thus with the ESA, with respect to the species addressed by the CHMS;
- The subject land is moved to Category M2 (and from there to Category M1 once a Mining Plan is in place for the land);
- The Habitat Inventory is updated to show the subject land as nonhabitat (*see* Section 14(d)(i));
- Covered Activities on the subject property cannot be affected by subsequent changes in the Habitat Inventory on the subject land; and
- Covered Activities on the subject property will benefit from any subsequent modifications to the CHMS that add to the species addressed by the CHMS.

ESA Compliance under the CHMS is subject to any re-initiation of the CHMS Section 7 Consultation, as described in Section 14(e).

As described in Section 3(b)(iii), the County shall adopt standardized conditions of approval consistent with the CHMS that may apply on a project-by-project basis to applications for mining and reclamation activities that are regulated by the County.

12. Revegetation

One characteristic of mining activities is that they have a conclusion, and after their conclusion the underlying land has an opportunity to regenerate habitat. The CHMS incorporates this opportunity to "recycle" the land as an important component of the strategy.

(a) Reclamation Regulations. As stated in Section 11(c) above, for a mining activity to maintain ESA Compliance under the CHMS, the activity must maintain substantial compliance with applicable Reclamation Regulations. Such regulations may include mandatory revegetation standards.

(b) Optional Reserve Contributions. As an incentive for mining interests to meet and exceed the revegetation requirements of the Reclamation Regulations, a landowner or claim holder who reclaims and revegetates mining land to meet the criteria for Revegetated Habitat (*see* box on page 18 and the Revegetation Guidelines) may make a Reserve Contribution of such land and receive Conservation Credits. Since the Habitat Inventory will show areas that have been granted ESA Compliance to have no habitat, the landowner or claim holder will want to first have the land resurveyed and request that the Habitat Inventory be updated to reflect the existence of Revegetated Habitat on the land. Section 14(d) describes the procedure for updating the Habitat Inventory. As shown in Section 7(b) and Section (a) of the Revegetation Guidelines, the Conservation Value of Revegetated Habitat varies based upon the success criteria that are met on each revegetated parcel.

(c) ESA coverage for revegetated areas. Conservation of the Carbonate Plants will benefit if mining interests make attempts to revegetate with Carbonate Plants beyond what is required under the Reclamation Regulations. Mining interests may desire to make such attempts both to find the most effective techniques for successfully revegetating with Carbonate Plants and to apply those techniques to successfully revegetate areas for Conservation Credits. Such effort are potentially discouraged, however, by the fact that the species are protected by the ESA and that success in revegetating areas could become a hindrance to future mine planning. This situation may occur, for example, if *(i)* the revegetation effort was only partially successful, so the landowner or claim holder would get too few Conservation Credits to make a Reserve Contribution worthwhile or *(ii)* it is later discovered that mineral deposits on the land are of greater value than the potential to receive Conservation Credits. To avoid such potential disincentives for revegetation efforts, losses of Carbonate Plants on land within the CHMA that becomes occupied by Carbonate Plants due to private revegetation activities shall be authorized under the terms and conditions described in Section (d) of the Revegetation Guidelines.

The following part, on CHMS administration, details the various parties and procedures that will be involved in administering the CHMS. ❀

Carbonate Habitat Management Strategy

IV. Administration

All of the concepts important to the CHMS have been described in the preceding parts. This part provides details regarding how the CHMS is to be administered, monitored, and funded. It also includes a section on federal legislation that may be sought to assist in implementing the CHMS and a section on how the CHMS may be amended.

13. Parties and Responsibilities

The CHMS contemplates the coordination of efforts by a number of parties to implement its provisions. The roles of the various parties are described throughout this document, but they are summarized and sometimes elaborated upon in this section. This section concludes with a description of a "Memorandum of Understanding" (subsection *(g)* below), which will set forth the understanding of the Resource Management Agencies, the County, the California Native Plant Society ("CNPS"), the private parties who intend to enter into the Initial Furnace Transactions, and each other party who receives either a Credit Verification Letter or a Compliance Verification Letter in the future (collectively, the "MOU Parties") regarding their respective roles in the CHMS.

(a) Resource Management Agencies. As the Resource Management Agencies, the Forest Service and the BLM have land use jurisdiction over land within the CHMA. The responsibilities of the Resource Management Agencies under the CHMS are summarized as follows:

(i) Coordinate the mining and land use regulations administered by the Resource Management Agencies with the provisions of the CHMS to facilitate the use of the CHMS by applicants to obtain ESA Compliance, such as by coordinating the administration of the Federal Land Plans with the CHMS.

(ii) In processing applications for mining activities, accept compliance with the CHMS as compliance with the Federal Land Plans, the ESA, and other federal laws and regulations with respect to impacts on the Carbonate Plants (subject, however, to review under NEPA).

(iii) Manage those portions of the Habitat Reserve that fall under their respective jurisdictions in a manner that is consistent with the CHMS (*see* Section 9(f)).

(iv) Facilitate federal land designations as contemplated by the CHMS to help form the Habitat Reserve (*see* Section 8(a)).

(v) Facilitate federal land purchases and exchanges as contemplated by the CHMS to help form the Habitat Reserve (*see* Section 8(b), (e), and (f)).

(vi) Facilitate acceptance by the federal government of title to privately owned land contributed to the Habitat Reserve under the CHMS.

(vii) Notify the MOU Parties if at any time Congress or the Secretary of the Interior determines that all or any part of the Habitat Reserve is no longer necessary to provide for the conservation of the Carbonate Plants and, as a consequence, an existing mineral withdrawal or other use restriction has been removed as to such land.

(viii) Work with the USFWS to develop and implement a plan for monitoring the effectiveness of, compliance with, and biological conditions under the CHMS.

(ix) Monitor the implementation of the CHMS for consistency with the CHMS Biological Opinion and immediately report to the MOU Parties any potential or realized inconsistencies.

(x) Monitor the CHMA for conditions that could require re-initiation of the CHMS Section 7 Consultation and immediately report any such conditions to the MOU Parties.

(xi) In the event of a re-initiation of the CHMS Section 7 Consultation, suspend or partially suspend operation of the CHMS, if required by Section 7(d) of the ESA, and report the suspension to the MOU Parties (*see* Section 14(e)).

(b) Forest Service. The Forest Service has the following responsibilities in addition to those under subsection *(a)* above:

(i) Maintain and update the Habitat Inventory in accordance with Section 14(d).

(ii) Administer the Credit Registry and related functions in accordance with Section 10(f).

(iii) Carry out the regular reporting functions for the CHMS described in Section 14(b).

(iv) Receive, maintain, and make publicly available records and reports it receives pursuant to the CHMS, such as revegetation reports (*see* the Revegetation Guidelines) and various monitoring reports (*see* Section 14).

(v) Manage those Category D lands that fall under its jurisdiction in a manner that is consistent with the CHMS (*see* Section 9(f)).

(c) County. The County has jurisdiction over mining reclamation under SMARA, and it has land use jurisdiction over the private lands located within the CHMA. The County shall adopt standardized conditions of approval for addressing impacts to Carbonate Plants by proposed mining and reclamation projects in a manner that is consistent with the CHMS. Such conditions of approval shall apply under SMARA, the County land use ordinances, and CEQA, subject to the approval of the Board of Supervisors on a project-by-project basis. Specifically, such conditions of approval shall provide for *(i)* habitat compensation requirements consistent with the Compensation Requirements set forth in the CHMS (*see* Section 11) and *(ii)* revegetation standards and incentives consistent with the Revegetation Guidelines and the revegetation incentives set forth in the CHMS (*see* Section 12 and the Revegetation Guidelines).

(d) USFWS. The responsibilities of the USFWS under the CHMS derive from the ESA and are as follows:

(i) Issue the CHMS Biological Opinion in response to the CHMS Section 7 Consultation.

(ii) Work with the Resource Management Agencies to develop and implement a plan for monitoring the effectiveness of, compliance with, and biological conditions under the CHMS.

(iii) Respond to any re-initiation of the CHMS Section 7 Consultation in a manner that is consistent with the ESA and the CHMS Biological Opinion (*see* Section 14(e)).

(iv) In the event of a re-initiation of the CHMS Section 7 Consultation, advise the Resource Management Agencies of any obligations with respect to Section 7(d) of the ESA that require any suspension of operations.

(e) CNPS. CNPS has been an active participant in the Working Group, representing the conservation interests of the Carbonate Plants and assuring that from their perspective, the CHMS provides a good and practical solution to the conflicts between the public economic interest in ongoing carbonate mining and the public interest in conserving the Carbonate Plants within the CHMA.

(f) Applicants. The private applicants that receive ESA Compliance under the CHMS must do as follows in order to maintain ESA Compliance:

(i) Remain in compliance with the ESA with respect to the covered mining project, taking into account that Covered Activities on the subject land are deemed to be in compliance with the ESA.

(ii) Remain in substantial compliance with all Reclamation Regulations that apply to the covered mining project.

(iii) Conduct any future mining operations occurring within the area covered by the CHMS prior to the consummation of the Initial Furnace Transactions in a manner which is consistent with the terms of the CHMS.

(iv) Comply with the terms of any Use Restriction Agreements entered into by the applicant under the CHMS in connection with making Relocatable Contributions (*see* Section 10(b)(ii)).

(v) Comply with the terms of any Surface Entry Restrictions entered into by applicant under the CHMS in connection with making surface right Reserve Contributions (*see* Section 10(b)(iii)).

(g) Memorandum of Understanding. The MOU Parties shall enter into a Memorandum of Understanding (the "MOU") to set forth the understanding of the MOU Parties regarding their respective responsibilities and activities under the CHMS. In the event of any conflict between the provisions of this document and the provisions of the MOU, the MOU shall control. The MOU will be signed by the MOU Parties as follows:

(i) Prior to initiation of the CHMS Section 7 Consultation, the Resource Management Agencies, the County, CNPS, and the private parties who intend to enter into the Initial Furnace Transactions will sign the MOU.

(ii) Effective upon the Activation of the Furnace Unit, the private parties who are part of the Initial Furnace Transactions as applicants for ESA Compliance will sign the MOU again, this time in their status as parties obtaining ESA Compliance. Such parties shall sign a separate amendment for each Compliance Verification Letter they are to obtain.

(iii) Subsequent applicants for ESA Compliance (after the applicants who are part of the Initial Furnace Transactions) will sign the MOU by means of an amendment prior to obtaining ESA Compliance. Such parties shall sign a separate amendment for each Compliance Verification Letter they are to obtain.

(iv) Parties making Reserve Contributions will sign an amendment to the MOU prior to obtaining Conservation Credits with respect to such contributions. Such parties shall sign a separate amendment for each Credit Verification Letter they are to obtain.

14. Monitoring

Several monitoring mechanisms are built into the CHMS to assure that it achieves its economic, conservation, and regulatory objectives.

(a) Monitoring under Section 7. Pursuant to Section 7 of the ESA, the Resource Management Agencies and the USFWS shall work together to develop and implement a plan for monitoring the effectiveness of, compliance with, and biological conditions under the CHMS. Such monitoring may overlap with the monitoring provisions described in the following subsections.

(b) Regular reporting. The following regular review and reporting activities shall be conducted under the CHMS:

(i) The Forest Service shall make Credit Registry information available to the public (*see* Section 10(f)).

(ii) The Forest Service shall conduct an annual review of the progress of the CHMS over the prior fiscal year (October 1 to September 30), report the following information to the MOU Parties and the USFWS, and make such information available to the public upon request, by each January 31 following the fiscal year under review:

(A) Changes in land categories over the calendar year (e.g., "D-to-E," "D-to-M2," "M2-to-M1," etc.);

(B) For each Administrative Unit, the Conservation Value contained within each land category;

(C) A summary of Conservation Credit transactions over the year;

(D) A summary of federal land designations, purchases, and exchanges over the year; and

(E) Any amendments to the CHMS (*see* Section 17(b)) that have been made during the year.

(c) Reserve formation. The Forest Service shall monitor the contribution of land within Priority Areas. Once all Stage 1 Priority Area lands within an Administrative Unit have been added to the Reserve, the Forest Service shall report to the MOU Parties and the USFWS that such Unit has been Activated (*see* Section 9(b)(i)).

(d) Habitat Inventory. The Habitat Inventory is intended to reflect the existence of Occupied Habitat, Suitable Habitat, Revegetated Habitat (including the level of success criteria met), and Other Beneficial Habitat, as those terms are more particularly defined in *Appendix C*, the box on page 18, and in Section (a) of the Revegetation Standards. The issuance of Conservation Credits (*see* Section 10(f)) and the measurement of Compensation Requirements (*see* Section 11(a)) are based upon the Habitat Inventory, and such actions are not reviewable based upon subsequent changes in the Habitat Inventory. However, the Habitat Inventory shall be updated from time-to-time by the Forest Service based upon new information, and changes in the Habitat Inventory will affect subsequent issuances of Conservation Credits and ESA Compliance. The circumstances under which the Forest Service shall make changes to the Habitat Inventory are as follows:

(i) Automatically upon issuance of a Compliance Verification Letter. The Forest Service shall automatically change the Habitat Inventory *on land covered by a Compliance Verification Letter* upon issuance of such letter to show the subject land as nonhabitat (in anticipation of disturbance of any existing habitat).

(ii) On initiative of the applicable Resource Management Agency. The Forest Service shall change the Habitat Inventory *on federal lands* (including lands subject to unpatented claims) whenever the applicable Resource Management Agency develops or otherwise obtains new biological information that it deems reliable that indicates a change is warranted based upon the habitat definitions. In any event, the Habitat Inventory shall be updated based upon the best available biological information no less than every 5 years.

(iii) On initiative of the County. The Forest Service shall change the Habitat Inventory *on private lands under the jurisdiction of the County* whenever the County develops or otherwise obtains new biological information that it deems reliable that indicates a change is warranted based upon the habitat definitions set forth in *Appendix C*.

(iv) On initiative of a private party. The Forest Service shall change the Habitat Inventory *on lands owned or claimed* by a private party when such party offers new biological information that the County (in the case of privately-owned land) or the applicable Resource Management Agency (in the case of an unpatented claim) deems reliable indicating that a change is warranted based upon the habitat definitions set forth in *Appendix C*.

Some examples of reasons that the Habitat Inventory may be inaccurate and require adjustment are:

- Inaccuracy of prior survey information.
- Naturally-occurring changes in environmental conditions and/or species dispersal patterns.
- Occurrence of undisturbed habitat on lands mapped as M1 or M2 when the underlying landowner or claim holder takes the necessary steps to obtain credit for them in accordance with Section 11(f).
- Meeting of revegetation success criteria (resulting in new Revegetated Habitat; *see* box on p. 18 and Section (a) of the Revegetation Guidelines).
- Habitat disturbance, whether authorized or unauthorized.

(e) Section 7 re-initiation. Under certain circumstances, the ESA and its regulations may require that the CHMS Section 7 Consultation be re-initiated and the CHMS Biological Opinion be reassessed. The conditions for re-initiating consultation set forth in the Section 7 regulations are:

- The amount or extent of incidental take is exceeded [not applicable to plants];
- New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in [the biological] opinion;
- The agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in [the biological] opinion; or
- A new species is listed or critical habitat designated that may be affected by the action.

Such re-initiation should be avoided, if at all possible, in order to maintain the regulatory certainty and streamlining provided by the CHMS. In the event that any Resource Management Agency determines that a condition exists or may be developing that could trigger re-initiation, such party shall report the condition to the MOU Parties. The MOU Parties may then consider whether to take any action to avoid or eliminate the condition that could lead to re-initiation. In the event that the triggering condition is the proposed or new listing of a species that may be affected by mining projects in the CHMA, then the MOU Parties may include in its consideration the possibility of amending the CHMS in accordance with Section 17(c) to address such species.

In the event re-initiation occurs in spite of any efforts of the MOU Parties, the USFWS has the authority under Section 7(d) of the ESA to issue a letter to the Resource Management Agencies stating that they have an obligation to suspend operations covered by the CHMS Biological Opinion. In such event, the Resource Management Agencies shall suspend operation of the CHMS only to the extent that it determines that Section 7(d) of the ESA requires such suspension. The Resource Management Agencies shall limit any such suspensions to the greatest extent possible (such as to only certain geographical areas, species, and/or types of activities) while still achieving compliance with the ESA.

The USFWS shall work closely with the MOU Parties during any re-initiation of the CHMS Section 7 Consultation in an effort keep the CHMS intact with as little disruption as possible to the expectations of the various MOU Parties.

15. Funding

Two types of costs require funding under the CHMS. The primary cost is that of acquiring land for the Habitat Reserve. The secondary type of cost is for administration of the CHMS, specifically for carrying out the various monitoring and reporting functions, maintaining the Habitat Inventory, maintaining the Credit Registry, and managing the Habitat Reserve. The balance of this section describes how these various costs will be funded.

(a) Reserve formation. All contributions of land to the Habitat Reserve involve a societal cost—the cost of foregoing uses of the land other than conservation in perpetuity. It is the intent of the CHMS that this cost be shared by the public sector and the private sector.

The following are the various ways, direct and indirect, that the cost of acquiring land for the Habitat Reserve shall be borne, with the first four constituting the public sector's share, and the last one constituting the private sector's share:

(i) Federal designations of unclaimed land;

(ii) Federal lands offered in exchange for claims or private land;

(iii) Federal Land & Water Conservation Fund (the "LWCF") (the Resource Management Agencies have made application for funding from this source);

(iv) Special congressional appropriations (*see* Section 16(a)); and

(v) Reserve Contributions made for Conservation Credits (which indirectly constitutes compensation to obtain ESA Compliance).

(b) Administrative costs. The administrative costs of the CHMS are likely to be small in comparison to the land acquisition costs, but provision must be made to cover these costs if the CHMS is to succeed. Administrative costs will be covered as follows:

(i) The Resource Management Agencies shall commit the federal budgetary resources necessary to manage the Habitat Reserve as part of their ordinary responsibilities for the lands under their jurisdiction;

(ii) The Forest Service shall commit the additional budgetary resources necessary to carry out the various monitoring and reporting functions required of it by the CHMS, maintain the Habitat Inventory, and maintain the Credit Registry; and

(iii) If the Forest Service deems it necessary, it may obtain supplemental funding for its administrative functions by charging *credit registration fees* in accordance with Section 10(f) for the handling of vari-

ous types of Conservation Credit transactions; the Forest Service shall set any such fees from time-to-time to cover actual uncovered costs and shall report to the MOU Parties the calculations used to size any such fees; the Forest Service may delegate some or all of its administrative functions, including any collection of credit registration fees, to another agency or to a private party.

16. Legislation

Federal legislation would be helpful in three primary ways for implementing the CHMS: to fund federal land purchases, to streamline the federal land exchange process, and to give the Resource Management Agencies the authority to permanently dedicate federal land to the Habitat Reserve. This section further describes the legislation that may be sought.

(a) Funding for land purchases. Although a significant amount of unclaimed federal land is available to set aside for the Habitat Reserve, much of the best habitat for the Carbonate Plants corresponds with claimed or privately owned land containing mineral deposits. Demand for ESA Compliance will result in some level of Reserve Contributions that will help in the addition of land from the Priority Areas to the Reserve, but such demand is insufficient to meet the objective of adding to the Reserve, in contiguous blocks, 100% of the Occupied Habitat and 85% of the Suitable Habitat contained within each Priority Area (*see* Section 9(b)), even in the very long term. Adding such Priority Area lands to the Reserve will require the federal government to purchase a significant amount of land (*see* Section 8(b)).

Since most current mining activity is within the Furnace Unit, and the Furnace Unit contains some of the best habitat for the Carbonate Plants, it is the intent of the MOU Parties to facilitate the addition of Furnace Unit Priority Areas to the Habitat Reserve as soon as possible after adoption of the CHMS and the issuance of the CHMS Biological Opinion. Fortunately, some of the best habitat for Carbonate Plants in the Furnace Unit is owned or claimed by parties who are willing, at least in concept, to sell their land or claims as part of the Initial Furnace Transactions (*see* Sections 4(d)(iii), 9(d)).

Some federal funding may be available administratively through the LWCF, and the Resource Management Agencies have applied for such funds. If such funds become available, they could play an important role in land purchases. The key to adding Priority Area lands to the Reserve (*see* Section 9(b)) is to be able to "escrow" several transactions that can all close at once. Federal legislation may be introduced to specifically appropriate LWCF monies and to streamline the process for applying such monies to complete the purchase of Priority Area lands. Some appropriated funds may be earmarked for one or more particular purchases, whiles others may be part of an "opportunity fund" available for miscellaneous purchases as the opportunities arise to purchase important habitat land at a good price.

(b) Assistance with implementing purchases and land exchanges. The administrative process required to consummate the purchase of land with federal funds or federal land exchanges involves land appraisals, mineral valuations, and claims validations that can require a significant amount of time to complete. The CHMS could benefit from legislation that streamlines both *(i)* the process of using any specially-appropriated funds obtained from the legislation described in subsection *(a)* above and *(ii)* the land exchange process for transfers of federal land to the private sector in exchange for the transfer of private habitat lands to the Resource Management Agencies for the Habitat Reserve. Such legislation could also direct specific transactions to occur at specified prices or exchange values. Such legislation can increase the contribution that federal land purchases and exchanges can make to the CHMS.

(c) Permanent reserve dedication. Finally, it would be desirable to increase the certainty of permanent protection of the Habitat Reserve by providing a means for permanent dedication of federal lands under the jurisdictions of the Forest Service and the BLM to the Habitat Reserve. Such dedication would presumably consist of a combination of a permanent mineral withdrawal and a permanent land allocation to management consistent with the intended purposes for the Habitat Reserve under the CHMS. Ideally, under such legislation, the processes established in the CHMS would serve as the processes for determining what land is appropriate a legislative Habitat Reserve designation.

All of the MOU Parties have a strong interest in supporting federal legislation as outlined above. The CHMS provides no formal process for pursuing such legislation, but leaves it to the MOU Parties to do so.

17. Amendment

It is important that certain kinds of changes can be made to the CHMS that will give it the ability to adapt to new information and circumstances without an unduly burdensome process. It is equally important that the CHMS be fundamentally stable, reliable, and predictable in order to maximize its integrity and usefulness to all of the MOU Parties. To strike a balance between flexibility and stability, the balance of this section describes a two-tier CHMS modification process, followed by a description of how new ESA listings can be addressed under the CHMS.

(a) Administrative changes. Throughout the CHMS are references to adjustments and modifications that may be made by the Resource Management Agencies in their discretion. Such actions are to be regarded as part of the normal operation of the CHMS and not as amendments so long as they are consistent with the other provisions of the CHMS. Examples of such actions include, without limitation, modification of the Habitat Inventory, changes in the Credit Registry procedures, and determination of the means of making CHMS data available to the public.

(b) Amendments. Any modification to the CHMS that does not qualify as an administrative change under subsection *(a)* above shall be regarded as an "Amendment." Amendments shall require *(i)* the approval of all MOU Parties that could be adversely affected by the proposed Amendment and *(ii)* the concurrence of the USFWS. Certain Amendments may result in a condition that triggers re-initiation of the CHMS Section 7 Consultation, in which case the Amendment would not become effective unless it is also incorporated into a revised, favorable CHMS Biological Opinion as a result of the re-initiation process.

(c) Addressing new ESA listings. If additional species (other than the Carbonate Plants) that occupy portions of the CHMA are proposed for listing or are listed as threatened or endangered under the ESA, and mining activities addressed by the CHMS may affect such species, then the MOU Parties may elect to initiate an Amendment process to attempt to address such additional species under the CHMS. The following provisions would apply to such a process:

(i) Upon proposal of such a species for listing, the MOU Parties may work with the Resource Management Agencies to conference with the USFWS and to obtain a conference opinion that upon the listing of such species, any take of the species pursuant to the CHMS shall not jeopardize the continued existence of such species. The MOU Parties may choose, by unanimous agreement among the affected parties, to modify the CHMS by an Amendment in order to help achieve such a conference opinion. In accordance with the ESA and its regulations, upon the listing of the species, such a favorable conference opinion would automatically be deemed to be a new biological opinion resulting from a re-initiation of the CHMS Section 7 Consultation, and suspension of the operation of the CHMS would be avoided.

(ii) Any Amendment that is made outside of the process described in subsection *(i)* above would require re-initiation of the CHMS Section 7 Consultation, but the availability of ESA Compliance for the Carbonate Plants under the CHMS would not be suspended, except potentially where the newly-listed species may be affected (*see* subsection *(iii)* below).

(iii) The availability of ESA Compliance under the CHMS may, if required under Section 7(d) of the ESA, be suspended in areas in which the newly-listed species may be affected.

(iv) Any proposed Amendment shall attempt to integrate any land under Habitat Reserve designations and management for the newly-listed species into the existing CHMS framework to the greatest extent possible.

(v) In deliberating on the revised CHMS Biological Opinion, the USFWS shall take into account and give credit for habitat of the newly-listed species

that is or will be included in either *(A)* the Habitat Reserve or *(B)* other permanent reserve or conservation areas within the CHMA that are protected by conservation easements or pursuant to other conservation planning efforts (such as the "West Mojave Plan," a multi-jurisdictional habitat conservation plan under preparation, with the BLM as the federal lead agency). ❀

Carbonate Habitat Management Strategy

Appendices

Appendix A: Glossary of Terms

All of the terms in this glossary are also defined in the section of the CHMS indicated in parenthesis. In some cases, the definitions in the body of the CHMS are more detailed and are only summarized here. In the event of any conflict between a definition in the body of the CHMS and a definition in this glossary, the definition in the body of the CHMS shall control.

Activated—the status of an Administrative Unit within which the required portions of the Stage 1 Priority Areas have been added to the Habitat Reserve, thereby allowing ESA Compliance to be obtained for mining projects within such Unit under the CHMS (Section 9(b)(i))

ACV—abbreviation for Adjusted Conservation Value (Section 7(e))

Adjusted Conservation Value—the Conservation Value of an area adjusted by the Net Edge Adjustment for that area (Section 7(e); *see also* "ACV")

Administrative Unit—a subarea of the CHMA established for purposes of administering the CHMS; there are five Administrative Units: White Mountain, Furnace, Helendale, Bertha, and Moonridge/Onyx (Section 6; *see also* "Unit")

Amendment—a modification to the CHMS that does not qualify as an administrative change (Section 17(b))

BLM—the U. S. Department of Interior Bureau of Land Management (Section 1)

Carbonate Plants—the four species listed under the ESA that occur within the CHMA and are addressed by the CHMS (Section 1)

Category M1, Category M2, etc.—see the definitions in Section 5 and the box on page 14

CEQA—California Environmental Quality Act (Section 2(a)(vi))

CHMA—Carbonate Habitat Management Area (Section 1 & *Figure 1*)

CHMS—Carbonate Habitat Management Strategy, referring both to this document and the program it describes (Section 1 introduction)

CHMS Biological Opinion—the programmatic biological opinion rendered by the USFWS under Section 7 of the ESA for the CHMS (Section 3(b)(i))

CHMS Section 7 Consultation—the Section 7 Consultation between the Resource Management Agencies and the USFWS, which will result in the CHMS Biological Opinion (Section 3(b)(i))

CNPS—the California Native Plant Society (Section 13 introduction)

Compensation Ratio—the required ratio of Reserve Contribution requirement to the amount of habitat loss to be caused by a project, both measured in Conservation Units; the Compensation Ratio is 3:1 (Section 11(a))

Compensation Requirement—the number of Conservation Credits that must be given to obtain ESA Compliance for mining activities on a given parcel (Section 11(a))

Compliance Verification Letter—a concurrence letter acknowledging the satisfaction of the requirements for obtaining ESA Compliance with respect to a particular parcel of land (Section 11(e))

Connective Land—land added to the Reserve within a Priority Area sufficient to connect all of the Occupied Habitat and Suitable Habitat in that Priority Area into one contiguous patch (Section 9(b)(i))

conservation banking—obtaining Conservation Credits, either by making Reserve Contributions or by purchasing them from other private parties, and holding them for future use or sale rather than immediately using them to obtain ESA Compliance (Section 8(d))

Conservation Category—the conservation land use category, which is Category E (Section 5(b))

Conservation Credit—the "currency" of the CHMS given to private parties in exchange for Reserve Contributions; a Conservation Credit represents one Conservation Unit of Conservation Value (Section 7(a))

Conservation Unit—the unit of measurement of Conservation Value under the CHMS (Section 7(a); *see also* "CU")

Conservation Value—the value of land for the conservation of the Carbonate Plants, as measured in Conservation Units (Section 7 introduction & box on page 9; *see also* "CV")

Contingent Contribution—a Reserve Contribution that is made contingent on either *(i)* ESA Compliance becoming available in a particular Administrative Unit (based upon the addition of the entire Stage 1 Priority Area to the Habitat Reserve) or *(ii)* approval of a Mining Plan for a particular project (Section 10(d))

County—County of San Bernardino (Section 1)

Covered Activities—mining activities that can obtain the benefit of ESA Compliance under the CHMS (Section 3(a))

Credit Holder—the registered owner of some number of Conservation Credits (Section 10(a))

Credit Registry—a database maintained by the Credit Registrar that tracks the creation, use, and transfer of Conservation Credits under the CHMS (Section 10(f))

Credit Verification Letter—a concurrence letter issued by the Forest Service that establishes the creation or transfer in ownership of a specified number of Conservation Credits (Section 10(f))

CU—abbreviation for Conservation Unit (Section 7(a))

CV—abbreviation for Conservation Value (Section 7 introduction)

edge—the line where land of one of the three type of land use categories (Mining Category, Reserve Category, or Uncommitted Category) meets another of the three types (box on bottom of page 15; Section 7(e)(ii))

ESA—federal Endangered Species Act of 1973, as amended (Section 1 introduction)

ESA Compliance—compliance with the ESA for Covered Activities with respect to the Carbonate Plants and any other listed species addressed by the CHMS in the future (Sections 3(b)(i), 11)

Federal Land Plan—a land use and management plan that covers Forest Service or BLM land within the CHMA (Section 2(a)(v))

Forest Service—the U. S. Department of Agriculture Forest Service (Section 1)

GIS—geographical information system (Section 4(b))

Habitat Inventory—the Forest Service's official GIS database for the CHMS that identifies habitat types within the CHMA (Sections 7(c), 14(d))

Habitat Reserve—the reserve system for the Carbonate Plants to be formed pursuant to the CHMS (Section 1)

Initial Furnace Transactions—the initial transactions toward the addition of the Furnace Unit Stage 1 Priority Areas to the Reserve (Sections 4(d)(iii), 9(d))

Initial Habitat Reserve—the Habitat Reserve at the commencement of CHMS implementation, prior to any private Reserve Contributions under the CHMS (Sections 4(d)(i), 9(a))

LWCF—Land and Water Conservation Fund (Section (15(a)(iii))

Mining Category—any of the mining-related land use categories, which include Categories M1, M2, and F (Section 5(a))

Mining Law—the Mining Law of 1872, as amended (Section 1)

Mining Plan—a mining plan of operations (in the case of a claim on federal land) or a mining and reclamation plan (in the case of mining on private land) (Section 5(a)(i))

MOU—the memorandum of understanding setting forth the understanding of key parties regarding the responsibilities and activities of those parties with respect to the CHMS (Section 13(g))

MOU Parties—the Resource Management Agencies, the County, CNPS, the private parties who intend to enter into the Initial Furnace Transactions, and each other party who receives either a Credit Verification Letter or a Compliance Verification Letter in the future (Section 13 introduction)

NEPA—National Environmental Policy Act (Section 2(a)(v))

Net Edge Adjustment—an adjustment to the Conservation Value of an area used to arrive at Adjusted Conservation Value (Section 7(e))

Occupied Habitat—land designated on the Habitat Inventory as occupied habitat for one or more of the Carbonate Plants; excludes Revegetated Habitat (box on page 14)

Other Beneficial Habitat—land that is designated on the Habitat Inventory as undisturbed natural land that provides some geomorphological, hydrological, or habitat configuration benefit to the Carbonate Plants; excludes all other habitat categories that provide some benefit to the Carbonate Plants (box on page 14)

Permanent Contribution—a Reserve Contribution in the form of an absolute, permanent grant of privately owned land or relinquishment of a mining claim (Section 10(b)(i); *see also* "Relocatable Contribution")

Priority Area—any Stage 1 Priority Area or Stage 2 Priority Area (Section 9(b))

Reclamation Regulations—collectively, all existing reclamation requirements outside of the CHMS that apply to a given mining operation, which may include, depending on location and other factors, reclamation standards under SMARA; a Memorandum of Understanding between the Forest Service, BLM, and the State of California signed October 1992 regarding the application of SMARA on federal lands in California; the Forest Service regulations under 36 CFR 228; and the 1991 Big Bear District Mining Reclamation Standards (Section 11(c))

Relocatable Contribution—a Reserve Contribution in the form of an agreement not to disturb certain land and to allow it to be managed as part of the Habitat Reserve, but reserving the right to substitute a different Reserve Contribution in the future (Section 10(b)(ii); *see also* "Permanent Contribution")

Reserve—the Habitat Reserve (Section 1)

Reserve Contribution—a contribution to the Habitat Reserve in the form of either *(i)* granting privately owned land, *(ii)* abandoning a mining claim, *(iii)* restricting a mining claim or privately owned land for conservation purposes subject to later redemption by offering equivalent Conservation Value in another form, or *(iv)* granting or relinquishing the surface rights of privately-owned land or a mining claim while retaining the right to conduct subsurface mining (box on page 9; Section 10(b))

Resource Management Agency—the Forest Service or the BLM, each with respect to the land under its jurisdiction (Section 1)

Revegetated Habitat—mining land that has been revegetated and meets all of the requirements for obtaining conservation credit set forth in the Revegetation Guidelines (box on page 14; Section (a) of *Appendix E*)

Revegetation Guidelines—the "Guidelines and Success Criteria for Revegetation and Carbonate Plant Introductions" set forth in *Appendix E* (Section 8(g))

SBNF—the San Bernardino National Forest (Section 1)

SMARA—the California Surface Mining and Reclamation Act of 1975, as amended (Section 2(c)(iv))

Stage 1 Priority Area—an area within the CHMA so designated on *Map 3* in *Appendix I*; certain portions of the Stage 1 Priority Areas within a Unit must be added to the Habitat Reserve for such Unit to be Activated (Section 9(b); *see also* "Priority Area")

Stage 2 Priority Area—an area within the CHMA so designated on *Map 3* in *Appendix I*; although there is no requirement that Stage 2 Priority Areas be added to the Habitat Reserve before loss of habitat may occur within a Unit, no loss of habitat may occur under the CHMS within any Stage 2 Priority Area (Section 9(b); *see also* "Priority Area")

Suitable Habitat—land designated on the Habitat Inventory as suitable habitat for one or more of the Carbonate Plants; excludes Occupied Habitat and Revegetated Habitat (box on page 14)

Surface Entry Restriction—an instrument that is recorded against fee-owned land or a mining claim restricting the surface entry rights of the landowner or claim holder; a Surface Right Restriction is a method of making a Reserve Contribution of the surface of land (Section 10(b)(iii))

Uncommitted Category—any of the land use categories that do not indicate a commitment to either mining activities or the Reserve, which include Categories D, P, and X (Section 5(c))

Unit—an Administrative Unit (Section 6)

Use Restriction Agreement—an agreement used to make a Relocatable Contribution whereby the contributor agrees not to disturb a parcel of land during the term of the agreement (Section 10(b)(ii))

USFWS—United States Fish and Wildlife Service (Section 1)

West Mojave Plan—a multi-jurisdictional habitat conservation plan under preparation, with the BLM as the federal lead agency (Section 17(c)(v))

Working Group—certain mining interests, conservation interests, and government agencies that have been working together since October 1999 to develop the CHMS (Section 1) ❀

Appendix B: Species Accounts

1. Cushenbury buckwheat

Cushenbury buckwheat—*Eriogonum ovalifolium* Nutt. var. *vineum* (Stokes) Jepson

(a) Author. Andrew C. Sanders, Herbarium, Department of Botany and Plant Sciences, University of California, Riverside, CA 92521-0124

(b) Management status. Federal: Endangered; California: S1.1, G5T1 (CDFG, 1998); CNPS: List 1B, RED code 3-3-3 (Skinner and Pavlik, 1994)

(c) General distribution. Cushenbury buckwheat is endemic to California and is restricted to dry calcareous (primarily limestone) slopes of the northern San Bernardino Mountains (Reveal, 1993). Most populations are on lands within the boundary of the San Bernardino National Forest, but the taxon does extend slightly onto BLM and private lands along the southern edge of the WMPA. The overall range of this plant extends from White Mountain southeast to Mineral Mountain on the north side of Rattlesnake Canyon.

There is a recent report of what is possibly this plant from the southern Sierra Nevada Mountains, but the identification has not yet been confirmed. This discovery is discussed in greater detail in the Natural History section, below.

(d) Natural history. Cushenbury buckwheat (Polygonaceae) was originally described as a distinct species, *Eriogonum vineum*, by Small (1898) from plants collected near Rose Mine by S.B. Parish (#3170) in 1894. At that time Small confused it with plants from farther north and cited a specimen from Oregon as representing this taxon also. It is now believed that this plant is endemic to the San Bernardino Mountains, with the possible exception of a small population in the southern Sierra Nevada.

Cushenbury buckwheat is a long-lived prostrate to mound-forming shrub that typically occurs on rocky slopes, often in cracks on bedrock or on otherwise stable slopes, but is also known from deeper soils derived from decomposed carbonates. It is typically not found in disturbed areas (either naturally or by man), nor is it usually found along washes or on canyon bottoms, unlike Parish's daisy (*Erigeron parishii)*, another limestone endemic that often occurs nearby. But, it has occasionally been found colonizing abandoned haul roads, as at Furnace Canyon (pers. obs., 1998). It is the only variety of *Eriogonum ovalifolium* found in the San Bernardino Mountains, though other varieties occur elsewhere on similar substrates. It has never been found away from carbonate substrates and appears to be more common on the higher value limestones than it is on the economically unimportant dolomites. It is thus, based on information from a survey done for a consortium of mining companies in 1992 (Tierra Madre, 1992), particularly vulnerable to destruction by limestone mining (Sanders, 1992).

Cushenbury buckwheat plants are very compact with short woody stems spreading a few centimeters over the ground. They have been described as "forming large silver mats" resembling "boulders of the limestone it occurs on" (T. Krantz, label notes, UCR). The foliage mounds seldom rise more than 4 in. (10 cm) above the surrounding rocks or soil. However, when the plants begin flowering, they send up inflorescences 1-5 in. (2-12 cm) above the foliage. The several to many short woody stems spread and ascend over a very small patch of ground from a thick woody base above a deep and well-developed woody taproot. The short branches hold many small round-obovate leaves with blades 0.16-0.5 in. (4-12 mm) long and slightly narrower. The petioles are distinct and ca. 0.12-0.24 in. (3-6 mm) long. The foliage is densely covered with tangled, white, rather felty, hairs on both surfaces. The leaves densely cover the upper parts of the stems and are densely grouped so that the ground is generally not visible through the plant. This overall plant density is partly caused by the dried leaves which do not fall from the plant but simply turn a dark brown color and cling to the older parts of the stem. This presumably provides insulation for the plant as well as added protection from water loss through the stems.

Cushenbury buckwheat seems to share many general ecological characteristics with the other varieties of *E. ovalifolium.* It is a perennial of open areas and appears intolerant of extensive shading, preferring full sunlight, and typically occurs between shrubs rather than under them (White, 1997). *Eriogonum ovalifolium* is not a species well adapted to competing for light, but it is very competitive on sites where tall and fast growing species are excluded by moisture deficiencies, wind, winter cold, or nutrient deficiencies. The compact "cushion" habit probably serves to reduce moisture loss on windy ridges as is true for other species of similar life form (Walter, 1973). The short annual growth intervals and consequent low stature makes all races of *E. ovalifolium* poor competitors on sites that are capable of supporting tall or dense vegetation. However, sites where moisture stress is combined with high insolation are highly favorable for plants such as this one. The nutrient deficiencies of limestone soil, exacerbated by the high pH which interferes with mineral uptake, doubtless serve to further reduce competition by fast growing species.

Winter cold is another major ecological factor that affects interior and montane species in the temperate zone. Cushenbury buckwheat, and other low growing cushion species, may be regularly covered by snow during the period of the year when soil moisture is unavailable because the ground is frozen, and when, in arid areas, the humidity of the air may still be very low. When covered with snow, Cushenbury buckwheat is subjected to even less moisture stress than it would be if exposed to the dry air. Under snow, the relative humidity is at virtually 100% and wind effects are excluded. Even when exposed, the low dense form of the plant shelters much of it from direct wind effects. The dense covering of wool on the leaves is evidence that moisture and not light is a major controlling factor for this species. Such a woolly covering will greatly reduce the amount of light striking the chloroplasts in the leaf tissue, but this tomentum also forms a layer of dead air at the leaf surface and may reduce water loss due to wind.

The inflorescence consists of a leafless peduncle (flowering stem) that supports a group of involucres that form a single head-like unbel of cream-white to reddish flowers, with green to reddish midribs, at the tip. The flowers are perfect (possess both male and female parts). Cushenbury buckwheat is distinguished from other mat-forming buckwheats in the San Bernardino Mountains by its compact cushion-form habit, large solitary heads of cream-white to maroon flowers, and round-obovate leaves. There are two similar buckwheat species in the general region. Perhaps the most grossly similar species in the area is southern mountain buckwheat (*Eriogonum kennedyi* var. *austromontanum)*, which occurs in a different habitat (pebble plains) and which has narrower leaves and smaller heads. Its general lifeform is very similar to Cushenbury buckwheat. Skree buckwheat (*Eriogonum saxatile*) is also quite similar, and occurs in the same general areas, but has a more open form and occurs primarily on loose granitic soils on slides and along washes. It is also less long-lived and is seldom conspicuously woody. Its leaf morphology is very similar, but its open cymose inflorescence is quite different from the compact head of Cushenbury buckwheat.

Based on a relatively small sample of herbarium specimens, it appears that Cushenbury buckwheat fruits ripen primarily in about July following the main May-June flowering period, but must ripen later for later flowerings (see below). This would make the seeds ready for germination at the time of any summer rains in August/September, assuming the seeds do not remain dormant for a lengthy period following dispersal. It appears that the relatively large perianth may dry around the fruit, with the achenes remaining attached to the receptacle, and that this whole unit is involved in dispersal, with the dried tepals acting as wings. Wind is thus probably important for local dispersal. Wind is not, however, very effective over long distances. Seed dispersal has not been studied in this species (or variety), but Stokes (1936) thought that birds may play a role in the dispersal of all *Eriogonum* seeds based on various observations of birds and their behaviors. She thought that seeds stored in the crop of a bird killed by a predator might serve to establish new populations in areas distant from existing populations. She also mentioned wind, rain and streams as dispersal agents, but presented no data to support these ideas. Given the extremely restricted distribution of Cushenbury buckwheat, it is not clear that long-distance dispersal has ever occurred and it certainly does not appear to be a common phenomenon. The rest of the varieties of *E. ovalifolium* occur north of the Mojave Desert, such as in the Inyo-White Mtns. and Sierra Nevada (Reveal, 1968) as well as through the Great Basin (e.g., Kartesz, 1988; Welsh et al, 1987; Reveal, 1968). It thus does appear that long distance dispersal occurred at some point, unless there was formerly suitable habitat across the Mojave Desert. There are scattered limestone outcrops on the Mojave Desert that would have supported pinyon woodland when, during the Pleistocene, this more mesic vegetation occupied what are now desert flats (Raven and Axelrod, 1978). These limestone hills could perhaps have served as stepping stones across the desert for populations of *Eriogonum ovalifolium*. It should also be noted that *Eriogonum ovalifolium* in general is not restricted to limestone. Other varieties of the species commonly occur on granite or general alluvium in sagebrush scrub (Reveal, 1968; Welsh et al., 1987). Thus it is possible that this taxon entered the range on other substrates, but then became restricted to limestone by competitive exclusion and subsequent refinement of existing adaptations.

The flowers are relatively large and are clustered into conspicuous head-like umbels. The flowers fade to pink or red at maturity (i.e., probably after pollination) and primarily bloom in May and June. There can be later flowering, for example in September (e.g., Derby and Krantz, s.n., UCR), but the extent of such late flowering or its environmental triggers are unknown. The flowers often dry to a yellowish color in herbarium specimens, but whether this may reflect the original color of some populations is unknown and unlikely. Few collectors of this species appear to bother recording flower color. White (#4012, UCR) has recorded the color of young flowers as "dull white w/reddish vein at centers of "petals" and reddish anthers". Maile Neel (pers. comm.) reports that there is flower color variation within populations and that fresh flowers vary from creamy white to yellowish and that some are pinkish to maroon even when newly opened. She also reports that not all individuals have flowers that turn reddish in age. Clearly, there is need for further study of the trends in flower color in this plant.

Pollination of this plant has only recently been studied, and small insects are almost certainly its pollinators (S. Morita, pers. comm., 1998). The flower color changes to red suggest that the pollinator may be a bee, but such have rarely been observed on the species and Morita (pers. comm., 1998) thinks the pollinators may be generalist flower visitors, rather than a specialist such as a bee. In the summer of 1998 Morita observed nearly 100 insect species visiting this plant, including potential pollinators, plant feeders and others. She noted that because it is relatively late flowering, it is one of the few nectar sources available in its habitat at the time it flowers and so may be heavily visited for that reason. The generalists that are potentially pollinators included many flies, particularly tachinids and bee-flies (Bombylidae), but also many smaller species, such as chloropids. A small species of bee-fly was locally common on the flowers. Two species of small solitary bees (Andrenidae and Halictidae) were also seen visiting, but these were very few (Morita, pers. comm., 1998). Exactly which species serve as effective pollinators has not yet been determined.

Among the plant feeders present were a leaf beetle (Chrysomelidae) which was seen eating the flowers, soft-winged flower beetles (Dasytidae) which were present in the flowers, and various hemipterans, including the small milkweed bug (*Lygaeus*), various plant bugs (Miridae), and stink bugs (Pentatomidae). Grasshoppers (Acrididae) and their nymphs were also present and probably feed on the foliage of the Cushenbury buckwheat.

(e) Habitat requirements. This taxon is apparently restricted to carbonate slopes on the north side of the San Bernardino Mountains. As noted above, it seems to display a preference for limestone rather than dolomite, but this needs confirmation. It also seems to prefer stable slopes with bedrock outcropping, and is rarely found on unstable slopes or along active washes. It can be locally common where it is found, but more commonly is present as scattered individuals. Cushenbury buckwheat occurs primarily in pinyon-juniper woodland but also descends into Joshua tree woodland, mixed desert and blackbrush scrub and extends upward into Jeffrey pine-western juniper woodland (Munz, 1974; Skinner and Pavlik, 1994; Gonella and Neel, 1995). Among its typical associates are: single-needled pinyon (*Pinus monophylla*), big-berried manzanita (*Arctostaphylos glauca*), curl-leaf mountain-mahogany (*Cercocarpus ledifolius*), Shockley's rock cress (*Arabis shockleyi)*, rose sage (*Salvia pachyphylla*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), rubber rabbitbrush (*C. nauseosus*), big sagebrush (*Artemisia tridentata*), pine needlegrass (*Stipa pinetorum*), canyon live-oak (*Quercus chrysolepis*), nevada forsellesia (*Forsellesia nevadensis*), green Mormon tea (*Ephedra viridis*), blackbrush (*Coleogyne ramosissima*), Coville's dwarf abronia (*Abronia nana covillei*), yellow cryptantha (*Cryptantha confertiflora*), Utah juniper (*Juniperus osteosperma*), small-cup buckwheat (*Eriogonum microthecum*), and Parish's daisy (*Erigeron parishii*).

Based on specimens at UCR, populations occur at elevations between 4800 and 6500 ft. (1450 and 1982 m), though Munz (1974) reports "ca. 5000-5500 ft." (1500-1675 m) and Reveal (1993) reports 1500-2100 m (5000-7000 ft.). Recent plot-based sampling has found it between 4680 and 7840 ft. (M. Neel, pers. comm.), and Melody Lardner (pers. comm.) reports that the Forest Service has the species mapped up to 8100 ft. elevation.

(f) Population status. Cushenbury buckwheat is naturally very restricted in its distribution, but has additionally suffered a large but unquantified population decline due to limestone mining (Krantz, 1988; Gonella and Neel, 1995). There are no populations that are secure from mining activity and most are within areas subject to massive disturbance within the next few decades.

Populations of this long-lived plant appear stable in areas where they are undisturbed (pers. obs.), but its habitat has been heavily disturbed and many plants destroyed by mines, haul roads, waste dumps and other mining related activities in recent decades (Krantz, 1988).

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2. Cushenbury milk-vetch

Cushenbury milk-vetch—*Astragalus albens* Greene

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(b) Management status. Federal: Endangered; California: S1.1, G1 (CDGF, 1998); CNPS: List 1B, R-E-D code 3-3-3 (Skinner and Pavlik, 1994)

(c) General distribution. Cushenbury milk-vetch is found in the northeast end of the San Bernardino Mountain range in San Bernardino County, California. With rare exceptions, it is restricted to carbonate and carbonate-related soils and outcrops from 4000-6600 ft. (1300-2000 m). Its range extends from a ridgetop just east of Dry Canyon to the southeast through Lone Valley, east of Baldwin Lake, to upper Burns Canyon. An unverified population at Box 'S' Springs, two to three miles northwest of Cushenbury at 3600 ft. (1100 m), is its northernmost and lowest reported location.

(d) Natural history. Cushenbury milk-vetch is an herbaceous member of the pea family (Fabaceae), and was first collected by Parish and Parish (Greene, 1885). Several prostrate stems, each 2-12 in. (0.5-3 cm) long, emerge from the base. The leaves and stem have appressed silvery-white hairs, giving the plant a smooth, sleek, gray appearance. The pinnately-compound leaves have 5-9 leaflets which are elliptic to oval-shaped, have obtuse tips, and are each 0.2-0.4 in. (5-10 mm) long. Flowers occur in racemes on 0.8-2.0 in. (2-5 cm) long peduncles. The calyces are about 0.16 in. (4 mm) long, and also bear the silky silvery-white hairs. The papillionaceous corolla is pink to purplish, with both banner and keel 0.3-0.4 in. (7-10) mm in length, exceeding the wing length. The sessile fruits have two locules, are about 0.4-0.7 in. (10-18 mm) long, crescent-shaped, three-sided, and densely strigose (Hickman, 1993; Munz, 1974; Barneby, 1964). This fruit shape helps to distinguish the Cushenbury milkvetch from Bear Valley milk-vetch (*A. leucolobus)* which may also grow sympatrically on carbonate soils (USFWS 1997). It also resembles Mojave milk-vetch (*A. mohavensis)* from the northern Mojave Desert, but Mojave milk-vetch is not pubescent, as is the Cushenbury milk-vetch (Isely, 1984).

Cushenbury milk-vetch has been described both as an annual and as a short-lived perennial herb (Barneby, 1964; Greene, 1885; Hickman, 1993; Munz, 1974; Skinner and Pavlik, 1994). Little is known of its life history. Greene reported that a "good proportion" of the plants flower precociously and are monocarpic, especially in years of low rainfall (Greene, 1885). However, it is not known whether the plants typically flower and fruit the first year, how long they live, or what conditions might cause them to act as annuals in some cases or perennials in other cases. Flowering occurs from late March to mid-June. Pods ripen at least as early as May, and become stiff and papery with long hairs as they mature.

Pollen vectors are most likely small bees, given the flower shape and color (Faegri and Van der Pijl, 1978). It is not known if this species is self-compatible. Most

Cushenbury milk-vetch reproduction presumably occurs by seed, and seeds have been found to have high viability (Tierra Madre Consultants, 1996). Vegetative reproduction has never been reported. Seeds require scarification, and greenhouse experiments have shown that seedlings are susceptible to damping off when grown in pots (Tierra Madre Consultants, 1996). It has long been known that seeds remain dormant in the soil during drought years (Greene, 1885), but the numbers of viable seeds present in the soil and the length of time they can remain viable is unknown. The extent of seed predation, the numbers and kinds of seed predators, and seed dispersal mechanisms are also unknown.

(e) Habitat requirements. Generally Cushenbury milk-vetch is restricted to carbonate soils (Gonella and Neel, 1995; Tierra Madre Consultants, 1992), but one account reported populations from non-carbonate soils. Subsequent surveys have not supported this finding (Tierra Madre Consultants, 1992), and it is likely that these plants were on carbonate alluvium that had been deposited over granite bedrock, as is often the case in populations below 5000 ft. (1600 m) elevations (USFWS, 1997). More recently, Cushenbury milk-vetch plants have been found on granitic soil (Psomas and Associates, 1996), but it is likely that these plants fell into the site, along with some carbonate substrate, during a debris slide. It is expected that, as larger species move into the disturbed area, the Cushenbury milk-vetch plants will be eliminated (Psomas and Associates, 1996). It often occupies areas with an open canopy, less litter accumulation (2.3%), higher per cent calcium (average 21.3%), and shallower slope angles (average 12.1) than other carbonate sites that do not support these plants (Gonella and Neel, 1995; USFWS, 1994).

Cushenbury milk-vetch has been reported from Joshua tree woodland and blackbush scrub communities, but is most commonly found in pinon-juniper woodland. It has been reported growing with dominant species Utah juniper *(Juniperus osteosperma)*, joint fir *(Ephedra viridis),* paper bag plant *(Salazaria mexicana), m*ountain mahogany *(Cercocarpus ledifolius),* Mojave yucca *(Yucca schidigera*), manzanita *(Arctostaphylos glauca)*, flannel bush *(Fremontodendron californicum),* Great Basin sagebrush *(Artemisia tridentata),* and needlegrass (*Stipa coronata)* (CDFG 1997; Gonella and Neel, 1995).

(f) Population status. It has been estimated that there are between 5000-10,000 Cushenbury milk-vetch plants throughout the entire range (USFWS, 1997), and the total number probably varies annually depending on rainfall (Barneby, 1964; USFWS, 1997). Estimates from previous surveys in 1988 indicated a total of just over 2000 plants (Barrows, 1988), but more detailed surveying in subsequent years with greater rainfall led to the increase in estimated number of plants. The population center with the most dense population is most likely in Lone Valley, with 3172 Cushenbury milk-vetch plants found at the proposed Right Star mine site in 1991 (USFS, 1992). However, the variation due to environmental conditions, coupled with the unknown nature of the soil seed population and inability to survey all potential habitat, make it very difficult to develop any reliable estimate of population size.

(g) Constraints to Recovery and Restoration.

(i) Natural recolonization. There appears to be some potential for natural recolonization of slightly disturbed sites by Cushenbury milk-vetch (Barrows, 1988; Tierra Madre Consultants, 1992; USFWS, 1997). This species has been observed on little used roads and on two small quarries that have been abandoned for 20 to 25 years (USFS, 1992). There is no indication that they can tolerate continuous disturbance or high levels of disturbance, such as active quarrying or continual usage of roads (Sanders 1992; Tierra Madre Consultants, 1992). That this species can tolerate a degree of disturbance does not mean that disturbed sites are preferred. At Right Star mine site in Lone Valley, there were significantly fewer Cushenbury milkvetch plants per acre in previously disturbed areas than in adjacent undisturbed areas. A greater proportion of juvenile plants were found in undisturbed areas, possibly indicating more recruitment when there is less disturbance (USFS, 1992).

(ii) Propagation. It is uncertain whether Cushenbury milkvetch plants could be propagated in a greenhouse for purposeful revegetation. Although an attempt to germinate seeds was successful as long as

seeds were scarified, the necessity to keep soil moist for seedling establishment encouraged the growth of the root rot fungus, *Pythium*, which probably caused death of all of the seedlings in the study (Tierra Madre Consultants, 1996). In a trial revegetation program at Gordon Quarry, Cushenbury milk-vetch plants were salvaged, potted, and kept in a greenhouse prior to relocation and transplant to a field site, but all plants died in the greenhouse. However, plants were observed later in the Gordon Quarry, evidently recolonizing naturally (Tierra Madre Consultants, 1992).

(iii) Genetic characteristics. Cushenbury milk-vetch populations experience extreme fluctuations due to amounts of annual precipitation (Barneby, 1964; USFWS, 1994). This could possibly lead to genetic bottlenecks, which could result in loss of genetic diversity (Barrett and Cohn, 1991). However, recent isozyme research has shown a surprisingly high degree of heterozygosity for an endemic species (Neel, 1999). The maintenance of genetic diversity through years with low populations is likely due to the soil seed bank. Although there are currently no seedbank data, Cushenbury milk-vetch population increases following rainy seasons indicate that seeds must persist in the soil for at least several years.

Human disturbances, such as road building and quarry excavation, cause habitat fragmentation which might eventually restrict gene flow and also lead to loss of genetic diversity and long term population viability (Beeby, 1993).

(h) Research needs.

(i) Reserve location and design. Further research is needed to obtain information necessary for appropriate selection of reserve sites as well as for management of Cushenbury milk-vetch. The specific areas already designated may turn out to be the best locations for recovery plan reserves, and it would be a good strategy to secure these lands as temporary reserves as soon as possible before any more habitat is destroyed. However, just because these areas have the highest number of carbonate endemic species, establishment of reserves in these locations does not ensure long-term population viability of any or all of the carbonate endemic taxa involved. Establishing a reserve for all carbonate endemics does not take into account habitat preferences for each species to be protected (Gonella and Neel, 1995). In addition, these areas may not represent the genetic diversity present within this taxon, and may not represent the ecological range of the taxon, both of which are important criteria in establishing effective reserves (Neel, 1999).

It is recommended that reserves should be set up at a variety of elevations and geographic locations, so that random events, such as fires or flash floods, would not impact all reserves at one time (White, 1997; Neel, 1995), and that each reserve site should include unoccupied habitat into which the species can move in the future (White, 1997).

(ii) Life history research needs. If data were available on recruitment and reproductive success in various areas within its range, efforts could be directed toward establishing reserves in those sites where the Cushenbury milk-vetch gets established and produces viable seed most readily. Research is needed to determine if the plants always flower and fruit the first year, how long they live, and what conditions influence their life history strategy. This information would be useful in conservation management by helping to predict future reproductive effort and population fluctuations.

If seed bank information were available (such as seed bank population size, numbers and kinds of seed predators, and the extent of seed predation) the genetic repercussions of random population variation due to climate could be more predictable, potential rates of recolonization of disturbed areas might also be determined with more accuracy, and there would be greater precision in determining how large preserves and buffers must be to maintain population viability. If seed dispersal mechanisms were known, there would be a better understanding of potential for natural recolonization.

(iii) Research on habitat requirements. It would be helpful to obtain information about mycorrhizal associations (White, 1997), and to use available information about soil mineral nutrient content and texture preferences for this species (Gonella and Neel, 1995); reserves could be established and revegetation efforts

could be directed only in areas which meet those requirements. To understand data gleaned from monitoring population fluctuations, it is imperative to know how rainfall affects population size from year to year, so these effects can be separated from those from human activities.

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3. Cushenbury oxytheca

Cushenbury oxytheca—*Oxytheca parishii* var. *goodmaniana*

(a) Author. Andrew C. Sanders, Herbarium, Department of Botany and Plant Sciences, University of California, Riverside, CA 92521-0124

(b) Management status. Federal: Endangered; California: S1.1, G4?T1 (CDFG, 1998); CNPS: List 1B RED code 3-3-3 (Skinner and Pavlik, 1994)

(c) General distribution. Cushenbury oxytheca is endemic to the San Bernardino Mountains of southern California and is restricted to the dry carbonate slopes on the north side of the range. It has never been found outside of this limited area.

(d) Natural history. Cushenbury oxytheca is an annual herb of the buckwheat family (Polygonaceae). It is poorly known and was almost unknown before it began to be studied as a result of the realization that most of its limited habitat was subject to elimination by limestone mining. Little has been published on the natural history of the plant and much of what follows is based on personal observation and the study of a limited number of herbarium specimens. It occurs on dry open slopes, mostly in loose scree and talus derived from limestone (Hickman, 1993; pers. obs.).

Oxytheca plants germinate in the fall following the first rains and exist as a vegetative rosette through the winter months. The basal rosette consists of relatively broad, oblong-obovate, green leaves, which are followed in the spring by a slender leafless inflorescence. As the inflorescence matures the leaves wither and dry, so that by the time of late flowering or fruit ripening the plant typically has no living leaves at all. All late season photosynthesis is presumably carried on by the green stems and the involucral bracts. The flowers are white with a reddish midrib, and are apparently insect pollinated. Specific pollinators, germination requirements, seed longevity, and most other aspects of the biology of this species are largely unknown, but there are some recent observations on the insect associates of this plant.

Based on limited observations in the summer of 1998, it appears that the insect pollinators of this species are generalists, such as various flies and possibly small beetles (S. Morita, pers. comm.), rather than highly specialized pollinators tied closely to this species. Small gray beetles of the family Dasitidae were found visiting the flowers (S. Morita, pers. comm.). At least two plant feeding insects have been identified attacking this species, including the bordered plant bug (Largidae: *Largus cinctus californicus*), which is a generalist sap feeder, and an otherwise unidentified leaf beetle (Chrysomelidae) which was observed eating the flowers (S. Morita, pers. comm.). In addition to the above, a number of big-eyed bugs (Lygaeidae: *Geocoris*) were found on the plants (S. Morita, pers, comm.), but these were probably predators on other insects rather than plant feeders (G. Ballmer, pers. comm.).

The taxonomy of Cushenbury oxytheca is in need of clarification, with respect to the distinctiveness of this taxon relative to the other two varieties of *Oxytheca parishii* in the San Bernardino Mountains, var. *parishii* and var. *cienegensis*. Cushenbury oxytheca is most readily separated from the other two San Bernardino Mountains varieties by its possession of only four (or rarely 5) involucral awns (Reveal, 1989). These awns are also shorter (ca. 2-3 mm) and more slender and inconspicuous than those in the other two varieties. Parish's oxytheca (var. *parishii*) is the most widespread and distinctive variety with its numerous (10-36) long (ca. 4-4.5 mm) awns on the involucral lobes. These awns are thicker and much more conspicuous than those in the other varieties. It is also the most widespread variety, due to its habitat preferences — openings on granitic slopes in yellow pine forest. It is widespread from Big Bear, west through the Crestline/Arrowhead area, and then continuing through the San Gabriel Mountains to the mountains of Ventura County (Reveal, 1989). Variety *cienegensis* is the most poorly known of the three varieties and the one most similar to variety *goodmaniana*. It is intermediate in involucral awn number (7-10) and length (3-4 mm) between the other two varieties. Variety *cienegensis* occurs on various substrates from Tip-Top Mountain to Cienega Seca near Onyx Peak, and plants near Tip-Top Mountain are on limestone and appear to be morphologically transitional toward var. *goodmaniana*. Being recently described (Ertter, 1980), and not being in an area of high environmental impact, this variety has received much less attention from botanists and environmental consultants than has Cushenbury oxytheca. All three varieties are illustrated in the Jepson Manual (Hickman, 1993).

(e) Habitat requirements. Cushenbury oxytheca occurs only on carbonate slopes, usually steep ones, and almost always on loose scree or talus. This preference is revealed in the data from the only published results from plot-based population sampling of limestone endemics in the San Bernardino Mountains (Gonella and Neel, 1995). Cushenbury oxytheca was never (0 of 30 plots) found on sample plots centered on Cushenbury milkvetch (*Astragalus albens*) plants but was fairly regularly found on plots lacking this species (Gonella and Neel, 1995). Cushenbury milkvetch is a species typical of stable, often bedrock, slopes. Likewise, Cushenbury oxytheca appears to be negatively correlated with the presence of Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*), another species which prefers stable slopes (Gonella and Neel, 1995). However, recent surveys conducted by Rancho Santa Ana Botanic Garden for the U.S. Forest Service did find Cushenbury oxytheca growing with *Astragalus albens* and *Eriogonum ovalifolium* var. *vineum* in some areas (V. Sosa, pers. comm.).

Populations occur at elevations between 4000 and 7800 ft. (1200-2380 m) in the pinyon-juniper woodland (Reveal, 1989) and Jeffrey pine-western juniper (M. Neel, pers. comm.) vegetation zones which, of course, occurs on the desert-facing slope of the mountains. In this zone air movement is primarily descending and hence often removes moisture from vegetation, rather than depositing moisture as rain as it does on the coastal slope. The resulting lack of rainfall and consequent substrate aridity makes it important that plants be either early flowering or deep rooted, so that they can take advantage of the limited water supply. Cushenbury oxytheca is late flowering (May-June), but has a relatively long straight taproot and presumably is able to tap into supplies of soil moisture below the surface where low atmospheric humidity results in moisture being removed from the soil.

The loose gravel and rock substrate preferred by Cushenbury oxytheca has several important ecological characteristics that may favor this species. The first and most obvious is that, because the slopes are unstable, it is difficult or impossible for larger, potentially competing, trees and shrubs to become established. This leaves the habitat open for smaller annuals like Cushenbury oxytheca to occupy. A second noteworthy characteristic is the coarse and well-aerated character of the substrate, which permits rapid infiltration of rainfall and thus less moisture loss to runoff than would otherwise be expected. It is probable, also, that soil moisture in occupied talus is supplemented by runoff from rocky slopes, cliffs and bedrock outcrops above, where those are present. The loose character of the soil also permits the easy penetration of roots and the coarse surface material serves as a "ock mulch" to retard the loss of soil moisture to the atmosphere. These characteristics permit plant growth after the soil surface has dried.

(f) Population status. Cushenbury oxytheca was found at nine of 88 sites sampled on carbonate substrates in the San Bernardino Mountains in 1992 and 1993 (Gonella and Neel, 1995), which clearly indicates that it is more widespread than formerly known though still uncommon. A total of at least 50 populations were known as of 1998 (V. Sosa, pers. comm.), which is a substantial increase from the four known in 1992 (Tierra Madre, 1992), or the 15 reported more recently (USFWS, 1997). It is apparent that a clear understanding of the abundance and distribution of this plant within its narrow range is still developing.

Populations of Cushenbury oxytheca do not appear to exhibit a general downward trend, given the population fluctuations that are normal in an annual plant, at sites where it is not being directly impacted by mining (pers. obs.). Populations are highly variable (White, 1997) at any given site, but plants can be locally common after particularly favorable years. Populations vary in response to rainfall and other climatic conditions, so that at a given site where there was a substantial population one year there may be few to none the next. Even in years when no plants are present, a living seed bank remains. However, large parts of its range are under heavy pressure by mining interests and so overall Cushenbury oxytheca has certainly declined significantly over recent decades. It has been estimated that over 1600 acres of potential habitat for the various carbonate endemics had been lost to mining by 1993 (Gonella and Neel, 1995). Unfortunately, because this plant was little collected and never censused prior to the 1980s, the historical pattern of its population sizes and distribution is unknown, except by inference. At best, we can infer former distributions based on habitat type and general range. Sites that are now mined down to bedrock, but which are in areas which were formerly suitable habitat, must be presumed to have formerly supported this plant. A quantitative survey of the abundance and distribution of this species has recently been completed and this has revealed that the species is more widespread than formerly known (V. Sosa, pers. comm.), though it is still seen to be very restricted in its distribution.

Cushenbury oxytheca is a naturally restricted endemic, but populations have apparently been further reduced by mining activity within its range, based on the widespread disturbance of carbonate habitats (Gonella and Neel, 1995).

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4. Parish's daisy

Parish's daisy—*Erigeron perishii* Gray

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(b) Management status. Federal: Threatened; California: S2.1, G2 (CDFG, 1998); CNPS: List 1B, RED code 2-3-3 (Skinner and Pavlik, 1994)

(c) General distribution. Parish's daisy is endemic to southern California and is restricted to the dry calcareous (primarily limestone) slopes of the San Bernardino Mountains, with a few collections from generally granitic areas at the east end of the San Bernardino Mountains and in the Little San Bernardino Mountains. The substrate at the sites where the species was collected away from the major carbonate deposits has often not been clearly specified and needs clarification. Most of the populations are on lands within the boundary of the San Bernardino National Forest. This species is reported by Nesom (1993) only from Cushenbury Canyon on the north slope of the San Bernardino Mountains, but specimens exist documenting its occurrence in many other nearby areas. There are reported to be 50 occurrences (USFWS, 1997) but many of these probably represent reports of different parts of single populations. Specific localities include: mouth of Marble Canyon (BLM land); Arctic Canyon, Bousic Canyon, Furnace Canyon, Grapevine Canyon, Cactus Flat (head of Cushenbury Canyon); Cushenbury Spring; Horsethief Flat, near Blackhawn Canyon, limestone outcrop 1.5 mi. (2.5 km) NE of Baldwin Lake, 6200 ft. (1890 m); 8 miles (13.3 km) S of Warren's Well [= site of Yucca Valley Airport], and E of Long Canyon, 3600 ft.(1100 m). The latter two localities are in the Little San Bernardino Mountains.

There have been, over the years, a number of reports and collections that indicate that this species occurs in the Eastern Mojave Desert in the vicinity of the Ivanpah Mountains but these have all, upon examination, proved to be errors, usually based on the vaguely similar *Erigeron concinnus* (H. & A.) Torr. & Gray [=*E. pumilus* var. *concinnoides*] and the species has never been reported from that area by any major flora (e.g., Nesom, 1993; Munz, 1974). It has also been erroneously reported from other areas based on the related *E. utahensis* (USFWS, 1997), which occurs on limestone slopes in the Providence Mountains (Nesom, 1993).

The Cactus Flat locality is somewhat dubious in that the habitat is not typical (largely or entirely granitic instead of calcareous) and it is based only on an old Marcus Jones collection. It is probable that Jones was camped at Cactus Flat and collected the *Erigeron* in the carbonate either below in Cushenbury Canyon, above in the Lone Valley area, or around Blackhawk Mtn. Jones is fairly notorious for generalized localities based on the site where he stayed and collected out from (e.g., Barstow, Blythe, etc.) and he is responsible for highly dubious records from a number of locations. There are also comparable problems with the Little San Bernardino Mountains locality, in that two of the three collections are by Edmund Jaeger. Jaeger had a life-long habit of intentionally misplacing or blurring collection sites slightly in order to protect the identity of his favored camping localities (P. Roos, pers. comm.). One of his Parish's daisy specimens, in fact, is merely labeled "Joshua Tree National Monument", but is generally presumed to be from the same site as his more precisely located specimen taken four days earlier. There is a more recent reported collection by P. Leary from the same area, which means that the species probably does occur, although the identity of the Leary specimen (presumably located in the herbarium at Univ. of Nevada, Las Vegas) seems not to have been confirmed. A search for the species in the late 1980s failed to find the Little San Bernardino Mountains locality and did not find any suitable habitat (either suitable washes or carbonates) in the area where it was reported. At least some people think the species was erroneously mapped (K. Barrows, pers. com., 1997). The CNDDB (CDFG, 1989) reports this locality as having the plant "growing out of a steep slope beneath pinyon pine" which is a somewhat unusual habitat for the species given the its preference for washes and loose soil elsewhere, but the plant does occur on dry slopes in the San Bernardino Mountains. The most serious peculiarity of this site is that there is no carbonate rock reported in the area (Dibblee, 1967a), and the labels of the collected specimens do not specify substrate.

(d) Natural history. Parish's daisy is an herbaceous perennial with a long simple tap root that extends for some distance (perhaps 50 cm) into the loose carbonate alluvium, which the species favors. This species was first described by Asa Gray in 1884 from specimens collected by S.B. Parish (#1251) at Cushenbury Springs in May 1881 (Ferris, 1960; Krantz, 1979). Though, oddly, the second edition (apparently unaltered) of the original description (Gray, 1888) merely says "rocky caÒons, borders of the Mojave Desert, S.E. California, *Parish*." Later authors must be relying on additional information derived from the label on the type specimen, since their locality descriptions are more expansive than the original description.

The stems are erect or ascending and may be either numerous or rather few on each plant, but on mature plants are typically at least 20 in number. The stems tend to be faintly zig-zag rather than straight. They arise from a somewhat woody base that usually bears the remains of previous years branches. The plants are 3-12 in. (7-30 cm) tall and have the stems and foliage covered with a conspicuous, loose, whitish to grayish appressed pubescence. This pubescence is particularly thick and persistent on the stems and these often stand out as whiter than the leaves. The older leaves appear to gradually lose pubescence so that they are often greener than the rest of the plant. The pubescence is often described as silvery-white. The leaves are slender and entire.

The flower heads are solitary on bracted, almost leafy, peduncles, but there are commonly 2-4 peduncles per stem. The total number of heads on a mature plant can easily equal 50 in a given season. The heads bear lavender ray flowers and yellow disk flowers.

The method of pollination is unknown for Parish's daisy, but is certainly by insects, based on the conspicuously colored flowers. Likely candidates include bees, butterflies or long-tongued flies, based on the known pollinators of other composites of similar general flower structure. Seed dispersal is unstudied as is the relative importance of seeds versus possible vegetative spread in the maintenance and expansion of populations, though seedlings have been reported at several sites (Krantz, 1979) and are probably the predominant mode of reproduction. Flowering is reported to occur from May to July (Krantz, 1979), but the peak of flowering seems to be from mid May to mid June. At least in some years a few plants continue flowering into July and some even into August (M. Provance, pers. com., 1998). Flower heads have been found to be attacked by insect larvae [Tephritid flies?] but the extent and effect of such damage is unknown, though reported to be "not widespread" (Krantz, 1979).

(e) Habitat requirements. Parish's daisy is largely restricted to carbonate substrates, but has been found on other rock types occasionally. Plants appear to be most commonly found either along washes on the canyon bottoms or on loose alluvial deposits on adjacent benches, but are also regularly found on steep rocky slopes. It appears that the Pioneertown site is primarily granitic, but along the washes where the species occurs there are reported to be some carbonate materials washed down from higher elevations (K. Barrows, pers. com., 1997). This is not certain and needs to be confirmed. There is limestone in the general vicinity (Dibblee, 1967b). It may be that the apparent carbonate preference is based on reduced competition from other plants on this substrate. Certain non-carbonate sites that are otherwise ecologically favorable could thus support the species. Two of the collections that appear to be from granitic areas are old (old collections are more frequently inaccurate or vague in their site data than more recent ones) and do not specify the substrate at the site where the plant was collected. However, there are recent reports of this species on non-calcareous, decomposed granite, slopes within the carbonate region on the north slope of the San Bernardino Mountains (M. Provance, pers. comm., 1998). These reports are very few, however. All sites where the soil was actually tested have been found to have strongly alkaline soils, regardless of predominant origin (M. Provance, pers, comm., 1998). This implies that even the granitic areas may have been somewhat influenced in their soil chemistry by drift from adjacent carbonate slopes.

Parish's daisy occurs, based on available specimens, at elevations from 3700-6600 ft. (1125 - 2012 m), though Nesom (1993) gives a range of 800-2000 m (2625-6560 ft.). The low end of the range given by Nesom seems definitely to be in error as that elevation (2625 ft.) would put the species far out onto the flats of the Mojave Desert, where it has never been collected.

(f) Population status. This species is naturally of rather restricted distribution and is probably largely confined to a very specific substrate that is not of wide occurrence within its range. That particular substrate (limestone) has become economically valuable in recent years and so many populations have been destroyed or damaged by limestone mining.

Parish's daisy is clearly declining, much habitat has been destroyed by limestone mining, but is still among the more common of the carbonate endemics of the San Bernardino Mountains. This species was reported to be "abundant on stony hillsides at Cushenberry Springs" by Hall (1907), which suggests a change in abundance over the past 90 years, but this is obviously not conclusive since the precise meaning of "abundant" in Hall's mind is unknown. It is possible that Hall never actually saw the plant at this site, since he notes that as of the date he wrote only Parish had collected it. He may have based his description of daisy abundance on notes on one of Parish's collections or on discussions with Parish (whom he knew personally). If Hall had seen it himself, at a suitable season, it seems likely he would have collected the plant.

Parish's daisy seems better able to recover after disturbance than some carbonate endemics. There is considerable need for clarification of its distribution and substrate preference at the eastern end of the San Bernardino Mountains (Pioneertown area) and in Joshua Tree National Park. These are areas where the reported occurrence is based on just a few specimens, often very old or poorly located (especially with respect to substrate). There were fewer than 25 occurrences of this species known prior to its listing as threatened by the USFWS, with a total of ca. 16,000 individuals reported. But, that occurrence total has since been increased to ca. 50 (USFWS, 1997). There are several problems with both the original estimate and this expansion based on the newer "occurrence" estimate. The largest problem is that it is not at all certain that the various reported occurrences actually represent separate populations or that some of the individuals reported in one "occurrence" are not also reported again in another.

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Appendix C: Habitat Definitions

*The calculation of Conservation Value under the CHMS (*see *Section 7) depends upon the definitions of "Occupied Habitat," "Suitable Habitat," and "Other Beneficial Habitat." This appendix explains how available data has been and will be used to determine whether land falls into these categories. Under the CHMS, Conservation Value can also be established for various categories of revegetated habitat, whose definitions are found in Appendix E.*

As described in Sections 7(c) and 14(d), the Habitat Inventory officially establishes the habitat categories that apply to any given parcel of land within the CHMA. The Forest Service maintains the Habitat Inventory as a set of digital GIS files.

(a) Habitat definitions for the initial Habitat Inventory. The initial Habitat Inventory for the CHMS has been established and is represented in the habitat statistics in *Appendix D* and by *Map 4* in *Appendix I.* The initial Habitat Inventory has been accepted by the MOU Parties as the official Habitat Inventory of the CHMS and will be the basis for the biological assessment prepared by the Resource Management Agencies to initiate the CHMS Section 7 Consultation and for the CHMS Biological Opinion from the USFWS that results from such consultation. Except as modified in accordance with Section 14(d), the initial Habitat Inventory controls for purposes of determining Conservation Values under the CHMS. The habitat models that were used to develop the GIS database for the initial Habitat Inventory are described in a memorandum dated September 5, 2001 from Sean Redar and Scott Eliason to the U.S. Fish and Wildlife Services (Redar and Eliason (2001); available from the Forest Service upon request). Based on those habitat models, the habitat category definitions for the initial Habitat Inventory were established in accordance with the following:

(i) Occupied Habitat. Habitat that is known to be occupied by one or more species of Carbonate Plants. Currently, these data are based on field survey information gathered over approximately the last 15 years. The Occupied Habitat data layer includes a wide range of precision, from approximately 30 meters down to approximately 1 meter. This range is based on improving GPS technology over time and differing mapping techniques. Despite this range of precision, the current occupied habitat layer is considered to be accurate and is the best available information.

(ii) Suitable Habitat. Habitat that possesses the qualities necessary to support occurrences of Carbonate Plant occurrences, but is not known to be occupied. These are areas where undiscovered occurrences are most likely to be found in the future, and are also areas that are likely to be occupied over long periods of time as the distribution of carbonate plants changes across the landscape. These are also important areas that support many species of plants and animals (including pollinators) that are associated with the Carbonate Plants. The data underlying the current mapping of Suitable Habitat, derived from the model described in Redar and Eliason (2001), are considered to be fairly accurate. Aerial photo interpretation and limited ground-truthing has verified the model, though much of the suitable habitat has not been verified in the field. Despite this uncertainty, the current Suitable Habitat layer represents the best available information.

(iii) Other Beneficial Habitat. Undisturbed natural land that provides some geomorphological, hydrological, or habitat configuration benefit to the Carbonate Plants, but excluding Occupied Habitat and Suitable Habitat. The layer for Other Beneficial Habitat was developed heuristically with reference to *(A)* available geological and hydrological information and *(B)* the locations of mapped patches of Occupied Habitat and Suitable Habitat.

(b) Habitat definitions for modifications to the Habitat Inventory. As the Habitat Inventory is revised over time in accordance with Section 14(d), it is necessary to apply clear and consistent data standards. Applying such data standards over time will eventually remove discrepancies in the precision of Occupied Habitat polygons and uncertainties in the Suitable Habitat layer and will ensure that Conservation Value derived from these layers is uniformly applied. These standards include survey protocols, suitable habitat criteria, mapping standards (both for the field and for the digital Habitat Inventory), and attribute data and metadata requirements. All of these standards are in draft form and available from the Forest Service upon request.

(c) Conservation Value mapping. As the Occupied Habitat and Suitable Habitat layers are refined based on future fieldwork, the Conservation Value layer will be updated with the same level of precision. Although the current Conservation Value map (*Map 5* in *Appendix I*) was created with 30 meter resolution raster data, future revisions should result in a more precise mapping of Conservation Value. At any time, calculations should be based on the best (i.e., most recent, accurate, and precise) data available. ❀

Appendix D: Habitat Statistics

The following tables provide an account of the habitat data in the current Habitat Inventory by Unit, habitat type, and land use category. All figures are given in acreage, except the summary of Conservation Value within each Unit, which is given in Conservation Units. "All Occupied Habitat" may be less than the sum of the Occupied Habitat of each of the Carbonate Plants because some acreage is occupied with more than one of the Carbonate Plants. Critical Habitat is the Carbonate Habitat that has been designated as critical habitat by the USFWS.

White Mountain Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**922**	-	-	701	112	109	326	
Occ Hab, E. ovalifolium	**29**	-	-	21	8	-	7	
Occ Hab, A. albens	**-**	-	-	-	-	-	-	
Occ Hab, O. parishii	**68**	-	-	58	-	10	53	
Occ Hab, E. parishii	**21**	-	-	12	9	-	-	
All Occupied Habitat	**99**	-	-	80	9	10	57	
Suitable Habitat	**1,331**	-	-	1,065	198	68	416	
Other Beneficial Habitat	**619**	-	-	349	-	270	231	
Total habitat acreage	**2,049**	**-**	**-**	**1,494**	**207**	**348**	**704**	
Critical Habitat	**435**	-	-	335	-	100	308	

Furnace Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**10,544**	-	1,045	4,597	2,918	2,094	1,234	1,125
Occ Hab, E. ovalifolium	**592**	-	29	352	166	53	219	115
Occ Hab, A. albens	**507**	-	11	383	74	66	198	182
Occ Hab, O. parishii	**342**	-	7	198	61	81	146	28
Occ Hab, E. parishii	**530**	-	14	266	243	35	119	192
All Occupied Habitat	**1,545**	-	47	915	426	202	452	418
Suitable Habitat	**14,077**	-	1,442	6,785	4,067	2,832	1,265	1,212
Other Beneficial Habitat	**6,753**	-	1,114	2,096	1,665	1,882	329	304
Total habitat acreage	**22,375**	**-**	**2,603**	**9,796**	**6,158**	**4,916**	**2,046**	**1,934**
Critical Habitat	**6,050**	60	213	3,362	1,876	729	1,423	1,314

Helendale Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**8,865**	-	-	5,862	72	2,934	1,513	842
Occ Hab, E. ovalifolium	**592**	-	-	454	4	137	218	123
Occ Hab, A. albens	**695**	-	-	663	7	25	386	165
Occ Hab, O. parishii	**108**	-	-	80	6	23	82	-
Occ Hab, E. parishii	**478**	-	-	416	-	64	228	132
All Occupied Habitat	**1,460**	-	-	1,243	15	218	633	335
Suitable Habitat	**13,356**	-	-	8,825	111	4,492	1,522	895
Other Beneficial Habitat	**2,571**	-	-	685	18	1,863	224	154
Total habitat acreage	**17,387**	**-**	**-**	**10,753**	**144**	**6,573**	**2,379**	**1,384**
Critical Habitat	**5,430**	19	-	3,848	95	1,481	1,674	924

(Continued on the following page)

White Mountain Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**922**	-	-	701	112	109	326	
Occ Hab, E. ovalifolium	**29**	-	-	21	8	-	7	
Occ Hab, A. albens	**-**	-	-	-	-	-	-	
Occ Hab, O. parishii	**68**	-	-	58	-	10	53	
Occ Hab, E. parishii	**21**	-	-	12	9	-	-	
All Occupied Habitat	**99**	-	-	80	9	10	57	
Suitable Habitat	**1,331**	-	-	1,065	198	68	416	
Other Beneficial Habitat	**619**	-	-	349	-	270	231	
Total habitat acreage	**2,049**	**-**	**-**	**1,494**	**207**	**348**	**704**	
Critical Habitat	**435**	-	-	335	-	100	308	

Furnace Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**10,544**	-	1,045	4,597	2,918	2,094	1,234	1,125
Occ Hab, E. ovalifolium	**592**	-	29	352	166	53	219	115
Occ Hab, A. albens	**507**	-	11	383	74	66	198	182
Occ Hab, O. parishii	**342**	-	7	198	61	81	146	28
Occ Hab, E. parishii	**530**	-	14	266	243	35	119	192
All Occupied Habitat	**1,545**	-	47	915	426	202	452	418
Suitable Habitat	**14,077**	-	1,442	6,785	4,067	2,832	1,265	1,212
Other Beneficial Habitat	**6,753**	-	1,114	2,096	1,665	1,882	329	304
Total habitat acreage	**22,375**	**-**	**2,603**	**9,796**	**6,158**	**4,916**	**2,046**	**1,934**
Critical Habitat	**6,050**	60	213	3,362	1,876	729	1,423	1,314

Helendale Unit	Total	M1	M2 & X	D	P	Init Resrv	S1 Priority	S2 Priority
Conservation Value	**8,865**	-	-	5,862	72	2,934	1,513	842
Occ Hab, E. ovalifolium	**592**	-	-	454	4	137	218	123
Occ Hab, A. albens	**695**	-	-	663	7	25	386	165
Occ Hab, O. parishii	**108**	-	-	80	6	23	82	-
Occ Hab, E. parishii	**478**	-	-	416	-	64	228	132
All Occupied Habitat	**1,460**	-	-	1,243	15	218	633	335
Suitable Habitat	**13,356**	-	-	8,825	111	4,492	1,522	895
Other Beneficial Habitat	**2,571**	-	-	685	18	1,863	224	154
Total habitat acreage	**17,387**	**-**	**-**	**10,753**	**144**	**6,573**	**2,379**	**1,384**
Critical Habitat	**5,430**	19	-	3,848	95	1,481	1,674	924

Appendix E: Guidelines and Success Criteria for Revegetation and Carbonate Plant Introductions

The following guidelines and success criteria have been developed to provide consistency in revegetating lands disturbed by mining activities in carbonate habitat within the CHMA. The intent herein is to provide specific guidelines and success criteria for revegetation of native plants and habitats and introduction of Carbonate Plants in conjunction with mining reclamation. The revegetation objectives promoted by these guidelines are to set a successional trajectory toward a specified target vegetation as closely as practicable and to promote the reintroduction of listed plant species to reclaimed sites, where applicable. These guidelines and success criteria were prepared for incorporation into the CHMS, and those portions which are not specific to Carbonate Plants may also be incorporated into other planning documents, as appropriate, subject to public review. These guidelines are supplemental to revegetation requirements contained in the Reclamation Regulations. Except as specifically indicated to the contrary, capitalized terms in this appendix shall have the meanings ascribed to them in the CHMS, of which this appendix is a part.

(a) Credit for successful revegetation and introduction of Carbonate Plants. Operators or claim holders may elect to introduce one or more Carbonate Plant species onto mines or other disturbed sites undergoing or having completed reclamation. Where introduction is successful, these operators or claim holders may (but are not required to) make a Reserve Contribution of the sites for conservation credit in accordance with Section 10 of the CHMS using the conservation multipliers set forth below in this Section. To qualify for such credit, revegetation must be carried out and its success measured in accordance with this *Appendix E*. "Introduction," as used in this appendix, includes both reintroduction of Carbonate Plants that occurred on the site prior to mining disturbance and introduction of Carbonate Plants onto the site when there were no previously known occurrences. The applicable multipliers for purposes of determining the Conservation Value of Revegetated Habitat are as follows:

(i) 0.25 per acre for successful revegetation in accordance with the revegetation success criteria described in Section (b)(iii) below without meeting success criteria for Carbonate Plants under Section (c)(i) below.

(ii) 0.50 per acre or sites meeting the success criteria described in Section (c)(i) below for at least one of the Carbonate Plants.

(iii) An additional 0.20 per acre for sites that meet the enhanced success criteria described in Section (b)(iv) below.

(iv) An additional 0.10 per acre will be added for each additional Carbonate Plant species (i.e., in excess of one) that meets the success criteria on the site, for an addition to the multiplier of up to 0.30 per acre.

Occurrences of Carbonate Plants that meet the success criteria set forth in this appendix will be mapped and credited using the same data and mapping standards that apply to Occupied Habitat on natural surfaces (*see Appendix C*).

(b) General revegetation guidelines and success criteria. The following revegetation guidelines are required as a condition of receiving conservation credit for revegetation areas under the CHMS, and subsections *(i)–(iii)* and *(v)* of this subsection *(b)* may be incorporated, subject to public review, into future Federal Land Plans. The County may also adopt subsections *(i)–(iii)* and *(v)* as conditions of future reclamation plans under SMARA. For revegetation under the CHMS, in the event of any conflict between the guidelines set forth in this Section (b) and revegetation guidelines in a future Federal Land Plan that are applicable in a particular case, the guidelines in such Federal Land Plan shall control. Because revegetation practice continues to evolve, practitioners should remain current with the literature and advances in the field. They also should contact SBNF, the BLM California Desert District, and the County for recommendations on revegetation practice.

(i) Target vegetation. The "target vegetation" for each revegetation site will be selected based on existing reference data for the appropriate vegetation zone or site-specific sampling (collectively, the "Baseline Data"), at the agreement of the applicant and the applicable Resource Management Agency. Reference data within the CHMA were derived from plot-based vegetation sampling taken across more than 600 plots between 1990 and 1998. Future sampling may result in an update and revision to these data. These data will be made available upon request by the Mountaintop District Botanist on the SBNF.

(ii) Soil inventory. Soil resources (all available topsoil or "growth medium") will be inventoried for volume and reclamation suitability during the planning stages, and soils inventory results will be included in the revegetation plan. To avoid the need for extended soil stockpiling, the use of soil salvaged from a new quarry site for reclamation of another (closed) quarry or waste dump will be encouraged.

(iii) Success criteria. All operations will be required to document full compliance with the applicable reclamation plan and associated regulations. The following additional criteria must be met to receive conservation credit under the CHMS. These criteria may be incorporated into revised Federal Land Plans (due for completion in 2004), subject to public review, after which these criteria would apply to future mining and reclamation plans on the SBNF and in the California Desert Conservation Area.

(A) Reclamation. Meet or exceed all reclamation requirements under the mining and reclamation plan for the site and under the applicable Reclamation Regulations, and maintain the mining operation in full compliance with the Mining Plan.

(B) Cover. Achieve a mean native vegetation cover percentage of at least 50% of the mean native cover value specified in the Baseline Data.

(C) Density. Achieve a mean density of each of three climax/dominant species for that vegetation zone that is at least 50% of the specified mean densities for those species in the Baseline Data.

(D) Richness. Achieve a mean species richness (average species count per 0.1 acre sample plot or other unit area as applicable, depending on sample methods) that is at least 50% that of the value specified in the Baseline Data.

(E) Non-native species cover. Non-native species cover will be no more than an absolute cover of 15%, and annual monitoring data will show a downward trend, documented by a declining regression coefficient (negative *b value*) over the monitoring period.

(F) Aggressive/invasive weeds. On the date of approval by the applicable Resource Management Agency, none of the following species of highly invasive exotic species (the "Invasive Exotics"), will occur within the revegetated site:

- *Arundo donax*
- *Pennisetum setaceum*
- *Tamarix* spp.
- *Elaeagnus angustifolia*
- *Ricinus communis*
- *Spartium junceum*
- *Verbascum thapsus*
- *Nicotiana glauca*
- *Linaria* spp.

All occurrences of Invasive Exotics must be documented and removed upon detection, and the reports required in Section (b)(v)(B) below must document any removal and confirm that all these species are absent from the site. Such removal may be performed at any time without being regarded as "Manipulation" that is otherwise prohibited during certain periods (*see* following paragraph of this subsection (F). The list of Invasive Exotics may be modified by the SBNF in cooperation with the BLM, the County, and appropriate stakeholders, including the mining industry. It will be limited to non-native species which show the potential to spread rapidly and are practical to completely eradicate. It will exclude non-native species that are widespread within the CHMA and not practical to completely eradicate. Thus, brome grasses (*Bromus* spp.), weedy mustards (*Brassica* spp., *Sisymbrium* spp., *Hirschfeldia incana*), Russian thistle (or tumbleweed, *Salsola* spp.), and storksbill (*Erodium* spp.) would not be appropriate.

In applying the foregoing criteria, only the habitat patches that meet the criteria, applying the habitat definitions and mapping standards set forth in *Appendix C*, shall be regarded as revegetated and qualify for conservation credit (upon updating the Habitat Inventory to reflect the revegetation success) If such patches are part of a larger reclamation site, only those areas that meet the criteria shall be eligible for conservation credit. The operator's final monitoring report will provide quantitative data that will determine whether or not the foregoing success criteria have been met. The final monitoring data will generally be submitted ten years following initiation of revegetation, though an operator may choose to finalize the work earlier or later, depending on individual circumstances. Regardless of the date of final monitoring, the revegetated site shall not be subject to enhancement (e.g. by irrigation, weeding, supplemental planting, or seeding; collectively, "Manipulation"), subject to the exception specified under criterion *(F)* above, during a minimum three years prior to the final data collection.

(*iv*) *Enhanced success criteria*. The following success criteria are required to receive an additional 0.2 CU/acre added to the Conservation Value multiplier under the Section (a)(i) above. These criteria are not required if the additional conservation credit is not sought, and there is no intention to incorporate these enhanced criteria into future Federal Land Plans or County conditions of approval except as they relate to conservation value under the CHMS.

(*A*) *Standard revegetation*. Satisfy all the standard success criteria under Section (b)(iii), above.

(*B*) *Cover*. Achieve a mean native vegetation cover percentage of at least 75% of the mean native cover value specified in the Baseline Data.

(*C*) *Native herbaceous component*. Achieve a relative abundance of three native herbaceous species with relative abundance equivalent to or greater than that specified in the Baseline Data.

(*D*) *Richness*. Achieve a mean species richness (average species count per 0.1 acre sample plot or other unit area as applicable, depending on sample methods) that is at least 75% that of the value specified in the Baseline Data.

(*E*) *Non-native species relative abundance*. Do not exceed the average relative abundance of non-native species specified in the Baseline Data.

(*F*) *Ecosystem Function*. Demonstrate at least one quantitative measure of ecosystem function as described in Section (c)(i)(E). Section (c)(i)(E) itself requires demonstration of at least one such measure as part of the standard introduction success criteria, so a party desiring to meet both the enhanced success criteria of this subsection *(iv)* and the standard introduction success criteria of Section (c)(i)(E) must demonstrate *two* quantitative measures of ecosystem function.

(v) Monitoring and revegetation reporting requirements. Each mining reclamation plan must include a revegetation plan. This plan will specify target vegetation, reference data, acres that will undergo active revegetation, and a revegetation schedule. To document progress under the revegetation plan, monitoring and periodic reporting will be required. Phased plans may compile these reports into a combined report where an area covered under a single mine plan has revegetation ongoing at different stages.

(A) Annual monitoring. Operators will monitor revegetation sites annually, making each of the following observations and measures, which will be recorded and provided to the applicable Resource Management Agency or County in periodic monitoring reports (*see* subsection *(B)* below):

(1) Survival of container plantings (where applicable);

(2) Germination of seeded species, noting distribution and abundance;

(3) List of native "volunteer" species, noting distribution and abundance;

(4) Measurements of vegetation cover, target species density, total species richness (list), and wildlife observations;

(5) Signs of erosion/soil loss;

(6) List of non-native species, with descriptions of abundance, distribution, and measures to control/eradicate; and

(7) Recommendations for any other needed remedial action (e.g., repairs to irrigation system, re-seeding, erosion control, or other).

(B) Reporting. On large revegetation sites, quantitative data collected and presented in the interim and final monitoring reports must be randomly sampled with sufficient replication to analyze and document the data with 90% confidence intervals about the mean values, and with a maximum confidence-interval-width of 20% of the mean value. For smaller sites, an alternate sampling protocol may be used so that the total sampling area is at least 50% of the area revegetated.

The following three reports, to be submitted to the applicable Resource Management Agency or the County with a copy provided to the Forest Service, are required to document the monitoring and status of revegetation:

(1) Initial report. This report shall include: *(aa)* detailed site plan, *(bb)* planting palette, *(cc)* propagule (seed, cutting, and container plant) inventory, and *(dd)* soil inventory (where applicable). This report must be prepared and submitted within one year of initiating revegetation.

(2) Interim (final minus 3) report. This report shall be made at the initiation of the final 3-year no-Manipulation period and shall mark the initiation of that period. This report shall summarize the monitoring data that is collected annually. It must include status of revegetation and qualitative and quantitative measures each success criterion, and it must specify any remediation prescribed. It shall also include a propagule and soil inventory update. This report is generally prepared during year 7, although may be earlier or later, depending on individual circumstances. If the operator prefers to delay initiating the 3-year period without Manipulation beyond year 7 of the revegetation effort, then a substitute "Year 7" report should be submitted, to include the contents described above and an explanation of the operator's plans for remediation and eventual completion of the revegetation.

(3) Final report. This report shall be prepared and submitted upon completion of reclamation. It shall have the same format and content requirements as the interim report described in subsection *(2)* above. Regardless of the date of final monitoring, the revegetated site shall have had no Manipulation during a minimum three years prior to the final data collection (subject to the exception specified under subsection *(iii)(F)* above for weed control). This report shall document the extent to which the revegetation is successful and shall be used, along with field checks, by the applicable Resource Management Agency to determine whether or not the success criteria set forth in subsection *(iii)* above have been met.

(c) Guidelines and success criteria for introduction of Carbonate Plants. To obtain conservation credit under the CHMS for the introduction of Carbonate Plants into reclamation sites, such introductions must follow the guidelines and meet the criteria described in this Section (c), in addition to satisfying the general revegetation guidelines and success criteria of Section (b) above (note that there is no intent to propose incorporation of these provisions as revegetation requirements in future Federal Land Plans):

(i) Carbonate Plant success criteria. At the end of a minimum 3-year period without Manipulation, the introduced Carbonate Plants occurrences must be documented to show:

(A) Successful reproduction, indicated by seed production, seedling establishment, and survival of seedlings to reproductive state so that the total number of living and reproductively mature plants is at least two times the number originally planted;

(B) A demographic pattern during the minimum 3-year no-Manipulation period in which recruitment to reproductive maturity is greater than or equal to mortality, indicating a stable or growing population;

(C) Expansion of the introduction area, indicated by the presence of progeny of the introduced plants at least 10 meters beyond the bounds of the original seeded or planted area;

(D) Within the introduction area, density (plants/acre) of the Carbonate Plants no less than one standard deviation below the mean density of the same species in natural populations, as documented in Forest Service data (where density in the overall area is below this level, the operator may wish to apply for Conservation Credits on a smaller area); and

(E) Demonstration of least one quantitative measure of ecosystem function; applicable measures include, but are not limited to, soil respiration, mycorrhizal hyphal mass in soil, glomilin assays, pollinator visitation, and wildlife utilization.

(ii) Collection and salvage requirements. Where revegetation includes introduction of Carbonate Plants to mining-reclamation surfaces, the following requirements pertaining to the collection of listed species must be followed in order to obtain conservation credit under the CHMS. Where collection, salvage, and/or planting of these species occurs as part of a Mining Plan, additional standards will apply, as specified under current ESA section 10(a)(1)(A) permits issued for this purpose.

(A) Seed collection. Seed collections of listed species from public land will be at the discretion of the USFWS. Unless other arrangements are made, collections on Forest Service or BLM land will be made under the authority of the applicable 10(a)(1)(A) permit and all conditions in the permit will apply. For collections on all non-federal lands, and on federal lands unless stated otherwise in the permit, the conditions described in the balance of this subsection will apply. No more than five percent of the seeds from any individual plant will be collected. Collections shall not be made from more than five percent of the individuals within a population. Collection methods will be designed to capture the majority of the genetic variation found in the sampled populations, by collecting seed systematically throughout the site and avoiding focusing only on certain plants due to size or location. Collections must avoid harming the source population's long-term viability. At no time will seeds derived from different natural populations be intermingled in revegetation activities. Detailed field information will be recorded at the time of seed collection, including estimated population size, number of individuals sampled, collecting strategy employed, apparent viability of the seed, global positioning satellite ("GPS") coordinates of the collecting location, California Natural Diversity Database element occurrence number (if any), and a photocopy of a USGS topographic map with the collection site identified. Seed collection data will be kept in permanent files and duplicated on the package where the seed is stored.

(B) Collection of cuttings. Seed collections of listed species from public land will be at the discretion of the USFWS. Unless other arrangements are made, collections on Forest Service or BLM land will be made under the authority of the applicable 10(a)(1)(A) permit and all conditions in the permit will apply. For collections on non-federal lands, and on federal lands unless stated otherwise in the permit, the conditions described in the balance of this subsection will apply. No more than five percent of any individual plant will be collected. Collections shall not be made from more than five percent of the individuals within a population. Collections will be made systematically throughout the site to capture the majority of the genetic variation found in the sampled populations. At no time will seeds or plants collected from different natural populations be intermingled in revegetation activities. Individual cuttings will be labeled with numbered metal tags corresponding to collection sites, as described above for seed collections. The tag numbers will be kept in permanent records and will be kept with the cuttings as they are incorporated into an off-site nursery or on-site revegetation sites for long-term monitoring. Tags need not identify every individual cutting, but should identify the source.

(C) Plant salvage. On sites where plants and seeds will be disturbed or destroyed by authorized activities, the limitations above will not apply. Up to 100% of plants or seed may be salvaged for use in concurrent or future reclamation. Maximum effort should be made to salvage listed carbonate plants from sites where mining or other disturbance is approved, and initial clearing and soil removal should be scheduled to

allow for seed salvage at the end of at least one growing season.

(D) Plant and seed return. Plants and seeds will be returned to the same general vegetation zone where they were collected (e.g. blackbush scrub), within no more than 1000 ft. elevation and 5 miles of the collection site, in order to ensure gene pool and ecotype integrity. Where individual plants are introduced onto a reclamation site (e.g., salvaged plants, or plants grown from seed or cuttings off-site), they will be labeled with metal tags for future growth and survival monitoring. The tag numbers will be kept in permanent records. Tag numbers need not identify every individual plant, but will identify their original source and the year they are planted. Where seed is introduced onto a reclamation site, the amount (weight) and seed collection data (above) will be kept in similar records.

(E) Documentation. Methods of Carbonate Plant introduction and progress of the introduction effort must be monitored and reported to the applicable Resource Management Agency in accordance with the monitoring requirements of Section (c)(iv), below. Operators may use Manipulation during the first few years after planting. As provided in Section (c)(i) below, however, revegetation success criteria will not be deemed to have been met until the end of a minimum 3-year period *without* Manipulation.

(iii) Monitoring. The following monitoring and associated documentation are required to determine successful introduction of Carbonate Plants. Introduction sites will also be subject to the revegetation monitoring described in Section (b)(v) below. Under this Section (c), for the first 3 years following planting, introduction sites shall be monitored at least annually to document survivorship and reproduction. After the initial 3-year period, formal monitoring will be done as needed to fulfill the requirements of the interim and final reports described in subsection (iv) below. In addition to the formal monitoring and reporting described here, introduction sites should be qualitatively monitored at least annually. Qualitative monitoring should document general survival and reproductive success of the Carbonate Plants and should document potential problems, such as erosion, excessive herbivory, and damaged irrigation systems.

(A) Marking: Parish's daisy and Cushenbury buckwheat. These are perennial plants, woody at their bases, and therefore capable of being tagged. Each monitoring cycle, each new plant will be tagged and numbered to indicate the year it was detected. Each previously-existing plant will be examined, and its tag number (if present) and condition will be recorded using the following categories:

(1) Healthy/reproductive (i.e., flower or seed);

(2) Healthy/non-reproductive;

(3) Living but evidently unhealthy;

(4) Dead; or

(5) Missing.

After the first three years of monitoring, new plants (not previously tagged) will be considered "progeny" of the plants initially introduced onto the site. Plants will not be tagged if they are too small to physically support the tags or if tagging is likely to damage them. Plants will be considered "established" when they are large enough to tag.

(B) Marking: Cushenbury milk-vetch and Cushenbury oxytheca. These species cannot be tagged due to their life histories. Instead, areas of occupied habitat will be identified using GPS and markers on the ground to define polygons containing a specified number of individual Carbonate Plants. For these species, parents and progeny will not be distinguished, and demographics will be inferred by total counts of individuals within the defined polygons.

(C) Mapping, all four species. The bounds of occupied habitat will be marked with colored flagging and recorded with a GPS unit. These data will be collected and recorded following the SBNF data and mapping standards. During the monitoring period or later in the year, as appropriate, a small sample of seed from introduced plants on the site will be collected and examined for apparent viability ("fill").

(iv) Reporting. Following the first three years of monitoring, a report will be prepared to include data tables of all plants examined, GPS coordinates of the

occupied habitat's boundaries, representative photographs of the overall site and selected individual plants. Following the second monitoring period (generally 4 years later) an interim report will be prepared with the same format and content as the report following the first 3 years, and additionally describing a demographic analysis of the occurrence. The demographic analysis shall consist of *(A)* assembly and graphing of monitoring data to show survivorship rates of plants initially introduced onto the site and their progeny; *(B)* calculation of the estimated half-life for each cohort; and *(C)* calculation and comparison of recruitment rates and death rates. This interim report initiates the final minimum 3-year no-Manipulation period. A final report (generally 3 years later) with the same format and content as the interim report will also summarize the full monitoring dataset and document the extent to which each of the Carbonate Plant success criteria (*see* Section (c)(i) above) have been met. The interim and final reports may be combined with the general revegetation reports described in Section (b)(v)(B), below.

(d) Authorized loss of revegetated areas. Upon issuance of a favorable CHMS Biological Opinion, losses of Carbonate Plants within the CHMA where Carbonate Plants have been introduced by operators or claim holders shall be authorized under the terms and conditions described below. The authorization provided pursuant to this Section provides relief only from the provisions of the ESA and does not relieve an owner or claim holder from any requirements of the Reclamation Regulations with respect to reclaimed or revegetated areas. This authorization also does not relieve the applicant from NEPA, CEQA, or other environmental review of any proposed new land use.

(i) Conditions to authorized loss. Occupied Habitat that occurs as a result of revegetation efforts on reclaimed land within the CHMA may be taken as necessary to carry out mining activities without any Compensation Requirement if the following conditions are met:

(A) The introduction effort, including a precise description of the location, has been reported to the applicable Resource Management Agency or the County in advance of the introduction work itself.

(B) The introduction effort proposed to be lost has complied with all of the seed collection and salvage requirements described in Section (c)(iii) above.

(C) The introduction site to be lost must not be the only remaining living material salvaged (as seed, cuttings, or whole plants) from an occurrence lost to previous land use changes unless a second salvage effort (from the introduced occurrence proposed to be lost) has been approved by the applicable Resource Management Agency or the County. Where operators salvage plant material from sites to be developed as quarries, waste areas, or other facilities, they should carefully plan the locations where these salvaged materials are introduced.

(ii) Coverage provided When all of the conditions set forth in subsection (i) above are satisfied, the following coverage under the CHMS Biological Opinion shall apply:

(A) Any future impacts or proposed impacts to the Carbonate Plants occurring as a consequence of introductions carried out in compliance with this Section (d) will not be subject to further review or enforcement action under the ESA and will not be subject to any Compensation Requirement under the CHMS.

(B) Collection of seed from living plants for purposes of revegetation activities will be permitted on public or private land, in compliance with USFWS permits, as applicable.

(C) All occurrences of Carbonate Plants discovered within a revegetation site implemented under the CHMS shall be treated as resulting from the introduction.

(iii) Not applicable to Reserve Contributions. This Section (d) shall not permit any habitat disturbance on land that has been contributed to the Habitat Reserve as either a Permanent Contribution or a Relocatable Contribution. In the case of a Relocatable Contribution, however, habitat disturbance may be permitted hereunder after the parcel has been replaced in accordance with Section 10(b)(ii) of the CHMS. ❀

Appendix F: Conservation Credit Worksheets

Contents

Reserve Contribution Valuation Worksheet

Use this form to determine the number of Conservation Credits to be received for a given Reserve Contribution of a parcel of land. For multiple discontiguous parcels, use multiple worksheets.

1 Enter the Conservation Value of the parcel

2a Enter the lineal mileage of any portion of the edge of the parcel that meets Uncommitted Category lands

2b Enter the lineal mileage of any portion of the edge of the parcel that meets existing Mining Category lands

2c Enter the lineal mileage of any portion of the edge of the parcel that meets the existing Habitat Reserve *and that was previously Category D or P land*

2d Enter the lineal mileage of any portion of the edge of the parcel that meets the existing Habitat Reserve *and that was previously Category M land*

2e Enter line 2a × 12

2f Enter line 2b × 24

2g Enter line 2c × 12

2h Enter line 2d × 24

2i Enter line 2e + line 2f – line 2g – line 2h (can be a negative number; this result is the Net Edge Adjustment)

3 Enter line 1 – line 2i (if negative, enter 0); this result is the Adjusted Conservation Value

4 If the parcel is being contributed as a Permanent Contribution, enter 1.00; if as a Relocatable Contribution, enter 0.50 (the *permanence factor*)

5 Enter line 3 × line 4; this result is the Conservation Credits that would be given for contributing the parcel

Compensation Requirement Worksheet

Use this form to determine the Compensation Requirement for obtaining ESA Compliance for a given parcel of land. For multiple discontiguous parcels, use multiple worksheets.

1	Enter the Conservation Value of the parcel	
2a	Enter the lineal mileage of any portion of the edge of the parcel that meets Uncommitted Category lands	
2b	Enter the lineal mileage of any portion of the edge of the parcel that meets the existing Habitat Reserve	
2c	Enter the lineal mileage of any portion of the edge of the parcel that meets existing Mining Category lands	
2d	Enter line 2a × 12	
2e	Enter line 2b × 24	
2f	Enter line 2c × 12	
2g	Enter line 2d + line 2e – line 2f (can be a negative number); this result is the Net Edge Adjustment	
3	Enter line 1 + line 2g (if negative, enter 0); this result is the Adjusted Conservation Value	
4	Enter line 3 × 3.00 (the Compensation Ratio); this result is the Compensation Requirement in terms of Conservation Credits	

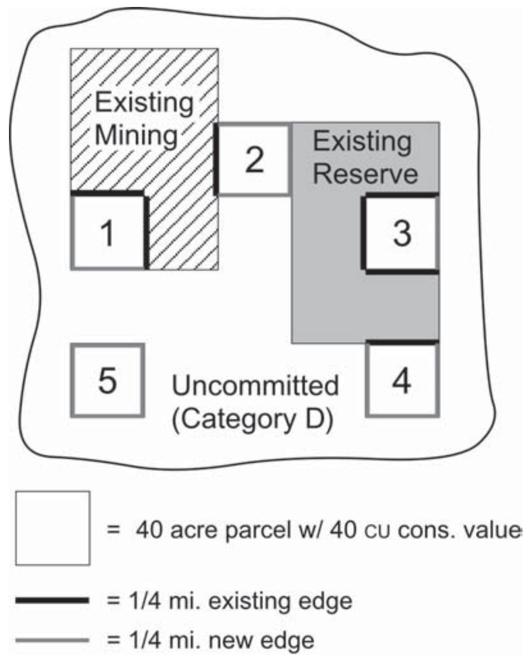
Appendix G: Edge Effect Examples

1. General Edge Effect Examples

Each example on this page involves one of the numbered parcels in the illustration to the right. Each numbered parcel consists of 40 acres and has a Conservation Value of 40 CU (1.00 CU/acre).

The examples in the table below demonstrate how the Net Edge Adjustment operates to affect the number of Conservation Credits given for Reserve Contributions. Each column presents the calculation of the Conservation Credits that would be given for making a Reserve Contribution of one of the numbered parcels in the illustration. The line numbers at the left edge of the table correspond to the line numbers on the Reserve Contribution Calculation Worksheet in *Appendix F.*

The examples in the table on the following page demonstrate how the Net Edge Adjustment operates to affect the Compensation Requirement for ESA Compliance. Each column presents the calculation of the Compensation Requirement for obtaining ESA Compliance to mine one of the numbered parcels in the illustration. The line numbers at the left edge of the table correspond to the line numbers on the Compensation Requirement Worksheet in *Appendix F.*



Conservation Credits Available for Reserve Contributions

		Parcel 1	Parcel 2	Parcel 3	Parcel 4	Parcel 5
1	CV of parcel	40.00	40.00	40.00	40.00	40.00
2a	Edge ag. Uncommitted	0.50	0.50	0.25	0.75	1.00
2b	Edge ag. Mining	0.50	0.25	-	-	-
2c	Edge ag. Reserve (contrib. previously D or P)	-	0.25	0.75	0.25	-
2d	Edge ag. Reserve (contrib. previously Cat. M)	-	-		-	-
2e	Lines 2a x 12	6.00	6.00	3.00	9.00	12.00
2f	Lines 2b x 24	12.00	6.00	-	-	-
2g	Lines 2c x 12	-	3.00	9.00	3.00	-
2h	Lines 2d x 24	-	-	-	-	-
2i	Lines 2e + 2f – 2g – 2h	18.00	9.00	(6.00)	6.00	12.00
3	Lines 1 – 2i (ACV)	22.00	31.00	46.00	34.00	28.00
4	Permanence factor	1.00	1.00	1.00	1.00	1.00
5	**Lines 3 x 4 = Conservation Credits given**	**22.00**	**31.00**	**46.00**	**34.00**	**28.00**

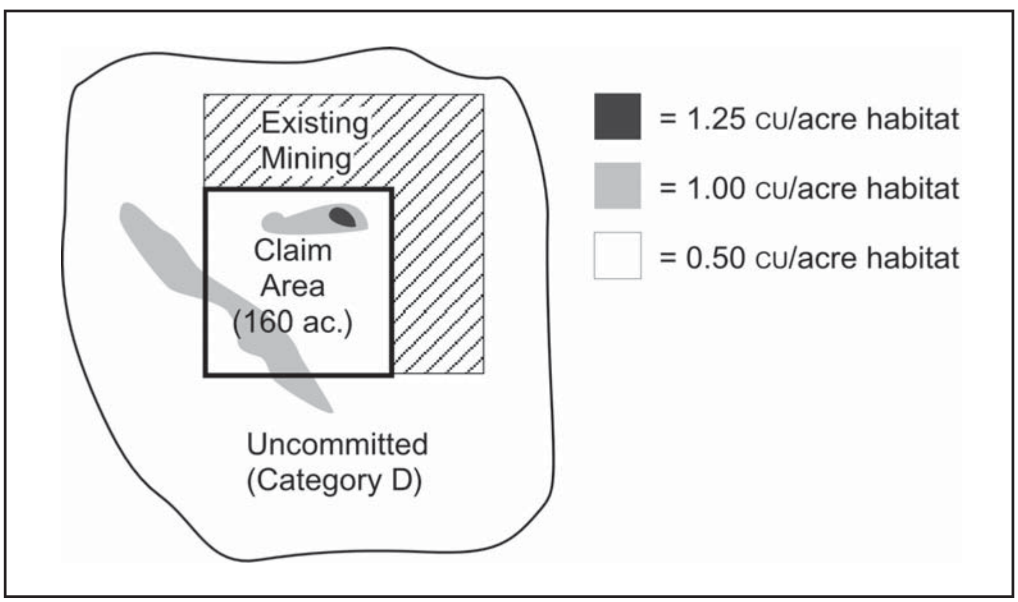
Compensation Requirements for ESA Compliance

		Parcel 1	Parcel 2	Parcel 3	Parcel 4	Parcel 5
1	CV of parcel	40.00	40.00	40.00	40.00	40.00
2a	Edge ag. Uncommitted	0.50	0.50	0.25	0.75	1.00
2b	Edge ag. Reserve	-	0.25	0.75	0.25	-
2c	Edge ag. Mining	0.50	0.25	-	-	-
2d	Lines 2a x 12	6.00	6.00	3.00	9.00	12.00
2e	Lines 2b x 24	-	6.00	18.00	6.00	-
2f	Lines 2c x 12	6.00	3.00	-	-	-
2g	Lines 2d + 2e – 2f	-	9.00	21.00	15.00	12.00
3	Lines 1 + 2g (ACV)	40.00	49.00	61.00	55.00	52.00
4	**Line 3 x 3.00 = ESA Compliance cost**	**120.00**	**147.00**	**183.00**	**165.00**	**156.00**

2. Edge Effect Examples with Curvilinear Edges

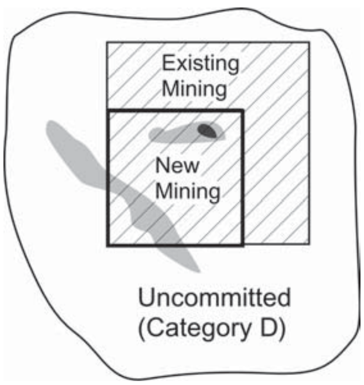
The examples on the following pages show how the Net Edge Effect adjustment affects Conservation Values using the scenario illustrated to the right. Based upon this scenario, a mining company would establish the limits of disturbance taking into account the cost of ESA Compliance and the value and accessibility of the mineral deposits within the claim, as well as other factors. The three examples below compare three configurations of limits of disturbance to provide an idea of how a company might consider the cost of ESA Compliance under the CHMS when establishing limits of disturbance for a mining project. The examples do not attempt to consider mineral value and other factors.

For each example, the cost of ESA Compliance is calculated for the limits of disturbance as shown in the example. Then the Conservation Credits are calculated that would be available for making a Reserve Contribution of the remainder of the claim (the area outside of the limits of disturbance). Note that it is an additional decision of the mining company (or claim holder) whether or not to make a Reserve Contribution of the portion of the claim avoided. If a Reserve Contribution is not made, then the mining company or claim holder retains the option to obtain ESA Compliance for the remainder area and mine it in the future. On the other hand, making a Reserve Contribution of the area would help to minimize the current net cost of ESA Compliance.



Curvilinear Edge Effect Examples: Summaries

Example A



Area of disturbance: 160.0 acres

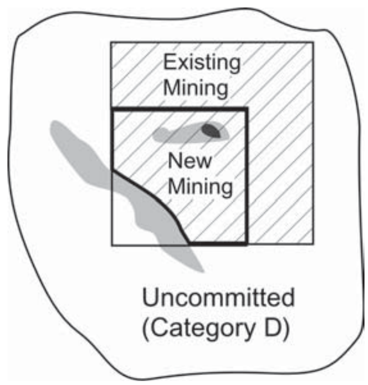
ESA Compliance cost: 285.2 CU (1.78 CU/acre of mining)

Credits for Reserve Contrib. of remainder: n/a

Net ESA Compliance cost after Reserve Contrib.: n/a

Comments: This is a baseline case that simply ignores the habitat present.

Example B



Area of disturbance: 129.5 acres

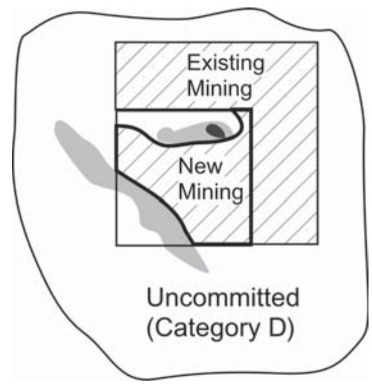
ESA Compliance cost: 206.8 CU (1.60CU/acre of mining)

Credits for Reserve Contrib. of remainder: 7.8 CU (0.26 CU/acre of contribution)

Net ESA Compliance cost after Reserve Contrib.: 198.9 CU (1.54 CU/acre of mining)

Comments: In this case, the limits of disturbance avoid the larger habitat patch but include the smaller habitat patch that is deeper in the mining area. This would be the most efficient design if all land had the same economic value.

Example C



Area of disturbance: 97.6 acres

ESA Compliance cost: 174.9 CU (1.79 CU/acre of mining)

Credits for Reserve Contrib. of remainder: 7.8 CU (0.13 CU/acre of contribution)

Net ESA Compliance cost after Reserve Contrib.: 167.0 CU (1.71 CU/acre of mining)

Comments: This case avoids all habitat patches, but is actually less efficient than both Examples “A” and “B.” This is primarily due to the large Net Edge Adjustments associated with preserving the additional habitat.

This example also demonstrates how the edge adjustment can devalue a Reserve Contribution with high edge effects. The number of Conservation Credits available for contributing the more northerly habitat area is zero for 31.9 acres. The Net Edge Adjustment for this contribution is –25.1 off of a pre-adjusted Conservation Value of 22.0, but the ACV cannot be less than zero.

The detailed calculations behind the summaries above are shown on the following two pages.

Curvilinear Edge Effect Examples: Detailed Calculations

Compensation Requirements for ESA Compliance

		Examp. A	Examp. B	Examp. C
1	CV of parcel	95.07	70.87	48.82
2a	Edge ag. Uncommitted	1.00	0.84	1.37
2b	Edge ag. Reserve	-	-	-
2c	Edge ag. Mining	1.00	1.00	0.58
2d	Lines 2a x 12	12.00	10.06	16.41
2e	Lines 2b x 24	-	-	-
2f	Lines 2c x 12	12.00	12.00	6.94
2g	Lines 2d + 2e – 2f	-	(1.94)	9.47
3	Lines 1 + 2g (ACV)	95.07	68.92	58.29
4	**Line 3 x 3.00 = ESA Compliance cost**	**285.21**	**206.77**	**174.87**
	ESA Compliance cost per acre of mining	**1.78**	**1.60**	**1.79**

Conservation Credits Available for Reserve Contributions

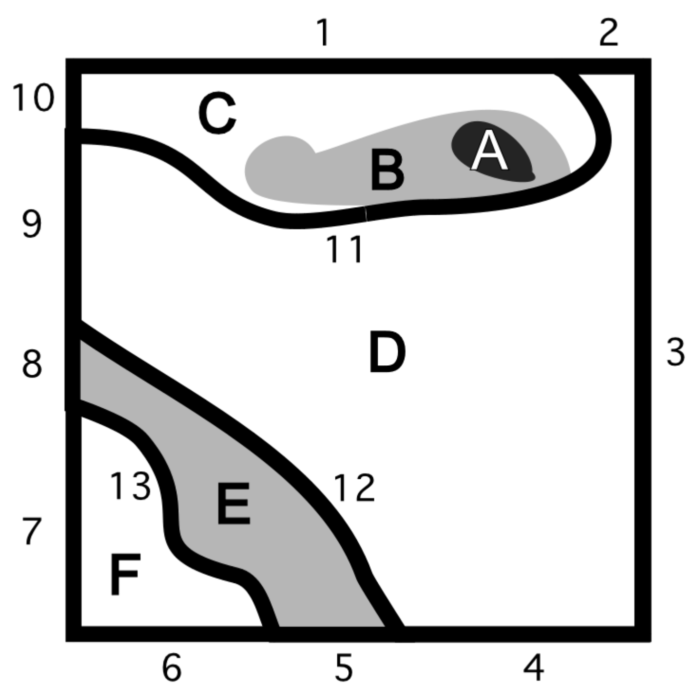
		Examp. A	Examp. B	(C1 + C2) Examp. C	C1	C2
1	CV of parcel	-	24.20	46.25	24.20	22.05
2a	Edge ag. Uncommitted	-	0.56		0.56	0.06
2b	Edge ag. Mining	-	0.40		0.40	1.01
2c	Edge ag. Reserve (contrib. previously Uncommitted)	-	-		-	-
2d	Edge ag. Reserve (contrib. previously Mining)	-	-		-	-
2e	Lines 2a x 12	-	6.75		6.75	0.75
2f	Lines 2b x 24	-	9.61		9.61	24.33
2g	Lines 2c x 12	-	-		-	-
2h	Lines 2d x 24	-	-		-	-
2i	Lines 2e + 2f – 2g – 2h	-	16.36		16.36	25.08
3	Lines 1 – 2i (ACV)	-	7.84		7.84	-
4	Permanence factor	1.00	1.00		1.00	1.00
5	**Lines 3 x 4 = Credits for Reserve Contrib. of remainder**	**-**	**7.84**	**7.84**	**7.84**	**-**
	Credits per acre for Reserve Contrib. of remainder	**-**	**0.26**	**0.13**	**0.26**	**-**

Net ESA Compliance cost after Reserve Contrib.

	Examp. A	Examp. B	Examp. C
Total	285.21	198.93	167.03
Per acre of mining	1.78	1.54	1.71

Curvilinear Edge Effect Example: Areas and Perimeters

Shape Areas/CVs				
Shape	Acreage	CV/ac.	CV	Perim. total
A	1.6787	1.25	2.0984	0.1991
B (incl. A)	11.3651	1.04	11.7848	0.6562
B – A	9.6864	1.00	9.6864	0.8553
C (incl. A & B)	31.8925	0.69	22.0485	1.0761
D	97.6371	0.50	48.8186	1.9402
C + D (incl. A & B)	129.5296	0.55	70.8670	1.8443
E	17.8483	1.00	17.8483	0.8820
F	12.7117	0.50	6.3558	0.6689
E + F	30.5600	0.79	24.2042	0.9631
All	160.0000	0.59	95.0712	2.0000



Perimeter edges (li. mi.)	
Edge1	0.4219
Edge2	0.0781
Edge3	0.5000
Edge4	0.2187
Edge5	0.1094
Edge6	0.1719
Edge7	0.2031
Edge8	0.0781
Edge9	0.1563
Edge10	0.0625
Edge11	0.5917
Edge12	0.4006
Edge13	0.2939

Appendix H: Credit Registration

Private participation in the CHMS consists primarily in "transactions" involving Conservation Credits. Parties can receive Conservation Credits for making Reserve Contributions, and they can "spend" Conservation Credits to obtain ESA Compliance. They can also sell Conservation Credits to another private party. To track the various types of Conservation Credit transactions, the CHMS has a "Credit Registry" administered by the Forest Service. Below is an example of the kinds of procedures that the Forest Service may adopt for credit registration.

Except as specifically indicated to the contrary, capitalized terms in this appendix shall have the meanings ascribed to them in the CHMS document to which this appendix is attached.

(a) Credit Registry. The Credit Registry is a database maintained by the Forest Service that tracks the *creation*, *use*, and *transfer* of Conservation Credits under the CHMS, along with various records and legal documents related to these transactions. The Forest Service may make available certain information from the Credit Registry on the World Wide Web. The basic procedures for the three types of Conservation Credit transactions are described in the following three subsections, which the Forest Service may modify from time to time.

(b) Credit Creation for Reserve Contributions. The following process applies when a landowner or claim holder wishes to make a Reserve Contribution and receive Conservation Credits:

(i) Contribution Assessment. The applicant submits to the Forest Service a "Contribution Assessment Application" that includes *(A)* a plat of the land to be contributed at an appropriate map scale, *(B)* a statement of the intended means of contribution (transfer of ownership, relinquishment of claim, a Use Restriction Agreement (in the case of a Relocatable Contribution), or a Surface Entry Restriction (in the case of a contribution of a split-estate contribution) and *(C)* a contribution assessment fee. Within five (5) business days, the Forest Service will prepare a "Contribution Assessment" that will state, as of the date of issuance, the number of Conservation Credits that would be issued to the applicant if a Reserve Contribution were made of the subject parcel.

(ii) Reserve Contribution Application. If the applicant elects to proceed after receiving the Conservation Value Assessment, the applicant submits to the Forest Service a "Reserve Contribution Application," including *(A)* a completed and signed amendment to the MOU, *(B)* a contribution processing fee (to cover the cost of the land assessment and closing steps described below), and *(C)* a completed and signed grant deed, mine claim quitclaim, Use Restriction Agreement, or Surface Entry Restriction (depending on the intended means of contribution).

(iii) Land Assessment. Upon receipt of a complete Reserve Contribution Application, the Forest Service shall perform a "Land Assessment" (by itself and/or through parties with which it subcontracts), which includes the following:

(A) A title search and evaluation of any encumbrances on the subject property;

(B) A Phase I environmental study;

(C) Site reconnaissance to determine the level of human disturbance of the property in the form of *(I)* trash and debris; *(II)* extent of soil and vegetation disturbance from off-road vehicle use, grazing, and other uses; and *(III)* any ongoing use;

(D) If needed in order to supply a correct legal description of the subject property, preparation of a survey, a record of survey, and/or an approved subdivision in compliance with the California Subdivision Map Act; and

(E) A report prepared by the Forest Service (in coordination with the applicable Resource Management Agency, if not the Forest Service) summarizing the contents of the Land Assessment, stating whether

the subject property meets the "Land Acceptance Criteria" established by the applicable Resource Management Agency, and, if not, listing the remedial measures that must be undertaken to meet the Land Acceptance Criteria.

If the subject property does not meet the Land Acceptance Criteria, follow-up Land Assessments may be subject to additional fees. The Forest Service may require applicants to engage outside parties to perform some or all of the Land Assessment work on behalf of the Forest Service, but at the expense of the applicant.

(iv) Closing. Once the subject property is determined to have met the Land Acceptance Criteria, the following steps occur to complete the closing of the Reserve Contribution:

(A) The applicant pays a closing fee to cover costs of title insurance, recordation, and processing the closing;

(B) The Forest Service (in coordination with the applicable Resource Management Agency, if not the Forest Service) verifies the Contribution Assessment, which can change over time with changes in the Habitat Inventory or shifts in the land use categories of adjacent parcels, and obtains the applicant's approval if the Conservation Credits to be issued have decreased;

(C) The Forest Service arranges for a policy of title insurance to be issued to the Resource Management Agency (not required when the contribution is by relinquishment of claims);

(D) The Forest Service files the record of survey, if one was required;

(E) The Forest Service files and/or records the instrument of conveyance (except in the case of a Use Restriction Agreement, which is only accepted, not recorded);

(F) The Forest Service records the transaction in the Credit Registry; and

(G) The Forest Service issues a Credit Verification Letter to the applicant indicating the number of Conservation Credits that have been registered in his/her/its name.

(v) Contingent Contributions (optional). Applicants have the option to make Contingent Contributions pursuant Section 10(d) using the process described in this subsection.

(A) To make a Contingent Contribution, the applicant shall include with its closing fee, paid pursuant to subsection *(iv)(A)* above, *(I)* a request to make the Reserve Contribution a Contingent Contribution, *(II)* a description of the requested contingency or contingencies, and, optionally, *(III)* a "Compliance Evaluation" (*see* subsection *(c)(i)* below) for one or more parcels.

(B) If the application is complete and the requested contingencies are consistent with those permitted under Section 10(d), then the Forest Service shall modify the closing process under subsection *(iv)* above by adding to the closing conditions the satisfaction of the contingencies requested by the applicant.

(C) If the application is either incomplete or the requested contingencies are inconsistent with Section 10(d), then the Forest Service shall reject the application and return it to the applicant.

(D) If the applicant has submitted a Compliance Evaluation, and the Forest Service can verify that the Compensation Requirement stated in the Compliance Evaluation is valid as of the date of application, then the Forest Service shall add an endorsement to the Compliance Valuation to the effect that the Compensation Requirement stated in the Compliance Evaluation is locked in so long as the Compensation Requirement is met entirely using Conservation Credits issuing from the subject Contingent Contribution.

(c) Credit use for ESA Compliance. The following process applies when a mining company, landowner, or claim holder wishes to obtain ESA Compliance using Conservation Credits:

(i) Compliance Evaluation. The applicant submits to the Forest Service a "Compliance Application" that includes *(A)* a project plan, at an appropriate map scale, depicting the land on which mining activity is to occur, with boundary lines separating the limits of surface disturbance from areas not to be disturbed; and *(B)* a fee for processing of the compliance evaluation. Within five (5) business days, the Forest Service will

prepare (in coordination with the applicable Resource Management Agency, if not the Forest Service) a "Compliance Evaluation" that will state, as of the date of issuance, the Compensation Requirement, in terms of Conservation Credits, for mining activities on the subject property. Note that the applicant may be a mining company that does not own the land or claim, but that the owner or claim holder must co-sign all applications required under this subsection *(c)*.

(ii) Compliance Verification Letter. The applicant obtains a Compliance Verification Letter, stating that the proposed project has obtained ESA Compliance under the CHMS, as follows:

(A) The applicant submits to the Forest Service *(I)* one or more Credit Verification Letters with a face value that is greater than or equal to the Compliance Requirement, *(II)* an executed amendment to the MOU adding applicant as a party with respect to the proposed project, and *(III)* payment of a fee for processing the Compliance Verification Letter.

(B) The Forest Service verifies the Compensation Requirement, which can change over time with changes in the Habitat Inventory, and obtains the applicant's approval if the Compliance Requirement has increased.

(C) The Forest Service verifies that no suspension or partial suspension of permitting authority under the CHMS Biological Opinion is in place that applies to the proposed project.

(D) The Forest Service records the transaction in the Credit Registry, issues the applicant a Compliance Verification Letter for the proposed project, and, if necessary, issues a new Credit Verification letter to the applicant for the difference between the number of Conservation Credits shown on the Credit Verification Letter(s) provided by the applicant and the Compliance Requirement.

(iii) Mining Plan. In the process of obtaining a Mining Plan from the Resource Management Agency, the applicant submits the Compliance Verification Letter obtained for the project as evidence of full compliance with the ESA with respect to the Carbonate Plants and any other species that may be addressed by the CHMS in the future. The Resource Management Agency will be required to verify that the limits of surface disturbance shown in the Compliance Verification Letter match the limits of surface disturbance shown in the Mining Plan.

(d) Credit transfer. Any Credit Holder may transfer any number of Conservation Credits registered in his/her/its name to any other party. Such a transfer may be the result of any kind of bargain between the parties or can be a gift or donation from one party to another. For any such transfer to be effective, however, it must be registered in the Credit Registry. The process for transferring Conservation Credits is as follows:

(i) The transferor and transferee both sign a "Transfer Request," with the transferor's Credit Verification Letter attached, providing basic information about the parties and indicating the number of Conservation Credits to be transferred.

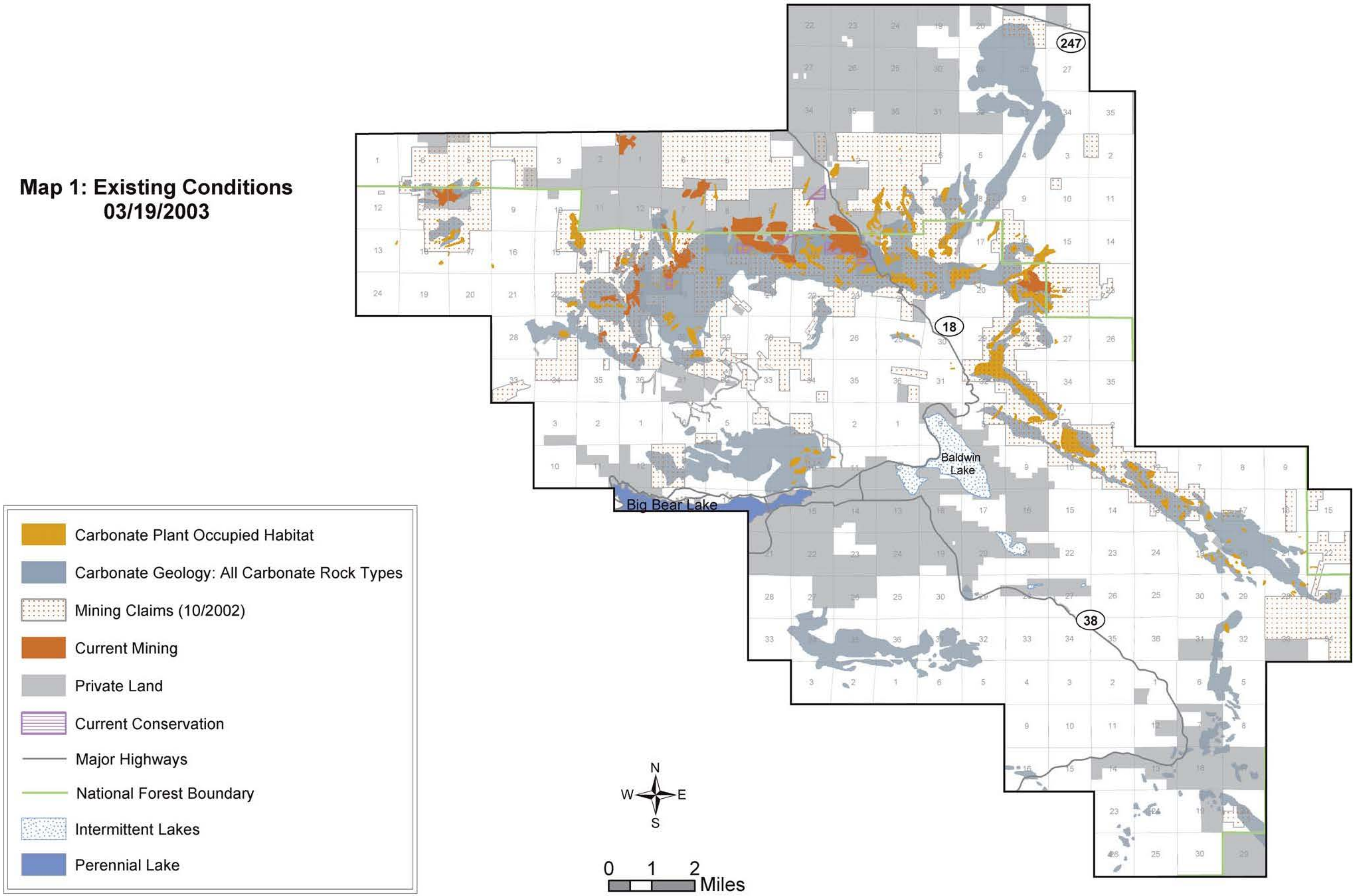
(ii) Either party submits the Transfer Request, along with a fee for processing the transfer, to the Forest Service.

(iii) The Forest Service records the transfer in the Credit Registry and issues a new Credit Verification Letter to the transferee for the number of Conservation Credits transferred and, if applicable, issues a new Credit Verification Letter to the transferor for the difference between the number of Conservation Credits shown on the old Credit Verification Letter and the number of Conservation Credits transferred to the transferee. ❀

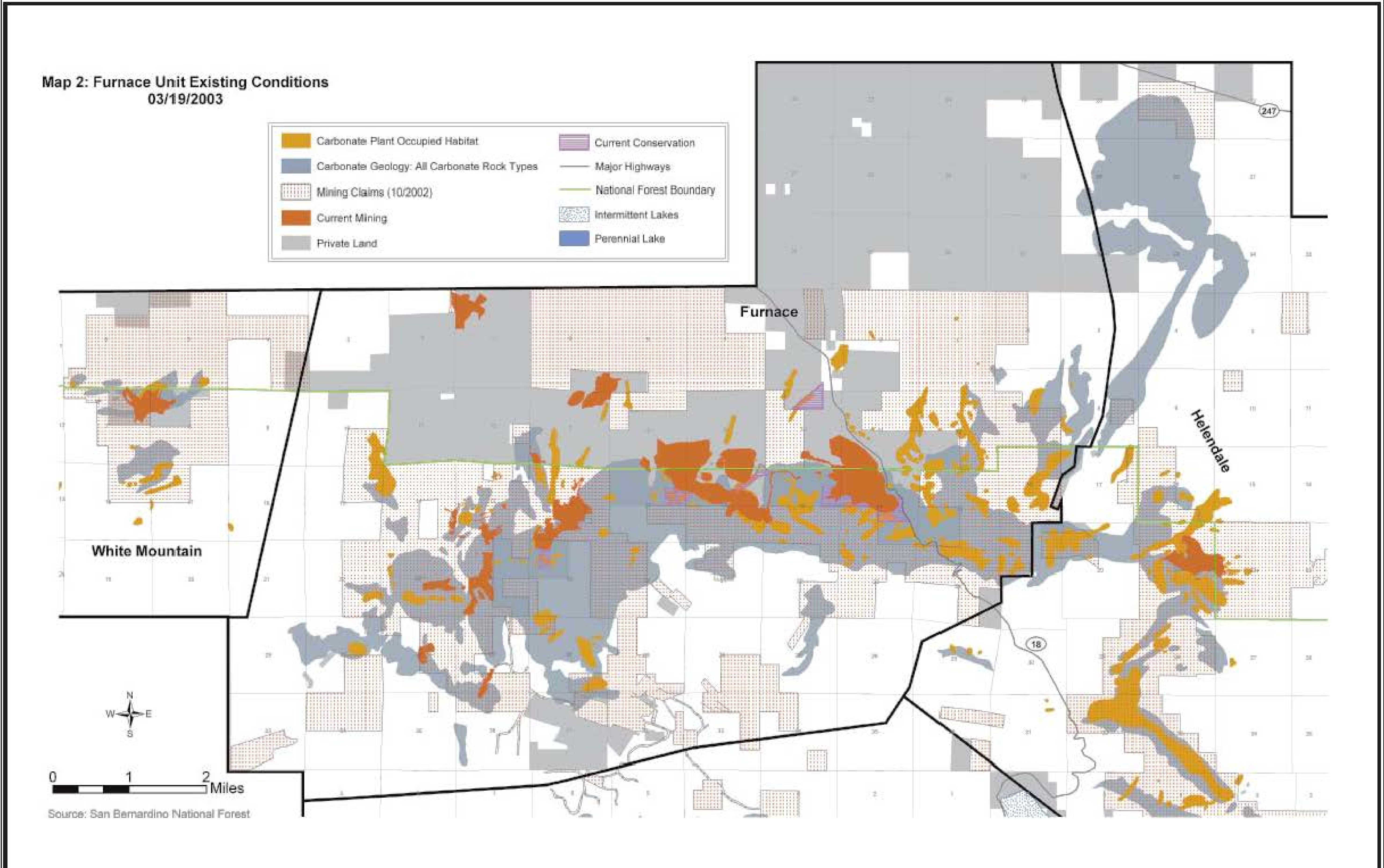
Appendix I: Maps

Contents

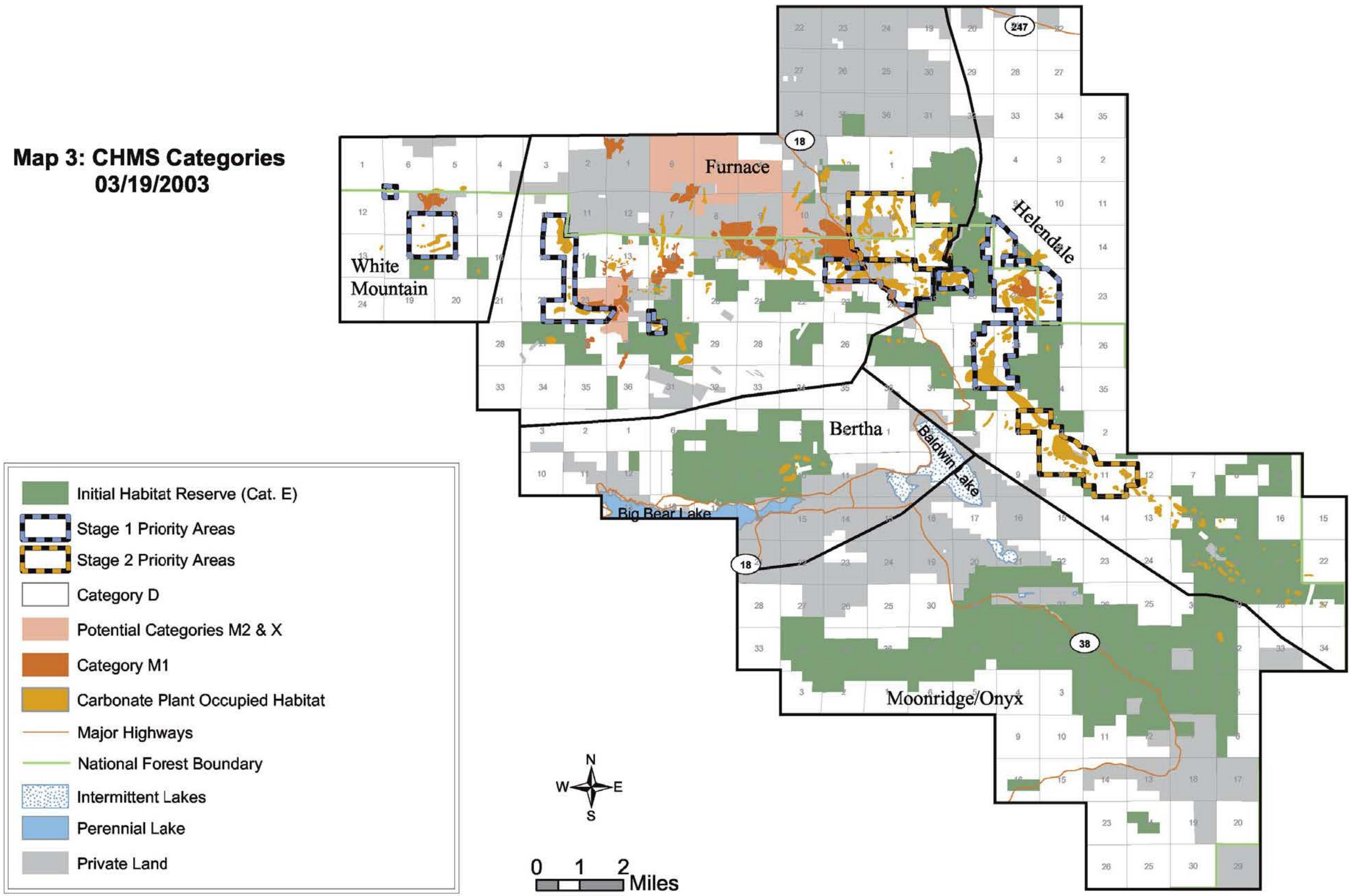
Map 1: Existing Conditions
03/19/2003



Source: San Bernardino National Forest

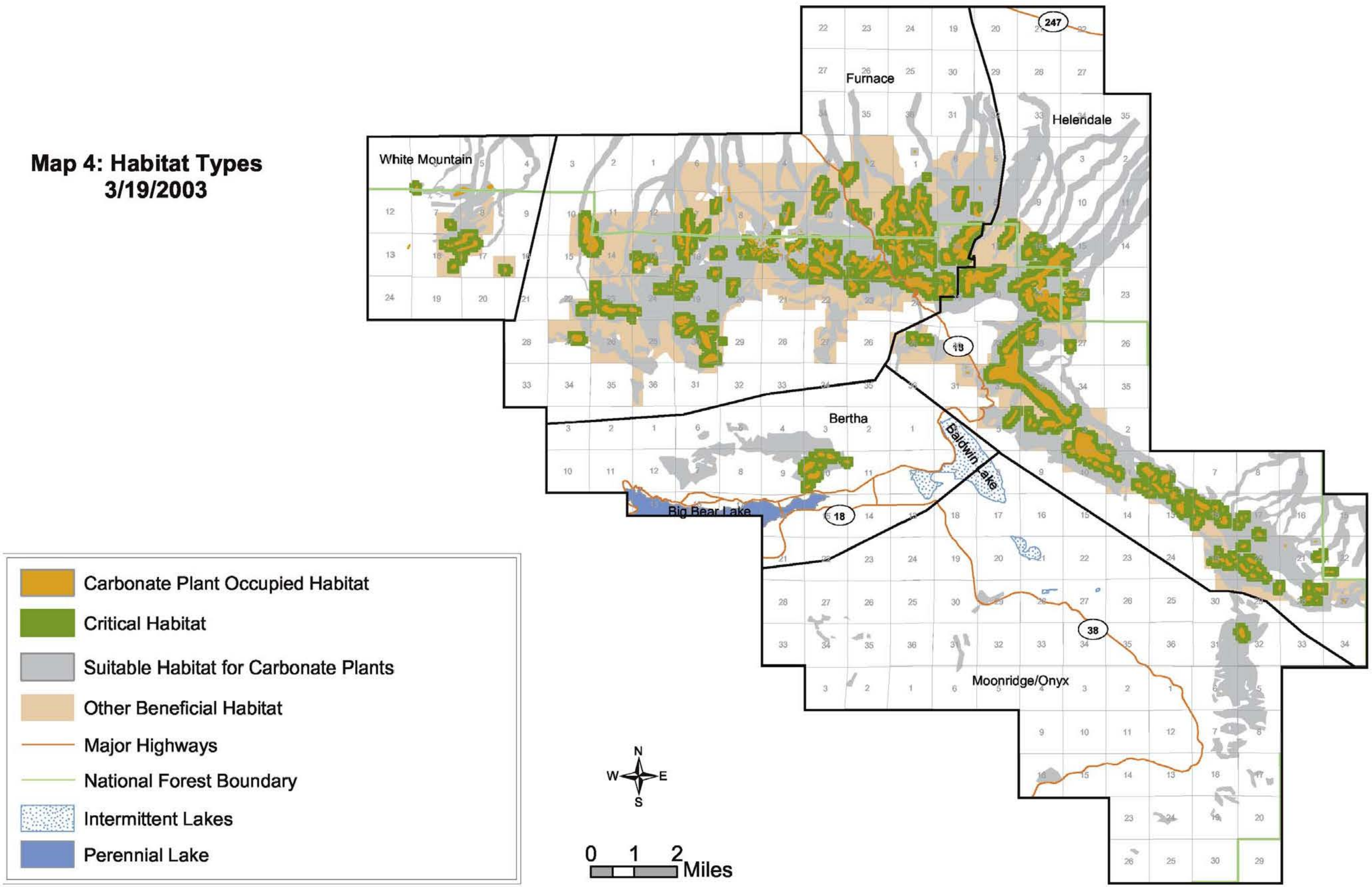

Map 2: Furnace Unit Existing Conditions
03/19/2003
Carbonate Plant Occupied Habitat
Carbonate Geology: All Carbonate Rock Types
Mining Claims (10/2002)
Current Mining
Private Land
Current Conservation
Major Highways
National Forest Boundary
Intermittent Lakes
Perennial Lake
Furnace
Helendale
White Mountain
247
18
N
W
E
S
0
1
2
Miles
Source: San Bernardino National Forest

Map 3: CHMS Categories
03/19/2003



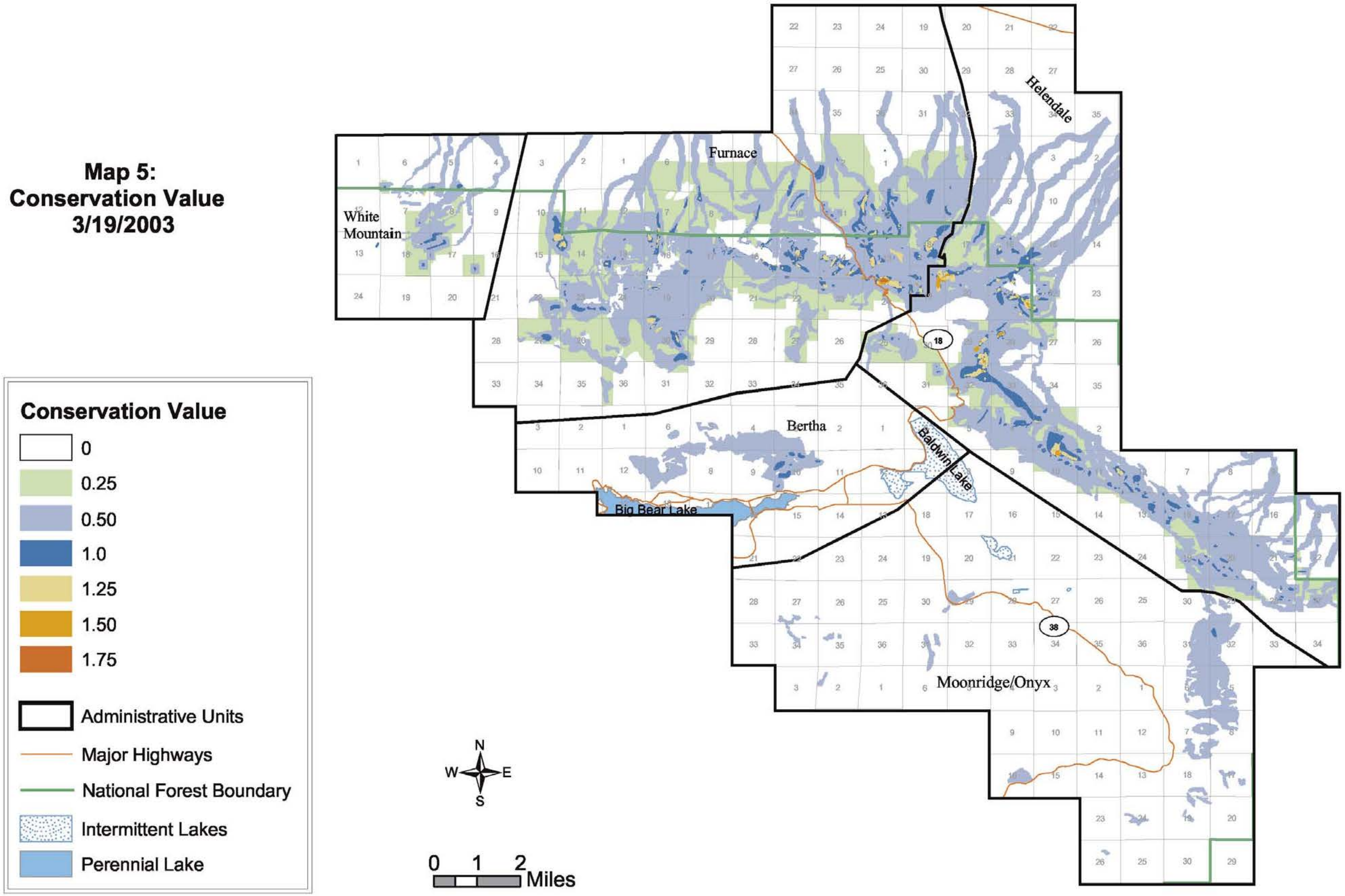
Source: San Bernardino National Forest

Map 4: Habitat Types
3/19/2003

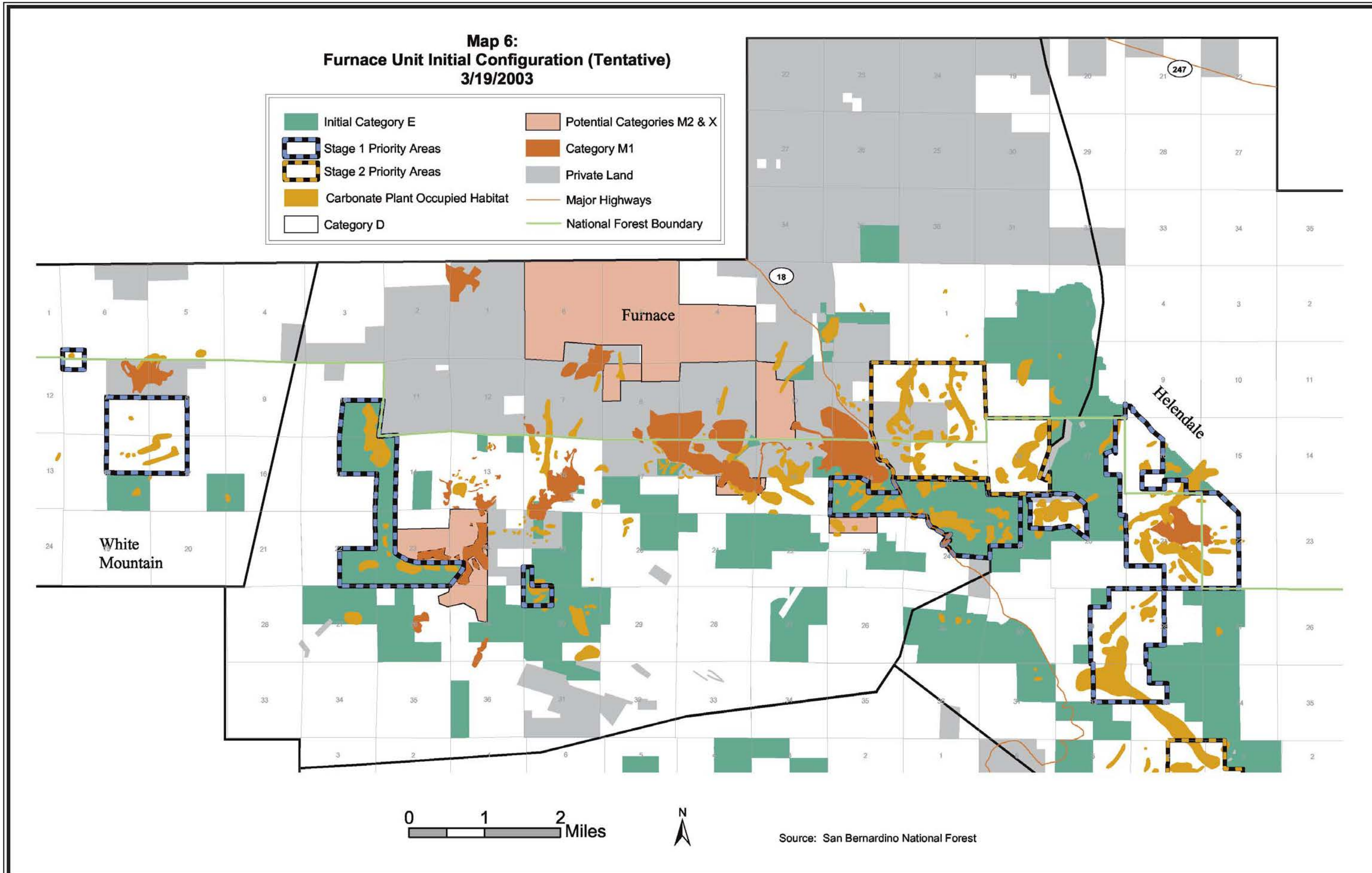


Source: San Bernardino National Forest

Map 5:
Conservation Value
3/19/2003



Source: San Bernardino National Forest



Map 6:
Furnace Unit Initial Configuration (Tentative)
3/19/2003
Initial Category E
Stage 1 Priority Areas
Stage 2 Priority Areas
Carbonate Plant Occupied Habitat
Category D
Potential Categories M2 & X
Category M1
Private Land
Major Highways
National Forest Boundary
Furnace
White Mountain
Helendale
18
247
0 1 2 Miles
N
Source: San Bernardino National Forest

APPENDIX T

RECREATION

T.1 VISITOR USE AND NATURE OF VISITOR USE

Table T-1 presents data regarding visitor use of a number of popular sites throughout the West Mojave planning area. The information is based on data gathered during fiscal year range October 1, 2000 to September 30, 2002.

Table T-1
Visitor Use in the West Mojave Planning Area

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
Afton Canyon			
Afton Canyon Campground	Camping	1,835	2,692
	Picnicking	19	3
Afton Canyon Natural Area	Hiking/Walking/Running	704	117
	Horseback Riding	35	9
	Hunting – Small Game	35	9
	Nature Study	2,111	352
	Photography	246	21
	Rockhounding/Mineral Collection	296	74
	Viewing – Other	704	59
	Viewing – Wildlife	1,232	205
Afton Group Area	Camping	1,167	1,845
Dispersed – Afton Canyon	Environmental Education	301	54
	Hiking/Walking/Running	602	208
	Horseback Riding	301	75
	Hunting – Small Game	150	38
	Hunting – Upland Bird	301	100
	Nature Study	602	115
	OHV – ATV	150	38
	OHV – Cars/Trucks/SUVs	451	75
	Photography	752	63
	Picnicking	301	25
	Rockhounding/Mineral Collection	1,354	451
	Social Gathering/Festival/Concert	75	19
	Viewing – Other	1,204	301
	Viewing – Wildlife	1,204	301
Mojave Road (Afton Canyon)	Horseback Riding	58	10
	OHV – Cars/Trucks/SUVs	3,649	608
	Picnicking	58	5

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	Viewing – Scenery/Landscapes	58	5
Amargosa/Grimshaw			
Amargosa Canyon	Backpacking	54	18
	Hiking/Walking/Running	3,115	519
	Horseback Riding	54	22
	Nature Study	161	40
	OHV-ATV	4,016	669
	OHV – Cars/Trucks/SUVs	535	134
	OHV – Dunebuggy	268	45
	OHV – Motorcycle	535	89
	Photography	107	9
	Picnicking	535	45
	Viewing – Other	54	4
	Viewing – Wildlife	3,554	592
Dispersed – Amargosa/Grimshaw	Camping	817	1,271
	Driving for Pleasure	1,284	214
	Hiking/Walking/Running	233	39
	Horseback Riding	233	58
	Hunting – Small Game	233	78
	Hunting – Upland Bird	233	58
	Nature Study	233	39
	OHV-ATV	1,051	472
	OHV – Cars/Trucks/SUVs	1,868	623
	OHV – Motorcycle	1,284	321
	Photography	350	29
	Picnicking	584	49
	Rockhounding/Mineral Collection	817	204
	Target Practice	233	39
	Trapping	117	49
	Viewing – Other	1,051	88
	Viewing – Wildlife	1,634	272
Grimshaw Lake	Driving for Pleasure	4,311	359
	Hiking/Walking/Running	652	109
	Photography	1,956	163
	Viewing – Wildlife	4,185	349
Barstow			
Barstow Office Headquarters	Staging/Comfort Stop	4,544	189
Calico Early Man Site	Photography	121	10
	Picnicking	242	20

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	Viewing – Cultural Sites	4,028	336
	Viewing – Interpretive Exhibit	4,028	336
Dispersed - Barstow	Bicycling – Mountain	21,145	7,048
	Camping	179,822	285,097
	Climbing – Mountain/Rock	102	201
	Driving for Pleasure	74,008	12,335
	Hiking/Walking/Running	52,863	8,810
	Horseback Riding	10,573	3,120
	Hunting – Small Game	40,306	10,076
	Hunting – Upland Bird	48,015	16,005
	Interpretive Programs	155	6
	Model Airplane/Rocket	325	158
	Nature Study	24,018	3,437
	OHV – ATV	42,290	10,573
	OHV – Cars/Trucks/SUVs	339,242	112,834
	OHV – Motorcycle	95,833	33,079
	Other Motor Land Sport/Event	147	104
	Pack Trips	10	25
	Photography	53,379	4,689
	Picnicking	75,728	6,403
	Rockhounding/Mineral Collection	39,437	9,859
	Social Gathering/Festival/Concert	15,177	5,092
	Spectator Sport	698	457
	Staging/Comfort Stop	4	0
	Target Practice	74,008	12,335
	Trapping	10,573	1,762
	Viewing – Other	21,145	5,286
	Viewing – Scenery/Landscapes	750	33
	Viewing – Wildflowers	71	3
	Viewing – Wildlife	63,445	21,146
	Viewing – Interpretive Exhibit	10,573	441
Juniper Flats	Camping	537	860
	Hiking/Walking/Running	537	90
	Horseback Riding	753	188
	Hunting – Small Game	403	101
	Hunting – Upland Bird	403	101
	Nature Study	343	41
	OHV – ATV	269	45
	OHV – Cars/Trucks/SUVs	940	235
	OHV – Motorcycle	1,350	225
	Photography	269	22
	Picnicking	3,089	257
	Viewing – Cultural Sites	1,209	101
	Viewing – Other	1,746	145

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	Viewing – Wildlife	2,552	213
Lucerne Dry Lake	OHV – Cars/Trucks/SUVs	259	11
	Picnicking	259	22
	Social Gathering/Festival/Concert	259	43
	Specialized Sport/Event (Non-Motor)	356	269
	Spectator Sport	176	88
	Viewing – Scenery/Landscapes	52	2
Mojave Road (Barstow)	OHV – Cars/Trucks/SUVs	1,593	266
Desert Discovery Center			
Desert Discovery Center	Environmental Education	1,099	165
	Nature Study	1,648	69
	Photography	476	20
	Viewing – Wildlife	951	40
	Viewing – Interpretive Exhibit	9,323	539
Dispersed – Desert Discovery Center	Viewing – Other	22	2
Dumont Dunes			
Dispersed – Dumont Dunes	Camping	183,808	375,405
	OHV – ATV	141,402	94,273
	OHV – Cars/Trucks/SUVs	32,590	12,068
	OHV – Dunebuggy	34,338	20,031
	OHV – Motorcycle	19,516	4,879
	Photography	30,537	2,546
	Picnicking	10,935	947
	Racing – OHV Cars/Trucks/Buggies	105	67
	Rockhounding/Mineral Collection	16,159	4,040
	Sand Boarding	20	17
	Social Gathering/Festival/Concert	835	888
	Spectator Sport	4,636	3,203
	Staging/Comfort Stop	213	18
	Viewing – Other	213	18
	Viewing – Scenery/Landscapes	325	27
	Viewing – Interpretive Exhibit	30,299	2,525
Salt Creek Hills ACEC	Nature Study	2,039	170
	Photography	1,223	102
	Picnicking	815	68
	Staging/Comfort Stop	5,485	114
	Viewing – Cultural Sites	4,892	408

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	Viewing – Wildlife	4,892	612
	Viewing – Interpretive Exhibit	3,150	131
El Mirage			
Dispersed – El Mirage	Camping	173,850	272,022
	Driving for Pleasure	23,909	3,985
	Hang-Gliding/Parasailing	4,782	1,002
	Hiking/Walking/Running	2,391	398
	Horseback Riding	2,391	797
	Land/Sand Sailing	11,955	3,985
	Model Airplane/Rocket	3,551	592
	OHV – ATV	88,464	22,116
	OHV – Cars/Trucks/SUVs	27,985	7,756
	OHV – Dunebuggy	4,782	1,594
	OHV – Motorcycle	96,725	32,343
	Other Motor Land Sport/Event	367	349
	Photography	7,294	1,688
	Picnicking	132,414	11,512
	Racing – Auto Track	3,449	2,485
	Racing – Motorcycle	370	185
	Social Gathering/Festival/Concert	7,327	3,535
	Specialized Sport/Event (Non-Motor)	38,007	13,026
	Spectator Sport	8,729	11,577
	Viewing – Scenery/Landscapes	2,930	122
	Viewing – Wildflowers	132	6
Rasor			
Dispersed – Rasor	Camping	18,690	27,378
	Hunting – Small Game	652	163
	Hunting – Upland Bird	435	109
	OHV – ATV	14,132	6,142
	OHV – Cars/Trucks/ SUVs	3,113	1,184
	OHV – Motorcycle	1,739	756
	Photography	51	34
	Picnicking	319	53
	Social Gathering/Festival/Concert	544	272
Mojave Road (Rasor)	OHV – Cars/Trucks/SUVs	1,593	266
Stoddard/Johnson			
Anderson Dry Lake	Camping	3,927	5,707
	OHV-ATV	1,704	529
	OHV – Cars/Trucks/SUVs	7,731	3,663
	OHV – Motorcycle	8,856	4,258

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	Photography	945	91
	Picnicking	3,343	413
	Racing – OHV Cars/Trucks/Buggies	151	65
	Social Gathering/Festival/Concert	2,645	1,492
	Viewing – Scenery/Landscapes	410	17
	Viewing – Wildflowers	65	3
Cougar Buttes	Camping	3,500	5,096
	OHV – ATV	455	214
	OHV – Cars/Trucks/SUVs	2,055	167
	OHV – Motorcycle	4,294	2,163
	Other Motor Land Sport/Event	127	63
	Photography	1,010	270
	Picnicking	4,445	2,131
	Racing – Motorcycle	913	1,125
	Social Gathering/Festival/Concert	3,667	2,671
	Spectator Sport	1,499	1,548
	Viewing – Scenery/Landscapes	950	51
Dispersed – Stoddard/Johnson	Camping	82,850	134,057
	Driving for Pleasure	14,717	2,555
	Hiking/Walking/Running	6,764	841
	Horseback Riding	3,874	1,291
	Hunting – Small Game	2,236	559
	Hunting – Upland Bird	2,236	745
	Nature Study	2236	373
	OHV – ATV	34,468	19,992
	OHV – Cars/Trucks/SUVs	53,760	30,469
	OHV - Motorcycle	38,664	22,069
	Other Motor Land Sport/Event	1,434	717
	Photography	6,964	1,393
	Picnicking	40,535	4,396
	Racing – Auto Track	493	329
	Racing – Motorcycle	2,953	1,528
	Racing – OHV Cars/Trucks/Buggies	318	153
	Re-enactment Events/Tours	135	168
	Rock Crawling – 4WD	399	532
	Rockhounding/Mineral Collection	6,708	2,385
	Social Gathering/Festival/Concert	25,126	14,251
	Spectator Sport	16686	11,700
	Staging/Comfort Stop	184	63
	Target Practice	6,708	1,118
	Viewing – Other	12,374	3,094
	Viewing – Scenery/Landscapes	8,549	453
	Viewing – Wildflowers	407	21
	Viewing – Wildlife	15,207	5,069

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
Means Dry Lake	Camping	718	1,020
	OHV – ATV	154	77
	OHV – Cars/Trucks/SUVs	2,998	531
	OHV – Motorcycle	2,494	1,222
	Photography	571	58
	Picnicking	2,723	132
	Racing – Motorcycle	244	122
	Social Gathering/Festival/Concert	2,467	432
	Spectator Sport	2,038	1,030
	Viewing – Scenery/Landscapes	2,214	92
Sidewinder Road	Camping	6,138	8,207
	Hiking/Walking/Running	109	5
	OHV – ATV	2,620	1,092
	OHV – Cars/Trucks/SUVs	3,483	894
	OHV – Motorcycle	6,308	2,940
	Photography	1,405	275
	Picnicking	3,161	10,162
	Racing – Auto Track	1,292	861
	Racing – OHV Cars/Trucks/Buggies	98	41
	Social Gathering/Festival/Concert	1,096	319
	Spectator Sport	5,213	2,357
	Viewing – Scenery/Landscapes	109	5
Slash-X	Camping	1,520	2,603
	OHV – ATV	5,251	2,392
	OHV – Cars/Trucks/SUVs	2,250	700
	OHV – Motorcycle	6,001	3,100
	Photography	150	13
	Picnicking	450	38
	Social Gathering/Festival/Concert	900	225
	Spectator Sport	1,500	750
Soggy Dry Lake	Camping	5,209	7,825
	Hiking/Walking/Running	91	8
	OHV – ATV	3,507	1,877
	OHV – Cars/Trucks/SUVs	183	76
	OHV – Motorcycle	10,478	5,212
	Photography	91	15
	Picnicking	1,282	115
	Social Gathering/Festival/Concert	685	399
	Specialized Sport/Event (Non-Motor)	129	32
	Spectator Sport	55	14
The Rockpile	Camping	6,165	6,049
	OHV – ATV	1,581	847

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	OHV – Cars/Trucks/SUVs	147	49
	OHV – Motorcycle	8,910	5,373
	Photography	652	295
	Picnicking	6,270	971
	Racing – Motorcycle	271	135
	Social Gathering/Festival/Concert	4,965	3,310
	Spectator Sport	503	252

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
Superior/Rainbow			
Dispersed – Superior/Rainbow	Camping	4,233	6,794
	Driving for Pleasure	3,267	817
	Environmental Education	584	68
	Hiking/Walking/Running	2,800	700
	Horseback Riding	1,400	583
	Hunting – Small Game	1,867	467
	Hunting – Upland Bird	1,867	622
	Land/Sand Sailing	966	438
	Nature Study	1,867	622
	OHV – ATV	1,867	467
	OHV – Cars/Trucks/SUVs	7,967	1,325
	OHV – Motorcycle	2,800	467
	Photography	940	79
	Picnicking	2,833	242
	Rockhounding/Mineral Collection	1,867	467
	Social Gathering/Festival/Concert	500	197
	Target Practice	2,334	389
	Trapping	467	233
	Viewing – Other	2,800	933
	Viewing – Wildlife	4,200	700
Harper Dry Lake	Environmental Education	204	34
	Nature Study	204	34
	Viewing – Wildlife	3,668	611
Owl Canyon Campground (DA)	Camping	2,996	4,237
	Climbing – Mountain/Rock	93	15
	Environmental Education	309	51
	Hiking/Walking/Running	154	26
	Nature Study	124	21
	Photography	154	13
	Picnicking	247	41
Owl Canyon Group CG	Camping	1,361	2,132
	Horseback Riding	1,542	642
	Nature Study	272	91
	Picnicking	399	33
Rainbow Basin Natural Area	Bicycling – Mountain	38	6
	Driving for Pleasure	151	25
	Hiking/Walking/Running	1,095	274
	Horseback Riding	113	47
	Nature Study	264	44
	OHV – ATV	38	6

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	OHV – Cars/Trucks/SUVs	76	13
	OHV – Motorcycle	76	13
	Photography	302	25
	Picnicking	491	82
	Rockhounding/Mineral Collection	227	57
	Trapping	38	19
	Viewing – Other	340	57
	Viewing – Wildlife	529	88

Table T-2 presents visitor use data for many of the same sites as those discussed in Table T-1, for the 1998 to 2000 time period. The information is based on data gathered during fiscal year range October 1, 1998 to September 30, 2000. The data in this table, as compared to that in Table Q3.7a, shows particular trends for the covered areas and recreational activities. Please note that the data presented in these two tables do not show a 40-year trend, but they do show trends over a range of several years.

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
Afton Canyon			
Afton Canyon Campground	Camping	2,591	2,374
	Picnicking	26	4
Afton Canyon Natural Area	Hiking/Walking/Running	490	82
	Horseback Riding	23	6
	Hunting – Small Game	23	6
	Nature Study	1,468	245
	Photography	171	14
	Rockhounding/Mineral Collection	147	37
	Viewing – Other	490	41
	Viewing – Wildlife	856	143
Afton Group Area	Camping	879	806
Dispersed – Afton Canyon	Environmental Education	867	216
	Hiking/Walking/Running	1,731	722
	Horseback Riding	867	216
	Hunting – Small Game	433	108
	Hunting – Upland Bird	867	289
	Nature Study	1,731	577
	OHV – ATV	433	108
	OHV – Cars/Trucks/SUVs	1,299	216

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	Photography	2,165	180
	Picnicking	867	72
	Rockhounding/Mineral Collection	3,896	1,299
	Social Gathering/Festival/Concert	216	54
	Viewing – Other	3,464	866
	Viewing – Wildlife	3,464	866
Mojave Road (Afton Canyon)			
	OHV – Cars/Trucks/SUVs	2,903	484
Amargosa/Grimshaw			
Amargosa Canyon	Backpacking	23	7
	Hiking/Walking/Running	1,634	272
	Horseback Riding	23	9
	Nature Study	66	16
	OHV-ATV	1,634	272
	OHV – Cars/Trucks/SUVs	218	54
	OHV – Dunebuggy	109	18
	OHV – Motorcycle	218	36
	Photography	45	4
	Picnicking	218	18
	Viewing – Other	23	2
	Viewing – Wildlife	2,176	363
Dispersed – Amargosa/Grimshaw	Camping	622	569
	Driving for Pleasure	975	163
	Hiking/Walking/Running	177	30
	Horseback Riding	177	44
	Hunting – Small Game	177	59
	Hunting – Upland Bird	177	44
	Nature Study	177	30
	OHV-ATV	798	266
	OHV – Cars/Trucks/SUVs	1,421	473
	OHV – Motorcycle	975	244
	Photography	265	22
	Picnicking	444	37
	Rockhounding/Mineral Collection	622	155
	Target Practice	177	30
	Trapping	89	37
	Viewing – Other	798	67
	Viewing – Wildlife	1,243	207

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
Grimshaw Lake	Driving for Pleasure	4,156	346
	Hiking/Walking/Running	462	77
	Photography	1,386	115
	Viewing – Wildlife	4,617	385
Barstow			
Calico Early Man Site	Camping	18	15
	Photography	122	10
	Picnicking	242	28
	Viewing – Cultural Sites	2,431	203
	Viewing – Interpretive Exhibit	4,046	337
Dispersed - Barstow	Backpacking	84	84
	Bicycling – Mountain	7,020	2,381
	Camping	59,809	54,618
	Driving for Pleasure	24,144	4,024
	Hiking/Walking/Running	17,334	2,904
	Horseback Riding	4,174	1,912
	Hunting – Small Game	20,696	5,174
	Hunting – Upland Bird	20,696	6,898
	Nature Study	10,346	2,587
	OHV – ATV	13,796	3,449
	OHV – Cars/Trucks/SUVs	111,111	37,283
	OHV – Motorcycle	31,879	10,591
	Photography	17,805	1,607
	Picnicking	24,576	2,084
	Rockhounding/Mineral Collection	10,346	2,587
	Social Gathering/Festival/Concert	8,605	3,547
	Specialized Sport/Event (Non-Motor)	349	348
	Target Practice	24,144	4,024
	Trapping	3,448	575
	Viewing – Other	6,898	1,725
	Viewing – Wildlife	20,696	6,898
	Viewing – Interpretive Exhibit	3,448	144
	Unspecified	258	22
Juniper Flats	Camping	459	460
	Hiking/Walking/Running	459	77
	Horseback Riding	230	57
	Hunting – Small Game	344	86
	Hunting – Upland Bird	344	86
	Nature Study	459	77
	OHV – ATV	230	38
	OHV – Cars/Trucks/SUVs	806	201

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	OHV – Motorcycle	574	96
	Photography	230	19
	Picnicking	2,643	220
	Viewing – Cultural Sites	1,034	86
	Viewing – Other	1,493	124
	Viewing – Wildlife	2,183	182
Mojave Road (Barstow)	OHV – Cars/Trucks/SUVs	1,410	235
Desert Discovery Center			
Desert Discovery Center	Environmental Education	715	60
	Nature Study	1,071	45
	Photography	357	15
	Viewing – Wildlife	715	30
	Viewing – Interpretive Exhibit	6,999	292
Dumont Dunes			
Dispersed – Dumont Dunes	Camping	96,652	85,665
	OHV – ATV	72,794	48,530
	OHV – Cars/Trucks/SUVs	7,668	3,032
	OHV – Dunebuggy	17,679	10,313
	OHV – Motorcycle	2,080	520
	Photography	21,363	5,107
	Picnicking	15,996	2,233
	Racing – OHV Cars/Trucks/Buggies	12,894	10,745
	Rockhounding/Mineral Collection	8,319	2,080
	Social Gathering/Festival/Concert	12,951	11,028
	Specialized Sport/Event (Non-Motor)	58	39
	Spectator Sport	13,166	10,972
	Viewing – Interpretive Exhibit	15,599	1,300
	Unspecified	13,645	1,137
Salt Creek Hills ACEC	Nature Study	1,130	94
	Photography	678	56
	Picnicking	453	38
	Viewing – Cultural Sites	2,712	226
	Viewing – Wildlife	2,712	339
	Viewing – Interpretive Exhibit	226	9
El Mirage			
Dispersed – El Mirage	Camping	166,141	149,829

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	Driving for Pleasure	22,012	3,669
	Hang-Gliding/Parasailing	4,402	1,468
	Hiking/Walking/Running	2,202	367
	Horseback Riding	2,202	734
	Land/Sand Sailing	11,071	3,711
	OHV – ATV	81,539	20,422
	OHV – Cars/Trucks/SUVs	17,611	5,870
	OHV – Dunebuggy	4,402	1,468
	OHV – Motorcycle	88,203	29,446
	Photography	8,261	3,172
	Picnicking	127,475	12,485
	Racing – Auto Track	19,493	12,374
	Social Gathering/Festival/Concert	15,324	10,263
	Specialized Sport/Event (Non-Motor)	34,412	11,935
	Spectator Sport	2,006	1,178
	Unspecified	16	1
Rasor			
Dispersed – Rasor	Camping	24,151	22,138
	Hunting – Small Game	853	213
	Hunting – Upland Bird	570	142
	OHV – ATV	18,470	6,156
	OHV – Cars/Trucks/ SUVs	3,694	923
	OHV – Motorcycle	2,274	758
	Social Gathering/Festival/Concert	283	71
Mojave Road (Rasor)	OHV – Cars/Trucks/SUVs	1,691	282
Stoddard/Johnson			
Anderson Dry Lake	Camping	3,302	3,006
	OHV-ATV	1,262	250
	OHV – Cars/Trucks/SUVs	4,372	1,458
	OHV – Motorcycle	7,193	2,865
	Photography	320	51
	Picnicking	2,394	399
	Racing – Auto Track	214	143
	Social Gathering/Festival/Concert	1,620	1,137
	Spectator Sport	3,190	1,064
Cougar Buttes	Camping	305	265
	OHV – ATV	184	61
	OHV – Motorcycle	1,298	680
	Photography	92	25
	Picnicking	347	58

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	Social Gathering/Festival/Concert	191	111
	Specialized Sport/Event (Non-Motor)	86	50
	Spectator Sport	25	13
Dispersed – Stoddard/Johnson	Camping	39,008	40,815
	Driving for Pleasure	3,433	286
	Hiking/Walking/Running	3,433	572
	Horseback Riding	1,716	572
	Hunting – Small Game	1,716	429
	Hunting – Upland Bird	1,716	572
	Nature Study	1,826	323
	OHV – ATV	26,564	8,969
	OHV – Cars/Trucks/SUVs	26,659	11,485
	OHV - Motorcycle	32,277	12,036
	Photography	4,480	1,575
	Picnicking	21,361	2,559
	Racing – Auto Track	5,932	4,187
	Rockhounding/Mineral Collection	5,151	2,146
	Social Gathering/Festival/Concert	8,655	5,198
	Specialized Sport/Event (Non-Motor)	400	321
	Spectator Sport	4,525	3,255
	Target Practice	5,151	858
	Viewing – Other	12,018	3,005
	Viewing – Wildlife	15,452	5,151
	Unspecified	92	8
Means Dry Lake	Camping	1,712	1,587
	OHV – ATV	448	280
	OHV – Cars/Trucks/SUVs	698	401
	OHV – Motorcycle	2,877	1,637
	Photography	129	45
	Picnicking	1,423	237
	Social Gathering/Festival/Concert	1,692	1,129
Sidewinder Road	Camping	4,932	4,258
	OHV – ATV	1,787	745
	OHV – Cars/Trucks/SUVs	1,531	511
	OHV – Motorcycle	3,957	1,319
	Photography	775	164
	Picnicking	1,929	336
	Racing – Auto Track	1,632	1,088
	Racing – OHV Cars/Trucks/Buggies	1,298	865
	Social Gathering/Festival/Concert	2,773	1,806
	Spectator Sport	1,915	798
	Unspecified	8	5
Slash-X	Camping	3,623	3,021

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
	Driving for Pleasure	221	111
	OHV – ATV	4,730	2,041
	OHV – Cars/Trucks/SUVs	3,226	1,522
	OHV – Dunebuggy	1,170	779
	OHV – Motorcycle	5,064	2,120
	Photography	93	9
	Picnicking	3,607	579
	Social Gathering/Festival/Concert	4,422	2,574
	Spectator Sport	892	446
	Unspecified	962	80
Soggy Dry Lake	Camping	1,324	1,212
	OHV – ATV	992	661
	OHV – Motorcycle	3,030	1,515
	Picnicking	109	18
	Specialized Sport/Event (Non-Motor)	56	14
The Rockpile	Camping	4,540	3,591
	OHV – ATV	1,051	565
	OHV – Cars/Trucks/SUVs	92	31
	OHV – Motorcycle	6,611	4,046
	Photography	338	119
	Picnicking	3,810	635
	Social Gathering/Festival/Concert	4,019	2,568
	Spectator Sport	318	212

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
Superior/Rainbow			
Dispersed – Superior/Rainbow	Camping	5,040	4,620
	Driving for Pleasure	3,920	980
	Environmental Education	1,122	187
	Hiking/Walking/Running	3,361	840
	Horseback Riding	1,679	700
	Hunting – Small Game	2,241	560
	Hunting – Upland Bird	2,241	747
	Land/Sand Sailing	1,122	467
	Nature Study	2,241	747
	OHV – ATV	2,241	560
	OHV – Cars/Trucks/SUVs	9,520	1,587
	OHV – Motorcycle	3,361	560
	Photography	1,122	93
	Picnicking	3,361	280
	Rockhounding/Mineral Collection	2,241	560
	Social Gathering/Festival/Concert	558	187
	Target Practice	2,800	467
	Trapping	558	280
	Viewing – Other	3,361	1,120
	Viewing – Wildlife	5,040	840
Harper Dry Lake	Environmental Education	124	21
	Nature Study	124	21
	Viewing – Wildlife	2,242	374
Owl Canyon Campground (DA)	Camping	3,827	3,509
	Climbing – Mountain/Rock	119	20
	Environmental Education	395	66
	Hiking/Walking/Running	198	33
	Nature Study	158	26
	Photography	198	16
	Picnicking	315	53
Owl Canyon Group CG	Camping	1,084	992
	Horseback Riding	1,227	511
	Nature Study	217	72
	Picnicking	318	26

AREA	ACTIVITY	NUMBER OF VISITS	NUMBER OF VISITOR DAYS
Rainbow Basin Natural Area	Bicycling – Mountain	54	9
	Driving for Pleasure	220	37
	Hiking/Walking/Running	1,594	398
	Horseback Riding	165	69
	Nature Study	385	64
	OHV – ATV	54	9
	OHV – Cars/Trucks/SUVs	110	18
	OHV – Motorcycle	110	18
	Photography	439	37
	Picnicking	715	119
	Rockhounding/Mineral Collection	329	82
	Trapping	54	27
	Viewing – Other	495	82
	Viewing – Wildlife	769	128

APPENDIX U

CULTURAL RESOURCES

Appendices

APPENDIX U
CULTURAL RESOURCES

The Barstow Field Office area includes nine subregions for route designation. Table U-1 lists the cultural resources potentially affected by proposed open routes.

Table U-1
BLM Barstow Field Office
Cultural Resource Data

QUADRANGLE	ROUTE	CULTURAL RESOURCES POTENTIALLY IMPACTED
Adobe Mt.		No recorded cultural resources impacted.
Alvord Mt. East	C1083, C3040, C3045 C3045 C3024, C3032, C3030 C3008, C3032, C3066 C3115 C3155 AF232	SBR4272H road SBR2223 lithic reduction, SBR7694H power transmission line SBR2223 lithic reduction CHL577/SBR4411H Mormon Trail SBR7694H power transmission line SBR3175/H lithic reduction SBR3695 lithic scatter
Alvord Mt. West	C1077 C2001 C2005, C1116 C1029 C1063, C1064, C2010 C1072 C2034, C1002 C3047, C3046, C2001, C3045, C1002, UK	SBR6493H mining PSBR45H road SBR884 lithic reduction SBR871 lithic reduction SBR848 lithic reduction SBR6435, SBR6436 lithic reduction, SBR6438 camp SBR893 lithic reduction SBR853 camp, SBR7694H power transmission line
Ash Hill		No recorded cultural resources impacted.
Astley Rancho		No recorded cultural resources impacted.
Apple Valley North		No recorded cultural resources impacted.
Bagdad SW		No data
Barstow		No recorded cultural resources impacted.
Barstow SE	SV275	SBR562, SBR3184, SBR3617
Big Bear City	T3N R2E Section 21	SBR4038 Terrace Springs
Bighorn Canyon	T3N R4E Section 27 T3N R4E Section 23 T3N R4E Section 26	SBR560 camp, SBR7075 pottery scatter SBR7074 rock art/food processing SBR135 rock art
Bird Spring	F3003	SBR518, SBR5658, SBR2579, SBR5673, SBR5670, SBR2577, SBR5672, SBR2748, SBR2749, SBR2750 rock art sites
Bitter Spring	C2001 C3156 AF331	IA2042-3 lithic, NRHP-E-SBR7694H power transmission line, SBR3138 lithic reduction, SBR2162 lithic quarry/habitation SBR434 lithic quarry SBR2162 lithic quarry/habitation, SBR6503 lithic quarry/stone circle
Blackwater Well		No recorded cultural resources impacted.

QUADRANGLE	ROUTE	CULTURAL RESOURCES POTENTIALLY IMPACTED
Boron NE	F4002	PSBR-39H power transmission line, NRHP-E-SBR4347/H lithic scatter/town site
Bristol Lake SW		No recorded cultural resources impacted.
Broadwell Lake	AF1512 AF327 AF152 AF0710, AF077, AF055 MH731	SBR170 village SBR2340H RR, SBR6404H road SBR2340H Road, IA1783-17, 18, 19 SBR6404H Road SBR2340H RR
Buttes, The	F5002	P2083-1 lithic reduction site
Cave Mt.	AF313 AF326 AF2511 AF311	SBR7400 food processing SBR3033H/CHL963 Mojave Rd. SBR3534 lithic reduction PSBR52 trail
Clarks Pass		No recorded cultural resources impacted.
Cleghorn Lakes		No recorded cultural resources impacted.
Cougar Buttes		No recorded cultural resources impacted.
Coyote Lake Coyote Lake (cont.)	C2004 C2005 C2002 C1042	SBR2170, SBR2165 lithic reduction SBR2172 lithic reduction SBR7420H structure SBR7185, SBR2167 rock shelters
Cronese Lakes	AF331	SBR248 pottery scatter, SBR2160 food processing, SBR5558H ranching, SBR2157 habitation/cremation
Crucero Hills	AF271 AF2421 AF327 AF325 UK	SBR1910H RR PSBR2033-2 habitation SBR 2340H RR, SBR143 prehistoric village SBR3033H/CHL963 Mojave Rd. SBR143 village
Dale Lake	MP252 MP351, MP352, MP354, MP355, MP356, MP357, MP359, MP3510	SBR1809 lithic reduction CHL985 Desert Training Center – CA-AZ Maneuvering Area
Dunn	AF232 C3032 C3079 C3032, C3008 AF232 AF192 C4002	SBR1910H RR, SBR3033/H/CHL963 Mojave Road, IA2043-2H glass bottle, SBR84/H structure, SBR2152/H cemetery NRHP-E-PSBR38H Hoover Dam to LA transmission lines SBR434 lithic quarry SBR4714 lithic scatter, SBR3608 lithic reduction SBR2152/H camp site SBR2150 lithic quarry, SBR3588 lithic scatter SBR4707 trail Various pending trails, habitation, lithics
E of Langford Well		No recorded cultural resources impacted.
East of Valley Mt.	MP258	SBR5181 fire hearth
Fairview Valley	T5N R2W Section 14 T5N R2W Section 4/9 T5N R2W Section 4 T5N R2W Section 4 & T6N R2W Section 33	SBR3401 homestead SBR6971, SBR6972 lithic reduction SBR6973 lithic scatter SBR2135 lithic reduction

QUADRANGLE	ROUTE	CULTURAL RESOURCES POTENTIALLY IMPACTED
Fawnskin		No data.
Freemont Peak	F3002 F4196 F4095, F4102	IA2082-2 lithic P2092-2 P2082-1
Goat Mountain		No recorded cultural resources impacted. No routes shown on map.
Grandview Mine	T6N R2E Section 7	SBR1569 rockshelter
Harvard Hill	C2001, C2035, C3008, C3046 C3008 C3002, C3004 C2002 C3008 C2001, C2035, C2036	NRHP-E-SBr7694H power transmission line P1802-9 lithic reduction SBR223 lithic reduction SBR7419 lithic scatter, SBR7418 lithic reduction SBR2821 lithic reduction SBR2100, SBR3168 lithic quarry
Helendale	SV215 0 (off SV214)	IA1581-1 flaked tool P1581-1H mining site
Hidden Valley East	AF122	SBR6289 fire hearth
Hidden Valley West	AF122 AF325	P1792-9H mining SBR3033H/CHL963 Mojave Rd.
Hinkley		No recorded cultural resources impacted.
Hodge Hodge (continued)	SV266 SV266, SV261 SV261 SV275 CO34 EF2663 CO34	SBR7374, SBR7306 trails, SBR8081 SBR8311 Stone Circle PSBR63H communication line, SBR9361H Road PSBR63H communication line NRHP-E-OHP3926 National Old Trails Highway, SBR2910H road PSBR62H power transmission line, SBR2910H SBR3033H/CHL963 Mojave Road, SBR719 lithic scatter
Humbug Mt.		No recorded cultural resources impacted.
Jackrabbit Hill		No recorded cultural resources impacted.
Joshua Tree South		No recorded cultural resources impacted.
Kramer Hills	K2107 F2230, F1002, F1002A	SBR5357 lithic quarry/camp NRHP-E-SBR6693H AT&F RR
Kramer Junction		No recorded cultural resources impacted.
Landers	T3N R5E Section 30 T3N R5E Section 29	SBR1604/H mining/prehistoric village IA1293-1 ground stone
Lane Mt.	SU5096, SU5004, SU5005, SU5061, SU5089, SU5081 SU5005 SU5004	NRHP-E-[80-5] Goldstone Historic Mining District SBR6430 lithic scatter; SBR6434, SBR6432, SBR6433 food processing; SBR6431 camp SBR6490H mining
Langford Well		No data.
Lavic Lake	T7N R6E Section 2, 10, 11 T7N R6E Section 1 T8N R6E Section 36 T8N R6E Section 35/36 T8N R6E Section 31	SBR420/H mining/lithic quarry SBR2328/H lithic quarry/historic camp SBR2328/H NRHP-E-CHP3926/SBR2910H National Old Trails Highway SBR5801, SBR5798 lithic scatter; SBR5800 lithic reduction

QUADRANGLE	ROUTE	CULTURAL RESOURCES POTENTIALLY IMPACTED
	T7N R7E Section 4	SBR4165H RR & cemetery
Lead Mt. SW		No recorded cultural resources impacted.
Lockhart	EF454, F3036, F1045B, DF461, F4003, EF373, F1036, C283, F3003 F3028 F2007	SBR193 habitation including multiple rock art sites. SBR27H structure SBR3502 lithic scatter
Lucerne Valley		No recorded cultural resources impacted.
Ludlow	T8N R8E Section 32 T7N R8E Section 5 Section 5/8 Section 17 Section 20 Section 19 Section 28 T8N R7E Section 26, 27, 28, 33, 34, 35 T7N R7E Section 10	SBR6404H road, IA1532-2 flaked lithic P1532-3H military site P1532-2H Ludlow town site P1532-1H railroad SBR6530H RR, SBR6529H mining SBR5802 lithic scatter SBR3594H town site (Ragtown) SBR2792 lithic quarry & rock shelters SBR3496 lithic scatter, IA1532-1 flaked lithic
Ludlow SE		No recorded cultural resources impacted.
Manix		SBR3033H/CHL963 Mojave Rd. NRHP-E-PSBR38H power transmission line
Melville Lake		No recorded cultural resources impacted. No routes plotted on map.
Minneola	NR1001B, NR1001C	SBR7694H Boulder Transmission Lines 1, 2, 3 & structure; SBR3169 lithic reduction
Morgans' Well		No recorded cultural resources impacted.
Morongo Valley	MP071, MP075	SBR2212, SBR2372
Mud Hills Mud Hills (continued)	SU3084 C111 SU3024, SU3010, SU1433, SU3003, SU3004, SU3070, SU3067, SU3025, SU3066, SU3068, SU3013, SU3016, SU3065, SU3017, SU3029, SU3019, SU3022, SU3020 SU3030, SU3033, SU3031, SU3058A, SU3038, SU3079, SU3070, SU3012, SU3073	SBR3136 lithic scatter SBR8001H airplane crash site NRHP-E-[80-5] Goldstone Historic Mining District
Nebo	SU4031 CO53 CO63 CO613 CO614 CO615 CO616 SU1217	SBR4677H camp SBR4085H RR SBR4100H mining SBR4099H mining P36-061555, IA1812-6 SBR4087H water storage SBR4082H town site, SBR4109 lithic reduction, SBR4084H telegraph line SBR4848, SBR4847, SBR4846/H, SBR4845, SBR4844,

QUADRANGLE	ROUTE	CULTURAL RESOURCES POTENTIALLY IMPACTED
	SU1221, SU1216	SBR4842 lithic reduction; SBR4843 lithic scatter SBR1968 habitation
New Dale		No recorded cultural resources impacted.
Newberry Springs	NR2060 NR2051	SBR502 rock shelter SBR125 rock art
Old Woman Springs	T4N R3E Section 31	SBR118 village near Old Woman Spring (SBR25).
Onyx Peak		No recorded cultural resources impacted.
Opal Mt.	SU2036 SU2059 F3003 SU2048 SU2071 SU2072 SU2049 SU2048 SU2037	SBR6116 lithic scatter/rock art, SBR281 rock art, SBR4348 lithic scatter/rock art SBR1800 lithic quarry, SBR1925 rock art, SBR7643/H food proc./rock art/historic graffiti SBR330 camp/rock art, SBR1919 & SBR2006 rock art, SBR329 camp SBR1918 lithic reduction, SBR994 lithic scatter, SBR995 lithic reduction, SBR1951 rock art SBR282 lithic quarry SBR109 village SBR103 camp/rock art, SBR6724 camp, SBR104 lithic scatter, SBR106 lithic quarry SBR7640/H structure/rock art/food processing, SBR5632/H rock art/graffiti/structure P2072-90/H, 96/H, 97/H, 98/H historic graffiti
Paradise Range	C1010, C1009 C205	SBR4525H road P2061-1 habitation
Pinto Mts.		No recorded cultural resources impacted.
Rattlesnake Canyon	T2N R3E Section 15 T3N R3E Section 19	SBR1882 food processing, SBR4280 pottery scatter SBR4039 food processing (Rattlesnake Spring)
Red Buttes	K2001 K3089 EM1082 EM1022	SBR7204, SBR7205, SBR7206 lithic reduction SBR7667 lithic reduction SBR2256 lithic quarry, rock shelter SBR2246 trail
Red Pass Lake NE		No recorded cultural resources impacted.
Rimrock	T2N R5E Section 19 T2N R4E Section 36 T2N R4E Section 35 T2N R4E Section 33/34 T2N R4E Section 33 T2N R4E Section 32 T1N R4E Section 4	SBR4948 habitation, SBR149 rock art (adjacent to T2N R4E Sec.24) SBR6161 lithic scatter SBR6154 SBR1958 rock shelter IA1041-1 flaked tool SBR1817 camp site SBR6146 lithic scatter
Saddleback Mt.	F5150 F2011	NRHP-E-PSBR-39H power transmission line SBR5731H RR
San Bernardino Wash		No recorded cultural resources impacted.
Shadow Mts.	EM1126	IA1591-1 flaked tool
Silver Bell Mine	NR3067 NR3063 NR2054	SBR4158H mining SBR4157H mining SBR5053, SBR306 rock shelter, rock art; SBR159 rock art

QUADRANGLE	ROUTE	CULTURAL RESOURCES POTENTIALLY IMPACTED
Sleeping Beauty	AF053, UK AF298 AF059 AF055 AF064, AF069, AF0610, AF0611	SBR4558H mining NRHP-E-SBR6693H ATS&F RR SBR5797 lithic scatter SBR6896, SBR6900 lithic scatter; SBR6897, SBR6898, SBR6899, SBR6941, SBR6942 lithic reduction; IA1794-2, 3, 4, 5, 6, 7, 8, 9 flaked lithic; SBR2792 lithic quarry, rock shelter SBR6900
Slocum Mt.	SU2009, SU2012	NRHP-E-[80-5] Goldstone Historic Mining District (Note: lithics, ground stone, camps, mining, cairn, stone circle, rock art types of sites present in Naval Weapons Center)
Stoddard Well	SV181	SBR181 Stoddard well
Sunfair	MP2022	P1022-1 fire hearth
Sunshine Peak	T7N R5E Section 2 T8N R5E Section 34 T8N R5E Section 33/28	IA542-4 flaked lithic IA542-2H glass bottle SBR7111H refuse disposal
Superior Lake	SU2020 SU3080 SU3089 SU2040 SU3095 SU2016	IA2071-2 ground stone P2071-6, 7, 9, 10, 11, 13 lithic scatters; SBR517 lithic quarry; SBR131 rockshelter, rock art P2071-1, 3, 4, 6, SBR1928 rock art SBR99 habitation SBR6473H mining SBR3872 camp, IA2324-3 sherd, IA2324-2 flaked lithic
Superior Valley		No recorded cultural resources impacted. (Note: similar types of sites as Slocum Mt. In Naval Weapons Center).
Troy Lake	AF129 AF125 AF031 AF0453 AF0450 AF0451 NR2030	SBR2082 lithic reduction SBR127 lithic reduction NRHP-E-SBR6693H ATS&F RR, SBR5793 lithic reduction, SBR6522/H lithic scatter/RR, SBR6954 camp site SBR6954 IA1804-6, IA1804-7, IA1804-8 flaked lithic; P1804-1 lithic reduction SBR2084 lithic reduction SBR6893, SBR6894 lithic reduction; IA1804-10, 11, 12, 13 flaked tool, flaked lithic
Turtle Valley	SV267 SV2225 CO76 SV181 SV262	SBR9090H homestead SBR9357 stone circle NRHP-E-SBR7694H Boulder Dam to LA power lines CHL577/SBR4411H Mormon Trail SBR9361H trail
Twelve Gauge Lake		No recorded cultural resources impacted.
Twenty-Nine Palms	MP221	P1021-3 lithic scatter
Valley Mountain		No recorded cultural resources impacted.
Victorville	T6N R4W Section 20 T6N R4W Section 33 T6N R4W Section 33/26	PSBR62H power transmission line SBR7694H power transmission line SBR4411H/CHL577H Mormon Trail
Victorville NW	EF1550	IA1582-9 flaked lithic, SBR7683 lithic scatter, SBR7685 lithic reduction, SBR7085 lithic quarry, SBR7684/H lithic

QUADRANGLE	ROUTE	CULTURAL RESOURCES POTENTIALLY IMPACTED
	 EF157	reduction/refuse disposal SBR8267 stone circle, lithic reduction
W of Broadwell Mesa	AF157 AF1512 AF122 AF327 AF329	P1782-1 lithic quarry SBR1552 lithic quarry, SBR170 village, SBR2340H RR SBR2340H RR SBR2215 habitation SBR3590 habitation
W of Soda Lake	C4034 C4002	NRHP-E-PSB38H power transmission line, SBR1066, SBR1065 stone alignments, SBR1068 trail SBR7689H road
Water Mt.		No recorded cultural resources impacted.
White Horse Mt.	T6N R1W Section 15	SBR2336 habitation
Wild Crossing	EF212 EF191 K4084	SBR720 lithic quarry SBR4862 lithic scatter, IA1834-18 flaked lithic, IA1834-10 flaked tool SBR5354 lithic scatter, cairn
Williams' Well	SU5004, SU5005, SU5096, SU5063	NRHP-E-[80-5] Goldstone Historic Mining District
Yermo	CO744 CO76, C2006, C2001, C074, C1001, C2036, CO72 CO760, CO745 CO753 CO749, C2007, CO62, CO625 C2006, C2007 C2007, C0744 CO76, C2036, C1001, CO74, CO744 CO760, CO753 CO745, CO760 C2028, C029, C2007	SBR2827/H refuse disposal, PSBR45H Road SBR2827/H refuse disposal SBR4908/H refuse disposal NRHP-E-SBR7694H Boulder transmission line 1, 2, 3 SBR4193H mining & CPHI-SBR54 Borate-Calico Hills SBR2829 lithic quarry SBR2828 lithic reduction SBR2827/H lithic quarry SBR3171 SBR4908/H camp SBR2831 lithic quarry
Yucca Valley North		No recorded cultural resources impacted.
Yucca Valley South		No recorded cultural resources impacted.

APPENDIX V

CEQA
SCOPING COMMENTS

Appendices

Notice of Completion *Supplementary Document M*

Mail to: State Clearinghouse, 1400 Tenth Street Sacramento, CA 95814 916/445-0613

See NOTE below

SCH 2003011017

Project Title: West Mojave Plan

Lead Agency: San Bernardino County and City of Barstow
Street Address: 385 N. Arrowhead , 1rst Floor
City: San Bernardino , CA Zip: 92415-0182

Contact Person: Matthew Whinery
Phone: (909) 387-4168
County: San Bernardino

Project Location

County: San Bernardino, Kern, Los Angeles, Inyo City/Nearest Community: California City, Ridgecrest, Tehachapi
Cross Streets:_____ Zip Code:_____ Total Acres: +/- 6,400,000
Assessor's Parcel No. various Section:___ Twp.___ Range:___ Base: SBBM
Within 2 Miles: State Hwy #:___ Waterways:___
Airports:___ Railways:___ Schools:___

Document Type

CEQA: ☒ NOP ☐ Early Cons ☐ Neg. Dec ☐ Draft EIR
PROPOSED
☐ Supplement/Subsequent ☐ EIR (Prior SCH No.)___ ☐ Other___
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
Other: ☐ Joint Document ☐ Final Document ☐ Other

Local Action Type

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, Parcel Map, Tract Map, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other: Habitat Conservation Plan

Development Type

☐ Residential: *Units*___ *Acres*___
☐ Office: *Sq.ft.*___ *Acres*___ *Employees*___
☐ Commercial: *Sq.ft.*___ *Acres*___ *Employees*___
☐ Industrial: *Sq.ft.*___ *Acres*___ *Employees*___
☐ Educational ___
☐ Recreational ___
☐ Water Facilities: *Type*___ *MGD*
☐ Transportation/FC: *Type*:___
☐ Mining: *Mineral*___
☐ Power: *Type*___ *Watts*___
☐ Waste Treatment *Type*___
☐ Hazardous Waste: *Type*___

Project Issues Discussed In Document

☒ Aesthetic/Visual
☒ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☐ Coastal Zone
☒ Drainage/Absorption
☒ Economic/Jobs
☒ Fiscal
☒ Flood Plain/Flooding
☒ Forest Land/Fire Hazard
☒ Geologic/Seismic
☒ Minerals
☒ Noise
☒ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☐ Schools/Universities
☐ Septic Systems
☐ Sewer Capacity
☐ Soil Erosion/Compact/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☒ Wetland/Riparian
☒ Wildlife
☒ Growth Inducing
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☒ Cumulative Effects
☐ Other

Present Land Use/Zoning/General Plan Use 3.6 million acres of public land and 2.8 million acres of private land in the West Mojave Desert of San Bernardino, Kern, Inyo and Los Angeles Counties.

Project Description
The West Mojave Plan will serve as a habitat conservation plan (HCP) for public and private lands in the West Mojave Desert of Southern California. All public lands of the WMP are within the California Desert Conservation Area.

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___Coastal Commission
___Coastal Conservancy
___Colorado River Board
✓ Conservation
✓ Fish & Game
✓ Forestry
___Office of Historic Preservation
✓ Parks & Recreation
✓ Reclamation
___S.F. Bay Conservation & Development Commission
✓ Water Resources (DWR)

Business, Transportation & Housing
___Aeronautics
___California Highway Patrol
✓ CALTRANS District # 8
___Department of Transportation Planning (headquarters)
___Housing & Community Development
___**Food & Agriculture**
___**Health & Welfare**
___Health Services

State & Consumer Services
___General Services
___OLA (Schools)

Cal-EPA
✓ Air Resources Board
✓ APCD/AQMD
✓ California Waste Management Board
___SWRCB: Clean Water Grants
___SWRCB: Delta Unit
✓ SWRCB: Water Quality
___SWRCB: Water Rights
✓ Regional WQCB # Lahontan

Youth & Adult Corrections
___Corrections

Independent Commissions & Offices
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✓ Native American Heritage Commission
✓ Public Utilities Commission
___Santa Monica Mountains Conservancy
✓ State Lands Commission
___Tahoe Regional Planning Agency

___Other______

Public Review Period (to be filled in by lead agency)

Starting Date: April 10, 2003

Ending Date: May 12, 2003

Signature [signature]

Date: 4/9/03

Lead Agency : County of San Bernardino

Address: 385 North Arrowhead Avenue, First Floor
City/State/Zip: San Bernardino, CA 92415-0182
Contact: Matthew Whinery
Phone: 909-387-4168

Applicant: ______
Address: ______
City/State/'Zip: ______
Phone: ______

For SCH Use Only:

Date Received at SCH ______

Date Review Starts ______

Date to Agencies ______

Date to SCH ______

Clearance Date ______
Notes:

Revised October 1989

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See NOTE below

SCH ______________

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☐ Recreational _____
☐ Water Facilities: *Type*_________*MGD*
☐ Transportation/FC: *Type*:_________
☐ Mining: *Mineral*_____
☐ Power: *Type*_____*Watts*_____
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✓ Forestry
___Office of Historic Preservation
✓ Parks & Recreation
✓ Reclamation
___S.F. Bay Conservation & Development Commission
✓ Water Resources (DWR)

Business, Transportation & Housing
___Aeronautics
___California Highway Patrol
✓ CALTRANS District # 8
___Department of Transportation Planning (headquarters)
___Housing & Community Development
___**Food & Agriculture**
___**Health & Welfare**
___Health Services

State & Consumer Services
___General Services
___OLA (Schools)

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___SWRCB: Clean Water Grants
___SWRCB: Delta Unit
✓ SWRCB: Water Quality
___SWRCB: Water Rights
✓ Regional WQCB # Lahontan

Youth & Adult Corrections
___Corrections

Independent Commissions & Offices
✓ Energy Commission
✓ Native American Heritage Commission
✓ Public Utilities Commission
___Santa Monica Mountains Conservancy
✓ State Lands Commission
___Tahoe Regional Planning Agency

___Other______

Public Review Period (to be filled in by lead agency)

Starting Date: January 8, 2003

Ending Date: February 7, 2003

Signature______________________ Date:

Lead Agency (Complete if applicable):
Consulting Firm:
Address:
City/State/Zip:
Contact:
Phone:

Applicant: ______________________
Address: ______________________
City/State/'Zip:______________
Phone:__________

For SCH Use Only:

Date Received at SCH ______________

Date Review Starts ______________

Date to Agencies ______________

Date to SCH ______________

Clearance Date ______________
Notes:

Revised October 1989

9 7 6

NOTICE OF PREPARATION

Date: December 27, 2002

To: Responsible and Trustee Agencies & Interested Parties

Subject: **NOTICE OF PREPARATION OF ENVIRONMENTAL IMPACT REPORT FOR THE WEST MOJAVE PLAN ON 6.4 MILLION ACRES LOCATED IN CALIFORNIA DESERT CONSERVATION AREA**

Co-Lead Agencies: County of San Bernardino and County of Kern

The San Bernardino County Land Use Services Department and Kern County Planning Department will be co-coordinating the development of a program Environmental Impact Report (EIR) for the West Mojave Plan (WMP). The WMP addresses the management of 3.6 million acres of public lands administered by the BLM and 2.8 million acres of private lands. The WMP is being prepared collaboratively with local, state and federal agencies. It is the intent of the collaborators that the WMP serve as a habitat conservation plan (HCP) for this area. All public lands are within the California Desert Conservation Area, and the study area lies within the borders of Kern, Inyo, Los Angeles, and San Bernardino Counties.

A major part of the WMP is the preparation of an HCP which will facilitate the issuance of programmatic incidental take permits by the California Department of Fish and Game and the United States Fish and Wildlife Service to participating cities and counties. Issues included in the HCP are conservation strategies for the desert tortoise, Mojave ground squirrel and other sensitive desert plants and animals, a motorized vehicle access network for public lands in the region, and multiple use issues such as livestock grazing, mining, cultural resources and recreation. The EIR will assess the environmental impacts of a proposed action and a range of reasonable alternatives (including a "no action" alternative).

The BLM held a series of scoping meetings for the West Mojave Plan in early 2002. At that time it wasn't clear whether the scope of the project would require CEQA evaluation. Since these meetings it has become clear that the development of a programmatic EIR is necessary to comply with CEQA guidelines. The County of San Bernardino and the County of Kern will serve as Co-Lead Agencies as they represent the largest implementation areas covered by the Plan.

As required by Section 15082 of the CEQA Guidelines, the Co-Lead Agencies are submitting this Notice of Preparation (NOP) to responsible agencies, other key agencies, private organizations, and individuals. The Draft EIR is scheduled for release in the spring of 2003. Availability of the Draft EIR for public review and comment will be announced and noticed in the local media.

The Co-Lead Agencies are seeking the views of your agency or organization as to the scope and content of the environmental information that is germane to your statutory responsibilities or other interest in connection with the proposed project. Your agency or organization will need to use the EIR when, if applicable, considering any permit or other approval of the project which you may be required or authorized to issue. Comments should be provided on this NOP in order to give the Co-Lead Agencies the opportunity to effectively consider your comments during preparation of the EIR. The West Mojave Plan is available on the Internet at http://www.ca.blm.gov/cdd/wemo.html or Kern and San Bernardino Counties have copies available in their planning departments.

This letter is a request for environmental information that you or your organization believes should be addressed in the EIR. Scoping meetings will be held on the following days and locations:

January 9, 2003, 2:00 pm - 4:00 pm
Kern County Public Services Building
2700 "M" Street
Bakersfield, California
Lorelei Oviatt, (661) 862-8866

January 10, 2003, 9:00 am - 11:00 am
City of Ridgecrest Council Chambers
100 W. California Avenue
Ridgecrest, California
Lorelei Oviatt, (661) 862-8866

January 16, 2003, 7:00 pm - 9:00 pm
San Bernardino County Museum
2024 Orange Tree Lane
Redlands, California
Matthew Whinery, (909) 387-4168

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The meeting will provide an opportunity for agencies and the public to comment on the scope and content of the EIR. You may also send comments regarding this EIR directly to the counties. Due to the time limits mandated by state law, your response to this NOP must be received at the earliest possible date but no later than 30 days after receipt of this notice. Please respond to:

County of San Bernardino
Land Use Services Department
Attention: Randy Scott
385 North Arrowhead Avenue
San Bernardino, CA 92415-0182

Kern County Planning Department
Attention: Lorelei Oviatt
Public Services Building
2700 "M" Street, Suite 100
Bakersfield, CA 93301-2370

County of San Bernardino
Land Use Services Department
385 North Arrowhead Avenue
San Bernardino, CA 92415-0182

Notice of Preparation
Environmental Impact Report for the West Mojave Plan
Scoping Meetings
January 9,10,16

Correction to Notice of Preparation dated December 27, 2002

Date: January 8, 2003

To: Responsible and Trustee Agencies & Interested Parties

Subject: **NOTICE OF PREPARATION OF ENVIRONMENTAL IMPACT REPORT FOR THE WEST MOJAVE PLAN ON 6.4 MILLION ACRES LOCATED IN CALIFORNIA DESERT CONSERVATION AREA**

Co-Lead Agencies: County of San Bernardino and County of Kern

Address correction for the January 16th meeting at the San Bernardino County Museum

The address of the San Bernardino County Museum was mistakenly listed as in the City of San Bernardino instead of Redlands. A map to the museum is shown below. **All other information on the previous letter was correct.** We apologize for this mistake. The times and locations of the other two sites were correct. The correct times and places for all meetings are listed below.

January 9, 2003, 2:00 pm - 4:00 pm
Kern County Public Services Building
2700 "M" Street
Bakersfield, California
Lorelei Oviatt, (661) 862-8866

January 10, 2003, 9:00 am - 11:00 am
City of Ridgecrest Council Chambers
100 W. California Avenue
Ridgecrest, California
Lorelei Oviatt, (661) 862-8866

January 16, 2003, 7:00 pm - 9:00 pm
San Bernardino County Museum
2024 Orange Tree Lane
Redlands, California
Matthew Whinery, (909) 387-4168

Thank you for you interest in the West Mojave Plan and we look forward to answering any questions you may have.

EXTENSION OF COMMENT PERIOD
AND
ADDITION OF SECOND PUBLIC SCOPING MEETING IN SAN BERNARDINO COUNTY

Date: January 24, 2003

To: Responsible and Trustee Agencies & Interested Parties

Subject: **NOTICE OF PREPARATION OF ENVIRONMENTAL IMPACT REPORT FOR THE WEST MOJAVE PLAN ON 6.4 MILLION ACRES LOCATED IN THE CALIFORNIA DESERT CONSERVATION AREA**

Co-Lead Agencies: County of San Bernardino and County of Kern

The County of San Bernardino is adding a second public scoping meeting to be held in the High Desert area of the County at the location and time shown below. Due to additional interest regarding the County's role as Lead Agency for the preparation of a program EIR on the West Mojave Plan, the County is hosting a second meeting to collect public input on the environmental issues to be addressed in the EIR. The location of the second scoping meeting has been chosen to better accommodate residents, agencies and interested parties of the affected desert region of the County.

Please refer to the Notice of Preparation dated December 27, 2002 for the complete description of the proposed project. The West Mojave Plan is available on the Internet at http://www.ca.blm.gov/cdd/wemo.html or at the Kern and San Bernardino County planning department offices.

The public comment period on the Notice of Preparation has been extended to **February 10, 2003** to provide for comments submitted at or following the second scoping meeting.

SECOND PUBLIC SCOPING MEETING DATE, TIME & LOCATION:

Wednesday, February 5, 2003; 7-9pm
City Council Chambers
City of Victorville
14343 Civic Drive
Victorville, California

County Contact Person: Matthew Whinery, (909) 387-4147

Thank you for your interest in the West Mojave Plan and we look forward to receiving your comments and answering any questions you may have.

REVISED NOTICE OF PREPARATION
CHANGE IN LEAD AGENCIES

Date: April 9, 2003

To: Responsible and Trustee Agencies & Interested Parties

Subject: NOTICE OF PREPARATION OF ENVIRONMENTAL IMPACT REPORT FOR THE WEST MOJAVE PLAN ON 6.4 MILLION ACRES LOCATED IN CALIFORNIA DESERT CONSERVATION AREA

Co-Lead Agencies: County of San Bernardino and City of Barstow

This notice is intended to inform interested parties of a change in lead agency status. The original Notice of Preparation, dated December 27, 2002, to prepare a programmatic Environmental Impact Report (EIR) for the West Mojave Plan (WMP) indicated that both Kern County and San Bernardino County would be serving as co-lead agencies. Since that time, Kern County has decided not to proceed in a lead agency capacity with the County of San Bernardino. The City of Barstow will now be serving as Co-Lead Agency with the County of San Bernardino. Kern County will continue to be a Cooperating Agency under the National Environmental Policy Act (NEPA) with the Bureau of Land Management on the public lands management plan, a Responsible Agency under the California Environmental Quality Act (CEQA) for the Environmental Impact Report (EIR) and an active participant in the planning effort for the habitat conservation plan (HCP). San Bernardino County and Barstow are moving forward with completing the EIR for a variety of reasons including resolution of endangered species issues that affect local jurisdictions, property owners within the plan area and the proposed expansion of the National Training Center at Fort Irwin. In addition, the County and City believe that the overall public interest will be better served by providing a single environmental document that addresses the full range of issues affecting both private and public lands by implementing the proposed conservation strategy of the WMP.

The City of Barstow was chosen as a replacement for many reasons. It was felt that having a city representative as a Co-Lead with a county would assure that both city issues and unincorporated private land issues would be thoroughly addressed in the plan. The location of Barstow in the center of the planning area and its interest in the relationship of the West Mojave Plan and the Fort Irwin expansion were also considered in this decision. And finally, the active participation of Barstow throughout the planning process thus far has prepared the city to step in as Co-Lead.

The San Bernardino County Land Use Services Department and the City of Barstow Planning Department will be co-coordinating the development of a programmatic (EIR) for the West Mojave Plan (WMP). The project description as presented in the December 2002 NOP remains unchanged. The WMP addresses the management of 3.6 million acres of public lands administered by the BLM and 2.8 million acres of private lands. The WMP is being prepared collaboratively with local, state and federal agencies. It is the intent of the collaborators that the WMP serve as (HCP) for this area. All public lands are within the California Desert Conservation Area, and the study area lies within the borders of Kern, Inyo, Los Angeles, and San Bernardino Counties.

A major part of the WMP is the preparation of an HCP that will facilitate the issuance of programmatic incidental take permits by the California Department of Fish and Game and the United States Fish and Wildlife Service to participating cities and counties. Issues included in the HCP are conservation strategies for the desert tortoise, Mojave ground squirrel and other sensitive desert plants and animals, a motorized vehicle access network for public lands in the region, and multiple use issues such as livestock grazing, mining, cultural resources and recreation. The EIR will assess the environmental impacts of a proposed action and a range of reasonable alternatives (including a "no action" alternative).

Pursuant to Sec. 15082 of the CEQA Guidelines, the Co-Lead Agencies are submitting this Revised Notice of Preparation (NOP) to responsible agencies, other key agencies, private organizations, and individuals, explaining the recent Lead Agency changes. The public comment period on the Notice of Preparation has been extended to **May 12, 2003** to provide for additional comments.

The City of Barstow and the County of San Bernardino welcome your comments. We have received many comments previously and all these letters have been reviewed and entered into the public record. It is not necessary to resubmit them. Additional comments should be mailed to the locations shown below:

County of San Bernardino
Land Use Services Department
Atten: Matthew Whinery
385 North Arrowhead, First Floor
San Bernardino, CA 92415-0182

City of Barstow
Community Development Department
Atten: Scott Priester
220 East Mountain View Street, Suite A
Barstow, CA 92311

Thank you for your continued interest in the West Mojave Plan and we look forward to working with you in the future.

Appendix *: Continued**

NOP Scoping Meetings

During the Initial NOP circulation period three public scoping meetings were advertised and held. A follow-up NOP (sent January 24, 2003) and the subsequent public meeting was scheduled following many requests from residents of San Bernardino District 1 (the desert region) to have an addition meeting in this region. The meetings were held with the specific intent of affording interested individuals/groups and public agencies a forum in which to orally present input directly to the lead Agency in an effort to assist in further refining the scope and focus of the West Mojave Plan. They were held at the following times and locations:

January 9, 2003, 2:00 PM - 4:00 PM
Kern County Public Services Building, 2700 "M" Street, Bakersfield, California

January 10, 2003, 9:00 AM - 11:00 AM
City of Ridgecrest Council Chambers, 100 W. California Ave, Ridgecrest, California

January 16, 2003, 7:00 PM - 9:00 PM
San Bernardino County Museum, 2024 Orange Tree Lane, San Bernardino, California

February 5, 2003, 7 PM – 9 PM (January 24, 2003 NOP)
City of Victorville, City Council Chambers, 14343 Civic Drive, Victorville, California

These meetings had a diverse cross section of people represented. There were large bodies of residents representing Off Highway Vehicle (OHV) and other access issues within the County. There were many people at the meetings wanting to ensure the protection of wildlife. There were also people who wanted the habitat corridors maintained and native plant communities given as much consideration as the wildlife. Specific comments included:

- Habitat Linkages need to be considered.
- Will the County keep its RS2477 cross-country Road Rights for all routes of travel?
- Who is the evaluating and enforcing RS2477? If routes are not accurate, how will this be corrected?
- Recreational Opportunities need to be increased
- The Barstow to Vegas race corridor needs to be kept.
- Are the local jurisdictions responsible for implementation funding (How do we assure adequate funding)?
- How is Tortoise preservation being guaranteed by this plan (number of tortoise saved, the GAO Report, etc.)?
    - The plan doesn't seem to be working and we keep closing off more land
    - Use different plans such as Head Start, translocation.

- Raven predation is the biggest problem

- What study shows that the current Endangered Species Act is not working and penalizes builders unfairly?
- How much are the fees going to be for the Plan?
- What are the fees based on?
- Do mitigation rates go up over time?
- Where is the land going to be purchased?
- If private land is purchased the tax is lost.
- How does the plan with migratory birds, in particular the Burrowing owl?
- Why is the Milkvetch (a weed) listed in the plan?
- Is wildfire address in the West Mojave Plan?

There were comment sheets returned at the meetings for entry into public record. These comments have been considered in the EIR and are kept on record at San Bernardino County.

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Appendix *: Continued**

Comment letters received as a result of the NOP.

There were 21 comment letters received during the comment period. The comment letters are found in their entirety in this Appendix. The majority of comments from residents were in reference to route designations (RS2477 rights), off highway vehicle access, and private property rights. Letters were also received from environmental groups pertaining to the continued protection of plants and animals of the region.

STATE OF CALIFORNIA - THE RESOURCES AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF FISH AND GAME
Eastern Sierra-Inland Deserts Region
Bishop Field Office
407 W. Line Street
Bishop, CA 93514
(760) 872-1171

February 6, 2003

County of San Bernardino
Land Use Services Department
Attn: Randy Scott
385 N. Arrowhead Avenue
San Bernardino, CA 92415-0182

Kern County Planning Department
Attn: Lorelei Oviatt
Public Services Building
2700 "M" Street, Suite 100
Bakersfield, CA 93301-2370

Subject: NOP of a Draft EIR for the West Mojave Plan on 6.4 Million Acres Located in the California Desert Conservation Area

Dear Mr. Scott and Ms. Oviatt:

The California Department of Fish and Game (Department) has reviewed the NOP of a Draft Environmental Impact Report (DEIR) for the West Mojave Plan (WMP) involving 6.4 million acres of the California Desert Conservation Area. The proposed project consists of the development of a programmatic Environmental Impact Report for the WMP. The WMP addresses the management of 3.6 million acres of public lands administered by the U.S. Bureau of Land Management (BLM) and 2.8 million acres of private lands. The WMP is intended to serve as a Habitat Conservation Plan (HCP). However, the NOP does not provide a clear description of the proposed project. These comments assume that the purpose of the DEIR is to evaluate the potential for environmental effects from the following: 1) adoption of the WMP HCP for the planning area, and 2) the issuance of an Incidental Take Permit (ITP) for Covered Species pursuant to Section 10(a)(1)(B) of the federal Endangered Species Act and the California Endangered Species Act, Section 2080, et seq., of the California Fish and Game code.

The Department is providing comments as the State agency which has the statutory and common law responsibilities with regard to fish and wildlife resources and habitats. California's fish and wildlife resources, including their habitats, are held in trust for the people of the State by the Department (Fish & Game Code section 711.7). The Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitats necessary for biologically sustainable populations of those species (Fish & Game Code section 1802). The Department's fish and wildlife management functions are implemented through its administration and enforcement of the Fish and Game Code (Fish & Game Code Section 702). The Department is a trustee agency for fish and wildlife under the California Environmental Quality Act (see CEQA Guidelines, 14 Cal. Code Regs. Sec. 15386(a)) and a Responsible Agency regarding any discretionary actions (CEQA Guidelines §15381) required by the Department including the issuance of ITPs and Lake and Streambed Alteration Agreements. The Department is providing these comments in furtherance of these statutory responsibilities, as well as its common law role as trustee for the public's fish and wildlife.

To enable Department staff to adequately review and comment on the DEIR, the following information should be included in the document:

1. A complete assessment of the flora and fauna within and adjacent to the plan area, with particular emphasis upon identifying endangered, threatened, sensitive, and locally unique species and habitats. Rare, threatened and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition. (See CEQA Guidelines §15380.) All assessments must be completed using protocols and methodologies approved by the Department and U.S. Fish and Wildlife Service. Assessments must be completed at appropriate times of the year and during appropriate survey hours. All persons conducting the surveys must have the required permits from the resource agencies. The assessment should include:

   a) A thorough assessment of rare plants and rare natural communities, following the Department's May 2000 Guidelines for Assessing Impacts to Rare Plants and Rare Natural Communities;

   b) A complete assessment of sensitive fish, wildlife, reptile, and amphibian species including seasonal variations of use within the plan area and focused species-specific surveys conducted at the appropriate time of year and time of day using acceptable species-specific survey procedures developed in consultation with the Department and U.S. Fish and Wildlife Service;

   c) An assessment of impacts to and maintenance of wildlife corridor movement areas; and

   d) A search of the Department's California Natural Diversity Data Base to obtain current information on any previously reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code.

2. A thorough discussion of direct, indirect, and cumulative impacts that may adversely affect biological resources with specific measures to offset such impacts. This

should include:

a) Analysis of plan implementation impacts relative to their effects on biological resources within the plan area including vegetation communities, listed Covered Species, non-listed Covered Species, non-Covered Species, cores and linkages, and edge effects.

b) Analysis of plan implementation impacts relative to their effect on off-site habitats and populations, specifically nearby public lands, open space, adjacent natural habitats, and riparian ecosystems; and

c) A cumulative effects analysis as described in CEQA Guidelines §15130. This analysis should include cumulatively significant impacts on Non-Covered Species because the issuance of ITPs will potentially remove impediments to development outside of identified Conservation Areas. Non-Covered Species may receive little or no protection outside the reserves under existing ordinances and regulations. Adverse cumulative effects may also be associated with the introduction of land use immediately adjacent to Conservation Areas, the direct loss of habitat and species associated with ground disturbance in take authorized areas, impacts associated with land uses and activities in take authorized areas proximal to Conservation Areas, and indirect impacts related to construction and long-term direct effects associated with development or land use practices proximal to conserved habitat areas.

d) Analysis of the cumulative impacts to ground water from proposed activities.

3. A range of alternatives to ensure that alternatives to the proposed plan are fully considered and evaluated. A range of alternatives which avoid or otherwise minimize impacts to sensitive biological resources should be included. Specific alternative impact locations in areas with lower resource sensitivity should also be evaluated, where appropriate.

4. An analysis of possible wildlife-human conflicts and mitigation measures to reduce these conflicts associated with development projects or other uses nearby or adjacent to natural areas.

5. An analysis of the effect the project may have on completion and implementation of regional and/or subregional conservation programs. Under 2800-2835 of the Fish and Game Code, the Department, through the Natural Community Conservation Planning (NCCP) program is coordinating with local jurisdictions, landowners, and the Federal Government to preserve local and regional biological diversity.

6. A thorough discussion of proposed mitigation measures for plan implementation impacts to sensitive plants, animals, and habitats emphasizing evaluation and selection of alternatives which avoid or otherwise minimize plan implementation impacts. Off-site compensation for unavoidable impacts through acquisition and

protection of high-quality habitats elsewhere may be required. It should be noted that:

a) The Department considers Rare Natural Communities as threatened habitats having both regional and local significance. Thus these communities should be fully avoided and otherwise protected from plan implementation-related impacts;

b) The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Department studies have shown that these efforts are experimental in nature and largely unsuccessful; and

c) A Department-approved Mitigation Agreement and Mitigation Plan is required for plants listed as rare under the Native Plant Protection Act.

If the plan has the potential to adversely affect species of plants or animals listed under the California Endangered Species Act, either during construction or over the life of the project, an ITP must be obtained pursuant to Section 2081 of the Fish and Game Code. Such permits are issued to conserve, protect, enhance and restore state-listed threatened or endangered species and their habitats. The NOP makes reference to the issuance of a "programmatic incidental take permit." Section 2081 does not describe, nor authorize such an ITP. However, the Department does anticipate the issuance of a single ITP to all signatories to the HCP. If the "project" as described includes the issuance of such a unified, non-severable ITP the Department will require information which indicates that:

1) the take is incidental to an otherwise lawful activity,

2) the impacts of the authorized take are minimized and fully mitigated, with the required measures being roughly proportional in extent to the impact of the authorized take and capable of successful implementation,

3) there is adequate funding to implement required minimization and mitigation measures, and

4) the issuance of an ITP will not jeopardize the continued existence of the species.

The DEIR should provide the information, analysis, mitigation measures, monitoring program, and other proposed activities to address the above requirements. This should include the quantification of anticipated take and a quantification of anticipated conservation or compensating measures which will offset the take. It should also include an economic analysis which can be used to determine if adequate funding will be available to implement the conservation being proposed.

Sections 3511 and 4700 of the Fish and Game Code identify Fully Protected Birds and Fully Protected Mammals respectively, and prohibit the take or possession of such species. These statutes also eliminate any authority to issue permits authorizing the take of such species. Golden eagle and Bighorn sheep (*Ovis canadensis),* both of which are being considered for Covered Species status in the WMP, are identified in these statutes as fully protected species.

The Department typically relies on the lead agency's EIR for the necessary CEQA compliance for issuance of an ITP, and without a sufficiently detailed, comprehensive CEQA document the Department will be unable to issue an ITP. The Department has concerns that the programmatic DEIR proposed may not be capable of providing the depth of information and analysis required to meet the above issuance requirements mandated by Section 2081. If so, the Department recommends that permit issuance be analyzed in subsequent supplemental EIRs and that the programmatic DEIR focus upon impacts associated with the adoption of the WMP HCP.

The DEIR should also contain a thorough discussion of potential impacts associated with species and/or habitat management, adaptive management, and monitoring. An adaptive management strategy is essential for an ITP that covers species that have biological data or information gaps that may incur a significant risk to that species. The Department suggests that the following definition of Adaptive Management, from the California NCCP Act of 1991, as amended in 2002, be utilized in the DEIR: "To use the results of new information gathered through the monitoring program of the plan and from other sources to adjust management strategies and practices to assist in providing for the conservation of covered species." The proposed planning area is a large, fragmented landscape consisting of diverse habitats and species which may not function in the future without human intervention through land-based management and an Adaptive Management Plan dependent upon adequate species and habitat monitoring.

The Department suggests that potential conservation strategies considered in the DEIR include: 1) a Listed and Unlisted Species alternative which addresses sensitive, rare, or unique unlisted species as well as state and federally listed species; 2) a Listed Species alternative which addresses only state and federally listed species; 3) a Listed and Candidate Species alternative which addresses state and federally listed species and candidate species for listing; and 4) an Existing Reserves alternative in which conservation activities are focused on existing reserves only.

The Department opposes the elimination of watercourses and/or their channelization or conversion to subsurface drains. All wetlands and watercourses, whether intermittent or perennial, must be retained and provided with substantial setbacks which preserve the riparian and aquatic values and maintain their value to on-site and off-site wildlife populations. The Department has direct authority under Fish and Game Code §1600 et. seq. in regard to any proposed activity which would divert, obstruct, or affect the natural flow or change the bed, channel, or bank of any river, stream or lake. Departmental jurisdiction under §1600 et. seq. may apply to all lands within the 100-year floodplain.

Thank you for the opportunity to comment on the proposed project. If you have any questions, or desire further information, please contact me at the letterhead address and phone.

Sincerely,

Darrell Wong

Darrell Wong
Senior Environmental Scientist

Cc: Mr. Alan Pickard, CDFG Bishop
Mr. Jeff Single, CDFG Fresno
Ms. Rebecca Jones, CDFG Palmdale
Ms. Denyse Racine, CDFG Bishop
Ms. Adrienne Disbrow, CDFG Bishop
Mr. Mike Mulligan, CDFG Fresno
Ms. Annette Tenneboe, CDFG Fresno
Ms. Gail Presley, CDFG Sacramento
Ms. Sandra Morey, CDFG Sacramento

SDG&E

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RECEIVED
FEB 28 2003
LAND USE SERVICES DEPT.
ADVANCE PLANNING DIVISION

February 25, 2003

Mr. Matthew Whinery, Sr. Associate Planner
Advanced Planning Division
Land Use Services Department
County of San Bernardino
385 N. Arrowhead Avenue
San Bernardino CA 92415-0182

RE: NOP OF EIR FOR THE WEST MOJAVE PLAN

Mr. Whinery:

Thank you for the opportunity to comment on the Notice of Preparation of the EIR for the West Mojave Plan. This letter is sent on behalf of The Southern California Gas Company (SCG) and San Diego Gas and Electric Company (SDG&E). However, our comments mainly concern the natural gas transmission and distribution operations of SCG within the limits of the West Mojave Plan. Though we were unable to submit our response and comments to meet the February 10, 2003 response date, we appreciate the offer discussed in our February 11, 2003 phone conversation allowing this submittal after that deadline.

SCG currently operates, maintains and repairs approximately 950 miles of underground gas pipelines with associated pipeline markers, cathodic protection units (CPU), fuel and flow meters, valves and compressor stations, telemetry equipment and facility inspection access roads within desert areas. These areas include Imperial County and the desert portions of Kern, Los Angeles, Riverside, San Bernardino and San Diego counties. Natural gas facility operation, maintenance and repair activities in these desert areas are currently performed in compliance with SCG's California Desert Conservation Area (CDCA) Section 7 Programmatic Biological Opinion (hereinafter referenced as the SCG Desert Programmatic Permit) issued in 1995 by the U.S. Fish and Wildlife Service and the Bureau of Land Management.

The area covered by the SCG Desert Programmatic Permit covers the geographical area of the proposed West Mojave Plan (hereinafter referenced as the Plan) with the exclusion of areas on the easternmost portions and northernmost portions of the Plan area (see attached map). The excluded area on the east consists of portions of Kern and Los Angeles County and the excluded area to the north is entirely within Inyo County. SCG has worked effectively since 1995 under the Desert Programmatic Permit, and will continue to do so, to reliably operate its natural gas facilities with a minimum impact to desert ecological resources. It concerns us that, with the implementation of the Plan, the construction, operation, maintenance and repair of SCG natural gas transmission and distribution systems could be subject to dual regulation under the conditions of existing programmatic permit, as well as any additional conditions within the Plan. The EIR, either in its discussion of Public Services or Utilities and Service Systems, should analyze the potential impacts for such dual regulation to increase the regulatory approval timeframe for the operation, maintenance and repair of SCG's gas facilities and the affect of that increased regulatory approval timeframe on the ability to maintain reliable natural gas service to the customers within our desert service territory. To avoid such dual regulation and its potential impact to natural gas facilities it would be our recommendation that the Plan adopt our existing Desert Programmatic Permit as the standard for natural gas facility operation, maintenance and repair.

Since the existing SCG Desert Programmatic Permit concentrates on operation, maintenance and repair of existing natural gas facilities, how the Plan will address the construction new natural gas transmission and distribution facilities within the Plan's 9.4 million-acre area, is still of concern. Our understanding of the Plan to date is based on review of the Suggested Conservation Strategies in the working draft of the West Mojave Plan Draft Evaluation Report dated September 14, 1999 that was available on the Plan's internet web site. Although the Evaluation Report is not the West Mojave Plan, it is likely that some or all the conservation strategies in the evaluation report may be implemented in the Plan. From our review of those conservation strategies we have the following comments and concerns:

Introduction and Chapter 1 – Conservation Overview

1. We support the objective of the Plan allowing state and federal agencies to implement their mandate to protect species and their habitats on public lands, while providing conservation strategies supporting the issuance of programmatic incidental take permits and "no surprises assurances facilitating a streamlined regulatory program that also minimizes and mitigates for project impacts on private property. The EIR for the Plan should discuss the potential impacts of these strategies on the utility activities performed on state and federal public lands, and private lands. The EIR should consider if, or how, the "streamlined" regulatory program envisioned by the Plan could potentially affect the timeframe for an authorization to proceed with utility construction, repair or maintenance projects reviewed under the Plan.

2. The Plan will authorize "take" of endangered or sensitive plant and animal species incidental to otherwise lawful activities such as the construction, operation, repair or maintenance of natural gas utility facilities. Authorization of such "take" will require that applicants, such as SCG, minimize or mitigate any taking to the maximum extent feasible by providing mitigation and monitoring to assure the success of that mitigation. The EIR for the Plan should consider and analyze the cost impacts of monitoring and mitigation to the end user or natural gas customer.

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This is especially important to SCG because we are already paying costs for mitigation and monitoring under our Desert Programmatic Permit. If as noted above, we could be subject to regulation under both the programmatic permit and the Plan, that dual regulation could significantly increase our cost of business and the costs to our natural gas customers.

3. The EIR must consider the existing SCG Desert Programmatic Permit as a part of the existing setting for the Plan. Discussion of the existing programmatic permit is most appropriately placed within the Land Use and Planning section in the analysis of the existing setting. The impacts section of the EIR should consider and analyze the potential for conflicts, if any, between the requirements of the existing programmatic permit and the proposed requirements of the Plan.

Chapter 2 – Desert Tortoise

4. On page 2-18 of the conservation strategy (hereinafter referenced as the Strategy) there is a biological goal for reducing tortoise mortality by ensuring a minimum two-mile width for movement corridors while providing for major highway crossings. This strategy should also include provisions for natural gas transmission or distribution crossings. The EIR for the Plan should consider and assess the potential for such utility crossings.

5. Page 2-20 of the Strategy, there is discussion on whether impacts from ministerial permit activities should be counted toward total loss of habitat. SCG considers all activities it would perform under its existing programmatic permit as ministerial activities. The majority of activities performed under the programmatic permit would have only temporary impacts and would be mitigated under conditions of that permit to restore disturbed areas in a manner that assists in the re-establishment of biological values. The EIR for the Plan must weigh the value of these re-vegetation efforts before assuming that temporary impacts resulting from natural gas construction, repair or maintenance projects result in a total loss of habitat.

6. The take avoidance measures on page 2-23 of the Strategy suggest that minimizing and mitigating the impacts of discrete projects, such as natural gas pipelines should apply to both construction and operation of those facilities. It is further suggested that the Supergroup assigned to write the Plan develop standard mitigation measures for ground-disturbing projects such as pipelines. We suggest that the EIR examine the mitigation measures already contained in the SCG programmatic permit and adopt these measures as effective mitigation for ministerial gas system construction, operation and maintenance performed under the Plan.

7. The guidelines on page 2-24 of the Strategy suggest that areas disturbed by pipelines within Desert Wildlife Management Areas (DWMA) and Managed Use Areas (MUA) be re-vegetated where feasible. We support such re-vegetation

efforts where they are consistent with the measures in our programmatic permit. However, we cannot support a re-vegetation program in the Plan that uses species that could affect the access to, or stability of, our pipelines or other natural gas facilities. Therefore, any re-vegetation program should consider avoiding species whose size would preclude access to our facilities or whose root systems could affect pipeline stability or natural gas facility integrity.

8. On page 2-24 of the Strategy, the guidelines for Utility Construction And Maintenance suggest that routine, non-emergency maintenance of pipelines requiring ground disturbance should occur during late fall and winter only. Our programmatic permit contains no such seasonal limitations as long as routine maintenance work implements the appropriate mitigation and monitoring measures in the programmatic permit, and we would expect to be able to operate in the same manner under the Plan. However, the EIR should examine the effect of seasonal limitations on the reliability of existing natural gas systems. If SCG cannot perform routine maintenance year-round, such limitations could affect reliability of service to our customers and, from a practical sense, performing ground disturbing maintenance and repair activities during the rainy season would have additional soils, water quality and habitat disturbance impacts not encountered in drier periods of the year.

9. The take-avoidance measures of the Strategy on page 2-26 recommend limiting new ground disturbance in a DWMA to a limit not exceeding a cumulative area of 1% of the DWMA for the life of the Plan. From our review of the conservation strategies, we are not certain if this proposed limit would be greater or less than the limits of disturbance allowed in SCG's existing programmatic permit. However, unless the limitations proposed in the Plan are less restrictive than the conditions in our existing programmatic permit, we would recommend at this time that the disturbance limits in our programmatic permit apply to the construction, operation, repair and maintenance of our natural gas facilities in the Plan area.

10. The Other Measures suggested for DWMAs in the Strategy would exclude ground disturbance or cross-country vehicle travel for commercial activities. We need to be assured that this restriction would not apply to SCG's ability to access, construct, operate or maintain natural gas facilities that may currently exist in, are planned in, or need to be added within, DWMAs designated in the Plan.

11. The take-avoidance measures for MUAs noted on page 2-30 of the Strategy suggest that pipeline re-vegetation would be determined on a case-by-case basis with input from the Implementing Team. Please see item 7., above, regarding our concerns about the proposed re-vegetation of pipelines.

12. On page 2-30 the Strategy suggests that narrowing the construction right-of-way (ROW) is an effective measure for limiting potential "take". We would caution that any such narrowing of construction work space cannot be so limiting as to

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create unsafe or hazardous working conditions for SCG personnel performing natural gas construction, operation, repair and maintenance activities.

13. The conservation strategies on page 2-33 suggest that the Bureau of Land Management (BLM) consider the closure of vehicle travel routes not designated as open or limited. As a signatory to our existing programmatic permit, we expect that the BLM will confer with SCG regarding the potential of closing roads that are currently used for access to any of our existing natural gas facilities. Should the BLM decide that such closings are necessary for the benefit of the Plan, the EIR must discuss the impacts to the integrity and reliability of any existing natural gas facilities to which access is curtailed. The EIR should also suggest alternative access routes or methods to replace any closed access roads that would no longer serve gas facilities.

14. On page 2-34 the Strategy recommends installation of tortoise-proof fencing along certain roads and within certain areas in the Plan area. Installation of such exclusion fencing cannot preclude access to critical natural gas facility access roads. If such fencing may cause conflict with access roads, SCG and the Supergroup should confer on appropriate gated access points.

15. On page 2-36 land acquisition and conservation easements are proposed in the Strategy as an effective measure for enhancing tortoise conservation. These acquired lands or easements must not limit the use, or the underlying land rights, of SCG's existing natural gas facility easements, licenses or leases within the Plan areas.

16. Please refer to item 9., above, for our concerns regarding the Strategy's proposed limits to disturbance within DWMAs and MUAs as noted on page 2-44 of the Strategy.

17. We disagree with the proposal on page 2-45 of the Strategy that temporary impacts, such as pipeline rights-of-way, should be factored into the take threshold percentages proposed by the plan. Working under our programmatic permit, it has been our experience that effective re-vegetation measures, employing appropriate plant species, can adequately mitigate for the temporary impacts of pipeline construction. The EIR for the Plan should consider adoption of such effective mitigation measures in lieu of an overly conservative accounting of temporary impacts in the Plan thresholds.

Chapter 3 and Appendices – Mojave Ground Squirrel

18. On page 3-16, the conservation strategies for the Mojave Ground Squirrel (MGS) suggest that an active program of habitat restoration through road-closures is an effective measure in conserving MGS habitat. Please refer to item 10. and 13., above, regarding our concerns about potential utility access road closure.

19. Biological goals for protection of MGS on pages 3-19 and 3-23 of the Strategy propose a one mile wide Biological Transition Area (BTA) adjacent to MGS conservation areas. Within the BTAs take would be allowed only after a special project review. Our existing programmatic permit does not currently cover potential impacts to MGS. Our concern regarding potential for dual regulation is mentioned in the opening of this letter and in item 2., above. As noted in item 3., above, we also have a desire to avoid conflicts between the measures in our programmatic permit and the proposed conservation strategies in the Plan. It is our recommendation that measures to protect the MGS, if needed for natural gas facility activities, be incorporated into our existing programmatic permit, rather than provided separately in the form of a special project review under the Plan.

20. Page 3-24 of the Strategy suggests re-vegetation of pipeline ROW on both public and private land as an effective means of retaining habitat value for the MGS. Please refer to items 7. and 17., above, regarding our concerns about re-vegetation of gas utility ROW.

21. On page 3-25 of the Strategy a fee strategy is proposed that would assess higher fee compensation ratios for MGS conservation areas versus those in BTAs. It is suggested that compensation reach 10:1 in conservation areas. The EIR should analyze the potential impacts a 10:1 fee ratio to the costs of utility operation and the eventual costs to the end user or natural gas customer. Our initial reaction to the suggested 10:1 ration in conservation areas is that we would not endorse a compensation measure that is far in excess of the current requirements of our programmatic permit.

22. See items 7. and 17., above, regarding our concerns about the re-vegetation of pipelines in MGS conservation areas as noted on page 3-28 of the Strategy.

23. Please refer to items 10. and 13., above, regarding our concerns about disallowing cross country commercial vehicle travel and potential closure of vehicular access routes as noted on page 3-29 of the Strategy.

24. Page 3-31 of the Strategy recommends that contingent utility corridors identified in the BLM's CDCA Plan should not be activated within MGS conservation areas. We do not concur with this strategy and feel that this restrictive approach is not conducive to effective utility planning given the increasing demands for natural gas needed to keep pace with California's growing population and economy. We would urge the Supergroup to retain these contingent corridors in the Plan unless the analysis in the EIR indicates that such a decision would have a significant unavoidable and unmitigable environmental impact.

25. Page 3-31 of the Strategy recommends that utility system maintenance be allowed as long as all utility maintenance activities remain on existing access roads except for the point location of the maintenance-related disturbance. Under SCG's existing programmatic permit limiting activities to existing access roads and

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disturbed areas is a prime objective. However, constraining SCG's ability to respond to a maintenance- related disturbance by limiting that activity to a "point" location is too restrictive. Working at the point of a disturbance, such as a gas pipeline repair site, often requires adequate work area for laydown of materials, temporary storage of excavated spoil and equipment access. This cannot be limited to a point location and we suggest that the EIR for the Plan evaluate the temporary impacts of providing reasonably sized work areas versus a limited point location for maintenance activities.

26. On page 3-32 of the Strategy, it is suggested that new ground disturbance within MGS conservation areas be limited to no more than 1% of the existing habitat within the conservation area. Please refer to item 9., above, for our concerns regarding limiting ground disturbance for natural gas transmission and distribution construction, operation, maintenance and repair.

27. See item 21., above, for our concerns regarding the potential 10:1 mitigation compensation for the MGS Conservation Area as noted on page A1-3 of the Strategy.

28. See item items 7. and 17 above, for our concerns regarding re-vegetation on public and private portions of a pipeline as noted on page A1-3 of the Strategy.

29. Please refer to items 10. and 13., above, regarding our concerns about disallowing cross country vehicle travel for commercial activities as noted on page A1-6 of the Strategy.

30. Please refer to item 12, above, regarding our concerns about the concept of narrowing utility rights-of-way to reduce potential MGS habitat impact as noted on page A1-6 of the Strategy.

31. Please refer to item 24., above, regarding our concerns with the concept of not activating contingent corridors in the CDCA Plan as a MGS conservation measure as noted on page A1-7 of the Strategy.

32. Table 9 on page A2-12 of the Strategy should note that although most utility corridors follow existing highways and roads, the Plan should also consider any existing or future cross-country natural gas facilities.

33. We do not concur with Suggested Measure 82 on Table 9. Please refer to item 24., above, regarding our concerns with the concept of not activating contingent corridors in the CDCA Plan as a MGS conservation measure.

34. Suggested Measure 87 should consider the need for adequate working area for natural gas facility maintenance and repair. Please refer to item 25., above, regarding our concerns with limiting the working area for natural gas maintenance and repair activities to a "point" location.

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35. Suggested Measure 89. on Table 9 suggests re-vegetation and narrowing of pipeline ROW as an effective means of retaining habitat values. Please refer to items 7. and 17., above, regarding our concerns about re-vegetation of gas utility ROW, and item 12., above, regarding narrowing of utility rights-of-way.

36. Our concerns regarding Measure 89 (re-vegetation and ROW narrowing), Measure 82 (contingent corridors) and Measure 87 (point location) on page A3-11 of the Strategy are noted in items 7. and 12., 24., and 25., above respectively.

Chapter 4 – Covered Plants and Animals

36. See item 13., above, regarding our concerns about closure of vehicle routes near bighorn sheep populations located outside of wilderness areas as noted on page 4-7 of the Strategy.

37. Page 4-15 of the Strategy suggests that motorized vehicle access be reduced in areas adjacent to the San Bernardino National Forest and within the Juniper Flat ACEC. We suggest that such motor vehicle access not be reduced or restricted for the purposes of constructing, operating, maintaining or repairing SCG's natural gas facilities.

Chapter 5 – Voluntary Conservation Measures

38. Chapter 5 of the Strategy recommends implementation of a variety of voluntary public and private conservation measures to protect species and habitats in the Plan area. SCG offers that the construction, operation, maintenance and repair of its natural gas facilities in conformance with its programmatic permit is consistent with the concept of voluntary conservation in the Strategy, and that the Programmatic Permit should be adopted as an effective conservation element within the Plan. Recognition and acceptance of the SCG Programmatic Permit as a conservation element of the Plan for the construction, operation, maintenance and repair of natural gas facilities would also reduce the potential for dual regulation, and avoid operational conflicts between the Plan, the Strategy, and SCG's Programmatic Permit.

In closing, The Southern California Gas Company would like to emphasize that the West Mojave Plan, its Conservation Strategies and the EIR for the Plan must consider and include provisions for the continued operation and reliability of natural gas facilities within the Plan area. The continued reliability of those natural gas facilities is dependent upon the ability of SCG to effectively construct, operate, maintain and repair natural gas facilities in areas that may contain sensitive species and habitats.

As noted above in our comments, we are especially concerned about the potential layer of additional regulation that could be imposed by the proposed Plan, and how that potential layer of additional regulation may cause conflicts or confusion between our natural gas operations under the proposed Plan and our operations under our existing Programmatic Permit. We are confident that we can operate our natural gas facilities under our Programmatic Permit in a manner consistent with the spirit and intent of the proposed Plan.

We would like to discuss with the Supergroup preparing the Plan, the idea of the Plan adopting our Programmatic Permit as a conservation element within the Plan and as a standard for the construction, operation, maintenance and repair of natural gas facilities under the Plan. We understand that there is a utility subcommittee that has provided input to the Task Group regarding the Conservation Strategy and the Plan. If this utility subcommittee continues to meet and discuss the Plan, we would appreciate the opportunity to attend and present information regarding our programmatic permit. We would like the input of the subcommittee regarding our idea of the Programmatic Permit as a conservation element in the Plan, prior to discussing that option with the Supergroup. Please advise us of the time and place for the next subcommittee meeting and we would be happy to attend

Please call me at (619) 696-2412 if you have any questions, or to inform me of the time and date for the next utility subcommittee meeting.

Sincerely

Mark Chomyn for

Donald E. Haines
Manager
Land Planning and Natural Resources

William Haigh, BLM
Karen Boven, Sempra Energy Utilities

Att: Plan map

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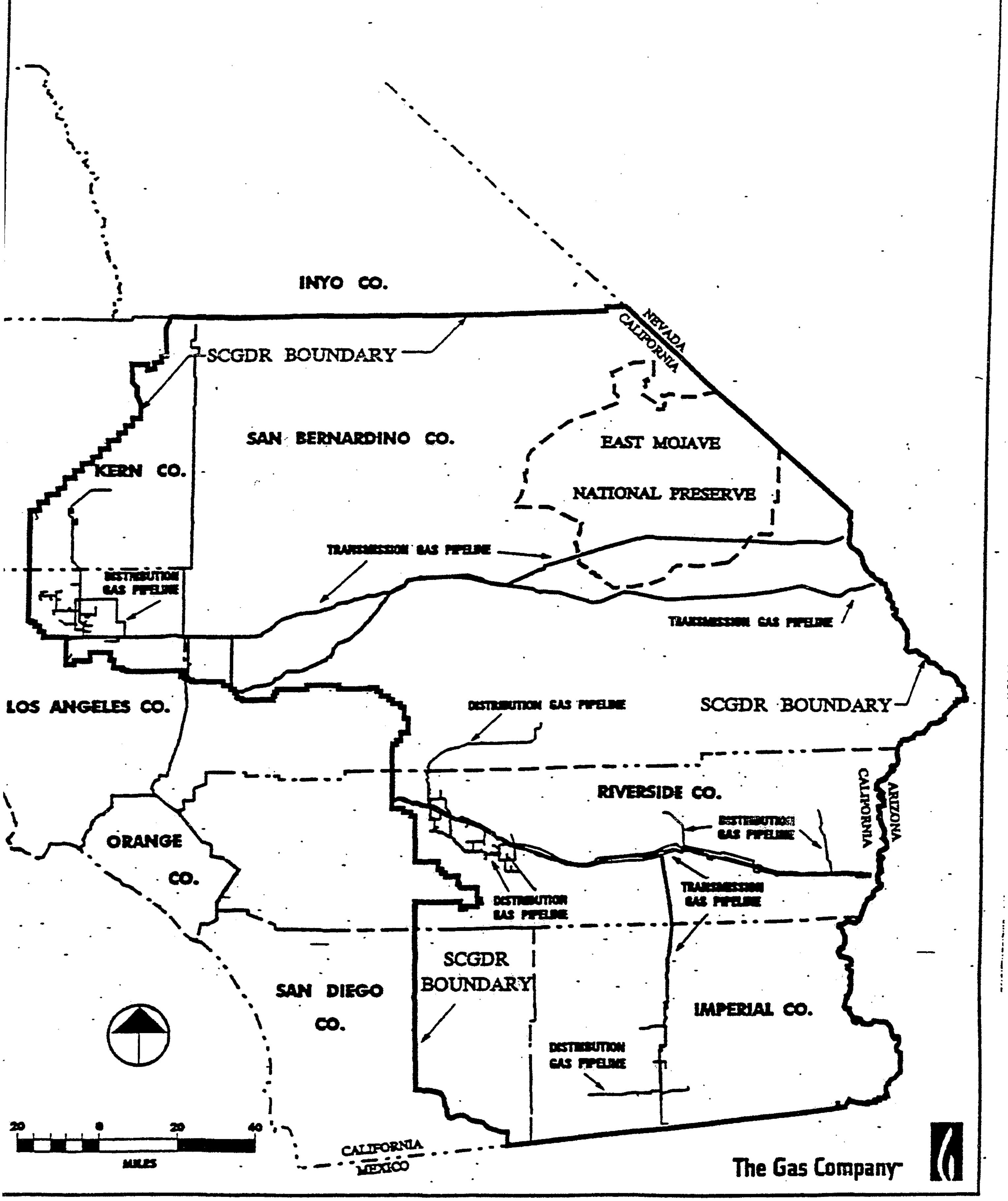
FIGURE 1

SOUTHERN CALIFORNIA GAS CO. DESERT REGION AREA SEGMENTS



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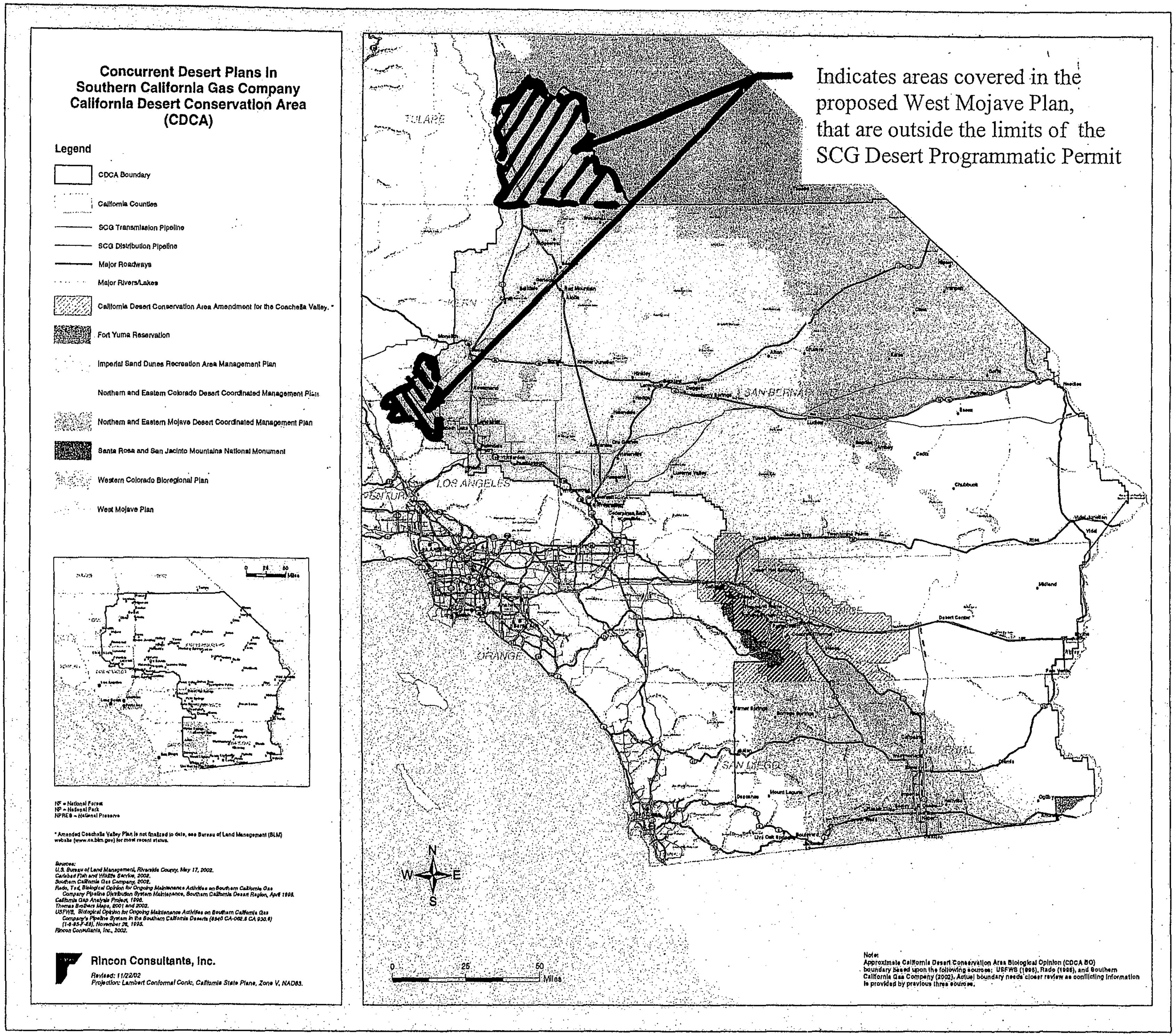
Concurrent Desert Plans in Southern California Gas Company California Desert Conservation Area (CDCA)
Legend
CDCA Boundary
California Counties
SCG Transmission Pipeline
SCG Distribution Pipeline
Major Roadways
Major Rivers/Lakes
California Desert Conservation Area Amendment for the Coachella Valley. *
Fort Yuma Reservation
Imperial Sand Dunes Recreation Area Management Plan
Northern and Eastern Colorado Desert Coordinated Management Plan
Northern and Eastern Mojave Desert Coordinated Management Plan
Santa Rosa and San Jacinto Mountains National Monument
Western Colorado Bioregional Plan
West Mojave Plan
NF = National Forest
NP = National Park
NPRES = National Preserve
* Amended Coachella Valley Plan is not finalized to date, see Bureau of Land Management (BLM) website (www.ca.blm.gov) for most recent status.
Sources:
U.S. Bureau of Land Management, Riverside County, May 17, 2002.
Carlsbad Fish and Wildlife Service, 2002.
Southern California Gas Company, 2002.
Rado, Ted, Biological Opinion for Ongoing Maintenance Activities on Southern California Gas Company Pipeline Distribution System Maintenance, Southern California Desert Region, April 1996.
California Gap Analysis Project, 1998.
Thomas Brothers Maps, 2001 and 2002.
USFWS, Biological Opinion for Ongoing Maintenance Activities on Southern California Gas Company's Pipeline System in the Southern California Deserts (6840 CA-062.5 CA 930.6) (1-6-95-F-48), November 28, 1995.
Rincon Consultants, Inc., 2002.
Rincon Consultants, Inc.
Revised: 11/22/02
Projection: Lambert Conformal Conic, California State Plane, Zone V, NAD83.
Indicates areas covered in the proposed West Mojave Plan, that are outside the limits of the SCG Desert Programmatic Permit
TULARE
KERN
SAN BERNARDINO
LOS ANGELES
VENTURA
ORANGE
RIVERSIDE
SAN DIEGO
IMPERIAL
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W
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S
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25
50
Miles
Note:
Approximate California Desert Conservation Area Biological Opinion (CDCA BO) boundary based upon the following sources: USFWS (1995), Rado (1996), and Southern California Gas Company (2002). Actual boundary needs closer review as conflicting information is provided by previous three sources.

Concurrent Desert Plans in Southern California Gas Company California Desert Conservation Area (CDCA)

Legend

- CDCA Boundary
- California Counties
- SCG Transmission Pipeline
- SCG Distribution Pipeline
- Major Roadways
- Major Rivers/Lakes
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- Fort Yuma Reservation
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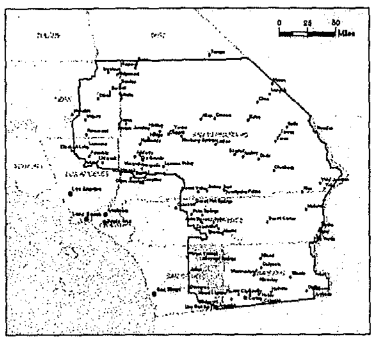
- Western Colorado Bioregional Plan
- West Mojave Plan



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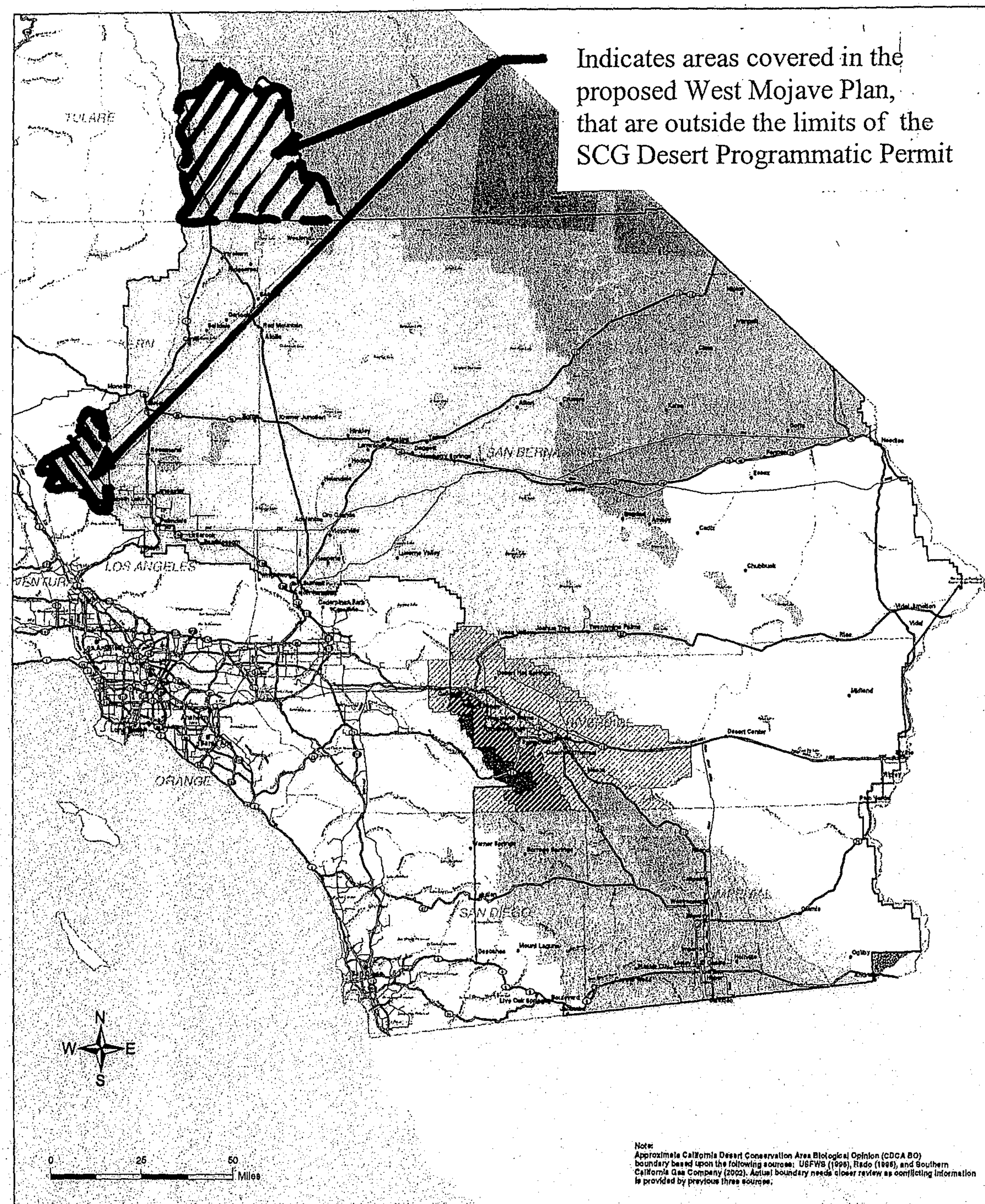

Note:
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DEPARTMENT OF TRANSPORTATION
District 9
500 South Main Street
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PHONE (760) 872-0785
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Flex your power!
Be energy efficient!

January 15, 2003

Ms. Lorelei Oviatt
Senior Planner
Kern County Planning Department
2700 M Street, Suite 100
Bakersfield, CA 93301

File: 09- KER
NOP EIR
SCH #: NONE

REF: NOTICE OF PREPARATION (NOP) OF ENVIRONMENTAL IMPACT REPORT (EIR) FOR THE WEST MOJAVE PLAN (JANUARY 2003)

Dear Ms. Oviatt:

The California Department of Transportation (Caltrans) appreciates the opportunity to comment on the NOP for the West Mojave Plan located in the California Desert Conservation area.

We have the following comments concerning the proposed project:

- Collaboration with Kern and San Bernadino counties should occur to ensure this plan is compatible with appropriate transportation elements of their General Plans.

- Ensure that any decisions made regarding areas adjacent to state transportation corridors do not preclude possible highway expansion or necessary maintenance that may be needed outside of our right-of-way.

Please continue to forward relevant information on this proposed project for our review, comments, and records. If you have any questions, please contact me at (760) 872-0785. We look forward to continuing to work with you in a cooperative manner.

Sincerely,

Gayle J Rosander

GAYLE J. ROSANDER
IGR/CEQA Coordinator

c: M. Heckman
T. Dayak

Rosamond Community Services District

• DIRECTORS •
DANIEL LANDSGAARD
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GENERAL MANAGER

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SECRETARY / TREASURER

DEAN DERLETH
ATTORNEY

CLAUD SEAL
ENGINEER

February 3, 2003

Kern County Planning Department
Attention: Lorelei Oviatt
Public Services Building
2700 'M" Street, Suite 100
Bakersfield, CA 93301-2370

Re: Notice of Preparation of Environmental Impact Report for the West Mojave Plan on 6.4 Million Acres Located in California Desert Conservation Area

Dear Ms. Oviatt:

Thank you for giving Rosamond Community Services District (the "District") the opportunity to have input on the scope of information that needs to be included in the Environmental Impact Report for the West Mojave Plan. The District provides water, sewer, street lighting, graffiti abatement and parks and recreation to the community of Rosamond. One of our responsibilities is to provide an adequate amount of potable water for residential and fire flow for our existing customers and for future growth. The District is very interested in any project that would impact the groundwater quality or quantity. Air quality and traffic patterns are other areas of concern to the District, as changes within the West Mojave Plan area could affect outlying communities.

Very truly yours,

Sherry L DeLano

Sherry L. DeLano
General Manager

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2700 20th Street West • Rosamond, California 93560 • (661) 256-3411 • FAX (661) 256-2557 • E-Mail: rcsd@qnet.com

COUNTY OF KERN

Waste Management

MEMO

To: TED JAMES, DIRECTOR
Attn: Lorelei Oviatt

From: DAPHNE H. WASHINGTON, DIRECTOR
By: Franklin Bedard
Franklin Bedard

Subject: Response to Notice of Preparation of Environmental Impact Report for The West Mojave Plan on 6.4 Million Acres Located in California Desert Conservation Area.

Date: February 14, 2003

The Kern County Waste Management Department (KCWMD) has reviewed *The West Mojave Plan, A Regional Strategy to Resolve Endangered Species Issues.* KCWMD operates, or is responsible for the following solid waste facilities within or near the plan area.

Kern County Waste Management Department facilities and sites within the West Mojave Plan Area:

Mojave-Rosamond Sanitary Landfill
Mojave Burn Dump #1
Mojave Burn Dump #2
Ridgecrest Sanitary Landfill
Ridgecrest Burn Dump #1
Ridgecrest Burn Dump #2
Boron Sanitary Landfill
Boron Burn Dump
Randsburg Transfer Station
Randsburg Burn Dump
Inyokern/Indian Wells Burn Dump #1
Inyokern/Indian Wells Burn Dump #2
College Heights Burn Dump
Rosamond Burn Dump
Tropico Burn Dump

The Kern County Waste Facilities Habitat Conservation Plan (KCWF-HCP) was adopted on October 14, 1997 by the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game (CDFG), and the KCWMD. The purpose of the KCWF-HCP is to ensure that

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take of listed species is avoided and minimized to the maximum extent practicable and to compensate for any habitat loss as a result of facility operations. The KCWF-HCP covers the Mojave-Rosamond Sanitary Landfill, Ridgecrest Sanitary Landfill, and the Boron Sanitary Landfill. KCWMD is currently working with USFWS and CDFG to develop an amendment to the KCWF-HCP that will include the other listed sites.

Eleven historic burn dumps are located within the West Mojave Plan area. A burn dump is a site where in the past, solid waste was burned at low temperature and the residual burn ash and debris have been landfilled or stockpiled. Burn dumps typically contain little biodegradable organic material because of the combustion of waste materials and the age of the sites. Burn dumps were phased out in the early 1970's in response to federal and state air quality legislation. Most burn dumps are considered closed sites as their operations ceased prior to the development of regulations addressing the closure of disposal sites, provided that these sites were operated under applicable permits at the time.

Burn dump problems and potential hazards result primarily from:

1. Improper cover contributing to burn ash becoming airborne and being inhaled by humans or animals.
2. Inadequate erosion protection contributing to transport of burn ash into surface waters and being ingested by humans and animals.
3. Improper site security allowing humans or animals access to areas of waste and hazards from direct contact, inhalation, and ingestion.

During the 1990s' heightened environmental awareness, encroachment by development and two legal actions forced KCWMD to identify and re-evaluate the historic burn dumps. KCWMD has established that the County may hold some potential obligation for 54 of the 64 alleged burn dumps in the County. This re-evaluation considered what had been done in the past, and current health and safety problems associated with each site (i.e., exposed ash, erosion, bottle digging, illegal dumping, etc.). Additionally, as regulations became more stringent, KCWMD began to look at what strategically could be done with these sites.

Based in part on the body of research compiled on burn dumps as part of the Solid Waste Assessment program, and the need to provide guidance to jurisdictions trying to remediate burn dumps, the California Department of Toxic Substances Control (DTSC) developed a Memorandum of Understanding (MOU) involving the California Integrated Waste Management Board (CIWMB), and DTSC outlining the regulations for remediating burn dumps. The guidelines were formalized by the CIWMB in Local Enforcement Agency (LEA) Advisory #56, dated November 4,1998.

KCWMD will continue to follow the guidelines set by California Integrated Waste Management Board's Local Enforcement agency Advisory #56 to remediate each burn dump site. KCWMD burn dump remediation goals include:

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1. Protect health and safety of local citizens.
2. Protect groundwater and air quality.
3. Reduce potential exposures to wildlife and the environment.
4. Minimize impacts on surrounding land uses.
5. Manage the County's risk from future liabilities.

West Mojave Plan
Project Description and Project Objectives

The West Mojave Plan (WMP) addresses the management of 3.6 million acres of public lands administered by the BLM and 2.8 million acres of private lands. The WMP is being prepared collaboratively with local, state and federal agencies. It is the intent of the collaborators that the WMP serve as a habitat conservation plan (HCP) for this area. All public lands are within the California Desert Conservation Area, and the study area lies within the borders of Kern, Inyo, Los Angeles, and San Bernardino Counties.

A major part of the WMP is the preparation of an HCP which will facilitate the issuance of programmatic incidental take permits by the CDFG and the USFWS to participating cities and counties. Issues included in the HCP are conservation strategies for the desert tortoise, Mohave ground squirrel and other sensitive desert plants and animals, a motorized access network for public lands in the region and multiple use issues such as livestock grazing, mining, cultural resources and recreation. The EIR will assess the environmental impacts of a proposed action and a range of reasonable alternatives (including a "no action" alternative). The general plan structure of the WMP proposed conservation strategy recommends the following:

- Biological goals and objectives for threatened and endangered species in the covered area.
- Establishment of a regional Habitat Conservation Area (HCA) composed primarily of BLM-administered public lands established specifically to conserve areas for specific species.
- A compensation framework.
- Allowable ground disturbance of one percent within the HCA lands.
- A habitat credit component.
- Species conservation measures, including take-avoidance measures to minimize and mitigate the impact of new development and proactive wildlife management programs.
- A public education program.

Comment:

KCWMD understands that the WMP is a programmatic HCP and that new projects within the plan area will require additional environmental analysis. KCWMD appreciates the way HCPs, in theory streamline the process for project approval and mitigation in areas that are environmentally sensitive.

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Section 1.1.1, Desert Tortoise Biological Goals and Objectives, Biological Goal 4 on Page 3:
Reduce tortoise mortality resulting from interspecific (i.e. raven predation) and intraspecific (i.e. disease) conflicts that likely result from human-induced changes in the ecosystem processes.

Objective 4.1: Initiate proactive management programs addressing each conflict, to be implemented by each affected agency or jurisdiction.

Objective 4.3: Continue research programs and monitoring programs that assess the relative importance of human activities and natural processes that affect desert tortoise populations.

Comments:

Once the WMP-HCP is approved, two separate HCP's will cover the same area and species. It is KCWMD's understanding that the KCWF-HCP is grandfathered into the WMP. KCWMD would use its HCP to cover the existing facilities, or use the WMP-HCP to cover operations outside its HCP covered areas. The KCWF-HCP has already mitigated for any potential take occurring on the covered sites. Avoidance, mitigation protocols and habitat compensation strategies established in the KCWF-HCP are to be followed at these previously covered sites. A major amendment to the KCWF-HCP is in progress, and would cover the additional sites not currently listed.

Biological Transition Areas (BTA). Page 6. Bullet #3:

A heightened biological review would be conducted by the pertinent county for all new projects proposed to be located within the BTA. This could include a review by the Implementation Team. The review would be intended to lessen the indirect impacts on the Tortoise Desert Wildlife Management Area (DWMA) of large scale industrial, residential and commercial development and public utilities, and ensure that no new landfills are located within these areas.

Comments:

Current review of WMP maps show that no KCWMD sanitary landfills are within the DWMA. KCWMD has no plans to site a new landfill within the DWMA or BTA. Burn dumps could be located within the BTA. Remediation of old burn dumps will need to be completed regardless of what area they occupy.

KCWMD employs safe and environmentally sound waste disposal operations in the proposed West Mojave HCA. These essential public facilities are subject to significant federal, state, and local regulation for the protection of human health and safety. KCWMD is not entirely clear on what level of facility prohibition is being proposed.

KCWMD seeks and supports any environmental documents that will allow it to successfully complete its mandate to provide safe and environmentally sound solid waste disposal for the citizens of Kern County.

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Section 1.4 Allowable Ground Disturbance (AGD) and Habitat Credit Component.
Page 15,

Goal 2. The short term goal is to eliminate existing conditions that are not conductive to species conservation and recovery. This may entail (a) eliminating mine pits, trash dumps and other existing conditions that adversely affect covered species;

Comments:

KCWMD is concerned with the use of the term "trash dumps". This term does not differentiate legal from illegal dump/disposal and burn dump sites. KCWMD finds this confusing as to the legitimacy and type of site is to be eliminated.

Another concern is what "*other existing conditions that adversely affect covered species*" entails. On first reading, this could include the elimination of existing permitted facilities that accept municipal solid waste. Landfills do not provide ideal habitat for native wildlife and plant species, whether endangered or not. Due to the very nature of the facilities and the activities occurring there, species which migrate onto a landfill site may encounter impacts which include:

I. Repeated eradication by inadvertent burial, where animals occupy areas that must be periodically graded to amend settlement, reduce erosion, and prevent ponding over or adjacent to refuse.
II. Attraction to and availability of uncovered and freshly buried refuse where deposition occurs at the "working face" for animals, and consequent contact with toxic elements of the waste stream.
III. Traffic impacts, resulting in burrow collapse during daylight hours of operations along the changing access routes through the facility.
IV. Sub-lethal, cumulative impacts of noise, lights, and disturbance associated with long-term constant operations.
V. Potential contact with contaminant-laden surface and sub-surface leachates migrating from the in-place refuse.
VI. Potential exposure to toxic gas emissions from in-place refuse.
VII. Exposure to substantially elevated bacterial levels in the decomposing refuse, particularly to fecal coliform and to other disease-producing organisms.

These concerns have been evaluated and mitigated for within the KCWF-HCP.

1.6.3 Proactive Tortoise Management Programs
Predators: Ravens. (Page 29)

With the exception of the Barstow Landfill expansion, the planning of which has already been initiated, counties and cities shall ensure that no new landfills are constructed inside Tortoise Desert Wildlife Management Areas (DWMAs) or within five miles of them.

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Comments:

At present, all KCWMD sanitary landfills within the HCA are outside the DWMAs. KCWMD is concerned that since the DWMA boundaries are not set that potential boundary changes could force unplanned restrictions on existing permitted facilities. CEQA analysis of the WMA will need to address the potential lack of disposal facilities available to the residences located within the WMP if permitted sites are eliminated or severely restricted.

The WMP stated in **Section 1.2** that no new landfills would be located within these areas (BTAs). KCWMD does not consider an expansion of an existing permitted facility a "new" facility. The solid waste facility permit (SWFP) number issued by the California Integrated Waste Management Board (CIWMB), and enforced by the county Environmental Health Services Department (EHS) does not change once it is issued, and identifies a specific site and activity. SWFP are re-issued each time a facility undergoes a significant change in operation (i.e., change in days and hours of operations, change in permitted inbound waste tonnage, change in permitted inbound traffic volume, etc.). No new permitted facilities are planned for the WMP area, but concerns are raised if the WMP appears to potentially jeopardize the SWFP renewal process. This jeopardy could remove needed flexibility from essential sanitary waste disposal for the West Mojave area.

Action H1: (page 29) *Reduce the density of ravens and number of birds that may take tortoises by reducing the availability to ravens of solid wastes at sanitary landfills. Reduce availability of anthropogenic sources of food to ravens by modifying landfill operation practices in the deserts: (i) ensure effective cover of waste (≤ 6 inches cover multiple times daily, cover with tarps temporarily), (ii) erect coyote-proof fencing, (iii) render raven-proof all sources of standing water at the landfill, and (iv) keep truck cleaning areas and temporary storage facilities clean and free from organic wastes and standing water.*

Comments:

KCWMD is concerned about the ability of the WMP to place restrictions and mitigation actions on landfill operations without demonstrating that said restrictions will, in fact, be beneficial. It has not been effectively demonstrated that any of the proposed theoretical restrictions will be effective. KCWMD has contracted the services of a certified wild life biologist to survey KCWMD landfills and the surrounding lands. To date, large number of ravens at the landfills have not been observed or quantified by the consulting biologist for KCWMD facilities. Studies and research quantifying extensive raven use of KCWMD facilities, and demonstrating practical benefits from severe operational restrictions have not been received or reviewed by KCWMD.

KCWMD sanitary landfills are operated by contractors whose day-to-day operational activities are set out in an Operational Agreement, a contractual agreement negotiated between the KCWMD and the operations contractor. An integral part of that agreement is the application of daily cover at the site. Cover of waste is determined by best management practices developed by

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waste management professionals and authorized by CIWMB and the LEA. Deviation from LEA approved cover operations is a violation of the SWFP. Current federal regulations, 40 CFR Subtitle D, only require cover at the end of the operating day.

Coyote–proof fencing is not specifically defined within the document. The engineering specifics or references as to what this entails would be helpful. SLFs are required to secure their perimeter. Any additional fencing represents substantial costs to operations.

KCWMD facilities (by permit) do not accept liquid waste. Standing water is not acceptable on a SLF by operational standards.

"Truck cleaning areas" is vague and unspecific in what it refers to. Vehicles are only allowed to empty waste at the working face of the landfill. Under direction of the site contractor, customers proceed to the working face. After vehicles have deposited their load at the working face, the site operator compacts and smoothes the working face and applies daily cover. Daily cover consists of either a minimum of six inches of clean soil or an LEA approved alternate daily cover (ADC), such as a geosynthetic tarp. In general, the operator maintains a small, compacted working face that is covered on a daily basis. This type of design and operation minimizes the propagation or harborage of flies, rodents or other vectors and the creation of nuisances. These practices help maintain air and water quality, noise control, odor control, public safety and other pertinent matters related to the protection of public health.

Action H2: (Page 29) *Reduce the availability to ravens of organic wastes outside of landfills. Take the following steps: (i) Encourage the use of self-closing trash bins at transfer stations...*

Illegal dumps on private and public lands in the Tortoise DWMAs shall be cleaned up. Ensure that landfill operations encourage legal dumping. Possible options include, but are not limited to, the following: Is free dumping available to local residents? Are receptacles available at landfills to receive after-hours refuse? Can operating hours be extended into the evening to accommodate refuse?

Comments:

Existing Kern County ordinances prohibit illegal dumping. Matters of illegal dumping are handled by County's Code Compliance Division.

There is no gate fee for Kern County residents disposing of residential solid waste at KCWMD facilities. The absence of a gate fee for residential solid waste disposal displaces the incentive for illegal dumping.

Transfer Stations (TS) and bin sites contain bins with closing tops. Signage at bin sites remind the general public to close lid after depositing their waste into the containers. KCWMD staff all bin sites during days and hours these sites are open to the general public. The staff coordinate and direct the public in the proper disposal of waste into the containers. It is staff responsibility to make sure the public place their waste into the containers and the tops are closed.

Receptacles are available at TSs and Bin sites. Landfills accept waste only at the working face.

KCWMD actively solicits the local community for inputs on determining the most effective days and hours of operation. Days and hours of operations are defined in the permit and enforced by the LEA. After dark operations would be inherently more dangerous than daylight operations and would expose KCWMD to additional liabilities. Expansion of operating hours into the evening would require the installation of artificial lighting as per OSHA regulations. Installation of artificial lighting would likely result in environmental impacts that would require CEQA analysis and mitigation. Costs for lighting at facilities would be significant. Not all TS and bin sites may have electricity on site. Additional costs for labor and contractor supplemental agreements would be substantial. Additional costs could potentially require KCWMD to request the County Board of Supervisors for an increase in the land use fees.

West Mojave Plan Proposed Multi-Species Conservation Strategies *(page 29)*
Objective 3.: Establish a secondary reserve.

The proposed designated North Edwards Conservation Area (NECA) includes existing disturbances, such as the Kern County Landfill (Boron SLF). The boundaries of the NECA are expected to change based on monitoring and additional botanical surveys. Until permanent boundaries are established, botanical surveys will be required for new projects and the cap on disturbance and mitigation formula for conservation areas will apply.

Comments:

The Boron Sanitary Landfill is in the central Mojave Desert of California on the Antelope Valley floor. Access is via Boron Road, a secondary paved road extending south for about one mile from State Highway 58. The 20.33-acre landfill accepts an average of 42 tons of municipal solid waste from Boron and other area communities per day and serves an estimated population of 4,805. The estimated closure date is 2045.

Municipal solid waste is deposited and buried on a daily basis. The site, with approximate dimensions of 625 by 1,250 feet, has been historically disturbed because of refuse collection and containment practices. No additional expansion to the landfill is planned at this time. Soils throughout the site have been regularly moved during site grading, trenching, and filling operations. Native vegetation has been removed from the site. A windrow of introduced tamarisk (*Tamarix* sp.) has been planted along the western landfill boundary. The understory of this windrow also has re-established weedy vegetation consisting of annual burweed (*Ambrosia acanthicarpa*), Russian thistle (*Salsola iberica*), London rocket (*Sisymbrium rio*), and Mediterranean schismis (*Schismis barbatus*). Vegetation throughout the remainder of the site is scattered "weedy" annuals at the base of the boundary fence or immediately downwind of the windrow. Topography is nearly level, with a slight south-to-north elevation dip. Soils consist of fine aeolian sands intermixed with coarse sands and fine gravels. There are no washes present either on the landfill or in adjacent areas. Elevation ranges between 2,500 to 2,525 feet. Habitats surrounding the landfill consist of disturbed creosote bush scrub, dominated by creosote

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bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), saltbush (*Atriplex* spp.), boxthorn (*Lycium cooperi*), and scattered Joshua trees (*Yucca brevifolia*). Conspicuous annuals include red-stemmed filaree (*Erodium cicutarium*), short pod mustard (*Brassica geniculata*), Mediterranean schismis, phacelia (*Phacelia* sp.), Russian thistle, and buckwheat (*Erigonum* sp.). There is no habitat within the CIWMB permitted area.

A field inventory of the Boron Sanitary Landfill and surrounding "buffer" extending for 200 yards around this 20.33-acre parcel was conducted on February 9, 1992 by RMI biological consultants. This initial survey was supplemented with a follow-up inventory for sensitive plants on April 22, 1992 by RMI. No federally or state-listed plant or animal species were observed on the landfill site during the surveys. A single desert tortoise burrow was found approximately 250 yards east of the landfill boundary during a survey of the surrounding site "buffer".

There are no anticipated impacts to listed species from continued operation and/or closure of this site. It is not anticipated that ravens will be attracted to the landfill site because the relatively small amount of waste deposited at this site is covered each day, therefore, predation on desert tortoise by ravens is not likely.

KCWMD purchased 160 acres from the Bureau of Land Management (BLM) as part of the land exchange for the Western Mojave Land Tenure Adjustment Project. This acreage is just west of the Boron Sanitary Landfill. A portion of this property may be needed for flood and drainage control. A portion may also be used for a small volume transfer station as an alternative to the existing landfill as KCWMD is investigating the option closing the Boron landfill.

The Biological Opinion of the USFWS dated Sept. 10, 1998, states that the proposed project (sale of property through the land exchange) is not likely to jeopardize the continued existence of the desert tortoise. Because the lands selected for exchange (which includes this 160 acres parcel) by the BLM are not within critical habitat, critical habitat will not be affected by the proposed action. This 160 acre buffer property is just south of the town of Boron, across the street from the Boron Landfill, and shares a fence with Edwards Air Force Base. This area has been disturbed by off road vehicles, illegal dumping, and other human activities.

The USFWS has agreed that anyone desiring to develop lands acquired from the BLM through the Western Mojave Land Tenure Adjustment Project would not be required to provide additional compensation in the form of land because the overall rate of exchange for the program will be very favorable to the desert tortoise. However, these individuals would require authorization to incidentally take desert tortoise through a 10(a)(1)(B) permit.

Conclusions:

KCWMD is generally supportive of the establishment of a HCP to cover the West Mojave area. KCWMD is determined to continue its mission of providing the citizens of Kern County with safe, environmental sound waste disposal. KCWMD's concerns center on how the WMP's HCP will influence two major issues:

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1) Cost of doing business,
2) Regulation of disposal practices.

Issues of increased costs are always a major concern. Increases in mandated mitigation, be it additional days and hours of operation, increased frequency of cover, additional fencing, or early closure of a facility, can represent substantial operational costs. Mandated changes in operations will require renegotiation of the Operational Agreement with the contracted operator.

Issues of regulated practices which could result in denial or delay of facility re-permit will have major impacts on quality of service to constituents, costs of operation and the remediation and maintenance of historic burn dumps. KCWMD has no current plan to site a new solid waste disposal facility in the WMP area. However, KCWMD needs to maintain its ability to expand permitted facilities as need arises.

Any change in operational practices requires the approval of the LEA, CIWMB and possibly the Regional Water Quality Control Board for that specific operational area and may require CEQA and or NEPA analysis. If the WMP results in proposed operational changes to Kern County's Waste Management facilities these should be treated as "reasonably foreseeable effects" and analyzed as part of the environmental review process of the WMP.

KCWMD appreciates the opportunity to comment on the WMP and requests that it be notified of future developments concerning the WMP, along with the other stakeholders.

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January 16, 2002

Kern County Planning Dept
2700 "M" Street, Suite 100
Bakersfield, CA 93301

San Bernardino County Planning Department
385 N. Arrowhead Ave., 3rd Floor
San Bernardino, CA 92415-018

RE: Scoping Comments for the West Mojave Habitat Conservation Plan and Environmental Impact Report.

Dear West Mojave Planning Team,

The California Native Plant Society (CNPS) is a non-profit group dedicated to the conservation and protection of California's native plant life and to the education of members and the public about the uniqueness of the California flora. Despite long-term, active involvement in the West Mojave Plan Process, we remain very concerned about the state of plant conservation in the West Mojave Plan. CNPS believes that without adequate scientific input and guidance, HCPs can actually imperil the species they are meant to protect. While we have submitted comments throughout the steering committee, task groups and supergroup meetings either in writing or verbally CNPS submits this statement of concerns as formal scoping comments:
According to section 10(a)(2)(B) of the Endangered Species Act and associated Federal regulations, HCPs must meet six requirements before an incidental take permit can be issued. These requirements are:

1. all takings must be incidental,
2. impacts must be minimized and mitigated "to the maximum extent practicable,"
3. there must be both adequate funding, and provisions to address "unforeseen circumstances,"
4. the taking must "not appreciably reduce the likelihood of the survival and recovery of the species in the wild,"
5. the applicant must ensure that additional measures required by federal regulators will be implemented, and
6. federal regulators must be certain that the HCP can and will be implemented.

In that context, CNPS offers the following guidelines from our evaluation of the HCP process - CNPS opposes any plan that fails to adequately include these elements:
1. Plans will be based on good baseline data. This will include:
   (a) a thorough knowledge and awareness of all existing documentation on each species of concern, including NDDB files, RareFind, CNPS' Inventory, scientific literature, herbarium records and previous EIRs and environmental documents;
   (b) carefully planned focused rare plant surveys for each species of concern;
   (c) aerial surveys with adequate ground truthing to identify and accurately map all plant communities;
   (d) ecological requirements for each species being evaluated, including studies to determine their survival needs and recovery thresholds of each population.
2. Reserve design will be based on accepted scientific theory, and will:
   (a) optimize and protect reserve edge-to-area ratio;
   (b) optimize and protect reserve size;
   (c) optimize and protect reserve buffers;
   (d) optimize and protect connectivity within and between reserves;

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(e) optimize and protect a representative geographical scope of included habitats;
(f) minimize edge effects from permitted adjacent uses;
(g) minimize non-compatible adjacent uses which lead to disturbance and invasion of reserve areas;
(h) minimize internal development "bubbles".

3. Mitigation strategies will be field tested and judged against relevant past research and experience; such that:
(a) avoidance and minimization of impacts will be the first option considered to limit impacts to rare plants and plant communities;
(b) transplanting of plant populations will not be relied on as a mitigation unless ample scientific evidence exists that the plant population can survive transplantation and recover, and that the transplant location is ecologically suitable to the plant population and to the area receiving the transplants;
(c) funding necessary for testing of mitigation strategies will not deplete funding for the final mitigation action.

4. Reserve/species management plans will be truly "adaptive":
(a) management plans will be developed concurrently with the plan, and approval of the plan will be contingent upon an acceptable management plan being in place;
(b) management plans will be designed to respond in a timely fashion to species' needs, as illustrated by comprehensive scientific monitoring;
(c) plans will be crafted so as to be easily modified as species needs become apparent;
(d) funding for monitoring activities will be assured and independent of other aspects of the plan.

5. Scientific monitoring will be the basis of ongoing management decisions:
(a) adaptive management strategies will have scientific monitoring to gather data on species' response to management techniques;
(b) data collection related to life history, ecological niche, response to stress, reproduction, and dispersal will be available to assess the long term needs for species survival and recovery;
(c) a "library" system for storing and retrieving all scientific data relevant to a given plan will be available to help ensure maximum utilization of all possible data;
(d) monitoring is funded, independent of other aspects of the plan.

6. Plans will be subject to independent scientific review at critical stages:
(a) an independent scientific review panel is established early in the planning process;
(b) experts on the species and on local conditions will be invited to participate;
(c) baseline studies will be reviewed on completion for accuracy, thoroughness, and comprehensiveness;
(d) reserve design will be reviewed prior to plan approval to ensure that it adheres to sound scientific principles to the maximum extent possible;
(e) mitigation strategies, monitoring plans and management plans will be reviewed prior to their final approval;
(f) funding will be assured and is independent of other aspects of the plan.

7. Plans which focus on maintaining species populations at or near their condition at the time of listing are not scientifically defensible. Plans will be focused on improving the lot of listed species, i. e. "recovery" of species, not simply survival.

While CNPS recognizes that many of the above issues have been addressed in preliminary plant conservation strategies, others have not. Additionally, several other general issues have been neglected and need to be addressed in the draft HCP/EIS.

- An independent scientific review group review group must review and provide cogent comments on the proposed action. (Other HCP's, as well as the BLM's Northern and Eastern Colorado Plan, have adopted this very important review process). The comments from the independent review group will be addressed and incorporated into the document.
- Definitive species list of taxa that are required to be identified for "take-permits" or just as BLM conserved species. Because the list of covered species is always changing, we request that the list be finalized and included in the document.
- Because HCP's are science-based, and adaptive management is a key to the success of this plan, CNPS still strongly supports surveys for all plant species in appropriate habitat outside of the Conservation Areas to evaluate the impact to the species. Regardless of the "guiding principles", this basic data collection is imperative to the scientific basis of the plan and the equitable mitigation of impacts to the species. If you don't know how many individuals have been impacted, one can't analyze the impacts or evaluate the equitability of the mitigation. These data are an integral part of the adaptive management as well, considering that many of the species lack basic information on range, as well as ecological factors. Of course CNPS supports monitoring inside the Conservation Areas to evaluate conservation success. We request that surveys recommendations for all plant species be included as part of the conservation and adaptive management conservation strategy.
- Although CNPS has repeatedly requested a vegetation map of the of the project area, none has been produced to date. **We again request that a vegetation community map be prepared at the plant series.** A vegetation map is required, so that analyses of impacts to the vegetation communities (including the Unusual Plant assemblages as identified in the 1980 California Desert Plan) level can be assessed. Between the advent of the planning process and now, many resources have been mobilized to map the vegetation of the Mojave Desert. Those data are now available and should be a basic component of planning effort.
- A full range of alternatives needs to be identified and evaluated, including a "BLM-only" alternative (only the BLM is involved in the HCP) and a "recovery" alternative (where all species are addressed with respect to their recovery of historic ranges in the West Mojave Plan area).
- The full range of cumulative impacts need be evaluated including (but not limited to) the proposed Ft. Irwin expansion. CNPS is very concerned that if the Fort Irwin expansion proceeds, its mitigation will occur by financing the mitigation/acquisition needs of the West Mojave HCP/EIS. The West Mojave Plan cannot mitigate for the proposed Fort Irwin expansion, because the Fort Irwin expansion is not part of the West Mojave HCP/EIS' proposed action. The proposed Fort Irwin expansion is a separate entity undergoing its own NEPA process. However, it is required to be evaluated in the cumulative impacts section of the West Mojave Plan, along with other actions.
- CNPS requests that success criteria for conservation, and complete maintenance and monitoring plans be included as part of each species analysis and conservation requirements. This plan should clearly lay out the monitoring, goals

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for conservation and adaptive management scenarios for the implementing group.

- Although restoration success criteria have not been formally explored as part of the West Mojave Plan, CNPS requests that success criteria be included in the HCP/EIS. The draft restoration success criteria were completely unacceptable to CNPS, for a variety of reasons, as discussed in the meetings. Clear, definitive guidelines need to be identified and implemented to prevent genetic degradation of species when/where restoration occurs.
- With regards to exotics, CNPS requests that the following issues be addressed:
    1. adopt and implement an invasive exotic plant management policy.
    2. coordinate with other local/state/federal agencies (including the Mojave Weed Management Area) at all levels regarding non-native plant policy formulation and implementation.
    3. publicize the need to prevent the spread of invasive exotic plants, as part of the education component of the plan.
    4. stop all introductions of invasive non-native plant species into natural ecosystems which are designed to achieve some other management objective.
    5. implement exotic plant control measures in such a manner that native species and natural systems are not adversely impacted.
    6. adequately fund the control of invasive exotic species.
    7. insist that all landscaping, mitigation, restoration, revegetation, and habitat/species recovery monitoring plans include provision for identifying and managing non-native plants and identifying no potential for damaging the genetic structure of local native plant communities.
    8. restrict introductions of invasive exotic species from commercial sources, including the agricultural, landscaping, and revegetation industries in/adjacent to the conservation areas.
- CNPS' most recent policy on grazing opposes grazing of domestic and feral animals except where compelling scientific evidence shows that such grazing is compatible with sustaining native plant communities and rare native plants. In this context if grazing is to be considered, CNPS requests that grazing exclusion areas of one-hectare size or greater be established in every livestock use area to assist in collecting documentable, quantitative monitoring data that is essential to a scientific evaluation of utilization of the resources.
- CNPS requests that an evaluation is made for each species of the probability of disturbance to the populations, fire management issues, exotics risk, validation tools, and monitoring methods.
- CNPS understands that the Unusual Plant Assemblages (UPA's) as identified in CDCA plan remain as an identified entity under the West Mojave Plan (as well as other BLM planning efforts). We request that the recognition of UPA's be specifically discussed in the West Mojave Plan, and that appropriate management issues be addressed as well, to assure retention of these areas, as the unique biological resources that they are, into the future.
- Much of the conservation is currently proposed to occur on private land. CNPS has concern that due to ease of management, public lands were selected as the "mitigation" areas. From the plant perspective, the most botanically unique areas do not always conveniently occur on public lands. Therefore we request that this science-based Habitat Conservation Plan evaluate the biological criteria for conservation requirements, not the land ownership maps. If in fact a species has

the best chance of conservation on private lands, then the West Mojave Plan should address conservation for the species in those areas – not just on public lands.

- CNPS requests that the implementing agreement include specific language to ensure dedication of funds for monitoring for conservation success. Success evaluation should be tied to goals, and allow the HCP to be less rigid and more adaptive to achieve true conservation.
- CNPS requests that UPA's, because of their unique botanical resources, be considered in the route designation and livestock use management decisions in the plan.
- CNPS strongly supports the inclusion of the Mojave River and other desert spring/riparian areas be comprehensively addressed in the plan, including specific spring restoration/implementation plans.

CNPS presumes that the recommendations presented in the Task Group1 meetings will be the basis for the Preferred Alternative of the West Mojave West Mojave HCP/EIR. These recommendations as proposed will assure *a net loss* of sensitive plant occurrences for the "covered" species, and inadequate conservation for the following reasons:

- Many of the sensitive plant occurrences are located within the Desert Wildlife Management Areas (DWMA's) that are designated for desert tortoise. Any disturbance within the DWMA is proposed to be mitigated is at a single 5:1 ratio for all species. However, sensitive plant occurrences are often based on unique ecological/hydrological/geomorphological conditions…and therefore not all mitigation lands are created equal. Our grave concern is that the "covered" plant occurrences will be impacted, and a 5:1 mitigation will be put in place to off-set desert tortoise/plants impacts in an area where no plant habitat occurs, resulting in a net loss for the rare plant species - although the mitigation will meet the "conservation" criteria under the West Mojave Plan. This is a conservation scenario for plant extinction! A true Habitat Conservation Plan requires equitable mitigation – including a requirement that impacted lands supporting both rare plant occurrences and desert tortoise be mitigated at 5:1 with comparable lands that support both species, or that the rare plants habitat (that does not support tortoise) be conserved at a 5:1 ratio, in addition to a 5:1 mitigation for tortoise habitat (that does not support rare plants). This assures that both (or multiple) "covered" species are adequately conserved.
- CNPS requests the addition of language that guarantees that equitable compensation for impacts to a particular species are directed to acquisition/conservation for that species. Development will occur in areas where land prices are generally greater than the average cost of land throughout the West Mojave Plan – due to nearby infrastructure advantages (roads, utilities etc.). Many of the plants that are on the list for conservation under the West Mojave Plan are there because of limited range and/or because populations have already been impacted by directly or indirectly by development activities which resulted in a decrease in the species numbers. CNPS' concern is that when the plants on more expensive lands are impacted, the more expensive lands will not be acquired to offset the impacts to the species, because more/cheaper land can be acquired elsewhere for the same price. Once again we see likely failure to guarantee species conservation for plants that occur on "expensive" lands and that are also more likely to be impacted because of where they occur.

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- Because sensitive plants are often restricted to unique ecological/ hydrological/ geomorphological areas, CNPS requests that impacted occurrences be mitigated at 5:1 regardless of whether or not they are within a conservation area. Because of the dependence of rare plants on their local habitats, it is imperative that mitigation measures be developed on a site-specific basis. Local environmental conditions, species biology, land use patterns and other factors must be incorporated into the design of mitigation plans. The current mitigation ratio for undisturbed lands outside of the "Conservation Areas" is unacceptable to CNPS considering that over 50% of the currently known populations for most plants occur outside of the conservation areas. In our view, that will appreciably reduce the likelihood of the survival of the species in the wild...not to mention any chance of recovery.
- All covered plant species need to have a designated Conservation Area that will be designated as an Area of Critical Environmental Concern (ACEC), with similar management strategies applied within those Conservation Areas to assure conservation goals are met for all rare plant species. As you know, an unlisted species is said to be "adequately covered" by an HCP when it is addressed "as if it was listed pursuant to section 4 of the ESA, and in which HCP measures for that species would satisfy permit issuance criteria under section 10(a)(1)(B) of the ESA if the species were listed."
- The 1% development cap must be applied to all Conservation Areas, not just DWMA's. In practice, for those rare plant species that occur in DWMA's, most all of the rare plant species occurrences could conceivably occur on acreage that makes up less than 1% of the DWMA. Under the current "conservation" scenario, they could all be impacted, and mitigated for with mitigations lands that do not contain plants or plant habitat, and the conservation goals of the West Mojave Plan would be met, but the plants would have suffered extinction within the DWMA. This is not a viable conservation strategy. A permanent 1% development cap in all of the Conservation Areas, both inside and outside the DWMA's, is the only way to achieve some type of meaningful rare plant protection.
- CNPS does not support different jurisdictions "opting out" of different species coverage, regardless of jurisdictional area. This option is an incentive for unlisted species coverage to be "opted out" of, decreasing the conservation for these species. Because CEQA and NEPA do not have as stringent requirements to mitigate for these species as the ESAs, ultimately, this option moves the species closer to extinction and potential listing under the Endangered Species Acts...and defeats the purpose of this plan.
- CNPS requests the identification of sensitive botanical resources that require specific hydrology/substrates. Where hydrology is a factor, the West Mojave Plan should include the acquisition of water rights to sustain those plants in perpetuity. Additionally, substrate-specific species need to have assurances that substrate regimes (flood events, etc.) are retained to assure conservation.
- CNPS does not support "no surveys" in the Incidental Take Areas (ITA's) for any species. Potentially historical occurrences add to the scientific knowledge base of species distribution. Losing this type of information is incompatible with CNPS' mission.

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Species-Specific comments on species for which there is a proposed conservation strategy:

***Calochortus striatus* (Alkali mariposa lily)**

Because the "conservation strategy" ultimately proposes an 41,135 acre Incidental Take Area (ITA) (17,051 acres in Lancaster + 23,810 acres of interim conservation area + 274 acres [1% conservation area]) and a 27, 165 acre conservation area (3,629 conservation area + 23,810 acres of interim conservation area –274 acres of 1% conservation area), CNPS cannot support a potential reduction of 60% of the habitat for this species in these areas.

Furthermore, although hydrology is identified as an essential component to maintain extant populations of *Calochortus striatus*, we do not identify any guarantees of maintaining hydrology. Therefore, we do not see how this conservation strategy provides any guarantees of long-term conservation of this species. Studies of hydrological needs are sensible, however, they are not mitigation for species (see above discussion under general comments). A prudent approach would be appropriating water rights for assuring continued water to these areas.

We cannot fully evaluate the conservation strategy for this species, when the City of Lancaster has not identified a mitigation ratio. However, as a generalization, we support a mitigation ratio of 5:1, based on the specific hydrological/soils needs of this species, throughout the range of the species.

CNPS supports acquisition from willing sellers of isolated springs, seeps and meadows for conservation of this species. However, we have concerns that these types of acquisition/conservation areas are not assured, and therefore should not be "counted" as assurances for conservation.

We support establishment of additional conservation areas across the range of the species where ever they occur on public lands as part of the conservation strategy, including the occurrences adjacent to Cuddeback dry lake.

At Green Springs in Kelso Valley, grazing restrictions should be implemented through the fruit maturation period to allow for seed dispersal.

***Eriophyllum mohavense* (Barstow Woolly Sunflower)**

CNPS supports the elimination of the existing ACEC due to its small, inappropriate size and the designation of several conservation areas within DWMA's. Additionally, we request that the "core" ACEC boundaries be extended to include the "Transmission line (cluster 8)" and connect with the "Harper Lake Rd. (cluster 4)" populations. Additionally, we request the recognition of each of the other populations clusters on the map, within the DWMA's, as conservation areas for this species. Under the current conservation scenario, a 1% disturbance limit in the DWMA could potentially extirpate a population cluster (as identified on the 8/22/01 map). The establishment of these additional conservation areas will help to conserve the species across the range with the 1% cap in each conservation area.

We are concerned about the statement that "Compatibility of military operations at Edwards AFB with the conservation of the Barstow woolly sunflower is recognized as an

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essential part of the overall conservation strategy" because it indicates that the conservation of this species may not be adequate for this species without EAFB participation. In our review of the Draft Integrated Natural Resources Management Plan (INRMP), August 2001, this species was not even addressed in the plan! With this lack of recognition in the EAFB plan, will this proposed strategy be adequate to guarantee this species existence?

ITA areas for this species are not referenced in the text. Are there any defined for this species?

It appears that the additional Marine Corps Nebo cluster (1) on the above referenced map is also outside of the DWMA, distributed on public and private lands. What is the strategy/status for this cluster?

Because the actual acreages of conserved habitat versus acreage for permitted extirpation have not been identified, we cannot fully evaluate the conservation strategy for this species.

***Castela emoryi* (Crucifixion Thorn)**

CNPS supports the establishment of the Pisgah ACEC to protect the population of Crucifixion Thorn. Additionally, we strongly encourage the establishment of additional Conservation Areas for this Pleistocene relict species throughout their limited range within the plan area.

***Mimulus shevockii* (Kelso Creek Monkeyflower)**

Considering that currently this species is either known or its potential habitat is only known from 12,000 acres this plant is very rare. Of that the West Mojave plan will only have jurisdictional influence on 6,989 acres. CNPS prefers to see a comprehensive conservation strategy throughout the range of this locally endemic species, instead of a piecemeal approach from ecologically arbitrary jurisdictional boundaries.

Currently, plants, in the West Mojave Planning area, are known to occur on more private lands (1000 acres) than on public (990 acres), but the conservation strategy relies primarily on public lands for conservation. This appears to indicate to us that over half of the known population in the West Mojave planning area will be potentially extirpated, and CNPS cannot support this strategy. Additionally this situation appears to already be in conflict with the Adaptive Management elsewhere in the document

The species generally occur just outside of the 100 year flood plain, so no conservation benefits are gained from the Kern County general Plan & Kelso Creek specific plan that requires only the 100 year floodplain remain as open space.

With the acreage of take "unspecified", CNPS fails to see how evaluation of impacts can be accurately assessed.

With no assurances that the Onyx Ranch will be an established mitigation bank, CNPS views no assurances for plant conservation through this strategy at this time. Furthermore, based on the map of 8/23/01, it appears that great majority (over 90%) of the Onyx Ranch land is not even within potential *Mimulus shevockii* potential habitat, and that the remaining 10% may contain only one population, although on the map it appears to fall outside the properties. We fail to see the conservation value of this mitigation bank for this species.

The public lands component seems partially redundant with existing management. For instance, "3a. Prohibit travel off designated routes" is redundant with the Jawbone/Butterbredt ACEC Management Plan, which states (Pg. 4) "Allow vehicle use on approved routes only, except in designated motorized vehicle play areas". We suggest eliminating routes where they are in conflict with conservation of this species. This will reduce the possibility of unauthorized vehicle trespass. CNPS also supports the removal of grazing from these sensitive areas during the flowering and fruiting seasons (spring and early summer) to minimize the impacts to the species, in addition to the grazing management in 3b. (page 4-31).

Considering the restricted range of this species, and ecological requirements, CNPS requests a "reserve level management" as the only option for conservation of this narrow endemic species.

***Astragalus jaegerianus* (Lane Mountain Milkvetch)**

Astragalus jaegerianus has one of the more restricted ranges within the West Mojave planning area. CNPS supports recommendations of the Fort Irwin Expansion Alternative, regardless of whether the proposed Fort Irwin expansion proceeds (no take, no grazing, route network). If the Fort does not expand, all areas that contain the plant species should be incorporated into the conservation area.
Additionally, conservation areas for *Astragalus jaegerianus* should be extended to include the *Eriophyllum mohavense* that also occurs in this area.

***Linanthus maculatus (formerly Gilia maculata)* (Little San Bernardino Mountains Gilia)**

CNPS requests that all occurrences on public lands be included as part of the Conservation Strategy. Based on the occurrence 9, located north east of Coyote Lake, the eastern most range of the species is not being considered for protection under this conservation strategy. We request that the Conservation Area include potential habitat east and northeast of Coyote Lake.

While we support using floodplain management rather than structural alternatives for flood control, we fail to see how restricting disturbance within 100' of the banks of desert washes within the Conservation Area can actually be enforced. The influences of development and its associated effects (vehicle intrusion, exotic weed invasions etc.) will impact the washes where this species occurs, despite the proposed sign posting. While CNPS supports maintaining existing hydrology to sustain this species, increased water from urbanization could alter the existing hyrdrology and potentially increase weeds as well. Weed invasion, which is noted as an ecological threat to the gilia, would be exacerbated by increased water coupled with disturbance. There must be assurances to eliminate OHV travel in the washes, as well as minimizing other types of disturbance (biking, riding, hiking etc.) that could potentially increase the spread of weeds, especially as increased urbanization occurs.

CNPS does not support the elimination of the 10 % extirpation cap for this species, page 4-41, #7.

This species is an example of one of the "relatively unknown" (page 4-39) taxa that occurs in a faster developing area, and on lands that are more expensive than the average land cost in the West Mojave. From our perspective, all of these factors strongly suggest that the conservation strategy as proposed, will doom the species to extinction.

***Mimulus mojavensis* (Mojave monkeyflower)**

Although CNPS has not reviewed the latest proposal for conservation of this species, we support establishing Conservation Areas specifically for the Mojave monkeyflower throughout the range of the species.

The proposed Brisbane Valley Conservation Area, should seek to acquire all remaining populations of this species, despite that fact that the BLM has recently disposed of some of those sections. As identified on the map of 4-18-02, CNPS has some concerns about maintaining the viability of the reserve over the long-term, in the context of the edge to area ratio.

***Eriogonum kennedyi* var. *pinicola* (Kern Buckwheat)**

Although no conservation strategy has been produced for this species, CNPS requests "no take" of this incredibly restricted (known from less than 12 acres on the planet), endemic plant. Special management for this species is required. Despite the fact that its whole range is within the proposed Middle Knob ACEC, that status alone will not provide adequate protection for this species in perpetuity. Current conflicts with a variety of users continues to imperil this plant and its limited, highly restricted habitat. All routes adjacent to the plant populations should be closed.

CNPS has consistently supported the West Mojave Plan through participation in a variety of Task Groups and Working Groups. By providing science-based input throughout the process, we look forward to a Habitat Conservation Plan that provides rare plant conservation – not Task Group 1 recommendations. We urge you to incorporate basic conservation principles into the plan to assure plant conservation. Thank you for the opportunity to submit these comments.

Sincerely,

Ileene Anderson
California Native Plant Society

Cc: David Chipping, Vice-President, Conservation, CNPS
CNPS State Office
Ray Bransfield, U.S. Fish and Wildlife Service
Becky Jones, California Department of Fish and Game

Eddie & MaryAnn Phillips
P O Box 41
Big Bear City, Ca 92314
909-585-8006

RECEIVED
MAR 17 2003
LAND USE SERVICES DEPT.
ADVANCE PLANNING DIVISION

March 7, 2003

San Bernardino County
Attention: Randy Scott
385 North Arrowhead Ave
San Bernardino, Ca 92415-0110

Dear Randy,

After being involved in the Route Designation portion of the West Mojave Plan we find it fails miserably in addressing Multiple Use. According to Federal Land Management Policy Act these Public Lands are to be managed in a multiple use fashion. This Plan comes nowhere close to the Multiple Use Concept.

With the West Mojave Plan, it not only threatens Private Property it also most clearly threatens the Private Property Aspects of RS2477. Without the residents of San Bernardino County being able to travel freely across our County it threatens those Private Property Issues that are raised for RS2477.

San Bernardino County especially the First District will suffer tremendous loss of tax revenues from this plan. Which as you know will only add to an already strained economy. It is very detrimental to the small Desert Towns.

We refuse to accept any part of this draft as a usable alternative. We are asking San Bernardino County to reject this plan and go back to the California Desert Conservation Act without any changes from the original plan.

Sincerely,

Eddie Phillips

Eddie & MaryAnn Phillips
Americans For Forest Access, AFFA
California Off Road Vehicle Association, CORVA
Public Land For Public Use, PLPU
Public Lands For the People

Cc: Robert Smith First District Senior Field Rep

976

Jennifer & Ken Foster
15546 Fir
Hesperia, Ca 92345
760-244-9157

March 6, 2003

San Bernardino County
Attention: Randy Scott
385 North Arrowhead Ave
San Bernardino, Ca 92415-0110

RE: BLM WEST MOJAVE PLAN IMPACT TO PRIVATE PROPERTY RIGHTS

Dear Randy,

Please excuse our lateness in submitting our comments. We have been out of town and Ken has had surgery since the last meeting in Victorville. We have been in touch frequently with Bob Smith as we have for the last two years.

Our concern about the West Mojave Plan of the BLM's, is that Private Property Rights will be violated in more ways than just impact to personal property. San Bernardino County Residents, especially within the First District, will be severely limited in travel across our area, as the BLM shuts down more routes. The First District will be severely impacted with loss of tax revenue from use of OUR Public Lands. Recreation plays a vital roll in monies brought into our Communities. The High Desert is especially fragile in its environment and its people. People travel great distances to work and to play. Many people from other areas travel Interstate 15 back and forth to Nevada and other areas. When the District starts to lose great money, one of the first services that is lost is Emergency Response Services. This should not only be of concern to San Bernardino County but anyone traveling across our County.

San Bernardino County has already suffered from the Federal Agencies mismanagement of lands with wildfires being a perfect example. As more Routes are shut down it becomes very dangerous for evacuating this area. Right now there is very few options in case of emergencies for people to travel. While we know San Bernardino County has asserted our Rights Of Way through the adoption of RS2477 Resolution, that is a perfect example of Private Property that the Agencies will argue on. We expect Representation from our elected officials

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and hold them accountable to do the jobs they have been elected to do. We are very fortunate in the First District to have Supervisor Postmus, Bob Smith and the rest of the staff. We know they understand the seriousness of the West Mojave Plan. We can only hope the other four Supervisors also understands.

At both meetings, in San Bernardino and Victorville, we shared with you our concerns. Ken and I have been heavily involved in the Route Designation Process and we can tell you that BLM has totally disregarded the community's hard work and input. We have maps that show their total disregard for the residents of the First District. We ask that you look at the RS2477 Routes as Private Property that belongs to the People of San Bernardino County. We have great concern that the County is viewing RS2477 as a Road Issue. RS2477 does not mean ROAD in the current definition of ROAD. An RS2477 Route does not require maintenance. There is many ways to travel an RS2477 Route; by car, by foot, by horseback and by waterway.

The West Mojave Plan has many Radical Environmental Elements to it. And all at the same time the BLM refuses to look at any other avenues for the Protection of our Desert through a more User Friendly way. This Plan has one way and only one way, and believe us when we say it does not give one thought to our Counties needs. The Residents of San Bernardino County need the support of our Officials to protect our Property Rights in many ways. After working with Supervisor Postmus's Office for the last two years we know we can count on them. The question is; can we count on the Rest of San Bernardino County to help the First District?

Thank you for taking the time to listen to our worries. And also thank you for helping to arrange the second meeting, so that more of our local people could attend.

Sincerely,

Ken Foster Jennifer Foster

Cc: Bob Smith

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Americans For Forest Access
P O Box 13110
Big Bear Lake, Ca 92315

March 7, 2003

San Bernardino County
Attention: Randy Scott
385 North Arrowhead Ave
San Bernardino, Ca 92415-0110

Dear Randy,

We are a Multiple Use Recreation minded organization and our affiliated organizations have the same goals. We have participated in the process of this plan especially the Route Designation and find the BLM's plan is totally unacceptable.

This plan only addresses environmental issues and leaves nothing to the recreational community. Without the income from the recreational community a lot of the small High Desert Towns will suffer sever financial impact. This could mean complete disaster for these communities whose economies are already strained. Many Private Property Issues will arise if this plan is implemented, including those that are founded in RS2477. If the Residents of our County can no longer move freely across the vast sections of Public Lands, that in itself should be enough for the County to view this plan with great scrutiny. Our Founding Fathers had the foresight to see the need for RS2477, which has been supported for the past 143 years. Yes it was repealed with FLPMA but all routes prior to October 21, 1976 were grand fathered in. These are true Private Property Issues.

Our Organization hopes that San Bernardino County will agree with us and the many other Users of Public Lands that this plan it totally unacceptable.

Sincerely,
Lloyd Sturdy
Lloyd Sturdy
President Americans For Forest Access, AFFA

List of Affiliates Upon Request

Cc: Robert Smith First District Senior Field Rep

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FEDERAL AGENCIES FAIL IN DESERT TORTOISE RECOVERY

1/8/03 San Diego. Public land access advocates served a notice of intent to sue to federal agencies on Wednesday charging that the U.S. Department of Interior, and its two subordinate agencies, the United Fish & Wildlife Service (USFWS) and the Bureau of Land Management (BLM) have knowingly and negligently impeded the recovery of the desert tortoise since its listing as "threatened" in 1989.

The four organizations, primarily off road groups, claim that the DOI, USFWS and BLM have failed to take reasonable steps to arrest the spread of Upper Respiratory Tract Disease (URTD), which is suspected to be the primary cause of dramatic declines in desert tortoise populations. The action also cites the agencies' failure to properly monitor the recovery efforts, and claim the agencies have ignored the growing body of science that indicates URTD, along with raven predation, are driving the species rapidly toward extinction throughout the deserts of California, Arizona, Nevada and Utah.

This action also follows the release of a report from the General Accounting Office (GAO), which indicates that federal government has spent over $100 million in the last 12 years trying to protect the tortoise; with little or no evidence these efforts have made any difference.

"The DOI efforts to recover the desert tortoise have been an abject failure.," states David P. Hubbard an environmental attorney who filed the notice. "Millions of dollars have been expended, and millions of acres of federal land have been closed off to public use; yet the tortoise continues to spiral towards extinction."

The filing will heat up the battle between recreationists and those who want to close the desert to off-road vehicles and campers. Since 1994, millions of acres of public lands have been closed off from motorized access, making over 14% of California inaccessible to the public.

"The federal agencies are being driven to closure decisions by environmental lawsuits, and fail to consider the science or economical impact of the communities that are affected.," states Michelle Cassella of AMA D-37 Sports Committee, the lead organization in the action. "Recent studies funded in part by off road interests clearly indicate that in many cases the public has little or no impact on threatened species. Ironically, it is the trails and highways in the desert that provide barriers for disease transmission among tortoise populations."

Other plaintiffs in the action include the California Off Road Vehicle Association (CORVA), Off Road Business Association (ORBA), and the San Diego Off Road Vehicle Association (SDORC).

David Hubbard is an environmental and land use attorney with the firm of Procopio, Cory, Hargreaves & Savitch, LLP located in San Diego, CA. He represents public land advocates who have filed the 60 Day Notice of Intent to Sue. (760) 496-0776

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January 5, 2003

Kern County Planning Department
Attention: Lorelei Oviatt
Public Services Building
2700 "M" Street, Suite 100
Bakersfield, CA 93301-2370

Tony Morin Jr.
Space 23 Front
200 West Moyer Street
Ridgecrest, CA 93555-2641
(760) 446-8007 Unlisted

Dear Mr. Oviatt:

How much land is the Bureau Land Management going to take way from the public use! Why is that the public wading to see that the BLM is going thing wrong with the lands that they are trying to manager. We stated out with almost 21 millions of areas and now that the BLM is going to miss manager the land that they don't even try to take care off.

I think it's time that the BLM get out off managing land that they know that they cannot manager in the first place. Put it in the hands of people that can run the land for the people of California and not the people who work in Washington, D.C.

I have talk to BLM's people in the office of the Ridgecrest Field Office, in Ridgecrest and they don't like what the government is doing with the lands.

If the BLM can take one part of the desert one spot that people can talk about. Do science work do that one stop in the desert and see what comes out of that one spot? Is there one spot in the desert that people can drive out into the desert who are handicapper a person like me who have a Mentally Retarded a spot in the desert that should take the time to do some science work that the BLM has close down because they don't want the people on there lands?

When I was reading the books the best that I can in which I have a reading problem and that works don't go in the way it come out. It sometime is call Dyslexia. My intelligence is on the low in . It is call Aphasia. It affect the memory, physical coordination, and skills or verbal or oral.

That is the past and now is the press that we the people must take part off so the people of California can work with the BLM.

What is going to be the outcome of the Naval Air Weapons Station in Ridgecrest, California in which the "The West Mojave Plan," goes through? The lands has a airport on the land and where do do booming test out there.

Respectfully,

Tony Morin Jr.

Tony Morin Jr.

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Rec	Titles	Listing
1	Page 1____Neuons Chemical Imbalance___	
2	Brain Damage: Accident	Reasons for learning disabilities
3	Birth Trauma	What is a learning disability?
4	Environment: Air, Water, Lack of food	
5	Inherited: Genes	
6	Child Hood Illness: High Fever	
7		
8	1. Average or about intelligence	2. Learning is effected by a dysfunction in the brain nervous system that causes
9		problems in anclitory, motor percetion, hearing, eyes and hands.
10	1. Dyslexia,	a term that "difficulty in learning to read."
11	2. Dysgraphia,	difficulty in learning to write.
12	3. Dyscalculia,	in learing to use numbers.
13		
14		[A] There are also types of disabilities that can affect memory,
15		physical coordination, and social skills.
16	4. Aphasia,	verbal or oral.
17		
18	The learning procedure is a five-step process	
19		
20	1. We take in information through our senses.	
21	2. We figure out what it means.	
22	3. We file it into memory.	
23	4. We later withdraw it from memory and	"remember" it.
24	5. We feed it back to the outside world	through some form of expression-speech, action, or social response.
25	6. Words that people call is: Mentally Retarded	

Jan. 10, 2003

I strongly suggest that any additional recommendations forwarded by this or any committee considering the land usage under the "Desert Land Use" under any name be considered flawed due to biased testimony and biased scientific reports as submitted.

The BLM, the USFWS and DOI have continued to use information that can ONLY be used to find against the rightful land users, the people that use, without abuse, the PUBLIC lands that are for all of our enjoyment and daily access.

All employees of the government whether Federal, State or Local must be excused from any decision making in these cases due to biased leanings. They must NOT sit upon any committee that will make recommendations that will affect any decision to close public land for any purpose whatever. Any public employee that has membership in any organization that appears as a litigant in any action concerning land use of any kind must abstain from decision making in any form.

Respectfully submitted by,

Dorothy G. Brown
221 N. Gold Canyon Dr.
Ridgecrest, Ca.93555

760-375-0751

Dorothy G. Brown

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West Mojave Plan EIR Preparation

Statement

My name is Lee Sutton, a resident of Ridgecrest. I am a member of the local BLM Steering Committee and am President of Kerncrest Audubon Society.

I will begin with a brief description of the Important Bird Areas Program. Birdlife International in the mid-1980s began the Important Bird Areas Program in Europe. The idea was simple: compile an inventory of key sites (Important Bird Areas, or IBAs) using standardized, scientifically grounded criteria, publicize the compilation and make it available for prioritizing conservation activities. In 1995, the National Audubon Society and the American Bird Conservancy jointly inaugurated the program in this country.

Under Audubon California's leadership, three IBAs have been designated within or near the West Mojave. They are the Argus Mountains, Southern Portion, Butterbredt Spring and Big Morongo Canyon Preserve. The southern portion of the Argus Range was nominated by Kerncrest Audubon Society on behalf of the Inyo California Towhee, and was determined to be qualified as Continentally Important in August of 1998 by Dr. Jeff Price of the American Bird Conservancy in his capacity as Director of the United States Important Bird Areas Program. Both Butterbredt Spring and Big Morongo Canyon preserve were designated as Nationally Important Bird Areas. Kern and Santa Monica Bay Audubon Societies nominated Butterbredt. BMC Reserve nominated big Morongo.

I am asking that the West Mojave Plan EIR acknowledge these IBA designations within its content.

Mr. Bob Parker of the local BLM office, the California Department of Fish and Game and the Naval Air Weapons Station have been provided copies of the southern Argus Range designation.

Thank you very much for this opportunity to address the West Mojave Plan EIR preparation meeting.

Lee Sutton
231 S. Lilac Street
Ridgecrest, CA 93555
(760) 375-1981
10 January 2003

9804

TO: San Bernardino County
Advance Planning Division

FROM: Carol Wiley, Chair
Mojave Group, Sierra Club

DATE: February 6, 2003

RE: West Mojave Plan
EIR Scoping Comments

We are generally supportive of the West Mojave Plan to conserve wildlife, plants and desert habitat, while at the same time simplifying the permitting procedure; however we do have concerns regarding impacts on our desert resources. While the compensation strategy, with tiered impact fees, is a practical idea, safeguards must also be in place to insure our natural resources protection and to insure that the permitting and growth is always done with good planning and a focus on Smart Growth. Cumulative impacts must be adequately evaluated. Impacts from human encroachment and urban interface, with problems of properties adjacent to conservation areas, exotic plants, domestic animal, air and water quality, will increase with the rapidly growing population in desert areas. The Fort Irwin Exapnsion and other military uses must also be analyzed in cumulative impacts.

To insure conservation of sensitive plants and animals, there needs to be adequate and scientific surveys and management plans designed to respond in a timely fashion to species needs, as illustrated by comprehensive scientific monitoring. There should also be surveys of plant and animal species outside of conservation areas to evaluate impacts on species. The plan needs to address recovery of species that are in trouble or that become troubled in the future.

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Cattle grazing in tortoise habitat is a critical concern. There is concern that the proposed new grazing guidlines could further threaten desert vegetation and the desert tortoise and that these proposed changes will cost even more money for managing cattle allotments, rather than habitat conservation. Grazing is incompatible with maintaining critical habitat in arid desert lands. We need adequate scientific input and guidance in any allowed grazing allotments in desert lands. Protection of all riparian habitat must be implemented. The rare and unique riparian areas are very important to desert ecology and must receive adequate management policy, including the control of invasive plants including tamarisk and Russian Olive. The Mojave River, being a major water resource in the Mojave Desert, is of particular concern to the Mojave Group.

The decline of burrowing owls is of great concern. Since burrowing owls can be found at any location, including vacant lots, surveys need to be required in all development projects, and mitigation be required in all cases where burrowing owls are found, as included in Alternative D. The plan should immediately define the best acquisition sites for burrowing owl reserves. Perhaps the Antelope Valley, which used to be a desert grassland and the owls original habitat, and along the Mojave River between Victorville and Helendale, would be the best places for such reserves.

Since powerline are continuing to be built across the desert, all new powerlines should be built to raptor-safe standards.

We would like to propose Pisgah Crater as an area of Cirtical Enviromental Concern. This is a unique area and a good recreational site for public

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enjoyment and for protection.

The plans 1% development cap should be applied to all Conservation Areas, not just the DWMS's.

We remain hopeful that the West Mojave Plan will be comprehensive, including the participation of the counties and cities, to insure the best possible Habitat Conservation Plan for the West Mojave, crafted with science that will protect the plants, animals and beauty of this desert.

Submitted by:
Carol A. Wiley

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Comments on the Proposed West Mojave Plan

The following comments are based upon information disseminated to the public, at both the January 16th presentation (at the San Bernardino County Museum in Redlands), and at the follow-up meeting held Feb 5th, 2003 at the Victorville, City Hall, Victorville, California.

I make these comments as a private citizen, who has concerns about the prospects for continued, public access to public lands in the future.

The West Mojave Plan, as it stands now, is a *seriously flawed* document.

I make these assertions on the basis that the following have occurred (or are likely to occur if the plan is implemented as currently drafted):

1). Violations of Constitutionally afforded protections under "takings" clause and the 5th amendment.

2). Collusion, possible corruption, and potential Hatch Act violations by BLM staff involved in the drafting of the WMP ("the plan").

3). The plan as proposed will itself, violate the Endangered Species Act by authorizing "disposal" of current public lands that presently contain substantial populations of "endangered" Desert Tortoises.

4). The "plan" is not a "Habitat conservation plan" per se, but a "development plan" cloaked in 'science-speak' techno-garble and applied in an inconsistent, fashion that favors the military, and developers.

5). Inherent inequities in the plan favor large developers, while the public loses public lands, access those remaining public lands, and it appears that the public (and small developers) will bear the brunt of "mitigation fees", in the future, as cleverly written "exemptions" will shield large developers from the financial hardship caused by the imposition of such fees.

6). Undue influence and/or collusion by the BLM staff with the US Military and it's various proxies (i.e. the Military-Industrial Complex).

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7). Improper and "unfair" appraisals regarding the disposition public lands in the West Mojave at valuations less then their "best use" values.

8). Dereliction of duty by the BLM in managing public lands under the mandates of FLPMA ,primarily through that agency's acquiescence in "managing" public lands for "multiple use", instead, becoming a "real estate agent" for developers coveting federal land.

In addition, it's now obvious that some lands were already "slated for disposal" from the start, and that thousands of acres of public domain has been transferred while the West Mojave Plan was still being drafted.

In other words, land that would otherwise be subject to the WMP was removed from the public domain into private hands, PRIOR-TO the plan being finalized, and well before mandatory public comment period had taken place.

I. Rancher's, miners, and off-roaders are being "pressured" ostensibly by BLM, & NPS staffers, to vacate certain mining claims, roads, riparian areas etc even though many were grandfathered by the creation of the Mojave Preserve. While the Preserve is not in the planning area I'm speaking in general terms on this point.

II. BLM biologist Ed La Rue, and USGS tortoise expert Dr. Kristen Berry belong to non-profit tortoise preservation groups, serve as officers in such groups (or have from time to time). Such groups also receive grant monies, from the feds and from the state, and La Rue has a private consultation firm on the side, as well.

According to the Tortoise Non-prof newsletters, their are numerous USAF staffers, some from Edwards AFB who are members as well.

I was told, at the Jan 16th meeting that "the BLM had an agreement with Edwards AFB", the context being in the "proposed disposal" in the future of public land in North Apple Valley and in the Brisbane Valley.

It is my OPINION, that the military is using conversion where public resources i.e. land, water, minerals are being acquired to fund various operations/programs, and that is the basis for the "close working relationship" of the two groups.

III. Real estate professionals have indicated that according to documentation they have assembled, large tracts of land north of Adelanto along US 395 have already been moved into private hands. Such lands fall generally into the WMP planning area. In fact, in a September 23, 1999 article written by Andrew Silva, from the San Bernardino Sun, biologist Ed La Rue was paraphrased in the following manner :
....For example, a proposed fence to keep tortoises from getting crushed on Interstate 15 northeast of Barstow would make more sense on highway 395 north of Adelanto "where they are more concentrated", LaRue said.

The tracts have street names, plots maps, and ownership histories, yet the area is/was public lands.

In fact, in a conversation by phone in December 1999, Dennis Schram told me that relative to land exchanges "We got 2-for-1along US 395".

So land with large tortoise populations will be subject to the bulldozer, while Ranchers like the Blairs, and Dave Fisher are getting booted from their grazing allotments due to the "deleterious" effects of bovines on tortoise habitat? Unbelievable.

IV. The plan is a development plan masquerading as a conservation plan. In the Western most reaches of the desert near Mojave, in what is "fragile desert tortoise habitat" and (again, in advance of the plan being adopted) giant overpasses are springing-up near the Mojave Airport. How is that possible?

V. The BLM handout on the proposed mitigation fees suggests that "exemptions apply to single family residential dwellings on lots of records created prior-to the date of the fee ordinance enactment.
If I'm interpreting that correctly, the transferred properties (as they have plot maps and subdivisions even though they are vacant land, would be exempt as they were created prior-to the fee schedule's adoption.

VI. See above

VII. See the Appraisal Institutes report and the DOI OIG's report on land exchanges.

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Land Use Services Dept. 02/10/03

Attention: Randy Scott

West Mojave Plan Alternative

G. No Action

For the following reasons

1. Not enough information on the tortoise.
2. We need to develop a rehab. And reintroduction program

Mr. Scott,

I will send a letter of explanation within a few days. I do believe I have a very sound and workable idea / proposal / that will help everyone, including the tortoise and the tax payer, plus the many people who truly love our desert.

Sincerely,

Ginger Miller

31922 Brucite
Lucerne Valley, Ca

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West Mojave Plan
EIR Scoping Meeting
Comment Sheet

Please use this sheet to provide written comments identifying any issues, concerns, and/or alternatives which should be analyzed by the EIR for the West Mojave Plan. Use the back and attach additional pages if necessary.

Name Greg Herring Representing Self

Address 58360 Sunnyslope Dr. Yucca Valley, CA 92284

E-mail address herringjg@29palms.usmc.mil Telephone 760 369 2911

My comments address the following (please check all that apply):

- [x] Desert Tortoise/MGS Conservation
- [ ] Other Species Conservation
- [ ] Plan Implementation
- [ ] Motorized Vehicle Access
- [x] Plan Alternatives
- [ ] Other

Comments:

I believe that Alternatives F (1st choice) & E (2nd Choice) are the only viable choices for implementation of the West Mojave Plan. When deciding on what can be done to protect the Desert Tortoise, a prominent decision factor must be the general public's access and availability for maximum use of land for recreational opportunities.

Alternative F maximizes the publics' right to use land for adventure and recreation. Yet it still emphasizes the need to protect the Desert Tortoise. The focus of this protect scheme properly underscores the real culprits that threaten this species, disease and the ravenous Ravens of our desert. More attention in these two key areas will do more for the tortoises than the human intervention management efforts that have been in effect for nearly 10 years

I also realize that the West Mojave Plan has grown to encapsulate more than just the Desert Tortoise. This is where alternative E can provide optimum protection for the animals and plant life listed as protected while still allowing the public of today to enjoy the use of the land to a greater extent than the proposed alternative, alternative A.

WEST MOJAVE PLAN Continued Comments:
Greg Herring, Yucca Valley

The GAO report clearly shows that the government has been unable to determine if any of the measures to lessen the impact of human intervention has produced any change in the tortoise population. It is a known fact that disease and Ravens do a lot of harm to this population. More resources need to be applied to aiding the population through disease control and Raven population management. One could even go as far as saying that the GAO report establishes grounds for questioning the validity of the creation of the protection program for this creature, for no one has been able to accurately count these elusive reptiles.

I am an advocate of protection, but I firmly believe that protection that hinders or removes the publics' right to use our land for recreational opportunities is protection that has gone too far. That saving species for future generations at the expense of limiting recreational use for today's generation is not right. A solution that allows both is the only viable approach and alternatives F & E do this.

As a Yucca Valley resident I use the Dale District and surrounding areas for recreation. The charts and information provided at the Victorville scoping meeting of 5 February 2003 indicates that this area is not a high tortoise population area; in terms of quantity, it is next to the lowest category, which requires no such conservation area designation at all. I propose eliminating the Dale district from the roles as a Desert Tortoise Conservation Area.

Based on all the facts presented by the BLM and other agencies, and the facts available from sources such as the GAO Report, I advocate Alternative F, but am willing to live with alternative E to satisfy the needs of others' opinions and, if need be, any regulatory requirements.

James G Herring

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LAND USE SERVICES DEPT.
ADVANCE PLANNING DIVISION

COPY SENT

William E. Jenson
3195 Dumbarton Avenue
San Bernardino, CA 92404

President George W. Bush
The White House
Washington, DC 20502

**RE: Support for RS 2477 Right of Way Route Designations,
San Bernardino County, CA (Mojave National Preserve)**

Dear President Bush:

It is with great respect that we support your executive efforts to provide Local County Governments with jurisdiction to valid RS 2477 roads. In Lanfair Valley, California, Private lands total over 70,000 acres, with the county claiming access RoW to private lands, in the exclusion area of the Mojave National Preserve.

As a long time property owner in the east Mojave, the existing roads provide access to private property and quail and wildlife waters. Your actions to finalize local County claims to valid RS 2477 Right of Ways is laudable.

In addition, our family fully supports your accomplishments, both domestic and in foreign policy. As a Korean War veteran, I fully support your efforts for a strong U.S. Military.

I look forward to hearing from you.

Sincerely,

William E. Jenson

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TO:

It is very disturbing to me about what is happening within and to the Mohave National Preserve located in the southeastern portion of California. Initially the rangers closed many of the established, well traveled roads making it impossible for the elderly, the not-so-young nature observer, much less the disabled person, who might want to enjoy this area and should be able to do so. The Park Service states they only closed 15% of the roads; unfortunately this 15% has denied access to over 250 miles of well-traveled roads. Their chosen 250 miles of road closures led to a majority of the springs and scenic areas that allowed for true enjoyment of this beautiful desert area. Furthermore, what good does it do to close only 15% if you are trying to preserve this environment? Either close them all, which I am afraid is coming, or let the public keep using these roads which have been traveled on for over 50 years. At this point, it looks like almost 50% of this beautiful mountainous/desert preserve is inaccessible to anyone but the youngest and hardiest hikers. What the park service is doing is preventing a good many Americans who are older or with any walking disability from enjoying their land. The Park Service says that they are preserving the desert for the future generations. What is wrong with now -- this generation?

Secondly and very important and very urgent, as we speak, the MNP has gained control of most of the grazing rights thus removing the cattle from the preserve, destroying a way of life the ranchers have endured for over 50 years. Under the direction of the National Park Service the ranchers have shut off the water and are in the process of removing all existing, man-made water tanks and system. A vast amount of the wildlife located in the Preserve have grown accustomed to and have become dependent on these existing watering areas. A few of the larger animals will be displaced but the majority of the wildlife will be destroyed, dying of thirst never to return. This is unacceptable to me, is a needless waste and this shows a grave lack of planning on the part of the MNP. The Park Service gives the reason that these watering areas, which have been in existence over 100 years, are not natural. The NPS wants the wildlife to exist on the few natural springs that they say are in the area but which go dry during drought years. It is hard for me to understand why you can't use an existing well for the benefit of these animals. Just to name a few of the animals that will be affected when they no longer will be able to get to this water are; Big Horn Sheep, burros, deer, coyote, kit foxes (endangered??), gray fox, badgers, bobcats, rabbits, hawks, owls, eagles, ducks, quail and countless other mammals and migratory birds. The Park Service say they only want the "natural" wildlife to exist. Question; how long does any wildlife have to exist in an area before they become natural? (FYI, is everyone aware that the beautiful ring-neck pheasant is unnatural to the U. S. A. and was imported).

I could possibly accept this destruction of wildlife if someone will give me a rational explantation for this action. Additionally, how can this possibly benefit the general public who might want to visit **their** preserve or the wildlife already in residence. Visitors to the area will see beautiful sunrises and sunsets, breathtaking scenery, only on the roads left open, but void of any wildlife. If there is water all of the above named animals could possibly flourish for all to see and enjoy.

There is a readily available solution to avoid this devastation. There are several organizations who will gladly volunteer their time and money to help maintain these areas for wildlife only. This will negate any argument the Park Service people have about no money, manpower or using too much water, as they could install watering areas sufficient only to service wildlife. What needs to be done by the MNP is to reopen some of the closed roads and permission given for a nonprofit group to maintain small and efficient, natural appearing watering areas for the wildlife, large and small. What or who would this hurt?

Awaiting your reply,

Name: [signature]

Age & Occupation:

Address:

Telephone & E-mail:

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From: Pamela Wright [pam@tstonramp.com]
Sent: Monday, March 03, 2003 7:35 AM
To: Slowik, Matt - Planning
Subject: could you please forward these comments....

Hi Matthew,

I attended the January 16 West Mojave EIR Scoping Meeting. The comment sheet we were provided did not include an email, and I am unlikely to ever submit my comments if I don't use email. Could you please forward this email to the appropriate person on the County LUSD staff?

Thanks,

Pam

Comments on January 16, 2003 Scoping Meeting - West Mojave EIR Scoping Meeting

First I would like to say that I don't envy those providing the public face of the planning group as I found many of those attending the meeting to behave rudely. The presenters did a nice job of letting the assorted passions state their opinions in a moderated forum.

I have not attended other meetings in this process, but I was struck by the lack of response/explanation/justification provided by the presenters when the plan was attacked with misinformation. Again, I don't envy his job, but I think the biologist should have been prepared to provide responses to many of the assertations by opponents of the plan. (For example, all we need is a cure for the tortoise diseases, reintroduction is the answer, but then it is the universities fault that desert tortoise is going extinct because they collect all the critters for study....). OK, so it's hard to respond in a measured and logical way when the comments are neither, but it still seems like part of the process should be to educate the misinformed even if they don't want to hear it. And since their were likely some present, like me, who may not have attended other meetings, it seems important to address these comments every time they come up (concisely, of course).

For example, if a common comment is "Reintroduction is the only thing that's ever saved animals", a response should be available. A study with lead author Noel Snyder (citation follows) evaluating the success rates of reintroductions reveals that the percentage of successful reintroductions is dismal. The study also points out reasons why this is a last resort technique.

Snyder, Noel, Scott Derrickson, Steven Beissinger, James Wiley, Thomas Smith, William
Toone, and Brian Miller. April 1996. "Limitations of Captive Breeding in Endangered
Species Recovery." Conservation Biology 10:338-348.

When the common notion that extinction is natural is offered, provide information on the unprecedented volume of extinctions occurring currently.

I guess what I'm trying to suggest, is that the biologist should have some time to prepare accurate and thoughtful responses to common comments so that the misinformation presented by passionate commenters is not left to stand as if it were accurate and as if there were no scientific information suggesting otherwise. These meetings shouldn't provide a forum for Rush Limbaugh inspired misinformation to spread.

Thank you,

Pamela Wright

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My comments do not necessarily reflect the views of my employer, but I am leaving my contact information attached. I live and work in San Bernardino County.

Pamela Wright - Biologist/Environmental Specialist
Tom Dodson & Associates
2150 N. Arrowhead Ave.
San Bernardino, CA 92405
Tel: 909-882-3612 ext. 17
Fax: 909-882-7015

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LAND USE SERVICES DEPT.
ADVANCE PLANNING DIVISION

February 10, 2003

Randy Scott
San Bernardino County Planning Department
385 North Arrowhead Avenue
San Bernardino, CA 92415-0182

Marion F. Ely II
17868 Hwy 18 PMB 352
Apple Valley, CA 92307

RE: Comments re: scope & content of the EIR for the West Mojave Plan (WMP)

The following comments are somewhat generalized due to my receiving the packet of information only 11/2 days before the February 5th meeting in Victorville (postmarked Jan. 29th, Riverside, received on the afternoon of Feb. 3rd. During the time prior to the meeting I was able to review only three documents : **West Mojave Plan**, A REGIONAL STRATEGY TO RESOLVE ENDANGERED SPECIES ISSUES, (11pp.); **West Mojave Plan**, GENERAL PLAN STRUCTURE, DESERT TORTOISE AND MOHAVE GROUND SQUIRREL CONSERVATION (43 pp.) and the **West Mojave Plan**, PROPOSED CONSERVATION STRATEGIES (49 pp.) In just these three documents I noted over 130 items worthy of comment.

Although I was in the "Supergroup" for about 10 years, and not notified of its progress for the last three, I was unable to obtain a hard copy of the current text of the draft WMP although it was said to be available on the internet. Being among the 50% of the population not on the web, there was not enough time to read it in any event since it is allegedly over 300 pages in length. **COMPLAINT: The EIR should not be contemplated or written before the draft WMP itself is made available for public review and comment for a time commensurate with its length, i.e. the general 90 days.**

Until the WMP has gone through the above, how can anyone compose pertinent comments on what might be? The current process as implemented by the previous administration has corrupted the public review and comment on federal proposals for plans and regulations. Having followed another regulation scheme for about 10-years I have already had experience with the system and am wholly distrustful of the outcome of the WMP as proposed by the documents available to me.

From the review of the afore mentioned documents I distilled the following.

1. As currently proposed the WMP would more accurately be described as "***The Federal Republic for the Western Mojave Wildlife***" or "***Biologists Eternal Employment Act.***"

Many of the studies, endless surveys and information gathering processes, and monitoring (many of which are to be carried out by the local jurisdictions) contained in the proposed WMP will collect data which should have been obtained even before listing of the Desert tortoise and Mohave Ground squirrel.

One salient piece of information lacking is what is the current population size of the Desert tortoise and Mohave ground squirrel? With over $100,000,000 having already been spent on the Desert tortoise alone, and some density studies already having been performed, even estimates of

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the population have not been made public. Given the draconian and Sisyphean nature of the WMP this is crucial information in the face of the measures being proposed.

2. The EIR should exhaustedly and ***honestly***, discuss the impact of the proposal on human resources and *their* environment. There are many instances within the documents where a disturbing distrust of *homo sapiens* are displayed. E.g. monitoring of activities, aerial (or space located?) photography or surveilance and on-the-ground observations and record keeping, etc. The proposed WMP *will* alter human responses to it.

3. The poisonous ***milkvetch*** is being protected instead of being eradicated. This is an absurd proposition which is being used in at least one case to withdraw mineral entry in the Lane Mountain area. The EIR should justify its protection and analyize the potential for poisonings arising out of its presence as well as the impact on humans prohibited from pursuing activities on such lands.

4. The 1% rule and the resulting costs to the ususpecting public should be quantified.

***

Much more could be written bu the time permitted does not allow it. At the very least, 120 days more should be permitted for an adequate review of the draft WMP itself.

In short, the WMP as presently assumed to be, is a very bad project that will have major adverse impacts and consequences on all resources involved.

Sincerely,

Marion Ely III

2-10-03
WMPEIR.COM

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APPENDIX W

CALTRANS MAINTENANCE ACTIVITIES

APPENDIX W
CALTRANS MAINTENANCE ACITIVITIES

W.1 PUBLICLY MAINTAINED ROADS

Some of the existing county maintained unpaved roads may be paved within the existing roadbed as future traffic, safety and/or environmental conditions warrant. In addition, safety improvements to other publicly maintained existing roadways within Public/Quasi-Public Lands are covered activities. Guidelines are provided below that would minimize and avoid impacts to sensitive species and habitats occurring adjacent to the existing roadway.

Necessary operation and maintenance activities conducted for safety purposes would be permitted within Public/Quasi-Public Lands. These activities include, but are not limited to, the following:

- **Signage -** The installation and maintenance of signs to control traffic for the purposes of regulation, warning or guidance.

- **Traffic Control Devices -** The installation and maintenance of official traffic control devices, including, but not limited to, signing, street lights, striping, pavement markings, flashing beacons, and traffic signals in order to control, regulate, and provide guidance to traffic movements and to clearly identify potentially hazardous conditions.

- **Guardrails and Fences -** The installation, replacement and maintenance of guardrails and fences solely for vehicle and pedestrian safety.

- **Pavement Repairs -** Pothole repair, chip seal, skin patching, slurry sealing, and resurfacing of roadways performed for the purpose of reducing roadway hazards and maintaining the useful life of the road.

- **Accident Response -** The removal and clearance of debris and spills related to traffic accidents, including the repair and/or restoration of any damaged roadway facilities.

- **Tree Trimming -** Routine tree and shrub trimming within the road rights-of-way to improve sight distance and eliminate potential traffic hazards.

- **Natural Disaster Damage/Restoration of Emergency Access -** Clearance of debris, and other natural material from roadways that results from natural disasters such as flooding, earthquake, and fire. Such actions necessary for public safety, especially in providing vehicular movement during emergency operations.

- **Storm Damage -** Clearance of mud and debris accumulated on the roadway due to a storm event. Road crews will complete these projects as soon as possible following the end of a storm event, and may use the excess mud, dirt, and rock on the roadway as fill material.

- **Weed Control -** Control of vegetation within road rights-of-way (including graded shoulder areas and open or closed channels) by means of mowing, discing, hand labor, or herbicide application in order to control weed populations and eliminate sight distance problems, roadway hazards, prevent fires, and provide proper drainage. This includes the control of weeds and grasses in revegetated mitigation areas and landscaped areas in order to allow plant establishment by the methods outlined above.

- **Grading Shoulders -** Shoulder grading up to 12 feet from the edge of paved or unpaved roadways in order to reduce accident potential and improve safety. Additional fill material may be needed to restore the original grade at the edge of the pavement; such material may consist of dirt, gravel, decomposed granite, or rip rap.

- **Grading Existing Dirt Roadways -** Grading of existing County-maintained dirt roadways in order to reduce accident potential and improve safety.

- **Dust Stabilization -** The placement of dust stabilizers on the soil including, but not limited to, magnesium chloride, permazion, penetration and gravel, in order to prevent erosion, provide dust control and improve site distance when traffic visibility is reduced due to dust clouds.

- **Culverts/Drop Structures -** Construction, replacement, and cleaning out of culverts/drop structures in areas where flooding hazards may arise. This includes the clearing of brush, sand, sediment, debris, and other obstructions to flow.

- **Curbs/Gutters/Sidewalks -** Construction, replacement and repair of curbs, gutters and sidewalks as necessary in order to reduce vehicular and pedestrian accident potential, improve safety and prevent storm damage.

- **Roadway Widening -** Minor widening of an existing roadway that does not add through travel lanes, but may add turn lanes at intersections or paved shoulders as necessary for safety reasons.

- **Berms** - Construction of berms within the road right-of-way as part of a resurfacing project to control drainage.

- **Roadway Resurfacing -** Grinding the pavement surface, paving, and grading of dirt shoulders, including chipseals, slurry seals, micro and macro paving.

- **Ditch Clearing** -Clearing of ditches and stabilization of the banks of drainage courses along roadways.

- **Landscape Maintenance -** Maintenance and repair of irrigation systems, landscape plantings, and associated facilities.

- **Bridge Maintenance -** Removal of vegetation, debris, sand, silt, sediment, and other obstructions to flow.

- **Roadway Reconstruction** - Removing existing paving to regrade, base and pave an existing roadway.

- **Roadside Maintenance -** Litter and debris removal, sign lighting, mechanical sweeping of shoulders and/or centerline, and graffiti removal.

- **Best Management Practices -** To meet NPDES permit work, includes but limited to; drainage Inspection, roadside stabilization, erosion control, illicit connections, illegal discharges, water quality structural treatments and ground water treatment facilities.

- **Traffic Control Devices -** (needs to include) pavement markers, roadside markers and vehicle energy attenuators.

- **Snow and Ice Control -** Snow removal, drift prevention, ice control, installation and maintenance of snow fences, snow pole installation, repair and removal, maintenance and control of tire chain installation points.

W.2 Guidelines for Safety Improvements for Existing Roadways Within Public/Quasi-Public Lands:

Maintenance and operation activities conducted for safety purposes, as described above, are subject to following guidelines.

- Timing of construction activities shall consider seasonal requirements for breeding birds and migratory non-resident species. Habitat clearing shall be avoided during species active breeding season defined as March 1 to June 30.

- Silt fencing or other sediment trapping materials shall be installed to minimize the transport of sediments off-site. Sediment and erosion control measures shall be implemented until such time soils are determined to be successfully stabilized.

- The footprint of disturbance shall be minimized to the maximum extent feasible. Access to sites shall occur on pre-existing access routes.

- Equipment storage, fueling and staging areas shall be sited within existing ROW or on non-sensitive upland habitat types with minimal risk of direct discharge into riparian areas or other sensitive habitat types.

- Exotic species removed during safety improvements shall be taken off-site to prevent sprouting or regrowth.

- Construction, maintenance and operation activities may be restricted within and adjacent to wetlands, vernal pools, restoration areas and sensitive wildlife habitat (e.g., during the breeding season) at the discretion of the Reserve manager.

- Fencing or other barriers shall be used to restrict access to sensitive areas during construction, operation and maintenance activities.

- Vegetation removed from the site shall not be stockpiled in any channel, streambed, lake or on the banks. Spoil sites shall not be located within-a channel, basin, stream, or lake where spoil or debris can be washed back into the channel or basin or a stream/lake, or where it will cover aquatic or riparian vegetation.

- The selection and application of (herbicides and rodenticides) shall comply with all applicable local, State and Federal permitting or licensing requirements or regulations.

- All debris, bark, slash, sawdust, rubbish, silt, cement, concrete, or washings thereof, asphalt, paint, or other coating material, oil or other petroleum products, or any other substances resulting from project-related activities which could be hazardous to aquatic life or waters of the State, shall be prevented from contaminating the soil and/or entering the waters of the State. None of these materials shall be allowed to enter into or be placed within or where they may enter or be washed by rainfall or runoff into waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any channel, basin, stream or lake.

APPENDIX X

BIOLOGICAL TRANSITION AREAS DROPPED FROM FURTHER CONSIDERATION

Appendices

APPENDIX X

BIOLOGICAL TRANSITION AREAS DROPPED FROM FURTHER CONSIDERATION

X.1 Background

In the very earliest planning stages, the biological evaluation team (Bureau of Land Management 1999) identified three different tortoise management areas: Desert Wildlife Management Areas (DWMAs) for tortoise conservation, Incidental Take Areas (ITAs) for authorized development, and Managed Use Areas for remaining lands. Following the September 1999 publication of the Biological Evaluation during public meetings, the Managed Use Area concept was dropped in favor of Biological Transition Areas, or "BTAs."

During these meetings, various BTA boundaries were discussed. Two original BTAs were subsequently merged into respective DWMAs: north of Silver Lakes into the Fremont-Kramer DWMA and south of Highway 62 into the Pinto Mountain DWMA.

During the public review of the Draft EIR/S, both the BLM and the counties expressed concern that the BTA concept was highly complex, would be very difficult to implement and offered little in the way of additional conservation for desert tortoises. As result of the concerns expressed, the West Mojave Team re-evaluated each BTA on an individual basis to determine the values that each area was anticipated to provide. Those areas with important conservation values were added to the adjacent tortoise DWMA, while those areas that were judged to have minimal contribution to the overall conservation design were deleted.

The 11 BTAs designated for the desert tortoise were depicted in Map 2-1 of the Draft EIR/S (foldout map in Volume 1). Table X-1 presents an overview of these 11 areas, including the county in which the BTA is located, and the acres of public and private lands included within the BTA. There was no differentiation between State-owned lands and other private ownership. Percentages following BLM acreage are relative to the total size of the associated BTA. Public lands accounted for 34% of the total, while 66% of the BTAs were in private ownership. Most of the private land BTA acreage (i.e., 59,223 of 79,664 acres, or 74%) was found in San Bernardino County. BLM lands accounted for as little as 5% of the BTA in the Edwards Bowl area and as high as 72% in the area between Highway 395 and the Kern County line.

Table X-1
Characteristics of the 11 Biological Transition Areas Associated With DWMAs.

Generic BTA Name	County	GIS-Based Acreage (acres)		
		Private	BLM	Total
1. Desert Tortoise Natural Area	Kern	20,441	3,615 (15%)	24,056
2. HWY 395 to Kern Co. line	San Berdo	5,980	14,840 (72%)	20,820
3. East of Harper Lake	San Berdo	2,920	905 (24%)	3,825
4. Southeast of Harper Lake	San Berdo	5,712	1,279 (18%)	6,991
5. West of Calico Mountain	San Berdo	3,441	2,596 (43%)	6,037
6. West of Newberry Springs	San Berdo	4,423	4,130 (48%)	8,553
7. East of Newberry Springs	San Berdo	1,370	104 (7%)	1,474
8. Edwards Bowl area	San Berdo/L.A.	22,341	1,252 (5%)	23,593
9. North of Adelanto	San Berdo	7,796	1,305 (14%)	9,101
10. Northern Lucerne Valley	San Berdo	3,791	7,719 (67%)	11,510
11. Twentynine Palms	San Berdo	1,449	2,424 (63%)	3,873
Totals	**N/A**	**79,664 (66%)**	**40,169 (34%)**	**119,833**

X.2 Findings

The Draft EIS/R referred to a heightened review of projects occurring within BTAs. However, it failed to list project types that would be incompatible with tortoise conservation. Nor did the Draft EIR/S attempt to identify what "heightened review" entailed. Such a heightened review was not identified for DWMAs, which are intended to be the main location for tortoise conservation. Eliminating BTAs would not increase the area of incidental take, as BTAs were already designated as part of the Incidental Take Area (ITA). With or without BTAs, the counties would continue to consider projects in the context of CEQA, and would need to determine potential significant impacts to rare and endangered species. Similarly, the BLM would be required to complete Environmental Assessments or Environmental Impact Statements for all projects, including those in BTAs. Given this information, there appears to be little difference in tortoise conservation with or without BTAs.

The primary function of BTAs was to prevent "spillover" impacts from projects located within the BTA onto the adjacent DWMA. Post-Draft analysis revealed that there really was no proximate urban interface to the following BTAs: 1, 2, 6, and 7. In several cases (BTAs 2 and 10), they are mostly comprised of public lands managed by the BLM, so there is little chance they would be used for residential, agricultural, and several other types of development. Six of the BTAs are situated between DWMAs and adjacent areas that are actively being developed: BTA 3, 4, 5, 8, 9, and 10. These six areas are where BTAs would most likely have provided a protective function, and these could be the focal areas for alternative means to accomplish similar protection.

Given the findings of this analysis, it was determined that eliminating BTAs would not substantially reduce tortoise conservation. DWMA boundaries were expanded in 7 of the 11 areas to facilitate tortoise conservation in critical habitat and on BLM lands (see Table 2 below).

Additional protective measures were identified for potential application in 6 of the 11 areas (see Table X-2 and point 13 at the end of this appendix).

Many of the considerations given above also apply to Mohave ground squirrel conservation. Some of the impacts associated with urbanizing areas are expected to affect tortoises but there is no evidence they would affect Mohave ground squirrels. For example, tortoises in adjacent areas are often affected by the following threats, for which there is no available information showing a similar threat to Mohave ground squirrels. Increased dumping, feral dogs, common ravens, pet collection, vandalism, poaching, etc. are examples of threats to tortoises that are not known to affect Mohave ground squirrels. Given this and the above information, it was determined that elimination of BTAs associated with the Mohave Ground Squirrel Conservation Area would not significantly detract from conservation for that species. BTAs adjacent to the MGS CA were eliminated without modifying the conservation area.

X.3 Recommendations for BTAs Adjacent to DWMAs

Given biological and political constraints, the Final EIR/S reflects two basic changes to the conservation strategy in response to eliminating tortoise BTAs adjacent to DWMAs. The modifications are intended to replace the function of BTAs by protecting DWMAs from adjacent impacts. The two changes included (1) modifying DWMA boundaries where appropriate and (2) identifying other protective measures for specified DWMAs to minimize impacts from adjacent Incidental Take Areas. Table X-2 summarizes the changes that were made. The rationales for the changes are described following the table.

Table X-2
BTA Elimination and DWMA Modifications

Generic BTA Name	Actions Taken
1. Desert Tortoise Natural Area	A total of 7,410 acres added to Fremont-Kramer; connect DTNA fence with Mojave-Randsburg fence; minimize OHV and sheep grazing impacts.
2. HWY 395 to Kern Co. line	BTA eliminated with no DWMA modification; MGS CA protections apply to 15,650 acres or 75% of former BTA.
3. East of Harper Lake	Superior-Cronese DWMA expanded by 3,835 acres to include entire BTA; may require installation of fence between cattle allotment and DWMA; may need other protective measures[1]
4. Southeast of Harper Lake	Superior-Cronese DWMA expanded by 1,778 acres to include the northern portions of the BTA; remaining area becomes part of ITA; may need other protective measures.
5. West of Calico Mountain	Superior-Cronese DWMA expanded by 3,111 acres, including 2,392 acres of BLM lands, located in the north part of the BTA; remaining areas to the south become part of ITA
6. West of Newberry Springs	Ord-Rodman DWMA expanded by 8,553 acres.
7. East of Newberry Springs	BTA eliminated with no DWMA modification.
8. Edwards Bowl area	Fremont-Kramer DWMA expanded by 11,898 acres to include critical habitat not included in Draft's boundary configuration; remaining BTA would become ITA; SEATAC would provide similar function for lands in L.A. County; may need other protective measures
9. North of Adelanto	BTA eliminated with no DWMA modification; may need other protective measures
10. Northern Lucerne Valley	Ord-Rodman DWMA expanded by 9,927 acres; may need other protective measures, particularly along south boundary
11. Twentynine Palms	BTA eliminated with no DWMA modification; may need other protective measures

[1] "Other protective measures" are listed below in point 13.

The primary function of the BTAs was to protect the integrity of the adjacent DWMAs. Rationale is provided below for DWMA modifications that were intended, in part, to functionally replace BTAs where appropriate.

(1) BTA1 – Desert Tortoise Natural Area. One can see in Table X-1 that 85% of proposed BTA1 at the Desert Tortoise Natural Area would have been comprised of private lands. Although this could be interpreted as an increased threat of human development, the necessary infrastructure (i.e., sewer, utilities, etc.) is lacking. There is little likelihood that residential development would occur, although other development, such as a new prison, is possible. In February 2004, the Desert Tortoise Preserve Committee provided a map showing proposed revised boundaries for the Desert Tortoise Natural Area. These modified boundaries were discussed with the CDFG relative to the then-proposed Hyundai test track. They would strengthen conservation for both the desert tortoise and Mohave ground squirrel in spite of eliminating BTA1.

The expanded DWMA encompasses several square miles that the Desert Tortoise Preserve Committee recently purchased that were not included in the Alternative A DWMA boundary shown in Map 2-1 in the Draft EIR/S. Since DTPC's mission is to conserve the tortoise in important habitats, it was appropriate that the boundary be modified to include lands they already own, and others that are identified for eventual acquisition and conservation. The northwestern part of the Fremont-Kramer DWMA is located north of Highway 58 and west of Highway 395. It is bounded to the south by hundreds of square miles of private land in California City and Kern County. Relatively mountainous areas with some good remaining populations (i.e., Little Dixie Wash, Indian Wells Valley, etc.) are still found to the north. This is a very important area in terms of managing OHV use and sheep grazing, much of which occurs in an unregulated manner on private lands. The new configuration helps "thicken" the conservation area at its most narrow point, between Koehn Lake and the east-central boundary of the Desert Tortoise Natural Area. The realignment along the Mojave-Randsburg Road makes for a more defensible boundary than the one proposed in the Draft EIR/S. Perimeter fences already exist around the Desert Tortoise Natural Area and along the Mojave-Randsburg Road that would facilitate DWMA management of this important area. The perimeter fence around the natural area already functions, in part, as a BTA by minimizing OHV and sheep grazing impacts, which are prevalent in adjacent areas. For these reasons, modifying the DWMA boundaries as shown in Map 2-1 is considered to provide relatively more conservation value than would have been provided by designating the BTA.

(2) BTA2 – Highway 395 West to Kern County Line. About 72% of this area is managed by the BLM, so there is somewhat less a threat of residential development. When conditions permit, woolgrowers use this area extensively. Its inclusion in the Fremont-Kramer DWMA would necessarily mean eliminating sheep grazing from this 21,820-acre (+/- 31-mi^2) area. The area was identified as being available for sheep grazing when grazing was effectively eliminated from the east side of Highway 395 in the early 1990's. It would require a fence along the county line to restrict sheep grazing from this area if it were managed as a DWMA. The current proposal is to fence Highway 395 to minimize vehicle impacts to tortoises. This would effectively create a fragmented block of habitat on the west side of Highway 395. The northern 15,650 acres (i.e., 75% of former BTA2) would be designated as part of the Mohave Ground Squirrel Conservation Area under the Proposed Action. Management prescriptions in the MGSCA would protect these habitats in the absence of the BTA designation. The BTA was dropped without modifying the adjacent DWMA.

(3) BTA3 – Harper Lake. West Mojave Plan records indicate that there are few structures in the eastern part of the BTA, proximate to Hinkley. The 940 acres of BLM land occur on the western portions of the BTA. In its comment letter, CDFG recommended that the DWMA be expanded in this area to ensure good connectivity among conservation lands to the east and west. The Harper Lake cattle allotment is immediately west of this area. There is no allotment fence along the western boundary to preclude cattle from entering the expanded DWMA. Tortoise surveys would be performed for future development, including single-family residences, and heightened Best Management Practices would apply. Impacts would be included in the BLM's and county's 1% Allowable Ground Disturbance. Thickening the narrow band of conserved habitat in this area is considered important to tortoise conservation. The Superior-Cronese DWMA boundary has been changed to include all of BTA3.

(4) BTA4 – Southeast of Harper Lake. For the reasons given above in BTA3, the change

was made to include the northern three miles of BTA4 within the Superior-Cronese DWMA to thicken the conservation land bridge southeast of Harper Lake. This habitat connector may be important to conservation of the MGS, particularly if the dry lake is an impediment to dispersal along a north-south axis. Inclusion of these two former BTAs into the Superior-Cronese DWMA would expand the DWMA, and the MGS CA, by 5,613 acres.

(5) BTA5 – West of Calico Mountain. There is no imminent urban threat from the west that would justify the configuration of BTA5. BLM currently manages approximately 2,400 acres in the northern portion of this BTA, with the remaining southern portion in private ownership. The change was made to expand the Superior-Cronese DWMA into the northern portion of the BTA, which includes 2,392 acres of BLM land and 719 acres of private land. Remaining areas to the south would be managed as an ITA and remain within the designated tortoise Survey Area.

(6) BTA6 – West of Newberry Springs. The 8,553 acres comprising BTA6, half of which is composed of public lands, is not directly threatened by a proximate urban interface. Tortoises are more likely to be affected by mining than other forms of development. The modification is intended, in part, to enlarge the DWMA, which at 388 square miles is still about 600 square miles smaller than what the recovery plan recommended. The importance of the Ord-Rodman DWMA cannot be over-emphasized, particularly if disease is responsible for decimating populations in the Fremont-Kramer and/or Superior-Cronese DWMAs. The change was made to include the 8,553 acres in the northern portion of the Ord-Rodman DWMA.

(7) BTA7 – East of Newberry Springs. Only 104 acres of this relatively small area are managed by the BLM. Most of the local residential development and all of the agricultural development occur north of Interstate 40. Since BTA8 is directly adjacent to I-40, it has already been somewhat degraded and is within an area of likely human development. It is recommended that this 1,474-acre area would not be included within the Ord-Rodman DWMA; rather, it would be retained within the ITA.

(8) BTA8 – Edwards Bowl Area. As given in Table 1, this was the second largest proposed BTA (23,593 acres compared to 24,056 acres in BTA1). There are approximately 12,000 acres of critical habitat in the area that were not included in the southern part of the Fremont-Kramer DWMA. Several public comments, particularly from tortoise interest groups, questioned the decision to exclude *any* critical habitat from proposed DWMAs. The jurisdictional protection that would have been provided by BTA management would be replaced by including all tortoise critical habitat in the area within the Fremont-Kramer DWMA. This entailed expanding the southern part of the Fremont-Kramer DWMA by 11,898 square miles. Although the BTA to the west of critical habitat would be abandoned, some of this area is included within the MGS CA, which would call for somewhat more restrictive management than under BTA management. Most of the BTA located within Los Angeles County would remain within a Significant Ecological Area (SEA), which would already require heightened review of environmental impacts by the Significant Ecological Area Technical Advisory Committee (SEATAC).

(9) BTA9 – North of Adelanto. This 9,100-acre area is comprised of about 86% private

lands, with the remaining BLM lands occurring in an unconsolidated pattern. Given the near-absence of public lands, this former BTA was not included within the DWMA. As given below in point 13, it would be appropriate to implement some or all of the protective measures described to functionally replace the BTA.

(10) BTA10 – North Lucerne Valley. Given the prevalence of BLM land and the apparent development threats from the south, all of BTA10 located west of Camp Rock Road has been included in the Ord-Rodman DWMA. Areas east of Camp Rock Road are within the Johnson Valley Open Area and would not be included within the DWMA. The southern boundary corresponds with an east-west road that provides an easily recognizable, defensible boundary. This change entailed adding 9,927 acres to the southern portion of the Ord-Rodman DWMA. Given the additions of BTA6 to the north and BTA10 to the south, the Ord-Rodman has been increased by approximately 29 square miles, for a total of about 417 square miles.

(11) BTA11 – Twentynine Palms. There were 2,424 acres of BLM land (63%) within this 3,873-acre BTA. In very early planning, these six square miles were first included in the proposed Pinto Mountain DWMA. Then it was found that this area is within the corporate boundary of the City of Twentynine Palms. The Biological Evaluation (Bureau of land Management 1999) stated that most areas within city limits would be designated as Incidental Take Areas. Given intended human growth within such areas, DWMAs were designed, in part, to avoid cities. As such, BTA11 was dropped with no expansion of the Pinto Mountain DWMA.

Other Protective Measures. Former BTAs 3, 4, 8, 9, 10, and 11 were the most likely to function as intended because of the proximate human development in adjacent Incidental Take Areas. In the absence of BTAs, the following measures are intended to help alleviate indirect impacts of adjacent human development on tortoises and habitat in proximate DWMAs. These measures include (a) Increase signing and/or fencing along boundary so adjacent residents are aware of the conservation area. (b) On BLM lands within the DWMAs, increase law enforcement or other BLM presence in the area to minimize illegal activities such as dumping, shooting, and cross-country vehicle use on public lands outside designated open areas. (c) Specifically consider and discuss DWMAs associated with these six areas when formulating the Feral Dog Management Plan. (d) Depending on monitoring results, there may need to be subsequent conservation (adaptive) management along the DWMA boundary to minimize impacts from authorized development in adjacent Incidental Take Areas.

Appendices

APPENDIX Y

SPECIES ADDRESSED BY THE PLAN

Appendices

APPENDIX Y

SPECIES ADDRESSED BY THE PLAN

Proposed Covered Species – 49

Reptiles - 4
Desert tortoise (*Gopherus agassizii*) **Threatened**
Mojave fringe-toed lizard (*Uma notata*)
San Diego horned lizard (*Phrynosoma coronatum blainvillei*)
Southwestern pond turtle (*Clemmys marmorata pallida*)

Birds – 16
Raptors
Burrowing owl (*Athene cunicularia*)
Ferruginous hawk (*Buteo regalis*)
Long-eared owl (*Asio otus*)
Prairie falcon (*Falco mexicanus)*

Riparian guild
Brown-crested flycatcher *(Myiarchus tyrannulus)*
Least Bell's vireo (*Vireo bellii pusillus*) **Endangered**
Southwestern willow flycatcher (*Empidonax traillii extimus*) **Endangered**
Summer tanager *(Piranga rubra)*
Vermilion flycatcher *(Pyrocephalus rubinus)*
Yellow-breasted chat *(Icteria virens)*
Yellow warbler *(Dendroica petechia brewsteri)*
Western yellow-billed cuckoo (*Coccyzus americanus*) **Federal Candidate, State Endangered**

Other birds
Gray vireo (*Vireo vicinior*)
Inyo California towhee (*Pipilo crissalis eremophilus*) **Threatened, Endemic**
LeConte's thrasher (*Toxostoma lecontei*)
Western snowy plover (*Charadrius alexandrinus*)

Mammals - 5
California leaf-nosed bat (*Macrotus californicus*)
Mohave ground squirrel *(Spermophilus mohavensis*) **State threatened, Endemic**
*Mojave River vole (*Microtus californicus mohavensis*) **Endemic**
Townsend's big-eared bat (*Corynorhinus townsendii*)
Yellow-eared pocket mouse *(Perognathus xanthonotus)* **Endemic**

Covered species (cont.)

Plants – 24
Alkali mariposa lily (*Calochortus striatus*)
Barstow woolly sunflower (*Eriophyllum mohavense*) **Endemic**
Charlotte's phacelia *(Phacelia nashiana)* **Endemic**
Crucifixion thorn (*Castela emoryi*)
Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*) **Endangered**
Cushenbury milkvetch (*Astragalus albens*) **Endangered**
Cushenbury oxytheca (*Oxytheca parishii* var. *goodmaniana*) **Endangered**
Desert cymopterus (*Cymopterus deserticola*) **Endemic**
Kern buckwheat (*Eriogonum kennedyi* var. *pinicola*) **Endemic**
Lane Mountain milkvetch (*Astragalus jaegerianus)* **Endangered, Endemic**
Little San Bernardino Mountains gilia (*Linanthus* [*Gilia*] *maculata*) **Endemic**
Mojave monkeyflower (*Mimulus mojavensis*) **Endemic**
Mojave tarplant (*Deinandra* [*Hemizonia*] *mohavensis*) **State endangered**
Parish's alkali grass (*Puccinellia parishii*)
Parish's daisy (*Erigeron parishii*) **Threatened**
Parish's phacelia (*Phacelia parishii*)
Parish's popcorn flower (*Plagiobothrys parishii*)
Red Rock poppy (*Eschscholtzia minutiflora* ssp. *twisselmannii*) **Endemic**
Red Rock tarplant (*Deinandra* [*Hemizonia*] *arida*) **State rare, Endemic**
Salt Springs checkerbloom (*Sidalcea neomexicana*)
Shockley's rock cress (*Arabis shockleyi*)
Short-joint beavertail cactus (*Opuntia basilaris* var. *brachyclada*)
Triple-ribbed milkvetch (*Astragalus tricarinatus*) **Endangered**
White-margined beardtongue (*Penstemon albomarginatus*)

Species not covered by incidental take permits

Species removed as covered species as a result of public and agency comments on the draft Plan and EIR/EIS – **9**

Panamint alligator lizard *(Elgaria panamintina)*
Golden eagle (*Aquila chrysaetos*)
Bighorn sheep (*Ovis canadensis)*
Long-legged myotis (*Myotis volans*)
Pallid bat (*Antrozous pallidus*)
Spotted bat (*Euderma maculatum*)
Western mastiff bat (*Eumops perotis*)
Flax-like monardella (*Monardella linoides* ssp. *oblonga*)
Reveal's buckwheat (*Eriogonum contiguum*)

Species removed as proposed covered species during the planning process

Adequate Protection in Place – 7

Plants
Dedecker's clover (*Trifolium dedeckerae*) **Endemic**
Gilman's goldenbush *(Ericameria gilmanii)*
Hall's daisy (*Erigeron aequifolius*)
Muir's raillardella (*Raillardiopsis muirii*)
Nine Mile Canyon phacelia *(Phacelia novenmillensis)* **Endemic**
Owens Peak lomatium (*Lomatium shevockii*) **Endemic**
Sweet-smelling monardella (*Monardella beneolens*)

Deleted – 19

Mammals
Fringed myotis (*Myotis thysanodes*)
Pocketed free-tailed bat (*Nyctinomops femerosaccus*)

Birds
American white pelican (*Pelacanus erythrorhynchos)*
Bank swallow (*Riparia riparia*)
California gull (*Larus californicus*)
Double-crested cormorant (*Phalacrocorax auritus*)
Hepatic tanager (*Piranga flava*)
Long-billed curlew (*Numenius americanus*)
Sharp-shinned hawk (*Accipiter striatus*)
Vaux's swift (*Chaetura vauxi*)
Virginia's warbler (*Vermivora virginiae*)
Yuma clapper rail (*Rallus longirostris yumanensis*) **Endangered**

Plants
Calico monkeyflower (*Mimulus pictus*)
Cream layia (*Layia heterotricha*)
Ertter's milkvetch (*Astragalus ertterae*)
Flat-seeded spurge (*Chamaesyce platysperma)*
Palmer's mariposa lily (*Calochortus palmeri* var. *palmeri*)
Peirson's spring beauty (*Claytonia lanceolata* var. *peirsonii*)
Spanish Needle onion (*Allium shevockii*)

Dropped - 39

Insufficient information **-** 21

Amphibians
Tehachapi slender salamander (*Batrachoseps stebbinsi*) **State Threatened**

Mammals
Argus Mountains kangaroo rat (*Dipodomys panamintinus argusensus*) **Endemic**
Tehachapi pocket mouse (*Perognathus alticola inexpectatus*)

Birds
Bendire's thrasher (*Toxostoma bendirei*)
Lucy's warbler (*Vermivora luciae*)
Tricolored blackbird (*Agelaius tricolor*)

Plants
Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri)*
Death Valley roundleaf phacelia *(Phacelia mustelina)*
Golden violet (*Viola aurea*)
Inyo hulsea *(Hulsea vestita ssp. inyoensis)*
Jackass clover (*Wizlizenia refracta* ssp. *refracta*)
Lancaster milkvetch (*Astragalus preussii* var. *laxiflorus*)
Mojave milkvetch (*Astragalus mojavensis* var. *hemigyrus*)
Piute Mountains jewelflower (*Streptanthus cordatus* var. *piutensis)*
Ripley's cymopterus (*Cymopterus ripleyi)*
Ripley's gilia (*Gilia ripleyi)*
Robinson's peppergrass (*Lepidium virginicum* var. *robinsonii*)
Robison's monardella (*Monardella robisonii*) **Endemic**
Sagebrush loeflingea (*Loeflingea squarrosa* var. *artemisiarum*)
Small-flowered androstephium *(Androstephium breviforum)*
Southern scullcap (*Scutellaria bolanderi* ssp. *austromontana*)

Too common - 8
Birds
Cooper's hawk (*Accipiter cooperii*)
Loggerhead shrike (*Lanius ludovicianus*)

Plants
Foxtail cactus (*Coryphantha alversonii* [*Escobaria vivipara* var. *alversonii*])
Sand linanthus (*Linanthus arenicola*)
Kern County evening primrose (*Camissonia kernensis* ssp. *kernensis*)

Pygmy poppy (*Canbya candida*)
San Bernardino buckwheat (*Eriogonum microthecum* var. *corymbosoides*)
The Needles buckwheat *(Erigonum breedlovei* var. *shevockii)*

Dropped (cont.)

Other Reasons - 10 (Special cases)
Mojave Tui Chub (*Gila bicolor mohavensis*) **Endemic**, **Endangered**
Arroyo toad (*Bufo microscaphus californicus*) **Endangered**
Red-legged frog (*Rana microscaphus californicus*) **Threatened**
Swainson's hawk (*Buteo swainsonii*) **State endangered**
Northern harrier (*Circus cyaneus*)
Short-eared owl (*Asio flammeus*)
Mountain plover (*Charadrius montanus*) **Proposed threatened**
Bald eagle (*Haliaeetus leucocephalus*) **State endangered**
Kelso Creek monkeyflower (*Mimulus shevockii*) **Endemic**
Clokey's cryptantha (*Cryptantha clokeyi*)

Total species = 123

Definitions for Species Review

Endemic – Entire range of species restricted (or nearly so) to the West Mojave Plan area.

Dropped = These species are addressed by the plan, but incidental take permits are not being sought. In most cases, insufficient information is available to determine the appropriate conservation areas or management measures. BLM will continue to monitor the status of these species on public lands and will provide conservation measures on a case-by-case basis until more information on the status and distribution is obtained. If feasible conservation measures can be developed for private lands, the species can be amended into the Habitat Conservation Plan at a later date.

Other reasons for dropping species from coverage by incidental take permits include:

6. The species is already addressed within the West Mojave by existing Biological Opinions.
7. The species has been found to be too common to require conservation measures.
8. The species is a special case, and planwide conservation measures are not applicable. Some of these species are found entirely or primarily within the boundaries of military bases. Others are single-occurrence species best treated on a case-by-case basis.
9. Governing jurisdiction decides that species should not be included in the permit application.
10. No feasible conservation measures can be applied to protect the species in the Plan area.
11. Task Group and Supergroup do not endorse recommended conservation measures.

In addition, review of the recommended plan by the wildlife agencies may result in species being dropped (not covered by incidental take permits). This might result if conservation measures, adaptive management, and monitoring are judged to be insufficient to protect the species during the term of the HCP and 10(a) or 2081 permits.

Deleted = These species were reviewed by West Mojave biologists and determined to be outside the plan boundaries or to have no essential habitat within the plan area. Several deleted plants at the northwest edge of the planning area occur close to the boundary and may be incorporated into the West Mojave Plan at a later date if they are discovered within the Plan area. Reasons for deletion of a species from the list include:

1. Species does not occur in the Plan area.
2. Species is of accidental or vagrant occurrence in the Plan area.
3. Species is a rare or temporary visitor to the Plan area (as with migratory birds) and does not have important migration habitat in the Plan area.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
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