United States Department of the Interior

FISH AND WILDLIFE SERVICE
Nevada Fish and Wildlife Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
Ph: (702) 515-5230 ~ Fax: (702) 515-5231

July 9, 2008
File Nos. 84320-2008-F-0078,
84320-2008-I-0079 and
84320-2008-TA-0080

Memorandum

To: District Manager, Ely District Office, Bureau of Land Management, Ely, Nevada

From: Field Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada

Subject: Programmatic Biological Opinion, Informal Consultation, and Technical Assistance for Implementation of Actions Proposed in the Ely Proposed Resource Management Plan, Lincoln, White Pine, and Portions of Nye Counties, Nevada

The attached programmatic biological opinion (Attachment 1, File No. 84320-2008-F-0078) is based on our review of programmatic activities proposed for implementation by the Bureau of Land Management (BLM), as described in your October 2007 biological assessment (BA; BLM 2007a), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*) and potential effects on:

- the threatened Mojave desert tortoise (*Gopherus agassizii*) and its designated critical habitat;
- the threatened Big Spring spinedace (*Lepidomeda mollispinis pratensis*) and its designated critical habitat;
- the endangered White River springfish (*Crenichthys baileyi baileyi*) and its designated critical habitat;
- the endangered Pahrump poolfish (*Empetrichthys latos*); and
- the endangered southwestern willow flycatcher (*Empidonax traillii extimus*).

BLM, in coordination with the Service, determined that implementation of activities associated with at least one program may result in adverse effects to the five species identified above (Table 1). The effects determination in Table 1 changed from the effects determination identified in the BA as a result of discussions of the proposed action between BLM and Service. In addition to formal consultation, BLM requested informal consultation (File No. 84320-2008-I-0079) and our concurrence that implementation of programs identified in Table 1 for informal consultation, *may affect but are not likely to adversely affect* the five species identified above.

The Programmatic Informal Consultation is included as Attachment 2. Further, BLM determined their proposed action would result in *no effect* to the endangered Hiko White River springfish (*Crenichthys baileyi grandis*), endangered Pahranagat roundtail chub (*Gila robusta jordani*), endangered White River spinedace (*Lepidomeda albivallis*), threatened Railroad Valley springfish (*Crenichthys nevadae*), and threatened Ute lady's tresses (*Spiranthes diluvialis*).

Table 1. BLM's effects determination by program for species included in this consultation[1]

PROGRAM	Desert Tortoise	Critical habitat	Big Spr. Spinedace	Critical Habitat	White R. Springfish	Critical Habitat	Pahrump Poolfish	SW Willow Flycatcher
Vegetation Management	F	*	I	N	N	N	I	F
Special Status Species	N	N	F	*	N	N	F	N
Weed Management	F	*	F	*	F	*	I	F
Wild Horse Management	I	N	N	N	N	N	N	I
Lands, Realty, and Renewable Energy	F	*	N	N	I	N	N	F
Travel and Off-Highway Vehicle Management	F	*	I	N	F	*	I	F
Recreation	F	N	N	N	F	*	I	F
Livestock Grazing Management	F	*	F	*	N	N	F	F
Geology and Mineral Extraction	F	*	I	N	N	N	N	F
Fire Management	F	*	F	*	F	*	F	F
Special Designations	N	N	N	N	N	N	N	N

[1] Effects determinations presented here were modified from those presented in the BA, following discussions between BLM and the Service.

F = *may affect, likely to adversely affect* (formal consultation, biological opinion)
I = *may affect, not likely to adversely affect* (informal consultation); includes beneficial effects
N = *no effect* (no further consideration) or beneficial effects incorporated into other programs
* = adverse effects to critical habitat anticipated

The decisions in the Special Designations program provide net benefits to listed species or offset the potential effects of other programs. BLM's proposed Watershed Management Program included two decisions, neither of which would result in effects to listed species not described in other programs. Implementation of BLM's Forest/Woodland and Other Plant Products Program is not anticipated to result in effects to listed species. With the exception of potential harvest of seed and desert vegetation, most actions under this program would occur outside listed species habitats. If BLM identifies or proposes a future action under the Forest/Woodland and Other

Plant Products Program that may affect listed species, the Service shall be contacted to determine the appropriate consultation action.

The attached biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

The attached biological opinion, informal consultation, and technical assistance are based on information provided by BLM including the October 2007 BA (BLM 2007a); June 11, 2007, memorandum from the Service to BLM providing comments on the draft BA; references cited; draft Service guidance for programmatic biological opinions (Service 2003); discussions between the Service and BLM staff; and our files. Other information provided by BLM includes the November 2007 Ely Proposed Resource Management Plan and Final Environmental Impact Statement (RMP/Final EIS; BLM 2007b); and correspondence identified in the Consultation History of the attached biological opinion. A complete administrative record of this consultation is on file in the Nevada Fish and Wildlife Office in Las Vegas.

The Service anticipates that future BLM actions that may adversely affect the desert tortoise, Big Spring spinedace, White River springfish, Pahrump poolfish, or southwestern willow flycatcher will be appended to the biological opinion in accordance with Service guidance for programmatic formal consultations.

BLM also requested technical assistance (File No. 84320-2008-TA-0080) for the bald eagle (*Haliaeetus leucocephalus*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), western burrowing owl (*Athene cunicularia hypugaea*), greater sage grouse (*Centrocercus urophasianus*), pygmy rabbit (*Brachylagus idahoensis*), Meadow Valley Wash speckled dace (*Rhinichthys osculus* ssp.), Meadow Valley Wash desert sucker (*Catostomus clarki* ssp.), Southwestern toad (*Bufo microscaphus*), banded Gila monster (*Heloderma suspectum cinctum*), and Sunnyside green gentian (*Frasera gypsicola*). Through technical assistance, the Service provides management recommendations to address potential effects to these species of concern. Our technical assistance memorandum is included in Attachment 3.

If we can be of any further assistance, please contact Janet Bair in the Nevada Fish and Wildlife Office in Las Vegas, at (702) 515-5230.

Jacky E. Brown

for Robert D. Williams

Attachments

cc:
Supervisory Biologist - Habitat, Nevada Department of Wildlife, Las Vegas, Nevada
Assistant Field Manager, Division of Recreation and Renewable Resources, Las Vegas Field Office Bureau of Land Management, Las Vegas, Nevada
Deputy State Director, Resources, Land Use and Planning, Bureau of Land Management, Reno, Nevada
Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff, Arizona
Field Supervisor, Utah Fish and Wildlife Office, West Valley City, Utah
Senior Resident Agent, Division of Law Enforcement, Fish and Wildlife Service, Boise, Idaho

Programmatic Biological Opinion (84320-2008-F-0078), Informal Consultation (84320-2008-I-0079), and Technical Assistance (84320-2008-TA-0080) for the Bureau of Land Management's Ely District Resource Management Plan

Photo: Jeff Servoss

Prepared by the Nevada Fish and Wildlife Office
Las Vegas, Nevada
July 10, 2008

TABLE OF CONTENTS

ATTACHMENT 1

BIOLOGICAL OPINION (File No. 84320-2008-F-0078)

A. Consultation History

On March 3, 2000, the Service issued a programmatic biological opinion to the Ely District Office for potential effects to the desert tortoise as a result of implementation of actions proposed in the Caliente Management Framework Plan (MFP) Amendment (File No. 1-5-99-F-450). The Service determined that proposed programmatic-level actions may result in disturbance of up to 7,645 acres of non-critical desert tortoise habitat and 950 acres of critical desert tortoise habitat. In addition, up to 16,926 acres of BLM-administered lands could be transferred to private or non-Federal administration. In addition to proposed programs of activities, BLM designated the Kane Springs, Mormon Mesa, and Beaver Dam Slope Area of Critical Environmental Concern (ACEC) in Lincoln County. Subsequently, the Service proposed to adjust the designated critical habitat boundaries to match the ACEC boundaries. However, because modification to critical habitat boundaries involves a listing action and is a low Service priority such modification is not likely in the near future. Any proposed modification to critical habitat requires consideration of the current status of the critical habitat including any additional areas to be designated as critical habitat, and how the proposed change would affect the species. Based on our current body of knowledge and the environmental baseline of critical habitat, any proposed modification to critical habitat boundaries would not likely match the current ACEC boundaries. This biological opinion superseded the 2000 programmatic biological opinion for the Caliente MFP Amendment.

On November 29, 2005, the Service provided comments on the July 2005 draft Ely RMP/EIS (File No. 1-5-06-TA-024). Major comments included:

- Critical habitat, ACECs, and other areas that provide habitat for federally listed species should be focal areas to remove livestock grazing. This would include the Mormon Mesa and Beaver Dam Slope critical habitat units (CHUs) (Kane Springs, Mormon Mesa, and Beaver Dam Slope ACECs).
- As proposed, approximately 88 to 90 percent of the Ely District would be open to mineral leasing or locatable minerals development which we believe conflicts with conserving biological resources. Further, we recommended closure of all ACECs to all forms of mineral extraction.
- Desert tortoise habitat should be a priority for road designations.
- Critical habitat and ACECs should receive additional consideration for off-highway vehicle (OHV) closures.

BLM responded to our comments on May 23, 2006, in a public comment report.

On March 1, 2006, the Service issued a species list (File No. 1-5-06-SP-081) for the Ely RMP planning area as requested by a BLM memorandum received February 2, 2006. The list included the species for which BLM requests formal and informal consultation identified above, as well as the Hiko White River springfish, Pahranagat roundtail chub, White River spinedace, bald eagle, Railroad Valley springfish, Ute lady's tresses, and western yellow-billed cuckoo, a candidate species for listing under the Act. The bald eagle was removed (delisted) from the List of Threatened and Endangered Wildlife under the Act, effective August 8, 2007 (72 FR 37345).

Beginning in 2006, BLM and the Service met multiple times to discuss the RMP/Final EIS and BA and transmitted information by email. A summary of those meetings and emails is provided in Table 2 below.

On February 14, 2007, the Service submitted comments on BLM's January 2007 Ely Proposed RMP/EIS (File No. 1-5-07-TA-068) which included comments provided previously. Major comments included:

- Designation of roads in desert tortoise habitat (both inside and outside ACECs) should be a high priority. Additional areas should be considered for OHV closures.
- We recommended removing livestock grazing from the Beaver Dam Slope CHU in response to stochastic catastrophic effects in the area (wildfires).
- There should be a clear explanation of the status of grazing allotments in desert tortoise habitat. We are concerned that these allotments have not been evaluated but current grazing prescriptions are allowed to continue in the absence of such evaluation.
- All three desert tortoise ACECs should be closed to mineral leasing.

On June 11, 2007, the Service provided comments on a draft of the BA. BLM considered all the comments and modified the BA to address many of them. Outstanding issues relevant to this consultation involved BLM's proposed action for mineral extraction, primarily involving fluid minerals, and livestock grazing. BLM responded to the Service comments by memorandum dated October 12, 2007.

On October 22, 2007, the Service received the final BA, additional information and a request to initiate consultation. On November 23, 2007, the Service received BLM's November 19, 2007, memorandum providing a report of activities covered under the 2003 biological opinion for the Caliente MFP Amendment. The Service incorporated the information in the activities report into this biological opinion. On March 10, 2008, the Service acknowledged that all required information had been received and provided a timetable for completing the consultation.

On March 18, 2008, the Service provided a portion of our draft biological opinion to BLM for review. BLM and the Service met on March 19, 2008, and discussed the draft and outstanding issues involving the proposed action for minerals management and livestock grazing.

On April 14, 2008, the Service provided a draft biological opinion to BLM for review and comments. A second draft was provided by email on June 16, 2008.

Meetings and email correspondence associated with this consultation are identified in Table 2.

Table 2. Chronology of meetings and email communications for this consultation and previous consultations on BLM Ely District programs and activities

DATE	MEETINGS: MAJOR TOPICS DISCUSSED
May 4, 2006	Reinitiation of consultation on the biological opinion for the Caliente Management Framework Plan (MFP) Amendment in response to 2005 wildfires; progress on preparing the RMP/EIS; review outline and schedule for the BA and biological opinion for the RMP/Final EIS; Service provided a recommended outline for the BA.
June 5, 2006	RMP/EIS and consultation schedule; Service expressed concern that BLM proposes to manage desert tortoise areas of critical environmental concern (ACECs) differently for mineral extraction activities; BLM informed the Service that watershed analysis will occur to address livestock grazing but may take years to complete (~10 years).
October 12, 2006	Conference Call. Revised schedule for the RMP/Final EIS and BA.
December 6, 2006	Schedule for the RMP/Final EIS; discussed changes from the previous draft.
March 5, 2007	Proposed livestock grazing in desert tortoise habitat, particularly in desert tortoise critical habitat.
May 31, 2007	Revised schedule for the RMP/EIS; the Service's recommendation to change the elevational distribution of the desert tortoise from 4,000 feet to 4,200 feet. Agreement that the term of the biological opinion is 10 years.
December 4, 2007	Update of the consultation and schedule for the RMP/Final EIS.
February 6, 2008	Status of the consultation, the Service's draft proposed action section of the biological opinion, and BLM's effects determinations for the desert tortoise, Big Spring spinedace, White River springfish, Pahrump poolfish, and southwestern willow flycatcher.
February 28, 2008	Conference call. BLM responded to additional information needs; discussed fluid mineral leases and monitoring grazing allotments.
March 19, 2008	Reviewed the first 70 pages of a draft of this biological opinion and outstanding issues.
April 17, 2008	The Service discussed a draft of the biological opinion and next steps in the consultation process as well as a proposed time table.
May 5, 2008	Discussed BLM's comments on the April 14, 2008, draft biological opinion
June 19, 2008	Conference call. Discussed revisions to draft biological opinion and schedule for completing consultation.

	EMAIL CORRESPONDENCE
October 16, 2006	BLM to Service. Summary of October 12, 2006 meeting.
April 17, 2007	BLM to Service. Draft BA to be provided May 7, 2007; planned meeting May 31, 2007
January 9, 2008	Service to BLM. Request for information on the proposed action in the BA and effects determination.
January 14, 2008	Service to BLM. Update on preparation of the biological opinion.
January 16, 2008	BLM to Service. Response to Service's 1/14/2008 email indicating additional information will follow.
January 18, 2008	BLM to Service. Submitted table with requested information on anticipated levels of disturbance of desert tortoise habitat.
February 15, 2008	Service to BLM. Confirm effects determination; draft portion of description of proposed action for BLM's review/approval; and additional information needs for listed species in the action area.
March 25, 2008	Service to BLM requesting an estimate of anticipated flycatcher habitat disturbance.
March 28, 2008	BLM to Service. Response to March 25 request, providing revised acreage estimates of anticipated disturbances.
April 3, 2008	BLM to Service. Additional information provided regarding potential effects to the southwestern willow flycatcher.
April 17, 2008	Service to BLM providing a draft of this biological opinion.
May 1, 2008	BLM to Service providing comments on the April 14, 2008, draft biological opinion.
June 4, 2008	BLM to Service providing suggested language for livestock grazing term and condition (7.b.).
June 16, 2008	Service to BLM providing second draft biological opinion.
June 25, 2008	BLM to Service providing comments on the June 16, 2008, draft biological opinion.

B. Programmatic Consultations

This biological opinion was prepared in accordance with the July 16, 2003, draft guidance for programmatic-level consultations. The term "programmatic consultation" has become a generic term encompassing a broad category of section 7 consultations that evaluate the potential for Federal agency programs to affect listed and proposed species, and designated and proposed critical habitat. Such programs typically guide implementation of future agency actions by establishing standards, guidelines, or governing criteria to which future actions must adhere. At times the term *programmatic consultation* has been used to refer to consultations on a large group of similar actions (*e.g.*, a National Forest's timber harvest program for a particular year) as well as to refer to consultations covering different types of actions proposed within a large geographic area, such as a watershed. Such consultations can provide the benefit of streamlining the consultation process while leading to a more landscape-based approach to consultations that can minimize the potential "piecemeal" effects that can occur when evaluating individual projects out of the context of the complete agency program.

This programmatic biological opinion analyzes the potential effects of implementing BLM's proposed actions in the Ely RMP/Final EIS and develops the appropriate project-specific documentation that addresses the effects of individual projects. This programmatic biological opinion contains all of the elements found in a standard biological opinion. The format of this programmatic biological opinion conforms to the *appended programmatic consultation*

approach, which will require that BLM and the Service produce project-specific documentation that is physically appended to this programmatic biological opinion before the action occurs. Exceptions are continuation of livestock grazing until term-permits are proposed for approval by BLM and wildfire suppression activities which would occur prior to the activity-level consultation.

Project-Level Consultation under the Appended Programmatic Consultation Approach

As individual projects or actions are proposed under the appended programmatic consultation approach, BLM will provide project-specific information that: (1) describes each proposed action and the specific areas to be affected; (2) identifies the species and critical habitat that may be affected; (3) describes the manner in which the proposed action may affect listed species; (4) describes the anticipated effects; (5) specifies, if appropriate, that the *anticipated effects from the proposed project are consistent with those anticipated in the programmatic biological opinion*; (6) describes proposed measures to minimize potential effects of the action; (7) describes any additional effects, if any, not considered in the programmatic consultation. On a limited, project-by-project basis, additional effects may occur in action areas that extend beyond BLM lands, but are subject to federal nexus as defined in 50 CFR 402.02 (activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States).

The Service reviews the information and effects analysis provided for each proposed project and this project-specific review is documented in accordance with the guidance provided below. To initiate the project-specific review, the project information and effects analysis should be accompanied by a cover letter that specifies that BLM has determined the proposed project is consistent with the programmatic biological opinion, and requests that the proposed project be appended to the programmatic biological opinion to fulfill BLM's consultation requirements. In this programmatic biological opinion, the Service determined the overall anticipated incidental take for all proposed BLM activities in the action area over a 10-year period at the programmatic level. As each action is submitted by BLM to the Service to be appended to this programmatic biological opinion, the Service will determine the anticipated incidental take for each action, at the project level, as a subset of the incidental take anticipated in the programmatic biological opinion. BLM shall be responsible for accurately reporting any incidental take of listed species to the Service that occurs in association with actions covered under this programmatic biological opinion.

Individual BLM actions that are *likely to adversely affect* listed species shall require a memorandum from BLM to the Service (or attached form, Appendix A) that contains:

(1) a summary of any information not identified in the programmatic consultation document used to evaluate the effects of the proposed action;
(2) a short project summary as provided by BLM;
(3) a detailed discussion of the effects of the proposed action on listed species and critical habitat;

(4) a statement regarding the specific project's effects to the environmental baseline, including a restatement of the estimated acres of disturbance and possible forms of take that are anticipated and a tallying of the overall effects to the environmental baseline from projects implemented under the programmatic consultation to date;
(5) any additional project-specific reasonable and prudent measures and/or terms and conditions needed to ensure the minimization of the effects of the take that will result from the proposed project; and,
(6) language that appends the project to the programmatic consultation and associated incidental take statement, if appropriate.

Although there is no standard for the required project-specific documentation, the Service generally should complete its response in approximately two pages and within 45 days. This documentation is then physically attached (appended) to the programmatic biological opinion in an appendix. Therefore, the programmatic biological opinion, together with the appended documentation, fulfills the consultation requirements for implementation of both program-level and project-level actions.

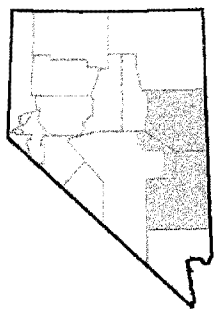
Monitoring shall be conducted at least annually by BLM and the Service to assure that the effects analysis in the programmatic biological opinion is accurate including a comprehensive review of how the program-level biological opinion is working, and whether its implementing procedures are in compliance. During this review, the environmental baseline should be reviewed and updated as needed to account for unanticipated effects or the lack of anticipated effects. During this process it may be determined that the program-level biological opinion is functioning as anticipated and, therefore, activities should continue, or that adjustments should be made.

C. Description of the Proposed Action

The Ely BLM proposes to implement various land management activities in the planning area (Figure 1) as described in the Ely Proposed RMP/Final EIS and BA. The planning area consists of public lands in White Pine, Lincoln, and a portion of Nye counties in east-central Nevada. The planning area measures approximately 230 miles (north-south) by 115 miles (east-west). The Ely District Office manages approximately 11.5 million acres of public lands and minerals out of approximately 13.9 million acres within the boundaries of the planning area.

Most of the information in this biological opinion is from the October 2007 BA (BLM 2007a). All decisions presented in the Ely Proposed RMP, contained in Chapter 2 of the RMP/Final EIS (BLM 2007b) constitute the proposed action and are incorporated here by reference. A detailed summary of the proposed action can be found in section 2.0 Summary of Proposed RMP of the BA, which is also incorporated in its entirety herein by reference as the proposed action for this consultation.

Regional View



Legend

- Cities and towns
- Roads
- County boundary
- Non-BLM-administered land*
- Desert tortoise habitat
- Big Spring spinedace critical habitat**

Special Status Species Known Occurrences

- White River springfish
- Hiko White River springfish
- Pahranagat roundtail chub
- Pahrump poolfish
- Railroad Valley springfish
- White River spinedace
- Ute ladies'-tresses
- Southwestern willow flycatcher

Note:
* All land not shown as non-BLM-administered land is BLM-administered land.
** *Critical habitat for other federally-listed fish species may be found in Table 1-1.*

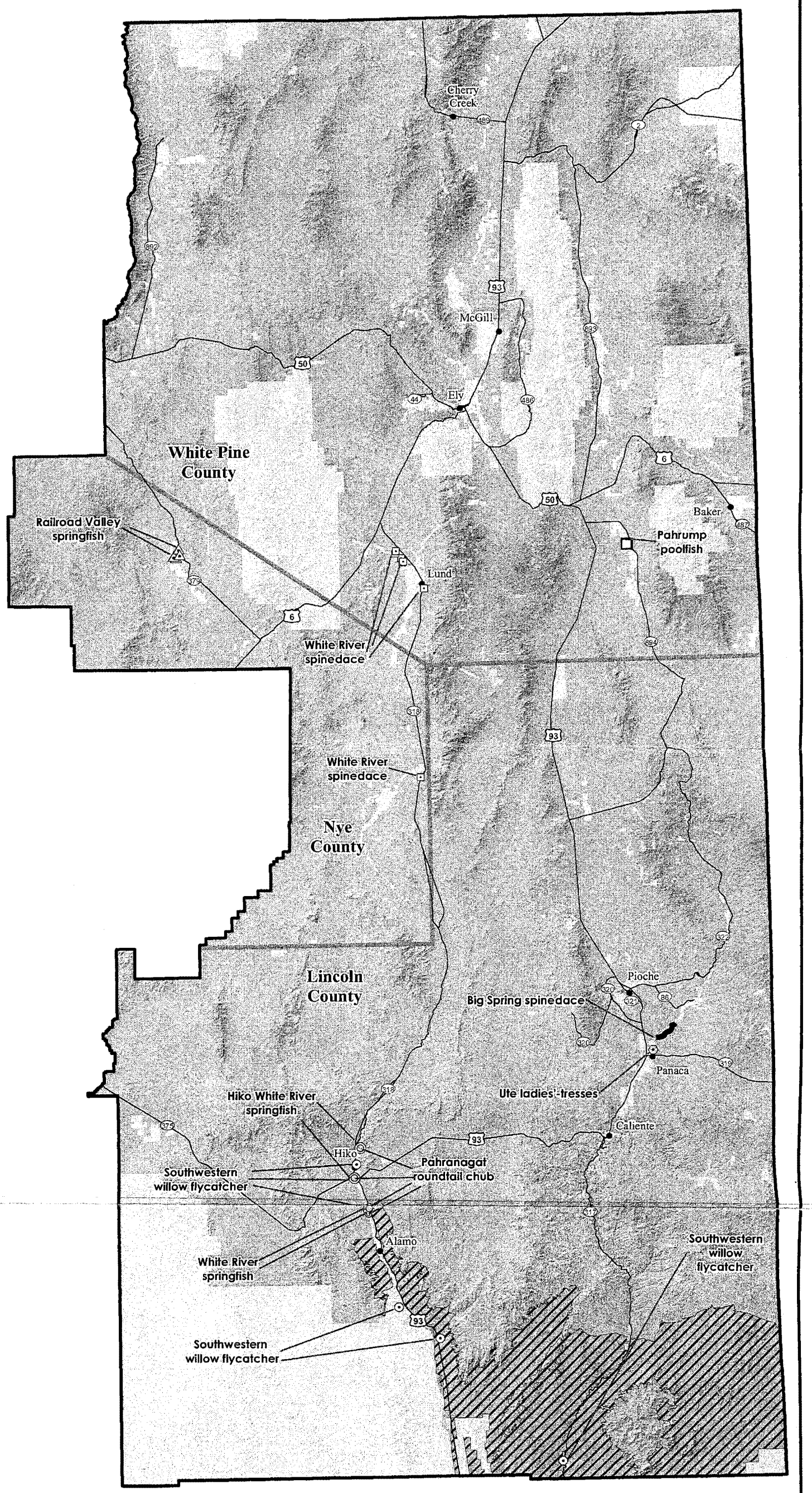
0 8 16
Miles

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Ely Biological Assessment

FIGURE 1

Planning Area for the Ely RMP with Species Locations



This programmatic biological opinion addresses the anticipated effects of the Proposed RMP at the broad-scale planning level. Subsequent site-specific section 7 consultation will be necessary for each discretionary action that may affect listed species.

Management actions from the Approved Caliente Management Framework Plan (MFP) Amendment and Record of Decision for the Management of Desert Tortoise Habitat (BLM 2000) have been incorporated into relevant sections of the Proposed RMP. Where appropriate, the management actions have been modified to reflect changes in conditions since 2000 and the editorial style of the proposed RMP.

The proposed RMP/Final EIS allocates resources and makes decisions regarding: air, water, and soil resources; vegetation; fish and wildlife; special status species; wild horses; cultural and paleontological resources; visual resources; lands and realty actions; renewable energy projects; travel management and OHV use; recreation management; livestock grazing; forest/woodland and other plant products; geology and mineral extraction; watershed management; fire management; noxious and invasive weeds management; and special designations.

The proposed RMP/Final EIS primarily is based on Alternative E presented in the 2005 Draft RMP/EIS and on changes to management actions in response to public and internal comments received on the Draft. The management actions that are presented in the Proposed RMP/Final EIS were developed through consideration of the planning criteria presented in Section 1.5 of the Draft and Final RMP/EIS, public scoping comments, BLM policy especially as presented in the Land Use Planning Handbook, the professional judgment of the staff in the Ely District Office, and comments from a wide array of users of the planning area. The proposed RMP is a compilation of those individual management actions from the other four alternatives, plus unique management actions that the Ely District Office has determined will best meet its obligations for multiple use management of the resources found within the decision area. Through the proposed RMP/Final EIS, BLM will strive to continue implementation of recovery plan action items from approved recovery plans and conservation agreements.

The proposed RMP/Final EIS will guide BLM management of public lands and minerals within the planning area for a period of approximately 20 years from the date of the record of decision or until it is amended or revised in the future. The term of this biological opinion is 10 years but BLM and the Service may establish conservation measures for listed species in this document and/or the RMP/Final EIS that extend beyond 10 years such as ACEC designations, or species and habitat protections in accordance with approved recovery plans.

The proposed plan represents those actions needed to achieve the plan goals and objectives. At the RMP level, these decisions describe what may or may not be authorized in the planning area and provide broad-scale direction for management. The actions are not usually site-specific. Site-specific actions are considered implementation decisions and are typically deferred to activity-level planning.

Many actions in the proposed plan will be implemented or become effective upon approval of the proposed RMP/Final EIS. This includes land-use allocations and special designations such as ACECs. Management actions that require additional site-specific project planning as funding becomes available will require further environmental assessment and consultation under the Act. Actions to implement site-specific projects are subject to administrative review at the time such decisions are made. BLM will continue to involve and collaborate with the Service during implementation of the RMP/Final EIS.

Elements of the Proposed Action that May Result in Effects to Listed Species

The proposed action is described in Chapter 2 of the proposed RMP/Final EIS and BA. For the purpose of preparing this biological opinion, the Service compiled and summarized BLM's proposed actions as described below. The summary is organized by resource program (*e.g.,* vegetation, lands and realty authorizations, etc.). Certain proposed RMP decisions (BLM 2007b) provide minimization measures and recovery actions. *Decisions* are actions that BLM will implement whereas the *best management practices (BMPs), standard operating procedures (SOPs), Stipulations, Monitoring, and Tools and Techniques* provided as appendices to the RMP and the BA, or contained in other existing management guidance documents, will be implemented as part of future actions, as appropriate. Through project-level consultation, the Service will consider which measures are necessary to avoid (informal consultation) or minimize (formal consultation) potential effects to listed species that may result from proposed actions.

The BMPs, SOPs, Stipulations, Monitoring, and Tools and Techniques are provided in: (1) Appendices A, B, and C of the BA (BLM 2007a), (2) BMPs contained in the Gold Book (U.S. Department of Interior and U.S. Department of Agriculture 2006), and (3) BMPs, SOPs, and Conditions from the Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States Programmatic EIS (BLM 2007c).

The *action area* for this consultation includes all habitat for the desert tortoise, Big Spring spinedace, White River springfish, Pahrump poolfish, and southwestern willow flycatcher within the planning area, as well as habitat of listed species outside the planning area that may be indirectly adversely affected by actions proposed in the RMP/Final EIS.

BLM estimates the potential disturbance of desert tortoise critical and non-critical habitat below in Table 3 as a result of implementation of the proposed action (BLM 2008). Additional disturbances may occur as part of a BLM action on non-Federal land. Disturbances are further described under the *effects* section of this biological opinion. The scope of this consultation including our effects analysis and incidental take exemption is based on the levels of disturbance anticipated to occur, by program identified in Table 3.

BLM estimates the potential disturbance of southwestern willow flycatcher habitat below in Table 4 as a result of implementation of the proposed action (BLM April 3, 2008 correspondence). Habitat disturbance is further described under the *effects* section of this biological opinion. As for the desert tortoise, the scope of this consultation including our effects

analysis and incidental take exemption for the flycatcher is based on the levels of disturbance anticipated to occur, by program identified in Table 4.

Table 3. Summary of Anticipated Disturbance of Desert Tortoise Habitat

PROGRAM	MAXIMUM ANTICIPATED DISTURBANCE OF DESERT TORTOISE HABITAT ON BLM LAND (ACRES)	
	CRITICAL	NON-CRITICAL
Vegetation Management	36,752	72,429
Weed Management	Site-specific	Site-specific
Lands, Realty, and Renewable Energy:		
• Disposal	0	4,870
• R&PP Act	0	15,000
• Land use authorizations:		
-Rights-of-way (except minerals)[a]	21,900	14,820
- Communication sites	0	20
-Renewable energy	18	166
Travel Management/OHV Management[b]	0	0
Recreation[b]	0	100
Livestock Grazing[c]		
Geology/Mineral Extraction:		
• Fluid leaseable minerals	100	500
• Solid leaseable minerals	0	0
• Locatable minerals	126	315
• Mineral materials (salable)	120	380
Fire Management[d]	360	1,140

[a] Major rights-of-way will be situated in corridors within the planning area; other rights-of-way may occur outside corridors. ACECs will be considered avoidance areas for rights-of-way and other land use authorizations in the future, but additional rights-of-way could be authorized subject to environmental impact analysis and section 7 consultation for specific applications. An unquantified portion of the designated utility corridors already have been disturbed or destroyed. (BLM 2008)

[b] Although roads and trails within and outside critical habitat currently exist, BLM does not anticipate creating new roads or trails as a result of this program. Vehicular travel will be limited to existing roads and trails.

[c] Currently, up to 50,000 acres of desert tortoise critical habitat and up to 470,000 acres of non-critical desert tortoise habitat occur in grazing allotments that may be grazed (Table 6). No new habitat disturbance is anticipated as a result of proposed grazing; however, continuation of grazing is anticipated to result in some level of habitat disturbance and impact which will be determined at the allotment-level consultation for each allotment.

[d] Figures are based upon average acreage disturbances due to suppression activities, Emergency Stabilization and Rehabilitation, and fuels management. The actual acreage is dependent upon too many environmental factors to predict with accuracy.

Table 4. Summary of Anticipated Disturbance of Southwestern Willow Flycatcher Habitat (BLM April 3, 2008 correspondence)

Program	Maximum Anticipated Disturbance (acres) of Southwestern Willow Flycatcher Habitat[a]
Vegetation and Weed Management	400
Lands, Realty, and Renewable Energy	
• Disposal	0
• R&PP Act	20
• Land Use Authorizations	
➢ Rights-of-way (except minerals)	20
➢ Communication sites	0
➢ Renewable energy	0
Travel, OHV, and Recreation Management	89
Livestock Grazing[b]	
Mineral Extraction	
• Fluid leasable minerals	10
• Solid leasable minerals	0
• Locatable	10
• Mineral materials (salable)	10
Fire Management	50

[a] Adverse effects from disturbance of flycatcher habitat are anticipated to be short term. BLM will replace the loss of riparian vegetation to ensure no net loss of flycatcher habitat along the Meadow Valley Wash or Clover Creek. Additional disturbance may occur on non-Federal lands.

[b] It is not currently known how many acres of suitable and potentially suitable flycatcher habitat occurs in grazing allotments along the Meadow Valley Wash. No new habitat disturbance is anticipated as a result of proposed grazing. However, continuation of grazing is anticipated to result in some level of ongoing habitat disturbance and impact which will be determined at the allotment-level consultation for each allotment.

The following definitions apply to the terms "Project" and "Event" as referred to in the Description of the Proposed Action:

1. "Project" means any surface-disturbing activities proposed by BLM that may cause disturbance of listed species habitat and/or death or injury of a listed species under this consultation, with the exception of activities associated with fire suppression, livestock grazing, and events authorized under a Special Recreation Permit (SRP). "Projects" include construction and related activities such as trenching, blading, building of structures, and other similar activities. Examples of "projects" include but are not limited to ROW actions, pipelines, communication towers, and range improvement projects.

2. "Event" means any activity authorized by BLM under a Special Recreation Permit that may cause disturbance of listed species habitat and/or death or injury of a listed species under this consultation. "Events" include motorized and non-motorized, speed and non-speed contests. "Events" may occur over one or more day's duration. Examples of "events" include but are not limited to horse endurance rides, motorcycle races, and OHV tours. Activities that are non-permitted, including casual use, are not considered "events."

This biological opinion was prepared to address potential adverse effects to listed species as a result of nine groups of activities or *programs* described in the RMP/Final EIS and BA. The term of this biological opinion is 10 years however BLM proposes to implement actions in the RMP/Final EIS over the next 20 years. Specifically, only those programs that may affect the desert tortoise (DT), Big Spring spinedace (BSSD), White River springfish (WRSF), Pahrump poolfish (PAPO) and southwestern willow flycatcher (SWWF) are summarized below.

A subset of management actions proposed by BLM may result in a positive or beneficial effect to listed species, while others may result in minimizing effects to species from program implementation. Specifically, BLM proposes to implement the following programs and management actions that may affect listed species covered under informal or formal consultation for the proposed RMP/Final EIS:

1. Vegetation Management (Formal: DT, SWWF; Informal: BSSD, PAPO)

BLM will emphasize treatment areas that have the best potential to maintain desired conditions or respond and return to the desired range of conditions and mosaic upon the landscape **(VEG-1)**. BLM proposes to develop specific management objectives through the watershed analysis process, and management strategies will be designed to achieve plant composition within the desired range of conditions for vegetation communities, emphasizing plant and animal community health at the watershed level **(VEG-2** and **VEG-4)**. Conservation and maintenance of existing healthy, resilient, and functional vegetation communities will be emphasized **(VEG-6)**. This program of activities focuses on management of native plant communities whereas weed management focuses on removal of invasive non-native plants from the landscape such as salt cedar (*Tamarisk* sp.)

Potential activities that BLM may approve or carry out include herbicide application, mechanical treatments, limited application of prescribed fire, broadcast seeding, and planting of live shrubs and trees. BLM's proposed action for vegetation management shares some common actions with weed management such as application of herbicides and mechanical treatment.

Vegetation Management of Mojave Desert Vegetation

The acreage of potential disturbance for vegetation management identified in Table 3 is based on the following assumptions (BLM 2008):

- all of the desert tortoise habitat (critical and non-critical) is in the Mojave Desert vegetation community;
- a maximum of 15 percent of the Mojave Desert vegetation community will be treated or maintained (15 percent of the creosotebush/bursage and 10 percent of the blackbrush communities);
- treated areas are uniformly distributed across the planning area; and
- any vegetation treatment in desert tortoise habitat (including weeds) will be done only after coordination/consultation with the Service and after meeting the Desert Tortoise Recovery Plan direction.

The major emphasis for vegetation treatment within the Mojave Desert is control of invasive and noxious weeds. Only a small percentage of Mojave Desert vegetation (<15 percent) will be scheduled for vegetation treatment. Management of salt desert scrub, Mojave Desert, and nonnative seedling vegetation communities may result in adverse effects to the desert tortoise and its critical habitat. Vegetation treatments will be performed on a very limited basis in the Mojave Desert ecosystem and, therefore, effects on critical habitat for desert tortoise will be minimal.

Vegetation Management of Aquatic and Riparian Communities

Management actions for riparian and wetland communities will promote vegetation structure and diversity that is appropriate and effective in controlling erosion, stabilizing stream banks, healing channel incisions, shading water, filtering sediment, and dissipating energy, in order to provide for stable water flow and bank stability **(VEG-23)**, and will focus on uses and activities that allow for the protection, maintenance, and restoration of riparian habitat **(VEG-24)**. The primary assumption for the effectiveness of this program in maintaining quality habitat for the fishes and flycatcher is that restoring non-functioning or poorly functioning areas to a properly functioning condition will result in an improvement of habitat for the fishes and the flycatcher.

The major emphasis for vegetation treatments in the vicinity of listed fishes habitats will be treatment of the surrounding uplands to increase soil stability and decrease erosion, which should cause minimal adverse effects to the listed fishes. Vegetation management in riparian communities that support southwestern willow flycatcher habitat will emphasize protection, maintenance, and restoration of riparian habitat. Vegetation management in the form of invasive weed control and subsequent restoration activities may result in short-term adverse effects to the flycatcher, with overall long-term beneficial effects. Control of invasive weeds, subsequent restoration activities, and

effects to the aquatic and riparian species in these habitats is discussed under "Weed Management."

BLM's proposed SOPs and BMPs to minimize the potential effects to listed species that may result from implementation of vegetation management actions are described in the BA (BLM 2007a) and Final EIS for vegetation treatments using herbicides (BLM 2007c).

2. Special Status Species Management (Formal: BSSD, PAPO)

The goal of the Special Status Species program is to conserve, maintain, and restore special status species populations and their habitats; support the recovery of federally listed threatened and endangered species; and preclude the need to list additional species. The objective of the program is to manage suitable habitat for special status species in a manner that will benefit these species directly or indirectly and minimize loss of individuals or habitat from permitted activities.

As part of the Special Status Species program, BLM proposes to develop and implement an interagency inventory and monitoring program for special status plant and animal species **(SS-2)**, participate on interagency recovery implementation teams to identify and address management actions for the recovery of listed species in the planning area **(SS-3)**, mitigate all discretionary permitted activities that result in the loss of special status species habitats at a ratio of 2 to 1 (with the exception of desert tortoise habitat) **(SS-10)**, manage the refugium at Shoshone Ponds for Pahrump poolfish in accordance with the Recovery Plan for the species **(SS-11)**, expand the fenced area at Shoshone Ponds **(SS-12)**, manage the uplands around Shoshone Ponds to increase vegetation cover, reduce runoff, and prevent excessive siltation into the ponds **(SS-13)**, develop additional ponds at Shoshone Ponds **(SS-14)**, manage listed species habitats by implementing those actions and strategies identified in recovery plans for the species that BLM has the authority to implement **(SS-17, SS-19, SS-21, SS-24)**, and implement various management actions to benefit the desert tortoise **(SS-24 through SS-33)**.

3. Weed Management (Formal: DT, BSSD, WRSF, SWWF; Informal: PAPO)

Activities associated with the treatment of noxious and invasive weeds include application of herbicides, clearing or cutting vegetation by hand or machinery (*e.g.*, chainsaw), and the use of OHVs or trucks. Mechanical methods of invasive species control may involve the use of machinery, OHVs, or hand tools.

BLM proposes to continue to use integrated weed management to treat weed infestations and use principles of integrated pest management to meet management objectives and to reestablish resistant and resilient native vegetation communities **(WEED-1)**. BLM will develop weed management plans that address weed vectors, minimize the movement of weeds within public lands, consider disturbance regimes, and address existing weed infestations **(WEED-2)**. When manual weed control is conducted, the cut weeds and

weed parts will be disposed of in a manner designed to kill seeds and weed parts **(WEED-3)**. Straw, hay, and other products used for reclamation or stabilization activities will be certified as weed free **(WEED-4)**. Source sites such as borrow, fill, or gravel pits will be inspected **(WEED-5)**, and vehicles and heavy equipment used during ground disturbing activities, emergency fire suppression, or authorized off-road driving will be free of soil and debris capable of carrying weed propagules **(WEED-6)**. Animals used on public lands by special recreation permittees or contractors will be weed-free **(WEED-7)**. Areas of weed infestation will be flagged and avoided during planned disturbance activities **(WEED-8)**, weed-infested soils will not be moved or redistributed **(WEED-9)**, and weed surveys will be conducted prior to project approval **(WEED-10)**.

Weed Control in Desert Tortoise Habitat

BLM's estimate of anticipated disturbance of desert tortoise habitat in Table 3 is based on management for weeds in areas not considered as other types of disturbance, including vegetation management, roads, and fire management (BLM 2008). Weed management will occur on a site-specific basis. Any vegetation treatment in desert tortoise habitat, including weeds, would be considered in coordination/consultation with the Service and in accordance with the Desert Tortoise Recovery Plan direction.

Weed Control in Aquatic and Riparian Habitats

Weed control activities are anticipated to occur at Condor Canyon, Ash Springs, and along the Meadow Valley Wash and Clover Creek. BLM estimates that up to 400acres of salt cedar considered suitable or potentially suitable flycatcher habitat may be removed along the Meadow Valley Wash (Table 4). Plans for weed control in Condor Canyon or Ash Springs will be coordinated with the appropriate Recovery Implementation Team, Nevada Department of Wildlife (NDOW), and the Service during plan development.

General Minimization Measures (Decisions) Proposed by BLM for the Weed Management Program:

BLM proposes measures to minimize the potential effects to listed species that may result from implementation of weed management actions in the Vegetation Treatments Using Herbicides EIS (BLM 2007c). In addition, BLM's proposed RMP/Final EIS decisions (BLM 2007a) will further minimize potential effects of weed management which include: ensure that organic and inorganic materials are weed-free **(WEED-4, WEED-5)**, ensure that vehicles, equipment, and animals do not transport weed propagules **(WEED-6, WEED-7)**, flag and avoid sensitive areas **(WEED-8)**, not move infested soils or materials are taken to weed-free or relatively weed-free areas **(WEED-9)**, and complete a weed survey and weed risk assessment prior to project approval **(WEED-10)**.

4. Wild Horse Management (Informal: DT, SWWF))

The Wild Free-roaming Horse and Burro Act of 1971 (Public Law 92-195) requires BLM to protect and manage wild horses in areas where they were found at the time of the Act, in a manner designed to achieve and maintain a thriving natural ecological balance in keeping with the multiple use management concept of public lands. BLM will maintain wild horse herds at appropriate management levels within herd management areas where sufficient habitat resources exist to sustain healthy populations at those levels. BLM will coordinate wild horse management with other Federal and State jurisdictions and resource management agencies.

General Minimization Measures (Decisions) Proposed by BLM for the Wild Horse Management Program:

BLM proposes measures to minimize the potential effects of the wild horse management program that may result from its implementation. These include: manage wild horses within six herd management areas designated from herd areas based on wild horse use and habitat suitability listed in **Table 2-11** of the BA (**WH-4**), remove wild horses and eliminate herd management area (HMA) status for those areas that do not provide sufficient habitat resources to sustain healthy populations (**WH-5**), (implementation of this decision will result in the removal of wild horses from HMAs that overlaps with habitats for the desert tortoise and southwestern willow flycatcher. No HMAs currently overlaps with habitats for the three listed fishes), and base adjustments to appropriate management levels on monitoring data and perform adjustments typically, but not exclusively, in conjunction with the watershed analysis process (**WH-7**).

For gathers that occur within desert tortoise habitat (**WH-9**): The Ely District Office does not plan to manage for any wild horses in desert tortoise habitat and this management will be used only if emergency gathers are needed in the future should wild horses re-enter the area. Under these circumstances: trap sites will be located at previous trap site locations or in previously disturbed areas, where possible. All trap and holding sites, and access routes will be cleared by a qualified tortoise biologist before the trap and holding facilities are set up. The parcel will be surveyed for desert tortoise using survey techniques that provide 100 percent coverage. Holding facilities will not be located inside ACECs. If possible, they should be located outside of desert tortoise habitat. If they cannot be located outside of desert tortoise habitat, they should be placed in previously-disturbed areas. All vehicle use in desert tortoise habitat will be restricted to existing roads and trails and within surveyed areas. Vehicles will not exceed 25 miles per hour (mph). Trash and garbage will be contained in a covered, raven-proof trash receptacle and disposed of off-site in a designated facility. No trash or garbage will be buried at the sites. Use of hay or grains as enticements into the traps will not occur within desert tortoise habitat to avoid the introduction of nonnative plant species. Feeding of hay or grains to animals will not be allowed within ACECs. Feeding of hay

or grains to animals at holding facilities on public land within desert tortoise habitat will be avoided when possible.

5. Lands, Realty, and Renewable Energy (Formal: DT, SWWF; Informal: WRSF)

a. Retention/Disposal/Acquisition/Withdrawal

All designated critical habitat and ACECs, and lands with springs and creeks that contain fisheries within the planning area will be retained in Federal ownership unless disposal results in the acquisition of land with higher quality habitat (**LR1, LR-2, and LR-5**). BLM will recommend withdrawal of lands with sensitive or high resource value from surface and mineral entry (**LR-31**). BLM proposes to maintain access to recreation areas (**LR-17**).

In accordance with the Lincoln County Conservation, Recreation, and Development Act of 2004, BLM proposes to dispose of up to 90,000 acres of public land in Lincoln County (**LR-8**) by sale, up to 15,000 acres of public land in Lincoln County for open space and parks (**LR-9**), 640 acres in Lincoln County by direct sale for a power plant (**LR-23**), and up to 45,000 acres of public land in White Pine County (**LR-11**) for sale. Of this, a total of 57,977 acres are available for potential disposal in Lincoln County, and 18,453 acres in White Pine County (**LR-20**). None of the potential disposal areas are in the vicinity of habitat for the Pahrump poolfish or Big Spring spinedace. The disposal of approximately 4,000 acres of land in Pahranagat Valley near the communities of Hiko, Ash Springs, and Alamo may directly or indirectly affect desert tortoise, White River springfish, and southwestern willow flycatcher.

In Table 3, BLM identified approximately 4,870 acres of non-critical desert tortoise habitat for possible disposal. BLM will consider withdrawal of lands with sensitive or high resource values from surface and mineral entry (**LR-31**). BLM proposes to withdraw the 80-acre area around Ash Springs from settlement, sale, location, or entry (with the exception of a *no surface occupancy* stipulation for fluid mineral leasing) (**LR-33**).

b. Recreation and Public Purposes Act (R&PP)

BLM may convey or lease public lands only for an established or definitely proposed project for which there is a reasonable timetable of development and satisfactory development and management plans (**LR-19**). Potential acreage of desert tortoise habitat affected by R&PP Act actions is based on the Lincoln County Conservation, Recreation, and Development Act which provides for a maximum of 15,000 acres throughout the entire County. BLM's land use decision(s) in the RMP provide direction on land disposal activities in federally listed species habitat, specifically linking it to acquisition of higher quality habitat. Based on BLM's direction for R&PP Act actions, BLM does not anticipate that R&PP actions will reach the maximum acreage estimate (BLM 2008).

Typically, BLM conducts sales and leases under the R&PP Act for historical monument sites, campgrounds, schools, fire houses, law enforcement facilities, landfills, parks, and fairgrounds (BLM 1996). The Service considers R&PP Act actions similar in scope to other land use authorizations such as rights-of-way, land disposal, and recreation.

c. Corridors

Portions of five corridors identified in the proposed RMP overlap with desert tortoise habitat, designated critical habitat, or desert tortoise ACECs (**LR-34**). Portions of at least one of these corridors may overlap with southwestern willow flycatcher habitat in Pahranagat Valley. BLM proposes to (1) retain a corridor 1,000 feet wide, 500 feet on either side of the centerline of the existing telephone fiber-optic lines, beginning within Township 11 South, Range 71 East, Section 30 running easterly to the Arizona State line; (2) designate the approved Southwest Intertie Project corridor as 0.75 mile wide from the Elko/White Pine County line to the point where it parallels U.S. Highway 93 (US 93) and the Pahranagat National Wildlife Refuge at which point it will be 0.5 mile wide to the Clark County line; (3) maintain the Moapa corridor; (4) maintain the corridors designated by the Lincoln County Conservation, Recreation and Development Act at 0.5 miles wide; and (5) designate a new 0.5 mile wide corridor connecting with the corridor designated by the Lincoln County Conservation, Recreation, and Development Act, beginning near the Atlanta Mine, trending in a northerly direction along the west side of Spring Valley, and ending at the Southwest Intertie Project corridor. Lands and realty actions that could occur within these corridors include but are not limited to powerlines, pipelines, transmission lines, and highways.

d. Land Use Authorizations (communication sites, renewable energy, rights-of-way, permits, leases, and easements)

BLM proposes to authorize communication sites with emphasis on co-location (**LR-35**). Wilderness Study Areas will be avoided for land use authorizations (**LR-36, LR-40**, and **RE-4**); designated wilderness will be excluded (**LR-37**, **LR-41**, and **RE-5**); and ACECs will be avoided or excluded (**LR-38**, **LR-42**, and **RE-6**).

Some material site rights-of-way in ACECs will be authorized under the Federal Highway Aid Act as valid existing claims within 0.5 mile of state and county roads and will be at least 10 miles apart (**LR-44**). Rights-of-way will be situated in corridors within the planning area and rights-of-way in desert tortoise habitat will be managed the same as described for the three desert tortoise ACECs (**LR-45**). Communication sites will not be authorized in critical desert tortoise habitat and disturbance in non-critical desert tortoise habitat are estimated at two communication towers requiring an estimated 10 acres each during the life of the RMP (BLM 2008).

BLM anticipates that a total of 40 acres of riparian habitat may be disturbed as a result of rights-of-way authorizations over the next 10 years (Table 4). No effects from rights-of-way are anticipated for the three listed fishes. The Lower Meadow Valley Wash ACEC will be established as an avoidance area for communication sites, rights-of-way, and renewable energy projects **(LR-38, LR-42, and RE-6)**.

BLM proposes to issue rights-of-way for renewable energy development projects. The issuance of rights-of-way for renewable energy is a discretionary BLM action and will be accomplished in accordance with the decisions in the RMP/Final EIS.

The three desert tortoise ACECs are closed to renewable energy development. Approximately 120 acres of moderate to high potential wind areas occur within designated critical habitat and 2,670 acres in non-critical habitat outside of ACECs. In addition, there are approximately 46,200 acres of designated critical habitat and 348,950 acres of non-critical habitat outside of ACECs that have moderate to high potential solar areas. BLM estimates that approximately 184 acres of long-term surface disturbance may occur within desert tortoise habitat including approximately 18 acres within critical habitat outside of the ACECs (BLM 2008). None of the disturbance is projected to occur within the ACECs. Desert tortoise habitat generally is unsuitable for development of biomass energy facilities.

General Minimization Measures (Decisions) Proposed by BLM for the Lands, Realty, and Renewable Energy Program:

BLM incorporated management decisions in the RMP/Final EIS to minimize the potential effects to the desert tortoise that may result from implementation of the Lands, Realty, and Renewable Energy Program (BLM 2007a; **LR-49**). Other management decisions under this program that may minimize effects to or benefit the fishes and the flycatcher include **LR-2** (retain lands within ACECs), **LR-5** (retain lands with springs and creeks that contain fisheries in Federal ownership), and **LR-46** (surface disturbances from unauthorized uses will be reclaimed to pre-disturbance conditions, to the extent possible).

6. Travel and OHV Management (Formal: DT, WRSF, SWWF; Informal: BSSD, PAPO)

The management actions for the travel management program are largely administrative. BLM will limit OHV use to designated roads and trails over 10,306,500 acres and close 1,153,500 acres to OHV use. This acreage reflects designated wilderness and Wilderness Study Areas (**TM-9**).

BLM proposes to close designated wilderness to motorized and mechanized travel according to policy and enabling legislation (**TM-1**). BLM will update the Ely District Office Transportation Plan through subsequent implementation-level plans completed

primarily along watershed boundaries **(TM-4)**. Until site-specific implementation plans and route designations are complete, motorized travel will be limited to existing roads and trails except when cross-country travel is needed for safety, required for government (federal, state, and local) administrative needs, as authorized on a permit, for big game retrieval, or as otherwise officially approved. BLM will produce a map depicting the designated roads, primitive roads, and trails available for use. BLM will rehabilitate roads that have been identified through the process as closed to motorized traffic on a case-by-case basis to discourage continued motorized use. In addition, BLM will place signs and barriers and produce public maps and other appropriate forms of education and communication to inform the public of updated route designations.

Comprehensive travel management planning addresses all resource use aspects and accompanying modes and conditions of travel on public lands. Roads on BLM-administered lands are used by permitted users such as miners and livestock operators and by recreationists for dispersed recreation activities such as hunting, fishing, camping, rock-hounding, OHV use, and sightseeing. Access is necessary for BLM personnel to administer the various resource management programs on public land including livestock grazing, mining, wildlife habitat management, watershed management, recreation management, and numerous other programs. Access also is an important factor in fire suppression and fire management.

BLM determined that complexity, incomplete data, and insufficient resources have made it infeasible to complete road and trail network selection and data collection for the RMP planning effort. Data collection will follow a standardized process using appropriate technology to allow staff to record road and trail conditions and characteristics.

Travel and OHV Management in Desert Tortoise Habitat

The Ely District is currently open to cross country travel. BLM will complete designation of vehicle routes within the Ely District **(TM-4)**. Until route designation is completed, motorized travel will be limited to existing roads and trails, with certain exceptions. Management of motorized vehicle use within the three desert tortoise ACECs will include limitation of OHV use to designated roads and trails except within designated wilderness areas, which are closed (approximately 40,160 acres in Mormon Mesa ACEC and 32,365 acres in Kane Springs ACEC). Establishment of new trails will be restricted within the ACECs. Motorized vehicle use within desert tortoise habitat outside the ACECs will be restricted to designated roads and trails (BLM 2008). Approximately 23 miles of roads and trails exist in critical habitat outside the ACECs. Refer to the Recreation Program below for additional proposed OHV management.

As a high-priority management action, BLM will limit motorized vehicle traffic to designated routes within desert tortoise habitat outside of designated wilderness **(TM-5)**. BLM will restrict the establishment of new permanent roads and trails in designated desert tortoise [critical] habitat **(TM-6)**. Roads and trails will be rerouted where feasible

to improve manageability of desert tortoise habitat (**TM-7**). BLM will coordinate with the Service, Lincoln County Road Department, and the Nevada Department of Transportation to identify roads and trails with high tortoise mortality due to impacts from vehicles. Fences and culverts may be installed along these roads and trails to allow for the safe passage of desert tortoises (**TM-8**).

Travel and OHV Management in Aquatic and Riparian Habitats

Limiting motorized travel to existing or designated routes should reduce the amount of disturbance to vegetation, prevent erosion, and increase soil stability, thereby contributing to habitat improvement for the three fishes and the flycatcher. BLM anticipates that approximately 89 acres of flycatcher habitat may be disturbed by OHV and recreational activities (Table 4.).

7. Recreation (Formal: DT, WRSF, SWWF; Informal: PAPO)

BLM proposes to manage five Special Recreation Management Areas (SRMAs) including the new Pahranagat SRMA (298,500 acres) which overlaps with approximately 35,000 acres of desert tortoise habitat (**REC-2**). None of the SRMAs are expected to affect habitats for the fishes or the flycatcher. BLM will write recreation management plans for each of the SRMAs (**REC-4**). BLM proposes to manage areas not designated as SRMA as extensive recreation management areas (**REC-5**). BLM will manage for recreation facilities and services such as trails, trailheads, staging areas, and associated structures in extensive recreation management areas following activity-level plans and National Environmental Policy Act (NEPA) analysis for the management of designated wilderness, ACECs, the Silver State Off-highway Vehicle Trail, backcountry byways, and where appropriate, for management of recreational impacts to natural and cultural resources (**REC-6**). BLM will develop or construct recreation trails and routes in extensive recreation management areas as future needs are identified in site-specific planning (**REC-7**). BLM will continue to provide visitor orientation information, interpretive activities, signage, safety programs, and other visitor outreach activities (**REC-9**). Motorized vehicle use within desert tortoise habitat will be either closed or limited to designated roads and vehicle trails including areas both within and outside of ACECs.

BLM proposes to issue Special Recreation Permits (SRPs) for OHV events, outfitters and guides, and other recreational activities. OHV permitted activities will be limited to designated routes.

BLM proposes to manage four special recreation permit areas totaling approximately 1.3 million acres to provide opportunities for competitive motorcycle special recreation permit events (**REC-11**). BLM will designate event routes and develop additional minimization measures in subsequent activity level plans (**REC-13**). BLM will manage for a maximum of two competitive truck events each calendar year (**REC-14**); and four

routes for competitive truck events. BLM will limit vehicle off-loading areas to areas of existing disturbance and event size by the number of vehicles that can be involved without expanding the disturbed area (**REC-20**). Routes will be rotated to minimize impacts (**REC-15**). Desert tortoise ACECs will be closed to all high-speed, competitive OHV use (**REC-17**) and all types of organized non-speed, OHV events from March 1 to June 15, and September 1 to October 31 (**REC-18**). BLM will limit non-speed OHV events in desert tortoise ACECs as identified in Table 2.4-13 of the FEIS (**REC-19**). OHV use in the Condor Canyon, Shoshone Ponds, and Lower Meadow Valley Wash ACECs will be limited to designated roads and trails (**SD-3**).

The Service must concur with any new proposed travel management disturbance in the future through section 7 consultation before BLM could proceed. Closure of the three desert tortoise ACECs to all speed competitive events has eliminated such events from 80 percent of the designated critical desert tortoise habitat in the planning area. Historically, only one competitive event has occurred annually in desert tortoise critical habitat, within the planning area. Approximately 64.4 miles of OHV roads and trails would cross desert tortoise habitat including 13.3 miles within the desert tortoise ACECs, 0.1 mile in critical habitat outside the ACECs, and 51.0 miles in non-critical habitat outside the ACECs.

BLM may permit non-speed organized events to pass through the desert tortoise ACECs on designated routes (22.2 miles within the ACECs), except during periods of higher tortoise activity. BLM may permit non-speed events such as trail rides and commercial sightseeing when consistent with the desert tortoise recovery plan; demand for these types of events historically has been less than one event per year. Table 5 identifies the general limitations proposed by BLM for OHV events in desert tortoise habitat.

Organized OHV events are not anticipated to affect the three listed fishes. One OHV route passes through southwestern willow flycatcher habitat in the Meadow Valley Wash within the city of Caliente. This portion of the route occurs on private land. Upon crossing onto BLM-administered land, the route enters upland areas with no flycatcher habitat.

Table 5. Summary of Limitations for Non-speed OHV Events within Desert Tortoise ACECs[1]

Stipulations	OHV Event Corridors		
	Carp-Elgin, Halfway Wash, and East Halfway Wash	**Littlefield**	**Kane Springs Road**
Dates allowed for events	June 16 – August 31 November 1 – February 28-29	November 1 – February 28-29	June 16 – August 31 November 1 – February 28-29
Maximum number of vehicles	100	300 4-wheeled vehicles or 400 motorcycles	300
Maximum number of laps	1	1	1
Maximum number of events allowed per tortoise ACEC	3	4	4

[1]Subject to change

8. Livestock Grazing Management (Formal: DT, BSSD, PAPO, and SWWF)

The goal of BLM's livestock grazing management program is to manage livestock grazing on public lands to provide for levels consistent with multiple use, sustained yield, and watershed function and health. BLM's rangeland management strategies are supported by the Standards for Rangeland Health and Guidelines for Livestock Grazing for the Mojave/Southern Great Basin and Northeastern Great Basin regions, which were adopted and approved by the Secretary of the Interior in 1997.

Standards for the Mojave/Southern Great Basin Area are:

- Watershed soils and stream banks should have adequate stability to resist accelerated erosion, maintain soil productivity, and sustain the hydrologic cycle.
- Watersheds should possess the necessary ecological components to achieve state water quality criteria, maintain ecological processes, and sustain appropriate uses. Riparian and wetlands vegetation should have structural and species diversity characteristic of the stage of stream channel succession in order to provide forage and cover, capture sediment, and capture, retain, and safely release water.
- Habitats and watersheds should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species.

Rangeland health standards are equivalent to *land health standards*. "Health" is expressed by indicators in the Mojave-Southern Great Basin Resource Advisory Council (RAC) standards. Specifically, Habitat Standard 3 states the following:

Habitat Indicators:
-Vegetation composition (relative abundance of species);
-Vegetation structure (life forms, cover, height, and age classes);

-Vegetation distribution (patchiness, corridors);
-Vegetation productivity; and
-Vegetation nutritional value.

Wildlife Indicators:
-Escape terrain;
-Relative abundance;
-Composition;
-Distribution;
-Nutritional value; and
-Edge-patch snags.

The above indicators are applied to the potential of the ecological site. Ecological sites are correlated to the soil surveys of the Mojave Desert in Lincoln County. These sites quantify two important indicators: vegetation composition and productivity. These indicators are relevant to habitat for the desert tortoise, Big Spring spinedace, Pahrump poolfish, and southwestern willow flycatcher. If standards are being met, then there should be appropriate habitat composition and structure to accommodate the needs of these species.

BLM will continue to monitor and evaluate allotments to determine if they are continuing to meet or are making significant progress toward meeting the standards for rangeland health **(LG-4)**. Current grazing preference, season-of-use, and kind of livestock will be maintained until the allotments that have not been evaluated are in conformance with the policies **(LG-5)**.

BLM will manage allotments that become vacant for any reason including relinquishment by the permittee, to best meet site-specific and land use planning objectives. Authorized uses may include new grazing permits, forage reserve allotments, dedication to purposes that preclude livestock grazing and others such as offsetting allotments for permittees who are displaced for any reason **(LG-7)**.

Livestock Grazing in Desert Tortoise Habitat

Land within designated desert tortoise ACECs closed to livestock grazing includes approximately 203,670 acres within the Kane Springs, Mormon Mesa, and Beaver Dam Slope ACECs **(LG-2)**. Livestock grazing would continue on 19 allotments within desert tortoise habitat outside of the ACECs including 8 allotments on 46,663 acres of the Beaver Dam Slope (BDS) and Mormon Mesa (MM) CHUs **(LG-3)** (Table 6). The RMP/Final EIS proposes no new disturbance as a result of livestock grazing. BLM is not proposing any new or changed direction for livestock grazing in desert tortoise habitat in the RMP/Final EIS.

BLM is in the process of, and will continue to evaluate allotments to determine whether they are meeting or making progress towards achieving rangeland health standards. Allotments or portions of allotments in desert tortoise habitat outside ACECs will be managed according to seasonal utilization limits of 40 percent of annual growth on key forbs, perennial grasses, and shrubs (March 1 to October 31), 50 percent of annual growth on key perennial grasses, and 45 percent of annual growth on key shrubs and perennial forbs (November 1 through February 28/29).

Table 6. Allotments in Desert Tortoise Habitat Available for Livestock Grazing and Current Use

Allotment Name	Approx. Total Allotment Public Acres[1]	Approx. Acres of Critical Habitat (CHU)	Approx. Acres of Non-Critical Habitat	Season of Use (no. months)	Active Animal Unit Months
Boulder Spring	13,537	0	9,736	10/1 to 3/31 (6)	416
Breedlove	89,500	41 (MM)	89,074	3/1 to 2/28 (12)	698
Buckhorn	82,968	0	2,544	3/1 to 2/28 (12)	3,370
Delamar	203,000	8,451 (MM)	30,494	3/1 to 2/28 (12)	5,558
Garden Springs	38,823	0	22,212	10/1 to 5/31 (8)	2,809
Gourd Spring	57,700	3,034 (MM,BDS)	50,908	10/1 to 5/31 (8)	3,458
Grapevine	22,000	1,299 (MM)	18,697	3/1 to 2/28 (12)	349
Henrie Complex	165,060	0	87,225	11/1 to 4/30 (6)	1,380
Lime Mountain	67,144	0	2,786	10/1 to 5/15 (7.5)	6,754
Lower Lake East	41,800	2,504 (MM)	27,353	3/1 to 2/28 (12)	640
Lower Lake West	57,000	0	5,553	3/1 to 2/28 (12)	1,247
Lower Riggs	19,569	0	125	5/1 to 3/24 (<11)	1,408
Mormon Peak	64,700	67 (MM)	12,892	6/1 to 3/31 (10)	600
Pahranagat East	34,146	0	11,401	8/1 to 5/31 (10)	511
Pahranagat West	70,138	0	12,005	10/1 to 5/31 (8)	2,144
Snow Springs	44,042	6,499 (BDS)	37,507	10/1 to 5/15 (7.5)	3,567
Summit Spring	18,035	2,738 (BDS)	14,257	10/1 to 5/31 (8)	715
Terry[2]	30,163	22,030 (BDS)	8,492	11/1 to 5/31 (7)	1,511
White Rock	32,916	0	24,725	10/1 to 5/31 (8)	2,880
TOTALS	1,152,241	46,663	467,986		40,015

[1] Not including allotment acreage unavailable for grazing within desert tortoise ACECs.
[2] Allotment administered by St. George Field Office.

Livestock Grazing in Big Spring Spinedace, Pahrump Poolfish, and Southwestern Willow Flycatcher Habitat

Four livestock grazing allotments overlap Big Spring spinedace habitat in the Condor Canyon area (Highland Peak, Black Hills, Condor Canyon, and N4/N5). Of these allotments, data for evaluating rangeland health standards has been collected only for N4/N5. However, the evaluation has not been completed. N4/N5 is 43,500 acres in size, and is grazed year-long at an assigned use level of 825 AUMs. Black Hills is 3,610 acres in size, and is grazed year-long at an assigned use level of 156 AUMs. Condor Canyon is 44,035 acres in size and is grazed from March 1 to January 24 at an assigned use level of

676 AUMs. Highland Peak is 45,542 acres in size, and is grazed from October 16 to May 15 at an assigned use level of 3,704 AUMs.

One livestock grazing allotment overlaps with Pahrump poolfish habitat. Scotty Meadows allotment is 17,322 acres in size, and is grazed from June 1 to September 30 at an assigned use level of 1,227 AUM. This allotment has not yet been evaluated for meeting rangeland health standards.

Table 7 lists the livestock grazing allotments that overlap with flycatcher habitat along the Meadow Valley Wash. Of these allotments, data for evaluating rangeland health standards has been collected for the Cottonwood, Henrie Complex, and Schlarman allotments; however the evaluation has not been completed.

Table 7. Livestock grazing allotments that overlap southwestern willow flycatcher habitat along the Meadow Valley Wash

Allotment Name	Approx. Acres of Affected Habitat on Public Lands	Season of Use	Active Animal Unit Months
Applewhite	120	Yearlong	562
Ash Flat	187	May 1 to Mar 24	74
Breedlove	209	Yearlong	698
Caliente	1	Yearlong	40
Cottonwood	11	May 1 to Oct 31	1,296
Henrie Complex	587	Nov 1 to Apr 30	1,373
Meadow Valley	135	Cattle Nov 1 to Apr 30 Horses Yearlong	56
Oak Springs	139	Yearlong	9,268
Peck	7	Yearlong	397
Pennsylvania	97	May 1 to Oct 31	588
Rainbow	7	Yearlong	665
Rox-Tule	98	Closed	0
Schlarman	105	Nov 1 to Apr 30	240

BLM proposes measures to minimize the potential effects to listed species that may result from implementation of the Livestock Grazing Management Program (BLM 2007a). Within approximately 2 years from the date of this biological opinion, BLM will conduct assessments of all grazing allotments and will propose to issue term livestock grazing permits. During these assessments, BLM and the Service will consult on the proposed grazing program at the allotment level. Issuance of term permits will require BLM to append those actions to this biological opinion and additional measures may apply.

Minimization Measures (Decisions) Proposed by BLM for the Livestock Grazing Program:

BLM proposes to monitor and evaluate allotments (**LG-4**) and include the option of retiring vacant allotments (**LG-7**). Management decision **LG-8** provides measures that would further minimize potential effects to listed species which include: restrict vehicle use to existing roads and trails; move tortoises out of harm's way; prohibit use of hay or grains as feeding supplement; conduct regular site visits to each allotment; adjust livestock levels in response to negative events or conditions; and require the permittee to remove straying livestock.

9. Geology and Mineral Extraction (Formal: DT, SWWF; Informal: BSSD)

Leasable minerals are those minerals on public lands where the land is leased to individuals for their exploration and development. The leasable minerals have been subdivided into two classes, *fluid* and *solid*. Fluid minerals include oil and gas; geothermal resources and associated by-products; and oil shale, native asphalt, oil impregnated sands, and any other material in which oil is recoverable only by special treatment after the deposit is mined or quarried. Solid leasable minerals include specific minerals such as coal and phosphates.

Geothermal development potential is moderate in the valley areas and low in the mountain areas. The moderate potential areas cover about 49 percent of the planning area. As of March 2004, the geothermal leasehold in the planning area is approximately 1,000 acres in a single lease. Geothermal leasing in the future is not expected to greatly increase in the short-term, but potential exists for a variety of low-temperature geothermal uses.

a. Fluid Leaseable Minerals

The proposed action for fluid mineral development potential in the planning area is based on reasonable foreseeable development scenarios for oil and gas and geothermal energy. Fluid mineral exploration and development could occur throughout the Mormon Mesa and Beaver Dam Slope ACECs, outside designated wilderness areas. Future oil and gas activity within ACECs will be managed as no surface occupancy. Existing oil and gas leases cover approximately 34,580 acres within the Beaver Dam Slope ACEC and 9,625 acres within the Mormon Mesa ACEC (BLM 2008). New lease areas will be managed as "no surface occupancy." Wildcat wells (exploratory oil wells drilled on lands of unknown potential) and an estimated one oil or gas field could occur during the life of the RMP. No habitat disturbance from seismic activities would occur within ACECs, since these activities will be restricted to existing roads and trails. Outside ACECs, existing leases cover approximately 28,740 acres in desert tortoise critical habitat and 43,422 acres of non-critical habitat. Habitat disturbance associated with fluid mineral activities

outside the ACECs would take place in three phases: exploration, well drilling, and oil field production.

This consultation is based on BLM's expectation that one wildcat well per year could occur during the life of the Ely RMP and disturb up to 5 acres and one oil and gas field could occur disturbing up to 500 acres outside desert tortoise critical habitat and sensitive habitat for other listed species.

The Condor Canyon ACEC will be either closed to leasable development or restricted to no surface occupancy. The Shoshone Ponds and Lower Meadow Valley Wash ACECs will be restricted to no surface occupancy. BLM is proposing to withdraw 80 acres adjacent to Ash Springs from all forms of mineral and agricultural entry, which will restrict fluid minerals development to no surface occupancy.

b. Solid Leasable Minerals

All three desert tortoise ACECs will be closed to solid mineral leasing (BLM 2008). Some areas within non-critical desert tortoise habitat outside of the ACECs will remain open to leasing subject to stipulations, conditions, and measures developed through project-level section 7 consultation. However, based on the low potential for solid leasable minerals, BLM considers development unlikely. There is a small probability that solid leasable minerals are present in commercially-exploitable deposits. Any solid leasable actions proposed by BLM that would result in adverse effects to listed species will require some level of modification to this programmatic consultation to include such actions.

The Condor Canyon ACEC will be either closed to leasable development or restricted to no surface occupancy. The Shoshone Ponds and Lower Meadow Valley Wash ACECs will be restricted to no surface occupancy. BLM is proposing to withdraw 80 acres adjacent to Ash Springs from all forms of mineral entry, which will close the area to solid leasable development.

c. Locatable Minerals

Surface mining is expected to remain the primary method of locatable mineral resource extraction in the planning area. Underground methods would be used to mine deeper deposits. New ore bodies would continue to be developed to replace reserves as they are mined out through both the discovery and development of new mines and expansions of existing mines. Total disturbance from locatable mining development associated with the above operations would be approximately 7,500 acres or 0.07 percent of the planning area. Reclamation of post-mining disturbance areas will be required under both Federal and State regulations.

This consultation is based on BLM's expectation that the following actions for locatable mineral may occur during the next 20 years.

- One large open-pit mine will be developed or undergo a major expansion. A large open-pit mine often consists of either one large pit or a number of smaller pits in close proximity to one another. The mine may encompass about 3,000 acres.
- Three medium-sized open-pit mines will be developed or undergo moderate expansion. The mines will consist of pits, waste rock piles, processing facilities, roads, exploration drill pads, and operations facilities. Each medium-sized open-pit mine will disturb about 700 acres resulting in a total disturbance of 2,100 acres.
- Six small mines will be developed or undergo minor expansion. Each mine will consist of small pits, waste rock piles, processing facilities, roads, exploration drill pads, and operations facilities covering up to 400 acres and total disturbance of up to 2,400 acres.
- BLM anticipates that exploration will continue at a rate of from 8 to 10 activities per year, for all types of locatable minerals within the entire planning area. The operations will consist of small exploration projects that could disturb an estimated 5 acres per project.
- Exploration and mineral developments may occur throughout the proposed Mormon Mesa and Beaver Dam Slope ACECs on valid existing claims and outside designated wilderness areas. Less than 10 acres of authorized mining plans and notices exist within the Mormon Mesa and Beaver Dam Slope ACECs. Disturbance could include approximately 70 acres within the Mormon Mesa ACEC and approximately 24 acres within the Beaver Dam Slope ACEC.

Outside ACECs, the impacts described above for locatable minerals could occur within desert tortoise habitat during exploration under notices for disturbances less than 5 acres. BLM estimates that disturbance could include approximately 32 acres within critical habitat outside ACECs.

The Condor Canyon, Shoshone Ponds, and Lower Meadow Valley Wash ACECs are proposed for withdrawal for locatable minerals development. BLM is proposing to withdraw 80 acres adjacent to Ash Springs from all forms of mineral and agricultural entry, which will also close this area to locatable minerals development.

d. Mineral Materials (Salable Minerals)

The demand for mineral materials, such as sand, gravel, and decorative rock is expected to increase as a result of growth in the planning area and Clark County. In spite of the long haulage distances, mineral materials from the planning area will be competitive with

sources closer to Las Vegas. In the near term, the most likely areas to have development of mineral material deposits will be in southern Lincoln County and the larger rural communities. The Nevada Department of Transportation (NDOT) will continue to mine gravel resources for road maintenance and construction. Additional community pits will be developed for the needs of expanding local communities. Current development of mineral materials is estimated at approximately 2,200 acres in approximately 400 existing pits. Projected additional development during the next 10 years is estimated at 1,000 acres.

The Lincoln County Road Department may need three new material pits along the Kane Springs and Carp-Elgin roads. These material sites must be at least 10 miles apart. The majority of the required mineral material pits will be located along US 93; the NDOT will continue to operate 14 material site rights-of-way (4 within the ACECs and 10 in desert tortoise habitat outside the ACECs), with the possibility of 3 more being developed (1 within and 2 outside the ACECs).

In addition to material pits required by Lincoln County, BLM estimates that one new pit will be established outside ACECs, every 2 to 5 years to meet demand. Each pit would result in 20 to 80 acres of disturbance within desert tortoise habitat over the life of the plan. Between free-use permits and NDOT rights-of-way there, BLM anticipates an additional long-term disturbance of approximately 500 acres of desert tortoise habitat during the life of the plan. Up to 120 acres of additional habitat loss could occur from these pits within the proposed ACECs, primarily within critical habitat, and up to approximately 380 acres in desert tortoise habitat outside the ACECs, primarily in non-critical habitat.

Federal Highway material site rights-of-way will be restricted to a 1-mile-wide corridor along US 93 and Kane Springs Road within the Kane Spring ACEC, and the Carp-Elgin Road within the Mormon Mesa ACEC. The majority of the required mineral material pits would be located along US 93; NDOT will continue to operate their existing material site rights-of-way. The Lincoln County Road Department also may have the need for additional free use pits along the Kane Springs and Carp-Elgin roads. However, material sites will be restricted to not less than 10-mile separations. Over the next 10 years, BLM estimates that no more than 500 acres of additional desert tortoise habitat loss will occur as a result of these pits, primarily in non-critical habitat outside of the ACECs.

The Condor Canyon and Shoshone Ponds ACECs will be closed to mineral materials development. The Lower Meadow Valley Wash ACEC will be open to mineral materials development with special stipulations, which will include controlled surface use, seasonal timing restrictions, restricted or no uses in avoidance areas (*e.g.*, riparian areas, live water, areas with special wildlife or plant features, and sensitive view sheds), additional NEPA analysis, and project-level section 7 consultation. BLM is proposing to withdraw 80 acres adjacent to Ash Springs from all forms of mineral entry, which will close this area to mineral materials development. BLM anticipates that a total of 30 acres of

flycatcher habitat may be disturbed or removed as a result of mineral extraction activities (Table 4).

General Minimization Measures (Decisions) Proposed by BLM for the Geology and Mineral Extraction Program:

BLM decision **MIN-1** will restrict exploration to existing roads and trails; contain drilling fluids; avoid impacts to tortoise burrows that may result from vibriosis and drill hole or surface shots; and require conservation fees. Decision **MIN-3** imposes timing restrictions. Decision **MIN-6** applies a no surface occupancy restriction for fluid mineral leasing within the proposed Ash Springs withdrawal and the Beaver Dam Slope, Mormon Mesa, Condor Canyon, Lower Meadow Valley Wash, and Shoshone Ponds ACECs, Decision **MIN-7** closes Kane Spring ACEC, Condor Canyon ACEC, and 6,200 acres of leased public lands in Coyote Spring Valley to fluid mineral leasing, and **MIN-9** applies special management actions for leasing within desert tortoise habitat, including timing stipulations. Decision **MIN-12** closes the Ash Springs proposed withdrawal area; the Coyote Springs leased public lands; and all ACECs established for tortoise, Big Spring spinedace, Pahrump poolfish, and flycatcher to solid leasable, locatable, and mineral materials extraction, with exceptions and special stipulations. Decision **MIN-13** closes all three desert tortoise ACECs to solid mineral leasing. Decisions **MIN-16** and **MIN-21** impose closures of the three desert tortoise ACECs to locatable minerals and mineral materials disposals (with exceptions).

10. *Fire Management (Formal: DT, BSSD, WRSF, PAPO, SWWF)*

Fire management will involve fuels management, fire suppression, and emergency stabilization and rehabilitation. In general, fuels management would result in a more widespread treatment in upland areas to prevent heavy fuel accumulation in comparison to current management and achieve vegetation goals. Treatment will include prescribed fire, wildland fire management, mechanical thinning, and herbicide application.

Management actions for fire suppression will be initiated on wildland fires. Activities associated with fire suppression could include the removal of vegetation with hand tools, burning out, bulldozers, and other heavy equipment; water removal by engines, portable pumps, or helicopter; and water and fire retardant drops from helicopters and air tankers. In general, these types of activities will be avoided except during suppression.

Following fire, the burned areas will be stabilized and rehabilitated through treatment actions that could include seedbed preparation (if necessary), seeding, and erosion control measures including water bars, contour furrows, and mulching.

Minimization Measures (Decisions) Proposed by BLM for the Fire Management Program: BLM's decision **FM-3** provides for emergency stabilization and rehabilitation following a wildfire. Specific measures to minimize impacts to the desert tortoise are in

decision **FM-7** which include: initiate full-suppression activities; assign a resource advisor to inform fire crews about the desert tortoise; do not burn unburned fingers or islands of vegetation; use previously disturbed areas where possible; restrict off-road travel to the minimal extent necessary; brief firefighters and support staff on the desert tortoise; control vehicular speeds as appropriate; rehabilitate habitat damaged by fire suppression activities; and locate tortoise mortalities post-fire

11. Special Designations (Areas of Critical Environmental Concern)

BLM is proposing to continue management of the Kane Springs, Mormon Mesa, and Beaver Dam Slope ACECs primarily for the recovery of the desert tortoise **(SD-1)**. These three ACECs encompass approximately 203,670 acres of desert tortoise habitat, most of which is designated critical habitat. These three ACECs were previously designated through the Approved Caliente MFP Amendment and Record of Decision for the Management of Desert Tortoise Habitat and corresponding biological opinion (Service File No. 1-5-99-F-450). Table 8 lists the management activities and associated management prescriptions for each of these ACECs.

Table 8. Management activities and prescriptions for desert tortoise ACECs[1]

	Management Prescriptions		
Management Activities	Beaver Dam Slope 36,800 acres	Kane Springs 57,190 acres	Mormon Mesa 109,680 acres
Land Use Authorization	Limited[2]/Avoidance Area[3]	Limited[2]/Avodance[3]/Exclusion Area	Limited[2]/Avoidance[3]/Exclusion Area
OHV Use	Closed/Limited[4]	Closed/Limited[4]	Closed/Limited[4]
Visual Resource Mgt Class	IV	I, II, III, IV	I, II, III, IV
Plant Collecting	Limited[5]	Limited[5]	Limited[5]
Road Maintenance	Limited[6]	Limited[6]	Limited[6]
Leasable Minerals	No Surface Occupancy with Exception[7]	Closed	No Surface Occupancy with Exception[7]
Locatable Minerals	Closed[8]	Closed[8]	Closed[8]
Mineral Materials	Closed	Limited[11]	Limited[11]
Land Disposals	No Disposal	No Disposal	No Disposal
Fire Management	Limited[9]	Limited[9]	Limited[9]
Transportation	Limited	Limited	Limited
Livestock Mgt	Unavailable	Unavailable	Unavailable
Fuelwood Cutting	Not Applicable	Not Applicable	Not Applicable
Renewable Energy	Closed[10]	Closed[10]	Closed[10]

1 Acres within the existing Beaver Dam Slope, Kane Springs, and Mormon Mesa ACECs are those within the planning area.

2 Rights-of-way: Authorization of future communication sites limited to existing established rights-of-way unless technically unfeasible; use of existing corridors for all future rights-of-way encouraged when possible.

3 Avoidance: Rights-of-way (surface, subsurface, aerial) within the area should be avoided, but may be granted if there is minimal conflict with identified resource values and impacts can be mitigated.

4 Off-highway vehicle use will be limited to designated roads and trails. Areas within ACECs designated as wilderness will be closed to off-highway vehicle use.

5 Plant materials, including common species, may be collected by permit only.

6 Road maintenance will be limited to the designated roadway; shoulder barrow/ditch construction will be limited to only that necessary to ensure public safety and serviceability of the road.
7 Exception requires a no adverse impact conclusion, with Service concurrence.
8 Subject to exception for existing valid claims.
9 Limits could be placed on fire management activities.
10 Closed to renewable energy facilities; avoidance area for ancillary rights-of-way for access roads, transmission lines, and pipelines.
11 Closed except for free use permits and federal highway material site rights-of-way within a 1-mile corridor, 0.5 mile on each side of road on three designated roads with spacing of at least 10 miles between adjacent sites.

BLM is proposing to designate 17 new ACECs, 3 of which will benefit the Big Spring spinedace, Pahrump poolfish, and southwestern willow flycatcher. Table 9 lists the management actions and associated management prescriptions for these three ACECs.

Table 9. Management activities and associated prescriptions for the Condor Canyon, Shoshone Ponds, and Lower Meadow Valley Wash Areas of Critical Environmental Concern.

	Management Prescriptions		
Management Activities	Condor Canyon 4,500 acres	Shoshone Ponds 1,240 acres	Lower Meadow Valley Wash 25,000 acres
Land Use Authorizations	Avoidance Area[1]	Exclusion Area; rights-of-way will not be granted within the area	Avoidance Area[1]
OHV Use	Limited[2]	Limited[2]	Limited[2]
Visual Resource Mgt Class	II, III	III	II, III, IV
Plant Collecting	Limited[3]	Closed	Closed
Road Maintenance	Limited[4]	Limited[4]	Limited[4]
Leasable Minerals	No Surface Occupancy/Closed	No Surface Occupancy	No Surface Occupancy
Locatable Minerals	Closed	Closed	Closed
Mineral Materials	Closed	Closed	Open[10]
Land Disposals	No Disposal	No Disposals	No Disposals
Fire Management	Limited[8]	Limited[8]	Limited[8]
Transportation	No New Roads	Limited	No New Roads
Livestock Mgt	Available[7]	Available[7]	Available[7]
Fuelwood Cutting	Open[5]	Closed	Closed
Renewable Energy	Closed[6]	Closed[6]	Closed[6]

1 Avoidance area; granting rights-of-way (surface, subsurface, aerial) within the area should be avoided, but rights-of-way may be granted if there is minimal conflict with identified resource values and impacts can be mitigated.
2 Off-highway vehicle use would be limited to designated roads and trails.
3 Plant materials, including common species, may be collected by permit only.
4 Road maintenance will be limited to the designated roadway; shoulder barrow/ditch construction will be limited to only that necessary to ensure public safety and serviceability of the road.
5 The activity is allowed in the area. NEPA compliance and clearances for cultural resources and threatened and endangered species required for some activities.
6 Closed to renewable energy facilities; avoidance area for ancillary rights-of-way for access roads, transmission lines, and pipelines.
7 Livestock grazing will be controlled through terms and conditions on the grazing permit.
8 Limits could be placed on fire management activities.

9 Open with special stipulations. Open to mineral material activities subject to controlled surface use, seasonal timing restrictions, restricted or no uses in avoidance areas (e.g., riparian areas, live water, areas with special wildlife or plant features, and sensitive view sheds), additional NEPA analysis and project-specific section 7 consultation.

D. Status of the Species/Critical Habitat- Rangewide

1. *Desert Tortoise - Rangewide Status*

a. Listing History

On August 20, 1980, the Service published a final rule listing the Beaver Dam Slope population of the desert tortoise in Utah as threatened (45 FR 55654). In the 1980 listing of the Beaver Dam Slope population, the Service concurrently designated 26 square miles of BLM-administered land in Utah as critical habitat. The reason for listing was population declines because of habitat deterioration and past over-collection. Major threats to the tortoise identified in the rule included habitat destruction through development, overgrazing, and geothermal development; collection for pets, malicious killing, road kills, and competition with grazing or feral animals.

On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered (54 FR 42270). On April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened (55 FR 12178). Reasons for the determination included significant population declines, loss of habitat from construction projects such as roads, housing and energy developments, and conversion of native habitat to agriculture. Livestock grazing and off-highway vehicle (OHV) activity have degraded additional habitat. Also cited as threatening the desert tortoise's continuing existence were illegal collection by humans for pets or consumption, upper respiratory tract disease (URTD), predation on juvenile desert tortoises by common ravens, coyotes (*Canis latrans*), and kit foxes (*Vulpes macrotis*), fire, and collisions with vehicles on paved and unpaved roads.

On February 8, 1994, the Service designated approximately 6.45 million acres of critical habitat for the Mojave population of the desert tortoise in portions of California (4.75 million acres), Nevada (1.22 million acres), Arizona (339 thousand acres), and Utah (129 thousand acres) (59 FR 5820-5846, also see corrections in 59 FR 9032-9036), which became effective on March 10, 1994.

b. Species Account

The desert tortoise is a large, herbivorous reptile found in portions of California, Arizona, Nevada, and Utah. It also occurs in Sonora and Sinaloa, Mexico. The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Sonoran Desert in California.

Desert tortoises reach 8 to 15 inches in carapace length and 4 to 6 inches in shell height. Hatchlings emerge from the eggs at about 2 inches in length. Adults have a domed carapace and relatively flat, unhinged plastron. Their shells are high-domed, and greenish-tan to dark brown in color with tan scute centers. Desert tortoises weigh 8 to 15 pounds when fully grown. The forelimbs have heavy, claw-like scales and are flattened for digging. Hind limbs are more stumpy and elephantine.

Optimal habitat for the desert tortoise has been characterized as creosote bush scrub in which precipitation ranges from 2 to 8 inches, where a diversity of perennial plants is relatively high, and production of ephemerals is high (Luckenbach 1982, Turner 1982, Turner and Brown 1982). Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. Desert tortoises occur from below sea level to an elevation of 7,300 feet, but the most favorable habitat occurs at elevations of approximately 1,000 to 3,000 feet (Luckenbach 1982).

Desert tortoises are most commonly found within the desert scrub vegetation type, primarily in creosote bush scrub. In addition, they occur in succulent scrub, cheesebush scrub, blackbrush scrub, hopsage scrub, shadscale scrub, microphyll woodland, Mojave saltbush-allscale scrub and scrub-steppe vegetation types of the desert and semidesert grassland complex (Service 1994). Within these vegetation types, desert tortoises potentially can survive and reproduce where their basic habitat requirements are met. These requirements include a sufficient amount and quality of forage species; shelter sites for protection from predators and environmental extremes; suitable substrates for burrowing, nesting, and overwintering; various plants for shelter (Appendix B); and adequate area for movement, dispersal, and gene flow. Throughout most of the Mojave Region, tortoises occur most commonly on gently sloping terrain with soils ranging from sandy-gravel and with scattered shrubs, and where there is abundant inter-shrub space for growth of herbaceous plants. Throughout their range, however, tortoises can be found in steeper, rockier areas (Gardner and Brodie 2000).

The size of desert tortoise home ranges varies with respect to location and year. Tortoise activities are concentrated in overlapping core areas, known as home ranges. Because tortoises do not defend a specific, exclusive area, they do not maintain territories. In the West Mojave Desert, Harless *et al* (2007) estimated mean home ranges for male desert tortoises to be 111 acres and 40 acres for females. Over its lifetime, each desert tortoise may require more than 1.5 square miles of habitat and make forays of more than 7 miles

at a time (Berry 1986). In drought years, the ability of tortoises to drink while surface water is available following rains may be crucial for tortoise survival. During droughts, tortoises forage over larger areas, increasing the likelihood of encounters with sources of injury or mortality including humans and other predators.
Desert tortoises are most active during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rainstorms. Desert tortoises spend most of the remainder of the year in burrows, escaping the extreme conditions of the desert. However, desert tortoises may be aboveground any month of the year. In Nevada and Arizona, tortoises are considered to be most active from approximately March 1 through October 31.

Tortoise activity patterns are primarily controlled by ambient temperature and precipitation (Nagy and Medica 1986, Zimmerman *et al.* 1994). Desert tortoises are active for approximately 6 weeks to 5 months of the year, depending on annual variations of temperature and rainfall. Deserts are characterized by prolonged periods of barely measurable rainfall. In much of the winter-rainfall Mojave Desert, droughts of 8 months or more occur regularly. At such times, the desert is virtually devoid of food for tortoises except for cacti and dried grasses (Oftedal 2002). In the East Mojave and Colorado Deserts, annual precipitation occurs in both summer and winter, providing food and water to tortoises throughout much of the summer and fall. Most precipitation occurs in winter in the West Mojave Desert resulting in an abundance of annual spring vegetation, which dries up by late May or June. Tortoises in the West Mojave are primarily active in May and June, with a secondary activity period from September through October.

Tortoises may also be active during periods of mild or rainy weather in summer and winter. During inactive periods, tortoises rest in subterranean burrows or caliche caves, and spend approximately 98 percent of the time in these shelter sites (Nagy and Medica 1986). During active periods, they usually spend nights and the hotter part of the day in their burrow; they may also rest under shrubs or in shallow burrows (pallets). Tortoises may use an average of 7 to 12 burrows at any given time (Bulova 1994, TRW Environmental Safety Systems Inc.1997).

Walde *et al* (2003) observed that desert tortoises retreated into burrows when air temperature reached 91.0° F ± 3.55° F and ground temperatures reached 94.6° F ± 6.05° F; 95 percent of desert tortoise observations of desert tortoises above ground occurred at air temperature less than 91° F. The body temperature at which desert tortoises become incapacitated ranges from 101.5° F to 113.2° F (Naegle 1976, Zimmerman *et al.* 1994).

Desert tortoise research in the Mojave Desert has identified nutritional constraints that may limit utilization of potential food plants. The kidney structure of the desert tortoise cannot concentrate electrolytes such as potassium as does the mammalian kidney (Maloiy 1979). Thus, the desert tortoise must rely on urine to excrete potassium resulting in more water loss in urine than it obtains in its food (Oftedal 2002). Tortoises produce uric acid

as a normal end product of protein metabolism. However, when tortoises ingest high levels of potassium without an increase in protein intake, both the amounts of urate precipitated in the bladder and the concentration of potassium in these precipitates increase (Oftedal 2003). Because urates contain approximately 30 percent nitrogen, a critical side effect of urate production is the removal of nitrogen from the body.

The amount of nitrogen excreted in urates increase dramatically as dietary potassium levels increase, with the net effect that animals on high potassium intake cannot retain nitrogen for growth even though the protein level is high. The amount of potassium that could potentially be excreted, potassium excretion potential (PEP), can be estimated based on the amount of water and nitrogen in the food, compared with the amount of potassium in the food (Oftedal 2002). A positive PEP index indicates there is more water and nitrogen in the food than is needed to excrete potassium whereas a negative PEP index indicates there is insufficient water and nitrogen in the food to excrete the potassium. Physiological responses of desert plants to low soil moisture appear to result in plants with a low PEP index that are poor food for tortoises. If high PEP index plants only germinate and grow in wet years, selective foraging by desert tortoises during these times may provide the greatest nutrition. Thus, nutritional status of wild tortoises may depend more on availability of plant species of high nutritional quality than on overall amounts of annual vegetation (Oftedal 2002).

Although desert tortoises eat alien plants, they generally prefer native forbs when available (Jennings 1993, Avery 1998). Consumption of alien plants may place them at a nitrogen and water deficit (Henen 1997). Droughts frequently occur in the desert, resulting in extended periods of low water availability. Periods of extended drought place tortoises at even greater water and nitrogen deficit than during moderate or high rainfall years (Peterson 1996, Henen 1997). During a drought, more nitrogen than normal is required to excrete nitrogenous wastes, thus more rapidly depleting nitrogen stored in body tissues. Plants also play important roles in stabilizing soil and providing cover for protection from predators and heat.

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). Succulent green forage of spring is essential to the growth, reproduction, and survivorship of the desert tortoise. Growth of individual tortoises is directly correlated to the amount and quality of forage available in any given spring. The size and number of egg clutches correlates with the quality and quantity of the spring diet. If spring forage is not available, the opportunity for the tortoise to meet its nutritional needs cannot be met until the next year. Important forage species for the desert tortoise can be found in Appendix B.

Further information on the range, biology, and ecology of the desert tortoise can be found in Berry and Burge (1984), Brooks *et al.* 2003, Burge (1978), Burge and Bradley (1976), Bury *et al.* (1994), Gardner and Brodie 2000; Germano *et al.* (1994), Hovik and

Hardenbrook (1989), Jennings (1997), Karl (1981, 1983a, 1983b), Luckenbach (1982), Oftedal 2002; Service (1994), Tracy *et al.* 2004; and Weinstein *et al.* (1987).

c. Recovery Plan

On June 28, 1994, the Service approved the final Desert Tortoise (Mojave Population) Recovery Plan (Recovery Plan) (Service 1994). The Recovery Plan divides the range of the desert tortoise into 6 recovery units and recommends establishment of 14 desert wildlife management areas (DWMAs) throughout the recovery units. Within each DWMA, the Recovery Plan recommends implementation of reserve-level protection of desert tortoise populations and habitat, while maintaining and protecting other sensitive species and ecosystem functions. The design of DWMAs should follow accepted concepts of reserve design. As part of the actions needed to accomplish recovery, the Recovery Plan recommends that land management within all DWMAs should restrict human activities that negatively impact desert tortoises (Service 1994). The DWMAs/areas of critical environmental concern (ACECs) have been designated by BLM through development or modification of their land-use plans in Arizona, Nevada, Utah, and parts of California.

The U.S. General Accounting Office (GAO) Report, *Endangered Species: Research Strategy and Long-Term Monitoring Needed for the Mojave Desert Tortoise Recovery Program* (GAO 2002), directed the Service to periodically reassess the Recovery Plan to determine whether scientific information developed since its publication could alter implementation actions or allay some of the uncertainties about its recommendations. In response to the GAO report, the Service initiated a review of the existing Recovery Plan in 2003. In March 2003, the Service impaneled the Desert Tortoise Recovery Plan Assessment Committee (Committee) to assess the Recovery Plan. The Committee was selected to represent several important characteristics with particular emphasis on commitment to solid science. The charge to the Committee was to review the entire Recovery Plan in relation to contemporary knowledge to determine which parts of the recovery plan will need updating. The recommendations of the Committee were presented to the Service and Desert Tortoise Management Oversight Group on March 24, 2004 (Tracy *et al.* 2004). The recommendations will be used as a guide by a recovery team of scientists and stakeholders to modify the Recovery Plan.

The Committee recognized that the distribution and abundance data indicate trends leading away from recovery goals in some parts of the species' range. These results indicate a need for more aggressive efforts to facilitate recovery. Many of the original prescriptions of the Recovery Plan were never implemented although these prescriptions continue to be appropriate. New prescriptions should be prioritized to assess redundancies and synergies within individual threats.

Federal, State, and local agencies and non-governmental organizations have undertaken numerous activities to attempt to recover the desert tortoise. Agencies and others have

modified grazing procedures, retired livestock allotments, fenced highways, removed burros, and restored disturbed habitat, among other activities in an attempt to recover the desert tortoise. The extent that these efforts will benefit the desert tortoise will be difficult to measure because of the slow reproductive rate of the species and other factors, such as disease, drought, and predation that may be affecting the number of individuals in a region.

On November 3, 2004, the Service announced the formation of the Desert Tortoise Recovery Office (DTRO) and plans to coordinate with regional recovery implementation work groups to develop 5-year recovery action plans as the basis for revising the 1994 recovery plan. A draft revision of the Recovery Plan is anticipated for release to the public in 2008.

d. Recovery Units

The **Northeastern Mojave Recovery Unit** occurs primarily in Nevada, but it also extends into California along the Ivanpah Valley and into extreme southwestern Utah and northwestern Arizona. Vegetation within this unit is characterized by creosote bush scrub, big galleta-scrub steppe, desert needlegrass scrub-steppe, and blackbrush scrub (in higher elevations). Topography is varied, with flats, valleys, alluvial fans, washes, and rocky slopes. Much of the northern portion of the Northeastern Mojave Recovery Unit is characterized as basin and range, with elevations from 2,500 to 12,000 feet. Desert tortoises typically eat summer and winter annuals, cacti, and perennial grasses. Desert tortoises in this recovery unit, the northern portion of which represents the northernmost distribution of the species, are typically found in low densities (about 10 to 20 adults per square mile).

The Northeastern Mojave Recovery Unit includes the Mormon Mesa, Coyote Spring, Piute-Eldorado DWMAs; and a portion of the Beaver Dam Slope and Gold Butte-Pakoon DWMAs. These areas generally overlap the Mormon Mesa, Piute-Eldorado, Beaver Dam Slope, and Gold Butte-Pakoon critical habitat units.

The **Eastern Mojave Recovery Unit** is situated primarily in California, but also extends into Nevada in the Amargosa, Pahrump, and Piute valleys. In the Eastern Mojave Recovery Unit, desert tortoises are often active in late summer and early autumn in addition to spring because this region receives both winter and summer rains and supports two distinct annual floras on which they can feed. Desert tortoises in the Eastern Mojave Recovery Unit occupy a variety of vegetation types and feed on summer and winter annuals, cacti, perennial grasses, and herbaceous perennials. They den singly in caliche caves, bajadas, and washes. This recovery unit is isolated from the Western Mojave Recovery Unit by the Baker Sink, a low-elevation, extremely hot and arid strip that extends from Death Valley to Bristol Dry Lake. The Baker Sink area is generally not considered suitable for desert tortoises. Desert tortoise densities in the Eastern Mojave

Recovery Unit can vary dramatically, ranging from 5 to as much as 350 adults per square mile (Service 1994).

The Ivanpah, Piute-Eldorado, and Fenner DWMAs are included in the Eastern Mojave Recovery Unit which generally overlaps the Ivanpah and Piute-Eldorado critical habitat units in California.

The **Northern Colorado Recovery Unit** is located completely in California. The 874,843-acre Chemehuevi DWMA is the sole conservation area for the desert tortoise in this recovery unit. Desert tortoises in this recovery unit are found in the valleys, on bajadas and desert pavements, and to a lesser extent in the broad, well-developed washes. They feed on both summer and winter annuals and den singly in burrows under shrubs, in intershrub spaces, and rarely in washes. The climate is somewhat warmer than in other recovery units, with only 2 to 12 freezing days per year. The tortoises have the California mitochondrial DNA (mtDNA) haplotype and phenotype. Allozyme frequencies differ significantly between this recovery unit and the Western Mojave, indicating some degree of reproductive isolation between the two.

The **Eastern Colorado Recovery Unit is** also located completely in California. The Chuckwalla DWMA and critical habitat unit; and a portion of the Joshua Tree DWMA and Pinto Basin critical habitat unit occur in this recovery unit. This recovery unit occupies well-developed washes, desert pavements, piedmonts, and rocky slopes characterized by relatively species-rich succulent scrub, creosote bush scrub, and Blue Palo Verde-Ironwood-Smoke Tree communities. Winter burrows are generally shorter in length, and activity periods are longer than elsewhere due to mild winters and substantial summer precipitation. The tortoises feed on summer and winter annuals and some cacti; they den singly. They also have the California mtDNA haplotype and shell type.

Approximately 187,046 acres of critical habitat unit lie within the Chocolate Mountains Aerial Gunnery Range. The Marine Corps primarily uses the Chocolate Mountains Aerial Gunnery Range to support target sites for aircraft and, to a lesser degree, ground-based artillery; maintenance of the targets is the other primary activity in this area. Target areas cover approximately 2,095 acres and forward arming and refueling points occupy 161 acres. Approximately 202.8 miles of roads cross this portion of the critical habitat unit.

The **Western Mojave Recovery Unit** occurs completely in California and is exceptionally heterogeneous and large. It is composed of the Western Mojave, Southern Mojave, and Central Mojave regions, each of which has distinct climatic and vegetational characteristics. The most pronounced difference between the Western Mojave and other recovery units is in timing of rainfall and the resulting vegetation. Most rainfall occurs in fall and winter and produces winter annuals, which are the primary food source of tortoises. Above ground activity occurs primarily in spring, associated with winter annual production. Thus, tortoises are adapted to a regime of winter rains and rare

summer storms. Here, desert tortoises occur primarily in valleys, on alluvial fans, bajadas, and rolling hills in saltbrush, creosote bush, and scrub steppe communities. Tortoises dig deep burrows (usually located under shrubs on bajadas) for winter hibernation and summer aestivation. These desert tortoises generally den singly. They have a California mtDNA haplotype and a California shell type.

Four DWMAs occur wholly or partially within the Western Mojave Recovery Unit: Fremont-Kramer, Ord-Rodman, Superior-Cronese, and Joshua Tree. These areas approximate the Fremont-Kramer, Ord-Rodman, Superior-Cronese, and Pinto Basin critical habitat units.

The **Upper Virgin River Recovery Unit** encompasses all desert tortoise habitat in Washington County, Utah, except the Beaver Dam Slope, Utah population. Only the Upper Virgin River DWMA and critical habitat unit occur in this recovery unit. The desert tortoise population in the area of St. George, Utah is at the extreme northeastern edge of the species' range and experiences long, cold winters (about 100 freezing days) and mild summers, during which the tortoises are continually active. Here the animals live in a complex topography consisting of canyons, mesas, sand dunes, and sandstone outcrops where the vegetation is a transitional mixture of sagebrush scrub, creosote bush scrub, blackbush scrub, and a psammophytic community. Desert tortoises use sandstone and lava caves instead of burrows, travel to sand dunes for egg-laying, and use still other habitats for foraging. Two or more desert tortoises often use the same burrow. Shell morphology and mtDNA have not been studied in this recovery unit, but allozyme variation is similar to that found in the Northeastern Mojave Recovery Unit.

e. Distribution

The 1994 Recovery Plan conceived desert tortoises to be distributed in large populations that required large areas and large densities to recover. However, existing data are consistent with the possibility that tortoises have evolved to exist in *metapopulations*. Metapopulation theory conceives that tortoises are distributed in metapopulation patches connected with corridors that allow inefficient and asynchronous movements of individuals among the patches (Hanski 1999, Levins and Culver 1971, Levin *et al.* 1984). This paradigm conceives that some habitat patches within the range of the desert tortoise will have low population numbers or no tortoises at all, and others will have higher population numbers. Movement among the patches is necessary for persistence of the "system." If desert tortoises evolved to exist in metapopulations, then long-term persistence requires addressing habitat fragmentation caused by highways and "satellite" urbanization. Satellite urbanization occurs when blocks of habitat become developed which are substantially disjunct from existing developments (leap-frog development) resulting in a greater edge effect and creating an area of habitat between the developments which becomes degraded over time. Ensuring the integrity and function of natural corridors among habitat patches might require active management of tortoise densities in habitat patches and associated corridors.

The prescriptions for recovery in the Recovery Plan were for individual populations and assumed that preserving large blocks of habitat and managing threats in that habitat would be principally all that would be necessary to recover the species. However, that original paradigm, and the prescriptions made within that paradigm, may be wrong. Existing data have revealed population crashes that have occurred asynchronously across the range. There are reports that some populations, which have crashed previously, have subsequently increased in population density. Additionally, all known dense populations of desert tortoises have crashed. This suggests that density-dependent mortality occurs in desert tortoise populations, and that population dynamics may be asynchronous.

The genetic distinctness of tortoise populations and their pathogens should be assessed to guide all manipulative management actions (*e.g.*, head starting, translocation, habitat restoration, and corridor management). The Committee proposed a revision to the previous delineation of recovery units, or Distinct Population Segments (DPSs) based on new scientific information. The recommended delineations reflect the prevailing concepts of subpopulation "discreteness," and "significance," and incorporate morphological, behavioral, genetic, and environmental information. The Committee's recommendation reduces the number of DPSs from six to five by leaving the original Upper Virgin River and Western Mojave units intact and recombining the four central units into three reconfigured units: Lower Virgin River Desert, Northeastern Mojave Desert (including Amargosa Valley, Ivanpah Valley, and Shadow Valley), and Eastern Mojave and Colorado Desert. These recommended DPSs are based largely on the best resolving biochemical/genetic data of Rainboth *et al.* (1989), Lamb *et al.* (1989), Lamb and Lydehard (1994), and Britten *et al.* (1997). Because these delineations are general and not definitive at this time, more data and analyses are required which may result in additional modification. Although DPSs have been proposed by the Committee, no DPSs have been officially designated by the Service.

The 1994 Recovery Plan conceived desert tortoises to be distributed in large populations that required large areas and large densities to recover. However, existing data are consistent with the possibility that tortoises have evolved to exist in *metapopulations*. Metapopulation theory conceives that tortoises are distributed in metapopulation patches connected with corridors that allow inefficient and asynchronous movements of individuals among the patches. This paradigm conceives that some habitat patches within the range of the desert tortoise will have low population numbers or no tortoises at all, and others will have higher population numbers. Movement among the patches is necessary for persistence of the "system." If desert tortoises evolved to exist in metapopulations, then long-term persistence requires addressing habitat fragmentation caused by highways and satellite urbanization. Ensuring the integrity and function of natural corridors among habitat patches might require active management of tortoise densities in habitat patches and associated corridors.

Threats

The Service identified key threats when the Mojave population of the desert tortoise was emergency listed as endangered and subsequently listed as a threatened species, which remain valid today. The Recovery Plan discusses threats and developed recovery objectives to minimize their effects on the desert tortoise and allow the tortoise to recover. Since becoming listed under the Act, more information is available on threats to the desert tortoise with some threats such as wildfires and alien plants affecting large areas occupied by tortoises.

Alien plants continue to contribute towards overall degradation or habitat quality for the desert tortoise. Land managers and field scientists identified 116 species of alien plants in the Mojave and Colorado Deserts (Brooks and Esque 2002). The proliferation of non-native plant species has also contributed to an increase in fire frequency in tortoise habitat by providing sufficient fuel to carry fires, especially in the intershrub spaces that are mostly devoid of native vegetation (Service 1994; Brooks 1998; Brown and Minnich 1986). Changes in plant communities caused by alien plants and recurrent fire may negatively affect the desert tortoise by altering habitat structure and species composition of their food plants (Brooks and Esque 2002).

Changing ecological conditions as a result of natural events or human-caused activities may stress individual tortoises and result in a more severe clinical expression of URTD (Brown *et al.* 2002). For example, the proliferation of non-native plants within the range of the tortoise has had far-reaching impacts on tortoise populations. Tortoises have been documented to prefer native vegetation over non-natives (Tracy *et al.* 2004). Non-native annual plants in desert tortoise critical habitat in the western Mojave Desert were identified to compose over 60 percent of the annual biomass (Brooks 1998). The reduction in quantity and quality of forage may stress tortoises and make them more susceptible to drought- and disease-related mortality (Brown *et al.* 1994). Malnutrition has been associated with several disease outbreaks in both humans and turtles (Borysenko and Lewis 1979).

Numerous wildfires occurred in desert tortoise habitat across the range of the desert tortoise in 2005 due to abundant fuel from the proliferation of non-native plant species after a very wet winter. These wildfires heavily impacted two of the six desert tortoise recovery units, burning less than 19 percent of desert tortoise habitat in the Upper Virgin River and 10 percent in the Northeastern Mojave (Table 10). In the Upper Virgin River Recovery Unit, 19 percent of the Upper Virgin River critical habitat unit (CHU) burned. In the Northeastern Mojave Recovery Unit, three CHUs were impacted: about 23 percent of the Beaver Dam Slope CHU burned, 13 percent of the Gold Butte-Pakoon CHU, and 4 percent of the Mormon Mesa CHU. Although it is known that tortoises were burned and killed by the wildfires, tortoise mortality estimates are not available at this time.

Table 10. Acres of desert tortoise habitat burned in each recovery unit during 2005.

Recovery Unit	Habitat Burned (acres)	% Habitat Burned	CH* Burned (acres)	% CH Burned
Upper Virgin River**	10,446	< 19	10,446	19
Northeastern Mojave***	500,000	10	124,782	11
Eastern Mojave	6,000	< 1	1,219	<1
Western Mojave	0	0	0	0
Northern Colorado	0	0	0	0
Eastern Colorado	0	0	0	0
Total	**516,446**	-	**136,447**	-

* CH – critical habitat

** Estimates only for Upper Virgin River; needs GIS analysis.

*** Potential habitat was mapped and calculated as Mojave Desert less than 4,200 feet in elevation minus playas, open water, and developed and agricultural lands.

Disease and raven predation have been considered important threats to the desert tortoise since its emergency listing in 1989. What is currently known with certainty about disease in the desert tortoise relates entirely to individual tortoises and not populations; virtually nothing is known about the demographic consequences of disease (Tracy *et al.* 2004). Disease was identified in the 1994 Recovery Plan as an important threat to the desert tortoise. Disease is a natural phenomenon in wild populations of animals and can contribute to population declines by increasing mortality and reducing reproduction. However, URTD appears to be a complex, multi-factorial disease interacting with other stressors to affect desert tortoises (Brown *et al.* 2002; Tracy *et al.* 2004). The disease occurs mostly in relatively dense desert tortoise populations, as mycoplasmal infections are dependent upon higher densities of the host (Tracy *et al.* 2004).

From 1969 to 2004 the numbers of common ravens in the west Mojave Desert increased approximately 700 percent (Boarman and Kristan 2006). Population increases have also been noted at other locations particularly in the California Desert. This many-fold increase above historic levels and a shift from a migratory species to a resident species is due in a large part to recent human subsidies of food, water, and nest sites (Knight *et al.* 1993, Boarman 1993, Boarman and Berry 1995). While not all ravens may include tortoises as significant components of their diets, these birds are highly opportunistic in their feeding patterns and concentrate on easily available seasonal food sources, such as juvenile tortoises.

Boarman (2002a) identified the following major categories of threats: Agriculture, collection by humans, construction activities, disease, drought, energy and mineral development, fire, garbage and litter, handling and deliberate manipulation of tortoises, invasive [alien] plants, landfills, livestock grazing, military operations, noise and vibration, off-road [OHV] activities, predation, non-off-road vehicle recreation, roads,

highways and railroads, utility corridors, vandalism, and wild horses and burros. For additional information on threats to the desert tortoise refer to Boarman (2002a), Tracy *et al.* (2004), Service 1994.

f. Reproduction

Desert tortoises possess a combination of life history and reproductive characteristics that affect the ability of populations to survive external threats. Tortoises grow slowly, require 15 to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential (Turner *et al.* 1984; Bury 1987; Tracy *et al.* 2004).

Choice of mate is mediated by aggressive male-male interactions and possibly by female choice (Niblick *et al.* 1994). Tortoises in the West Mojave Desert may exhibit pre-breeding dispersal movements, typical of other vertebrates, ranging from 1 to 10 miles in a single season (Sazaki *et al.* 1995). The advantage of pre-breeding dispersal may be to find a more favorable environment in which to reproduce. However, the risk is increased mortality from predation, exposure, starvation, or anthropogenic factors (*e.g.*, motor vehicle mortality).

The average clutch size is 4.5 eggs (range 1 to 8), with 0-3 clutches deposited per year (Turner *et al.* 1986). Clutch size and number probably depend on female size, water, and annual productivity of forage plants in the current and previous year (Turner *et al.* 1984, 1986; Henen 1997). The ability to alter reproductive output in response to resource availability may allow individuals more options to ensure higher lifetime reproductive success. The interaction of longevity, late maturation, and relatively low annual reproductive output causes tortoise populations to recover slowly from natural or anthropogenic decreases in density. To ensure population stability or increase, these factors also require relatively high juvenile survivorship (75 to 98 percent per year), particularly when adult mortality is elevated (Congdon *et al.* 1993). Most eggs are laid in spring (April through June) and occasionally in fall (September to October). Eggs are laid in sandy or friable soil, often at the entrance to burrows. Hatching occurs 90 to 120 days later, mostly in late summer and fall (mid-August to October). Eggs and young are untended by the parents.

Tortoise sex determination is environmentally controlled during incubation (Spotila *et al.* 1994). Hatchlings develop into females when the incubation (*i.e.*, soil) temperature is greater than 88.7° F) and males when the temperature is below that (Lance 2006). Mortality is higher when incubation temperatures are greater than 95.5° F or less than 78.8° F. The sensitivity of embryonic tortoises to incubation temperature may make populations vulnerable to unusual changes in soil temperature (*e.g.*, from changes in vegetation cover).

At Yucca Mountain, Nye County Nevada (Northeastern Mojave Recovery Unit), Mueller *et al.* (1998) estimated that the mean age of first reproduction was 19 to 20 years; clutch

size (1 to 10 eggs) and annual fecundity (0 to 16 eggs) were related to female size but annual clutch frequency (0 to 2) was not. Further, Mueller suggested that body condition during July to October may determine the number of eggs a tortoise can produce the following spring. McLuckie and Friedell (2002) determined that the Beaver Dam Slope desert tortoise population, within the Northeastern Mojave Recovery Unit, had a lower clutch frequency (1.33 ± 0.14) per reproductive female and fewer reproductive females (14 out of 21) when compared with other Mojave desert tortoise populations. In the 1990's, Beaver Dam Slope experienced dramatic population declines due primarily to disease and habitat degradation and alteration (Service 1994). The number of eggs that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition (Henen 1997; McLuckie and Fridell 2002).

g. Numbers

Long-term monitoring of desert tortoise populations is a high priority recovery task as identified in the Recovery Plan. From 1995 to 1998, pilot field studies and workshops were conducted to develop a monitoring program for desert tortoise. In 1998, the Desert Tortoise Management Oversight Group identified line distance sampling as the appropriate method to determine rangewide desert tortoise population densities and trends. Monitoring of populations using this method is underway across the range of the desert tortoise. Successful rangewide monitoring will enable managers to evaluate the overall effectiveness of recovery actions and population responses to these actions, thus guiding recovery of the Mojave desert tortoise. Rangewide tortoise population monitoring began in 2001 and is conducted annually.

Declines in tortoise abundance appear to correspond with increased incidence of disease in tortoise populations. The Goffs permanent study plot in Ivanpah Valley, California, suffered 92 to 96 percent decreases in tortoise density between 1994 and 2000 (Berry 2003). The high prevalence of disease in Goffs tortoises likely contributed to this decline (Christopher *et al.* 2003). Upper respiratory tract disease has not yet been detected at permanent study plots in the Colorado Desert of California, but is prevalent at study plots across the rest of the species' range (Berry 2003) and has been shown to be a contributing factor in population declines in the western Mojave Desert (Brown *et al.* 2002; Christopher *et al.* 2003). High mortality rates at permanent study plots in the northeastern and eastern Mojave appear to be associated with incidence of shell diseases in tortoises (Jacobson *et al.* 1994). Low levels of shell diseases were detected in many populations when the plots were first established, but were found to increase during the 1980s and 1990s (Jacobson *et al.* 1994; Christopher *et al.* 2003). A herpesvirus has recently been discovered in desert tortoises, but little is known about its effects on tortoise populations at this time (Berry *et al.* 2002; Origgi *et al.* 2002).

The general trend for desert tortoises within the California Desert is one of decline. Transects in the Western Mojave Recovery Unit that did not detect any sign over large

areas of previously occupied habitat and the numerous carcasses found on permanent study plots provide evidence of a decline. During line distance sampling conducted in 8 DWMAs in California in 2003, 930 carcasses and 438 live desert tortoises were detected; more carcasses than live animals were detected in every study area (Woodman 2004). In 2004, workers conducting line distance sampling in California detected 1,796 carcasses and 534 live desert tortoises; more carcasses were detected than live animals in every study area (Woodman 2005).

There are many natural causes of mortality, but their extents are difficult to evaluate and vary from location to location. Native predators known to prey on tortoise eggs, hatchlings, juveniles, and adults include: coyote, kit fox, badger (*Taxidea taxus*), skunks (*Spilogale putorius*), common ravens, golden eagles (*Aquila chrysaetos*), and Gila monsters (*Heloderma suspectum*). Additional natural sources of mortality to eggs, juvenile, and adults may include desiccation, starvation, being crushed (including in burrows), internal parasites, disease, and being turned over onto their backs during fights or courtship (Luckenbach 1982, Turner *et al.* 1987). Free-roaming dogs cause mortality, injury, and harassment of desert tortoises (Evans 2001). Population models indicate that for a stable population to maintain its stability, on average, no more than 25 percent of the juveniles and 2 percent of the adults can die each year (Congdon *et al.* 1993, Service 1994). However, adult mortality at one site in the West Mojave was 90 percent over a 13-year period (Berry 1997). Morafka *et al.* (1997) reported 32 percent mortality over 5 years among free-ranging and semi-captive hatchling and juvenile tortoises (up to 5 years old) in the West Mojave. When the 26 that were known to have been preyed on by ravens were removed from the analysis, mortality dropped to 24 percent. Turner *et al.* (1987) reported an average annual mortality rate of 19 to 22 percent among juveniles over a 9-year period in the East Mojave.

Northeastern Mojave Recovery Unit. A kernel analysis was conducted in 2003-2004 for the desert tortoise (Tracy *et al.* 2004) as part of the reassessment of the 1994 Recovery Plan. The kernel analyses revealed several areas in which the kernel estimations for live tortoises and carcasses did not overlap. The pattern of non-overlapping kernels that is of greatest concern is those in which there were large areas where the kernels encompassed carcasses but not live animals. These regions represent areas within DWMAs where there were likely recent die-offs or declines in tortoise populations. The kernel analysis indicated large areas in the Piute-Eldorado Valley where there were carcasses but no live tortoises. For this entire area in 2001, there were 103 miles of transects walked, and a total of 6 live and 15 dead tortoises found, resulting in a live encounter rate of 0.06 tortoises per mile of transect for this area. This encounter rate was among the lowest that year for any of the areas sampled in the range of the Mojave desert tortoise (Tracy *et al.* 2004).

Results of desert tortoise surveys at three survey plots in Arizona indicate that all three sites have experienced significant die-offs. Six live tortoises were located in a 2001 survey of the Beaver Dam Slope Exclosure Plot (Walker and Woodman 2002). Three

had definitive signs of URTD, and two of those also had lesions indicative of cutaneous dyskeratosis. Previous surveys of this plot detected 31 live tortoises in 1996, 20 live tortoises in 1989, and 19 live tortoises in 1980. The 2001 survey report indicated that it is likely that there is no longer a reproductively viable population of tortoises on this study plot. Thirty-seven live tortoises were located in a 2002 survey of the Littlefield Plot (Young *et al.* 2002). None had definitive signs of URTD. Twenty-three tortoises had lesions indicative of cutaneous dyskeratosis. Previous surveys of this plot detected 80 live tortoises in 1998 and 46 live tortoises in 1993. The survey report indicated that the site might be in the middle of a die-off due to the high number of carcasses found since the site was last surveyed in 1998. Nine live tortoises were located during the mark phase of a 2003 survey of the Virgin Slope Plot (Goodlett and Woodman 2003). The surveyors determined that the confidence intervals of the population estimate would be excessively wide and not lead to an accurate population estimate, so the recapture phase was not conducted. One tortoise had definitive signs of URTD. Seven tortoises had lesions indicative of cutaneous dyskeratosis. Previous surveys of this plot detected 41 live tortoises in 1997 and 15 live tortoises in 1992. The survey report indicated that the site may be at the end of a die-off that began around 1996-1997.

Eastern Mojave Recovery Unit. The permanent study plot in the Ivanpah Valley is the only such plot in this DWMA; consequently, we cite information from that plot herein, although it is located within the Mojave National Preserve. Data on desert tortoises on a permanent study plot in this area were collected in 1980, 1986, 1990, and 1994; the densities of desert tortoises of all sizes per square mile were 386, 393, 249, and 164, respectively (Berry 1996).

The Shadow Valley DWMA lies north of the Mojave National Preserve and west of the Clark Mountains. It occupies approximately 101,355 acres. Data on desert tortoises on a permanent study plot in this area were collected in 1988 and 1992; the densities of desert tortoises of all sizes per square mile were 50 and 58, respectively (Berry 1996).

The Piute-Fenner DWMA lies to the east of the southeast portion of the Mojave National Preserve. It occupies approximately 173,850 acres. The permanent study plot at Goffs is the only such plot in this DWMA; consequently, we cite information from that plot herein, although it is located within the Mojave National Preserve. Data on desert tortoises on the permanent study plot were collected in 1980, 1990, and 1994; Berry (1996) estimated the densities of desert tortoises of all sizes at approximately 440, 362, and 447 individuals per square mile, respectively. As Berry (1996) noted, these data seem to indicate that this area supported "one of the more stable, high density populations" of desert tortoises within the United States. Berry (1996) also noted that "a high proportion of the animals (had) shell lesions." In 2000, only 30 live desert tortoises were found; Berry (2000) estimated the density of desert tortoises at approximately 88 animals per square mile. The shell and skeletal remains of approximately 393 desert tortoises were collected; most of these animals died between 1994 and 2000. Most of the desert tortoises exhibited signs of shell lesions; three salvaged desert tortoises showed

abnormalities in the liver and other organs and signs of shell lesions. None of the three salvaged desert tortoises tested positive for upper respiratory tract disease.

Ivanpah and Piute-Eldorado valleys contained study plots that were analyzed in the Eastern Mojave Recovery Unit analysis. While there was no overall statistical trend in adult density over time, the 2000 survey at Goffs and the 2002 survey at Shadow Valley indicate low densities of adult tortoises relative to earlier years. Unfortunately, there are no data in the latter years for all five study plots within this recovery unit, and therefore, while there is no statistical trend in adult densities, we cannot conclude that tortoises have not experienced recent declines in this area. The probability of finding a carcass on a distance sampling transect was considerably higher for Ivanpah, Chemehuevi, Fenner, and Piute-Eldorado, which make up the Eastern Mojave Recovery Unit.

Northern Colorado Recovery Unit. Two permanent study plots are located within the Chemehuevi DWMA. At the Chemehuevi Valley and Wash plot, 257 and 235 desert tortoises were registered in 1988 and 1992, respectively (Berry 1999). During the 1999 spring survey, only 38 live desert tortoises were found. The shell and skeletal remains of at least 327 desert tortoises were collected; most, if not all, of these animals died between 1992 and 1999. The frequency of shell lesions and nutritional deficiencies appeared to be increasing and may be related to the mortalities.

The Upper Ward Valley permanent study plot was surveyed in 1980, 1987, 1991, and 1995; Berry (1996) estimated the densities of desert tortoises of all sizes at approximately 437, 199, 273, and 447 individuals per square mile, respectively.

Eastern Colorado Recovery Unit. This recovery unit is also located completely in California. Desert tortoises occupy well-developed washes, desert pavements, piedmonts, and rocky slopes characterized by relatively species-rich succulent scrub, creosote bush scrub, and Blue Palo Verde-Ironwood-Smoke Tree communities. Winter burrows are generally shorter in length, and activity periods are longer than elsewhere due to mild winters and substantial summer precipitation. The tortoises feed on summer and winter annuals and some cacti; they den singly. They also have the California mtDNA haplotype and shell type.

Two permanent study plots are located within this DWMA. At the Chuckwalla Bench plot, Berry (1996) calculated approximate densities of 578, 396, 167, 160, and 182 desert tortoises per square mile in 1979, 1982, 1988, 1990, and 1992, respectively. At the Chuckwalla Valley plot, Berry (1996) calculated approximate densities of 163, 181, and 73 desert tortoises per square mile in 1980, 1987, and 1991, respectively. Tracy *et al.* (2004) concluded that these data show a statistically significant decline in the number of adult desert tortoises over time; they further postulate that the decline on the Chuckwalla Bench plot seemed to be responsible for the overall significant decline within the recovery unit.

The kernel analysis of the Eastern Colorado Recovery Unit shows that the distributions of the living tortoises and carcasses overlap for most of the region. The Chuckwalla Bench study plot occurs outside the study area, which creates a problem in evaluating what may be occurring in that area of the recovery unit. However, the few transects walked in that portion of the DWMA yielded no observations of live or dead tortoises. This illustrates our concern for drawing conclusions from areas represented by too few study plots and leaves us with guarded concern for this region. The percentage of transects with live animals was relatively high for most DWMAs within the Eastern Colorado Recovery Unit. In addition, the ratio of carcasses to live animals was low within this recovery unit relative to others.

Western Mojave Recovery Unit. This recovery unit includes the proposed Pinto Mountains, Ord-Rodman, Superior-Cronese, and Fremont-Kramer DWMAs. Heaton *et al.* (2004) estimated that 20,420 to 41,224 adult desert tortoises reside in the Western Mojave Recovery Unit; this range was based on extrapolation of data collected during line distance sampling.

The proposed 117,120-acre Pinto Mountains DWMA is located in the southeastern portion of the Western Mojave Recovery Unit. No permanent study plots are located in this proposed DWMA. Little information exists on the densities of desert tortoises in this area. Tracy *et al.* (2004) noted that the distribution of carcasses and live desert tortoises appeared to be what one would expect in a "normal" population of desert tortoises; that is, carcasses occurred in the same areas as live animals and were not found in extensive areas in the absence of live desert tortoises.

The proposed Ord-Rodman DWMA is located to the southeast of the city of Barstow. As proposed, it would cover approximately 248,320 acres. The recovery plan notes that the estimated density of desert tortoises in this area is 5 to 150 animals per square mile (Service 1994). Three permanent study plots are located within and near this proposed DWMA.

The proposed Superior-Cronese DWMA is located north of the Ord-Rodman DWMA; two interstate freeways and rural, urban, and agricultural development separate them. This proposed DWMA covers 616,320 acres. No permanent study plots have been established in this area; the density of desert tortoises has been estimated through numerous triangular transects and line distance sampling efforts. This DWMA supports densities of approximately 20 to 250 desert tortoises per square mile (Service 1994).

The proposed Fremont-Kramer DWMA is located west of the Superior-Cronese DWMA; the two DWMAs are contiguous. This proposed DWMA covers approximately 494,720 acres. The recovery plan notes that the estimated density of desert tortoises in this area was 5 to 100 animals per square mile (Service 1994).

Berry (1996) notes that the overall trend in this proposed DWMA is "a steep, downward decline" and identifies predation by common ravens and domestic dogs, off-road vehicle activity, illegal collecting, upper respiratory tract disease, and environmental contaminants as contributing factors.

During the summers of 1998 and 1999, BLM funded surveys of over 1,200 transects over a large area of the western Mojave Desert. These transects failed to detect sign of desert tortoises in areas where they were previously considered to be common. Although these data have not been fully analyzed and compared with previously existing information, they strongly suggest that the number of desert tortoises has declined substantially over large areas of the western Mojave Desert. The Desert Tortoise Recovery Plan Assessment Committee also noted that the Western Mojave Recovery Unit has experienced declines in the number of desert tortoises (Tracy *et al.* 2004).

The Western Mojave has experienced marked population declines as indicated in the Recovery Plan and continues today. Spatial analyses of the Western Mojave show areas with increased probabilities of encountering dead rather than live animals, areas where kernel estimates for carcasses exist in the absence of live animals, and extensive regions where there are clusters of carcasses where there are no clusters of live animals. Collectively, these analyses point generally toward the same areas within the Western Mojave, namely the northern portion of the Fremont-Kramer DWMA and the northwestern part of the Superior-Cronese DWMA. Together, these independent analyses, based on different combinations of data, all suggest the same conclusion for the Western Mojave. Data are not currently available with sufficient detail for most of the range of the desert tortoise with the exception of the Western Mojave (Tracy *et al.* 2004).

Upper Virgin River Recovery Unit. The recovery plan states that desert tortoises occur in densities of up to 250 adult animals per square mile within small areas of this recovery unit; overall, the area supports a mosaic of areas supporting high and low densities of desert tortoises (Service 1994). The Utah Division of Wildlife Resources (UDWR) has intensively monitored desert tortoises, using a distance sampling technique, since 1998. Monitoring in 2003 indicated that the density of desert tortoises was approximately 44 per square mile throughout the reserve. This density represents a 41 percent decline since monitoring began in 1998 (McLuckie *et al.* 2006). The report notes that the majority of desert tortoises that died within one year (n=64) were found in areas with relatively high densities; the remains showed no evidence of predation.

In the summer of 2005, approximately 10,446 acres of desert tortoise habitat burned in the Red Cliffs Desert Reserve. UDWR estimated that as many as 37.5 percent of adult desert tortoises may have died as a direct result of the fires (McLuckie *et al.* 2006).

Rangewide Population Monitoring Results: 2001-2005

Rangewide tortoise population monitoring began in 2001 and is conducted annually (Table 11). Rangewide sampling of desert tortoises consisted of 4,986 transects totaling 15,957 miles which is the most comprehensive attempt undertaken to date to establish the density of this species (Service 2006). The rangewide monitoring program is designed to detect long-term population trends. However, density estimates from any brief window of time (*e.g.*, 2001-2005) would be expected to detect only catastrophic declines or remarkable population increases. Therefore, following the first 5 years of the long-term monitoring project, the goal is not to document trends within this time period, but to gather information on baseline densities, and year-to-year and recovery unit-to-recovery unit variability. This information will also reflect transect-to-transect variability in observations as well as regional variability in detection functions.

Rangewide sampling was initiated during a severe drought that intensified in 2002 and 2003, particularly in the western Mojave Desert in California. At the time the Recovery Plan was written, there was less consideration of the potentially important role of drought in the desert ecosystem, particularly regarding desert tortoises. In the meantime, studies have documented vulnerability of juvenile (Wilson *et al.* 2001) and adult tortoises (Peterson 1994, Peterson 1996, Henen 1997, Longshore *et al.* 2003) to drought.

Considerable decreases in density were reported in 2003 in the Eastern Colorado and Western Mojave recovery units, with no correspondingly large rebound in subsequent estimates. Desert tortoise densities reported in these recovery units were approximately eight to nine tortoises per square mile.

The status and trends of desert tortoise populations are difficult to determine based only upon assessment of tortoise density due largely to their overall low abundance, subterranean sheltering behavior, and cryptic nature of the species. Thus, monitoring and recovery should include a comprehensive assessment of the status and trends of threats and habitats as well as population distribution and abundance.

For more information on desert tortoise or expanded discussions on recovery units and recommended DPSs, please refer to the Recovery Plan (Service 1994) and report prepared by the Committee (Tracy *et al.* 2004).

Table 11. Summary of Desert Tortoise Densities by Recovery Unit

	Year	# of Transects	Length (mi)	# of Adult Tortoises Located	Density (mi^2)	95 percent Confidence Interval Low	95 percent Confidence Interval High
Recovery Units (5)	2001	1,631	1,653	279	9.40	8.02	11.0
	2002	1,010	2,490	289	8.95	7.35	10.9
	2003	990	2,407	354	8.19	6.77	9.90
	2004	610	4,086	445	8.05	6.97	9.29
	2005	745	5,321	489	8.76	7.66	10.0
Upper Virgin River[1]	2001	159	195	168	48.6	37.0	63.7
	2002	–	–	–	–	–	–
	2003	157	192	96	27.2	21.1	35.0
	2004	–	–	–	–	–	–
	2005	155	189	136	35.1	26.4	46.7

[1] Data from McLuckie *et al.* (2006)

2. Desert Tortoise Critical Habitat- Rangewide Status

Desert tortoise critical habitat was designated by the Service to identify the key biological and physical needs of the desert tortoise and key areas for recovery, and focuses conservation actions on those areas. Desert tortoise critical habitat is composed of specific geographic areas that contain the primary constituent elements of critical habitat, consisting of the biological and physical attributes essential to the species' conservation within those areas, such as space, food, water, nutrition, cover, shelter, reproductive sites, and special habitats. The specific primary constituent elements of desert tortoise critical habitat are:

1. sufficient space to support viable populations within each of the six recovery units, and to provide for movement, dispersal, and gene flow;
2. sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species;
3. suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites;
4. sufficient vegetation for shelter from temperature extremes and predators; and
5. habitat protected from disturbance and human-caused mortality.

CHUs were based on recommendations for DWMAs outlined in the *Draft Recovery Plan for the Desert Tortoise (Mojave Population)* (Service 1993 Table 12). These DWMAs

are also identified as desert tortoise ACECs by BLM. Because the critical habitat boundaries were drawn to optimize reserve design, the critical habitat unit may contain both "suitable" and "unsuitable" habitat. Suitable habitat can be generally defined as areas that provide the primary constituent elements.

Although recovery of the tortoise will focus on DWMAs/ACECs, section II.A.6. of the Recovery Plan and section 2(b) of the Act provide for protection and conservation of ecosystems on which federally-listed threatened and endangered species depend, which includes both recovery and non-recovery areas. The Mojave Desert ecosystem, of which the desert tortoise and its habitat are an integral part, consists of a dynamic complex of plant, animal, fungal, and microorganism communities and their associated nonliving environment interacting as an ecological unit (Noss and Cooperrider 1994). Actions that adversely affect components of the Mojave Desert ecosystem may directly or indirectly affect the desert tortoise. The Recovery Plan further states that desert tortoises and habitat outside recovery areas may be important in recovery of the tortoise. Healthy, isolated tortoise populations outside recovery areas may have a better chance of surviving catastrophic effects such as disease, than large, contiguous populations (Service 1994).

The Recovery Plan recommended DWMAs and subsequently the Service designated CHUs based on these proposed DWMAs (Service 1993). When designated, desert tortoise critical habitat contained all the primary constituent elements of desert tortoise critical habitat. The following seven principles of conservation biology serve as the standards by which the Service determines whether or not the CHUs are functioning properly:

(1) *Reserves should be well-distributed across the species' range.* The entire range of the Mojave desert tortoise occurs within one of the six recovery units identified in the Recovery Plan and at least one DWMA and CHU occurs within each recovery unit. The reserves remain well-distributed across the range of the desert tortoise.

(2) *Reserves should contain large blocks of habitat with large populations of target species.* The desert tortoise requires large, contiguous areas of habitat to meet its life requisites. Each DWMA and its associated CHUs that were designated to conserve contiguous blocks of habitat that exceed 500,000 acres, with the exception of the Upper Virgin River Recovery Unit (Table 12). The Upper Virgin River Recovery Unit does not meet the minimum size requirement identified in the Recovery Plan, however the Service anticipates that reserve-level management will adequately conserve the desert tortoise within this recovery unit Designation of CHUs were based largely on transect data and included areas with the largest populations of desert tortoises.

(3) *Blocks of habitat should be close together.* This principle was met when CHUs were designated and remains valid.
(4) *Reserves should contain contiguous rather than fragmented habitat.* This principle was met when CHUs were designated and generally continue to be met. Desert tortoise-

proof fencing has been constructed along major roads and highways that traverse critical habitat including Interstate 15 in Nevada and California (Ivanpah Valley DWMA/CHU), U.S. Highway 95 (US 95) in Nevada (Piute-Eldorado DWMA/CHU), and Highway 58 in California (Fremont-Kramer DWMA/CHU). Major roads and highways alone constitute a barrier to tortoise movements without fencing; however, the fencing minimized take of tortoises and culverts or underpasses allow for limited tortoise movement across the road or highway.

(5) *Habitat patches should contain minimal edge-to-area ratios.* This principle was met when CHUs were designated and generally continue to be valid. Notable exceptions include the northern Gold Butte-Pakoon CHU, and the southern termini of the Mormon Mesa, Ivanpah Valley, and Chuckwalla CHUs which have large edge-to-area rations and further compromised by highways that traverse these relatively narrow areas within the CHUs. Pending development of private lands in Coyote Springs Valley would substantially increase the edge-to-area ratio in the southwestern section of the Mormon Mesa CHU.

(6) *Blocks should be interconnected by corridors or linkages connecting protected, preferred habitat for the target species.* Most CHUs are contiguous with another CHU with the exception of Ord-Rodman, Ivanpah Valley, Gold Butte Pakoon, and Upper Virgin River CHUs. Interstate 15 and the Virgin River separate the Gold Butte-Pakoon CHU from other CHUs in the Northeastern Mojave Recovery Unit. Similarly, Interstate 40 separates the Piute-Eldorado and Chemehuevi CHUs, and Ord Rodman and Superior-Cronese CHUs. Pending development in Coyote Springs Valley may fragment the Mormon Mesa DWMA by restricting tortoise movements between the Kane Springs ACEC to the north and Coyote Springs ACEC to the south which is dependant upon the extent of development.

(7) *Blocks of habitat should be roadless or otherwise inaccessible to humans.* Achieving this principle is the most problematic. A 2001 inventory of roads in the Western Mojave suggests that road density increased from the mid-1980's. Further evaluation should be conducted as some of the recently mapped roads were actually historical roads especially with the advent of effective mapping capabilities (Tracy *et al* 2004). Roads proliferate desert tortoise habitat rangewide and may be increasing in density (Tracy *et al.* 2004).

The recommendations for desert tortoise critical habitat in the Recovery Plan include elimination of specified activities that are incompatible with desert tortoise conservation including habitat destruction that diminishes the capacity of the land to support desert tortoises, and grazing by livestock, and feral burros and horses. Since approval of the Recovery Plan, livestock grazing in desert tortoise critical habitat has been substantially reduced. BLM and NPS manage for zero burros in Nevada and the California Desert Managers Group developed a burro management plan in 2004.

Table 12. Desert Tortoise CHUs, DWMAs, and Recovery Units - Size and Location

CHU	SIZE (ac.)	STATE	DWMA	RECOVERY UNIT
Chemehuevi	937,400	CA	Chemehuevi	Northern Colorado
Chuckwalla	1,020,600	CA	Chuckwalla	Eastern Colorado
Fremont-Kramer	518,000	CA	Fremont-Kramer	Western Mojave
Ivanpah Valley	632,400	CA	Ivanpah Valley	Eastern Mojave
Pinto Mtns.	171,700	CA	Joshua Tree	Western Mojave/ Eastern Colorado
Ord-Rodman	253,200	CA	Ord-Rodman	Western Mojave
Piute-Eldorado- CA Piute-Eldorado- NV	453,800 516,800	CA NV	Fenner Piute-Eldorado	Eastern Mojave Northeastern & Eastern Mojave
Superior-Cronese	766,900	CA	Superior-Cronese Lakes	Western Mojave
Beaver Dam:	87,400 74,500 42,700	NV UT AZ	Beaver Dam Beaver Dam Beaver Dam	Northeastern Mojave (all)
Gold Butte-Pakoon	192,300 296,000	NV AZ	Gold Butte-Pakoon Gold Butte-Pakoon	Northeastern Mojave (all)
Mormon Mesa	427,900	NV	Mormon Mesa Coyote Spring	Northeastern Mojave
Upper Virgin River	54,600	UT	Upper Virgin River	Upper Virgin River

The status of the desert tortoise and its critical habitat has been impacted by decades of human activities. In their 1991 report, the GAO found that livestock grazing practices of the late 1880s and early 1990s badly damaged desert lands in the southwest. Domestic livestock grazing on BLM's hot desert allotments continue to pose the greatest risk of long-term environmental damage to a highly fragile resource. The GAO offered several options for consideration by Congress including the discontinuation of livestock grazing in hot desert areas. They concluded that BLM did not have the resources to properly manage the intensity of livestock grazing in hot deserts. Without sufficient monitoring data, BLM will not have the necessary data to change active preference levels and overgrazing may occur (GAO 1991).

Further information on desert tortoise critical habitat can be found in the following documents:

- Desert Tortoise Recovery Plan Assessment Report (Tracy *et al.* 2004)- all CHUs
- Final Environmental Impact Report and Statement for the West Mojave Plan (BLM 2005b)- Fremont-Kramer CHU, Superior-Cronese CHU, Ord-Rodman CHU, and Pinto Mountains CHU
- Mojave National Preserve General Management Plan (National Park Service 2002) - Ivanpah Valley CHU and Piute-Eldorado CHU
- Northern and Eastern Colorado Coordinated Management Plan (BLM 2002a)- Chemehuevi CHU, Pinto Mountains CHU, and Chuckwalla CHU
- Northern and Eastern Mojave Desert Management Plan (BLM 2002b)- Ivanpah Valley CHU, Piute-Eldorado CHU, and Chemehuevi CHU

- Clark County Multiple Species HCP (RECON 2000)- Beaver Dam Slope CHU, Mormon Mesa CHU, Gold Butte-Pakoon CHU, and Piute-Eldorado CHU
- Washington County HCP (Washington County Commission 1995)
- Biological Assessment for the Proposed Addition of Maneuver Training Land at Fort Irwin, CA (U.S. Army National Training Center 2005)- Superior-Cronese CHU
- Desert Tortoise (Mojave Population) Recovery Plan and Proposed DWMAs for Recovery of the Mojave Population of the Desert Tortoise (companion document to the Desert Tortoise Recovery Plan) (Service 1994)

3. Big Spring Spinedace- Rangewide Status

a. Listing History

The Big Spring spinedace was included in the Service's Notice of Review of Vertebrate Wildlife published December 30, 1982 (47 FR 58454). The Service received a petition from the Desert Fishes Council on April 12, 1983, to add the Big Spring spinedace to the List of Endangered and Threatened Species. The petition was evaluated and found to present substantial information supporting the petitioned action, and a notice of finding to this effect was published on June 14, 1983 (50 FR 27273). On November 30, 1983, the Service published a proposal to list the Big Spring spinedace as threatened with critical habitat (50 FR 54082). The Big Spring spinedace was listed as threatened with critical habitat on April 29, 1985 (50 FR 12298). The species was listed because one of the two existing populations was extirpated, and the remaining population was threatened by habitat alteration and the possible introduction of nonnative species. The listing included a special rule allowing take of the species for certain purposes in accordance with state laws and regulations.

b. Species Account

Big Spring spinedace is one of three native fishes occupying the stream habitat of Meadow Valley Wash in Lincoln County, Nevada. It historically occupied the Panaca (Big) Spring outflow stream, which flows into Meadow Valley Wash below Condor Canyon. The species was extirpated from Big Spring in 1959, and now only occurs in the stream segment of the Meadow Valley Wash that flows through Condor Canyon.

Big Spring spinedace is a member of the Plagopterini tribe of cyprinid fishes. Members of this tribe are distinguished from other cyprinids by the spine-like character of the pelvic and pectoral fin rays and the two anterior dorsal fin rays, a membranous connection between the innermost ray of the pelvic fins and the belly, bright silver coloration, and the absence or diminutive development of body scales (Miller and Hubbs 1960).

Big Spring spinedace were described by Miller and Hubbs (1960) following a review of the previous classification of the genus *Lepidomeda*. Big Spring spinedace are

differentiated from Virgin River spinedace (*Lepidomeda mollispinis mollispinis*) by a higher, more pointed dorsal fin, longer pelvic fins, and a smaller, more oblique mouth (Miller and Hubbs 1960).

Big Spring spinedace are bright silver in color, with some individuals having yellow to orange at the axils of paired fins, base of the anal fin, upper edge of the shoulder girdle, vertical arm of the preopercular bone, and above the mouth. Specimens collected from the outflow of Big Spring in 1938 ranged from 1.9 to 2.2 inches total length (Miller and Hubbs 1960). Big Spring spinedace captured from Meadow Valley Wash in Condor Canyon varied from 1.9 to 3.7 inches total length (Allan 1985). Two male Big Spring spinedace collected from Condor Canyon in 1986 exceeded 4.3 inches total length (Withers 1986).

Big Spring spinedace life history and habitat requirements are poorly understood. Some information is available from field observations made during collecting efforts or status surveys. Big Spring spinedace collected in 1938 occupied the outflow stream and associated marsh areas below Big Spring, but not the spring pool (Miller and Hubbs 1960). Water temperature of the stream within the meadow was 84°Fahrenheit (F), and the channel was 1 to 3 feet wide and up to 2 feet deep. Stream bottom substrate consisted of firm to soft clay with some gravel. Aquatic vegetation included watercress (*Rorippa* sp.), pondweed (*Potamogeton* sp.), and bulrushes (*Scirpus* sp.). By 1959, when Big Spring spinedace was reported as extirpated from Panaca Spring, the spring outflow stream was clogged with silt and a variety of submergent and emergent vegetation, conditions different than those in 1938.

Flows at Panaca Spring decreased from 31.3 cubic yards per minute (yd^3/m) recorded in 1946, to 24.3 yd^3/m recorded in 1963 (Garside and Schilling 1979). Spring discharge continued to decline such that between 1989 and 1990 it varied from a low of 0.9 yd^3/m in November to a high of 3.9 yd^3/m in March (Pupacko *et* al. 1989; Bostic *et al.* 1990; Garcia *et al.* 1991; Hess *et al.* 1992). Currently, all water from Panaca Spring is captured and used for agricultural purposes.

Delmue Springs, just above the northern end of Condor Canyon, provides a base flow of approximately 1.0 yd^3/m (Garside and Schilling 1979). Above Delmue Springs, Meadow Valley Wash flows intermittently and is interrupted by two reservoirs. Additional springs within Condor Canyon add to the stream's total volume. Flow measurements taken at Condor Canyon in 1987 ranged from 5.0 to 15.4 yd^3/m (BLM 1990).

Big Spring spinedace collected in Condor Canyon in 1981 and 1984 were found in areas 1 to 3 feet deep, with moderate to slow currents, undercut banks, and floating aquatic vegetation (Allan 1985). Spawning behavior has never been observed and spawning habitat requirements are unknown. Spawning condition has been observed most frequently in late May and early June (Langhorst 1991).

Food preferences and feeding habits are unknown. The closely related Virgin River spinedace are opportunistic drift feeders, feeding primarily on aquatic insect larvae but consuming algae and other plant material when insects are scarce (Rinne 1971; Minckley 1973). Allan (1985) suggested that vegetation, especially watercress, is important in providing habitat for aquatic insect and invertebrate foods for Big Spring spinedace.

c. Distribution

The Big Spring spinedace historically occurred at Big Spring in Panaca, Lincoln County, Nevada, but was extirpated from this location in 1959 due to the introduction of nonnative aquatic species, the diversion of water, and occasional desiccation of both the original outflow and the diversion ditch. Currently, the species is only known to exist in a 0.5 mile stretch of the Meadow Valley Wash that flows through Condor Canyon northeast of Panaca in Lincoln County. They were discovered in 1977, in the plunge pool beneath a 49 foot waterfall in Condor Canyon, approximately 3.8 miles north of Panaca Spring (Allan 1985). In 1980, larval Big Spring spinedace were transplanted from the waterfall plunge pool to small, instream pools 0.9 mile above the waterfall.

d. Survival and Recovery Needs

Big Spring spinedace may be proposed for delisting when a self-sustaining population exists in Meadow Valley Wash at Condor Canyon for at least 5 consecutive years and its habitat is secured from all known threats. The recovery plan recommends protecting the population in Condor Canyon and restoring habitat between Condor Canyon and Panaca Spring to allow Big Spring spinedace to expand into historic habitat. Since completion of the recovery plan, the habitat in this area has become increasingly degraded and is located entirely on private land. Restoring the habitat and reestablishing a population in this portion of the stream may no longer be feasible.

The recovery plan also recommends establishing one or more self-sustaining refugia populations to prevent the extinction of the species should unforeseen catastrophic events severely impact or eliminate the Condor Canyon population (Service 1993). Recovery actions for the spinedace include: (1) securing, enhancing, and maintaining the Big Spring spinedace population; and (2) establishing one or more refugia populations.

e. Abundance and Population Trends

Big Spring spinedace are considered to be relatively abundant in Condor Canyon, but the actual population size is unknown. During 1984, five sites within Condor Canyon were sampled, but Big Spring spinedace were present only at the transplant site (Allan 1985). In May of 1986, a total of 204 spinedace were collected from 11 of 15 sites sampled along approximately 7 km of Meadow Valley Wash, above and within Condor Canyon (Withers 1986). Big Spring spinedace were most abundant in and near the transplant site, where 97 individuals were captured. A total of 546 Big Spring spinedace were captured from 13 sample sites within Condor Canyon during November 1990 (Langhorst 1991).

Surveys for Big Spring spinedace are conducted annually by NDOW. The latest information available on population size is from surveys conducted in 2006. Seven 25-meter plots were sampled to provide an index of population size, which ranged from approximately zero individuals per square meter at the base of the canyon to six individuals per square meter at locations above the waterfall. Numbers of spinedace within these plots were stable compared with previous years (NDOW 2006).

f. Threats

The Service listed the Big Spring spinedace in 1985 because one of the two known populations of this species was extirpated and the remaining population was potentially threatened by habitat alteration and introduction of nonnative species. In addition, the limited distribution of the one population at Condor Canyon makes the spinedace vulnerable to extirpation from a catastrophic event.

The population at Panaca (Big) Spring was extirpated due to a combination of decline in spring flow, clogging of the natural channel with silt and vegetation, and the invasion of mosquitofish and bullfrogs (*Rana catesbiana*). At the time the spinedace was listed, nonnative species were not known to occur at Condor Canyon. Since then, surveys have detected the establishment of an unknown nonnative crayfish species, and limited numbers of largemouth bass (*Micropterus salmoides)*, rainbow trout (*Oncorhynchus mykiss*), and white crappie (*Poxomis annularis*) (Withers 1986, 1987a, 1987b, 1988). Livestock grazing also occurs at Condor Canyon. Poorly managed grazing practices can lead to increased sedimentation and erosion, resulting in degraded aquatic habitat.

Water flow in the stream channel through Condor Canyon originates from a series of springs located in the Condor Canyon area. Therefore, future groundwater depletion due to development of water wells within the groundwater system supporting the Condor Canyon springs could adversely affect the aquatic ecosystem.

4. Big Spring Spinedace Critical Habitat- Status

Critical habitat for the spinedace was designated when the species was listed (50 FR 12298). It encompasses 4 miles of Meadow Valley Wash and a 50-foot riparian zone along each side of the stream as it flows through Condor Canyon (Figure 2). Critical habitat begins at the north end of the canyon and continues downstream to the terminus of the canyon. Critical habitat does not include all stream habitat currently or historically occupied by Big Spring spinedace. The primary constituent elements of Big Spring spinedace critical habitat include: (1) clean, permanent, flowing, spring-fed stream habitat with deep pool areas and shallow marshy areas along the shore; and (2) the absence of nonnative fishes.

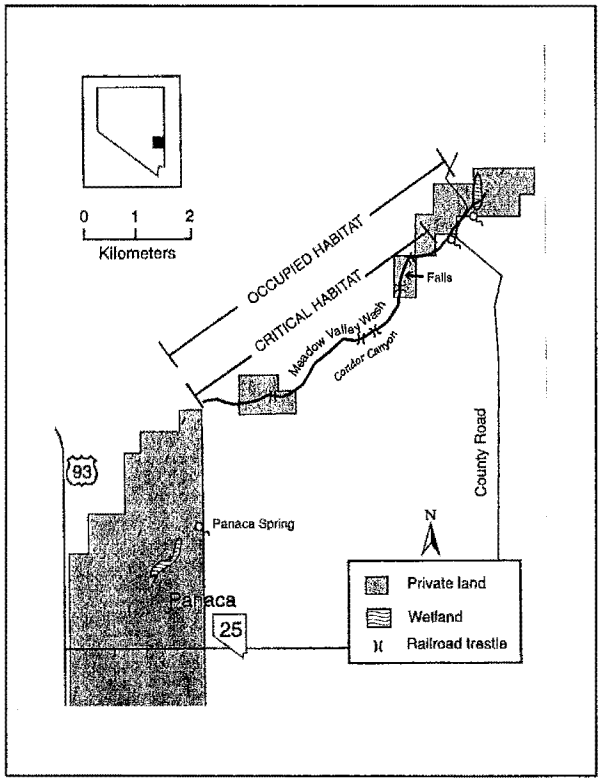


Figure 2. Big Spring spinedace historic habitat (Panaca Spring outflow stream, designated critical habitat, and currently occupied habitat in Meadow Valley Wash, near Panaca, Lincoln County, Nevada.

5. White River Springfish- Rangewide Status

a. Listing History

On September 27, 1985, the White River springfish was listed as endangered with critical habitat (50 FR 39123). The common name of the species is the same as that of the listed subspecies found at Ash Springs. This document refers to the listed subspecies as White River springfish, whereas references to the species will use the scientific name *C. baileyi* to avoid confusion.

b. Species Account

White River springfish were originally described as a subspecies of *Cyprinodon macularius*, but were later considered to be a distinct species (Gilbert 1893; Jordan and Evermann 1896). Springfish of the White River flow system were assigned to the genus *Crenichthys* in 1932 with the description of Railroad Valley springfish (*C. nevadae*) (Hubbs 1932; Sumner and Sargent 1940; La Rivers 1962). The genus *Crenichthys* is closely associated with the killifish genus *Empetrichthys*, and was originally assigned the common name of "killifish". In 1980, the common name of the genus *Crenichthys* was changed to "springfish" to reflect its occurrence in spring habitats (Hubbs 1932; Bailey *et al.* 1970; Robins *et al.* 1980; Williams and Wilde 1981). Williams and Wilde (1981) further refined White River springfish taxonomy by describing the following five subspecies based on significant morphological differences among populations from isolated springs along the pluvial White River in Nevada: (1) Preston White River springfish (*C. baileyi albivallis*), Moorman White River springfish (*C. b. thermophilus*), Hiko White River springfish (*C. b. grandis*), Moapa White River springfish (*C. b. moapae*), and White River springfish.

Very little information is available on the life history and habitat requirements of the White River springfish. However, more information is available for other *Crenichthys* subspecies, and because of the close relationship among the springfish subspecies, it is assumed that life history requirements and habitat needs for the White River springfish are similar to those of the other subspecies.

Adult White River springfish are found at varying depths, from 1.3 to 5.6 feet, but prefer deeper water at about 3.6 feet. Juvenile springfish will also use all depths, but generally occur in shallower water at about 2.1 feet and are more vertically dispersed. Larval springfish restrict their movement to the top of the water column from 0 to 2 feet and are found most frequently at 1.1 feet. All age classes are present in areas of calm water (Tuttle *et al.* 1990).

White River springfish are feeding generalists (Deacon and Minckley 1974; Williams and Williams 1982; Wilde 1989). Invertebrates, especially amphipods, are the most

important items in their diets (Wilde 1989). Williams and Williams (1982) found Preston White River springfish to be predominantly herbivorous, although some individuals consumed large quantities of midges and caddisfly larvae. Differences in diet probably result from differences in habitat that dictate food item availability. Wilde (1989) noted a shift in diet to herbivory in the winter when invertebrates were not abundant. Springfish forage along the substrate and in plants. They are active only during the daytime, with peaks occurring in the morning and afternoon.

Springfish spawning is asynchronous, where individual females will spawn at different times of the year (Deacon and Minckley 1974). Most females average two spawning periods a year, while the spawning season of the entire population extends over a long period of time each year. The period of spawning activity may be regulated by the primary productivity in the spring system (Schoenherr 1981).

c. Distribution

Ash Springs is located in Pahranagat Valley approximately 100 miles northwest of Las Vegas, Nevada, and 9 miles north of the community of Alamo in Lincoln County, Nevada. White River springfish are found throughout the Ash Springs pool. They are also found infrequently in the outflow stream (Tuttle *et al.* 1990). Historically, White River springfish were considered common in the Ash Springs area. With the introductions of mosquitofish in 1963, and convict cichlid (*Cichlasoma nigrofasciatum*), shortfin molly (*Poecilia mexicana*) and sailfin molly (*P. latipinna*) in 1964, White River springfish experienced a population decline (Service 1998). Additionally, Ash Springs is a popular recreational swimming area. From 1986 through 1989, the pool was drained annually to control algal growth, keeping White River springfish numbers low. The pool is no longer drained, although swimming continues primarily in the northern and southern ends of the spring pool, allowing the springfish to maintain a stable population in the pool.

d. Survival and Recovery Needs

A recovery plan for three listed fish species in Pahranagat Valley was completed in 1998. The recovery plan includes objectives and recovery actions for the Pahranagat roundtail chub (*Gila robusta jordani*), White River springfish, and Hiko White River springfish. The Pahranagat roundtail chub and Hiko White River springfish occur only on private land; the White River springfish occurs both on private and BLM-administered land.

The White River springfish may be considered for delisting when (1) a self-sustaining population comprising three or more age classes, a stable or increasing population size, and documented reproduction and recruitment is present in the spring pools of Ash Spring for three complete generations or a minimum of 6 consecutive years; and (2) impacts to the species and its habitat have been reduced or modified to a point where they no longer represent a threat of extinction or irreversible population decline. To meet

these criteria, the following recovery actions were identified in the recovery plan: (1) maintain and enhance aquatic and riparian habitats in the Pahranagat Valley; (2) develop and implement monitoring plans; (3) provide public information and education; and (4) establish and maintain refugia populations.

e. Abundance and Population Trends

Estimates of population size prior to 1998 varied between 1,200 individuals in 1986 to over 46,000 individuals in 1994 (Service 1998). Numbers were consistently lower (357 to 1,705 individuals) between 1986 and 1989 because the pool was drained annually to control algal growth. Once draining of the pool ceased, the population size improved (6,400 in 1991 to 46,275 in 1994). There are no current population estimates; however, based on observations it appears to be similar to pre-1998 estimates.

f. Threats

Reasons for listing the White River springfish include habitat alteration and the presence of nonnative species, which compete and prey upon the springfish. The use of water from the White River flow system for irrigation purposes has been ongoing for more than a century. Also, the Ash Spring pool is used for recreational swimming, although swimming does not necessarily preclude recovery of the springfish as long as areas are designated solely for springfish. Previous draining of the pool to control algal growth negatively affected population size in the 1980s, but this practice no longer occurs. Future development of groundwater resources to support population growth in the area may have an effect on the flows at Ash Springs.

Nonnative species such as shortfin molly and convict cichlids are considered a threat to the springfish. Mollies and cichlids, as well as springfish, are thermophilic; therefore, mollies and cichlids are abundant in areas occupied by springfish. In laboratory experiments, both the convict cichlid and shortfin molly were found to be extremely adept at larval predation. Competition for food between mollies and springfish was minimal, but greater between cichlids and springfish as cichlids are both omnivorous and thermophilic.

6. White River Springfish Critical Habitat- Status

Ash Springs is the southernmost, largest, and warmest of the three major spring systems found in Pahranagat Valley. Ash Springs consists of at least seven springs which originate from a contact between alluvium and bedrock (Garside and Shilling 1979). The springs have a common outflow stream, which has been impounded by construction of U.S. Highway 93, and now forms a large pool. The spring pool provides good stream flow when the gate controlling the water level is open. Ash Springs was historically a stream with continuous flow before it was modified into the existing deep convoluted pool. Below the highway, the outflow stream flows southwest to join the outflow stream

from Crystal Spring. From this point on, the stream is referred to as the Pahranagat River (also known as the ditch).

The Ash Springs pool occupies a surface area less than 2 acres in size, and is approximately 0.2 mile long and 1.6 to 6.6 feet deep (Tuttle *et al.* 1990). The bottom consists of sand and silt with locally dense submergent vegetation and algal mats. A thick canopy of willow (*Salix* sp.) and ash trees (*Fraxinus* sp.) border the eastern bank while the west side is more sparsely vegetated with willow, ash, and grasses.

Critical habitat at Ash Springs encompasses approximately 12 acres, of which 11.9 acres are located on private land and 0.1 acre is located on land administered by BLM. Critical habitat includes the springs and associated outflows, as well as the surrounding land that supports vegetative cover that contributes to the uniform water conditions preferred by the springfish and provides habitat for insects and other invertebrates which constitute a substantial portion of their diet.

7. Pahrump Poolfish- Rangewide Status

a. Listing History

On March 11, 1967, the Service published a final rule listing the Pahrump killifish as endangered (32 FR 4001). Reasons for the listing included declines of the population and significant threats to its remaining habitat. On September 22, 1993, the Service published a proposed rule to reclassify the killifish from endangered to threatened status (58 FR 49279). On April 2, 2005, a notice was published withdrawing the proposed rule to reclassify the killifish to threatened status (69 FR 17383). The April 2 notice also recognized a change in the taxonomic status of the killifish from a subspecies to a species, based on the extirpation of all related subspecies. The fish is now known as the Pahrump poolfish (*E. latos*).

b. Species Account

The Pahrump poolfish is endemic to the Pahrump Valley in southern Nye County, Nevada. Three subspecies of *E. latos* historically occurred in Pahrump Valley, each existing in a separate spring – *E. l. latos*, *E. l. concavus*, and *E. l. pahrump*. The last two fish are now extinct and *E. l. latos* disappeared from its native habitat at Manse Spring in August of 1975. It is now the last representative of the genus *Empetrichthys* and only exists in transplanted populations.

The Pahrump poolfish is a small fish that obtains an average maximum length of 3 inches, with females generally larger than males (Service 1980; Deacon 1984a, 1984b, 1984c). The poolfish has a slender, elongate body with dorsal and anal fins placed far back, a broad upturned mouth, a dark longitudinal streak (which tends to disappear in older, larger individuals), and an orange ring around the eyes. On average, there are 30 to 32 scales in the lateral series (scales found along the lateral line, which is a series of pore-like openings along the sides of a fish), but the number may vary from as low as 29 to a high of 33 scales (Sigler and Sigler 1987; La Rivers 1994). Poolfish lack pelvic fins, but the dorsal, anal, and caudal fins are bright orange-yellow when the fish are in an environment of optimal temperature and dissolved oxygen (Selby 1977; Soltz and Naiman 1978). The pectoral fins of the species typically have 16 to 18 rays (Sigler and Sigler 1987). The body of the poolfish is generally greenish-brown with black mottling, but males may be silver-blue without mottling during the spawning season (Soltz and Naiman 1978; Service 1980).

Poolfish are opportunistic omnivores, eating a wide variety of available animal and plant material (Deacon *et al.* 1980; NDOW 1999). Dietary studies have shown that debris, insects, snails, zooplankton and plants comprise the majority of their diet (Deacon *et* al. 1980; NDOW 1999; Hobbs *et al.* 2003, in prep.). Poolfish utilize all portions of the pool, with larger adults in the open, deeper waters and smaller adults and juveniles in shallow, vegetated areas (Deacon *et al.* 1980; Service 1980). Given the partitioning of habitat by age class, it is likely that different food resources are available to and consumed by adults and juveniles.

Poolfish have a fairly broad thermal tolerance. Despite the fact that the native habitat of the poolfish remained nearly constant at 75.2° F, the transplanted populations have demonstrated the ability to withstand a wider range of water temperatures. At Corn Creek Springs, poolfish survived in waters covered by ice at 39.2° F (Selby 1977). At another site, the species withstood temperatures ranging from below 50.9° to 77° F for five years (Selby 1977).

Spawning occurs from January to July, with a peak in April (D. Selby, *in litt.* 1976; Baugh *et al.* 1987). In transplanted populations, breeding periods are delayed (breeding typically occurs in late May or early June), possibly due to cooler water temperatures. Females measuring 1.8 to 1.9 inches total length lay an average of 14 eggs per female (Baugh *et al.* 1987). Development of poolfish eggs occur over a period of 2 to 3 weeks (D. Selby, *in litt.* 1976).

c. Distribution

Currently, poolfish are located at Corn Creek Spring refugium on the Desert National Wildlife Range northwest of Las Vegas, Clark County, Nevada; Shoshone Ponds Natural Area on lands managed by BLM southeast of Ely, White Pine County, Nevada; and in an

irrigation reservoir at the State of Nevada's Spring Mountain Ranch State Park (SMRSP), west of Las Vegas in Clark County, Nevada (Figure 3).

Historically, Pahrump poolfish only occurred in an isolated spring, Manse Spring, on private property known as Manse Ranch in the Pahrump Valley, southern Nye County, Nevada. In 1975, poolfish were extirpated from Manse Spring as a result of desiccation of the spring from groundwater pumping and competition from nonnative goldfish (Deacon *et al.* 1964; J. Deacon, *in litt.* 1970). Anticipating the loss of flow at Manse Spring (Minckley and Deacon 1968), poolfish were removed from the spring during the early 1970s and transplanted into three locations in Nevada: (1) Los Latos Pool; (2) Corn Creek Spring; and (3) Shoshone Ponds Natural Area. Transplanted poolfish at Los Latos Pool were lost during floods in the late 1970s, and individuals were never replaced at this location. Poolfish at Shoshone Ponds were lost to vandalism in 1974 when the water source was intentionally turned off. Modifications were made to the ponds' water system to try to prevent future vandalism, and the poolfish were replaced in August 1976 with fish from Corn Creek (L. McLelland, Nevada Division of Fish and Game (NDFG), *in litt.* 1976; Logan 1977; M. Barber *in litt.* 1987). In June 1983, a third population of poolfish was established in the irrigation reservoir at SMRSP to replace the population lost at Los Latos Pool, using poolfish from the Corn Creek Spring refugium (Richard Haskins, NDFG, *in litt.* 1983).

All three transplanted populations of poolfish reproduced successfully and thrived in their new habitats between 1986 and 1993 (NDOW 1988a, 1988b; Sjoberg 1989; Heinrich 1991a, 1991b, 1993). In the late 1990s, the population at Corn Creek was lost to illegally introduced nonnative crayfish (*Procambarus clarkii*) (NDOW 1999). The last three poolfish were found at Corn Creek during summer surveys in 1998 and no other poolfish were captured during surveys in subsequent years (NDOW 1999, 2000). A new, isolated refugium for the poolfish was built at Corn Creek in 2002 and poolfish were transplanted to the refugium in 2003.

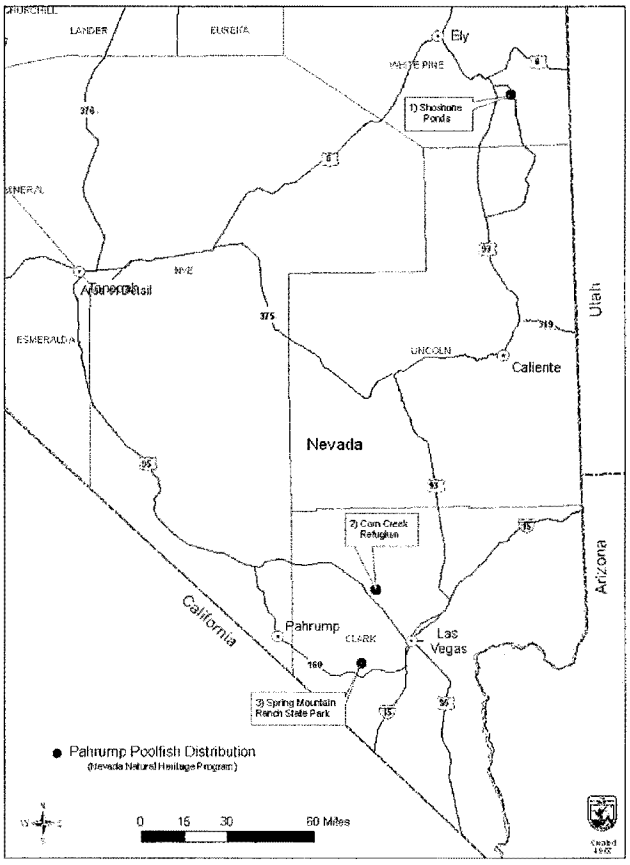


Figure 3. Present distribution of Pahrump poolfish. The three locations are: (1) Shoshone Ponds; (2) Corn Creek Refugium on the Desert National Wildlife Range; and (3) in an irrigation reservoir at Spring Mountain Ranch State Park. Distribution data provided by the Nevada Natural Heritage Program.

d. Survival and Recovery Needs

When the Pahrump killifish was listed in 1967 under the Endangered Species Preservation Act, the species was not subject to the same listing process used under the current Act. Upon authorization of the Act, the Pahrump poolfish was grandfathered in as an endangered species; and the five-factor threats assessment required for listings under the Act was not conducted. In 1980, the Service completed a recovery plan for the Pahrump poolfish, which includes recovery objectives and downlisting and delisting goals for the species. Under current policy, recovery plans must identify criteria for downlisting and delisting a species; however, under the 1980 poolfish recovery plan, downlisting and delisting goals are discussed as part of the rationale for the recovery objectives (Service 1980). The recovery plan includes the best scientific and commercial

data available at the time of publication; however, portions of the plan are now significantly outdated.

Since Pahrump poolfish no longer occur in their natural habitat, recovery objectives in the recovery plan focus on the protection and management of poolfish populations in their transplanted habitats, namely Corn Creek Spring, Shoshone Ponds, and SMRSP. The primary recovery goal identified in the recovery plan is to successfully establish and maintain at least three viable, reproducing populations. Each of the populations should maintain a minimum of 500 adults. If each of the populations maintains this number for 3 years, the species may then be considered for reclassification to threatened status. The habitat must be free of immediate and potential threats to permit the change in status. The recovery plan suggests that a 3-year period, with a minimum adult population of 500 fish in each location each year, be considered an evaluation interval. If, after an additional 3-year interval, the population continues to sustain 500 adults per year per location count, consideration should be given to delist the species. Prior to 1995 this objective had been met, but due to a proposed renovation project at SMRSP and loss of an entire population at Corn Creek Spring, the status of Pahrump poolfish was not changed.

Other recovery objectives for the poolfish include: (1) preserving and protecting existing transplanted Pahrump poolfish; (2) establishing and protecting viable self-sustaining Pahrump poolfish populations in suitable new or restored habitats; (3) conducting ecological studies and applying findings to management of Pahrump poolfish and its habitats; (4) delineating essential habitat for species preservation; (5) enforcing laws and regulations protecting Pahrump poolfish and its essential habitat; and (6) informing the public of Pahrump poolfish status and recovery plan objectives.

e. Abundance and Population Trends

Surveys are being conducted annually by NDOW to monitor the status of Pahrump poolfish populations at Shoshone Ponds, SMRSP, and Corn Creek as part of the recovery objectives identified in the recovery plan. Poolfish are trapped using standard minnow traps and marked before release. Population estimates are calculated using a mark-recapture method.

Shoshone Ponds: Shoshone Ponds is a series of three small excavated ponds (north, middle, and south) fed by an artesian well, one large spring-fed stock pond, and one artesian well outflow. Poolfish inhabit the north, middle and stock pools. Since the 1980s, poolfish populations have remained stable with only natural population fluctuations affecting their status (NDOW *in litt.* 2003b). However, surveys in 2003 detected a significant decrease in the population to less than 1,000 fish (NDOW *in litt.* 2003b). The cause for the decline is unknown; however, it was likely that the decline stemmed from degradation of the pond banks and sheet flows allowing for the dispersal of fish. Subsequent surveys in July 2004 and August 2005 detected substantial increases

in the populations (NDOW 2004, 2005a, 2005b). Poolfish were also found in the outflow of the artesian well in 1999 and 2004, indicating the poolfish populations at Shoshone Ponds may be higher than estimated (NDOW 1999, 2004). In 2005, NDOW concluded that poolfish populations at Shoshone Ponds are stable and healthy (NDOW 2005b).

Spring Mountain Ranch State Park: Poolfish are currently the only fish in the irrigation reservoir at SMRSP. In 1983, 426 poolfish were introduced into the reservoir after exotic fishes were eradicated from the site (Haskins, NDFG, *in litt.* 1983). Poolfish populations have fluctuated since being introduced, decreasing from a high of almost 60,000 fish in 2002 to a low of just under 10,000 in 2006 (NDOW 2006). Despite these fluctuations, the population at SMRSP is the largest and most stable of the transplanted poolfish populations.

Corn Creek Refugium: Poolfish are found in two separated tanks (north and south) in an isolated refuge at Corn Creek. In 2003, 120 adult poolfish were transferred to observation tanks at the Corn Creek refugium from the SMRSP population. Visual surveys conducted by the Service in 2003 after the fish were introduced revealed 8 young poolfish. Surveys completed in 2004 and 2005 yielded 142 and 186 fish (NDOW 2005b), and observations of many larval fish by Service personnel during June of 2006 suggest that there is a large rate of reproduction. In late summer of 2006, surveys revealed that the population had decreased to 76 fish. Because the observation tanks at the refugium are likely not large enough to support a viable self-sustaining population, NDOW recommends attempting to rehabilitate and introduce poolfish into the adjacent ponds with the expectation of creating a population that would persist into the future.

f. Threats

Historically, the primary threat to the poolfish has been the loss of habitat due to groundwater withdrawals. Both *E. l. concavus* and *E. l. pahrump* were extirpated due to desiccation of their native habitat caused by groundwater withdrawals in Pahrump Valley, and the Pahrump poolfish no longer exists in its native habitat due to the loss of flows at Manse Spring. Adequate, reliable water sources are necessary to ensure that currently occupied ponds provide suitable habitat for the poolfish. The potential for long-term declines in spring flows due to groundwater pumping from areas in the vicinity of existing poolfish habitat remains a threat to all populations. Threats to water sources necessary for poolfish habitat have been minimized to the extent possible by state and Federal agencies who administer the land within which poolfish habitat occurs by acquiring water rights that will secure the water supply for poolfish populations. However, all of the groundwater rights held by other local water agencies are not currently being utilized, and increasing demand for water to accommodate growing human populations and expanding urban development in the arid southwest will likely encourage the full utilization of these unused water rights (Southern Nevada Water Authority 2008).

Predation by introduced nonnative aquatic species has likely contributed to the decline of poolfish in their native habitats. In 1975, the population of poolfish at Corn Creek Springs experienced a rapid reduction as a result of unauthorized introduction of nonnative mosquitofish (*Gambusia affinis*). A coordinated effort among State agencies, academic institutions, and the Service successfully eradicated the mosquitofish (Selby 1977). The stability of this population was again threatened when nonnative crayfish were illegally introduced into the ponds at Corn Creek Springs. Surveys first noted the presence of crayfish in 1993, and thereafter the poolfish population rapidly declined (NDOW 1999). Despite attempts to eliminate crayfish, the poolfish population was extirpated by 1999. Nonnative common goldfish were also discovered at Corn Creek Springs in 1998 (NDOW 1999). The presence of competing and predatory goldfish may have compounded the problem of an already declining population of poolfish. Efforts by state agencies and volunteers to eradicate crayfish from Corn Creek Springs have been unsuccessful (NDOW in litt. 2001a). Subsequently, an isolated refugium for the poolfish was constructed at Corn Creek Springs in 2002, and poolfish taken from SMRSP were transplanted into the refugium in June and July of 2003 (NDOW *in litt.* 2003a). Currently, populations at SMRSP and Shoshone Ponds have not been significantly affected by nonnative aquatic species. However, the recent loss of the population at Corn Creek Springs illustrates that the poolfish is vulnerable to extinction as a result of predation by aquatic nonnative species.

8. Southwestern Willow Flycatcher- Rangewide Status

a. Listing History

The flycatcher was listed as endangered without critical habitat on February 27, 1995 (60 FR 10694). Critical habitat was originally designated on July 22, 1997 (62 FR 39129) and redesignated on October 19, 2005 (70 FR 60886). A total of 737 river miles in southern California, Arizona, New Mexico, southern Nevada, and southern Utah were included in the final designation. A final recovery plan for the flycatcher was completed in March 2003 (Service 2002).

b. Species Account

The southwestern willow flycatcher (flycatcher) is a small grayish-green passerine bird (Family Tyrannidae) measuring approximately 5.75 inches. The song is a sneezy "fitz-bew" or a "fit-a-bew," the call is a repeated "whitt." It is one of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993).

The flycatcher breeds in dense riparian habitat from sea level in California to approximately 8,500 feet in Arizona and southwestern Colorado. Historical egg/nest collections and species descriptions throughout its range describe widespread use of willow (*Salix* spp.) for nesting (Phillips 1948, Phillips *et al.* 1964, Hubbard 1987, Unitt

1987, San Diego Natural History Museum 1995). Currently, flycatchers primarily use Geyer willow (*Salix geyeriana*), coyote willow (*Salix exigua*), Goodding's willow (*Salix gooddingii*), boxelder (*Acer negundo*), salt cedar (*Tamarix* sp.), Russian olive (*Elaeagnus angustifolia*), and live oak (*Quercus agrifolia*) for nesting. Other plant species less commonly used for nesting include: buttonbush (*Cephalanthus* sp.), black twinberry (*Lonicera involucrata*), cottonwood (*Populus* spp.), white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), and stinging nettle (*Urtica* spp.).

Throughout its range the southwestern willow flycatcher arrives on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge and Tibbitts 1994, Sferra *et al.* 1997). Nesting begins in late May and early June and young fledge from late June through mid-August (Willard 1912, Ligon 1961, Brown 1988, Sogge and Tibbitts 1992, Muiznieks *et al.* 1994). Southwestern willow flycatchers typically lay three to four eggs per clutch (range 1-5). Eggs are laid at one-day intervals and are incubated by the female for about 12 days (Bent 1960, Walkinshaw 1966, McCabe 1991). Young fledge about 12 to 13 days after hatching (King 1955, Harrison 1979). Typically one brood is raised per year, but birds have been documented raising two broods during one season and renesting after a failure (Whitfield 1990, Sogge *et al.* 1993, Whitfield and Strong 1995). The entire breeding cycle, from egg laying to fledging, is about 28 days.

Southwestern willow flycatcher territory size likely fluctuates with population density, habitat quality, and nesting stage. Territories are established within a larger patch of appropriate habitat sufficient to contain several nesting pairs of flycatchers. Cardinal and Paxton (2005) found that the home ranges of telemetered flycatchers at Roosevelt Lake, Arizona, varied from 0.37 to 890 acres. Birds were found using a variety of riparian habitat in a variety of conditions (open, young mature, exotic, mixed, etc.) and the distances moved indicate that birds can occupy a larger area and use more types of habitat than previously believed (Cardinal and Paxton 2005).

Salt cedar is an important component of the flycatcher's nesting and foraging habitat in Arizona and other parts of the bird's range. In 2001 in Arizona, 323 of the 404 (80 percent) known flycatcher nests (in 346 territories) were built in a salt cedar tree (Smith *et al.* 2002). Salt cedar is considered by some to be a habitat type of lesser quality for the southwestern willow flycatcher, however comparisons of reproductive performance (Service 2002), prey populations (Durst 2004), and physiological conditions (Owen and Sogge 2002) of flycatchers breeding in native and exotic vegetation has revealed no difference.

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of flycatcher territories and nests; flycatchers sometimes nest in areas where nesting substrates are in standing water (Maynard 1995, Sferra *et al.* 1997). Hydrological conditions at a particular site can vary remarkably in the arid Southwest within a season and among years. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season (*i.e.*, May and part of June). However,

the total absence of water or visibly saturated soil has been documented at several sites where the river channel has been modified (*e.g.* creation of pilot channels), where modification of subsurface flows has occurred (*e.g.* agricultural runoff), or as a result of changes in river-channel configuration after floods (Spencer *et al.* 1996).

c. Distribution

The flycatcher is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical breeding range of the flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987). The flycatcher's distribution is confined to riparian areas along waterways within the range of the species.

The site and patch fidelity, dispersal, and movement behavior of adult, nestling, breeding, non-breeding, and migratory southwestern willow flycatchers are just beginning to be understood (Kenwood and Paxton 2001, Koronkiewicz and Sogge 2001). Most southwestern willow flycatchers return to former breeding sites, although flycatchers can regularly move among sites within and between years (Kenwood and Paxton 2001). Within-drainage movements are more common than between-drainage movements (Kenwood and Paxton 2001). Year-to-year movements of birds have been detected between the San Pedro/Gila river confluence and Roosevelt Lake, the Verde River near Camp Verde and Roosevelt Lake, and the Little Colorado River near Greer and Roosevelt Lake (Kenwood and Paxton 2001). Typical distances moved range from 1.2 to 18 miles. However, long-distance movements of up to 137 miles have been observed on the lower Colorado River and Virgin River (McKernan and Braden 2001). Breeding groups of southwestern willow flycatchers act as a meta-population (Busch *et al.* 2000).

d. Survival and Recovery Needs

There are no extensive records for the actual causes of adult southwestern willow flycatcher mortality. Incidents associated with nest failures, human disturbance, and nestlings are typically the most often recorded due to the static location of nestlings, eggs, and nests. As a result, nestling predation and brood parasitism are the most commonly recorded causes of southwestern willow flycatcher mortality. Band returns at Roosevelt Lake determined that the average adult return rate from 1998 to 2004 was 60 percent with survivorship estimated at 65 percent (Newell *et a*l. 2005). From 1998 to 2004, the average nestling return rate was 28 percent and survivorship estimated at 35 percent (Newell *et al.* 2005).

Intensive nest monitoring efforts in California, Arizona, and New Mexico have shown that cowbird parasitism and predation can result in the following: failure of the nest;

reduced fecundity in subsequent nesting attempts; delayed fledging; and reduced survivorship of late-fledged young. Cowbirds have been documented at more than 90 percent of sites surveyed (Sogge and Tibbitts 1992, Camp Pendleton 1994, Sogge and Tibbitts 1994, Holmgren and Collins 1995, Maynard 1995, San Diego Natural History Museum 1995, Sogge 1995b, Skaggs 1996, Whitfield and Enos 1996, Tomlinson 1997, McCarthey *et al.*1998). The probability of a southwestern willow flycatcher successfully fledging its own young from a cowbird parasitized nest is low (*i.e.*, <5 percent). Also, nest loss due to predation appears consistent from year to year and across sites, generally in the range of 30 to 50 percent.

A final recovery plan for the southwestern willow flycatcher was signed in 2002 (Service 2002a). The Plan describes the reasons for endangerment and current status of the flycatcher, addresses recovery actions, includes detailed papers on management issues, and provides recovery goals. The recovery plan divides the range of the flycatcher into six recovery units, which were further divided into management units. Recovery is based on reaching numerical and habitat-related goals for each specific management unit established throughout the subspecies range and establishing long-term conservation plans (Service 2002a). Flycatcher habitat within the proposed action area occurs within the Lower Colorado recovery unit and the Pahranagat management unit (Figure 4).

e. Abundance and Population Trends

Unitt (1987) documented the loss of more than 70 southwestern willow flycatcher breeding locations rangewide estimating the rangewide population at 500 to 1000 pairs. Since 1993, a total of 122 sites once known to have breeding flycatchers are no longer occupied by nesting birds. Numbers have increased since the bird was listed and some habitat remains unsurveyed; however, after more than a decade of intense surveys, the existing known numbers are just past the upper end of Unitt's 1987 estimate.

Rangewide, the population is comprised mostly of extremely small, widely-separated breeding groups including unmated individuals. However, across the bird's range, 3 percent of all sites support greater than 50 territories (Durst *et al.* 2005).

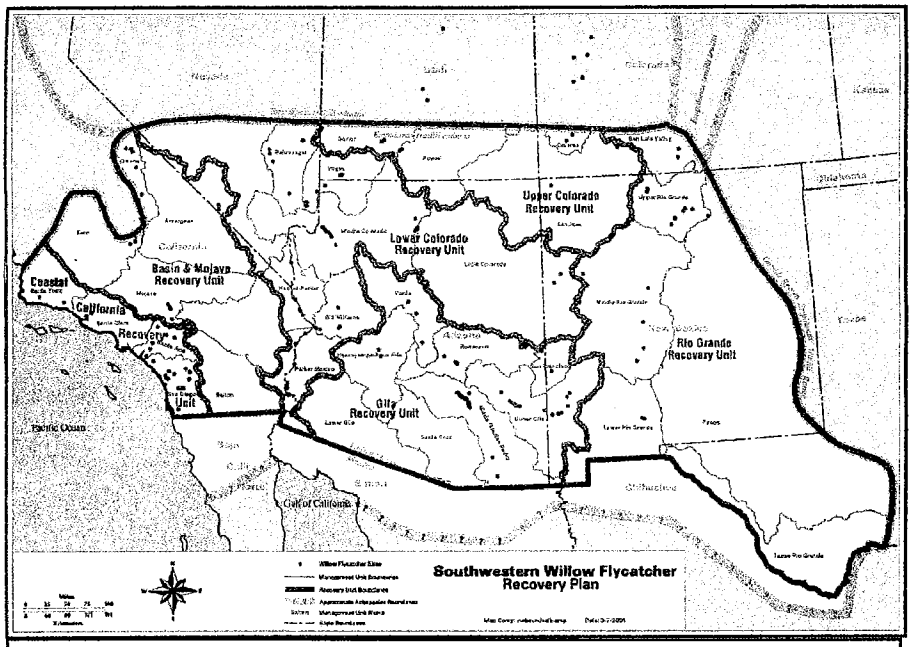


Figure 4. Southwestern willow flycatcher recovery and management units.

There are currently 284 known flycatcher breeding sites in California, Nevada, Arizona, Utah, New Mexico, and Colorado (all sites from 1993 to 2006 where a resident flycatcher has been detected) holding an estimated 1,262 territories (Durst *et al.* 2007). Approximately 50 percent of the 1,262 territories currently estimated throughout the range of the species are located at four general locations (Cliff/Gila Valley, New Mexico; Roosevelt Lake, Arizona; San Pedro River/Gila River confluence, Arizona; Middle Rio Grande, New Mexico).

The distribution of breeding groups is highly fragmented, often separated by considerable distance. In Arizona, about a 55-mile straight-line distance exists between breeding flycatchers at Roosevelt Lake and the next closest territories on the San Pedro River or Verde River. Long distances between breeding groups and small size of those populations reduces meta-population stability and increases the risks of local extirpation due to stochastic events, predation, cowbird parasitism, and other factors (Service 2002a). Conversely, having about 50 percent of the entire subspecies at four locations can also create instability should catastrophic events occur that would remove or significantly reduce habitat suitability at those places. The survival and recovery of the flycatcher is not dependent on having a few locations with large numbers of birds, but rather properly distributed populations throughout the subspecies' range placed close together (Service 2002a).

f. Threats

Reasons for decline of flycatcher populations have been attributed primarily to loss, modification, and fragmentation of riparian breeding habitat, along with a host of other factors including loss of wintering habitat and brood parasitism by the brown-headed cowbird (Sogge *et al.* 1997; McCarthey *et al.* 1998). Habitat loss and degradation are caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, dams, and livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton *et al.* 1996), especially in monotypic salt cedar vegetation (DeLoach 1991) and where water diversions and groundwater pumping desiccates riparian vegetation (DeLoach 1991) and where water diversions and groundwater pumping desiccates riparian vegetation (Sogge *et al.* 1997). Willow flycatcher nests are parasitized by brown-headed cowbirds, which lay their eggs in the host's nest. Feeding sites for cowbirds are enhanced by the presence of livestock and range projects such as waters and corrals; agriculture; urban areas; golf courses; bird feeders; and trash areas. When these feeding areas are in or near flycatcher breeding habitat, especially coupled with habitat fragmentation, cowbird parasitism of flycatcher nests may increase (Hanna 1928; Mayfield 1977; Tibbitts *et al.* 1994).

Many activities continue to adversely affect the distribution and extent of all stages of flycatcher habitat throughout its range (development, urbanization, grazing, recreation, native and non-native habitat removal, dam operations, river crossings, ground and surface water extraction, etc.). Stochastic catastrophic events also continue to change the distribution, quality, and extent of flycatcher habitat.

E. Environmental Baseline

1. Desert Tortoise

a. Status of the Desert Tortoise in the Action Area

Desert tortoises occur in the planning area primarily in the Sonora-Mojave Creosotebush-White Bursage Desert Scrub (Creosote-Bursage) and Mojave Mid-Elevation Mixed Desert Scrub (Mixed Desert Scrub) ecological systems. The Creosote-Bursage ecological system forms the vegetation matrix in broad valleys, lower bajadas, plains and low hills in the Mojave and lower Sonoran deserts. This desert scrub is characterized by a sparse to moderately dense layer (2-50 percent cover) of xeromorphic microphyllous and broad-leaved shrubs. Creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) are typical dominants with many different shrubs, dwarf-shrubs, and cacti that co-dominate or form sparse understories.

The Mixed Desert Scrub ecological system represents the extensive desert scrub in the transition zone above the Creosote-Bursage ecological system. This community is also

common on lower piedmont slopes in the transition zone into the southern Great Basin. The vegetation in this ecological system is quite variable.

There are approximately 1.2 million acres of potentially suitable desert tortoise habitat in the planning area. Desert tortoises may occur wherever suitable habitat is available. For analysis purposes, the Service assumes that most desert tortoise habitat consists of Mojave Desert scrub vegetation and occurs below 4,200 feet elevation. Approximately 265,742 acres have been designated as critical habitat. Desert tortoise sign have been found in the planning area from Ash Springs southward. Desert tortoises occur in scattered patches of suitable habitat throughout southern Lincoln County with areas of concentration occurring along Kane Springs Wash, Meadow Valley Wash, and the region just south of the Tule Springs Hills. Approximately 5 adult/subadult tortoises occur per square mile within the Northeast Mojave Recovery Unit (Service 2006) which includes the Mormon Mesa and Beaver Dam Slope ACECs and CHUs.

Three ACECs (Kane Springs, Mormon Mesa, and Beaver Dam Slope) were designated by BLM to assist in the recovery of the desert tortoise within the planning area. These ACECs encompass the best available habitat in the vicinity and include 212,500 acres or approximately 80 percent of the designated critical habitat for the desert tortoise in the planning area (BLM 2000). Portions of three wilderness areas overlap the Kane Springs and Mormon Mesa ACEC and desert tortoise habitat north of the ACECs. The remaining 20 percent or approximately 53,242 acres, of desert tortoise critical habitat occurs outside these three ACECs within the planning area.

The kernel analysis conducted by the Desert Tortoise Recovery Plan Assessment Committee (Tracy *et al.* 2004) which included the Coyote Springs DWMA showed areas where the distributions of carcasses and living tortoises do not overlap; however, densities of adult tortoises for the region do not show a statistical trend over time. Thus, while there may be a local die-off occurring in the northern portion of this DWMA, this does not appear to influence the overall trend in the region as interpreted by study plot data. Large regions of non-overlapping carcass and live tortoise kernels in the regions were not identified adjacent to the Coyote Springs DWMA. The probability of finding either a live tortoise or a carcass was relatively very low for Beaver Dam Slope and moderately low for Mormon Mesa/Coyote Springs.

b. Factors Affecting the Desert Tortoise in the Action Area

Wildfires. The 2005 wildfires burned approximately 309,155 acres of desert tortoise habitat which includes 44,872 acres of desert tortoise critical habitat. Desert tortoise mortality/injury estimates are not available for the wildfires. Wildfire occurred in desert tortoise habitat in years before and after 2005 but were relatively minor in their effect to the desert tortoise.

On April 12, 2006, the Service issued a biological opinion (File No. 1-5-05-F-526) to BLM for the Southern Nevada Fire Complex Fire Suppression Actions and Proposed Burned Area Emergency Response Treatments, in Clark and Lincoln counties, Nevada, and Washington County, Utah. BLM fire suppression actions that resulted in adverse effects to the desert tortoise and its habitat included fireline construction, off-road travel, air operations, burnouts and backfires, and base and spike camps. Habitat stabilization and rehabilitation efforts include seeding native species.

On October 30, 2006, the Service issued a biological opinion (File No. 1-5-06-F-551) to BLM's Ely and Las Vegas districts for conducting emergency stabilization treatments on areas burned in the 2005 wildfires. Treatments in desert tortoise habitat include: seeding of native plants on approximately 3,000 acres of designated critical habitat for the desert tortoise; horse and burro removal; repairing damaged livestock fencing to protect seeded areas; constructing 33 miles of fencing to protect burned areas; placing safety signs to warn of flood danger; temporarily closing and increasing patrols on undesignated motorized routes; and installing protective cages around emerging and remaining Joshua trees (*Yucca brevifolia*) and yuccas to protect them from grazing and browsing. Many of these treatments are complete but seeding treatments will continue.

Roads. A major highway, US 93, connects Interstate 15 (I-15) in northern Clark County with communities in eastern and northern Nevada. Major unpaved roads also connect to I-15 and provide access into the planning area which includes Toquop Wash Road, Carp-Elgin Road, and Halfway Wash Road. State Route 168 connects US 93 with I-15 and also connects with Meadow Valley Wash Road which parallels the Union Pacific Railroad line and travels north into the planning area. Kane Springs Road is a major unpaved road which connects US 93 in Coyote Springs Valley with Meadow Valley Wash Road near Elgin.

A road network exists in the planning area which provides public access to desert tortoise habitat otherwise generally inaccessible by vehicles. Existing roads and trails within critical habitat and all but approximately 70,000 acres of non-critical habitat have been inventoried. Approximately 516 miles of roads occur in non-critical habitat and 463 miles occur within critical habitat (BLM 2008).

Mineral Extraction/Mining. Existing oil and gas leases cover approximately 34,580 acres within the Beaver Dam Slope ACEC and 9,625 acres within the Mormon Mesa ACEC (BLM 2008). Outside ACECs, existing leases cover approximately 28,740 acres in desert tortoise critical habitat and 43,422 acres of non-critical habitat.

Grazing. Grazing by cattle and sheep has occurred in the planning area since the mid-1800s, increasing in intensity near the turn of the 19th century. All grazing allotments in the planning area are classified as perennial allotments with term permits issued by BLM to authorize grazing use based on perennial vegetation. The Beacon, Sand Hollow, and Rox-Tule grazing allotments, and portions of the Breedlove, Delamar, Gourd Springs,

Mormon Peak, Grapevine, and Lower Lake East allotments that occur within desert tortoise ACECs were closed under the Caliente MFP Amendment. Livestock grazing continued outside ACECs including areas within critical habitat but outside ACECs. After the wildfires of 2005, BLM issued partial and full temporary burn closures or reduced grazing for all but one allotment (Lower Lake West). To date, no monitoring data are available to the Service for livestock grazing in desert tortoise habitat that would provide the basis for assessing the status of desert tortoise on each grazing allotment in tortoise habitat.

During tortoise surveys conducted in 1980, Karl (1982) observed that livestock grazing became noticeably heavier at the southwest entrance to Kane Springs Valley than in Coyote Springs Valley, as evident by many well-chewed perennial grasses, herds of up to 50 cattle, and the presence of red brome (*Bromus madritensis ssp. rubens*), an introduced non-native grass. Karl further observed that tortoise sign decreased to zero where grazing pressure became heavier in comparison to observations in Coyote Springs Valley where she estimated densities up to 100 tortoises per square mile.

Under the CMFP Amendment, wild horses were managed outside ACECs on approximately 32,200 acres of desert tortoise habitat within the Blue Nose Peak HMA. Emergency wild horse gathers occurred within desert tortoise habitat in 2000, 2002, and 2006 to remove stray animals. BLM does not manage wild horse HMAs in desert tortoise habitat.

Rights-of-Way. On December 21, 1990, the Service issued a biological opinion (File No. 1-1-87-F-36R to the Federal Energy Regulatory Commission (FERC) for construction of the Kern River and Mojave gas pipeline projects. The biological opinion evaluated the potential effects that may result from proposed activities on the federally-listed species including the desert tortoise. The Service concluded that 45 desert tortoises may be killed or injured; 424 desert tortoises harassed; and 93 desert tortoise nests destroyed. As of June 24, 1991, approximately 23 deaths and 253 harassments of desert tortoise were recorded by Kern River along the pipeline right-of-way. Problems associated with vehicular traffic on the right-of-way and access roads may have contributed to the mortalities in combination with high desert tortoise activity levels that were not anticipated. Consequently, on June 24, 1991, FERC requested reinitiation of formal consultation for the project based on a high incidence of desert tortoise mortality and harassment on the Kern River pipeline project, which may exceed those limits established in the incidental take statement. The Service responded by letter dated June 28, 1991, and imposed additional minimization measures, and increased the harassment limits for desert tortoise from 294 to an unlimited number and injury/mortality limits from 25 to 35 for only the Kern River segment of the project.

On April 28, 1998, the Service issued a biological opinion (File Nos. 1-5-98-F-032 and 6-UT-98-001) to BLM for issuance of a right-of-way for the FTV Western Build for construction of a buried fiber-optic cable within an existing right-of-way for the Kern

River gas transmission pipeline in Nevada and Utah. In Nevada, the project occurs over 95.5 miles in Clark and Lincoln counties. The project disturbed 153 acres of non-critical habitat and 142 acres of critical habitat in the Mormon Mesa and Beaver Dam Slope CHUs.

On December 8, 1999, the Service issued a biological opinion (File No. 1-5-99-F-411) to BLM for construction of the Level-3 fiber-optic line. The project disturbed 119 acres in the Mormon Mesa CHU along US 93 and 39 acres of non-critical habitat north and south of the Mormon Mesa CHU.

On July 9, 2003, the Service issued a biological opinion to the FERC for their approval of the Kern River 2003 Expansion Project which involved construction of an underground natural gas pipeline (File No. 1-5-02-F-476) approximately parallel to the 1991 Kern River project. The pipeline traversed the planning area and disturbed 1,007 acres of non-critical habitat and 542 acres of critical habitat for the desert tortoise. The Mormon Mesa and Beaver Dam Slope CHUs were impacted by the project. Only one desert tortoise was killed as a result of this project.

On December 20, 2007, the Service issued a biological opinion (File No. 84320-2008-F-0066) to BLM-Las Vegas for their proposal to amend an existing right-of-way for construction, operation, and maintenance of a single-circuit, overhead 500 kV transmission line (Southwest Intertie Project). The southern portion of the project begins at the Harry Allen Substation in Clark County, Nevada, crossing through the planning area, and ending approximately 34 miles north of Ely in White Pine County, Nevada. The project would disturb 231 acres of non-critical and 365 acres of critical desert tortoise habitat.

Land Disposals and Urbanization. On September 7, 2001, the Service issued a biological opinion to BLM for Phase I of the Lincoln County Land Act (LCLA) disposal (File No. 1-5-01-F-517). Under the LCLA, 13,500 acres of public lands would become available for disposal by BLM. The LCLA directs BLM to dispose of 4,817 acres of land not later than one year (Phase I), and 8,683 acres of land not later than 5 years (Phase II), after enactment of this law, for a total of 13,500 acres. As part of Phase I, BLM proposes to transfer 6,478 acres of public land to private ownership by competitive sale within one year.

BLM proposes to sell through a land disposal action, 640 acres of desert tortoise habitat which would be used to construct and operate the natural gas-fired Toquop Energy plant. On May 1, 2002, BLM requested formal consultation for their proposed disposal of 640 acres for development of the Toquop Energy Project. On June 11, 2002, the Service issued a biological opinion for the land disposal and construction of a gas-fired power plant (File No. 1-5-02-F-494). Subsequently, BLM discovered that the land proposed for the disposal was not identified within proposed disposal areas in the Caliente MFP Amendment, thus additional consultation was required. The Service determined that the

consultation should occur through reinitiation of consultation of the biological opinion for the Caliente MFP Amendment. On June 13, 2003, the Service issued a biological opinion (File No. 1-5-99-F-450.R) concluding reinitiation of consultation on the Caliente MFP Amendment which included the proposed 640-acre land disposal action for the Toquop Energy Project.

On July 13, 2007, the Service issued a biological opinion (File No. 1-5-07-F-487) to BLM for the proposed Alamo land sale. The disposal involves 855 acres of desert tortoise habitat. The Service estimates that 20 desert tortoises may be adversely affected by the land sale.

The human population has exploded in the communities adjacent to the Beaver Dam Slope CHU such as St. George and Mesquite. In 2005, St. George was considered to be the second-fastest-growing city in the U.S. The population of St. George in 2003 was 104,000 which is an increase of 15.2 percent since 2000. Similarly, the 2005 population of Mesquite, Nevada was 21,600 which represent an increase of approximately 39 percent since 2000 when the population was 15,500. The projected population of Mesquite in 2010 is 30,500. BLM land disposals in Lincoln County have facilitated community growth in southeastern Lincoln County which will result in increased use of public lands in the area and impacts to the desert tortoise and other species of concern.

Recreation. Under the biological opinion for the Caliente MFP Amendment, BLM authorized the Yuccachucker Motorcycle Race annually from 2000 through 2007; the Nevada 2000 Race (2000); the Nevada 1000 (2002); the Vegas to Reno Race (2003, 2006); and the Harden Dual Sport Motorcycle Ride (2007). BLM land is used by the public for casual recreation purposes including hunting, camping, hiking, and off-highway travel.

Geology and Mineral Extraction. Historically, most of Lincoln County has been leased for oil and gas resources (6,285,603 Acres). Currently there are 150,203 acres of active leases within desert tortoise habitat (some of these leases are in the Beaver Dam and Mormon Mesa ACECs).

c. Status and Factors Affecting the Species' Critical Habitat in the Action Area

The action area includes both critical and non-critical desert tortoise habitat. The action area occurs within the Northeastern Mojave Recovery Unit in the northern portion of the Mormon Mesa CHU, and western portion of the Beaver Dam Slope CHU. The Northeastern Mojave Recovery Unit occurs primarily in Nevada, but it also extends into California along the Ivanpah Valley and into extreme southwestern Utah and northwestern Arizona.

The status of the primary constituent elements (PCE) of desert tortoise critical habitat is described below. Effects to the PCEs that are anticipated to occur as a result of the

proposed action are not discussed here. Refer to the *Effects of the Action* section of this biological opinion for a discussion of anticipated effects to critical habitat as a result of the proposed action.

- PCE: *Sufficient space to support viable populations within each of the six recovery units, and to provide for movement, dispersal, and gene flow.*

  In 2005, wildfires burned approximately 46,757 acres (23 percent) of the Beaver Dam Slope CHU (Nevada and Utah) and 15,559 acres (4 percent) of the Mormon Mesa CHU. Although efforts are underway to rehabilitate these burned areas, it is unlikely that these acres will return to functional desert tortoise habitat for decades, thus reducing the space available for tortoises in these CHUs.

  Ongoing residential and commercial development associated with the Coyote Springs Investment project south of the planning area in Clark County but within the Mormon Mesa CHU, has resulted in loss of 7,550 acres of desert tortoise critical habitat. Desert tortoise movement and dispersal is currently limited in this area and will be further restricted as development proceeds northward into Lincoln County. Long-term effects of the development including gene flow are not known.

  Infrastructure such as power transmission lines and towers constructed in support of development has resulted in additional loss of critical habitat further reducing the amount of space available for the desert tortoise. For example, the Southwest Intertie electrical transmission project will adversely affect this PCE by disturbing or destroying 365 acres of critical desert tortoise habitat in the Mormon Mesa CHU.

  The extent of contiguous or large blocks of desert tortoise habitat in the Mormon Mesa and Beaver Dam Slope CHUs is reduced by railroads, major utility corridors, and major roads and highways such as I-15, US 93, SR 168, and Union Pacific railroad.

- PCE: *Sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species.*

  Although the additive effects of 100 years of livestock grazing have been substantial, some of the changes have occurred so slowly that they are almost imperceptible over a span of a few years. Plant communities with a short evolutionary history with grazing such as the Mojave Desert, are more likely to change when grazed by domestic animals than those communities with a long evolutionary history of grazing. The decline in native perennial grasses and their replacement with nonnative annual grasses over vast areas of the Midwest and West are associated with the introduction of large numbers of livestock following European settlement.

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 percent and light to moderate intensities reduced infiltration by 25 percent over un-grazed areas. These differences are statistically significant.

Agriculture, including livestock grazing, is the principle source of nonnative plant introductions. Invasive weeds continue to affect this PCE by reducing the quality of forage available to the desert tortoise and facilitating wildfires. Wildfires in 2005 burned approximately 46,757 acres of critical habitat in the Mormon Mesa and Beaver Dam Slope CHUs. Nonnative grasses dominate burned areas in the CHUs affected by the 2005 wildfires. Forage for desert tortoises with home ranges that overlap burned areas will have reduced diversity and quantity of forage available.

Soil conditions may also be degraded locally, particularly in areas of livestock concentration. Cryptobiotic soil crusts in the CHUs are mostly impacted by livestock grazing and OHV activity. Removal or damage of the cryptobiotic crusts can have significant adverse effects on desert soils and nutrient cycling (Donahue 1999).

The Desert Tortoise Recovery Team determined that livestock grazing in DWMAs is not compatible with recovery (Service 1994). BLM allows livestock grazing on 46,663 acres in the Mormon Mesa and Beaver Dam Slope DWMAs/CHUs. The Service determined that livestock grazing contributes to an overall reduction in both the quality and quantity of forage for the desert tortoise, thus adversely affecting this PCE (refer to section on effects of livestock grazing for additional information).

- PCE: *Suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites.*

  Many large-scale disturbances such as mineral material sites, utility construction, and development have reduced the burrowing, sheltering, and nesting substrates for the desert tortoise. Wildfires have greatly reduced the availability of shrubs which serve as shelter sites for tortoises as discussed below. An unknown number of desert tortoise burrows have been damaged or destroyed by livestock.

- PCE: *Sufficient vegetation for shelter from temperature extremes and predators.*

  The Meadow Valley, Halfway, Garnet, Dry Middle, and Dry Rock fires of 2005 occurred in the Mormon Mesa CHU. These wildfires have effectively removed the shrub component over large areas which may not return or may require decades to recover and provide shelter for desert tortoises. In their monitoring plots, USGS

researchers determined that burned areas had a reduction of perennial cover from 31 percent to 12 percent. In the spring of 2006, nonnative annual grass production was significantly higher in burned areas, often three to five times higher, as compared with nearby unburned reference sites for all but one fire monitored including, Meadow Valley, Halfway, Dry Middle, Dry Rock and Garnet. This pattern of greater production of invasive annuals in burned areas persisted in 2007. Tortoises living in this landscape are faced with an altered environment including a lack of shrub cover.

Rights-of-way, particularly for linear projects such as power transmission lines, have removed the vegetative shelter for tortoises and provide a swath of bare ground across the landscape. Desert tortoises that cross, or attempt to cross these areas are highly visible to predators, particularly avian predators such as the common raven or red-tailed hawk (*Buteo jamaicensis*).

- PCE: *Habitat protected from disturbance and human-caused mortality.*

The Caliente MFP Amendment provided a level of protection to the desert tortoise within that portion of the DWMA that overlaps the Mormon Mesa, Kane Springs, or Beaver Dam Slope ACECs which would continue through the proposed action of this consultation. However, BLM's enforcement of protective measures is sporadic due to limited law enforcement staff. Any public assess into desert tortoise habitat provides the opportunity for human-caused mortality including vandalism, trash dumping, poaching or killing of tortoises, and habitat degradation by traveling off road.

Critical habitat within the planning area and outside ACECs has been open to all forms of mineral extraction subject to section 7 consultation. The Beaver Dam Slope and Mormon Mesa ACECs/CHUs are open to fluid mineral leasing with no surface occupancy. Grazing on public lands continues on most of the Beaver Dam Slope CHU in Arizona and Utah.

Protected habitat for the desert tortoise (*i.e.* ACECs) continue to be affected by activities associated with mineral extraction, utility corridors which also serve as public roads, livestock grazing, and OHV use.

ACECs are protected from potential transfer to private ownership and subsequent development and habitat loss/degradation, livestock and wild horse grazing, and restrictions on potential mineral extraction activities. Portions of the Delamar Mountains, Meadow Valley Range, and Mormon Mountains Wilderness Areas overlap the Mormon Mesa CHU as well as the Kane Springs and Mormon Mesa ACECs which provide additional protection.

2. Big Spring Spinedace

a. Status of the Big Spring Spinedace in the Action Area

The range of the Big Spring spinedace occurs entirely within the planning area of the RMP. The species exists within a 5-mile stretch of the Meadow Valley Wash that flows through Condor Canyon northeast of Panaca in Lincoln County. Riparian vegetation consists primarily of box elder, Gooddings willow, sandbar or coyote willow, and salt cedar. Cottonwoods are also present. Common herbaceous riparian species include cattails (*Typha domingensis* and *T. latifolia*), redtop (*Agrostis stolonifera*), sedges (*Carex* sp.), and rushes (*Juncus* sp.). Water cress (*Nasturtium* sp.) occurs in patches within the stream channel. Adjacent upland areas contain pinyon-juniper vegetation typical of the Great Basin ecological system.

Aquatic habitat within the canyon has been altered, likely due primarily to historic mining and railroad development. In general, the channel is highly incised and filled with sediment. Daytime aquatic habitat conditions are relatively turbid. Dissolved oxygen averages 7.5 mg/L, and water temperature from May to September averages 50 to 72°F, with daily fluctuations of about 16°. The substrate is predominantly sand/silt and gravel (NDOW 2006).

The most current information on population status is from surveys conducted by NDOW in 2006. Seven 25-meter plots were sampled using a triple-pass depletion model to provide an index of population size. Estimates ranged from approximately zero individuals per square meter at the base of the canyon to six individuals per square meter at locations above the waterfall. Compared to previous years' surveys, the population appears to be stable (NDOW 2001, 2002, 2004, 2005).

No quantitative information is available on water quality or water flow levels.

b. Factors Affecting the Big Spring Spinedace in the Action Area

Invasive Species

Invasive species negatively impact the Big Spring spinedace. Aquatic invasive plant species are common. Cattails bind silt substrate, creating habitat for other non-native aquatic species by removing gravel substrate that was used for reproduction and as a source of invertebrates for food. Both non-native crayfish and rainbow trout, which prey on spinedace, are very abundant and persist throughout the system.

Salt cedar has invaded the riparian area in the canyon. Salt cedar reduces aquatic habitat quality for native fish, alters fire regimes, and out-competes native vegetation. A large fire in the early 2000s substantially reduced upland and riparian vegetative cover, which

facilitated increased siltation of the aquatic habitat, and also enhanced the productivity of fire-adapted salt cedar and cattails.

Invasive Species Control

Weed control treatments have occurred in Condor Canyon since 2004. A small amount of Dalmatian toadflax (*Linaria dalmatica*) was removed, as well as approximately 1.3 acres of hoary cress (*Lepidium draba*) and 9.5 acres of salt cedar. Removal of salt cedar and other invasive aquatic plants may have short term adverse effects on the spinedace in the form of mortality from trampling in the stream during plant control activities, inadvertent introduction of chemical herbicides, and short term increases in sedimentation from bank instability as a result of salt cedar removal. Long-term benefits from removal of invasive species should include increased bank stability as native vegetation replaces nonnatives, decreased sedimentation, and less frequent incidence of wildfire.

Roads and Recreational Use

One main route, a one-track dirt road following an historic railroad bed, crosses private and BLM-administered lands through Condor Canyon. Damage to bridge structures, as well as erosion and lack of maintenance, has made a portion of the road unusable. The main road is most often used by OHVs. Additional spur trails originate from the road; however, they appear to be infrequently used. BLM visitor use records for 2007 estimated approximately 1,564 visitors to the area for that year.

No permitted or organized events currently occur within Condor Canyon. On average, one competitive OHV event per year utilizes existing roads and trails within the Condor Canyon watershed. Based on BLM post-use reports, the average number of participants for these events is 240.

Livestock grazing

Four livestock grazing allotments overlap the Condor Canyon area (Highland Peak, Black Hills, Condor Canyon, and N4/N5). Of these allotments, data for evaluating rangeland health standards have been collected only for N4/N5. The outcome of the evaluation is yet to be determined. N4/N5 is 43,500 acres in size, and is grazed year-long at an assigned use level of 825 AUMs. Black Hills is 3,610 acres in size, and is grazed yearlong at an assigned use level of 156 AUMs. Condor Canyon is 44,035 acres in size and is grazed from March 1 to January 24 at an assigned use level of 676 AUMs. Highland Peak is 45,542 acres in size, and is grazed from October 16 to May 15 at an assigned use level of 3,704 AUMs. Ongoing livestock grazing may result in mortality of fish and loss of eggs to trampling in the stream. Indirect effects to habitat quality such as siltation, loss of shading through removal of riparian vegetation, and water quality degradation may be occurring.

Mining

Past impacts from mineral extraction resulted from three mining claims which exist in the immediate vicinity of Condor Canyon and overlap with Big Spring spinedace critical habitat. Impacts from these mining activities included loss or alteration of habitat, sedimentation, and removal of riparian vegetation. These claims were closed in 1986. One active claim exists in the southwestern quarter of section 23, which encompasses a portion of the habitat in Condor Canyon.

c. Status and Factors Affecting the Species' Critical Habitat in the Action Area

Critical habitat for the Big Spring spinedace encompasses 4 miles of Meadow Valley Wash and a 50-foot riparian zone along each side of the stream as it flows through Condor Canyon. The primary constituent elements of Big Spring spinedace critical habitat include (1) clean, permanent, flowing, spring-fed stream habitat with deep pool areas and shallow marshy areas along the shore; and (2) the absence of nonnative fish.

The status of contaminates in the water is unknown, and to our knowledge has not been measured or monitored. General water parameters appear to be suitable for spinedace. Turbidity may be higher than historic conditions, but it is unknown how this may affect spinedace. The turbidity releases sediments, filling in deep pool areas, resulting in shallow, vegetated runs. Therefore, deep pools are probably less abundant or smaller in scale compared to historic conditions.

Nonnative species.

At the time the spinedace was listed, nonnative species were not known to occur at Condor Canyon. Since then, surveys have detected the establishment of one crayfish species and rainbow trout. Warm water game fish, including crappie and largemouth bass are occasionally present; however, they do not persist due to habitat conditions unsuitable for warm water fish. It is likely these fish are washed downstream from reservoirs during temporary connections from rain events. Specific effects to Big Spring spinedace from these non-native species are unknown; however, based on known effects to other species, Big Spring spinedace are most likely negatively affected by the presence of non-native species by way of predation and competition for food resources.

Crayfish are known to consume fish eggs and larvae, and capture and kill adult fish. Crayfish also increase turbidity, remove native vegetation, and eliminate macroinvertebrate communities that fish may use as a food resource. The occurrence of substantial numbers of crayfish in the Condor Canyon system likely limits the spinedace population.

Rainbow trout are trophically and behaviorally similar to spinedace, and these species likely compete for limited food resources. In addition to the trout's diet of invertebrates,

they are also piscivorous and may predate on spinedace. However, trout are not ideally suited to the habitat in Condor Canyon, and since they occur in low densities, their overall effect to the spinedace is most likely negligible.

3. White River Springfish

a. Status of the White River Springfish in the Action Area

White River springfish occurs entirely within the planning area of the RMP. The species exists in the Ash Springs pool, which was formed when US 93 was constructed and impounded the flow from a series of springs originating from a contact between the alluvium and bedrock. The Ash Springs pool occupies a surface area of about 2 acres, and is approximately 0.2 mile long and 1.6 to 6.6 feet deep. A thick canopy of willow and ash trees borders the eastern bank while the west side is more sparsely vegetated with willow, ash, and grasses. Adjacent upland habitat is typical of the Mojave Desert scrub ecological system.

The population is not regularly surveyed; however, NDOW reported 470 individuals within the pool area during a snorkeling event in 2006 (B. Hobbs, NDOW, pers. comm., 2008). This estimate does not include individuals that occur in the pool's outflow.

From 1993 to 1995, Tuttle and Weimeyer (1999) measured water conditions at Ash Springs during spring through fall. Conditions varied, possibly due to time of year and sampling location. Temperature ranged from 86 to 93°F, pH was 6.9 to 7.4, conductivity was 550 to 600 µS per centimeter, salinity was 0.0 to 0.4 ppt, and dissolved oxygen was 4.0 to 4.5 mg/L. USGS manual flow measurements obtained between 2006 and 2008 estimated an average flow of approximately 3.2 cubic feet per second, ranging from 1.7 to 7.6 (USGS 2008).

b. Factors Affecting the White River Springfish in the Action Area

Habitat alteration

Springfish habitat has been altered by widening of the spring pool and placement of a culvert for the stream to pass under US 93. The upper portion of the springpool was also converted to a cinderblock-lined pool. Past disturbance included periodic draining for maintenance, leaving only the base streamflow in the pool. The effects of this habitat manipulation on the species are unknown; however, the species has persisted despite these perturbations to its habitat.

Nonnative species

Non-native species are prevalent in Ash Springs. These species include convict cichlid (*Archocentrus nigrofasciatus*), shortfin molly, and mosquitofish. Common carp

(*Cyprinus carpio*) are present in the extreme downstream portion of springfish habitat. Crayfish are also abundant. Due to the proximity of a main road and the attraction of the springs as a recreational swimming site, this habitat has a high risk of non-native species introduction. The population size of the springfish is most likely constrained by the presence of non-native species.

Recreational swimming

Recreational swimming affects the springfish mostly from disturbance of the substrate and bank disturbance. Springfish typically forage and spawn on algae mats. Disruption of these mats by swimming may destroy eggs and larvae, and may affect the periphyton composition, which is used as a food source. Swimming and algae disruption also may disturb bottom sediments, which may impact benthic macroinvertebrates and cause siltation of spawning habitat. Easy accessibility to the site has also facilitated water contamination and vandalism, including the intentional release of diesel fuel into the springhead. The species has persisted despite these activities, but it is unknown as to the extent that these activities limit population size.

c. Status and Factors Affecting the Species' Critical Habitat in the Action Area

Critical habitat for the White River springfish includes Ash Springs and its associated outflow in Pahranagat Valley. Critical habitat also includes the adjacent riparian areas immediately surrounding the pool and outflow, which provides vegetative cover that contributes to the uniform water conditions preferred by the springfish and provides habitat for insects and other invertebrates that constitute a substantial portion of the springfish's diet. The most critical elements to survival of the springfish is the consistent quality and quantity of springflows. Critical habitat encompasses a total of 12 acres at Ash Springs, of which most (11.9 acres) occurs on private land. The remaining 0.1 acre is located on land administered by BLM.

Water conditions (pH, conductivity, dissolved oxygen, and temperature) are within normal range suitable for the springfish, and show no sign of degradation (Tuttle and Weimeyer 1999). Several metals of concern were present in Ash Springs, mostly elevated in the sediments but also present in algae, fish tissue, invertebrates, and water. Arsenic and selenium were detected in concentrations that have been determined to cause effects to sensitive organisms in the laboratory, and mercury was in concentrations that have been shown to affect a broad range of invertebrates. Tuttle and Weimeyer (1999) suggest that selenium and arsenic, were likely to have originated from ground water, and although mercury has a complex cycle, it may have also originated from ground water. If these metals were derived from ground water, then it may be that they are background conditions to which the fish and invertebrates are adapted. However, modern concentrations are likely higher than they were historically.

One key factor that may be affecting the critical habitat is the impoundment of water which entraps sediment and greatly increases the amount of silt in the system. Presumed historic conditions of the spring outflow considered silt as a minor substrate component; however, siltation dominates under current conditions, providing a potential for additional contaminants accumulation and a base for bioaccumulation. Additionally, pedestrian traffic and swimming enhances bank erosion, which may mobilize additional sediment with associated metals into the aquatic environment.

Other effects to critical habitat include the introduction of foreign substances to the springpool, which generally flows downstream and has the potential to accumulate in the pool. The introductions range from illegal activities such as the pouring and ignition of diesel fuel in the spring to the use of soaps in bathing or washing. Substances such as soap often contain musks (fragrances) that may cause endocrine disruption in fish. The effects of introducing foreign substances into springfish habitat have not been determined.

4. *Pahrump Poolfish*

a. Status of the Pahrump Poolfish in the Action Area

The Pahrump poolfish currently occurs in three locations: (1) Corn Creek Spring refugium on the Desert NWR in Clark County, Nevada; (2) Spring Mountain Ranch State Park in Clark County, Nevada; and (3) Shoshone Ponds Natural Area in White Pine County, Nevada. Shoshone Ponds is the only site that occurs within the planning area for the RMP.

Since the poolfish no longer occurs in its natural habitat, recovery objectives focus on protection and management of poolfish in their transplanted habitats. Shoshone Ponds is a series of three small excavated ponds fed by artesian well flows, one large spring-fed stock pool, and one artesian well outflow in pinyon/juniper habitat located approximately 38 miles southeast of Ely in White Pine County, Nevada. The small pools (north, middle, and south) are currently in disrepair, and issue a sheet flow of water that merges with the spring flow. The three small pools are fenced to exclude livestock. Water rights are held by NDOW. The north and middle pools contain poolfish while the south pool contains relict dace (*Relictus solitarius*). The stock pond and spring outflows also contain poolfish. The stock pond and spring outflows are not fenced to exclude livestock. Water rights to the spring outflows are held by BLM. The population experiences natural fluctuations but has been stable overall since the 1980s. Surveys conducted in 2006 (NDOW 2007) estimated a population size of approximately 6,700 individuals. Water chemistry characteristics of the spring outflow are unknown. Table 13 shows water quality characteristics of the Shoshone Ponds. Poolfish are also occasionally found in the artesian well outflow.

Table 13. Select water chemistry and population estimates of Pahrump poolfish at Shoshone Ponds, White Pine County, Nevada, August 2005

Location	Dissolved Oxygen (mg/L)	Temperature (C)
North Pond	5.67	26.5
Middle Pond	2.77	23.9
Stock Pond	7.98	21.0

The vegetation surrounding Shoshone Ponds consists of swamp cedar (q unique ecotype of rocky mountain juniper). There are two main gravel roads that lead to the ponds and several two-track trails in the area. Camping occurs in the area, mainly during hunting season, because swamp cedars provide shade and the ground is flat.

Shoshone Ponds is located within the 17,322-acre Scotty Meadows livestock grazing allotment. The allotment is grazed from June 1 to September 30 at an assigned use level of 1,227 AUMs. This allotment has not yet been evaluated for meeting rangeland health standards. However, the small ponds are fenced to keep livestock out of the immediate vicinity of the habitat. The stock pond, which is not fenced, sustains the greatest intensity of livestock grazing. This pool appears to support the best poolfish habitat. Grazing of emergent vegetation by cattle eliminates habitat for ambush predators such as dragonflies, and also opens the habitat to solar radiation that encourages primary productivity and increased fish growth. The small ponds were overgrown with aquatic vegetation, and in 2005 fish appeared to be in poor condition, likely due to energy constraints. A fifth pond is proposed to be developed using the spring outflow, which would consist of two sections, one available to cattle and the other to some extent unavailable (permanent closure to seasonal use). Additional studies are needed to identify optimal management of poolfish habitat, and must consider other potential impacts of livestock grazing, such as increased erosion.

b. Factors Affecting the Pahrump Poolfish in the Action Area

Vegetation

Based on casual observation, it appears that overgrowth of wetland vegetation inhibits poolfish condition and abundance. This is evident at the small pools which are fenced to exclude cattle. These ponds are currently undergoing encroachment by rushes. The current artificial environment of the Pahrump poolfish and Shoshone Ponds may benefit from modifications to the area that would promote more open habitat.

Irrigation Runoff

The pools at Shoshone Ponds are located downstream of the pasture, and are impacted to various degrees by irrigation runoff. The scope of the effect is unknown, but obvious

problems related to runoff are not evident. Given the density of wetland vegetation surrounding the small pools, runoff is likely not an issue.

Livestock Grazing

The stock pond is exposed to livestock grazing and poolfish in the pond most likely experience effects from substrate disturbance and trampling. Grazing in the area may also lead to increased sediment input to the pond. However, grazing also keeps vegetation from overtaking the pond, providing a benefit to the poolfish.

5. Southwestern Willow Flycatcher

a. Status of the Southwestern Willow Flycatcher in the Action Area

The Meadow Valley Wash extends 110 miles in a general north-to-south direction from its northern origin in the Wilson Creek Range of eastern Lincoln County to its confluence with the Muddy River in Clark County. The drainage originates within the Great Basin physiographic region, but enters the Mojave Desert approximately 30 miles south in the vicinity of Elgin. Approximately 70 miles of the wash are located in Lincoln County.

The Meadow Valley Wash is an intermittently flowing stream. Stream flows are perennial from Caliente south to about Elgin (the stretch of the stream known as Rainbow Canyon), at which point flows become intermittent depending on where the bedrock interfaces with the alluvium. During the hot summer months, surface water flows may dry up in certain reaches of the stream.

The majority of land in Lincoln County is public land managed by BLM. Overall, approximately 97 percent of the land is in public ownership and 3 percent is privately owned. However, private lands tend to be concentrated within the Meadow Valley Wash floodplain where surface and shallow ground water are more accessible and available. Hence, approximately 25 percent of the land along the wash is in non-Federal ownership and 75 percent is administered by BLM.

Woody riparian vegetation along Meadow Valley Wash and Clover Creek is comprised of a mix of species such as cottonwood, willow, ash, and salt cedar. An ecological assessment of the Meadow Valley Wash was conducted by BioWest in 2003 (BioWest 2005a). As part of the assessment, riparian vegetation types were described and delineated along the wash for the purpose of defining, locating, and quantifying suitable and potentially suitable habitat for the southwestern willow flycatcher. The study identified 12 woody riparian vegetation types comprising approximately 1,430 acres in Lincoln County. Salt cedar-dominated types comprised 54 percent (670 acres) of the total woody riparian vegetation, with the balance dominated by native vegetation (760 acres). Overall, the majority of woody riparian vegetation in Rainbow Canyon is native-dominated, while most of the salt cedar-dominated vegetation occurs from just

north of Lyman Crossing to south of Vigo, and in the vicinity of Rox near the Lincoln/Clark County line.

Of the 1,400 acres of woody riparian vegetation that occurs in Lincoln County, BioWest (2005a) defined approximately 575 acres of suitable flycatcher breeding habitat and 560 acres of potentially suitable breeding habitat. The primary components of suitable breeding habitat were defined as: (1) a stand, or patch size, of 0.25 acre or greater; (2) a vegetation width of more than 30 feet; (3) a dense canopy; (4) dense interior vegetation from ground level up to about 15 feet or dense patches interspersed with openings; and (5) surface water or saturated soils present within the stand or within 125 feet of the stand. Approximately 60 percent (350 acres) of the suitable habitat in Lincoln County is dominated by salt cedar, while 40 percent is predominantly native vegetation.

Southwestern willow flycatchers have been detected infrequently along the Meadow Valley Wash. Surveys have detected flycatchers in or adjacent to areas where the vegetation was defined as suitable breeding habitat (BioWest 2005a). Flycatchers have been observed just north of the south Highway 93 bridge in Caliente (as described in BioWest 2005a), in Rainbow Canyon (San Bernardino County Museum 1999, 2001), and in the vicinity of Rox (NDOW 2003). Breeding was detected in Rainbow Canyon in 1998 (San Bernardino County Museum 1999). The most recent observation was made by NDOW in 2002 (NDOW 2003). Long-term flycatcher surveys have not been conducted consistently in the wash; therefore, current information on flycatcher presence in the wash is lacking.

For the most part, the floodplain of the Meadow Valley Wash is narrow, and the gradient is steep enough to produce flash floods during heavy rains that strip the vegetation and change the location of the main channel. Sediment flows are also very heavy in this drainage. In January of 2005, the Meadow Valley Wash experienced a 100-year flood event that scoured the floodplain, removing much of the habitat for flycatchers. BioWest (2005b) estimated that approximately 50 percent of the suitable flycatcher habitat in the wash was stripped by the flood. The vegetation is expected to resprout and the habitat will likely recover.

The Union Pacific Railroad (UPRR) operates a railroad line along Clover Creek and the Meadow Valley Wash. During the 2005 flood, the track was damaged and UPRR initiated unauthorized construction activities to repair the track and prevent future flooding from damaging the railroad line. Their emergency work resulted in additional damage to riparian vegetation, the stream channel, and the floodplain. UPRR is currently negotiating with the Environmental Protection Agency on a settlement agreement that will address UPRR's unauthorized activities, and will likely include requirements for riparian habitat restoration.

The stretch of the wash that flows through Caliente historically supported vegetation considered suitable for breeding flycatchers. The City periodically clears the vegetation

in an attempt to control flooding that occurs occasionally within the city. BioWest's ecological assessment of the wash (2005a) identified approximately 18 acres of flycatcher habitat within the city. Caliente is planning on implementing a flood control project and constructing a linear park through the city that will effectively reduce the potential of that stretch of the wash to support suitable flycatcher habitat in the future.

Clover Creek is a tributary to the Meadow Valley Wash, and flows from east to west to Caliente, where it joins the Meadow Valley Wash. Clover Creek is mostly dry, but perennially-flowing stretches occur in the vicinity of Big Spring, located approximately 13 miles east of Caliente. Thick riparian vegetation grows along the creek at this location. Although vegetation structure is characteristic of suitable flycatcher habitat, previous surveys conducted by NDOW have not detected flycatchers along Clover Creek.

One of Nevada's largest populations of flycatchers breeds in Pahranagat Valley on the Pahranagat NWR. They also breed in patches of coyote willow along the western edge of Nesbitt Lake on the Key Pittman Wildlife Management Area. Flycatchers have also been detected in clumps of coyote willow scattered throughout the Pahranagat Valley on private lands, but survey data is lacking due to access limitations. Although none of these sites occur on land administered by BLM, they are surrounded by BLM land and are located in the vicinity of proposed land disposal areas.

b. Factors Affecting the Southwestern Willow Flycatcher in the Action Area

Invasive Species Control

BLM has been active in salt cedar control in the Meadow Valley Wash since at least 1999. Prior to 2004, BLM treated salt cedar within a 2,667-acre area. Since 2004, BLM has removed approximately 15 acres of salt cedar along the wash, none of which was considered suitable flycatcher habitat.

Wild Horse Management

Under BLM's Caliente Management Framework Plan, five HMAs for wild horses overlap with the Meadow Valley Wash and Clover Creek areas. These five HMAs covered approximately 563,755 acres, with a combined Appropriate Management Level (AML) of 54 to 115 animals. Under the RMP, these HMAs will be closed and animals will be removed.

Utility, Road, and Railroad Rights-of-Way

State Highway 317 runs from Caliente south along the edge of the Meadow Valley Wash to Elgin, then veers west to join with US 93. NDOT has removed vegetation in the wash to allow for road maintenance and repair activities and to protect bridge integrity. Suitable flycatcher habitat was removed by NDOT in the late 1990s just south of the

US 93 bridge on the southern edge of Caliente. UPRR removes vegetation in the riparian area and manipulates the stream channel to protect the integrity of the railroad line. Other utility lines may be constructed through Rainbow Canyon along the wash requiring vegetation removal.

OHV and Recreational Management

Currently, the Ely District is open to OHV cross-country travel. BLM also authorizes OHV races that cross the Meadow Valley Wash and run adjacent to Clover Creek. BLM permits on average four OHV events per year in this area. In most instances, these events utilize portions of the Clover Creek and Meadow Valley Wash as part of the permitted event. In most years, this includes one motorcycle race, two motorcycle group rides, and one truck race. All of these events start and stage on private land in Caliente, typically running down the wash through the city, and veering off onto adjacent upland areas on BLM land just south of the US 93 bridge south of the city. Approximately 521 people participate in these events in a year, based on figures provided by BLM in post-use reports for 2007. Events begin in late March and continue through the summer and fall season, with the last event usually occurring in late September. BioWest (2005a) noted that stresses to the riparian area from OHV use along the wash were evident, but did not clarify the nature of the impact (crushing of vegetation, erosion of the stream channel, etc.). It is not known to what extent this disturbance is caused by casual use or organized events.

Livestock Grazing

Table 7 lists the livestock grazing allotments that overlap with flycatcher habitat along the Meadow Valley Wash. Data for evaluating rangeland health standards have been collected for the Cottonwood, Henrie Complex, and Schlarman allotments; however, the outcome of the evaluation is yet to be determined. BLM will evaluate the other nine allotments within the next two years to determine if they are meeting or making progress toward achieving rangeland health standards. BioWest (2005a) noted that grazing was a stressor in several stands of suitable and potentially suitable flycatcher habitat. Grazing may reduce understory cover and density, but the extent to which livestock grazing is currently affecting understory density of riparian vegetation along the Meadow Valley Wash is unknown.

Minerals Extraction

There are currently no existing effects to flycatcher habitat along the Meadow Valley Wash from BLM-authorized mineral materials pits. However, indirect effects from the construction of access roads for existing mining operations may occur. An existing gypsum mine located adjacent to the wash in upland habitat is currently proposing to construct an access road that would cross the wash, which would result in the removal of flycatcher habitat.

Fire and Fire Management

Small fires are occasionally started from sparks emitted during track cleaning by the UPRR. The extent that these fires have affected riparian vegetation along the Meadow Valley Wash is unknown. In addition, one of the many wildfires that burned in southern Nevada during 2005 spread to the Meadow Valley Wash and burned approximately 10 acres of riparian habitat. Most of the riparian habitat was not burned by fire due in part to fire suppression efforts, which limited the loss of vegetation to a few cottonwood trees. A fire in 2003 near Carp burned 62 acres of riparian habitat, most of which was salt cedar.

Hydrological Factors

The Meadow Valley Wash and Clover Creek have been subject to major modifications to the hydrological regime since the late 1800s, when farming and the railroad came to the valley. Prior to human settlement, the stream channel was multi-braided and formed a broader floodplain. The drainage experiences naturally high sediment loads carried down into Clover Creek and Meadow Valley Wash from the many tributaries that connect with these streams. These sediments accumulate in areas where water flow is slower or backs up at points of constriction such as bridge crossings and culverts. The stream channel has been dredged in several locations to confine flows to one main channel and to remove sediment accumulation. Construction of the railroad tracks, railroad access roads, and state and county roads along the wash also constricted the floodplain, which increases flow velocities and the potential for erosion to occur. After the January 2005 flood, UPRR constructed a series of levees throughout the Meadow Valley Wash drainage to divert future flood flows from their right-of-way. In many areas these levees reduced the channel flood capacity and created potential sediment or flood hazards to downstream habitat, water quality, and infrastructure such as bridges and roads.

F. Effects of the Action

Direct effects encompass the immediate, often obvious effect of the proposed action on the listed species or its habitat. Indirect effects are caused by, or result from the proposed action, are later in time, and are reasonably certain to occur. In contrast to direct effects, indirect effects are more subtle, and may affect species populations and habitat quality over an extended period of time, long after surface-disturbing activities have been completed. Indirect effects are of particular concern for long-lived species such as the desert tortoise because project-related effects may not become evident in individuals or populations until years later.

1. Desert Tortoise and its Critical Habitat

General Effects. Capture and handling of desert tortoises, particularly if performed improperly, may result in adverse effects to tortoises. Blythe *et al.* (2003) found that Sonoran desert tortoises moved out of harm's way a distance less than 0.5 mile and

returned to their home ranges within a few days. Unless movement barriers are in place, tortoises moved a distance of less than 0.5 mile out of harm's way are likely to return to potentially harmful conditions. Tortoises may die or become injured by capture and relocation if done improperly, particularly during extreme temperatures, or if they void their bladders. Averill-Murray (2001) determined that tortoises that voided their bladders during handling had significantly lower overall survival rates (0.81-0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists/ monitors without protective measures including unused latex gloves, pathogens may be spread among the tortoises.

Perhaps the most important general threat to tortoise populations relates to actual human presence in tortoise habitat and thus refers primarily to access (Boarman 2002a). Human activities in the planning area potentially provide food in the form of trash and litter, or water, which attract tortoise predators such as the common raven, kit fox, and coyote (Berry 1985; BLM 1990). Some forms of trash may be ingested by tortoises or they may become entangled resulting in their injury or death. If fuel or other hazardous materials are spilled in desert tortoise habitat, desert tortoises and their habitat may be adversely affected as a result. Natural predation in undisturbed, healthy ecosystems is generally not an issue of concern. However, predation rates may be altered when natural habitats are disturbed or modified. Common raven populations in some areas of the Mojave Desert have increased 1500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002b). Since ravens were scarce in this area prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (BLM 1990). In addition to ravens, dogs have emerged as significant predators of the tortoise particularly near residential development. Dogs may range several miles into the desert and have been found digging up and killing desert tortoises (Service 1994, Evans 2001). Dogs brought into the planning area with visitors may harass, injure, or kill desert tortoises, particularly if allowed off leash to free-roam in occupied desert tortoise habitat.

Habitat loss, degradation, and fragmentation that result from the myriad activities that take place in the desert are among the most pervasive problems for desert tortoise populations and are among the most difficult to evaluate (Boarman 2002a). BLM programs in this biological opinion that are anticipated to result in the most habitat impacts include lands, realty, and renewable energy; geology and mineral extraction; and livestock grazing. 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 such as Barstow, Mojave, and Victorville (Berry and Nicholson 1984, Feldmeth and Clements 1990, Tierra Madre Consultants 1991, Service 1994).

a. Effects of Vegetation and Weed Management

BLM estimates that a maximum of 36,752 acres of critical habitat and 72,429 acres of non-critical habitat may be affected by these two programs (Table 3; BLM 2008). Overall, the desert tortoise is likely to benefit from activities implemented under this program by restoring the native plant communities, thus improving habitat conditions. Acreage of disturbance that may result from implementation of vegetation management activities is based on the assumption that all of the desert tortoise habitat (critical and non-critical) is in the Mojave Desert vegetation community; a maximum of 15 percent of the Mojave Desert vegetation community will be treated or maintained; and treated areas are uniformly distributed across the planning area.

In addition to habitat impacts, individual desert tortoises could be killed, injured, or harassed by program activities which include:

- encounters with project vehicles and equipment;
- capturing and relocating from harm's way;
- improper handling;
- exposure to herbicides;
- burrows crushed by project vehicles and/or equipment; and
- disruption of behavior including foraging, breeding, and sheltering.

Actions may involve use of heavy equipment, all-terrain vehicles (ATVs), or hand-tools and include recontouring, ripping of soil, ground watering, broadcast seeding, use of water trucks for dust abatement, and vegetation planting. The behavior of individual tortoises including foraging, breeding, and sheltering may be temporarily disrupted as a result of project activities. Weeds and invasive non-native plants may become established as a result of transport into project areas by vehicles and equipment. Animals used by permittees or contractors may also facilitate establishment of weeds and non-native plants.

Use of vehicles and heavy equipment may increase the risk of injury or mortality of individuals, short-term displacement/noise during the project, short-term loss of vegetation (though unlikely), and temporary ground disturbance. Many potential effects of habitat restoration are the same as, or similar to, other surface-disturbing activities identified below. Activities associated with weed treatments that may affect the desert tortoise include application of herbicides; clearing or cutting vegetation by hand or with machinery; and use of ATVs on disturbed areas for site access. Effects to the desert tortoise include: unintentional removal/destruction of plants used by tortoises for forage or shelter; soil compaction; alteration of local microclimate through vegetation removal; and harassment, injury or mortality of tortoises as a result of vehicle or machinery operation.

Although some adverse effects are anticipated, most effects to the desert tortoise that would occur under these two programs will be beneficial to the species. These effects

include long-term improvement of plant species diversity (including food sources); long-term reduction in erosion; long-term increased habitat quality; increased tortoise abundance and distribution through habitat enhancement; decreased potential for future alien plant invasions; and decreased wildfire potential.

The desert tortoise may be affected by weed management activities which are approximately the same as those identified above for vegetation management. BLM did not provide an estimate of anticipated disturbance of tortoise habitat that may result from this program due to the uncertainty associated with funding and scope of potential projects. Site-specific effects of weed management activities would be identified when such actions are proposed and developed by appropriate agencies. At that time, BLM will submit the appropriate documents to the Service to append the action to this biological opinion. Any vegetation and weed treatment in desert tortoise habitat will be conducted only after coordination/consultation with the Service.

b. Effects of Lands, Realty, and Renewable Energy Actions

Disposal. BLM may dispose of up to 4,870 acres of non-critical desert tortoise habitat during the life of the RMP. BLM does not propose to dispose of any critical habitat.

Although this biological opinion evaluates only the effects to the desert tortoise that may result from the transfer of BLM-administered land out of Federal ownership, the direct and indirect effects to the species that may occur after transfer would be evaluated under section 10 of the Act. Similarly, the subsequent take of tortoises and loss or disturbance of their habitat following transfer from public administration to private ownership, may be authorized by the Service through an incidental take permit under section 10(a)(1)(B) of the Act, following development of an HCP by the landowner. Lands transferred out of Federal administration would likely no longer benefit from conservation mandates of Federal agencies under section 7 of the Act.

The transfer of BLM land out of Federal administration may result in development for commercial purposes, residential housing, local government projects, or other actions. Once lands are transferred out of BLM administration, impacts that result from future non-Federal actions on these lands may be considered as cumulative effects, which are identified in that section of this opinion.

Based on desert tortoise abundance estimates of 20 tortoises per square mile, we anticipate that approximately 152 desert tortoises may occur on the 4,870 acres of disposal lands. If not located and removed, tortoises that occur on the properties could be killed by development or surface-disturbing activities. Tortoises that occur on disposal lands would be taken by capture and relocated from harm's way. Additional harassment of tortoises adjacent to the properties may occur as a result of increased levels of noise and ground vibrations produced by blasting, vehicles, and heavy equipment (Bondello 1976; Bondello, *et al.* 1979). Desert tortoises from adjacent parcels may move onto

disposal lands if no barrier exists to exclude them from project areas. As development proceeds, public use and impacts in adjacent areas are anticipated to increase. These uses include increases in recreation, vandalism, dogs, illegal trash dumping, and illegal collection of desert tortoise.

Land Use Authorizations. The Lincoln County Conservation, Recreation, and Development Act provides for a maximum of 15,000 acres available for R&PP Act actions throughout the entire County. Rights-of-way will be situated in corridors within the planning area. An unquantified portion of designated utility corridors have been disturbed. BLM estimates that two communication towers may be approved and constructed outside critical habitat requiring an estimated 10 acres each during the life of the RMP.

Activities that follow land use authorizations threaten desert tortoises in the project area including access roads. Tortoises may fall into trenches or other excavations that remain open. Vehicles and equipment may stray from existing roads or designated areas and kill or injure tortoises, or crush their burrows. Rights-of-way may provide new access into tortoise habitat for the public resulting in all the effects associated with increased human presence. Project vehicles may travel at excessive speeds, preventing the operator from seeing desert tortoises in time to avoid them. Tortoises may take shelter under parked vehicles and be killed, injured, or harassed when the vehicle is moved.

Failure to report tortoise injuries and mortalities may result in additional take of tortoises if measures are not implemented to address the cause of such take. If BLM is not notified in advance of the project, proper oversight may not occur. If tortoise-proof fencing is installed, over time breaches may occur, thus allowing tortoises to pass through the barrier and be in harm's way. Temporary fencing left in place following the action or threat to tortoises in the area may contribute towards habitat fragmentation. Materials and equipment left behind following a project or action may be ingested by tortoises, entrap or entangle tortoises, attract desert tortoise predators such as common ravens and coyotes, or provide shelter for tortoises which when removed may result in displacement or injury of the tortoise.

Utility and energy rights-of-way cause linear impacts to tortoise populations and may have levels of impacts well beyond those of many point sources of impacts (Boarman 2002a). In a retrospective evaluation of results of 234 biological opinions in California and Nevada (LaRue and Dougherty 1999), 80 percent (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 provide public access to less disturbed habitat (Brum *et al.* 1983).

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 (Boarman 2002b). By one estimate, ravens probably do most (75 percent) of their foraging within one-quarter mile 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 one-half mile, may significantly reduce juvenile tortoise populations within one-quarter mile of the corridor, but this effect is quite localized.

Linear construction projects can negatively affect desert populations. Studies suggest that differences in the extent of the threat are related to the scale of the project, the ability of crews to avoid disturbing burrows, and timing of construction to avoid peak activity periods of tortoises (Boarman 2002a). In addition to the discrete disturbance points formed by towers and lines, maintenance roads and repeated operations can (1) introduce continuous sources of disturbance and (2) provide potential sites for invasion of exotic species. Rights-of-way can cause habitat destruction and alteration where vegetation is minimal, possibly increasing mortality, directly or indirectly (Boarman 2002a).

The greatest potential threat to desert tortoises resulting from land and realty actions is from vehicles and heavy equipment activity on new and existing access roads. Roads provide direct invasion routes and habitat generation for invasive weedy plants. Tortoises could also be killed or injured as a result of being crushed by worker vehicles commuting to and from the project area. Tortoises in harm's way and not re-located before project activities commence, or not avoided by vehicles, could also be killed or injured. Any tortoise on an access road during project hours would be highly vulnerable. If vehicles travel at excessive speeds on access roads they may inadvertently run over desert tortoises. Project vehicles or equipment that stray from designated areas or widen existing access roads may crush desert tortoises aboveground or in their burrows or damage habitat outside the project area. Tortoises could wander into the construction work area or take refuge underneath project vehicles and equipment, and be killed or injured when the vehicle/equipment is moved.

Habitat disturbance caused by project vehicles and equipment often result in damage to desert soils which are protected by fragile organic or inorganic crusts. The organic crust can be the result of various microflora such as algae, lichen, and fungi, which form cryptobiotic crusts or macroflora consisting of the remnants of fibrous root material from dead annual plants (Cooke and Warren 1973; Went and Stark 1968). The inorganic crust can be comprised of desert pavement, silt/clay, or chemicals. All of these crusts help

prevent erosion, and may increase infiltration and retard evaporation (Epstein *et al.* 1966).

Mechanical disturbance of desert soils may cause: (1) changes in annual and perennial plant production and species composition including introduction of non-native plants, including noxious weeds, or increases in the area of distribution of weeds; (2) outright soil loss due to increased rates of water and wind erosion; (3) reduced soil moisture; (4) reduced infiltration rates; (5) changes in soil thermal regime; and (6) compaction or an increase in surface strength (Adams, *et al.* 1982; Biosystems 1991; Burge 1983; Bury 1978; Bury and Luckenbach 1983 and 1986; Davidson and Fox 1974; Hinkley *et al.* 1983; Nakata 1983; Vollmer *et al.* 1976; Webb 1983; Wilshire 1977 and 1979; Wilshire and Nakata 1976; Woodman 1983). When the soil surface is exposed by vehicular activity (e.g., OHVs), the thermal insulation provided by the vegetative cover is decreased, which results in increased daytime temperatures. Higher temperatures decrease the soil moisture, which causes soil temperature to increase further because less heat is required to vaporize the water present. Revegetation is inhibited as a result of these processes (Webb *et al.* 1978).

Following construction, the public may use project access roads which may result in adverse effects to tortoise populations. Humans use the desert for off-road exploration, casual shooting and target practice, personal or commercial collection of animals and plants, searches and digging for minerals and gems, geocaching (GPS guided stash hunts), and even the production of illegal drugs. Desert tortoise shells found in the Mojave Desert with bullet holes were examined forensically and it was determined that these tortoises were alive when they were shot (Berry 1986). Project personnel could illegally collect tortoises for pets or bring dogs to the project area.

Project activities may provide food in the form of trash and litter which attracts important tortoise predators such as the common raven, kit fox, and coyote (BLM 1990, Boarman and Berry 1995). The majority of raven predation occurs during the spring and is most likely accomplished by breeding birds (Boarman 2002b). Ravens use transmission towers as well as other anthropogenic structures as nest sites which threaten small tortoises in the area surrounding the nest site (Boarman 2002b). During the raven breeding season, most foraging is probably done near the nest (Sherman 1993) and most food is likely brought back to or near the nest.

Rights-of-way would be situated in corridors within the planning area. An unquantified portion of the designated utility corridors have been disturbed. BLM estimates that two communication towers may be approved and constructed outside critical habitat requiring an estimated 10 acres each during the life of the RMP.

c. Effects of Travel and OHV Management

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 2002a). Continued use of existing roads may result in habitat fragmentation; increased opportunities for collection or vandalism; introduction of alien plants and exotic animals; injury or mortality as a result of encounters with visitors' pets; and illegal release of pet tortoises including exotic species.

Road kills and litter from vehicles and trail users may attract subsidized tortoise predators. Census data indicate that desert tortoise numbers decline as vehicle use increases (Bury *et al.* 1977) and that tortoise sign increases with increased distance from roads (Nicholson 1978). Tortoises often use roads which have depressions as drinking sites. Vehicular activity on unpaved roads following rains may preclude tortoises from drinking water, which may be available for only brief periods. Tortoises that move or occur in the paths of recreational vehicles may be killed or injured (Bury and Luckenbach 2002, Nicholson 1978), or collected as pets or food (Berry *et al.* 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 (Kristan *et al.* 2004)

Other potential effects of these activities may include mortality, injury or harassment of individuals as a result of vehicle encounters including disruption of behavior during road construction, grading/paving/graveling, maintenance, and use of trails and roads.

BLM estimates that an impact area exists alongside roads which involve 148,160 acres in desert tortoise critical habitat and 165,120 of non-critical habitat. These acreage estimates are based upon BLM inventory data recently completed which identified 516 miles of roads in non-critical habitat and 463 miles of roads in critical habitat. BLM determined that a zone of depression (*i.e.*, area where tortoise numbers have been reduced as a result of road mortality) may exist along roads that extend one-quarter mile on each side (Nicholson 1978, Berry and Turner 1987, Berry *et al.* 1990, Boarman and Sazaki 1996, von Seckendorff Hoff and Marlow 1997). The area of impact was determined by the length of the road/trail and a total width of one-half mile (Boarman *et al.* 1997). Generally, the actual impact of a road on desert tortoise populations depends upon traffic speed and volume, density and demography of surrounding tortoise population, and perhaps width and age of road (Boarman 2002a). The cause of this depression is likely road kills, but illegal collections, noise, and other factors may also contribute. There are no data to determine precise estimates of road effects.

d. Effects of Recreation

Recreation activities likely to occur within the planning area include OHV use, hiking, mountain biking, equestrian use, rock-climbing, dog exercise, hunting, nature study and

sight-seeing, and dispersed camping. Boarman (2002a) determined that there were no known studies concerning the impacts of these activities on desert tortoise populations; however, there are likely impacts which include: Illegal handling and disturbance of tortoises by the public; loss of habitat through development of trails and other recreational infrastructure; introduction and spread of alien plants by visitors and horses; vandalism; road kills by vehicles operated by recreationists; desert tortoise harassment, injury, or mortality by dogs if not controlled; trampling of desert tortoises and their burrows as a result of cross-country equestrian activities; and increases in raven populations attracted by human presence and trash. Further, the potential increase in trash may result in injury or mortality of desert tortoises if ingested or if the tortoise becomes entangled.

Additional unauthorized impacts that may occur from casual use include unauthorized trail creation; illegal shooting; and administrative/law enforcement activities which may occur off existing roads, trails or other disturbed areas; and illegal OHV activities. Mountain bikes that stray off designated roads and trails, and cross-county equestrian activities will likely cause habitat damage and create new trails that may subsequently be used by recreationists. Vegetation and cryptobiotic crusts may be damaged from off-trail travel by mountain bikes, horses, and hikers. Hiking off of trails can significantly damage cryptobiotic crusts (Belnap 1996).

Actions proposed by BLM for OHV events may result in additional habitat disturbance beyond existing baseline conditions from uncontrolled disturbance by event vehicles that stray off the course. In addition to habitat disturbance, vehicles that stray off existing roads and trails may collapse occupied burrows, crushing nests and burying the occupants (Burge 1983, Bury 1978 and 1980, Bury and Marlow 1973). Effects to tortoise may occur as a result of permitted events that violate stipulations imposed by BLM. Historically, event spectators have been difficult to control at many OHV events which has resulted in substantial environmental and habitat damage (Burge 1983). OHVs, operated by spectators of an organized event, may enter unauthorized areas or travel cross-country to observe a race, causing adverse effects on individual desert tortoises or their habitat (Burge 1983, Woodman 1983). Unauthorized route proliferation, crushing of shrubs, and wind erosion resulting from vehicle disturbance contribute to habitat degradation and loss. NDOW has documented that an unauthorized trail became incorporated into an OHV event course near Johnnie, Nevada (NDOW 2002).

Studies have shown that in areas of moderate to intensive OHV use, the number of perennial shrubs, as well as tortoise reproduction and body mass, are reduced (Biosystems Analysis 1991, Bury and Luckenbach 1986, Bury 1987). OHV activities reduce floral diversity and forage species availability for tortoises (Medica, *et al.* 1976, Webb, *et al.* 1978).

Bury (1987) demonstrated that desert tortoise densities and health deteriorated as a result of off-road vehicle activities when contrasted to populations from appropriately

controlled areas. OHV impacts to the soils and vegetation of desert ecosystems that support the desert tortoise are well documented and may affect tortoise populations and habitat quality over a long period of time. Many of these effects are similar to habitat disturbance associated with activities involving construction (*e.g.,* projects within rights-of-way).

Census data indicate that desert tortoise numbers decline as OHV use increases (Bury, *et al.* 1977), and that tortoise sign increases with increased distance from roads (Nicholson 1978). Tortoises often use roads which have depressions as drinking sites. Vehicular activity on unpaved roads following rains may preclude tortoises from drinking water, which may be available for only brief periods. Tortoises that move or occur in the paths of recreational vehicles may be killed or injured (Bury 1978, Bury and Luckenbach 1986, Luckenbach 1975, Nicholson, 1978), or collected as pets.

Noise levels produced by OHVs may alter tortoise behavior (potentially affecting foraging and other activities) or cause hearing loss, but these effects are difficult to assess and are not well documented. Noise from OHVs has the potential to disrupt communication and mask the sounds of approaching predators (Service 1994). Brattstrom and Bondello (1983) stated that the best available scientific data indicate that acoustical impacts of recreation vehicles pose a threat to the well-being of desert vertebrates, and that the problem is not just the abilities of specific sounds to carry into desert regions, but the abilities of specific sound sources to penetrate deep into these regions. Bondello (1976) reported that reptile hearing can be damaged by exposure at close range by impulsive noise from recreation vehicles. More recently, Bowles, *et al.* (1997) found that no significant temporary threshold shift, or temporary change in auditory sensitivity, was detected even in the most acoustically sensitive tortoises after a worse case scenario exposure to subsonic aircraft noise. Some tortoises did, however, prove to have relatively sensitive hearing at summer temperatures.

The effects of OHV activity on arid lands continue long after the event if some physical property of the soil is altered. Loosened soils blown off the surface can collect at the bases of shrubs or accumulate in nearby foothills, resulting in small dunes. Finer pulverized soils require lower threshold wind velocities for transportation than coarser pulverized soils having higher fine-clay content. Alluvial fans, bajadas, and desert flats with sandy soils, which have very low moisture content and are devoid of vegetation, are most affected by wind erosion following disturbance by OHVs (Gillette and Adams 1983). Recovery of Mojave desert vegetation and soils may require 30 to 100 years or more following OHV activity (Lathrop 1983). Dust may be deposited on vegetation along the course. Gibson, *et al.* (1998) found that heavy dust does not kill creosote bush; however, net photosynthesis may be reduced and leaf temperature substantially increased. Continued use of existing event courses may preclude natural revegetation of these disturbed areas. Course widening and rut formation are other physical effects of OHV activity.

Jennings (1993) found that 3 of the 10 most preferred tortoise forage plants, *Euphorbia albomarginata*, *Astragalus layneae*, and *Camissonia boothii*, were largely confined to washes. The tortoises in this study spent significantly more time traveling and foraging in hills, washes, and washlets than on the flats, the same areas preferred by recreational vehicle users. In the southern, eastern, and northeastern Mojave and the Sonoran deserts, washes are also important in the ecology and behavior of desert tortoises (Woodbury and Hardy 1948; Burge 1978; Baxter 1988). The tortoises use the washes for travel, excavation of burrows or dens, and for feeding. Because tortoises spend so much more time in washes and hills, they are also more likely to suffer direct mortality from vehicles than if they used the habitat randomly.

e. Effects of Livestock Grazing

The full range of grazing effects may never be thoroughly understood and is much more diverse and complex than a simple enumeration of individual impacts (Donahue 1999), or lack thereof. Livestock trample tortoises, crush their burrows, and reduce the vegetation on which tortoises depend for food, protection from predators, thermoregulation, and intraspecific behavioral interactions. Avery and Neibergs (1997) have observed tortoise burrows that were partially or completely destroyed by cattle trampling. They saw tortoises trying unsuccessfully to enter completely destroyed burrows. Grazing can alter the environment by compacting soils, depositing urine and feces and trampling vegetation. Once altered, upland vegetation communities appear to change or improve only gradually. When management is directed at improving upland vegetation associations improvements have occurred in as little as 20 years, but areas not receiving much precipitation (*i.e.,* less than 12 inches of annual precipitation) generally have not improved (U.S. Department of Interior [USDOI] 1994). Wagner (1994) observed that natural recovery from grazing in arid and semiarid areas was likely to be especially slow, sometimes requiring a century or more.

Ecological processes may take a long time to express themselves, and many depend on rare or unpredictable events on a particular site which may occur once every 20 years or so. Climate must be recognized as a confounding factor in research on the effects of grazing. Because long-term ecological changes caused by climate may mask or confound impacts due to grazing, research based on short-term studies may not effectively detect such changes or determine their causes (Donahue 1999). Thus, 3-5 year studies are limited in their effectiveness in quantifying changes (Noss and Cooperrider 1994).

Tracy *et al.* (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 years of low precipitation, cattle may remove enough forage to reduce tortoise reproductive output, thus competition occurs in those years.

Little is known about the long-term effects of livestock on animals other than ungulates. The desert tortoise is of particular concern. Livestock eat or trample the same plants that

tortoises feed upon. One tortoise eats far less plant forage in a year than a cow eats in a single day (Donahue 1999; Noss and Cooperrider 1994). In general, vegetation diversity decreases with grazing intensity, especially under continuous grazing pressure. Laylock (1994) cites a Nevada study in which 30 years of protection from grazing resulted in increased vegetal cover of all life forms.

Cattle introduce propagules of nonnative plants by bringing seed into an area either on their coats or in feces. Many nonnative plant species have established themselves in part due to environmental modifications by livestock and ranching practices. Although these plants take hold and spread simply because they out-compete native species, more often it is because livestock grazing has changed the environment in ways conducive to nonnatives' establishment and proliferation (Donahue 1999; Noss and Cooperrider 1994). Non-native plants such as red brome are usually well-adapted to grazing and invade overgrazed sites. Most range managers agree that moderate to heavy grazing over several years will usually change plant composition. Changing the plant species composition can substantially affect both erosion and rainwater infiltration (Noss and Cooperrider 1994).

In a study of 530 different rangeland sites in southern Utah, Gelbard (1999) found that cheatgrass (*Bromus tectorum*) cover was five times greater on sites without cryptobiotic soils (disturbed by either cattle or motorized use) than on sites with undisturbed crusts; 64 percent of all sites that were disturbed and lacking crusts were attributed to cattle grazing. Heavy grazing reduced crusts by 98.5 percent and light grazing reduced crusts by 52.3 percent at the Desert Experimental Range in southern Utah (Marble 1990). Creatgrass and other alien annual grasses provide the fine fuels that facilitate wildfires. Non-native plants such as cheatgrass are usually well-adapted to grazing and invade overgrazed sites. Changing the plant species composition can substantially affect both erosion and infiltration (Noss and Cooperrider 1994).

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. Avery 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 soil compaction) than in the protected area.

Environmental Impact Statements prepared by BLM between 1978 and 1989 indicate that removal of livestock from hot deserts would result in less soil erosion, increased water infiltration rates, and soils would generally improve. Vegetation would gain health and vigor, and cover would increase (U.S. GAO 1991).

Laylock (1994) cites a Nevada study in which 30 years of protection from grazing resulted in increased vegetation cover of all life forms. Other studies have documented

significantly greater native plant species richness in ungrazed areas compared to those that are grazed (Brady *et al.* 1989; Floyd-Hanna *et al.* 2000). Sixteen years following removal of livestock grazing from the Appleton-Whittell Research Ranch Sanctuary in New Mexico resulted in an increase in plant and animal diversity (Brady *et al.* 1989).

Numerous studies document the adverse effects on the cryptobiotic crusts of arid soils as a result of disturbance (Jones 2001, USDI 2001). Removal or damage of the cryptobiotic crusts may have adverse impacts on desert soils and nutrient cycling. Soil and plant characteristics of low- and mid-elevation arid and semi-arid ecosystems in North America west of the Rocky Mountains indicate that these ecosystems evolved with low levels of soil surface disturbance. Neff *et al.* (2005) found that many soils in southeastern Utah are protected from surface disturbance by biological soil crusts that stabilize soils and reduce erosion by wind and water. These cryptobiotic crusts are only prominent components of ecosystems where large-bodied herbivores have been absent from recent evolutionary history such as in the arid west. If grazing leads to disturbance of these soil crusts, regeneration typically requires decades for the recolonization of microbes and hundreds of years for a crust lichen community to form. Neff *et al.* compared never-grazed grassland in Canyonlands National Park with two historically grazed sites with similar geologic, geomorphic, and geochemical characteristics that were grazed from the late 1800s until 1974. Despite almost 30 years without livestock grazing, surface soils in the historically grazed sites have 38–43 percent less silt, as well as 14–51 percent less total elemental soil magnesium, sodium, potassium, and manganese content relative to soils never exposed to livestock disturbances.

Neff *et al.* (2005) also found that grazing may also lead to changes in soil organic matter content including declines of 60–70 percent in surface soil carbon and nitrogen relative to the never-grazed sites. This study further suggests that nutrient loss due to wind erosion of soils should be a consideration for management decisions related to the long-term sustainability of grazing operations in arid environments.

Livestock turned out onto the range during the period of peak growth and nutritional value of forage can have an opportunity to graze the most nutritious forage first, forcing wildlife to forage and survive in a habitat that has been degraded nutritionally. The total biomass present in tortoise habitat may have little relation to the amount of suitable desert tortoise forage available to the tortoise which has an extremely narrow and highly selective diet requirement. Generally, a reduced level of nutritional intake has been shown to affect growth rates in juvenile desert tortoises (Medica *et al.* 1975) and female reproductive output (Turner *et al.* 1986, 1987; Henen 1992). Fencing can prevent livestock from moving to better forage areas, resulting in higher frequencies and intensities of defoliation than would occur otherwise (Donahue 1999).

Hobbs and Huenneke (1992) report that increases in baseline nutrient status such as those resulting from input from livestock feces can exacerbate the likelihood of invasive weedy plants. Deposition of feces and urine by livestock can alter the baseline nutrient status of

ecosystems causing nutrient enrichment. For most arid western rangelands which have a naturally low nutrient status, this gradual enrichment is an important problem with important implications for the entire ecosystem. Nutrients are removed from the ecosystem when cattle are taken off the range (Donahue 1999).

Oftedal (2002) suggests that tortoises selectively forage for plants high in protein and water (high PEP index plants) during optimal environmental conditions (*i.e.,* high rainfall years). Although high PEP index plants may only germinate and grow in wet years, such plants can be scarce. Tortoises in the West Mojave have been observed to search out and eat scarce plants high in protein such as *Astragalus*, *Lotus*, and *Camissonia* (Jennings 1993). In Ivanpah Valley, California, livestock outside exclosures removed plants high in protein leaving lower quality forage for tortoises (Avery 1998).

Jones (2000) conducted a quantitative review of the effects of cattle grazing in arid systems on 16 response variables. Eleven of 16 analyses (69 percent) revealed significant detrimental effects of cattle grazing, suggesting that cattle can have a negative impact on arid ecosystems. Soil-related variables were most negatively impacted by grazing (3 of 4 categories tested were significantly impacted).

Winter grazing effects: There is considerable evidence that winter grazing can impact xeric communities. Dormant woody riparian species are known to be especially negatively affected by browsing and trampling (Elmore and Kauffmann 1994). In upland communities, decadent plants with standing dead or dormant growth are unattractive to native herbivores but will be readily eaten by cattle in winter (Ganskopp 1993). The removal of this natural protective barrier can result in heavy grazing of the new growth on the plant by numerous herbivores, which can lead to increased plant mortality (Painter 1995).

In Utah, a study by Rasmussen and Brotherson (1986) compared a winter-grazed site to an ungrazed site between the Paria River and the Arizona state line in southern Utah. The ungrazed site had higher species diversity, significantly greater litter cover, significantly greater shrub cover, significantly greater winterfat (*Krascheninnikovia lanata*) cover, greater coverage of Indian ricegrass (*Achnatherum hymenoides*), and 10 times less Russian thistle (*Salsola kali*) cover than the winter-grazed site. They attributed the lower coverage of Indian ricegrass in the winter-grazed site to the fact that Indian ricegrass actively grows during the late winter months. In addition to impacts to the vegetal communities, Avery and Neibergs (1997) found that cattle grazing during winter may result in destruction of a large percentage of active tortoise burrows.

While considerable literature exists that enumerate the negative effects of grazing on the tortoise, particularly focused on habitat effects, there are no studies to date that quantify effects of grazing on entire populations of tortoises, or that demonstrate the absence or insignificance of such effects. Although this knowledge is critically needed in order to

inform management of the desert tortoise and its habitat, collecting such data may take decades.

f. Effects of Geology and Mineral Extraction

The direct effects and many of the indirect effects of mineral extraction are similar to those described for *land use authorizations* described above. Future oil and gas activity within ACECs will be managed with no surface occupancy. BLM anticipates that wildcat wells and an estimated one oil or gas field could occur during the life of the RMP. If an oil or gas field is located in non-critical desert tortoise habitat, up to 500 acres could be disturbed. Existing leases cover approximately 34,580 acres in the Beaver Dam Slope ACEC and 9,625 acres in the Mormon Mesa ACEC. These leases are not subject to the 'no-surface occupancy' lease stipulation required in the RMP/Final EIS. BLM estimates that up to 100 acres of tortoise habitat could be disturbed until existing leases expire and are replaced by new leases containing the 'no-surface occupancy' stipulation.

Lands within the desert tortoise ACECs will be closed to solid mineral leasing. Some areas within non-critical desert tortoise habitat outside of the ACECs will remain open to leasing subject to stipulations and conservation measures developed through subsequent section 7 consultation. However, based on the low potential for solid leasable minerals, development is deemed unlikely.

Disturbance in critical habitat for locatable minerals is based on BLM's estimate of potential development of existing mining claims within the Mormon Mesa ACEC (70 acres), the Beaver Dam Slope ACEC (24 acres), and a proportional distribution of the reasonably foreseeable development scenario outside of the ACECs (32 acres). Disturbance in non-critical desert tortoise habitat is based on proportional distribution of the reasonable foreseeable development scenario (7,500 acres) throughout the planning area. Mineral material disturbance estimates are based on potential expansion of existing sites as described in the BA.

g. Effects of Fire Management

BLM estimates that 360 acres of critical and 1,140 acres of non-critical desert tortoise habitat may be affected by fire management activities. Disturbance estimates are based upon statistical average of acres burned per year and opinions of BLM subject experts. The actual acreage that may be involved in fire management is dependant on many environmental factors thus making accurate predictions difficult.

Fire Suppression

In addition to the habitat impacts described above, desert tortoise may be killed or injured by fire equipment and vehicles. Other tortoises may be harassed or captured if in harm's

way. However, if fire suppression activities are hindered, the extent of desert tortoise habitat burned may increase and the number of tortoises affected (including killed or injured) is likely to increase.

Emergency Stabilization and Rehabilitation

BLM will design and implement emergency stabilization and rehabilitation actions to achieve vegetation, habitat, soil stability, and watershed objectives in accordance with their Programmatic Emergency Stabilization and Rehabilitation Plan (refer to Appendix C, page C-6 of the BA [BLM 2007a]). The Emergency Stabilization and Rehabilitation program will streamline procedures for completion of rehabilitation projects after a wildland fire. Implementation of stabilization and rehabilitation measures may cause short-term impacts such as increased erosion; however, there would be long-term benefits from increased soil stability, water quality, and wildlife habitat for listed species within the plan area. Over time, burned areas would be reclaimed to function as habitat for the listed species

2. Big Spring Spinedace and its Critical Habitat

a. Effects of Weed Management

As part of BLM's weed management program, salt cedar and other invasive weeds as necessary may be removed from the riparian corridor in Condor Canyon. Removal of invasive weeds may be accomplished by the use of mechanical or chemical methods, or a combination of these methods. If salt cedar roots are removed, there may be short term effects of increased erosion from loss of bank stability. Herbicides from accidental spills, incorrect application, or residue flushed from rain events may enter the water and result in fish mortality. Removal of salt cedar may also result in a decrease in shading canopy, which may cause changes in water temperature. Personnel removing salt cedar may step in the channel, which may result in disturbance of substrate and destruction of eggs. Removal of salt cedar is expected to have long term beneficial effects to the species and its critical habitat by recovering the native plant community.

b. Effects of Special Status Species Management

BLM may assist with the implementation of restoration and habitat enhancement projects for the Big Spring spinedace that would provide long term benefits to the species, but may result in short term adverse effects. Projects that require the removal or manipulation of vegetation and soils may result in harassment of individuals and loss of eggs and larvae. Temporary increases in sedimentation may cause changes in spawning and foraging behavior. If restoration efforts require temporary stream diversion, fish would be captured and relocated to an alternate reach of the stream, which would cause stress to all individuals and may lead to mortality of a small portion of the relocated population.

c. Effects of Livestock Grazing

Livestock grazing may result in loss of ground cover, which promotes increased erosion and sediment deposition in the stream channel. Sediment deposition fills pool habitat and converts gravel substrates to silt, resulting in less suitable habitat for the spinedace. Cattle also trample stream banks, which contributes to soil instability and erosion. However, cattle grazing has been permitted in the Condor Canyon area for many years, during which the spinedace population has persisted. Although cattle most likely have caused some habitat degradation in the area, the extent to which this affects the spinedace is unknown.

d. Effects of Fire Management

Fuels Management

There may be a short term loss of understory and woody debris in drainages, which may result in increased erosion and sedimentation to streams and springs and a decrease in spinedace habitat quality. In the long term, fuels management would reduce erosion input to perennial drainages by increasing soil stability. Restoration of vegetation resilience and return to historical fire regimes would reduce impacts to aquatic habitat when wildfires occur.

Fire Suppression

Harassment or mortality to fish would occur if dipping or pumping water from the stream would be necessary during fire suppression activities. Also, withdrawal of water could result in a temporary reduction in available habitat. Indirect effects may include water quality degradation from fire retardant and increased sedimentation in runoff from disturbed sites such as fuel breaks or staging areas.

Emergency Stabilization and Rehabilitation

BLM will design and implement emergency stabilization and rehabilitation actions to achieve vegetation, habitat, soil stability, and watershed objectives in accordance with their Programmatic Emergency Stabilization and Rehabilitation Plan (refer to Appendix C, page C-6 of the BA [BLM 2007a]). The Emergency Stabilization and Rehabilitation program will streamline procedures for completion of rehabilitation projects after a wildland fire. Implementation of stabilization and rehabilitation measures may cause a short term increase in erosion; however, there would be long term benefits from increased soil stability, water quality, and wildlife habitat for listed species within the plan area. Over time, burned areas would be reclaimed and sedimentation input to the stream would be minimized or eliminated.

3. White River Springfish and its Critical Habitat

a. Effects of Weed Management

Environmental Impact Statements prepared by BLM between 1978 and 1989 indicate that removal of livestock from hot deserts would result in less soil erosion, increased water infiltration rates, and generally improved soils. Vegetation would gain health and vigor, and cover would increase (U.S. GAO 1991).

Weed treatments may be conducted at Ash Springs along the access road and parking area. Mechanical removal of weeds could result in short term surface disturbance and sediment input to the spring, depending on the extent of the disturbance area and location of weed removal efforts. Herbicides may enter the water and result in fish or invertebrate mortality.

b. Effects of Travel and OHV Management

Construction of a new access road to Ash Springs is being considered. Construction activities may result in the introduction of additional sediments and pollutants into the spring. Improvement of the road may promote greater use of the spring as a recreational swimming and picnic area, which would lead to further disruption of substrate, additional contribution of soaps, oils, and fragrances to the water from swimmers, and increased chance of vandalism from visitors.

c. Effects of Recreation

Public use of the spring pool as a recreational swimming area may result in disturbance to substrate, trampling and damage to banks and adjacent riparian vegetation, decreases in water quality, and destruction of eggs and larvae. Vandalism may also occur, which may include introduction of toxic substances into the water. The introduction of soaps, oils, and fragrances from swimmers may decrease water quality.

d. Effects of Fire Management

The effects of fire management (fuels management, fire suppression, and emergency stabilization and rehabilitation) described above for the Big Spring spinedace and its critical habitat would be essentially the same for the White River springfish and its critical habitat.

4. Pahrump Poolfish

a. Effects of Special Status Species Management

BLM may assist with the implementation of restoration and habitat enhancement projects for Pahrump poolfish that would provide long term benefits to the species, but may result in short term adverse effects. Projects that require the removal or manipulation of vegetation and soils may result in harassment of individuals and loss of eggs and larvae. Replacement of parts for water measuring instruments may also result in loss of eggs and larvae. Temporary increases in sedimentation may cause changes in spawning and foraging behavior. Construction of additional ponds, manipulation of water flow, or other activities associated with habitat enhancement may require translocation, salvage, or handling of individuals, which may result in stress to or mortality of a small portion of the population.

b. Effects of Livestock Grazing

Livestock grazing may result in loss of ground cover, which promotes increased erosion and sediment deposition in the stock pond and spring outflows. Sediment deposition fills pool habitat and converts gravel substrates to silt, resulting in less suitable habitat for the spinedace. Cattle also trample banks, which contributes to soil instability and erosion. However, cattle grazing has been permitted around the stock pond and outflow springs at Shoshone Ponds for many years, during which the poolfish population has persisted. Livestock grazing may also benefit poolfish in the stock pond by preventing overgrowth of vegetation in the pond. Although cattle most likely have caused some habitat degradation in the area, the extent to which this affects the poolfish is unknown.

c. Effects of Fire Management

The effects of fire management (fuels management, fire suppression, and emergency stabilization and rehabilitation) described above for the Big Spring spinedace would be essentially the same for the Pahrump Poolfish.

5. *Southwestern Willow Flycatcher*

a. Effects of Vegetation and Weed Management

Approximately 400 acres of suitable or potentially suitable flycatcher habitat along the Meadow Valley Wash are anticipated to be lost temporarily from weed removal projects, in particular, removal of salt cedar. Removal of suitable habitat may prevent flycatchers from breeding in the area until restored native vegetation reaches a suitable successional stage for breeding flycatchers. Incorrect application of herbicides may affect flycatchers that are in the vicinity of weed treatment areas. Salt cedar removal could result in the

loss of nests with eggs or young if conducted during the flycatcher breeding season. Harassment from noise and human presence may also occur if salt cedar removal is conducted during the breeding and migration season.

b. Effects of Lands, Realty, and Renewable Energy Actions

Approximately 40 acres of suitable or potentially suitable flycatcher habitat are anticipated to be temporarily disturbed from construction activities in rights-of-way. Two utility corridors originate at Meadow Valley Wash and Clover Creek. Issuance of rights-of-way for construction of utilities within these corridors may result in a short term loss of riparian vegetation that may be suitable as nesting or foraging habitat for the flycatcher. Construction activities may also result in harassment of individuals caused by increased noise and human presence, and loss of nests with eggs or young if conducted in suitable habitat during the flycatcher breeding season.

c. Effects of Travel, OHV, and Recreation Management

Approximately 89 acres of flycatcher habitat may be disturbed by OHV and other recreational activities. OHV use of existing roads and trails may result in erosion and crushing of riparian vegetation. Use of roads in or adjacent to suitable or potentially suitable flycatcher habitat during the breeding season may result in harassment of birds, and loss of nests with eggs or chicks. Use of roads during the breeding season may also result in indirect effects from increased noise and human disturbance, dispersal of invasive weeds, and dust effects associated with travel on unpaved roads and trails. Camping or other recreational activities that occur in flycatcher habitat may lead to trampling of vegetation, and may cause birds to flush from breeding or foraging sites during the breeding season.

d. Effects of Livestock Grazing

Livestock grazing occurs on BLM-administered land along the Meadow Valley Wash; however the extent or effect of grazing in riparian vegetation is not known. Livestock grazing in riparian vegetation elsewhere has resulted in decreased vegetation density necessary for maintaining suitable flycatcher breeding habitat. Decreased vegetation density may prevent birds from breeding in otherwise suitable habitat. Livestock may also trample vegetation and disturb nesting birds. Access to the stream channel may cause soil compaction and bank erosion, alter soil chemistry, and cause increased sediment input into the stream, all factors affecting the hydrological regime and which may lead to drying of the floodplain and subsequent depressed vigor and biomass of vegetation. Excessive grazing may also prevent the establishment of seedlings. Consumption of forage up to the maximum height of the herbivore reduces the vegetation's suitability for supporting nests, may increase nest detectability to predators, and reduces foraging options.

e. Effects of Geology and Mineral Extraction

Approximately 30 acres of flycatcher habitat may be removed as a result of mineral extraction activities. The Lower Meadow Valley Wash ACEC imposes the following limits to minerals extraction: (1) no surface occupancy for leasable minerals; (2) closed to locatable minerals; and (3) open to mineral materials with special stipulations. Mineral materials activities will be subject to controlled surface use, seasonal timing restrictions, restricted or no uses in avoidance areas (e.g., riparian areas, live water, areas with special wildlife or plant features, and sensitive watersheds), and additional NEPA analysis. There is currently no mineral materials extraction along the Meadow Valley Wash that is affecting flycatcher habitat. Future mineral materials extraction activities would be subject to the above restrictions. The indirect effects of constructing access roads and other ancillary structures for existing mining operations may result in loss of flycatcher habitat. Removal of suitable habitat during the breeding season may result in loss of nests with eggs.

f. Effects of Fire Management

Fire Suppression

Large wildland fires are relatively infrequent along the wash; therefore, it is anticipated that no more that 50 acres of flycatcher habitat would be affected by suppression activities. If wildland fire burns riparian habitat, it may result in the incremental loss of suitable or potentially suitable flycatcher habitat. In the event that wildland fire encroaches into riparian vegetation along the Meadow Valley Wash, suppression efforts may require the felling of trees for fire breaks to prevent further spread of fire, and disturbance of vegetation in staging areas or from emergency vehicle access. Effects to flycatchers may include loss of nests with eggs or chicks if fire suppression activities occur during the flycatcher breeding season.

Emergency Stabilization and Rehabilitation

Emergency stabilization and rehabilitation activities implemented under the Fire Management Program should have overall beneficial effects to listed species in the plan area. As described in Management Action FM-3 (4), BLM will design and implement emergency stabilization and rehabilitation actions to achieve vegetation, habitat, soil stability, and watershed objectives in accordance with their Programmatic Emergency Stabilization and Rehabilitation Plan (refer to Appendix C, page C-6 of the BA). The Emergency Stabilization and Rehabilitation program will streamline procedures for completion of rehabilitation projects after a wildland fire. Implementation of stabilization and rehabilitation measures may cause a short term increase in erosion; however, there would be long term benefits from increased soil stability, water quality, and wildlife habitat for listed species within the plan area. Over time, burned areas

would be reclaimed and sedimentation input to the stream would be minimized or eliminated.

6. *Anticipated Effects of BLM Proposed Decisions and Minimization Measures*

The potential effects of BLM's proposed action will be minimized by measures proposed in the BA; and decisions and conservation measures in the RMP/Final EIS. Other conservation measures are provided in the Final Programmatic EIS for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (BLM 2007c) to minimize potential effects to the listed species that may result from vegetation and weed management. Collectively, these measures are intended to improve the status of the species, improve habitats, minimize impacts, and reduce the likelihood that listed species would be killed or injured.

a. Beneficial Actions Common to All Listed Species

BLM will develop and implement an interagency inventory and monitoring program for special status plant and animal species (**SS-2**). BLM will consider acquisition of lands or interest in lands with at-risk or high resource values or those characteristics that contribute to restoration, healthy watersheds, or other resource goals in the planning area, or those lands that also provide for environmentally responsible commercial activities (**LR 26**). BLM will recommend withdrawal of lands with sensitive or high resource values (*e.g.*, ACECs) from surface and mineral entry (**LR-31**). BLM will consider requests by other federal agencies for new withdrawals, withdrawal relinquishments, and modifications on a case-by-case basis (**LR-32**).

BLM will emphasize treatment areas that have the best potential to maintain desired conditions or respond and return to the desired range of conditions and mosaic upon the landscape. Specific management objectives through the watershed analysis process will be developed, and management strategies will be designed to achieve plant composition within the desired range of conditions for vegetation communities, emphasizing plant and animal community health at the watershed level. Conservation and maintenance of existing healthy, resilient, and functional vegetation communities will be emphasized **(VEG-1 through VEG-4, VEG-6).**

BLM will continue to use integrated weed management to treat weed infestations and use the principles of integrated pest management to meet management objectives and to reestablish resistant and resilient native vegetation communities. Movement of weeds will be minimized; weeds will be removed in a manner designed to kill seeds and weed parts; straw, hay, or other products used for reclamation or stabilization activities will be certified as weed free; source sites such as borrow, fill, or gravel pits will be inspected; and vehicles and heavy equipment used during ground disturbing activities, emergency fire suppression, or authorized off-road driving will be free of soil and debris capable of carrying weed propagules. Animals used on public lands by special recreation permittees

or contractors will be weed-free. Areas of weed infestation will be flagged and avoided during planned disturbance activities, weed-infested soils will not be moved or redistributed, and weed surveys will be conducted prior to project approval. These management actions (**Weed 1 through 10**) should prevent the further spread of non-native invasive weeds, and restore native vegetation in areas that have been overtaken by non-native species (in particular, salt cedar), thus improving the quality of the habitat for the desert tortoise, listed fishes, and the flycatcher.

b. Desert Tortoise and its Critical Habitat

General
Authorized biologists and monitors will survey for tortoises in project areas to ensure that tortoises are located and move any tortoise from harm's way (**SS-3; SS-33**; **LR-49**; **REC-21; FM-7**). Where appropriate, BLM proposes to restrict permitted activities from March 1 through October 31 within desert tortoise habitat (**SS-32**). BLM will require the area underneath vehicles be checked for sheltering tortoises (**SS-33**).

Within ACECs: BLM will ensure that an authorized biologist will be onsite; fencing may be installed and inspected to exclude tortoises from project areas; desert tortoise burrows will be avoided; and desert tortoise nests will be relocated from harm's way (**SS-33**). For actions that occur anywhere in desert tortoise habitat, BLM proposes to assess remuneration fees; ensure that project personnel will be informed of the tortoise through a desert tortoise awareness program; BLM wildlife staff will review all proposed actions to ensure that appropriate measures have been incorporated into BLM authorizations; and a designated BLM representative will oversee compliance with terms and conditions of all permitted activities and reporting requirements (**SS-33**).

Lands and Realty
BLM's decision to retain lands within ACECs would ensure that private development will not occur in these areas (**LR-2**) and establish them as avoidance or exclusion areas (**LR-42**). BLM established wilderness study areas as avoidance areas (**LR-40**) and wilderness as exclusion areas (**LR-41**).

Geology and Mineral Extraction
The Kane Springs ACEC will be closed to all mineral leasing and the Mormon Mesa and Beaver Dam Slope ACECs will be closed for solid mineral leasing and managed for no surface occupancy for fluid mineral leasing (**MIN-9, MIN-13**). All three desert tortoise ACECs will be closed to locatable mineral activities subject to valid existing claims (**MIN-16**) and closed to salable mineral activities except the 1-mile-wide corridor along major roads (**MIN-21**).

Recreation
Impacts to the desert tortoise that may occur as a result of recreation would be minimized by measures to designate roads/trails for recreation and visitor use, including closing those identified by BLM as unnecessary; and prohibiting speed OHV events in ACECs (**REC-17**). BLM will manage OHV events to restrict spectators, support staff, and participants to designated areas; designate a BLM representative to oversee permitted activities; provide a map of approved or designated routes for public use; and limit the number, type, and location of OHV events (**REC-13, REC-14, REC-15, REC-18, REC-19, REC-20, REC-21**).

Habitat Disturbance
In addition to the general measures described above, BLM proposes to minimize impacts to, and disturbance of desert tortoise habitat by implementing measures to minimize the extent of potential disturbances (**MIN-1**); conducting habitat restoration and ensuring that remuneration fees are paid to fund conservation programs; restricting vehicles to existing, designated routes; ensuring that seed mixes are appropriate and weed-free; and avoiding tortoise burrows located in project areas, where possible.

The potential effects of mineral extraction and exploration activities would also be minimized by closing important desert tortoise habitat to leasing and restricting or prohibiting surface use in ACECs, and closing all desert tortoise ACECs to locatable mineral activities and restricting development of mineral materials.

BLM decisions in the RMP will restore and maintain a desired range of soil conditions (**SR-1**) including salvaging and stockpiling seed and all available growth media prior to surface disturbance for soil disturbing actions which will require reclamation; recontouring and ripping compacted soils; and establishing an adequate seed bed (**SR-2**). BLM will protect soils from high compaction during surface disturbing activities through soil moisture and/or seasonal use restrictions commensurate with soil surface texture or other properties (**SR-3**).

Roads
Road impacts would be minimized by exclusionary fencing, posting informative signs and speed limits; and restricting or prohibiting new roads (**SS-29, SS-33, LR-49, TM-6, MIN-1**); closing wilderness (which includes desert tortoise habitat) to motor vehicles (**TM-1**); and designating, mapping, rerouting, closing, and rehabilitating roads identified for these actions in transportations plans (**TM-4, TM-7**).

Harmful Substances
The potential exposure of tortoises to harmful substances would be minimized by requirements to mix and clean herbicides away from sensitive areas (BMP 1.3.13); ensuring herbicides are applied by certified applicators (BMP 1.19.2); and properly containing and disposing of hazardous materials (**MIN-1**; BMPs 1.19.9; 1.19.11; 1.19.12; and 1.19.14).

Predators
BLM will require removal and disposal of garbage and trash which may attract desert tortoise predators (**LR-49**). BLM will also cooperate with the Service, NDOW, and the U.S. Department of Agriculture-Wildlife Services, in a program to control desert tortoise predators (**SS-27**).

Livestock Grazing
Desert tortoise ACECs will be closed to grazing (**LG-2**). Allotments will be monitored and evaluated by frequent site visits to ensure standards are being met (**LG-4**). Allotments that become vacant may be dedicated to purposes that preclude livestock (**LG-7**). Vehicle use will be restricted and no new access roads will be considered (**LG-8**). Permittees will be required to take action to remedy straying livestock and BLM will make regular site visits to active allotments (**LG-8**).

Potential effects that may result from issuance of grazing permits would be minimized by those measures identified above, and implementation of a tortoise awareness program; designation of a BLM representative to oversee permitted activities; checking underneath parked vehicles for tortoises before they are moved; use of previously disturbed areas where possible; removing project-related materials; prohibiting ground disturbance and damage, collection, or introduction of plants or animals; and reporting research data to BLM and the Service. BLM's requirement for permittees to provide data collected under research or monitoring permits may contribute towards recovery of the tortoise by minimizing future impacts in the action area and increasing our knowledge base for the species.

Recovery
BLM will develop and implement an interagency inventory and monitoring program for special status plant and animal species (**SS-2**). BLM will participate on interagency recovery implementation teams to identify and address implementation of management actions for the recovery of listed species in the Ely planning area (**SS-3**). BLM will manage desert tortoise habitat by implementing those actions and strategies identified in the Desert Tortoise Recovery Plan and appropriate actions from other plans that the Ely District Office has the authority to implement (**SS-24**). BLM will coordinate with the Service and NDOW to inventory desert tortoise habitat and desert tortoise populations (**SS-25**). BLM will implement an interagency monitoring program for desert tortoise habitat and desert tortoise populations, approved by the Service and the Desert Tortoise Management Oversight Group (**SS-26**). BLM will coordinate with the Service and NDOW to develop approved translocation research projects for desert tortoises (**SS-28**). BLM will coordinate with local, state, and Federal agencies to install tortoise-proof fencing and crossing culverts along US 93 in the Kane Springs ACEC and along other roads, as needed, in all three desert tortoise ACECs (**SS-29**). BLM will manage leased public lands in the Coyote Springs area in accordance with Public Law 100-275 dated March 31, 1988, and the Land Lease Agreement signed July 14, 1988 (**SS-30**).

c. Measures Applicable to the Listed Fishes and Southwestern Willow Flycatcher

Many proposed management actions in the RMP that would minimize effects of BLM's management programs or improve listed species status are applicable to the three fishes, their critical habitats, and the flycatcher. These measures are summarized below by management program or resource.

Water Resources
WR-1, WR-2, WR-4: BLM will ensure authorized activities on public lands will not degrade water quality, and will integrate land health standards, best management practices, and appropriate mitigation measures into authorized activities to ensure water quality meets state requirements and BLM resource management objectives. BLM will maintain or improve watershed conditions by controlling or restricting land uses and utilizing tools, where appropriate, to promote desired vegetation conditions. The implementation of these actions should contribute to overall improvement of riparian and aquatic habitats within the planning area.

Soil Resources
SR-1, SR-3: BLM will restore and maintain a desired range of conditions to increase infiltration, conserve soil moisture, promote groundwater recharge, and ground cover composition to increase or maintain surface soil stability and nutrient cycling. Soils will be protected from high compaction during surface disturbing activities through soil moisture and/or seasonal use restrictions commensurate with soil surface texture or other properties on a case-by-case basis. Implementation of these actions should help to maintain quality habitat for the fishes and the flycatcher.

Vegetation and Weed Management
VEG-23, VEG-24: BLM will promote vegetation structure and diversity that is appropriate and effective in controlling erosion, stabilizing stream banks, healing channel incisions, shading water, filtering sediment, and dissipating energy, to provide for stable water flow and bank stability. Management actions will focus on uses and activities that allow for the protection, maintenance, and restoration of riparian habitat. Implementation of these actions should facilitate restoration of previously non-functional riparian areas or areas functioning at risk to properly functioning condition and improve habitat for the fishes and the flycatcher.

Special Status Species
SS-10: BLM will mitigate all discretionary permitted activities that result in the loss of aquatic and priority wildlife habitats by improving 2 acres of comparable habitat for every 1 acre of lost habitat as determined on a project-by-project basis.

Lands and Realty
LR-2, LR-5, LR-46: ACECs and lands with springs and creeks that contain fisheries will be retained in Federal ownership unless the disposal of these lands will result in the acquisition of lands with higher quality habitat. Surface disturbances from unauthorized uses will be reclaimed to pre-disturbance conditions, to the extent possible.

Travel Management and OHV Use
TM-4: The Ely District is currently open to cross country travel. BLM will complete designation of vehicle routes as open, closed, or limited use within the Ely District. Until route designation is completed, motorized travel will be limited to existing roads and trails, with certain exceptions. These limitations should reduce the amount of disturbance to vegetation, prevent erosion, and increase soil stability, thereby improving habitat for listed species.

d. Measures Applicable to Big Spring Spinedace and its Critical Habitat, White River Springfish and its Critical Habitat, and Pahrump Poolfish

SS-3: BLM will participate on interagency recovery implementation teams to identify and address implementation of management actions for the recovery of listed species in the Ely planning area. BLM's participation in the development and implementation of recovery actions should increase the potential for successful recovery of the species.

e. Measures Applicable to Big Spring Spinedace and its Critical Habitat

SS-17: BLM will manage Big Spring spinedace habitat by implementing those actions and strategies identified in the Big Spring Spinedace Recovery Plan that the Ely District has the authority to implement, and in accordance with the Condor Canyon Habitat Management Plan. BLM's participation in the development and implementation of recovery actions for the Big Spring spinedace should increase the potential for successful recovery of the species.

SD-3: BLM will designate the Condor Canyon ACEC, to protect Big Spring spinedace and its designated critical habitat. Management activities and associated prescriptions for the Condor Canyon ACEC is provided in Table 9.

f. Measures Applicable to White River Springfish and its Critical Habitat

SS-2: BLM will develop and implement an interagency inventory and monitoring program for special status plant and animal species. Currently, population surveys for the White River springfish are not regularly conducted. BLM may be able to facilitate more frequent surveys for the species to gain a better understanding of the status of the population.

SS-21: BLM will manage White River springfish habitat at Ash Springs by implementing actions and strategies identified in the Recovery Plan for the Aquatic and Riparian Species of Pahranagat Valley and the Ash Springs Coordinated Management Plan. BLM's participation in the development and implementation of recovery actions for the White River springfish should increase the potential for successful recovery of the species.

LR-33: BLM will withdraw the 80-acre area around Ash Springs from settlement, sale, location, or entry.

g. Measures Applicable to Pahrump Poolfish

BLM will:

SS-11: Manage the refugium at Shoshone Ponds for Pahrump poolfish in accordance with the Recovery Plan for the species.

SS-12: Expand the fenced area at Shoshone Ponds.

SS-13: Manage the uplands around Shoshone Ponds to increase vegetation cover, reduce runoff, and prevent excessive siltation into the ponds.

SS-14: Develop additional ponds at Shoshone Ponds to increase the habitat for the Pahrump poolfish.

SD-3: Designate the Shoshone Ponds ACEC to protect Pahrump poolfish. Management activities and associated prescriptions for the ACEC are provided in Table 9.

h. Measures Applicable to Southwestern Willow Flycatcher

WL-16: When planning projects, BLM will consider migratory birds, as appropriate, to minimize take and limit impacts.

WL-17: BLM will work with the Service, NDOW, and other partners (*e.g.*, Great Basin Bird Observatory, Partners in Flight) to conduct breeding bird surveys that document the population status and trends of migratory bird species of concern.

SS-2: BLM will develop and implement an interagency inventory and monitoring program for special status plant and animal species.

SS-19: BLM will manage southwestern willow flycatcher habitat by implementing actions and strategies identified in the Recovery Plan for the species and appropriate actions from future habitat conservation plans. BLM's participation in the development

and implementation of recovery actions and habitat conservation plans should increase the potential for successful recovery of the southwestern willow flycatcher.

SS-20: BLM will limit livestock grazing in the Lower Meadow Valley Wash ACEC through terms and conditions and/or season-of-use restrictions on grazing permits in accordance with a site-specific ACEC plan.

SD-3: BLM will designate the Lower Meadow Valley Wash ACEC, to protect southwestern willow flycatcher and other riparian and aquatic associated species of concern. Management activities and associated prescriptions for the ACEC are provided in Table 9.

G. Cumulative Effects

Cumulative effects are those effects of future non-Federal (State, local government, or private) activities that are reasonably certain to occur in the project area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The vast majority of the human population in southern Nevada is concentrated in the Las Vegas Valley and has increased significantly over the past 20 years. Tourism is the major industry in the area and the proximity of the planning area to urban areas including Las Vegas, Mesquite, and St, George, Utah makes the area very popular with tourists and locals. With increased tourism, there may be an increase of visitors not familiar with the area. Their presence could lead to the capture or collection of desert tortoise and the use of vehicles off existing roads and trails, further impacting the tortoise and its habitat. Increased traffic on US 93, SR 168, and other roads will increase fragmentation of the Mormon Mesa CHU and non-critical habitat for the desert tortoise, and may result in increased road kills.

Desert tortoise habitat at the interface between developed lands and open desert is most susceptible to negative impacts. There may be an alteration of predation rates beyond what could be considered normal. Public land adjacent to urban areas may be affected by indiscriminate use of firearms and OHV use. The majority of the lands within the action area are administered by BLM. Therefore, any actions on these lands would be subject to consultation under section 7 of the Act. Effects to listed species from actions on non-Federal lands must be addressed under section 10 of the Act. Lincoln County is currently developing a habitat conservation plan for the southeastern portion of the county that would minimize and mitigate effects from development on the desert tortoise and the southwestern willow flycatcher. Coyote Springs Investment is developing a habitat conservation plan for their lands in Coyote Spring Valley.

As the population in southern Nevada continues to grow, greater demands will be placed on available surface and ground water resources. The disposal of Federal land for urban development will increase the need to develop additional water to support new communities that

will be built on that land. Water sources for future land development within the planning area are unknown; however, applications to the Nevada State Engineer for new water rights, or changes to existing rights would be required. As additional water sources are identified, potential effects to listed species that depend on aquatic and riparian habitats must be considered, and if necessary, addressed either under section 7 or section 10 of the Act, as appropriate.

H. Conclusion

After reviewing the current status of the species, the environmental baseline for the project area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that implementation of programmatic activities as proposed in BLM's Proposed RMP/Final EIS and BA is not likely to jeopardize the continued existence of the threatened Mojave population of the desert tortoise, the threatened Big Spring spinedace, the endangered White River springfish, the endangered Pahrump poolfish, and the endangered southwestern willow flycatcher, or adversely modify any designated critical habitat for these species.

We have reached this conclusion based on the following assumptions:

(1) BLM will implement actions identified above to minimize or avoid adverse effects on listed species, and that will result in beneficial effects to these species.
(2) BLM will implement the recommendations of approved recovery plans within their authority (RMP Decisions **SS-11, SS-17, SS-19, SS-21, SS-24**);
(3) As part of the livestock grazing term permit process, BLM and the Service will develop allotment-level grazing prescriptions and monitoring procedures for allotments within the habitat of the desert tortoise, Big Spring spinedace, Pahrump poolfish, and southwestern willow flycatcher. If such plans are not developed, BLM will reinitiate consultation on their livestock grazing program.
(4) BLM will reduce or eliminate the effects of livestock on listed species by reducing AUMs, restricting areas of use, reducing season or duration of use, or removal of livestock from allotments (or portions of allotments) that fail to meet the objectives of that allotment for listed species and livestock consistent with existing law and regulation.
(5) Habitats of the listed species should be able to sustain viable populations of those species if rangeland health standards are being met.
(6) Restoring riparian systems that are non-functioning or functioning at-risk to properly functioning condition will result in an improvement of habitat for the fishes and the flycatcher.
(7) Other than ongoing actions such as non-permitted recreation and visitor use, no actions will proceed under this biological opinion until BLM submits required information on each project that *may adversely affect* the desert tortoise, Big Spring spinedace, White River springfish, Pahrump poolfish, and southwestern willow flycatcher and a response has been received from the Service to append this programmatic biological opinion in accordance with the Service's draft guidance for programmatic biological opinions.

(8) Desert tortoise, Big Spring spinedace, Pahrump poolfish, White River springfish, and southwestern willow flycatcher will be conserved by land use restrictions for White River springfish and management of ACECs established specifically for protection of listed species.

INCIDENTAL TAKE STATEMENT

A. Incidental Take for Programmatic Consultations

Each BLM action that may result in incidental take must have an incidental take statement, whether the action is the adoption of a strategy for developing future projects or the implementation of specific activities under the strategy. The take anticipated as a result of a specific action would be a subset of the programmatic incidental take statement. Though the intent in the appended programmatic approach is for the programmatic incidental take statement to contain all necessary reasonable and prudent measures and associated terms and conditions, due to the lack of available information regarding the specifics of individual projects, it may be necessary to develop project-specific reasonable and prudent measures and terms and conditions to ensure the minimization of the impacts of the incidental take associated with the specifics of each individual project. However, if this is the case, the Service would carefully consider whether the individual proposed project is beyond the scope of the programmatic consultation.

Section 9 of the Act, as amended, prohibits take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering (50 CFR § 17.3). "Harass" is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR § 17.3). Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to, and not intended as part of the agency action, is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The Service hereby incorporates by reference the conservation measures proposed by BLM from the *Description of the Proposed Action* into this incidental take statement as part of these terms and conditions to be applied to future appended actions, as appropriate. Some decisions in the RMP/Final EIS are measures that would minimize adverse effects to listed species which are also incorporated into this incidental take statement as terms and conditions. Terms and conditions for actions covered under, or appended to, this opinion: (1) modify the measures proposed by BLM, or (2) specify additional measures considered necessary by the Service. Where action-specific terms and conditions (*i.e.*, terms and conditions developed for each action to be

appended and covered under this programmatic opinion in the future) vary from or contradict the minimization measures proposed under the *Description of the Proposed Action* or general terms and conditions below, the action-specific terms and conditions shall apply. The measures described below are general in nature and may or may not apply to future actions proposed for appendage to this programmatic biological opinion. Terms and conditions that are specific to future BLM projects or actions are nondiscretionary and must be implemented by BLM so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply.

BLM has a continuing duty to regulate the activity that is covered by this incidental take statement as long as the affected area is retained in Federal ownership and/or control. If BLM (1) fails to require the project proponent to adhere to the action-specific terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with action-specific terms and conditions, the protective coverage of section 7(o)(2) may lapse.

B. Amount or Extent of Take Exempted

Based on the analysis of impacts provided above, history of effects from similar actions including the previous programmatic biological opinion covering the same action area, anticipated scope of all future actions, and minimization measures proposed by BLM, the Service anticipates that the following take of the listed species could occur as a result of the proposed action at the programmatic level. Generally, no incidental take of the listed species is, or will be exempted under this Incidental Take Statement as a result of disposal of public land. The Service anticipates that the take of listed species that results from these actions would typically fall under purview of Section 10 of the Act following the transfer of ownership.

1. Desert Tortoise

Based on desert tortoise population density estimates, anticipated extent of habitat disturbance (Table 3), type of activities anticipated, anticipated effects to the desert tortoise, reports of incidental take for similar actions, and scope of proposed activities at the program level, the Service anticipates that the following incidental take of desert tortoise may occur:

PROGRAM	MAX. NO. TORTOISES ANTICIPATED TO BE TAKEN:	
	LETHAL	NON-LETHAL[1]
Vegetation and Weed Management	2	No estimate available[2]
Lands & Realty	10	850
Travel and OHV Management	10	No estimate available[2]
Recreation	5	100
Livestock Grazing	10	No estimate available[2,3]
Geology and Mineral Extraction	5	22
Fire Management	5	No estimate available[2]

[1]All desert tortoises found in harm's way may be taken by harassment which includes capture, displacement, relocation, and disruption of behavior. When sufficient information is available, the Service provides an estimate for the number of desert tortoises anticipated to be non-lethally taken at the programmatic level, however, action- or project-specific take will be exempted for each appended action.

[2]Although no estimates are available for animals taken by non-lethal means, the Service determined that these tortoises will remain in the wild and serve their role for recovery; the effects to these animals will be minimal and short-term.

[3]All desert tortoises that occur on actively grazed livestock allotments may be adversely affected by livestock through harassment or through harm if livestock is not managed to meet the needs of the tortoise. As part of the issuance of term grazing permits, monitoring plans and population and/or habitat thresholds will be established during project-specific consultation. If established thresholds are reached at any time during the term permit, take would be exceeded under this biological opinion.

In addition, the Service estimated that over the 10-year term of this biological opinion, two tortoise nests with eggs per year may be excavated and relocated, or incidentally destroyed if not found during clearance surveys.

To ensure that the protective measures are effective and are being properly implemented, BLM shall contact the Service immediately if a desert tortoise is killed or injured as a result of any activity covered under this biological opinion. Upon locating a dead or injured desert tortoise within the action area, notification must be made to the Nevada Fish and Wildlife Office at (702) 515-5230. At that time, the Service and BLM shall review the circumstances surrounding the incident to determine whether additional protective measures are required. If more than two desert tortoises are found dead or injured during any calendar year, activities may proceed; however, BLM shall contact the Service immediately to determine whether formal consultation should be reinitiated. This threshold is intended to determine whether certain activities or circumstances may be affecting desert tortoises more substantially than we anticipated.

2. Big Spring Spinedace, White River Springfish, and Pahrump Poolfish

The Service anticipates incidental take of Big Spring spinedace, White River springfish, and Pahrump poolfish could occur as a result of the following programs over the course of the 10-year timeframe of this biological opinion:

Big Spring spinedace
- Weed Management
- Special Status Species Management
- Livestock Grazing
- Fire Management

White River springfish
- Weed Management
- Travel and OHV Management
- Recreation
- Fire Management

Pahrump poolfish
- Special Status Species Management
- Livestock Grazing
- Fire Management

Incidental take of the fishes is expected to be primarily in the form of harm or harassment. Take of fish species is difficult to detect and quantify because dead fish or crushed eggs would be difficult to find, harassment of individuals may occur under situations where it is not observed, losses may be masked by seasonal fluctuations in population numbers or distribution, or a direct cause-and-effect correlation between BLM's programs and take may be difficult to establish. Therefore, take of the fishes is expressed as the proportion of the population taken during any one event or activity, or estimated using a surrogate factor identified for each species below that is associated with changes in habitat and/or population size.

Big Spring Spinedace

- Take in the form of harm or harassment during weed removal projects may occur within no more than 20 percent of the habitat, measured as length of the stream reach, during any one weed removal project.
- The entire population may be harassed as a result of salvage events during habitat restoration activities. No more than 5 percent of the population may be taken in the form of injury or mortality during any one salvage event. An unquantifiable number of eggs or larvae may be taken during these events.

- The entire population may be harassed as a result of ongoing livestock grazing. As part of the issuance of term grazing permits, monitoring plans and population and/or habitat thresholds will be established during project-specific consultation. If established thresholds are reached at any time during the term permit, take in the form of harm would be exceeded under this biological opinion.
- A small portion (*i.e.*, less than 10 percent) of the population is anticipated to be taken during any one water drafting event for fire management.

White River Springfish

- The small portion of the population that occurs on BLM-administered land (which is approximately one-quarter of the 2-acre pool area) may be taken in the form of harm or harassment during weed removal projects.
- The same portion of the population may be taken in the form of harm or harassment during any one soil-disturbing event associated with improvement of the access road.
- The same portion of the population may be taken in the form of harm or harassment from ongoing recreational use in the springpool.
- The same portion of the population may be taken during any one water drafting event for fire management.

Pahrump Poolfish

- The population may be harassed as a result of salvage events during habitat restoration activities. No more than 5 percent of the population within any one pool may be taken in the form of injury or mortality during any one salvage event. An unquantifiable number of eggs or larvae may be taken during these events.
- The portion of the population occurring in the stock pond and artesian well outflow may be harassed or harmed as a result of ongoing livestock grazing. As part of the issuance of term grazing permits, monitoring plans and population and/or habitat thresholds will be established during project-specific consultation. If established thresholds are reached at any time during the term permit, take in the form of harm would be exceeded under this biological opinion.
- A small portion (i.e., less than 10 percent) of the population is anticipated to be taken during any one water drafting event for fire management.

3. Southwestern Willow Flycatcher

The Service anticipates incidental take of southwestern willow flycatcher to be primarily in the form of harm due to short-term loss or disturbance of habitat as a result of discretionary BLM actions. Estimated habitat disturbance for each program is:

Program	Acres Disturbed
Vegetation and Weed Management	400
Lands and Realty	40
Travel, OHV, and Recreation	89
Minerals Extraction	30
Fire Management	50

Vegetation and weed management activities and construction in rights-of-way could cause harm through short term loss of suitable or potentially suitable habitat. Ongoing livestock grazing may prevent vegetation from reaching a seral stage suitable for breeding flycatchers. Grazing may also cause bank erosion and soil instability, which may alter stream hydrology and result in drying of the riparian area. Livestock grazing and fire management activities may also result in harassment or mortality of flycatchers if grazing or fire suppression activities occur in suitable habitat during the flycatcher breeding season.

Based on limited data from previous survey efforts along the Meadow Valley Wash, the Service anticipates that no more than one nesting pair of flycatchers may be taken every five years. However, it is difficult to detect and quantify incidental take of flycatchers because finding a dead or impaired specimen is unlikely, harassment of individuals may occur under situations where it is not observed, and losses may be masked by seasonal or temporal fluctuations in population numbers or distribution. Therefore, it is assumed that take of southwestern willow flycatcher will have been exceeded if:

(a) Disturbance of suitable or potentially suitable flycatcher habitat exceeds the acreage of disturbance for each program listed above, or

(b) population and/or habitat thresholds established for livestock grazing program during project-specific consultation are reached at any time during the term permit.

C. Effect of Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the desert tortoise, Big Spring spinedace, White River springfish, Pahrump poolfish, or southwestern willow flycatcher, or destruction or modification of critical habitat for the desert tortoise, Big Spring spinedace, or White River springfish.

D. Programmatic Reasonable and Prudent Measures with Terms and Conditions

The Service believes that the following reasonable and prudent measures (RPMs) with terms and conditions stated below or incorporated by reference are necessary and appropriate to minimize the incidental take for ongoing actions and may be relevant for future actions to be appended to this biological opinion. In order to be exempt from the prohibitions of section 9 of the Act, BLM must comply with RPMs as implemented by terms and conditions. For future actions to be appended to this biological opinion, terms and conditions will be provided at the project-level consultation and are non-discretionary. Terms and conditions will be based on measures proposed by BLM in this document and the October 2007 BA to minimize the potential impacts to desert tortoise, Big Spring Spinedace, White River Springfish, Pahrump poolfish, and southwestern willow flycatcher. **These measures below may not apply to all future actions; they may apply with modification; and/or additional measures may be required when specific actions are proposed for appendage to this programmatic biological opinion. Where proposed measures or decisions vary from measures in this biological opinion, measures in this biological opinion shall take precedence.**

All species

RPM 1. BLM shall implement measures to ensure **compliance** with the reasonable and prudent measures, terms and conditions, project reporting requirements, and reinitiation requirements contained in this biological opinion.

Terms and Conditions:

1.a. BLM shall keep an up-to-date log of all actions taken under this consultation including acreage affected; number of listed species taken and form of take; and fees paid for each action. BLM will provide the log information to the Service on an annual basis. Information will be cumulative throughout the term of this consultation. The first annual report will cover the period through December 31, 2008, and will be due to the Service by February 15, 2009. Subsequent annual reports will cover the calendar year and be due on February 15 of the following year.

Desert tortoise

RPM 2: BLM shall implement measures to minimize the incidental take of desert tortoises that may result from **implementation of all programs**.

Terms and Conditions:

2.a. Prior to initiation of an activity within desert tortoise habitat, a desert tortoise awareness program shall be presented to all personnel who will be onsite,

including but not limited to contractors, contractors' employees, supervisors, inspectors, and subcontractors. This program will contain information concerning the biology and distribution of the desert tortoise and other sensitive species, their legal status and occurrence in the project area; the definition of "take" and associated penalties; speed limits; the terms and conditions of this biological opinion including speed limits; the means by which employees can help facilitate this process; responsibilities of workers, monitors, biologists, etc.; and reporting procedures to be implemented in case of desert tortoise encounters or non-compliance with this biological opinion.

2.b. Tortoises discovered to be in imminent danger during projects or activities covered under this biological opinion, may be moved out of harm's way.

2.c. Desert tortoises shall be treated in a manner to ensure that they do not overheat, exhibit signs of overheating (*e.g.*, gaping, foaming at the mouth, *etc.*), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. Desert tortoises will be kept shaded at all times until it is safe to release them. No desert tortoise will be captured, moved, transported, released, or purposefully caused to leave its burrow for whatever reason when the ambient air temperature is above 95°F. Ambient air temperature will be measured in the shade, protected from wind, at a height of 2 inches above the ground surface. No desert tortoise will be captured if the ambient air temperature is anticipated to exceed 95°F before handling and relocation can be completed. If the ambient air temperature exceeds 95°F during handling or processing, desert tortoises will be kept shaded in an environment that does not exceed 95°F and the animals will not be released until ambient air temperature declines to below 95°F.

2.d. Desert tortoises shall be handled by qualified individuals. For most projects, an authorized desert tortoise biologist will be onsite during project activities within desert tortoise habitat. Biologists, monitors, or anyone responsible for conducting monitoring or desert tortoise field activities associated with the project will complete the Qualifications Form (Appendix D) and submit it to the Service for review and approval as appropriate. The Service should be allowed 30 days for review and response.

2.e. A litter-control program shall be implemented to minimize predation on tortoises by ravens drawn to the project site. This program will include the use of covered, raven-proof trash receptacles, removal of trash from project areas to the trash receptacles following the close of each work day, and the proper disposal of trash in a designated solid waste disposal facility. Appropriate precautions must be taken to prevent litter from blowing out along the road when trash is removed from the site. The litter-control program will apply to all actions. A litter-control program will be implemented by the responsible federal agency or their

contractor, to minimize predation on tortoises by ravens and other predators drawn to the project site.

RPM 3: BLM shall implement measures to minimize the incidental take of desert tortoises that may result from **habitat disturbing activities**, including mineral extraction activities and activities authorized by BLM on rights-of-way.

Terms and Conditions:

3.a. BLM shall implement measures in the RMP/Final EIS, proposed for Special Status Species (**SS**), Lands and Realty (**LR**), Renewable Energy (**RE**), and Geology and Mineral Extraction (**MIN**) unless modified below or at the project-level consultation.

3.b. Prior to vehicle and equipment travel on a right-of-way or project area, authorized biologists shall survey for desert tortoises and their burrows using Service-approved protocols unless determined to be unnecessary by the Service at the project-level consultation. Timing of the survey will be determined at the project-level consultation. All potential desert tortoise burrows will be examined to determine occupancy of each burrow by desert tortoises in accordance with Service-approved protocol.

3.c. Companies controlling new road segments shall be required to restrict access to the general public. This restriction could be in the form of closed gates and will not apply to authorized agents of the operator or their subcontractor(s), the land managing agency, and other agencies with a legitimate access need.

3.d. When a permitted or approved activity, including unauthorized disturbances such as may occur during OHV events, results in residual impacts to desert tortoise habitat, remuneration fees shall be required. The fee rate will be determined during the NEPA process for each proposed action. Fees for disturbance of desert tortoise critical habitat will be calculated according to the formula identified in the document, Compensation for the Desert Tortoise (Hastey *et al.* 1991). The section 7 fees will be indexed for inflation based on the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers (CPI-U) and becomes effective March 1 of each year. Information on the CPI-U can be found on the internet at: http://stats.bls.gov/news.release/cpi.nws.htm.

3.e. Prior to starting operations each day on any project that is not totally enclosed by tortoise-proof fencing and cattleguards, the project proponent shall be responsible for conducting a desert tortoise inspection by authorized desert tortoise biologists using techniques approved by the Service and BLM. The inspection will determine if any desert tortoises are present in the following locations:

- Around and under all equipment;
- In and around all disturbed areas to include stockpiles and reject materials areas;
- In and around all routes of ingress and egress; and
- In and around all other areas where the operation might expand to during that day.

If a tortoise is discovered during this inspection or later in the day, the operator will immediately cease all operations in the immediate vicinity of the tortoise and will immediately notify BLM authorized officer.

3.f. Within desert tortoise ACECs: Mineral exploration shall be allowed only on existing roads and trails unless a route can be identified that results in no substantial habitat disturbance as determined at the project-level consultation. All proposed surface disturbance and vehicular travel will be limited to the approved operation plan and access route. Upon determination of an impending field development, a transportation plan will be prepared and submitted to the Service for activity-level consultation. No blading or other dirt work will be allowed without prior approval of BLM authorized officer. An authorized biologist will monitor cross-country travel for tortoise and will move them as needed.

3.g. Drilling fluids and cuttings shall be contained in portable mud pits or lined reserve pits in all operations.

3.h. Vibriosis, drill hole shot, or surface shot shall not be completed within 100 yards of known tortoise burrows.

3.i. No surface activity for fluid minerals leasing shall be allowed within desert tortoise habitat from March 1 to October 31 without concurrence from the Service.

3.j. Upon completion or temporary suspension of mining operations, the project proponents shall backfill all holes and trenches and re-contour the pit to the natural slope, if possible, with pit walls greater than 3 feet in height knocked down and sloped at 3 horizontal to 1 vertical or to the original topography, whichever is less.

3.k. BLM will include stipulations for future rights-of-way grants, renewals, and amendments for towers authorized under this biological opinion to require that structures be inspected annually for nesting ravens and observations of raven nests. All nests shall be reported to the Service. The right-of-way grantee will

cooperate with the Service to discuss the necessity to remove any nests determined by the Service to threaten tortoise populations in the area.

RPM 4: BLM shall implement measures to minimize the incidental take of desert tortoises that may result from **travel, OHV, and recreation management**.

Terms and Conditions:

4.a. BLM shall implement measures in the RMP/Final EIS, proposed for Travel Management and OHV Use (**TM**) and Recreation Management (**REC**) unless modified below or at the project-level consultation.

4.b. Desert washes shall be managed as avoidance areas for OHV activity.

4.c. Until site-specific implementation plans and route designations are complete, motorized travel shall be limited to existing roads and trails except when cross-country travel is needed for safety, required for government (federal, state, and local) administrative needs, as authorized on a permit, for big game retrieval, or as otherwise officially approved. Upon completion of route designations, BLM will produce a map depicting the designated roads, primitive roads, and trails post it on a BLM website. A printed map will be available for the public at BLM offices as soon as funding is available and printed copies have been made..

4.d. Establishment of new permanent roads and trails shall be avoided in desert tortoise habitat. New access routes may be allowed outside desert tortoise critical habitat if BLM and the Service determine that the road is compatible with tortoise conservation efforts.

4.e. Event routes shall be designated and additional measures developed at the activity level. Habitat disturbed by event-related vehicles will require remuneration fees in accordance with Hastey *et al.* 1991.

4.f. For all events: Any desert tortoise found on or adjacent to the event course shall be temporarily penned if in a burrow or moved into undisturbed desert within 2 miles by a authorized tortoise biologist or BLM personnel experienced or trained in the handling of tortoises, according to current Service-approved protocol. Currently, the Service-approved protocol is "Guidelines for Handling Desert Tortoises during Construction Projects (Desert Tortoise Council 1994, revised 1999)."

Occupied desert tortoise burrows along the event route during a period of reduced tortoise activity (*e.g.,* winter), may be temporarily penned to ensure the tortoise is confined to the burrow and immediate area. Tortoises should not be penned in

areas of moderate or heavy public use. Penning shall be accomplished by installing a circular fence, approximately 20 feet in diameter to enclose the tortoise/burrow. The pen should be constructed with durable materials (*i.e.*, 16 gauge or heavier) suitable to resist desert environments. Fence material should consist of ½-inch hardware cloth or 1-inch horizontal by 2-inch vertical, galvanized welded wire. Pen material should be 24 inches in width. Steel T-posts or rebar (3 to 4 feet) should be placed every 5 to 6 feet to support the pen material. The pen material should extend 18 to 24 inches aboveground. The bottom of the enclosure shall be buried several inches; soil mounded along the base; and other measures should be taken to ensure zero ground clearance. Care should be taken to minimize visibility of the pen by the public. A biologist, monitor, or designated worker should check the pen daily. All instances of penning or issues associated with penning should be reported to the Service within three days.

Tortoises shall be deliberately moved solely for the purpose of moving them out of harm's way. Desert tortoises shall not be placed on land not under the ownership of BLM without written permission of the landowner. All road repair crews shall be accompanied by BLM personnel or their designee to ensure that no tortoises or tortoise burrows are harmed during repair operations.

RPM 5: BLM shall implement measures to minimize the incidental take of desert tortoises that may result from **fire management**.

Terms and Conditions:

5.a. BLM shall implement measures in the RMP/Final EIS, and measures proposed for Fire Management (**FM**) unless modified below or at the project-level consultation.

5.b. Within desert tortoise habitat, full suppression activities shall be initiated using appropriate techniques/tools (engines, equipment off road, burning out, etc.) with the minimum necessary surface disturbances to limit the size of a wildland fire, reduce loss of tortoise cover and minimize the spread of exotic annual grasses, in accordance with Duck *et al.* 1995.

RPM 6: BLM shall implement measures to minimize the incidental take of desert tortoises resulting from **attraction of potential tortoise predators** to the actions area.

Terms and Conditions:

6.a. BLM shall implement a litter-control program as described in Term and Condition 2.e. and require inspections of towers for nesting ravens as described in Term and Condition 3.k.

Desert Tortoise, Big Spring Spinedace, Southwestern Willow Flycatcher, and Pahrump Poolfish

RPM 7: BLM shall implement measures to minimize the incidental take of desert tortoise, Big Spring spinedace, Pahrump poolfish, and southwestern willow flycatcher that may result from permitting of **livestock grazing**.

Desert tortoise

7.a. Livestock grazing may continue in desert tortoise habitat under the previous conditions established under the Caliente MFP Amendment until such time the term permits come up for renewal based on the existing permit expiration dates. Those allotments or portion of allotments in desert tortoise critical habitat will be a priority for review and issuance of term permits. During this interim period for grazing within desert tortoise habitat outside the Mormon Mesa, Kane Springs, and Beaver Dam Slope ACECs: Livestock use may occur from March 1 to October 31, as long as forage utilization management levels are monitored and do not exceed 40 percent on key perennial grasses, shrubs and perennial forbs; and between November 1 and February 28/29, provided forage utilization management levels are monitored and do not exceed 50 percent on key perennial grasses and 45 percent on key shrubs and perennial forbs. If the utilization management levels are reached, livestock will be moved to another location within the allotment or taken entirely off the allotment. No livestock grazing will occur in desert tortoise critical habitat March 1 through October 31.

7.b. Livestock grazing in desert tortoise habitat shall be managed in accordance with the most current version of the Desert Tortoise Recovery Plan, including allotments or portions of allotments that become vacant and occur within desert tortoise critical habitat outside of ACECs. Grazing may continue in currently active allotments until such time they become vacant. BLM will work with the permittees of active allotments to implement changes in grazing management to improve desert tortoise habitat which may include use of water, salt/mineral licks, or herding to move livestock; changes in season of use and/or stocking rates; installation of exclusionary fences; reconfiguring pasture or allotment boundaries; and retiring pastures or allotments.

Desert tortoise, Big Spring spinedace, Pahrump poolfish, Southwestern willow flycatcher

7.c. When BLM proposes to issue a term permit or other type of grazing authorization, BLM shall provide the following to the Service with their request to append the action to this biological opinion:

- an allotment-level assessment of current conditions (relative to listed species habitat); if unknown, a description of, and timeframe for actions BLM will implement to collect such information;
- a plan and schedule for monitoring listed species habitat on the allotment;
- a description of the grazing system and how it will minimize conflicts with listed species habitat;
- proposed actions or remedies (*e.g.*, reduce utilization levels, reduce AUMs, limit season-of-use) if listed species habitat has not attained the goals for the allotment; and
- other information requested by the Service that is necessary to conclude activity-level consultation.

7.d. BLM and Service will cooperatively develop livestock grazing utilization levels or other thresholds, as appropriate for each of the listed species. These levels or thresholds shall be incorporated into each of the allotment term permits for those allotments that overlap with habitat for the listed species.

7.e. The permittee shall be required to take immediate action to remove any livestock that move into areas unavailable for grazing. If straying of livestock becomes problematic, BLM, in consultation with the Service, will take measures to ensure straying is prevented.

7.f. All vehicle use in listed species habitat associated with livestock grazing, with the exception of range improvements, shall be restricted to existing roads and trails. Permittees and associated workers will comply with posted speed limits on access roads. No new access roads will be created.

7.g. Use of hay or grains as a feeding supplement shall be prohibited within grazing allotments. Where mineral and salt blocks are deemed necessary for livestock grazing management they will be placed in previously disturbed areas at least 0.5 mile from riparian areas wherever possible to minimize impacts to flycatchers and listed fishes and their habitat. In some cases, blocks may be placed in areas that have a net benefit to tortoise by distributing livestock more evenly throughout the allotment, and minimizing concentrations of livestock that result in habitat damage. Water haul sites will also be placed at least 0.5 mile from riparian areas.

7.h. Site visits shall be made to active allotments by BLM rangeland specialists and other qualified personnel, including Service biologists, to ensure compliance with

the terms and conditions of the grazing permit. Any item in non-compliance will be rectified by BLM and permittee, and reported to the Service.

7.i. Livestock levels shall be adjusted to reflect significant, unusual conditions that result in a dramatic change in range conditions (*e.g.*, drought and fire) and negatively impact the ability of the allotment to support both listed species and cattle.

White River Springfish

RPM 8: BLM shall implement measures to minimize the incidental take of White River springfish that may result from **soil disturbing activities**.

8.a. BLM shall implement measures in the RMP/Final EIS, proposed for Special Status Species (**SS**), Lands and Realty (**LR**), Renewable Energy (**RE**), and Geology and Mineral Extraction (**MIN**) unless modified below or at the project-level consultation.

8.b. BLM shall implement BMPs or SOPs that will stabilize soils and minimize sediment input to the pond from soil-disturbing construction activities.

8.c. All fuel, transmission or brake fluid leaks, or other hazardous materials shall not be drained onto the ground or into streams or drainage areas. All petroleum products and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials. Waste leaks, spills or releases will be reported immediately to BLM. BLM or the project proponent shall be responsible for spill material removal and disposal to an approved off-site landfill. Servicing of construction equipment will take place only at a designated area. All fuel or hazardous waste leaks, spills, or releases will be stopped or repaired immediately and cleaned up at the time of occurrence. Service and maintenance vehicles will carry a bucket and pads to absorb leaks or spills.

8.d. BLM shall avoid conducting soil-disturbing activities during the peak springfish spawning period (in general, April 1 through May 31).

RPM 9: BLM shall implement measures to minimize the incidental take of White River springfish that may result from **recreational use** of Ash Springs.

9.a. BLM shall develop public educational materials to provide to casual users of Ash Springs that describes the importance of the area to White River springfish and ways in which the public can minimize their impact on the springfish and its habitat.

9.b. BLM shall incorporate actions into management plans to restrict use or otherwise minimize impacts along pool banks.

Southwestern Willow Flycatcher

RPM 10: BLM shall implement measures to minimize the incidental take of southwestern willow flycatcher that may result from **vegetation management, weed removal projects, and habitat-disturbing activities**.

10.a. BLM shall implement measures in the RMP/Final EIS, proposed for Special Status Species (**SS**), Lands and Realty (**LR**), Renewable Energy (**RE**), and Geology and Mineral Extraction (**MIN**) unless modified below or at the project-level consultation.

10.b. BLM shall avoid the removal of salt cedar in areas considered flycatcher habitat during the flycatcher breeding season.

10.c. BLM shall ensure that salt cedar removed from suitable or potentially suitable flycatcher habitat is replaced with appropriate native riparian vegetation to assure no net loss of habitat. If soil and hydrological conditions are conducive to survival of native species, riparian vegetation restoration efforts, if determined appropriate, shall commence no later than one year after removal of salt cedar.

10.d. BLM and Service will cooperatively develop a riparian vegetation monitoring program to determine the overall habitat condition including success of restoration efforts. The program will incorporate monitoring into the Lower Meadow Valley Wash ACEC management plan.

10.e. BLM or an authorized contractor shall conduct southwestern willow flycatcher surveys in suitable habitat. Where restoration projects have been conducted surveys would be initiated once the vegetation has reached a mid-to-late seral stage of development (approximately 3 to 5 years after project completion). Surveys must be conducted by a biologist using Service-approved flycatcher survey protocol (Sogge *et al.* 1997, Service *in litt.* 2000). Conducting presence/absence surveys for flycatchers requires obtaining a section 10(a)(1)(A) recovery permit from the Service.

10.f. If possible, overnight parking and storage of equipment and materials, including stockpiling, shall occur in previously disturbed areas. If not possible, areas for overnight parking and storage of equipment shall be designated by a BLM authorized officer in consultation with the Service.

10.g. All vehicular traffic shall be restricted to existing access roads, or those roads approved by BLM authorized officer in consultation with the Service.

10.h. Project activity areas shall be clearly marked or flagged at the outer boundaries before the onset of construction. All activities will be confined to designated areas. Disturbance of riparian vegetation will occur only to the extent necessary and will be limited to areas designated for that purpose by a BLM authorized officer in consultation with the Service.

RPM 11: BLM shall implement measures to minimize the incidental take of southwestern willow flycatcher and disturbance of habitat that may result from **travel, OHV, and recreation management**.

11.a. BLM shall implement measures in the RMP/Final EIS, proposed for Travel Management and OHV Use (**TM**) and Recreation Management (**REC**) unless modified below or at the project-level consultation.

11.b. BLM shall reroute SRP events on those portions of routes that pass through suitable southwestern willow flycatcher habitat.

11.c. BLM shall not construct new roads in the Lower Meadow Valley Wash ACEC.

11.d. BLM shall develop public educational materials to provide to casual users that explains the importance of riparian areas to the flycatcher and other wildlife. These materials will describe ways in which the public can avoid disturbance of riparian vegetation and soils, and promote good stewardship of watersheds in the planning area.

RPM 12: BLM shall implement measures to minimize the incidental take of southwestern willow flycatcher that may result from **minerals extraction.**

12.a. BLM shall avoid permitting mineral materials extraction in riparian areas within the Lower Meadow Valley Wash ACEC.

12.b. If the construction of ancillary structures related to mining operations, or other actions associated with minerals extraction results in the disturbance of southwestern willow flycatcher habitat, BLM shall implement the terms and conditions listed under RPM 10 for actions associated with vegetation management, weed removal projects, and other habitat-disturbing activities.

RPM 13: BLM shall implement measures to minimize the incidental take of southwestern willow flycatcher that may result from **fire suppression activities**.

13.a. All firefighters and support personnel shall be briefed on the potential presence of southwestern willow flycatcher in areas along the Meadow Valley Wash that support suitable or potentially suitable flycatcher habitat.

13.b. Within flycatcher habitat, full suppression activities shall be initiated using appropriate techniques/tools (engines, equipment off road, burning out, etc.) with the minimum necessary surface disturbances to limit the size of a wildland fire, reduce loss of riparian vegetation, and minimize the spread of non-native plants.

13.c. Fire suppression actions in riparian areas shall be prioritized where feasible to minimize damage to stands of native vegetation from wildfire or suppression operations. To the extent possible, large, downed woody debris and snags that are not a hazard to firefighters should be retained.

13.e. An authorized resource advisor shall be assigned to each wildland fire to provide relevant information on the occurrence of southwestern willow flycatcher nesting sites and important habitat to the incident commander. The resource advisor serves as the field contact representative responsible for coordination with the Service.

13.f. In riparian areas, natural barriers or openings in riparian vegetation shall be used where possible as the easiest, safest method to manage a riparian wildfire. Where possible and practical, wet firebreaks in sandy overflow channels shall be used rather than constructing firelines by hand or with heavy equipment.

13.g. Fire camps, staging areas, and helispots shall be established in previously disturbed areas outside of riparian areas or river/stream corridors, where possible, and in consultation with a qualified resource advisor. Prior to use of any area during the flycatcher breeding season, a resource advisor will be allowed to survey 100 percent of the area. If flycatchers are detected or suitable habitat is found, the area will be adjusted, if possible, to avoid flycatchers or habitat.

13.h. Use of chainsaws or bulldozers to construct firelines through occupied or suitable habitat shall be minimized except where necessary to reduce the overall acreage of occupied habitat or other important habitat areas that would otherwise be burned.

13.i. Development of access roads that would result in fragmentation or a reduction in habitat quality shall be avoided. All roads that were necessary for project implementation shall be closed and rehabilitated.

13.j. Off-road travel and use of tracked vehicles shall be restricted to the minimum necessary to suppress wildland fires. All vehicles will be parked as close to the road as possible using disturbed areas or wide spots in the road to turn around. All tracks will be obliterated immediately following fire suppression activities, to the extent possible.

13.k. Fire lines and disturbances associated with fire suppression activities shall be rehabilitated, where appropriate. Native plant species should be used in rehabilitation efforts on a site-specific basis dependent on the probability of successful establishment. Native plant species known to occur in the riparian corridor along the Meadow Valley Wash should be used.

Big Spring spinedace and Pahrump poolfish

14. **RPM:** BLM shall implement measures to minimize the incidental take of Big Spring spinedace and Pahrump poolfish that may result from **restoration or habitat enhancement activities, or other recovery actions under the Special Status Species program**.

14.a. If translocation, salvage, or other handling of fish is necessary to accomplish restoration, habitat enhancement, or other recovery actions, BLM shall use appropriate fish handling procedures developed with assistance from the Service and NDOW.

Big Spring spinedace and White River springfish

15. **RPM:** BLM shall implement measures to minimize the incidental take of Big Spring spinedace and White River springfish that may result from **weed removal projects**.

15.a. BLM shall implement measures in the RMP/Final EIS, proposed for Special Status Species (**SS**), Lands and Realty (**LR**), Renewable Energy (**RE**), and Geology and Mineral Extraction (**MIN**) unless modified below or at the project-level consultation.

15.b. BLM shall ensure that methods used for weed removal projects and measures to minimize potential effects to aquatic species and their environment are consistent with the standard operating procedures and mitigation measures described in the Final Programmatic EIS for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (BLM 2007c), and the best management practices described in the RMP/Final EIS and appendices (BLM 2007b). These methods will be determined during project-specific consultation and appended to the programmatic biological opinion as terms and conditions, at which time take will be exempted.

15.c. BLM shall replace salt cedar removed during weed control projects with appropriate native vegetation as determined during project-specific consultation to ensure no net loss of habitat.

15.d. BLM shall instruct all work crew members to avoid stepping, standing, or walking in the streambed during weed removal activities.

15.e. BLM shall avoid conducting weed removal activities during the peak spawning period (in general, April 1 through May 31).

Big Spring spinedace, White River springfish, and Pahrump poolfish

16. **RPM:** BLM shall implement measures to minimize the incidental take of the Big Spring spinedace, White River springfish, and Pahrump poolfish that may result from **fire management activities**.

16.a. Alternative water sources shall be identified, where available and feasible, for use during fire management activities to avoid the need to draft water from habitats for Big Spring spinedace, White River springfish, and Pahrump poolfish.

16.b. The application of fire retardant or foam within 300 feet of a stream channel or waterway shall be avoided, when possible, except for the protection of life and property. If the use of fire retardant or foam within 300 feet of a stream channel or waterway is determined necessary for the protection of life and property, the Service shall be notified immediately to determine if contingency actions are necessary to protect listed species.

16.c. When using water from sources supporting federally protected species, care shall be taken to ensure adverse impacts to these species are minimized or prevented. Unused water from fire abatement activities will not be dumped in sites occupied by federally protected aquatic species to avoid introducing nonnative species, diseases, or parasites.

16.d. If water is drafted from a stock tank or other body of water for fire suppression, it shall not be refilled with water from another tank, lakes, or other water sources that may support nonnative fishes, bullfrogs, crayfish, or salamanders.

16.e. A containment barrier shall be constructed around all pumps and fuel containers utilized within 100 feet of the stream channel or edge of pond to prevent petroleum products from entering the stream or pond. The containment barrier will be of sufficient size to contain all fuel being stored or used on site.

16.f. Retardant shall not be mixed within 300 feet of the stream channel, spring source, impoundment ponds, outflow channel, or marsh/wetland areas.

16.g. Stream or spring flow shall not be impounded or diverted by mechanical or other means to facilitate extraction of water from the stream or pond for fire suppression efforts.

16.h. The intake end of the draft hose shall be screened to prevent entry of fish species. Screen opening size will be a maximum of 3/16 inch.

16.i. Before each fire assignment in the Ely District, all fire suppression equipment utilized to extract water from stream or spring sources (*i.e.*, helicopter buckets, draft hoses, and screens) shall be thoroughly rinsed to remove mud and debris and disinfected with a chlorine solution (one part bleach to 32 parts water, or stronger). Rinsing equipment with disinfectant solutions will not occur within 100 feet of natural water sources (springs or streams).

16.j. An assessment of the impacts of fire suppression activities to listed fishes habitats shall be completed by an interdisciplinary team of resource specialists from BLM's Ely District or Caliente Field Offices, representatives from the Service, and representatives from NDOW. Based on the assessment, appropriate rehabilitation measures will be identified consistent with Departmental Emergency Stabilization and Rehabilitation Handbook guidance. Specific measures will be identified during project-specific consultation and appended to the programmatic biological opinion.

E. Closing Paragraph

Desert tortoise

The Service believes that no more than 47 desert tortoises will be incidentally killed or injured over the 10-year period of this consultation as a result of proposed activities. The effects of livestock grazing involve mostly indirect effects through habitat modification over time. In addition, 972 desert tortoises may be taken by non-lethal means as a result of lands and realty actions, recreation, and geology and mineral extraction activities; and an unknown number of desert tortoises may be taken by non-lethal means as a result the remaining activities for which we have no estimate. Although we have no estimate for certain programs, we determined that these tortoises, though taken by non-lethal means, will remain in the wild and serve their role for recovery; the effects to these animals will be minimal and short-term. In addition, the Service estimated that over the 10-year term of this biological opinion, two tortoise nests with eggs per year may be excavated and relocated, or incidentally destroyed if not found during clearance surveys.

Big Spring spinedace, White River springfish, and Pahrump poolfish

The Service believes that incidental take of the Big Spring spinedace, White River springfish, and Pahrump poolfish is expected to be primarily in the form of harm or harassment. Take may result from implementation of activities under BLM's Weed Management; Special Status Species; Travel, OHV, and Recreation; Livestock Grazing, and Fire Management programs. Harm may result from activities that modify, damage, or destroy habitat for the fishes. Harassment of adults or lethal take of eggs and larvae may result from people or livestock

trampling in the stream, or from water drafting for wildland fire efforts. Harassment and mortality may also result from fish handling if translocation, salvage, or other forms of capture are necessary during restoration, habitat enhancement, or other recovery activities. Take of individual fish cannot be quantified; therefore, we assume incidental take of the Big Spring spinedace, White River springfish, and Pahrump poolfish to be exceeded if BLM fails to adhere to their conservation measures and the terms and conditions of this opinion, or population declines are demonstrated through ongoing monitoring efforts.

Southwestern willow flycatcher

Overall, the Service estimates that not more than one nesting pair every 5 years will be incidentally taken in the form of harassment or harm over the next 10 years. However, since it is difficult to detect and quantify take of flycatcher, acres of habitat disturbance is used as a surrogate for estimating take for all programs except Livestock Grazing. The Service believes that incidental take of the southwestern willow flycatcher in the form of harassment or harm may occur as a result of the temporary loss of (1) up to 400 acres of habitat from vegetation and weed management activities, (2) up to 40 acres of habitat from authorization of rights-of-way, (3) up to 89 acres of habitat from OHV and recreation management activities, (4) up to 30 acres of habitat from mineral extraction activities, and (5) up to 50 acres of habitat from fire management activities. An unknown acreage of habitat may be disturbed from livestock grazing. We assume incidental take of southwestern willow flycatcher to be exceeded if (a) disturbance of suitable or potentially suitable flycatcher habitat exceeds the acreage of disturbance for each program listed above, or BLM fails to adhere to the conservation measures and terms and conditions of this opinion to minimize adverse effects to the flycatcher from livestock grazing.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed actions. If, during the course of the actions, this level of incidental take is reached and anticipated to be exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. BLM must immediately provide an explanation of the causes of the taking, and review with the Service the need for possible modifications of the reasonable and prudent measures.

F. Reporting Requirements

Upon locating a dead or injured endangered or threatened species, initial notification must be made to the Service's Nevada Fish and Wildlife Office in Las Vegas, Nevada, at (702) 515-5230. Care should be taken in handling sick or injured animals to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death.

1. Desert Tortoise

In conjunction with the care of sick or injured desert tortoises or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by the Service to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

Injured desert tortoises shall be delivered to any qualified veterinarian for appropriate treatment or disposal. Dead desert tortoises suitable for preparation as museum specimens shall be frozen immediately and provided to an institution holding appropriate Federal and State permits per their instructions. Should no institutions want the desert tortoise specimens, or if it is determined that they are too damaged (crushed, spoiled, etc.) for preparation as a museum specimen, then they may be buried away from the project area or cremated, upon authorization by the Service. BLM shall bear the cost of any required treatment of injured desert tortoises, euthanasia of sick desert tortoises, or cremation of dead desert tortoises. Should sick or injured desert tortoises be treated by a veterinarian and survive, they may be transferred as directed by the Service.

2. Fish

Dead fish suitable for preparation as museum specimens shall be frozen immediately and provided to the Nevada Fish and Wildlife Office in Las Vegas, Nevada.

3. Southwestern Willow Flycatcher

Refer to general instructions above if sick, injured, or dead flycatchers are located.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service hereby makes the following conservation recommendations:

1. We recommend that BLM coordinate with the Service to develop measures to minimize the transport of livestock-borne noxious weed seeds, roots, or rhizomes between weed-infested and weed-free areas.

2. We recommend that BLM fully implement Recovery Plans for the desert tortoise, Big Spring spinedace, White River springfish, Pahrump poolfish, and southwestern willow flycatcher and subsequent revisions of these plans within their authority.
3. We recommend that BLM coordinate with other BLM offices in Nevada, Utah, Arizona, and California; and other land management agencies in the northeastern Mojave recovery

unit in the development of regional planning efforts to implement the Desert Tortoise Recovery Plan, and in the integration of those plans with the Ely RMP.

4. We recommend that BLM coordinate with NDOW and the Service to develop and implement scientific investigations that would evaluate Condor Canyon and neighboring properties to determine environmental factors that may be managed to enhance Big Spring spinedace populations.

5. We recommend that BLM coordinate with NDOW and the Service to establish consistent and frequent surveys for the White River springfish at Ash Springs.

6. We recommend that BLM coordinate with NDOW and the Service to install water monitoring equipment at Shoshone Ponds that will allow water quality data collection with minimal disturbance to the Pahrump poolfish.

7. We recommend that BLM identify completion of road designations in tortoise and flycatcher habitat as the highest priority action under the Travel Management Plan.

8. We recommend that any grazing allotment in desert tortoise habitat that becomes vacant should be closed in perpetuity.

9. We recommend that BLM coordinate and partner with other local, State, and Federal agencies as well as private groups to sponsor and/or assist with public education regarding conservation of desert tortoise, Big Spring spinedace, White River springfish, Pahrump poolfish, and southwestern willow flycatcher to enhance public support for conservation activities. Target groups for education and outreach may include OHV groups, hunting groups, home owner associations, scout troops, public schools, libraries, and other audiences and venues associated with land use and/or educational programming.

In order for the Service to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION REQUIREMENT

This concludes formal consultation on the actions outlined in your October 22, 2007, request. As required by 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over an action has been retained (or is authorized by law) and if: (1) The amount or extent of incidental take is exceeded; (2) 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 this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the

action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

LITERATURE CITED

Desert Tortoise

Adams, J. A., A. A. Endo, L. H. Stolzy, P. G. Rowlands, and H. B. Johnson. 1982. Controlled experiments on soil compaction by ORVs in the Mojave Desert, California. Proceedings of the 1981 Desert Tortoise Council Symposium. Pages 200-210.

Averill-Murray, R. C. 2001. Program MARK survival analysis of tortoises voiding their bladders during handling. Proceeding of the 2001 Desert Tortoise Council Symposium. Page 48.

Baxter, R. J. 1988. Spatial distribution of desert tortoises (*Gopherus agassizii*) at Twentynine Palms, California: implications of relocations. *In* proceedings: symposium management of amphibians, reptiles, and small mammals in North America, pp. 180–189. 19–21 July 1988, Flagstaff, Arizona.

Belnap, J. 1996. Soil surface disturbances in cold deserts: effects on nitrogenase activity in cyanobacterial-lichen crusts. Biology and fertility of soils 23:362-367.

Berry, K. H. 1985. Avian predation on the desert tortoise *(Gopherus agassizii)* in California. U.S. Bureau of Land Management, Riverside, California. Report to Southern California Edison Company, Rosemead, California.

Berry, K. H. 1986. Desert tortoise *(Gopherus agassizii)* research in California, 1976-1985. Herpetologica 42:62-67.

Berry, K. H. 1996. Summary of the results of long-term study plots for the desert tortoise in California. Letter to Molly Brady, Bureau of Land Management, Riverside, California. Riverside Field Station, U.S. Geological Survey. Riverside, California.

Berry, K. H. 1997. Demographic consequences of disease in two desert tortoise populations in California. Proceedings: conservation, restoration, and management of tortoises and turtles - an international conference. Pages 91-99.

Berry, K. H. 1999. Preliminary report from the 1999 spring survey of the desert tortoise long-term study plot in Chemehuevi Valley and Wash, California. Box Springs Field Station, Western Ecological Research Center, U.S. Geological Survey. Riverside, California.

Berry, K. H. 2000. Preliminary report on the spring survey of desert tortoises at Goffs permanent study plot. Box Springs Field Station, Western Ecological Research Center, U.S. Geological Survey. Riverside, California.

Berry, K. H. 2003. Declining trends in desert tortoise populations at long-term study plots in California between 1979 and 2002: multiple issues. Abstract of paper presented at the twenty-eighth annual meeting of the Desert Tortoise Council.

Berry, K. H. and B. L. Burge. 1984. The desert tortoise in Nevada. Chapter 8 *In*: the status of the desert tortoise *(Gopherus agassizii)* in the United States. Report to U.S. Fish and Wildlife Service from the Desert Tortoise Council. Order No. 11310-0083-81.

Berry, K. H. and L. L. Nicholson. 1984. The distribution and density of desert tortoise populations in California in the 1970's. Pages 26-60 *In:* The status of the desert tortoise *(Gopherus agassizii)* in the United States. Report to U.S. Fish and Wildlife Service from the Desert Tortoise Council. Order No. 11310-0083-81.

Berry, K. H. and F. B. Turner. 1987. Notes on the behavior and habitat preferences of juvenile desert tortoises (*Gopherus agassizii*) in California. Proceeding of the 1984 Desert Tortoise Council Symposium. Pages 111-130.

Berry, K. H., L. L. Nicholson, S. Juarez, A.P. Woodman. 1990. Changes in desert tortoise populations at four study sites in California. Proceedings of the 1986 Desert Tortoise Council Symposium. Pages 60-80.

Berry, K. H., E. K. Spangenberg, B. L. Homer, and E. R. Jacobson. 2002. Deaths of desert tortoises following periods of drought and research manipulation. Chelonian Conservation and Biology 4:436-448.

Berry, K. H., F. G. Hoover, and M. Walker. 1996. The effects of poaching desert tortoises in the Western Mojave Desert: evaluation of landscape and local impacts. Proceedings of the twenty-first annual meeting of the Desert Tortoise Council. Page 45.

Biosystems Analysis, Incorporated. 1991. A review of the emergency listing of the desert tortoise (*Gopherus agassizii*). Unpublished draft report prepared for the city of Ridgecrest, California.

BLM (Bureau of Land Management). 1980. The California Desert Conservation Plan. Prepared by BLM, California Desert Plan Program, Riverside, California. 173 pages.

BLM. 1990. Draft raven management plan for the California Desert Conservation Area. Prepared by Bureau of Land Management, California Desert District, Riverside, California. April 1990.

BLM. 1996. Recreation & public purposes act, revised August 1996. U.S. Department of Interior. BLM/WY/GI-94/036+4333REV96.

BLM. 1998. Proposed Las Vegas resource management plan and final environmental impact statement. Las Vegas Field Office, Las Vegas, Nevada. May 1998. Two volumes.

BLM. 2000. Approved Caliente Management Framework Plan Amendment and Record of Decision for the Management of Desert Tortoise Habitat. Ely Field Office. Ely, Nevada. September 19, 2000. 86 pages.

BLM. 2002a. Proposed Northern and Eastern Colorado coordinated management plan. A California Desert Conservation Area Plan Amendment. Bureau of Land Management, California Desert District, Moreno Valley, California.

BLM. 2002b. Proposed Northern and Eastern Mojave Desert management plan amendment to the California Desert conservation area plan and final environmental impact statement.

BLM. 2005. Final environmental impact report and statement for the West Mojave Plan. A habitat conservation plan and California Desert Conservation Area Plan Amendment. Bureau of Land Management, California Desert District, Moreno Valley, California. January 2005. 2 volumes.

BLM. 2007a. Biological assessment for the proposed Ely resource management plan. Bureau of Land Management, Ely District Office, Ely, Nevada. October 2007.

BLM. 2007b. Ely proposed resource management plan/final environmental impact statement. Volumes I and II. November 2007.

BLM. 2007c. Vegetation treatments using herbicides on Bureau of Land management lands in 17 western states. Final programmatic environmental impact statement. Volumes I and II. June 2007.

BLM. 2008. Additional information regarding anticipated disturbance of desert tortoise habitat submitted by the Ely District Office (J. Weeks) to the Service (M. Burroughs) on January 18, 2008.

Blythe, A.K., D.E. Swann, R.J. Steidl, and E.W. Stitt. 2003. Movement patterns of translocated desert tortoises. Proceeding of the 2003 Desert Tortoise Council Symposium. Page 81.

Boarman, W. I. 1992. The raven management program: Status as of 1992. Paper presented at the 1992 Desert Tortoise Council Symposium. Pages 113-116.

Boarman, W. I. 1993. When a native predator becomes a pest: a case study. For: conservation and resource management (S. K. Majumdar, *et al.*, eds.), pages. 186-201. Pennsylvania. Academy of Science, Easton, Pennsylvania.

Boarman, W. I. 2002a. Threats to desert tortoise populations: a critical review of the literature. U. S. Geological Survey, Western Ecological Research Center, Sacramento, California. Unpublished report prepared for the West Mojave Planning Team, Bureau of Land Management. August 9, 2002.

Boarman, W. I. 2002b. Reducing predation by common ravens on desert tortoises in the Mojave and Colorado Deserts. Unpublished report prepared for the Bureau of Land Management. July 18, 2002. 33 pp.

Boarman, W. I. and W. B. Kristan. 2006. Trends in common raven populations in the Mojave and Sonora deserts: 1968-2004. Draft report to U. S. Fish and Wildlife Service, Ventura, California. Contract No. 814405M055.

Boarman, W. I. and K. H. Berry. 1995. Common ravens in the southwestern United States, 1968-92. Pages 73-75 in E. T. LaRoe, G. F. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac, editors. Our living resources: A report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems. National Biological Service. Washington, D.C.

Boarman, W. I., and M. Sazaki. 1996. Highway mortality in desert tortoises and small vertebrates: success of barrier fences and culverts. *In*: G. J. Evink, P. Garrett, D. Zeigler, and J. Berry (eds.), *Trends in addressing transportation related wildlife mortality. Proceedings of the transportation related wildlife mortality seminar.* Environmental Management Office, Department of Transportation, Tallahassee, Florida.

Boarman, W. I., M. Sazaki, and W. B. Jennings. 1997. The effect of roads, barrier fences, and culverts on desert tortoise populations in California, USA. *In* J. Van Abbema (ed.), Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles-An International Conference, pages 54-58. New York Turtle and Tortoise Society, New York.

Bondello, M. C. 1976. The effects of high-intensity motorcycle sounds on the acoustical sensitivity of the desert iguana *(Dipsosaurus dorsalis)*. M.A. Thesis, Biology Dept., California State University, Fullerton. 37 pages.

Bondello, M. C., A. C. Huntley, H. B. Cohen, and B. H. Brattstrom. 1979. The effects of dune buggy sounds on the telencephalic auditory evoked response in the Mojave fringe-toed lizards (*Uma scoparia*). Report, Contract NO. CA-060-CT7-2737, USDI Bureau of Land Management, Riverside, California. 31 pages.

Borysenko, M., and S. Lewis. 1979. The effect of malnutrition on immunocompetence and whole body resistance to infection in *Chelydra serpentina*. Developmental and Comparative Immunology 3:89-100.

Bowles, A. E., J. K. Francine, J. Matesic, and H. Stinson. 1997. Effects of simulated sonic booms and low-altitude aircraft noise on the hearing of the desert tortoise *(Gopherus agassizii)*. Abstracts from the 22nd Annual Desert Tortoise Council Symposium. Pages 8-10.

Brady, W. W., M. R. Stromberg, E. F. Aldon, C. D. Bonham, and S. W. Henry. 1989. Response of a semidesert grassland to 16 years of rest from grazing. Journal of Range Management 42(4):284-288.

Brattstrom, B. H., and M. C. Bondello. 1983. The effect of off-road vehicle noise on three species of desert vertebrates. *In*: R. H. Webb and H. G. Wilshire, editors. Environmental effects of off-road vehicles: Impacts and management in arid regions. Springer-Verlag, New York. Pages 167-221.

Britten, H. B., B. R. Riddle, P. F. Brussard, R. W. Marlow and T. E. Lee, Jr. 1997. Genetic delineation of management units for the desert tortoise, *Gopherus agassizii*, in northeastern Mojave Desert. Copeia 1997: 523-530.

Brooks, M. L. 1998. Alien annual grass distribution, abundance, and impact on desert tortoise habitat in the western Mojave Desert. Ph.D. Dissertation. University of California at Riverside.

Brooks, M. L., and T. C. Esque. 2002. Alien plants and fire in desert tortoise (*Gopherus agassizii*) habitat of the Mojave and Colorado deserts. Chelonian Conservation and Biology 4:330-340.

Brooks, M. L., T. C. Esque, and J. R. Matchett. 2003. Current status and management of alien plants and fire in desert tortoise habitat. Proceedings of the 2003 Desert Tortoise Council Symposium. Page 82.

Brown, D. E., and R. A. Minnich. 1986. Fire and changes in creosote bush scrub of the western Sonoran Desert, California. American Midland Naturalist 116(2):411-422.

Brown, M. B., I. M. Schumacher, P.A. Klein, K. Harris, T. Correll, and E.R. Jacobson. 1994. *Mycoplasma agassizii* causes upper respiratory tract disease in the desert tortoise. Infection and Immunity 62: 4580-4586.

Brown, D. R. , I. M. Schumacher, G. S. McLaughlin, L. D. Wendland, M. B. Brown, P. A. Klein, and E. R. Jacobson. 2002. Application of diagnostic tests for mycoplasmal infections of the desert and gopher tortoises, with management recommendations. Chelonian Conservation and Biology 4:497-507.

Brum, G. D., R. S. Boyd, and S. M. Carter. 1983. Recovery rates and rehabilitation of powerline corridors. *In*: Environmental effects of off-road vehicles: impacts and management in arid regions (Webb, R. H., & H. G. Wilshire, eds.). Springer-Verlag, New York. Pages 303-314.

Bulova, S. J. 1994. Patterns of burrow use by desert tortoises: gender differences and seasonal trends. Herpetological. Monographs 8:133-143.

Burge, B.L. 1978. Physical characteristics and patterns of utilization of cover sites by *Gopherus agassizii* in southern Nevada. Proceedings of the 1978 Desert Tortoise Council Symposium. Pages 80-111.

Burge, B. L. 1983. Impact of Frontier 500 off-road vehicle race on desert tortoise habitat. Proceedings of the 1983 Desert Tortoise Council Symposium. Pages 27-38.

Burge, B. L. and W. G. Bradley. 1976. Population density, structure and feeding habits of the desert tortoise *(Gopherus agassizii)*, in a low desert study area in southern Nevada. Proceedings of the 1976 Desert Tortoise Council Symposium. Pages 51-74.

Bury, R. B. 1978. Desert tortoises and off-road vehicles: Do they mix? Proceedings of the 1978 Desert Tortoise Council Symposium. Page 126.

Bury, R. B. 1980. What we know about off-road vehicle impacts on wildlife. *In*: R. N. L. Andrews and P. F. Nowak, editors. Off-road vehicle use: A management challenge. U. S. Department of Agriculture and University of Michigan, School of Natural Resources. Pages 110-120.

Bury, R. B. 1987. Off-road vehicles reduce tortoise numbers and well-being. U. S. Department of the Interior, Fish and Wildlife Service, National Ecology Research Center, Fort Collins, Colorado. Research Information Bulletin Number 87-6.

Bury, R. B., R. A. Luckenbach, and S. D. Busak. 1977. Effects of off-road vehicles on vertebrates in the California desert. U. S. Department of the Interior, Wildlife Research Report 8, Washington, D.C.

Bury, R. B. and R. A. Luckenbach. 1983. Vehicular recreation in arid land dunes: biotic responses and management alternatives. *In* R. H. Webb and H. G. Wilshire, editors. Environmental effects of off-road vehicles: impacts and management in arid regions. Springer-Verlag, New York. Pages 207-221.

Bury, R. B. and R. A. Luckenbach. 1986. Abundance of desert tortoises *(Gopherus agassizii)* in natural and disturbed areas. U. S. Department of the Interior, Fish and Wildlife Service, National Ecology Research Center, Fort Collins, Colorado. 24 pages.

Bury, R. B. and Luckenbach, R.A. 2002. Comparison of desert tortoise (*Gopherus agassizii*) populations in an unused and off-road vehicle area in the Mojave Desert. Chelonian Conservation Biology 4(2):457-463.

Bury, R. B., T. C. Esque, L. A. DeFalco, and P. A. Medica. 1994. Distribution, habitat use, and protection of the desert tortoise in the Eastern Mojave Desert. *In:* R. B. Bury and D. J. Germano, editors. Biology of the North American tortoises. National Biological Survey, Fish and Wildlife Research 13. Pages 57-72.

Christopher, M. M., K. H. Berry, B. T. Henen, and K. A. Nagy. 2003. Clinical disease and laboratory abnormalities in free-ranging desert tortoises in California (1990-1995). Journal of Wildlife Diseases 39:35-56.

Congdon, J. D., A. E. Dunham, and R. C. Van Loben Sels. 1993. Delayed sexual maturity and demographics of blanding's turtles (*Emydoidea blandingii*): Implications for conservation and management of long-lived organisms. Conservation Biology 7: 826-833.

Cooke, R. U. and A. Warren. 1973. Geomorphology in deserts. University of California Press, Berkeley, California. 374 pages.

Davidson, E., and M. Fox. 1974. Effects of off-road motorcycle activity on Mojave desert vegetation and soil. Madrono 22:381-412.

Desert Tortoise Council. 1994 (Revised 1996). Guidelines for handling desert tortoises during construction projects. Edward L. LaRue, Jr., editor. San Bernardino, California.

Epstein, E., W. J. Grant, and R. A. Struchtmeyer. 1966. Effects of stones on runoff, erosion, and soil moisture. Proceedings of the Soil Science Society of America 30:638-640.

Evans, R. 2001. Free-roaming dog issues at the United States Marine Corps Air Ground Combat Center, Twentynine Palms, California. Proceedings of the 2001 Desert Tortoise Council Symposium. Page 61.

Feldmeth, R. and R. F. Clements. 1990. City-wide survey of desert tortoise and Mojave ground squirrel: Final report for the City of Palmdale. Ecological Research Services, Claremont, California.

Gardner, T. J. and E. D. Brodie, Jr. 2000. The occupation of steep slopes by desert tortoises (*Gopherus agassizii*) in the western Mojave Desert: a description of occupied habitats, habitat use, and desert tortoise density. Final report.

Germano, D. J., R.. B. Bury, T. C. Esque, T. H. Fritts, and P. A. Medica. 1994. Range and habitat of the desert tortoise. *In:* R. B. Bury and D. J. Germano, editors. Biology of the North American tortoises. National Biological Survey, Fish and Wildlife Research 13:57-72.

Gibson, A. C., M. R. Sharifi, and P. W. Rundel. 1998. Effects of military activities and dust on creosote bushes. Proceedings of the 1998 Desert Tortoise Council Symposium, Tucson, Arizona.

Gifford, G. F., and R. H. Hawkins. 1978. Hydrological impact of grazing on infiltration: a critical review. Water Resources Research 14:305-313.

Gillette, D. A. and J. A. Adams. 1983. Accelerated wind erosion and prediction of rates. *In*: R. H. Webb and H. G. Wilshire, editors. Environmental effects of off-road vehicles: impacts and management in arid regions. Springer-Verlag, New York. Pages 95-109.

Goodlett, G., and A.P. Woodman. 2003. Desert tortoise population survey at Virgin Slope desert tortoise study plot, spring 2003. Unpublished report prepared for Arizona Game and Fish Department, Nongame Branch, Contract G90040-K, Phoenix, Arizona.

Hanski, I. 1999. Metapopulation Ecology. Oxford University Press. Oxford.

Harless, M. L., A. D. Walde, D. K. Delaney, L. L. Pater, and W. K. Hayes. 2007. The effect of sampling effort on home range estimates of desert tortoises from the West Mojave Desert. Abstract of paper presented at the Thirty-Second Annual Meeting of the Desert Tortoise Council, Las Vegas, Nevada.

Hastey, E., L. K. Rosenkrance, B. R. Templeton, J. M. Parker, W. H. Radtkey, D. L. Harlow, B. D. Taubert, F. Worthley, W. A. Molini, R. D. Radantris. 1991. Compensation for the desert tortoise. A report prepared for the Desert Tortoise Management Oversight Group. November 1991. 16 pages.

Heaton, J.S., A. Karl, K. Nussear, R. Inman, and C. Everly. 2004. Estimation of numbers of desert tortoises in the additional training lands at Fort Irwin and the Western Mojave Recovery Unit. Unpublished calculations.

Henen, B.T. 1997. Seasonal and annual energy budgets of female desert tortoises (*Gopherus agassizii*). Ecology 78:283-296.

Hinkley, B. S., R. M. Iverson, and B. Hallet. 1983. Accelerated water erosion in ORV-use areas. *In:* R. H. Webb and H. G. Wilshire, editors. Environmental effects of off-road vehicles: impacts and management in arid regions. Springer-Verlag, New York. pp. 81-96.

Hovik, D. C. and D. B. Hardenbrook. 1989. Summer and fall activity and movements of desert tortoise in Pahrump Valley, Nevada. Abstract of paper presented at the fourteenth annual meeting of the Desert Tortoise Council.

Jacobson, E. R., T. J. Wronski, J. Schumacher, C. Reggiardo, and K. H. Berry. 1994. Cutaneous dyskeratosis in free-ranging desert tortoises, *Gopherus agassizii*, in the Colorado Desert of Southern California. Journal of Zoo and Wildlife Medicine 25(1):68-81.

Jennings, W. B. 1993. Foraging ecology of the desert tortoise (*Gopherus agassizii*) in the western Mojave Desert. Masters thesis. University of Texas, Arlington.

Jennings, W. B. 1997. Habitat use and food preference of the desert tortoise, *Gopherus agassizii*, in the Western Mojave Desert and impacts of off-road vehicles. Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles–An International Conference. Pages 42-45.

Jones, A. 2000. Effects of cattle grazing on North American arid ecosystems: A quantitative review. Western North American Naturalist 60:155-164.

Karl. A. 1981. The distribution and relative densities of the desert tortoise *(Gopherus agassizii)* in Lincoln and Nye Counties, Nevada. Proceedings of the 1981 Desert Tortoise Council Symposium. Pages 76-92.

Karl, A. E. 1983a. The distribution and relative densities of the desert tortoise *(Gopherus agassizii)* in Clark County, Nevada. Unpublished Report to Bureau of Land Management, Denver, Colorado. Contract No. YA-512-CT9-90. 46 pp.

Karl, A. E. 1983b. The distribution, relative densities, and habitat associations of the desert tortoise *(Gopherus agassizii)* in Nevada. M.S. Thesis, California State University, Northridge. 111 pp.

Knight, R. L., and J. Kawashima. 1993. Responses of raven and red-tailed hawk populations to linear right-of-ways. Journal of Wildlife Management 57: 266-271.

Knight, R. L., H. A. L. Knight, and R. J. Camp. 1993. Raven populations and land-use patterns in the Mojave Desert, California. Wildlife Society Bulletin 21:469-471.

Kristan, W. B. III, and W. I. Boarman. 2001. The spatial distribution of common ravens (*Corvus corax*) and raven depredation. *In:* W. B. Kristan, III, ed., Effects of habitat selection on avian population ecology in urbanizing landscapes. Ph.D. Dissertation, University of California, Riverside. Riverside, CA 92521.

Kristan, W. B. III, W. I. Boarman, and J. J. Crayon. Diet composition of common ravens across the urban-wildland interface of the West Mojave Desert. Wildlife Society Bulletin 32(1):244-253.

Lamb, T., J.C. Avise, J. W. Gibbons. 1989. Phylogeographic patterns in mitochondrial DNA of the desert tortoise (*Xerobates agassizii*), and evolutionary relationships among North American gopher tortoises. Evolution 43: 76-87.

Lamb, T., and C. Lydehard. 1994. A molecular phylogeny of the gopher tortoises, with comments on familiar relationships within the Testudinoidea. Molecular Phylogenetics and Evolution 3: 283-91.

Lance, V. 2006. Temperature-dependent sex determination in reptiles. Abstract and presentation given at the 31st Desert Tortoise Council Symposium, Tucson, Arizona. February 17-20, 2006.

LaRue, E. and S. Dougherty. 1999. Federal biological opinion analysis for the Eagle Mountain Landfill project. Proceedings of the 1997-1998 Desert Tortoise Council Symposium. Pages 52-58.

Lathrop, E. W. 1983. The effect of vehicle use on desert vegetation. *In*: Environmental effects of off-road vehicles: Impacts and management in arid regions. Springer-Verlag, New York. Pages 153-166.

Levins R., and D. Culver. 1971. Regional coexistence of species and competition between rare species. Proceedings of the National Academy of Sciences 68:1246-1248.

Levin S. A., D. Cohen, A. Hastings. 1984. Dispersal strategies in patchy environments. Theoretical Population Biology 26:165-191

Luckenbach, R. A. 1975. What the ORVs are doing to the desert. Fremontia 2:3-11.

Luckenbach, R. A. 1982. Ecology and management of the desert tortoise *(Gopherus agassizii)* in California. *In*: R. B. Bury, editor. North American tortoises: Conservation and ecology. U.S. Fish and Wildlife Service, Wildlife Research Report 12, Washington, D.C.

Longshore, K. M., J. R. Jaeger, and J. M. Sappington. 2003. Desert tortoise (*Gopherus agassizii*) survival at two eastern Mojave Desert sites: death by short-term drought? Journal of Herpetology 37:169–177.

Maloiy, G. M. O. 1979. Comparative physiology of osmoregulation in animals. Academic Press, New York.

McLuckie, A. M. and R. A. Fridell. 2002. Reproduction in a desert tortoise population on the Beaver Dam Slope, Washington County, Utah. Chelonian Conservation and Biology 2002, 4(2):288-294.

McLuckie, A. M., M. R. M. Bennion, and R. A. Fridell. Draft 2006. Regional desert tortoise monitoring in the Red Cliffs Desert Reserve, 2005. Salt Lake City: Utah Division of Wildlife Resources, Publication Number 06-06. 44 pages.

Medica, P. A., R. B. Bury, and F. B. Turner. 1976. Growth of the desert tortoise *(Gopherus agassizii)* in Nevada. Copeia 1975:639-643.

Morafka, D. J., K. H. Berry, and E. K. Spangenberg. 1997. Predator-proof field exclosures for enhancing hatching success and survivorship of juvenile tortoises: a critical evaluation. Pages 147-165 *in* Proceedings: conservation, restoration, and management of tortoises and turtles - an international conference (J. Van Abemma, ed.). New York Turtle and Tortoise Club, New York.

Mueller, J. M., K. R. Sharp, K. K. Zander, D. L. Rakestraw, K. P. Rautenstrauch, and P. E. Lederle. 1998. Size-specific fecundity of the desert tortoise (*Gopherus agassizii*). Journal of Herpetology 32:313-319.

Naegle, S. 1976. Physiological response of the desert tortoise, *Gopherus agassizii.* Master of Science thesis, University of Nevada, Las Vegas, Nevada.

Nagy, K. A. and P. A. Medica. 1986. Physiological ecology of desert tortoises in southern Nevada. Herpetologica 42:73-92.

Nakata, J. K. 1983. Off-road vehicular destabilization of hill slopes: The major contributing factor to destructive debris flows in Ogden, Utah, 1979. *In*: R. H. Webb and H. G. Wilshire, editors. Environmental effects of off-road vehicles: impacts and management in arid regions. Springer-Verlag, New York. Pages 343-354.

National Park Service. 2002. General management plan for the Mojave National Preserve. San Bernardino County, California. April 2002.

Nevada Division of Wildlife. 2002. Letter from Cris Tomlinson to Bureau of Land Management regarding summaries of special recreation permit applications for the period January 2002 to June 2002: Terrible's Town 250 (BLM Permit No. NV-050-02-008).

Niblick, H. A., D. C. Rostal, and T. Classen. 1994. Role of male-male interactions and female choice in the mating system of the desert tortoise, *Gopherus agassizii*. Herpetological Monographs 8:124-132.

Nicholson, L. 1978. The effects of roads on desert tortoise populations. Proceedings of the 1978 Desert Tortoise Council Symposium. Pages 127-129.

Olson, T. E. 1996. Comparison of impacts and mitigation measures along three multi-state linear construction projects. Proceedings of the 1996 Desert Tortoise Council Symposium. Pages 1-9.

Olson, T. E., K. Jones, D. McCullough, and M. Tuegel. 1993. Effectiveness of mitigation for reducing impacts to desert tortoise along an interstate pipeline route. Proceedings of the 1992 Desert Tortoise Council Symposium. Pages 209-219.

Oftedal, O. T. 2002. The nutritional ecology of the desert tortoise in the Mohave and Sonoran deserts. *In:* Van Devender, T.R., editor. The Sonoran desert tortoise. Natural history, biology and conservation. Tucson, AZ. University of Arizona Press. Pages 194-241.

Oftedal, O. T. 2003. Are desert tortoises nutritionally constrained by a shortage of high PEP plants, and if so what do we do? Proceedings of the 2003 Desert Tortoise Council Symposium. Pages 130-131.

Origgi, R., C.H. Romero, P.A. Klein, K.H. Berry, and E.R. Jacobson. 2002. Serological and molecular evidences of herpesvirus exposure in desert tortoises from the Mojave Desert of California. Abstract of paper presented at the twenty-seventh annual meeting of the Desert Tortoise Council.

Peterson, C. C. 1994. Different rates and causes of high mortality in two populations of the threatened desert tortoise *Gopherus agassizii*. Biological Conservation 70:101–108.

Peterson, C.C. 1996. Ecological energetics of the desert tortoise (*Gopherus agassizii*): effects of rainfall and drought. Ecology 77:1831-1844.

Rainboth, W.J., D.G. Booth, and F B. Turner. 1989. Allozyme variation in Mojave populations of the desert tortoise. Copeia 1989: 115-123

Regional Environmental Consultants. 2000. Clark County multiple species habitat conservation plan and environmental impact statement. Report prepared for Clark County and U.S. Fish and Wildlife Service. San Diego, California. June 2000.

Sazaki, M., W.I. Boarman, G. Goodlett, and T. Okamoto. 1995. Risk associated with long distance movements by desert tortoises. Proceedings of the 1994 Desert Tortoise Council Symposium. Pages 33-48.

Service. 1993. Draft for the desert tortoise (Mojave population). Prepared for Regions 1, 2, and 6 of the Fish and Wildlife Service. Portland, Oregon. 170 pp. plus appendices.

Service. 1994. Desert tortoise (Mojave population) recovery plan. Portland, Oregon. 73 pp. plus appendices.

Service. 2003. Draft programmatic consultation guidance. July 16, 2003.

Service. 2006. Range-wide monitoring of the Mojave population of the desert tortoise: 2001-2005. Summary report prepared by the Desert Tortoise Recovery Office, Reno, Nevada.

Sherman, M. W. 1993. Activity patterns and foraging ecology of nesting common ravens in the Mojave Desert, California. S.S. thesis, Colorado State University, Ft. Collins, Colorado.

Spotila, J. R., L. C. Zimmerman, C. A. Binckley, J. S. Grumbles, D. C. Rostal, A. List, Jr., E. C. Beyer, K. M. Philips, and S. J. Kemp. 1994. Effects of incubation conditions on sex determination, hatching success, and growth of hatchling desert tortoises, *Gopherus agassizii*. Herptological Monographs 8:103-116.

Tierra Madre Consultants. 1991. Biological assessment for Lancaster City and planning area: relative density surveys for desert tortoise and cumulative human impact evaluations for Mohave ground squirrel habitat. Unpublished report prepared for the City of Lancaster, California. August 1991. 51 pages.

Tracy, C. R., R. Averill-Murray, W. I. Boarman, D. Delahanty, J. Heaton, E. McCoy, D. Morafka, K. Nussear, B. Hagerty, and P. Medica. 2004. Desert tortoise recovery plan assessment report. Unpublished report. 254 pages.

Tracy, C. R. 1996. Nutritional ecology of the desert tortoise. Report to National Biological Service. Biological Resources Research Center, Univ. Nevada, Reno Nevada.

TRW Environmental Safety Systems Inc. 1997. Patterns of burrow use by desert tortoises at Yucca Mountain, Nevada. Unpublished report to U.S. Department of Energy. TRW Environmental Safety Systems Inc., Las Vegas, Nevada

Turner, R. M. 1982. Mohave desertscrub. *In*: Biotic communities of the American southwest-United States and Mexico. D. E. Brown, editor. Special issue of desert plants, volume 4. Pages 157-168.

Turner, R. M. and D. E. Brown. 1982. Sonoran desertscrub. *In*: Biotic communities of the American southwest-United States and Mexico. D. E. Brown, editor. Special issue of desert plants, volume 4. Pages 181-221.

Turner, F. B., K. H. Berry, D. C. Randall, and G. C. White. 1987. Population ecology of the desert tortoise at Goffs, California, in 1983-1986. Annual report to Southern California Edison Company, Rosemead, California. 101 pages.

Turner, F. B., P. Hayden, B. L. Burge, and J. B. Robertson. 1986. Egg production by the desert tortoise (*Gopherus agassizii*) in California. Herpetologica 42: 93-104.

Turner, F. B., P. A. Medica, and C. L. Lyons. 1984. Reproduction and survival of the desert tortoise *(Scaptochelys agassizii)* in Ivanpah Valley, California. Copeia 1984(4):811-820.

U.S. Army National Training Center. 2005. Biological assessment for the proposed addition of maneuver training land at Fort Irwin, California. Prepared by Charis Professional Services Corporation, Temecula, California. May 2003.

U.S. Department of Interior and U.S. Department of Agriculture. 2006. Surface Operating Standards and Guidelines for Oil and Gas Development; BLM/WO/ST-06/021+3071. BLM, Denver, Colorado. 84 pp. Available at http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/gold_book.html.

U.S. General Accounting Office (GAO). 2002. Endangered species: research strategy and long-term monitoring needed for the Mojave desert tortoise recovery program. GAO-03-23. Washington, DC. 53 pages.

Vollmer, A. T., B. G. Maza, P. A. Medica, F. B. Turner, and S. A. Bamberg. 1976. The impact of off-road vehicles on a desert ecosystem. Environmental Management 1:15-129.

von Seckendorf Hoff, K. and R. Marlow. 1997. Highways and roads are population sinks for desert tortoises. Proceedings: conservation, restoration, and management of tortoises and turtles- an international conference. Page 482.

Walde, A., L. Bol, D. Delaney, and L. Pater. 2003. The desert tortoise: a preliminary analysis of operative and environmental temperatures. Unpublished report submitted to the U.S. Fish and Wildlife Service July 25, 2003.

Walker, M. and P. Woodman. 2002. Desert tortoise population survey at Beaver Dam Slope exclosure desert tortoise study plot; spring, 2001. Report to Arizona Game and Fish Department, Phoenix, Arizona

Washington County Commission. 1995. Washington County, Utah desert tortoise incidental take permit application/documents. Unpublished report submitted to the U.S. Department of Interior, Fish and Wildlife Service. December 1995.

Webb, R. H. 1983. Compaction of desert soils by off-road vehicles. *In*: R. H. Webb and H. G. Wilshire, editors. Environmental effects of off-road vehicles: Impacts and management in arid regions. Springer-Verlag, New York. pp. 51-79.

Webb, R. H., H. C. Ragland, W. H. Godwin, and D. Jenkins. 1978. Environmental effects of soil property changes with off-road vehicle use. Environmental Management 2:219-233.

Weinstein, M., K. H. Berry, and F. B. Turner. 1987. An analysis of habitat relationships of the desert tortoise in California. A report prepared for Southern California Edison Company. 96 pages.

Went, F. W. and N. Stark. 1968. The biological and mechanical role of soil fungi. Proceedings of the National Academy of Sciences (U.S.A.) 60:497-505.

Wilshire, H. G. 1977. Orphaning desert land-dirt bikes move faster than planners. Cry California 13:5-7.

Wilshire, H. G. 1979. Study results of nine sites used by off-road vehicles that illustrate land modifications. United States Geological Survey open file report 77:601.

Wilshire, H. G. and J. K. Nakata. 1976. Off-road vehicle effects on California's Mojave Desert. California Geology 29:123-133.

Wilson, D. S., K. A. Nagy, C. R. Tracy, D. J. Morafka, and R. A. Yates. 2001. Water balance in neonate and juvenile desert tortoises, *Gopherus agassizii*. Herpetological Monographs 15:158–170.

Woodbury, A. M. and R. Hardy. 1948. Studies of the desert tortoise, *Gopherus agassizii*. Ecological Monograph 18:145-200.

Woodman, A. P. 1983. Effects of Parker 400 off-road race on desert tortoise habitat in Chemehuevi Valley, California. Proceedings of the 1983 Desert Tortoise Council Symposium. pp. 69-79.

Woodman, P. 2004. Summary report for line distance transects conducted in spring, 2003 in the Mojave Desert, California. Prepared for U.S. Fish and Wildlife Service, Las Vegas, Nevada. Inyokern, California.

Woodman, P. 2005. Summary report for line distance transects conducted in spring, 2004 in the Mojave Desert, California. Prepared for U.S. Fish and Wildlife Service, Reno, Nevada. Inyokern, California.

Young, R., C. Halley, and A. P. Woodman. 2002. Desert tortoise population survey at Littlefield desert tortoise study plot, spring 2002. Unpublished report prepared for Arizona Game and Fish Dept, Nongame Branch, Contract G40088-001, Phoenix, Arizona.

Zimmerman, L.C., M. P. O'Connor, S. J. Kemp, and J. R. Spotila. 1994. Thermal ecology of desert tortoises in the Eastern Mojave Desert: seasonal patterns of operative and body temperatures, and microhabitat utilization. Herpetological Monographs 8:45-59.

Grazing References Cited

Avery, H. W. 1998. Nutritional ecology of the desert tortoise (*Gopherus agassizii*,) in relation to cattle grazing in the Mojave Desert. PhD dissertation, University of California, Los Angeles.

Avery, H. W. and A. G. Neibergs. 1997. Effects of cattle grazing on the desert tortoise, *Gopherus agassizii:* nutritional and behavioral interactions. Proceedings: conservation, restoration, and management of tortoise and turtles- an international conference. July 11-13, 1993. Purchase, New York. Pages 13-20.

Brady, W. W, Stromberg, M. R, Aldon, E. F, Bonham, C. D. and S. H. Henry. 1989. Response of a semi-desert grassland to 16 years of rest from grazing. Journal of range Management 42: 284-288.

Donahue, D. L. 1999. The western range revisited, removing livestock from public lands to conserve native biodiversity. Chapters 3, 4, and 6. G. M. Bakken, editor. University of Oklahoma Press.

Durfee, J. A. 1988. Response of Mohave Desert communities to release from grazing pressure. M.S. thesis. Brigham Young University, Orono, Utah.

Elmore W. and B. Kauffman. 1994. Riparian and watershed systems: degradation and restoration. p 212–231 . *In:* M. Vavra, W.A. Laycock, and R.D. Pieper (ed.) Ecological implications of livestock herbivory in the Western Society for Range Management, Denver, Colorado

Floyd-Hanna, M. L. Fleischner, T. L. and D. Hanna. 2000. Effects of historic livestock grazing on vegetation at Chaco Culture National Historic Park. Final report, environmental studies program, Prescott College. Project No. CHCU-R98-0819.

Gankopp, E. R. 1993. Wolf plants: how finicky are cattle about old growth in standing forage? Special report 923. Agricultural Experimental Station, Oregon State University, Corvalis, Oregon.

Gelbard, J. L. 1999. Multiple scale causes of exotic plant invasions in the Colorado Plateau and Great Basin, USA. Master's Project completed in partial fulfillment of MEM Degree. Nicholas School of the Environment, Duke University, Durham, North Carolina.

Henen, B. T. 1992. Desert tortoise diet and dietary deficiencies that may limit egg production of Goffs, California. Abstracts of the 17th Annual Symposium and Meeting of the Desert Tortoise Council, Las Vegas, Nevada, March 6-9, 1992.

Hobbs, R. J. and L. F. Huenneke. 1992. Disturbance, diversity, and invasion: implications for conservation. Conservation Biology 6(1992):324-327.

Jenkins, P. 1996. Harmful exotics in the United States. *In:* Biodiversity and the law. W. Snape III editor. Island Press, Washington, D.C.

Jennings, W. B. 1993. Foraging ecology of the desert tortoise (*Gopherus agassizii*) in the western Mojave Desert. Masters thesis. University of Texas, Arlington.

Jones, A. 2001. Review and analysis of cattle grazing effects in the arid west, with implications for BLM grazing management in southern Utah. Unpublished report. 43 pages.

Karl. A. 1982. The distribution and relative densities of the desert tortoise, *Gopherus agassizii*, in Lincoln and Nye Counties, Nevada. Unpublished report prepared for the Bureau of Land Management, Contract No. YA-512-CT9-90. Submitted March 28, 1981. 61 pages.

Laylock, W. A. 1994. Implications of grazing vs. no grazing on today's rangelands. *In:* ecological implications of livestock herbivory in the west. M. Vavra, W. A. Laylock, and R. D. Pieper editors, Denver, Colorado.

Marble, J. R. 1990. Rangeland microphytic crust management: distribution, grazing impacts, and mineral nutrition relations. PhD Dissertation, University of Utah, Salt Lake City.

Neff, J. C., R. L. Reynolds, J. Belnap, and P. Lamothe. 2005. Multi-decadal impacts of grazing on soil physical and biochemical properties in southeastern Utah. Ecological Applications 15(1), pages 87-95.

Noss, R. F. and A. Y. Cooperrider. 1994. Managing rangelands. *In:* Saving nature's legacy, protecting and restoring biodiversity. Island Press, Washington, DC.

Oftedal, O. T. 2002. The nutritional ecology of the desert tortoise in the Mohave and Sonoran deserts. *In:* Van Devender, T. R., editor. The Sonoran desert tortoise. Natural history, biology and conservation. Tucson, Arizona. University of Arizona Press. Pages 194-241.

Painter, E. L. 1995. Threats to the California flora: ungulate grazers and browsers. Madroño 42:180-188.

Rasmussen, L. L. and J. D. Brotherson. 1986. Response of winterfat communities to release from grazing pressure. Great Basin Naturalist 46:148-156.

Turner, F. B., K. H. Berry, D. C. Randall, and G. C. White. 1987. Population ecology of the desert tortoise at Goffs, California, in 1983-1986. Annual report to Southern California Edison Company, Rosemead, California. 101 pages.

Turner, F. B., P. Hayden, B. L. Burge, and J. B. Robertson. 1986. Egg production by the desert tortoise (*Gopherus agassizii*) in California. Herpetologica 42: 93-104.

U.S. Department of Interior. 1994. Rangeland Reform '94. Draft Environmental Impact Statement. Washington, DC.

U.S. General Accounting Office. 1991. Report to the Chairman, Subcommittee on National Parks and Public Lands, Committee on Interior and Insular Affairs, House of Representatives. Rangeland management, BLM's hot desert grazing program merits reconsideration. GAO/RCED-92-12. 68 pages.

Wagner, F. H. 1994. Changing institutional arrangements for setting natural resource policy. *In:* ecological implications of livestock herbivory in the west. M. Vavra, W. A. Laylock, and R. D. Pieper editors, Denver, Colorado.

Big Spring Spinedace

Allan, R. C. 1985. A field survey of the endemic fishes of the pluvial White River and Carpenter River systems. Unpublished report. Nevada Department of Wildlife, Reno.

Bostic, R., D. Hitch, L. VanGordon, and R. Swanson. 1990. Water Resources Data – Nevada: Water Year 1990. U.S. Geological Survey Water-Data Report NV-90-1.

Bureau of Land Management (BLM). 1990. Condor Canyon Habitat Management Plan. Caliente Resource Area, Las Vegas District, Nevada. Prepared in cooperation with the Nevada Department of Wildlife, Las Vegas, Nevada.

Garcia, K. T., G. C. Gortsema, R. N. Pennington, and A. M. Preissler. 1991. Water Resources Data – Nevada: Water Year 1991. U.S. Geological Survey Water-Data Report NV-91-1. Carson City, Nevada.

Garside, L. J. and J. H. Schilling. 1979. Thermal waters of Nevada. Nevada Bureau of Mines and Geology. Bulletin 91. University of Nevada, Reno.

Hess, D. A., K. A. Mello, R. J. Sexton, R. L. Young. 1992. Water Resources Data – Nevada: Water Year 1992. U.S. Geological Survey Water-Data Report NV-92-1. Carson City, Nevada.

Langhorst, D. 1991. Status report on Big Spring spinedace contract. Department of Biological Sciences. University of Nevada, Las Vegas. Report to Nevada Department of Wildlife, Las Vegas.

Miller, R. R. and C. L. Hubbs. 1960. The spiny-rayed cyprinid fishes (Plagopterini) of the Colorado River system. Miscellaneous Publication of the Museum of Zoology 115:1-39. University of Michigan.

Minckley, W. L. 1973. Fishes of Arizona. Arizona Game and Fish Dept. Phoenix, Arizona.

NDOW. 2001. Field trip report. Survey native fish populations in particular Big Springs spinedace, 31 July, 1 August, 20 September 2001.

NDOW. 2002. Field trip report. Survey native fish populations in particular Big Springs spinedace, 6-7 August 2002.

NDOW. 2004. 2004 Big Spring spinedace monitoring and recovery activities field trip report, 7-8 September 2004.

NDOW. 2005. Nevada Department of Wildlife native fish and amphibians field trip report, 19-22 September 2005. Meadow Valley Wash, Clover Creek, Condor Canyon, Lincoln County, Nevada.

NDOW. 2006. Native fish and amphibians field trip report for the Meadow Valley Wash, Clover Creek, and Condor Canyon, Lincoln County, Nevada. September 11 through 13, 2006.

Pupacko, A., L. C. Van Gordon, J. R. Stewart, and R. P. Collins. 1989. Water Resources Data – Nevada: Water Year 1989. U.S. Geological Survey Water-Data Report NV-89-1. Carson City, Nevada.

Rinne, W. E. 1971. The life history of *Lepidomeda mollispinis mollispinis* (the Virgin River spinedace) a unique western cyprinid. Unpublished M. S. Thesis. Department of Zoology. University of Nevada, Las Vegas.

Service. 1993. Big Spring Spinedace, *Lepidomeda mollispinis pratensis*, Recovery Plan. Portland, Oregon. 42 pages.

Withers, D. 1986. Field trip report: Condor Canyon survey. May 28, 1986. Nevada Department of Wildlife, Las Vegas.

Withers, D. 1987a. Field trip report: Collection of Big Spring spinedace. June 17, 1987. Nevada Department of Wildlife, Las Vegas.

Withers, D. 1987b. Field trip report: Removal of exotic species and transplant of spinedace. July 13, 1987. Nevada Department of Wildlife, Las Vegas.

Withers, D. 1988. Field trip report: Population inventory of Big Spring spinedace. July 14, 1988. Nevada Department of Wildlife, Las Vegas.

White River Springfish

Bailey, R. M., J. E. Fitch, E. S. Lachner, C. C. Lindsey, C. R. Robins, and W. B. Scott. 1970. A list of common and scientific names of fishes from the United States and Canada. 3rd edition. American Fisheries Society Special Publication No. 6.

Deacon, J. E. and W. L. Minckley. 1974. Desert Fishes. *In*: Desert Biology, Volume II. G. W. Brown, editor. Academic Press, Inc. New York. Pages 385-488

Garside, L. J. and J. H. Schilling. 1979. Thermal Waters of Nevada. Nevada Bureau of Mines and Geology. Bulletin 91. University of Nevada, Reno.

Gilbert, C. 1893. Report on fishes of the Death Valley Expedition collected in southern California and Nevada in 1891, with descriptions of new species. North American Fauna, Number 7:229-234.

Hubbs, C. L. 1932. Studies of the fishes of the order Cyprinodontes. XII. A new genus related to *Empetrichthys*. Occasional Papers of the Museum of Zoology, University of Michigan 252:1-5.

Jordan, D. S. and B. W. Evermann. 1896. Fishes of North and Middle America. United States Commission Fish Fisheries. Bulletin of the United States National Museum Volume 47.

La Rivers, I. 1962. Fishes and fisheries of Nevada. Nevada State Fish and Game Commission, Carson City.

Robins, C. R., R. M. Bailey, C. E. Bond, J. R. Brooker, E. A. Lachner, R. N. Lea, and W. B. Scott. 1980. A list of common and scientific names of fishes from the United States and Canada. 4th edition. American Fisheries Society Special Publication No. 12.

Schoenherr, A. 1981. The role of competition in the replacement of native fishes by introduced species. *In*: R. J. Naiman and D. L. Soltz (eds.). Fishes in North American deserts. John Wiley and Sons, New York.

Sumner, F. B. and M. C. Sargent. 1940. Some observations on the physiology of warm spring fishes. Ecology 21(1):45-54.

Tuttle, P.L., and S. Wiemeyer. 1999. Reconnaissance assessment of contaminants in Pahranagat Valley, Lincoln County, Nevada. U.S. Fish and Wildlife Service, Nevada Fish and Wildlife Office, 24 pp.

Tuttle, P., G. Scoppettone, and D. Withers. 1990. Status and life history of Pahranagat River fishes completion report. U.S. Fish and Wildlife Service, National Fisheries Research Center, Seattle, Washington. 51 pages.

U.S. Geological Survey. 2008. National Water Information System: Web Interface. USGS 09415639 Ash Springs Diversion at Ash Springs, Nevada. 04/06/07 to 04/06/08.

U.S. Fish and Wildlife Service (Service). 1998. Recovery plan for the aquatic and riparian species of Pahranagat Valley. Region 1, Portland, Oregon.

Wilde, G. R. 1989. Foods and feeding periodicity of the White River springfish, *Crenichthys baileyi*. Great Basin Naturalist 49(2):249-251.

Williams, J. E. and G. R. Wilde. 1981. Taxonomic status and morphology of isolated populations of the White River springfish, *Crenichthys baileyi* (Cyprinodontidae). The Southwestern Naturalist 25:485-503.

Williams, C. D. and J. E. Williams. 1982. Summer food habits of fishes from two springs in east-central Nevada. The Southwestern Naturalist 27(4):437-445.

Pahrump Poolfish

Baugh, T. M., J. E. Deacon, and P. Fitzpatrick. 1987. Reproduction and growth of the Pahrump poolfish (*Empetrichthys latos latos* Miller) in the laboratory and in nature. Journal of Aquariculture and Aquatic Sciences 5:1-5.

Deacon, J. E., C. Hubbs and B. J. Zahuranec. 1964. Some effects of introduced fishes on the native fish fauna of southern Nevada. Copeia 1964(2): 384-388.

Deacon, J. E., T. B. Hardy, J. Landye, J. Pollard, W. Taylor and P. Greger. 1980. Environmental analysis of four aquatic habitats in east-central Nevada, June-July, 1980. Unpublished interim summary report to HDR Sciences (Contract No. HDR/RPA15). 218+ pages.

Deacon, J. E. 1984a. Interim report: Status of the Pahrump poolfish *Empetrichthys latos latos* in the irrigation impoundment at Spring Mountain Ranch State Park. Contract E-1-1, Job 3, unpublished report submitted to the Nevada Department of Wildlife, January 17, 1984. 6 pages.

Deacon, J. E. 1984b. Final report: Status of the Pahrump poolfish *Empetrichthys latos latos* in the irrigation impoundment at Spring Mountain Ranch State Park. Contract E-1-1, Job 3, unpublished report submitted to the Nevada Department of Wildlife, July 23, 1984. 6 pages.

Deacon, J. E. 1984c. Recovery efforts for the Pahrump killifish at the Shoshone North Pond. Contract E-1-1, Job 1, unpublished report submitted to the Nevada Department of Wildlife, August 24, 1984. 25 pages.

Heinrich, J. 1991a. Native nongame fish program progress report, January 1, 1990 through December 31, 1990. Unpublished report submitted to the Nevada Department of Wildlife, February 1991. 17 pages.

Heinrich, J. 1991b. Native nongame fish program progress report, January 1, 1991 through December 31, 1991. Unpublished report submitted to the Nevada Department of Wildlife, December 1991. 20 pages.

Heinrich, J. 1993. Native nongame fish program progress report, January 1, 1992 through December 31, 1992. Unpublished report submitted to the Nevada Department of Wildlife, January 1993. 23 pages.

La Rivers, I. 1994. Fishes and Fisheries of Nevada. University of Nevada Press, Reno, NV. Pp. 60-63, 88, 114-116, 191, 216-219, and 520-230.

Logan, W. 1977. Unpublished special Report on the Pahrump killifish in Shoshone Ponds. April 29, 1977. 3 pages.

Minckley, W. L. and J. E. Deacon. 1968. Southwestern fishes and the enigma of "endangered species". Science 159: 1424-1432.

NDOW 1988a. Nevada endemic fish program – June 1, 1986 through June 30, 1987. Unpublished Federal Aid Job Completion Report, October 3, 1988. 9 pages.

NDOW 1988b. Nevada endemic fish program – September 25, 1987 through September 30, 1988. Unpublished Federal Aid Job Completion Report, October 3, 1988. 5 pages.

NDOW 1999. Region III, native fish and amphibian program, program activities report, January 1, 1998 through December 31, 1998. Unpublished report, February 1999. 81+ pages.

NDOW. 2000. Southern region, native fish and amphibian program, program activities report, January 1, 1999 through December 31, 1999. Unpublished report, February 2000. 78+ pages.

NDOW 2004. Field trip report at Shoshone Ponds Natural Area regarding determination of populations of Pahrump poolfish and relict dace, July 7 and July 22, 2005.

NDOW 2005a. Field trip report at Shoshone Ponds Natural Area regarding determination of populations of Pahrump poolfish and relict dace, July 27 and August 2, 2005.

NDOW 2005b. Field trip report at Shoshone Ponds Natural Area regarding determination of populations of Pahrump poolfish and relict dace, August 16 and August 17, 2005.

NDOW 2006. Field trip report at Spring Mountain Ranch, Clark County, Nevada to estimate the population size of Pahrump poolfish, August 7 and 14, 2006.

NDOW 2007. Field trip report at Shoshone Ponds Natural Area regarding determination of populations of Pahrump poolfish and relict dace, August 16 and August 17, 2006.

Selby, D. A. 1977. Thermal ecology of the Pahrump killifish, *Empetrichthys latos latos* Miller. Master Thesis, University of Nevada, Las Vegas, May 1977.

Service 1980. Recovery Plan for the Pahrump killifish. Endangered Species Program, Region 1, Portland, Oregon. 29+ pages.

Sigler, W. F. and J. W. Sigler. 1987. Fishes of the Great Basin, a natural history. University of Nevada Press, Reno, NV. 273-275 pages.

Sjöberg, J. 1989. Native endemic fish program – July 1, 1988 through September 30, 1989. Unpublished Federal Aid Completion Report, Project No.: E-1-4 submitted to the Nevada Department of Wildlife, December 1989. 6+ pages.

Soltz, D. L. and R. J. Naiman. 1978. The natural history of native fishes in the Death Valley system. Natural History Museum of Los Angeles County, Science Series 30: 24.

Southern Nevada Water Authority. 2008. 2008 Water Resource Plan. Southern Nevada Water Authority, Las Vegas, Nevada. 58+ pages.

In Litt.

Barber, Mark. 1987. From Bureau of Land Management District Biologist, narrative describing history of activities at Shoshone Ponds Natural Area, March 9, 1987.

Deacon, James. E. 1970. Field notes regarding transplant of *Empetrichthys latos* from Manse Ranch to Los Latos Pool, June 4, 1970.

Haskins, Richard. 1983. Field trip report submitted to the Nevada Department of Wildlife regarding the stocking of Spring Mountain Ranch State Park Reservoir, June 10, 1983.

McLelland, L. 1976. Field trip report regarding reintroduction of Pahrump killifish (*Empetrichthys latos*) into the facilities at Shoshone Pond, September 7, 1976.

McLelland, L. 2003a. Field trip report at Spring Mountain Ranch State Park and Corn Creek, Desert National Wildlife Refuge regarding introduction of Pahrump poolfish to the new refuge tank at Corn Creek, June 3, 2003.

McLelland, L. 2003b. Letter regarding annual Pahrump poolfish surveys at Shoshone Ponds Natural Area estimating population at lowest numbers since 1989, September 5, 2003.

NDOW. 2001a. Field trip report at Corn Creek to determine population size of Pahrump poolfish and document invasion of exotic aquatic species, June 4 and 5, 2001.

NDOW. 2003a. Field trip report at Spring Mountain Ranch State Park and Corn Creek, Desert National Wildlife Refuge regarding introduction of Pahrump poolfish to the new refuge tank at Corn Creek, June 3, 2003.

NDOW. 2003b. Letter regarding annual Pahrump poolfish surveys at Shoshone Ponds Natural Area estimating population at lowest numbers since 1989, September 5, 2003.

Selby, D. A. 1976. Letter to Dr. R. J. Naiman, Department of Fisheries and Wildlife, Oregon State University, Corvallis, Oregon, regarding life history information and thermal ecology of Pahrump poolfish, October 13, 1976.

Southwestern Willow Flycatcher

Bent, A. C. 1960. Life histories of North American flycatchers, larks, swallows and their allies. Dover Press, New York, New York. 555 pages.

BioWest. 2005a. Meadow Valley Wash baseline ecological assessment. Submitted to Lincoln County, Pioche, Nevada. 105 pages + appendices.

BioWest. 2005b. Meadow Valley Wash post-flood vegetation assessment. Submitted to U.S. Department of the Interior, Bureau of Land Management, Ely, Nevada. 32 pages.

Brown, B. T. 1988. Breeding ecology of a willow flycatcher population in Grand Canyon, Arizona. Western Birds 19:25-33.

Browning, M. R. 1993. Comments on the taxonomy of Empidonax traillii (willow flycatcher). Western Birds 24:241-257.

Busch, J. D., M. P. Miller, E. H. Paxton, M. K. Sogge, and P. Keim. 2000. Genetic variation in the endangered southwestern willow flycatcher. The Auk 117(3):586-595.

Camp Pendleton Marine Corps Base. 1994. Biological assessment: Riparian and estuarine habitat.

Cardinal, S. N. and E. H. Paxton. 2005. Home range, movement, and habitat use of the southwestern willow flycatcher at Roosevelt Lake, AZ – 2004. U.S. Geological Survey report to the U.S. Bureau of Reclamation, Phoenix, AZ.

DeLoach, C. J. 1991. Salt cedar, an exotic weed of western North American riparian areas: a review of its taxonomy, biology, harmful and beneficial values, and its potential for biological control. Report to the Bureau of Reclamation, Boulder City, Nevada, Contract No. 7-AG-30-04930

Durst, S. L. 2004. Southwestern willow flycatcher potential prey base and diet in native and exotic habitat. Masters Thesis. Northern Arizona University, Flagstaff, Arizona.

Durst, S. L., M. K. Sogge, A. B. Smith, S. O. Williams, B. E. Kus, and S. J. Sferra. 2005. Southwestern willow flycatcher breeding site and territory summary – 2003. U. S. Geological Survey, Colorado Plateau Research Station, Flagstaff, Arizona.

Durst, S. L., M. K. Sogge, S. D. Stump, S. O. Williams, B. E. Kus, and S. J. Sferra. 2007. Southwestern willow flycatcher breeding site and territory summary – 2006. U. S. Geological Survey Open File Report 2007-1391. [http://pubs.usgs.gov/of/2007/1391]

Hanna, W. C. 1928. Notes on the dwarf cowbird in southern California. Condor 30:161-162.

Harrison, H. H. 1979. A field guide to western birds' nests of 520 species found breeding in the United States west of the Mississippi River. Houghton Mifflin Co., Boston. 279 pages.

Holmgren, M. A. and P. W. Collins. 1995. Interim report on the distribution, breeding status, and habitat associations of seven federal special-status bird species and brown-headed cowbirds at Vandenberg Air Force Base, Santa Barbara County, California. Environmental Report No. 3, Museum of Systematics and Ecology, Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara.

Howell, S. N. G., and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University Press, New York, New York. 851 pages.

Hubbard, J. P. 1987. The status of the willow flycatcher in New Mexico. Endangered Species Program, New Mexico Department of Game and Fish, Santa Fe, New Mexico. 29 pp.

Kenwood, K. E. and E. H. Paxton. 2001. Survivorship and movements of southwestern willow flycatchers at Roosevelt Lake, Arizona – 2001. U. S. Geological Survey report to the U. S. Bureau of Reclamation, Phoenix.

King, J. R. 1955. Notes on the life history of Traill's flycatcher (*Empidonax traillii*) in southeastern Washington. The Auk 72:148-173.

Koronkiewicz, T. J. and M. K. Sogge. 2001. Southwestern willow flycatchers recaptured at wintering sites in Costa Rica. North American Bird Bander 26:161-162.

Ligon, J. S. 1961. New Mexico birds and where to find them. The University of New Mexico Press, Albuquerque, New Mexico. 360 pages.

Mayfield, H. F. 1977. Brown-headed cowbird: agent of extermination? American Birds 31:107-113.

Maynard, W. R. 1995. Summary of 1994 survey efforts in New Mexico for southwestern willow flycatcher (*Empidonax traillii extimus*). Contract # 94-516-69, New Mexico Department of Game and Fish, Santa Fe, New Mexico. 48 pages.

McCabe, R. A. 1991. The little green bird: ecology of the willow flycatcher. Palmer Publications, Inc., Amherst, Wisconsin. 171 pages.

McCarthey, T. D., C. E. Paradzick, J. W. Rourke, M. W. Sumner, and R. F. Davidson. 1998. Arizona Partners in Flight southwestern willow flycatcher survey: 1997 survey and nest monitoring report. Technical report, Nongame Branch, Arizona Game and Fish Department, Phoenix.

McKernan, R. L. and G. Braden. 2001. Status, distribution, and habitat affinities of the southwestern willow flycatcher along the lower Colorado River: year 5 – 2000. Report submitted to the U. S. Bureau of Reclamation, Boulder City, Nevada.

Muiznieks, B. D., S. J. Sferra, T. E. Corman, M. K. Sogge, and T. J. Tibbitts. 1994. Arizona Partners in Flight southwestern willow flycatcher survey, 1993. Draft report: Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix, Arizona. Draft of April 1994. 28 pp.

NDOW. 2003. Breeding status and surveys for the southwestern willow flycatcher and yellow-billed cuckoo at various sites in southern Nevada. Program Activities Report January 1, 2002 through December 31, 2002. Southern Region Diversity Program, Las Vegas, Nevada.

Newell, P. J., C. Causey, M. Pollock, E. H. Paxton, and M. K. Sogge. 2005. Survivorship and movements of southwestern willow flycatchers at Roosevelt Lake, Arizona – 2004. U. S. Geological Survey report to U. S. Bureau of Reclamation, Phoenix.

Owen, J. C. and M. K. Sogge. 2002. Physiological condition of southwestern willow flycatchers in native and salt cedar habitats. U. S. Geological Survey report to the Arizona Department of Transportation.

Paxton, E., J. Owen, and M. K. Sogge. 1996. Southwestern willow flycatcher response to catastrophic habitat loss. U. S. Geological Survey Biological Resources Division, Colorado Plateau Research Station, Northern Arizona University, Flagstaff. 12 pp.

Peterson, R. T. 1990. A field guide to western birds. Houghton Mifflin Co., Boston. 432 pages.

Phillips, A. R. 1948. Geographic variation in Empidonax traillii. The Auk 65:507-514.

Phillips, A. R., J. Marshall, and G. Monson. 1964. The Birds of Arizona. University of Arizona Press, Tucson, Arizona. 212 pages.

Ridgely, R. S. and G. Tudor. 1994. The Birds of South America. Volume II: The suboscine Passerines. University of Texas Press, Austin. 814 pages.

San Bernardino County Museum. 1999. Status, distribution, and habitat affinities of the southwestern willow flycatcher along the lower Colorado River, Year 3 – 1998. Redlands, California. 71 pages + appendix.

San Bernardino County Museum. 2001. Status, distribution, and habitat affinities of the southwestern willow flycatcher along the lower Colorado River, Year 4 – 1999. Redlands, California. 83 pages + appendix.

San Diego Natural History Museum. 1995. Empidonax traillii extimus in California. The willow flycatcher workshop. 17 November 1995. 66 pages.

Service. 1995. Final rule determining endangered status for the southwestern willow flycatcher. Federal Register 60:10694-10715.

Service. 1997. Final determination of critical habitat for the southwestern willow flycatcher. Federal Register 62(140):39129-39146.

Service, *in litt.* 2000. Revised survey protocol for the southwestern willow flycatcher. California/Nevada Operations Office, Sacramento, California

Service . 2002. Southwestern Willow Flycatcher Recovery Plan, Region 2, Albuquerque, New Mexico.

Service. 2005. Designation of critical habitat for the southwestern willow flycatcher: final rule. Federal Register 70(201):60886.

Sferra, S. J., T. E. Corman, C. E. Paradzick, J. W. Rourke, J. A. Spencer, and M. W. Sumner. 1997. Arizona Partners in Flight southwestern willow flycatcher survey: 1993-1996 summary report. Technical Report 113, Arizona Game and Fish Department. 104 pages.

Skaggs, R. W. 1996. Population size, breeding biology, and habitat of willow flycatchers in the Cliff-Gila Valley, New Mexico. New Mexico Department of Game and Fish, Santa Fe, New Mexico. 38 pages.

Smith, A. B., C. E. Paradzick, A. A. Woodward, P. E. T. Dockens, and T. D. McCarthey. 2002. Southwestern willow flycatcher 2001 survey and nest monitoring report. Technical Report 191, Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix.

Sogge, M. K. 1995b. Southwestern willow flycatcher surveys along the San Juan River, 1994-1995. Final report to Bureau of Land Management, San Juan Resource Area, National Biological Service, Colorado Plateau Research Station./Northern Arizona University, Flagstaff, Arizona. 27 pages.

Sogge, M. K. and T. J. Tibbitts. 1992. Southwestern willow flycatcher (Empidonax traillii extimus) surveys along the Colorado River in Grand Canyon National Park and Glen Canyon National Recreation Area. NPS CPSU/N. Arizona University, Flagstaff, Arizona. 43 pages.

Sogge, M. K. and T. J. Tibbitts. 1994. Distribution and status of the southwestern willow flycatcher along the Colorado River in the Grand Canyon – 1994. Summary Report. National Biological Service, Colorado Plateau Research Station./Northern Arizona University, Flagstaff, Arizona. 37 pages.

Sogge, M. K. and T. J. Tibbitts, and S. J. Sferra. 1993. Status of the southwestern willow flycatcher along the Colorado River between Glan Canyon Dam and Lake Mead – 1993. Summary Report. National Park Service Coop. Park Studies Unit/Northern Arizona University, U.S. Fish and Wildlife Service and Arizona Game and Fish Department, Flagstaff, Arizona. 69 pp.

Sogge, M. K., R. M. Marshall, S. J. Sferra, and T. J. Tibbitts. 1997. A southwestern willow flycatcher survey protocol and breeding ecology summary. Technical Report NRTR-97/12, National Park Service/Colorado Plateau Research Station/Northern Arizona University. 37 pages.

Spencer, J. A., S. J. Sferra, T. E. Corman, J. W. Rourke, and M. W. Sumner. 1996. Arizona Partners in Flight 1995 southwestern willow flycatcher survey. Technical Report 97, Arizona Game and Fish Department, Phoenix. 69 pages.

Stiles, F. G. and A. F. Skutch. 1989. A guide to the birds of Costa Rica. Cornell University Press, New York.

Tibbitts, T. J., M. K. Sogge, and S. J. Sferra. 1994. A survey protocol for the southwestern willow flycatcher (Empidonax traillii extimus). Technical Report NPS/NAUCPRS/NRTR-94/04, Northern Arizona University, Flagstaff. 24 pages.

Tomlinson, C. 1997. Summary of surveys in 1997 for southwestern willow flycatchers in southern Nevada.

Unitt, P. 1987. *Empidonax traillii extimus*: An endangered subspecies. Western Birds 18:137-162.

Walkinshaw, L. H. 1966. Summer biology of Traill's Flycatcher. Wilson Bulletin 78:31-46.

Whitfield, M. J. 1990. Willow flycatcher reproductive response to brown-headed cowbird parasitism. Masters Thesis, California State University, Chico, California. 25 pages.

Whitfield, M. J. and C. M. Strong. 1995. A brown-headed cowbird control program and monitoring for the southwestern willow flycatcher, South Fork Kern River, California. Calif. Dept. Fish and Game, Bird and Mammal Cons. Program Report 95-4, Sacramento, California. 17 pages.

Whitfield, M. J. and K. M. Enos. 1996. A brown-headed cowbird control program and monitoring for the southwestern willow flycatcher, South Fork Kern River, California, 1996. Final report to the U. S. Army Corps of Engineers, Contract DACW05-96-P-0900. Weldon, California: Kern River Research Center, 1996. 16 pages.

Willard, F. C. 1912. A week afield in southern Arizona. The Condor 14:53-63.

APPENDIX A. REQUEST TO APPEND AN ACTION TO THE PROGRAMMATIC BIOLOGICAL OPINION (FILE NO. 84320-2008-F-0078)

Name of Action: Date:

Requested by:
Title:
Agency/Office
Phone No.

Species Affected:

Critical Habitat Affected: Yes ❑ No ❑

I. Description of Action and Action Area (include map)

A. Habitat quality/suitability:

B. Surveys or assessments conducted:

II. Measures Proposed to Minimize the Effects of the Proposed Action

A. Recommendations for future programmatic actions:

III. Effects of Proposed Action on the Listed Species

A. No. of acres and plant communities disturbed:

B. Description of affected individuals of listed species:

C. Assessment of habitat rehabilitation recommended:

D. Are there additional effects of the action not considered in the programmatic biological opinion? If so, describe.

APPENDIX B. IMPORTANT FORAGE AND SHELTER PLANTS FOR THE DESERT TORTOISE.

Grasses	
Six-weeks three-awn	*Aristida adscensionis*
Gramma grass	*Bouteloua* sp.
Fluffgrass	*Erioneuron pulchellum*
Big galleta grass	*Hilaria rigida*
Bush muhly	*Muhlenbergia porteri*
Indian rice grass	*Oryzopsis hymenoides*
Sand dropseed	*Sporobolis cryptandrus*
Desert needle grass	*Stipa speciosa*
Six-weeks fescue	*Vulpia octoflora*
Shrubs	
White bursage	*Ambrosia dumosa*
Blackbrush	*Coleogyne ramosissima*
California buckwheat	*Eriogonum fasciculatum*
Mormon tea	*Ephedra* sp.
Spiny hopsage	*Grayia spinosa*
Little-leaf ratany	*Krameria parvifolia*
Creosote bush	*Larrea tridentata*
Forbs	
Windmills	*Allionia incarnate*
Two-seeded milkvetch	*Astragalus didymocarpus*
Layne's milkvetch	*Astragalus layneae*
Woolly bottlebrush	*Camissonia boothii*
Desert pincushion	*Chaenactis fremontii*
Nievitas	*Cryptantha* sp.
Rattlesnake weed	*Euphorbia albomarginata*
Sandmat	*Euphorbia micromera*
Deer vetch	*Lotus strigosus*
Desert dandelion	*Malacothrix glabrata*
Combbur	*Pectocarya recurvata*
Plantain	*Plantago* sp.
Desert globemallow	*Sphaeralcea ambigua*

APPENDIX C. LINCOLN COUNTY SECTION 7 FEE PAYMENT FORM
Entire form is to be completed by project proponent

Biological Opinion File Number: 84320-2008-F-0078

Biological Opinion issued by: Nevada Fish and Wildlife Office, Reno, Nevada

Species: Desert tortoise (*Gopherus agassizii*)

Project: _____

Number of acres anticipated to be disturbed: _____

Fee rate (per acre): _____

Total payment required: _____

Amount of payment received: _____

Date of receipt: _____

Check or money order number: _____

Project proponent: _____

Telephone number: _____

Authorizing agencies: Bureau of Land Management

Make checks payable to:

Deliver check to:

If you have questions, contact the Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230.

APPENDIX D. GENERAL DESERT TORTOISE QUALIFICATIONS STATEMENT

This form should be used to provide your qualifications to agency officials if you wish to undertake the duties of an authorized biologist with regard to desert tortoises during construction or other projects authorized under Sections 7 (Biological Opinions) or 10(a)(1)(B) (i.e. Habitat Conservation Plans) of the Endangered Species Act.

(If you seek approval to attach/remove/insert any devices or equipment to/into desert tortoises, withdraw blood, or conduct other procedures on desert tortoises, a recovery permit or similar authorization may be required. Application for a recovery permit requires completion of Form 3-200-55, which can be downloaded at http://www.fws.gov/forms/3-200-55.pdf.)

1. Contact Information:

Name	
Address	
City, State, Zip Code	
Phone Number(s)	
Email Address	

2. Date:

3. Areas in which authorization is requested (check all that apply):

□ San Bernardino, Kern, and Los Angeles Counties, California (Ventura office)
□ Riverside and Imperial Counties, California (Carlsbad office)
□ Nevada □ Utah □ Arizona

4. Please provide information on the project:

USFWS Biological Opinion or HCP No.		**Date:**
Project Name		
Federal Agency		
Proponent or Contractor		

5. If you hold, or have held, any relevant state or federal wildlife permits provide the following:

Species	Dates	State (specify) or Federal Permit Number	Authorized Activities

6. Education: Provide up to three schools, listing most recent first:

Institution	Dates attended	Major/Minor	Degree received

7. Desert Tortoise Training.

Name/Type of Training	Dates (From/To)	Location	Instructor/Sponsor
1. Classes			
2. Field Training			
3. Translocation			
4.			

8. Experience – Include only those positions relevant to the requested work with desert tortoises. Distinguish between Mojave desert tortoise and other experience. Include only your experience, not information for the project you worked on (e.g., if 100 tortoises were handled on a project and you handled 5 of those tortoises, include only those 5. List most recent experience first. Handling a Mojave desert tortoise must be authorized by a Biological Opinion or other permit and reported to the USFWS. Information proved in this section will be used by the USFWS to track the numbers of tortoises affected by previous projects (baseline). **Be sure to include a project supervisor or other contact that can verify your skills and experience in relation to your job performance.** Attach additional sheets as necessary.

Experience by project and activity:

Project Name, Job Title, Dates	Project Contact name, phone no., & Email address	Conduct Clearance Surveys (Hrs/Days)	Excavate DT burrows (No.)	Locate DT No. < 100mm ≥100mm	Relocate DTs (No.)	Excavate, and relocate DT nests (No.)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Experience by project and activity (continued): Each project number should correspond with the project listed on the previous page

Project Number (Corresponds to previous page)	Construct Artificial Burrows (No.)	Monitor project equipment and activities (Hrs/Days)	Oversee project compliance (Hrs/Days)	Supervise field staff (Hrs/Days)	DT fence Installation and inspection (Hrs/Days)	Present DT Awareness Training (No.)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Summary of experience:

Total time spent for all desert tortoise-related field activities (referenced above):
Specify total number of hours:
OR total number of 8-hour days: _____

Total number of miles/kilometers walked conducting survey transects:

Total number of wild, free-ranging desert tortoises you personally handled:

<100 mm: _____

≥100 mm: _____

I certify that the information submitted in this form is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. Ch.47, Sec. 1001.

Signed: _____Date:_____

ATTACHMENT 2.

PROGRAMMATIC INFORMAL CONSULTATION (FILE NO. 84320-2008-I-0079)

BLM requests concurrence from the Service that implementation of eight programs *may affect, but is not likely to adversely affect* listed species as indicated with an (**X**) in Table 1. A description of BLM's proposed action can be found in the programmatic biological opinion (Attachment 1).

Table 1 Effect Determinations for Listed Species by Program

PROGRAMS	Desert Tortoise	Big Spring Spinedace	White River Springfish	Pahrump Poolfish	SW Willow Flycatcher
Vegetation Management		X		X	
Weed Management				X	
Wild Horse Management	X				X
Lands, Realty, and Renewable Energy			X		
Travel and OHV Management		X		X	
Recreation				X	
Geology and Mineral Extraction		X			

The Service reviewed BLM's request including minimization measures and concurs with their determinations of effect for the programs and species identified above in Table 1.

Justification for Concurrence

1. Vegetation and Weed Management

Big Spring Spinedace and Pahrump Poolfish

Refer to the biological opinion for a description of effects to the Big Spring spinedace from weed management activities. Vegetation management activities in Condor Canyon would focus on improving vegetation in the upland areas adjacent to the stream. No vegetation or weed treatments are planned for the area immediately adjacent to Shoshone Ponds. Therefore, effects to the Big Spring spinedace and Pahrump poolfish are anticipated to be negligible in the short term and beneficial in the long term.

2. *Wild Horse Management*

a. Desert Tortoise:

All herd management areas (HMAs) occur outside the range of the desert tortoise in the planning area. Wild horses will remain within two HMAs that will be eliminated in the RMP/Final EIS that overlap approximately 74,550 acres of desert tortoise habitat. BLM may conduct emergency gathers and implement measures to minimize the potential effects of the gathers on the desert tortoise. These measures include: trap sites will be located/in areas that will not impact tortoises or their habitat; holding facilities will not be located within ACECs and preferably outside tortoise habitat; vehicle use will be restricted to existing roads and 25 miles per hour; trash will be contained and removed; hay or grains will not be used for trap enticements in tortoise habitat, nor used for feed in ACECs; and discharge of firearms will be restricted.

b. Southwestern Willow Flycatcher

All horses will be removed from HMAs that overlap with southwestern willow flycatcher habitat along the Meadow Valley Wash and Clover Creek. Wild horses will be removed from the Applewhite, Blue Nose Peak, Clover Creek, Clover Mountains, Delamar Mountains, Little Mountain, Meadow Valley Mountains, and Miller Flat HMAs. Removal of wild horses from these HMAs should result in reduction of erosion, habitat degradation, and spread of noxious and invasive weeds.

3. *Lands, Realty, and Renewable Energy*

White River Springfish

The disposal of Federal land in Pahranagat Valley for urban growth may promote the development of water resources in the valley to support expansion of new communities, which may affect the White River springfish if water development results in depletion of spring flows at Ash Springs. The source of the water that may be required for future land development within the planning area is unknown at this time, and there is not adequate information available to determine effects of future water development on listed species. Applications for new water rights, or changes to existing rights would be required to obtain additional water. As water sources are identified through the State Engineer's permitting process, potential effects to White River springfish must be considered, and if necessary, addressed either under section 7 or section 10 of the Act, as appropriate.

4. *Travel/OHV Management/Recreation*

Big Spring Spinedace and Pahrump Poolfish

BLM will restrict vehicular travel to existing roads and trails until the road designation process is completed. At that time, all vehicular travel will be restricted to roads and trails designated as open or limited use. Cross country travel will no longer be allowed,

and no OHV events occur close to occupied habitat; therefore, the chance that vehicular travel would result in an adverse affect to these species is unlikely. Casual recreational activities such as camping may occur in the vicinity of occupied habitat, but the likelihood that these activities will adversely affect the species is remote.

5. *Geology and Mineral Extraction*

Big Spring Spinedace

The Condor Canyon ACEC is closed to locatable minerals and mineral materials development; therefore, effects from these activities are not expected to occur. Condor Canyon is located within an area of high potential oil and gas development, and any future minerals development would be implemented only under certain conditions that would protect Big Spring spinedace and its designated critical habitat. Although Condor Canyon is considered a high potential oil and gas development area, management prescriptions for the ACEC allow no surface occupancy from this activity, and BLM anticipates that development of oil and gas resources in this area is unlikely.

Conclusion: This response constitutes programmatic informal consultation. When a specific action is proposed that may affect but is not likely to adversely affect a listed species, BLM should complete the second phase of informal consultation by completing the attached form (Appendix A) and submitting it to the Service for concurrence at the action level. This informal consultation does not authorize any take of any listed species.

APPENDIX A (TO ATTACHMENT 2). **INFORMAL CONSULTATION FORM**

(Pages 1-3 to be completed by BLM)

Date: _____

Service File No.: _____ **Agency/Case Project No.:** _____

Species: _____

Project Name: _____

County/State: _____

Jurisdictional land managers: _____

Federal Agency

Name: Bureau of Land Management

Address: _____

City/State/Zip: _____

Contact/Title: _____

Phone/Fax: _____

Project Proponent

Name: _____

Address: _____

City/State/Zip: _____

Contact/Title: _____

Phone/Fax: _____

Service File No.: _____ **Agency/Case Project No.:** _____

Brief Project Description:
(exact location, size, prior site disturbance, starting date, and duration; attach photos of site if available.)

Habitat Description (including surveys conducted and results)**:**

Service File No.: _____ **Agency/Case Project No.:** _____

Minimization Measures:

Additional Comments:

Listed Species: _____

Determination: _____ No effect (for informational purposes only; no Service response required)

_____ Not likely to adversely affect

If determination is *likely to adversely affect*, initiate formal consultation.

Critical Habitat

Affected? _____ Yes _____ No

If yes, determination: _____ Not likely to adversely modify

If determination is *likely to adversely modify*, initiate formal consultation.

Signature: _____ _____

(Agency Representative) Date

Title: _____

(This page to be completed by the U.S. Fish and Wildlife Service)

Service File No.: _____ **Agency/Case Project No.:** _____

Service Response:

Based on the information provided, the agency has determined that the action, as proposed and analyzed, *is not likely to adversely affect* listed species. The U.S. Fish and Wildlife Service

_____ concurs _____ does not concur (see suggested alternatives) with this determination.

Justification for Response:

Suggested Alternatives:

Conclusion:

Signature: _____ _____

Robert D. Williams, Field Supervisor
Nevada Fish and Wildlife Office

Date

ATTACHMENT 3.

TECHNICAL ASSISTANCE (FILE NO. 84320-2008-TA-0080)

Introduction

BLM has requested technical assistance from the Service for the following non-listed species of concern. These species were chosen based on factors such as listing history and status, rarity, population trends, and imminence of threats. Some management actions BLM has proposed to implement as part of their Proposed Action will benefit these species. Those actions are identified under the sub-heading "*BLM Proposed Management Actions*". As part of the technical assistance, the Service is providing management recommendations in addition to BLM's proposed management actions to address potential effects to the species and contribute to BLM's proposed conservation efforts. Implementation of the following management recommendations by the action agency is discretionary, but can assist in conserving the species, thus avoiding the need to list the species in the future.

1. Western burrowing owl (*Athene cunicularia hypugaea*)

Species Description

The western burrowing owl is a small ground-dwelling owl with a total length of about 8 to 10 inches and a wing span of about 21 inches. The legs are long and sparsely feathered and the head is round and lacks eartufts. Adults have a distinct facial ruff, framed by buffy-white eyebrow-to-mallar stripe on the interior part and a white throat. Back and crown are brown with white spots and the underparts are buffy-white with broad brown stripes. Juveniles largely lack adult white spots on back and crown, and the belly is an unmarked buffy color without stripes.

Species Range

Burrowing owl range covers much of the western United States, extending from the Great Plains in the east to the California Coast in the west. North to south, the range extends from southern Canada into Central and South America (Haug *et al.* 1993). Additional populations occur in Florida and the Caribbean.

Habitat

Burrowing owls prefer open, arid, treeless landscapes with low vegetation. The species is found throughout the Great Basin and Mojave landscapes as well as in and around golf courses, cemeteries, road allowances, vacant lots, airports, and other similar habitats associated with urban environments (Haug *et al.* 1993, Floyd *et al.* 2007). Species occurrence is strongly associated with presence of fossorial mammals.

Distribution in the Planning Area

Burrowing owls occur throughout the planning area in appropriate lower-elevation, basin habitats, although densities should be anticipated to be low (Floyd *et al.* 2007). Occurrence likely restricted to spring and summer breeding months, however, potential exists for year-round residence in southern Lincoln County. Data on winter occurrences are limited.

Reasons for Concern

From 1994 to1996, the western burrowing owl was designated by the Service as a Category 2 Candidate species under the Endangered Species Act. In 1996 the Category 2 designation was discontinued. The burrowing owl is currently federally protected by the Migratory Bird Treaty Act. The burrowing owl is listed by the Service as a National Bird of Conservation Concern and as a Bird of Conservation Concern in Regions 1 (Pacific Region, mainland only), 2 (Southwest Region), and 6 (Mountain-Prairie Region) (Klute *et al.* 2003). Additionally, the species is recognized as a species of concern or sensitive species by various Federal, State, and nongovernmental organizations. Apparent cause for concern stems from suggested population declines including documented peripheral range contractions in several large regions, notable in the northeast Great Plains and Canada. However, estimates of population trends in many regions are generally inconclusive due to limited sample sizes and high degree of data variability. Primary threats across the North American range of the species are habitat loss due to land conversions for agricultural and urban development, and habitat degradation and loss due to reductions of burrowing mammal populations. The elimination of burrowing mammals through control programs and habitat loss has been identified as the primary factors responsible for declines of burrowing owls. Additional threats to burrowing owls include habitat fragmentation, predation, illegal shooting, indirect effects of disease, collision with stationary and moving objects, pesticides, and other contaminants.

BLM Proposed Management Actions That May Benefit the Species

VEG-1: Emphasize treatment areas that have the best potential to maintain desired conditions or respond and return to the desired range of conditions and mosaic upon the landscape, using all available current or future tools and techniques.

VEG-4: Design management strategies to achieve plant composition within the desired range of conditions for vegetation communities, and emphasize plant and animal community health at the mid scale (watershed level).

SS-2: Develop and implement an interagency inventory and monitoring program for special status plant and animal species.

SS-34: Identify the spatial and temporal habitat needs for the western burrowing owl to help achieve the desired range of conditions of the various vegetation communities.

SS-35: Work with the Service, NDOW, and other partners (*e.g.*, Great Basin Bird Observatory, Partners in Flight) to conduct breeding bird surveys to document the population status and trends of western burrowing owls.

MIN-3: Open to leasing, subject to moderate constraints – Protect resources beyond the standard lease terms and conditions by requiring timing and controlled surface use restrictions.

Raptors – Raptors (*i.e.*, hawks, eagles, owls, etc.) are protected under numerous laws including the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Endangered Species Act of 1973. Timing limitations are required to protect raptor nesting activities.

MIN-4: Stipulation Maintenance – Regularly maintain wildlife databases of species subject to the above MIN-3 stipulations to reflect current inventory status. For example an updated greater sage-grouse lek inventory may show the location of a new lek for which the lease stipulation will be applied in subsequent lease sales.

Additional Management Recommendations

1. Review and follow conservation recommendations included in: Klute, D. S., L. W. Ayers, M. T. Green, W. H. Howe, S. L. Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States. U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C.

2. Review and incorporate into management programs, the use of the survey protocol and mitigation guidelines available at http://www2.ucsc.edu/scpbrg/section1.htm.

3. Conserve burrowing mammal and reptile species that form burrowing owl nest sites, which is essential for maintaining burrowing owl populations.

4. Use applicable information and results from the Rangeland Standards & Guidelines to assist with special status species habitat assessments and to make recommendations for habitat protection and enhancements when necessary.

5. Share data and planning accomplishments with the Service to enhance the species baseline information.

References

Floyd, T., C. S. Elphick, G. Chisholm, K. Mack, R. G. Elston, E. M. Ammon, and J. D. Boone. 2007. Atlas of the Breeding Birds of Nevada. University of Nevada Press, Reno, Nevada.

Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. Burrowing Owl (Speotyto cunicularia). *In The Birds of North America,* Number 61 (A. Poole and F. Gill, Editors). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Klute, D. S., L. W. Ayers, M. T. Green, W. H. Howe, S. L. Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States. U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C.

2. Greater sage grouse (*Centrocercus urophasianus*)

Species Description

The greater sage-grouse is the largest North American grouse species. Adult males range in size from 26 to 30 inches and weigh between 3.8 and 6.4 pounds; adult females range in size from 19.7 to 23.6 inches and weigh between 2.2 and 3.9 pounds (Schroeder *et al.* 1999). Males and females have dark grayish-brown body plumage with many small gray and white speckles, fleshy yellow combs over the eyes, long pointed tails, and dark-green toes. Males also have blackish chin and throat feathers, conspicuous phylloplumes (specialized erectile feathers) at the back of the head and neck, and white feathers forming a ruff around the neck and upper belly. During breeding displays, males also exhibit olive-green apteria (fleshy bare patches of skin) on their breasts (Schroeder *et al.* 1999).

Species Range

Prior to settlement of the western United States by European immigrants greater sage-grouse were found in 13 States and 3 Canadian provinces - Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, Utah, South Dakota, North Dakota, Nebraska, Arizona, British Columbia, Alberta, and Saskatchewan (Schroeder *et al.* 2004). Greater sage-grouse still occur in most of these states and provinces except for Nebraska, British Columbia, and possibly Arizona where they have been extirpated. Sagebrush habitats that potentially supported greater sage-grouse covered approximately 463,509 square miles before the year 1800 (Schroeder *et al.* 2004). Current distribution is estimated at 258,075 square miles or 56 percent of the potential pre-settlement distribution.

Habitat

Sage-grouse depend on a variety of shrub-steppe habitats throughout their life cycle, and are considered obligate users of several species of sagebrush (*e.g.,* Wyoming big sagebrush (*Artemisia tridentata wyomingensis*), mountain big sagebrush (*A. t. vaseyana*), and basin big sagebrush (*A. t. tridentata*) (Connelly *et al.* 2004)). Sage-grouse also use other sagebrush species such as low sagebrush (*A. arbuscula*), black sagebrush (*A. nova*), fringed sagebrush (*A. frigida*) and silver sagebrush (*A. cana*). Thus, sage-grouse distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder *et al.* 2004).

During the spring breeding season, male sage-grouse gather together to perform courtship displays at sites called leks. Areas of bare soil, short-grass steppe, windswept ridges, exposed knolls, or other relatively open sites may serve as leks (Connelly *et al.* 2004). Leks are often surrounded by denser shrub-steppe cover, which is used for escape, thermal and feeding cover. Leks range in size from less than 0.1 acres to over 90 acres and can host from several to hundreds of males (Connelly *et al.* 2004). Males defend individual territories within leks and perform elaborate displays with their specialized plumage and vocalizations to attract females for mating. A relatively small number of dominant males accounts for the majority of breeding on each lek (Schroeder *et al.* 1999).

Sage-grouse typically select nest sites under sagebrush cover, although other shrub or bunchgrass species are sometimes used (Connelly *et al.* 2004). The sagebrush understory of productive nesting areas contains native grasses and forbs, with horizontal and vertical structural diversity that provides an insect prey base, herbaceous forage for pre-laying and nesting hens, and cover for the hen while she is incubating (Schroeder *et al.* 1999, Connelly *et al.* 2000, Connelly *et al.* 2004). Shrub canopy and grass cover provide concealment for sage-grouse nests and young, and are critical for reproductive success. Vegetation characteristics of nest sites, as reported in the scientific literature have been summarized by Connelly *et al.* (2000). Females have been documented to travel more than 12.5 miles to their nest site after mating (Connelly *et al.* 2000), but distances between a nest site and the lek on which breeding occurred is variable (Connelly *et al.* 2004). While earlier studies indicated that most hens nest within 2 miles of a lek, more recent research indicates that many hens actually move much further from leks to nest based on nesting habitat quality (Connelly *et al.* 2004). Research by Wakkinen *et al.* (1992) demonstrated that nest sites are selected independent of lek locations.

Hens rear their broods in the vicinity of the nest site for the first 2 to 3 weeks following hatching (Connelly *et al.* 2004). Forbs and insects are essential nutritional components for chicks (Johnson and Boyce 1990, Connelly *et al.* 2004). Therefore, early brood-rearing habitat must provide adequate cover adjacent to areas rich in forbs and insects to assure chick survival during this period (Connelly *et al.* 2004). Sage-grouse move from sagebrush uplands to more mesic areas during the late brood-rearing period (3 weeks posthatch) in response to summer desiccation of herbaceous vegetation (Connelly *et al.* 2000). Summer use areas can include sagebrush habitats as well as riparian areas, wet meadows and alfalfa fields (Schroeder *et al.* 1999). These areas provide an abundance of forbs and insects for both hens and chicks.

Sage-grouse will use free water although they do not require it since they obtain their water needs from the food they eat. However, natural water bodies and reservoirs can provide mesic areas for succulent forb and insect production, thereby attracting sage-grouse hens with broods (Connelly *et al.* 2004). Broodless hens and cocks will also use more mesic areas in close proximity to sagebrush cover during the late summer (Connelly *et al.* 2004). As vegetation continues to desiccate through the late summer and fall, sage-grouse shift their diet entirely to sagebrush (Schroeder *et al.* 1999). Sage-grouse depend entirely on sagebrush throughout the winter for both food and cover. Sagebrush stand selection is influenced by snow depth (Connelly *et al.* 2000), and, in some areas, topography (Crawford *et al.* 2004). Many populations of sage-grouse migrate between seasonal ranges in response to habitat distribution (Connelly *et al.* 2004). Migration can occur between winter and breeding/summer areas, between breeding,

summer and winter areas, or not at all. Migration distances of up to 100 mi have been recorded; however, average individual movements are generally less than 21 miles (Schroeder *et al.* 1999). Migration distances for female sage-grouse generally are less than for males (Connelly *et al.* 2004). Almost no information is available regarding the distribution and characteristics of migration corridors for sage-grouse (Connelly *et al.* 2004). Sage-grouse dispersal (permanent moves to other areas) is poorly understood and appears to be sporadic.

Distribution in the Planning Area

Sage-grouse may occur throughout the Great Basin portion of the planning area in suitable habitat. The southern extent of sage-grouse distribution occurs in the transition zone between the Great Basin and Mojave Deserts or approximately the latitude of Pioche, Nevada. Distribution including leking sites, summer/brood rearing habitat and winter range is relatively well known within the District.

Reasons for Concern

Rangewide as well as various population segments of greater sage-grouse have been petitioned for listing under the Act numerous times since the late 1990s. Currently, the only population segment listed under the Act occurs in central Washington. The greater sage-grouse is not covered or managed under the provisions of the MBTA. Reasons for concern include loss, degradation, and fragmentation of sagebrush habitats due to both anthropogenic and natural factors including wildfire, conversion, grazing, and infrastructure development. Additional impacts stem from drought, disease, and disturbance. During the Service's 12-month finding to list the greater sage-grouse under the Act (70 FR 2244), a panel of sage-grouse experts were asked to rank potential threats to the species. Acting alone or synergistically, threats identified as most pertinent were: invasive species, infrastructure related to energy development and urbanization, wildfire, agriculture, grazing, energy development, urbanization, weather, and pinyon-juniper expansion. In 2008, the Service initiated a status review of the greater sage-grouse to determine if the species should be protected under the Act. That effort is currently underway.

BLM Proposed Management Actions That May Benefit the Species

VEG-1: Emphasize treatment areas that have the best potential to maintain desired conditions or respond and return to the desired range of conditions and mosaic upon the landscape, using all available current or future tools and techniques.

VEG-4: Design management strategies to achieve plant composition within the desired range of conditions for vegetation communities, and emphasize plant and animal community health at the mid scale (watershed level).

VEG-5: Focus restoration of undesirable conditions initially on those sites that have not crossed vegetation transitional thresholds.

VEG-6: Emphasize the conservation and maintenance of healthy, resilient, and functional vegetation communities before restoration of other sites.

VEG-17: Integrate treatments to: Establish and maintain the desired herbaceous state or early shrub state where sagebrush is present along with a robust understory of perennial species.

VEG-18: Manage native range to meet the requirements of wildlife species. Management will focus on maintaining or establishing diversity, mosaics, and connectivity of sagebrush between geographic areas at the mid and fine scales.

VEG-24: Focus management actions on uses and activities that allow for the protection, maintenance, and restoration of riparian habitat.

SS-2: Develop and implement an interagency inventory and monitoring program for special status plant and animal species.

SS-10: Mitigate all discretionary permitted activities that result in the loss of special status species habitats on a ratio of 2 acres of comparable habitat for every 1 acre of lost habitat as determined on a project-by-project basis.

SS-37: Manage greater sage-grouse habitat by implementing those actions and strategies identified in BLM National Sage-Grouse Habitat Conservation Strategy, Greater Sage-Grouse Conservation Plan for Nevada and Eastern California, and local greater sage-grouse conservation plans that the Ely District Office has the authority to implement.

SS-38: Maintain intact and quality sagebrush habitat. Prioritize habitat maintenance actions from BLM National Sage Grouse Conservation Strategy to: 1) maintain large areas of high quality sagebrush currently occupied by greater sage-grouse; 2) maintain habitats which connect seasonal sagebrush habitats in occupied source habitats; and 3) maintain habitats that connect seasonal sagebrush habitats in occupied isolated habitats.

SS-39: Implement proactive and large scale management actions to restore lost, degraded, or fragmented sagebrush habitats and increase greater sage-grouse populations. Prioritize habitat restoration actions from BLM National Sage Grouse Conservation Strategy to: 1) reconnect large patches of high quality seasonal habitats, which greater sage-grouse currently occupy; 2) enlarge sagebrush habitat in areas greater sage-grouse currently occupy; 3) reconnect stronghold/source habitats currently occupied by greater sage-grouse with isolated habitats currently occupied by greater sage-grouse; 4) reconnect currently occupied and isolated habitats; 5) restore potential sagebrush habitats that currently are not occupied by greater sage-grouse. Develop allowable use restrictions in greater sage-grouse habitats undergoing restoration, on a case-by-case basis, as dictated by monitoring.

SS-40: Outside of designated corridors, above-ground facilities will not be constructed within 0.25 mile of greater sage-grouse leks. Underground facilities will not be installed within 0.25 mile of greater sage-grouse leks unless the vegetation can be established to pre-disturbance conditions within a reasonable period of time. No new roads will be constructed within 0.25 mile of greater sage-grouse leks. Exceptions may be granted by the authorized officer, in consultation with NDOW, if the project can be designed so that it will not affect breeding activity nor degrade the integrity of the habitat associated with the lek, or if the lek has been inactive for at least 5 consecutive years or the habitat has changed such that there is no likelihood that the lek will become active.

SS-41: Where appropriate, restrict permitted activities from March 1 through May 15 within 2 miles of an active greater sage-grouse lek.

SS-42: Where appropriate, restrict permitted activities from November 1 through March 31 within greater sage-grouse winter range.

MIN-3: Open to leasing, subject to moderate constraints – Protect resources beyond the standard lease terms and conditions by requiring timing and controlled surface use restrictions.

Greater Sage-grouse – The greater sage-grouse is a Nevada BLM sensitive species and was petitioned for listing under the Endangered Species Act as a threatened or endangered species. Timing limitations are required to protect greater sage-grouse breeding and nesting activities and habitat during the crucial winter period.

MIN-4: Stipulation Maintenance – Regularly maintain wildlife databases of species subject to the above MIN 3 stipulations to reflect current inventory status. For example an updated greater sage-grouse lek inventory may show the location of a new lek for which the lease stipulation will be applied in subsequent lease sales.

MIN-6: Open to leasing, subject to major constraints. The no surface occupancy for greater sage-grouse leks is a 0.25-mile buffer.

Additional Management Recommendations

1. Continue to work with states to implement state and local conservation plans which guide monitoring and threat identification and abatement.

2. Use information and results from Rangeland Standards & Guidelines to assist with special status species habitat assessments and to make recommendations for habitat protection and enhancements when necessary.

3. Share data and planning accomplishments with the Service to enhance the species baseline information.

References

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation of greater sage-grouse and sagebrush habitats. Western Association Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming. USA.

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967–985.

Crawford, J. A., R. A. Olson, N. E. West, J. C. Mosley, M. A. Schroeder, T. D. Whitson, R. F. Miller, M. A. Gregg, and C. S. Boyd. 2004. Ecology and management of sage-grouse and sage-grouse habitat. Journal of Range Management 57:2–19.

Johnson, G. D., and M. S. Boyce. 1990. Feeding trials with insects in the diet of age grouse. Journal of Wildlife Management 54:89-91.

Schroeder, M. A., C. L. Aldridge, A. D. Apa, J. R. Bohne, C. E. Braun, S. D. Bunnell, J. W. Connelly, P. A. Deibert, S. C. Gardner, M. A. Hilliard, G. D. Kobriger, S. M. Mcadam. C. W. McCarthy, J. J. McCarthy. D. L. Mitchell, E. V. Rickerson, S. J. Stiver. 2004. Distribution of sage-grouse in North America. The Condor 106:363–376.

Schroeder, M. A., J. R. Young, and C. E. Braun. 1999. Sage grouse (*Centrocercus urophasianus*). *In* Birds of North America, Number 425 (A. Poole and F. Gill, editors). The Birds of North America, Incorporated, Philadelphia, Pennsylvania.

Service. 2005. Endangered and threatened wildlife and plants: 12-monh finding for petitions to list the greater sage-grouse as threatened or endangered; proposed rule. Federal Register 70:2244-2282.

Wakkinen, W. L., K. P. Reese, and J. W. Connelly. 1992. Sage grouse nest location in relation to leks. Journal of Wildlife Management 56:381-383.

3. Yellow-billed cuckoo (Western distinct population segment) (*Coccyzus americanus*)

Species Description

The yellow-billed cuckoo is a medium-sized bird with an average length of 12 inches and weighing about 2 ounces. The cuckoo has a slender tail and a fairly stout and slightly down-curved bill which is blue-black with yellow on the base of the lower mandible. Plumage is grayish-brown above and white below, with rufous primary flight feathers. The tail feathers are boldly patterned with black and white below, giving the appearance of large white spots. The legs are short and bluish-gray, and adults have a narrow, yellow eye ring. Juveniles resemble adults, except the tail patterning is less distinct, and the lower bill may lack yellow coloring.

Species Range

The species ranges throughout North America from southern Canada to the Greater Antilles and northern Mexico. Recently, its range has contracted in the western portion of the United States. Its northern limit along the western coast is now in the Sacramento Valley, California; and the northern limit in the interior west is southern Idaho. Due to its decline in the western United States, the western Distinct Population Segment (DPS) of the cuckoo was placed on the Service's candidate list of threatened and endangered species considered for protection under the Act. The limits of the DPS were defined as the area west of the crest of the Rocky Mountains. In Montana, Wyoming, northern and central Colorado, the crest coincides with the Continental Divide. In southern Colorado and New Mexico the crest coincides with the eastern boundary of the Rio Grande drainage, including the Sangre de Cristo Mountains and excluding the drainage of the Pecos River. In west Texas, the boundary is the line of mountain ranges that form a southeastern extension of the Rocky Mountains to the Big Bend area of west Texas and along the western boundary of the Pecos River drainage. The northern and southern extent of the DPS is the Canadian and Mexican international boundaries.

Habitat

Western yellow-billed cuckoos breed in large blocks of dense riparian habitats, most often including woodlands with tall cottonwoods and willows. Dense understory foliage may be an important factor in nest site selection, and cottonwoods may provide important foraging habitat. Home ranges are typically about 25 acres in size, but may be as large as 99 acres. Cuckoos west of the Continental Divide nest almost exclusively near water.

Distribution in the Planning Area

Western yellow-billed cuckoos are known to occur in Pahranagat Valley and along the Meadow Valley Wash in Lincoln County. Nesting has not been documented, but comprehensive survey efforts, particularly in Pahranagat Valley, are limited by inaccessibility to private lands where much of the habitat occurs. Within the planning area, yellow-billed cuckoos have been detected north of Elgin along the Meadow Valley Wash, on the Pahranagat National Wildlife Refuge (NWR), and on private lands north of the refuge in Pahranagat Valley.

Reasons for Concern

The yellow-billed cuckoo's range and population numbers in the western United States have declined substantially over the last 50 years. Contracted range and population declines are mainly attributed to loss of riparian habitat from dams, flow alterations, channel modification, and clearing of land for agriculture, pesticide use, non-native plant invasion (salt cedar), and brown-headed cowbird parasitism. The Service published a 12-month finding in the Federal Register on July 25, 2001, that described the distributional extent of the western distinct population segment of the yellow-billed cuckoo and found that the listing of the western DPS was warranted but precluded by other higher priority listing actions. The yellow-billed cuckoo western DPS was subsequently placed on the candidate species list for future consideration for listing as a threatened or endangered species under the Act.

BLM Proposed Management Actions That May Benefit the Species

VEG-23: Promote vegetation structure and diversity that is appropriate and effective in controlling erosion, stabilizing stream banks, healing channel incisions, shading water, filtering sediment, and dissipating energy, in order to provide for stable water flow and bank stability.

VEG-24: Focus management actions on uses and activities that allow for the protection, maintenance, and restoration of riparian habitat.

WL-1: Emphasize management of priority habitats for priority species.

WL-4: Mitigate all discretionary permitted activities that result in the loss of aquatic and priority wildlife habitats by improving 2 acres of comparable habitat for every 1 acre of lost habitat as determined on a project-by-project basis.

WL-16: When planning projects, consider migratory birds, as appropriate, to minimize take and limit impacts.

WL-17: Work with the Service, NDOW, and other partners (e.g., Great Basin Bird Observatory, Partners in Flight) to conduct breeding bird surveys to document the population status and trends of those migratory bird species of concern.

SS-2: Develop and implement an interagency inventory and monitoring program for species status plant and animal species.

SS-20: Limit livestock grazing in the Lower Meadow Valley Wash ACEC through terms and conditions and/or season-of-use restrictions on grazing permits in accordance with a site-specific ACEC plan.

LR-2: Retain lands within ACECs.

Additional Management Recommendations

1. Avoid the authorization of actions that would promote or contribute to declines in surface and ground water resources.

2. Avoid disposal of BLM-administered lands that contain riparian areas.

3. Upon completion of salt cedar removal projects in the Meadow Valley Wash, revegetate project sites with native riparian plant species to ensure no net loss of large woody riparian vegetation.

References

Johnson, M. J., J. A. Holmes, C. Calvo, I. Samuels, S. Krantz, and M. K. Sogge. 2007. Yellow-billed cuckoo distribution, abundance, and habitat use along the Lower Colorado and tributaries, 2006 Annual Report. U. S. Geological Survey Open-File Report 2007-1097, Southwest Biological Science Center, Flagstaff, Arizona. 105 pp.

National Geographic. 1999. Field guide to the birds of North America. Third edition. Washington, D.C.

Furtek, R.T. Gallagher, and C. Tomlinson. 2001. Breeding status of the southwestern willow flycatcher and initial surveys for the Yuma clapper rail and yellow-billed cuckoo at various sites in southern Nevada. Program Activities Report, January 1, 2000 through December 31, 2000. Nevada Division of Wildlife, Las Vegas, Nevada. 15 pp. + app.

Furtek, R.T., C. R. Tomlinson, and F. R. Griego. 2002. Breeding status and surveys for the southwestern willow flycatcher and yellow-billed cuckoo at various sites in southern Nevada. Program Activities Report, January 1, 2001 through December 31, 2001. Nevada Division of Wildlife, Las Vegas, Nevada. 22 pp. + app.

Service. 2001. Endangered and threatened wildlife and plants; 12-month finding for a petition to list the yellow-billed cuckoo (Coccyzus americanus) in the western continental United States. Federal Register 66:38611-38626.

4. Bald eagle (*Haliaeetus leucocephalus*)

Species Description

The bald eagle is a large raptor with a wingspread of about 7 feet. Adults have a dark brown body and wings, white head and tail, and a yellow beak. Juveniles are mostly brown with white mottling on the body, tail, and undersides of wings. Adult plumage is usually obtained by the sixth year. In flight, the bald eagle often soars or glides with wings held at a right angle to the body.

Species Range

The range of the bald eagle extends from Alaska and Canada throughout the United States and into northern Mexico.

Habitat

Bald eagles frequent estuaries, large lakes, reservoirs, major rivers, and some seacoast habitats. These areas must have an adequate food base, and appropriate perching and nesting sites that meet certain requirements to support bald eagles. In winter, bald eagles often congregate at specific wintering sites that are generally close to open water and that offer good perch trees and night roosts.

Distribution in the Planning Area

The only consistent nesting territory within the planning area occurs in the vicinity of the Ruby Lake NWR. There are several nests in the area and active sites have varied annually but all sites occur on land either managed by the NWR or private parcels located in the area. An additional nest site has been documented on the Pahranagat NWR, although this site has not been active in nearly a decade. Bald eagles are known to traditionally winter in several locations within the planning area. These sites include Pahranagat Valley in and around the Pahranagat NWR; Ruby Valley in and around the Ruby Lake NWR; White River Valley near the Kirch Wildlife Management Area; Little Smoky, Railroad, and Big Sand Spring Valleys surrounding the Pancake Range; Antelope Valley near the Goshute Indian Reservation; and Steptoe Valley from Ely extending north.

Reason for Concern

The bald eagle was listed as endangered in 1967 under the Endangered Species Preservation Act of 1966, in response to declines in the population attributed to effects from the use of dichlorodiphenyltrichloroethane (DDT) and other organochlorine compounds. Only those eagles south of the 40th parallel were considered endangered. In 1978, the Service listed the bald eagle throughout the lower 48 states as endangered except in Michigan, Minnesota, Wisconsin, Washington and Oregon, where it was designated as threatened. In 1995, the Service reclassified the bald eagle from endangered to threatened status throughout the lower 48 states. In July of 2007, the Service determined that the bald eagle had recovered to the point that it no longer required protection under the Act, and removed the bald eagle from the list of threatened and endangered species. In March 2008, bald eagles in the Sonoran Desert of Central Arizona were relisted as threatened, while a status review is conducted. The Service is required to monitor species populations for a minimum of five years after delisting. The availability of a draft monitoring plan for the bald eagle was published in the Federal Register on July 9, 2007 (72 FR 37373). Although not final, the draft plan proposes to monitor bald eagle populations every 5 years for a 20-year period. The bald eagle remains protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

BLM Proposed Management Actions That May Benefit the Species

VEG-24: Focus management actions on uses and activities that allow for the protection, maintenance, and restoration of riparian habitat.

SS-10: Mitigate all discretionary permitted activities that result in the loss of special status species habitats on a ratio of 2 acres of comparable habitat for every 1 acre of lost habitat as determined on a project-by-project basis.

LR-5: Retain all public lands with springs and creeks that contain fisheries in federal ownership unless the disposal of these lands will result in the acquisition of lands with higher quality habitat.

Additional Management Recommendations

1. Avoid the authorization of actions that would promote or contribute to declines in surface and ground water resources.

2. Avoid disposal of BLM-administered lands that contain riparian areas.

3. Maintain large cottonwoods along the edges of lakes and streams to provide roosting sites for wintering birds.

References

Floyd, T., C. S. Elphick, G. Chisholm, K. Mack, R. G. Elston, E. M. Ammon, and J. D. Boone. 2007. Atlas of the Breeding Birds of Nevada. University of Nevada Press, Reno, Nevada.

National Geographic. 1999. Field guide to the birds of North America. Third edition.

Service. 1994. Endangered and threatened wildlife and plants: reclassify the bald eagle from endangered to threatened in most of the lower 48 states. Federal Register 59:35584-35594.

5. Pygmy rabbit (*Brachylagus idahoensis*)

Species Description

The pygmy rabbit is the smallest North American rabbit. Adult weights range from 0.54 to 1.2 pounds and adult lengths range from approximately 9 to 12 inches (70 FR 29253). Adult females are generally larger than adult males. The species can be distinguished from other rabbits by its small size, gray color, short rounded ears, small hind legs, and the absence of white on the tail (66 FR 59734).

Species Range

The pygmy rabbit's current geographic range includes most of the Great Basin and some of the adjacent intermountain areas of the western United States (Green and Flinders 1980). The northern boundary extends into southeastern Washington and southern Idaho. The eastern boundary extends into southwestern Montana and southwestern Wyoming. The southeastern boundary extends into southwestern Utah. Central Nevada and eastern California provide the southern and western boundaries (Bailey 1936, Washington Department of Fish and Wildlife 1995). The isolated population occurring in Washington is currently listed by the Service as an endangered distinct population segment.

Habitat

Pygmy rabbits typically occur in areas of tall, dense sagebrush cover, and are highly dependent on sagebrush to provide both food and shelter throughout the year (70 FR 29253). The pygmy rabbit is one of only two rabbits in North America that digs its own burrows, and as such is thought to be restricted to areas with suitable soils which are sufficiently deep and loose enough to allow burrowing. Burrows are typically dug into gentle slopes or mound/inter-mound areas of more level or dissected topography (Wilde 1978, Gahr 1993).

Distribution in the Planning Area

The pygmy rabbit may occur throughout the majority of the planning area in appropriate habitats. The species is likely absent from the Mojave Desert portion of the District located in southern Lincoln County. Rabbit densities should be anticipated to be variable across the Great Basin section of the District based on habitat requisites. Species distribution is likely not contiguous across or among a single or multiple Basins.

Reasons for Concern

From 1991 to 1996, the pygmy rabbit was designated by the Service as a Category 2 candidate species under the Act. In 1996, the Category 2 designation was discontinued and the pygmy rabbit was removed from the candidate list at that time. In January 2008, the Service published a 90-day finding on a petition to list the pygmy rabbit, concluding that the petition presented substantial scientific or commercial information indicating that listing the species may be warranted. Apparent cause for concern stems from suggested population declines and reductions in distribution. Primary threats across the North American range of the species are habitat loss, degradation, and fragmentation due to natural and anthropogenic causes including wildfire; agricultural, urban, and energy developments; recreation; grazing; and other associated activities that disturb or alter sagebrush habitats. Additional threats to pygmy rabbits may include alterations to predator-prey dynamics, illegal shooting, disease, collisions with moving objects, pesticides, and other contaminants.

BLM Proposed Management Actions That May Benefit the Species

VEG-1: Emphasize treatment areas that have the best potential to maintain desired conditions or respond and return to the desired range of conditions and mosaic upon the landscape, using all available current or future tools and techniques.

VEG-4: Design management strategies to achieve plant composition within the desired range of conditions for vegetation communities, and emphasize plant and animal community health at the mid scale (watershed level).

VEG-18: Manage native range to meet the requirements of wildlife species. Management will focus on maintaining or establishing diversity, mosaics, and connectivity of sagebrush between geographic areas at the mid and fine scales.

SS-2: Develop and implement an interagency inventory and monitoring program for special status plant and animal species.

SS-10: Mitigate all discretionary permitted activities that result in the loss of special status species habitats on a ratio of 2 acres of comparable habitat for every 1 acre of lost habitat as determined on a project-by-project basis.

SS-43: Survey all proposed ground disturbing activities in suitable pygmy rabbit habitat utilizing the appropriate protocol. Surveys will be completed by a qualified biologist approved by the Ely District Office.

Additional Management Recommendations

1. Support mapping, surveying, and monitoring efforts of potential, suitable pygmy rabbit habitat on BLM-administered lands with the Ely District planning area.

2. Draft survey guidelines have been developed for pygmy rabbit and are available upon request from the Service. We recommend surveys be completed prior to ground disturbing activities and that the needs of the species are considered during project planning and implementation.

References

Bailey, V., and B. H. Dutcher. 1936. Pygmy Rabbit (*Brachylagus idahoensis*). Mammals of Oregon. North America Fauna Number 55:110-114.

Gahr, M. L. 1993. Natural history, burrow habitat use, and home range of the pygmy rabbit (Brachylagus idahoensis) of sagebrush flat, Washington. Masters Thesis. University of Washington, Seattle, Washington. 126 pages.

Green, J. S., and J. T. Flinders. 1980. Brachylagus idahoensis. The American Society of Mammalogists. Mammalian Species Number 125:1-4.

Washington Department of Fish and Wildlife. 1995. Washington state recovery plan for the pygmy rabbit. Wildlife Management Program, Washington Department Fish and Wildlife, Olympia, Washington. 73 pages.

Wilde, D. B. 1978. A population analysis of the pygmy rabbit (Sylvilagus idahoensis) on the INEL site. Dissertation. Idaho State University, Pocatello, Idaho. 171 pages.

Service. 2005. Endangered and threatened wildlife and plants; 90-day finding on a petition to list the pygmy rabbit as threatened or endangered. Federal Register 70:29253-29265.

Service. 2001. Endangered and threatened wildlife and plants; Emergency rule to list the Columbia Basin distinct population segment of the pygmy rabbit (*Brachylagus idahoensis*) as endangered. Federal Register 66:59734-59749.

6. Meadow Valley Wash desert sucker (*Catostomus clarki* ssp.)

Species Description

Very little information is available on the Meadow Valley Wash (unnamed) subspecies of desert sucker; however, it is assumed that species description, habitat preferences, and other life history information for the subspecies should be generally similar to that for the species.

The desert sucker is silvery tan to darkish green above and silvery to yellowish below. There is a distinct notch at each corner of the mouth. The edge of the jaw inside the lower lip has a hard cartilaginous sheath. The upper lip is recurved and there is a small flap of skin at the base of each pelvic fin.

Adults reach a maximum size of 13 inches and probably live 8 to 10 years. It is an herbivore, feeding on encrusted diatoms and algae scraped from stones and other surfaces by its cartilage-sheathed jaws. In Arizona the desert sucker spawns at age 3, in late winter to early spring on riffles in a manner similar to other suckers. The young tend to congregate in large numbers along the bank in quiet waters then progressively move into the main stream as they increase in size.

Species Range

The species ranges throughout the lower Colorado River basin downstream from Grand Canyon in south central and southern Arizona, and in western New Mexico. In the Great Basin, it is present in the pluvial White River near Preston and Lund in White Pine County, Nevada; and in the Meadow Valley Wash in Lincoln County, Nevada. Three subspecies are recognized: White River desert sucker (*C. c. intermedius*), Virgin River desert sucker (*C. c. utahensis*), and the Meadow Valley Wash desert sucker (*C. c.* [unnamed]). The unnamed subspecies is known only from the Meadow Valley Wash.

Habitat

The desert sucker is found in rapids and flowing pools of streams and rivers primarily over bottoms of gravel-rubble with sandy silt in the interstices. Adults may live in pools during the day then move to swift riffles and runs to feed and spawn. Waters can be turbid or muddy, but it also lives in clear trout waters. Water temperatures are variable depending on the season, and range from 45 to 85°F during June to September. Adults may live in water as deep as 6 to 8 feet but are frequently found at depths of 3 to 4 feet.

Distribution in the Planning Area

The Meadow Valley Wash desert sucker occurs in the Condor Canyon area of Meadow Valley Wash north of Caliente, and in perennially-flowing reaches of the Meadow Valley Wash south of Caliente and the Clover Creek east of Caliente.

Reasons for Concern

The Meadow Valley Wash subspecies of desert sucker was formerly designated by the Service as a Category 2 Candidate species under the Act. In 1996, the Category 2 designation was discontinued and the Meadow Valley Wash desert sucker was removed from the candidate list at that time. The subspecies is protected by the State of Nevada as a sensitive species. The desert sucker is a narrowly distributed subspecies that occurs only within the Meadow Valley Wash and Clover Creek streams in Lincoln County. Alteration of historic flows has reduced the amount of available habitat. Other threats include flood control and agricultural activities that result in dewatering of stream reaches. The effect of nonnative aquatic species on the Meadow Valley Wash desert sucker is not known.

BLM Proposed Management Actions That May Benefit the Species

VEG-23: Promote vegetation structure and diversity that is appropriate and effective in controlling erosion, stabilizing stream banks, healing channel incisions, shading water, filtering sediment, and dissipating energy, in order to provide for stable water flow and bank stability.

LR-5: Retain all public lands with springs and creeks that contain fisheries in federal ownership unless the disposal of these lands will result in the acquisition of lands with higher quality habitat.

Additional Management Recommendations

1. Ensure that routes for organized recreational activities avoid crossing the Meadow Valley Wash and Clover Creek to prevent erosion and increased sedimentation of stream channels.

2. Use best management practices as described in *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007c), for herbicide use close to aquatic habitats during nonnative species removal projects.

3. Avoid the authorization of actions that would promote or contribute to declines in surface and ground water resources.

4. In the event that a stream reach must be temporarily dewatered or diverted as a result of any BLM-authorized activities, and after obtaining all necessary Federal, state, and local permits, follow direction provided by the Meadow Valley Wash Fish Translocation and Salvage Protocol (available from the Service) for translocating native fish to alternate upstream habitats prior to initiation of the activity.

References

Arizona Game and Fish Department. 2002. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona. 4 pp.

Minckley, W. L. 1973. Fishes of Arizona. Phoenix: Arizona Game and Fish Department, Sims Printing Company. 293 pp.

NatureServe. 2007. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.2. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer.

Sigler, W. F. and J. W. Sigler. 1987. Fishes of the Great Basin. University of Nevada Press, Reno. 425 pp.

Sigler, W. F. and J. W. Sigler. 1996. Fishes of Utah. University of Utah Press, Salt Lake City. 375 pp.

7. Meadow Valley Wash speckled dace (*Rhinichthys osculus* ssp.)

Species Description

The Meadow Valley Wash speckled dace is one of many undescribed subspecies of the speckled dace, *Rhinichthys osculus*. The speckled dace is a small fish in the minnow family, reaching a length of only 3 to 4 inches. Females are generally larger than males. It is gray or gray-brown with scattered and vague darker flecks, usually above the midline of the sides. The lower sides and belly are yellowish or creamy-white. Life span is short, with individuals rarely living beyond 3 years. The speckled dace is a bottom-dwelling fish, feeding on benthic organisms such as aquatic insects, freshwater shrimp, plant material, and zooplankton.

Species Range

Although the species occurs over wide and diverse habitats throughout the western United States, it has adapted at the sub-specific level in response to the many variable habitats within which it is found. The Meadow Valley Wash subspecies is endemic to Nevada, only found in the Meadow Valley Wash and Clover Creek within reaches that support perennial or intermittent flows.

Habitat

The Meadow Valley Wash speckled dace lives in a wide variety of habitats, from swift, cold riffles of mountain streams to the quiet waters of isolated cool or warm springs. It is uncommon in water over 3 feet deep. It is rarely found singly, but avoids forming large schools except during spawning. It is most active at night, spending the day among rocks in shallow water or in slightly deeper areas.

Distribution in the Planning Area

The Meadow Valley Wash speckled dace co-occurs with the Meadow Valley Wash desert sucker in the Condor Canyon area of Meadow Valley Wash, and in perennially-flowing reaches of the Meadow Valley Wash south of Caliente and Clover Creek to the east of Caliente.

Reasons for Concern

The Meadow Valley Wash speckled dace was formerly designated by the Service as a Category 2 Candidate species under the Act. In 1996, the Category 2 designation was discontinued and the Meadow Valley Wash speckled dace was removed from the candidate list at that time. The subspecies is protected by the State of Nevada as a sensitive species. Similar to the Meadow Valley Wash desert sucker, the Meadow Valley Wash speckled dace is a narrowly distributed subspecies that occurs only within the Meadow Valley Wash and Clover Creek streams in Lincoln County. Alteration of historic flows has reduced the amount of available habitat. Other threats include flood control and agricultural activities that result in dewatering of stream reaches. The effect of nonnative aquatic species on the Meadow Valley Wash desert sucker is not known. The adaptability of this species to a wide range of habitats exhibits the importance of both the species as a whole and the numerous subspecies as mechanisms for evolutionary studies.

BLM Proposed Management Actions That May Benefit the Species

VEG-23: Promote vegetation structure and diversity that is appropriate and effective in controlling erosion, stabilizing stream banks, healing channel incisions, shading water, filtering sediment, and dissipating energy, in order to provide for stable water flow and bank stability.

LR-5: Retain all public lands with springs and creeks that contain fisheries in federal ownership unless the disposal of these lands will result in the acquisition of lands with higher quality habitat.

Additional Management Recommendations

1. Ensure that routes for organized recreational activities avoid crossing the Meadow Valley Wash and Clover Creek to prevent erosion and increased sedimentation of stream channels.

2. Use best management practices as described in *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007c), for herbicide use close to aquatic habitats during nonnative species removal projects.

3. Avoid the authorization of actions that would promote or contribute to declines in surface and ground water resources.

4. In the event that a stream reach must be temporarily dewatered or diverted as a result of any BLM-authorized activities, and after obtaining all necessary Federal, state, and local permits, follow direction provided by the Meadow Valley Wash Fish Translocation and Salvage Protocol (available from the Service) for translocating native fish to alternate upstream habitats prior to initiation of the activity.

References

Miller, R. R. 1984. *Rhinichthys deaconi*, a new species of dace (Pisces: Cyprinidae) from southern Nevada. Occasional Papers of the Museum of Zoology, Number 707, University of Michigan, Ann Arbor, Michigan. 21 pp.

Sigler, W. F. and J. W. Sigler. 1987. Fishes of the Great Basin. University of Nevada Press, Reno. 425 pp.

Sigler, W. F. and J. W. Sigler. 1996. Fishes of Utah. University of Utah Press, Salt Lake City. 375 pp.

Williams, J. E. 1978. Taxonomic status of *Rhinichthys osculus* (Cyprinidae) in the Moapa River, Nevada. The Southwestern Naturalist 23(3):511-517.

8. Arizona toad (*Bufo microscaphus*)

Species Description

Arizona toads are medium-sized toads that measure 2-3 inches in length (snout to urostyle). Their background color varies from olive to brown to pink with light stripe/patch on head and back. Arizona toad may or may not have spots on their back (dorsum). Pure Arizona toads do not have cranial crests or mid-dorsal stripes which are characteristics of the Woodhouse toad. Parotid glands are oval in shape and a lighter color towards the front of the head.

Species Range

The Arizona toad occurs in localized populations throughout southern California, southern Nevada, western-central Arizona, western New Mexico, and northwestern Mexico.

Habitat

The Arizona toad inhabits streams and intermittent desert washes and arroyos, palm oases, Joshua tree and sagebrush-mixed chaparral communities. The toad breeds in clear, quiet water along streams and does not depend directly on rainfall to initiate breeding.

Distribution in the Planning Area

The species primarily occurs along the Meadow Valley Wash however, no systematic surveys have been conducted to document the distribution of the species in Nevada. In the early 1990s, a

graduate student (San Diego State University) located a substantial population of Arizona toads in Meadow Valley Wash on Route 317 from Elgin to south of Caliente. This may be the only remaining population in Nevada.

Reasons for Concern

The distribution of Arizona toads in Nevada, which is the northernmost extent of the species' range, has likely been reduced from its historical distribution. Degradation of intermittent and perennial streams from invasive salt cedar, livestock grazing, stream channelization for flood-control and irrigation are recognized as important threats to the species in Nevada. Woodhouse toads hybridize with Arizona toad and out-compete the Arizona toad in disturbed and modified (lentic) habitats.

BLM Proposed Management Actions That May Benefit the Species

VEG-2: Develop specific management objectives through the watershed analysis process.

WR-1 and **WR-2**: Implement actions to ensure that activities do not degrade water quality.

WR-4: Control land uses to promote desired watershed vegetation conditions.

Additional Management Recommendations

1. Remove salt cedar and replace with native canopy species such as willow and cottonwood.

2. Establish project avoidance areas, particularly mining projects, along the Meadow Valley Wash between Elgin and Caliente to minimize impacts to the remaining habitat for the Arizona toad including OHV events.

3. Manage aquatic habitat to retain stream (lotic) environments. Ponded (lentic) areas provide the woodhouse toad (*Bufo woodhousii*) a competitive advantage over Arizona toads.

4. Consider the conservation needs of the Arizona toad during the watershed analysis process.

References

Bradford, D.F. 2002. Amphibian declines and environmental change in the Eastern Mojave Desert. Conference proceedings, spring-fed wetlands: important scientific and cultural resources of the Intermountain Region.

Bradford, D.F., J.R. Jaeger, and S.A. Shanahan. 2005. Distributional changes and population status of amphibians in the eastern Mojave Desert. Western North American Naturalist 65(4):462-472.

Malmos, K.B, B.K. Sullivan, and T. Lamb. 2001. Calling behavior and directional hybridization between two toads (*Bufo microscaphus* X *B. woodhousii*) in Arizona. Evolution 55(3):626-630.

Stebbins, R.C. Western reptiles and amphibians, third edition. Peterson field guides. Houghton Mifflin Company, New York, New York.

Sullivan, B.K. 1991. Distribution and status of the Arizona toad, Bufo microscaphus microscaphus. Unpublished report submitted to the Nongame Branch, Arizona Game and Fish Department, Phoenix, Arizona. November 1, 1991.

9. Banded Gila monster (*Heloderma suspectum cinctum*)

Species Description

The Gila monster and Mexican beaded lizard (*H. s. horridum*) are the only two species of venomous lizards. Gila monsters have enlarged, grooved teeth in their lower jaw immediately adjacent to the opening of the venom duct which conveys venom from the venom gland. The dorsal coloration of the Gila monster is black with pink or orange. In the southern subspecies, the reticulated Gila monster (*H. s. suspectum*), the light markings or bands, are broken up to form a reticulated pattern. In the northern subspecies, the banded Gila monster, the light markings generally form an unbroken band across the back. They are the largest lizard in the U.S. measuring up to 22 inches in total length, and are able to store more energy than smaller lizards. They store fat in their tail and in their bodies. Gila monsters have low resting metabolic rates, are capable of consuming meals up to one-third their body weight, and are capable of storing large amounts of fat in their tails and body, thus making frequent searching for food unnecessary. Therefore, they are rarely seen above ground. It has been suggested that Gila monsters may consume their entire yearly energy budget in three or four large meals.

Gila monsters are most active above-ground during spring. Not only is this when mating occurs, but it is when their main source of food (vertebrate nests) is most abundant. They are diurnal but most activity occurs in the morning. Gila monsters have a home range of about one square mile. They are usually solitary animals, but do gather in communal areas in the spring for mating.

The Gila monster inhabits hot desert regions of the southwestern U.S. and northern Mexico. Because Gila monsters spend over 95 percent of their time resting in sub-surface refugia, the characteristics of shelters used by Gila monsters may be important in influencing patterns of distribution and abundance. Gila monsters feed predominately on juvenile mammals and eggs of ground nesting birds and reptiles (Lowe *et al.* 1986; Beck 1990; Beck 2005).

A component of Gila monster venom (Exendin-4) is currently being investigated as a promising new drug to treat type-2 diabetes.

Species Range

The range of the banded Gila monster includes extreme southeastern California, southern Nevada, southwestern Utah, and western Arizona (Beck 2005). Banded Gila monster populations show a patchier pattern of geographic distribution in the Mojave Desert than in the Sonoran Desert. The upper elevational limit for the species is approximately 5,000 feet.

Habitat

Banded Gila monsters are often confined to the margins of certain rocky outcrops, along sandy areas bordering such cliffs, and along arroyos and riparian areas (Woodbury 1931, Beck 1985). Habitat parameters for the Gila monster are complex involves geology, hydrology, vegetation communities, climatic factors, animal communities that share Gila monster habitat, and human-altered habitat.

Recent work in New Mexico has shown that Gila monsters select habitats based on the availability and quality of potential retreat sites (Beck and Jennings 2000). Gila monsters show great fidelity to shelters year after year, and alter their choice of shelters as conditions change seasonally. Humidity may play an important role in habitat selection. Shelters used by Gila monsters during the hottest, driest time of the year are significantly more humid inside than are other shelters (Beck and Jennings 2000). Gila monsters have unusually high rates of water loss (especially for desert lizards), which may strongly influence their habitat requirements and seasonal patterns of activity and habitat use.

Distribution in the Planning Area

The lack of knowledge about distribution patterns and habitat requirements has severely limited management options for this lizard. The map below, developed by NDOW, estimates the distribution of Gila monsters in the planning area.

Reasons for Concern

From 1991 to 1996, the Gila monster was designated by the Service as a Category 2 candidate species under the Act. In 1996, Category 2 designation was discontinued and the Gila monster was removed from the candidate list at that time. There are serious concerns that fragmentation of habitat has reduced not only individual numbers within localities, but also the overall range of the Gila monster, to only a fraction of its historical abundance and distribution, especially in the Mojave Desert (Beck 1985). Other reasons for concern include: Overcollection for personal and commercial (herpetoculture) purposes; malicious killing; road kills; development associated with urbanization; modification of desert riparian and wash habitat coincidental to various land uses; livestock grazing, mining, recreation, and agricultural development.

Gila monsters have enormous black market value. "Legal" banded Gila monsters are selling for $1,600-$2,000 from reptile dealers on the internet. The cumulative effects of illegal collection on Gila monster populations are unknown but may be catastrophic. There are several reasons that banded Gila monster populations are declining in the Mojave Desert. Gila monsters are long-lived, show low reproductive potential, very low rates of metabolism, patchy and localized

population distributions, a specialized diet (eggs and young of vertebrate nests), and very low levels of activity (Lowe *et al.* 1986, Beck 1990, Beck and Lowe 1994). These traits make Gila monsters particularly vulnerable to population decline in response to habitat disturbance, fragmentation, illegal collection, and other factors, yet also make them difficult to study.

As urban development continues within, or contiguous with Gila monster habitat, Gila monsters will likely be negatively affected by loss of habitat, and indirectly through human-related land uses. As development occurs, Gila monsters will be impacted by: Increases in the number and distribution of free-ranging dogs and other opportunistic predators of Gila monsters; vandalism and intentional killing; illegal collection; and construction of new roads or increases in traffic levels on existing roads resulting in mortality and injury of Gila monsters. The current status of the banded Gila monster is unknown but believed to be declining in certain portions of its range (Beck 2005).

BLM Proposed Management Actions That May Benefit the Species

SS-2: Develop and implement an interagency inventory and monitoring program for special status plant and animal species.

SS-24: Manage desert tortoise habitat [which partially overlaps Gila monster habitat] by implementing those actions and strategies identified in the Desert Tortoise Recovery Plan and appropriate actions from future habitat conservation plans that the Ely District Office has the authority to implement.

SS-30: Manage leased public lands in the Coyote Springs area in accordance with Public Law 100-275 dated March 31, 1988, and the Land Lease Agreement signed July 14, 1988.

SS-32: Where appropriate, restrict permitted activities from March 1 through October 31 within desert tortoise habitat [which includes the period of highest Gila monster activity].

LR-1: Retain lands or interest in lands within designated critical habitat for federally listed threatened and endangered species unless the disposal results in the acquisition of land with higher quality habitat.

LR-2: Retain lands within ACECs.

LR-40 through **LR-49**: Establishes avoidance areas and includes measures to minimize effects to the desert tortoise which may also protect Gila monsters.

RE-4 through **RE-6**: Establishes avoidance areas, some of which are occupied by Gila monsters.

TM-1 through **TM-8**: Minimizes impacts of roads.

REC-13: Designate event routes and develop additional mitigation in subsequent activity level plans.

Additional Management Recommendations

1. Establish desert washes as avoidance areas for OHV activities particularly from March through mid-June.

2. Coordinate with NDOW and the Service to identify and map key habitat for the Gila monster and implement special management for these areas.

3. Include Gila monsters in desert tortoise awareness programs presented for project personnel.

4. Include Gila monster in transportation and recreation management plans in coordination with NDOW and the Service.

5. Eliminate livestock grazing from the Beaver Dam Slope to minimize effects to Gila monsters that are known to occur there and allow the area to recover from long-term grazing effects.

6. For projects that may occur within the range of the Gila monster, BLM should provide project personnel a copy of the NDOW November 17, 2005, protocol (*Gila Monster Protocol for Minimizing Impacts in the Construction Site*) which is attached (Appendix B)

References

Beck, D. D. 1985. The natural history, distribution, and present status of the Gila monster, *Heloderma suspectum*, in southwestern Utah. Report to the Utah Division of Wildlife Resources, 78p.

Beck, D. D. 1990. Ecology and behavior of the Gila monster in southwestern Utah. Journal of Herpetology 24:54-68.

Beck, D. D. 2005. Biology of Gila monsters and beaded lizards. University of California Press, Berkeley and Los Angeles, California. 211 pages.

Beck, D. D. and C. H. Lowe. 1991. Ecology of the beaded lizard, Heloderma horridum, in a tropical dry forest in Jalisco, Mexico. Journal of Herpetology 25:395-406.

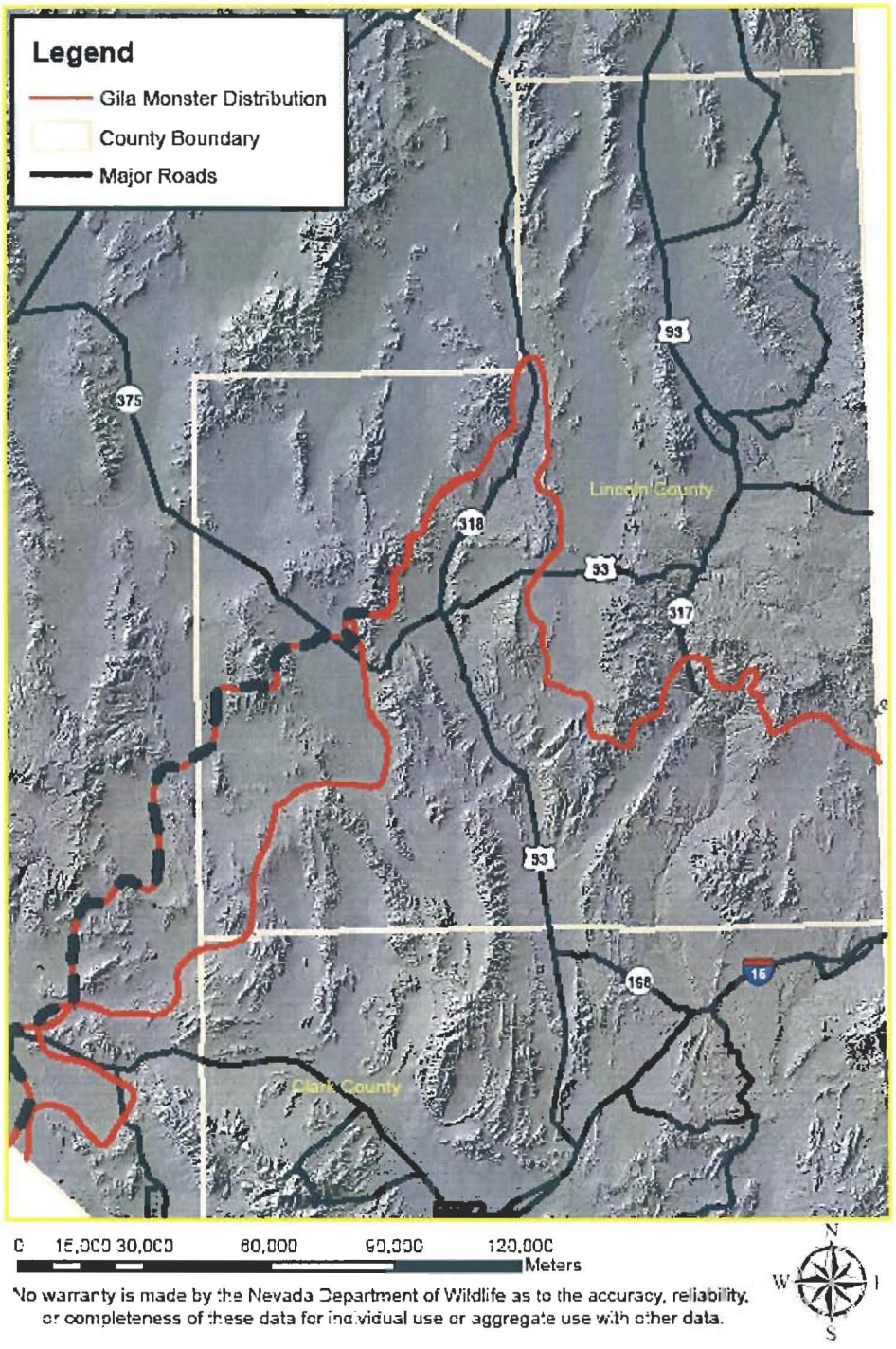
Beck, D. D. and C. H. Lowe. 1994. Resting metabolism of helodermatid lizards: allometric and ecological relationships. Journal of Comparative Physiology. B 164:124-129.

Beck, D. D. and R. D. Jennings. 2000. The role of shelters in the ecology of a desert lizard, *Heloderma suspectum* (unpublished manuscript submitted to Ecology).

Lowe, C. H., C. R. Schwalbe, and T. B. Johnson. 1986. The venomous reptiles of Arizona. Arizona Game and Fish Department, Phoenix, Arizona.

Woodbury, A. M. 1931. A descriptive catalog of the reptiles of Utah Bulletin, University of Utah. 21:5.

Estimated Gila Monster Distribution in Lincoln Co.



No warranty is made by the Nevada Department of Wildlife as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

10. Sunnyside green gentian (*Frasera gypsicola*)

Species Description

Sunnyside green gentian is a pale green or whitish perennial with a short, wide root crown from which arise numerous branches tightly pressed together (Barneby 1942). The leaves are thin and grass-like, always opposite, close together, and approximately 2 to 3.5 inches long. The leaves form a depressed mound 4 to 8 inches wide. Mature plants stand approximately 4 to 8 inches high. Flowers are typically present in June and July and are white and freckled with purple-blue.

Species Range

Global distribution appears to be limited to the White River Valley in White Pine and Nye Counties in Nevada; a disjunct population also exists in Millard County, Utah (Forbis 2007). Prior to 2005, 7 to 9 populations had been documented with an estimated population size of approximately 70,000 individuals on about 800 acres (Smith 2000). Recent surveys funded by the Service and conducted by The Nature Conservancy have discovered several new populations and found that some of the previously known populations are more extensive than previously thought. None of the newly discovered populations have increased its known range.

Habitat

The habitat has been described as open, dry, alkaline, often salt-crusted and spongy silty-clay soils on calcareous flats and barrens, with little if any gypsum content (Smith 2000, Nevada Natural Heritage Program 2001), where the plant is typically found in cushion-plant associations around 5180-5510 feet elevation and surrounded by sagebrush, greasewood, and occasionally barberry and swamp cedar vegetation. Recent studies have found Sunnyside green gentian to be more closely associated with Pleistocene gypsum spring mounds and less commonly in saline bottoms (Forbis 2007). On some of the gypsum spring mounds, the species co-occurs Tiehm blazingstar (*Mentzelia tiehmii*) another White River Valley endemic with an even narrower range (Forbis 2007).

Distribution in the Planning Area

Distribution in the planning area is the same as the *Species Range*, with the exception of the disjunct population in Utah.

Reasons for Concern

From 1991 to 1996, the Sunnyside green gentian was designated by the Service as a Category 2 candidate species under the Act. In 1996, the Category 2 designation was discontinued and the Sunnyside green gentian was removed from the candidate list at that time. The species is currently not afforded any specific recognition under the Act. The species was included in a petition to list 206 species, dated July 24, 2007. The petition is currently under review by the Service. Sunnyside green gentian is currently considered a fully protected species under Nevada State law and a Sensitive Species by BLM. The population trend of the species is not known but

distributional surveys appear relatively complete. The reasons for concern stems primarily from the species restricted range, small population sizes, and extreme habitat specialization.

Potential impacts likely include any management action or natural event, which has the potential to disturb the plant's habitat or diminish its populations including, but not limited to recreation, energy development, wildfire, grazing, and climate change. OHV recreation likely poses the greatest and most imminent ongoing threat to the species; a significant increase in OHV use has been reported in the vicinity of Hot Creek Butte associated with recreational use of the nearby hot spring (Forbis, pers. comm., February 7, 2008).

The most likely impacts from energy development are likely to be related to potential solar generation facilities and infrastructure located to take advantage of the energy transmission corridor that passes to the west of known populations. Because of the rarity of the known populations, however, impacts from solar energy development should be easily avoidable with proper planning.

Neither wildfire nor grazing is likely to pose a significant threat at this time. The generally sparsely-vegetated nature of the habitat in which the Sunnyside green gentian occurs is unlikely to provide sufficient fuel to sustain wildfire. However, an increase in annual fine fuels, such as cheatgrass (*Bromus tectorum*), as a result of climate change or surface disturbance by OHVs or livestock, could increase the potential for wildfire to occur and/or spread, and pose a more significant threat to the species. The low forage value of the habitat suggests that the effects of grazing are likely limited to the occasional tramping and/or grazing of individuals.

Climate change is likely to pose a significant threat over the coming decades to species adapted to specialized habitats, such as the Sunnyside green gentian. Its habitat only exists within an elevation range of about 300 feet on the floor of the White River Valley making migration in response to changed environmental conditions impossible unless the species can evolve into a broader range of habitats. The extreme habitat specialization of the Sunnyside green gentian suggests that both migration and evolution are unlikely within the time frame over which climate changes are currently predicted to occur.

BLM Proposed Management Actions That May Benefit the Species

SS-2: Develop and implement an interagency inventory and monitoring program for special status plant and animal species.

SS-36: Inventory and monitor populations of the Sunnyside green gentian in conjunction with the development of the White River Valley ACEC management plan.

Additional Management Recommendations

1. Partner with the Nevada Division of Forestry and the Nevada Fish and Wildlife Office to delineate with a global positioning system the population boundaries of all reported occurrences of the Sunnyside green gentian in the White River Valley, obtain basic

population estimates, and identify and assess the significance of site-specific threats to the species.

2. Collaborate with the Nevada Division of Forestry and the Nevada Fish and Wildlife Office to develop a conservation strategy for the Sunnyside green gentian that provides sufficient assurances to preclude a federal listing of the species. At a minimum, the conservation strategy should address the following points:

    a. The population and threat data obtained through implementation of management recommendation No.1 above.

    b. Development and implementation of a multistage (i.e., a combined qualitative and quantitative) long-term monitoring strategy for status and trend assessment.

    c. Collection and long-term conservation storage of representative germplasm of the Sunnyside green gentian in the designated seed bank for threatened and endangered plants of the Great Basin at the Red Butte Garden and Arboretum at the University of Utah, Salt Lake City (Maunder *et al.*, 2004).

    d. Specific management strategies to address and mitigate all identified significant threats to the long-term viability of the species.

3. Incorporate conservation of the Sunnyside green gentian into all management and permitting actions that may affect any population of the species. Because of the rarity of this species, the emphasis should be placed on impact avoidance. If avoidance is not possible, impact minimization and mitigation measures should be implemented. All mitigation measures should include specific performance standards for success and should identify remedial actions if the performance standards are not met.

References

Barneby, R.C. 1942. An addition to the genus *Swertia*. Leaflets of Western Botany 3: 155-157.

Forbis, T. 2007. Report on White River Valley rare plant conservation strategy. Unpublished report prepared by The Nature Conservancy, Reno, Nevada, for the U.S. Fish and Wildlife Service, Nevada Fish and Wildlife Office, Reno.

Harrison, B.F. 1980. Botanical survey of threatened and endangered plants. Schell Resource Area. Bureau of Land Management, Ely, Nevada.

Lindsey, K. 1985. Report on the status of *Frasera gypsicola* in the Ely District. Bureau of Land Management, Ely, Nevada.

Maunder, M., E.O. Guerrant, Jr., K. Havens, and K.W. Dixon. 2004. Realizing the full potential of *ex-situ* contributions to global plant conservation. Pp. 389-418, *in* E.O. Guerrant, Jr., K. Havens, and M. Maunder, eds. Ex-situ Plant Conservation: Supporting Species Survival in the Wild. Society for Ecological Restoration International. Island Press, Washington, D.C.

Nevada Natural Heritage Program. 2001. *Frasera gypsicola* in the Nevada Rare Plant Atlas. Available online at http://heritage.nv.gov/atlas/atlasndx.htm.

Smith, F. 2000. Current knowledge and conservation status of *Frasera gypsicola* Barneby (Gentianaceae). Status report prepared for the Nevada Natural Heritage Program, Carson City, Nevada, and the U. S. Fish and Wildlife Service, Nevada Fish and Wildlife Office, Reno, Nevada.

Meadow Valley Wash
Fish Translocation and Salvage Protocol

April 2008

The following protocol has been adapted from a work plan developed by EDAW, Inc. on behalf of Union Pacific Railroad (UPRR) to safely and thoroughly translocate all native fish species from UPRR project sites related to flood repair damage activities that occurred along the Meadow Valley Wash and Clover Creek in 2005 (EDAW *in litt.* 2005). This protocol is appropriate to use for native fish translocation in those situations where dewatering of a portion of the stream is necessary and cannot be avoided. Use of this protocol shall be coordinated with the Nevada Department of Wildlife and U.S. Fish and Wildlife Service prior to commencement of projects.

1. Prior to initiating fish translocation activities, a preliminary site assessment will be conducted to visually evaluate general conditions of the stream reach that is to be dewatered and upstream habitat for potential release locations.

2. Block nets shall be placed above (i.e., upstream) and below (i.e., downstream) the designated construction area to isolate fish movement and prevent fish from entering the site on the morning of the fish translocation. The upstream block net shall be placed across the channel approximately 100 feet above the designated construction area. Placement of the downstream block net will be determined on a case-by-case basis, depending on the nature of the project, but shall be placed in the most appropriate area to minimize the number of fish entering the work area.

3. Once the stream reach has been isolated, the triple-pass electrofishing survey methodology (see below) based on historic stream survey methods will be employed throughout the entire length of the reach to capture, remove, and count fish. State and/or Federal agency personnel will be notified 2 days prior to the survey and on-site to observe the activities of the project fisheries biologist and assistants while conducting the electrofishing survey. Other components of the survey methodology include water quality, riparian, and aquatic invertebrate assessments as described below under "Electrofishing Survey Methodology".

4. A minimum of 5 passes with a seine net and hand dip nets shall be made throughout the entire length of the reach to attempt to capture and remove remaining fish from the channel. Seine passes shall continue as necessary until a diminishing return on fish captured per pass is reached (i.e., numbers of fish captured per pass are reduced to a level where the method is deemed no longer effective). The project fisheries biologist shall make the determination when a diminishing return on fish captured has been reached.

5. Additional electrofishing passes shall be made as necessary until it has been reasonably determined by the project fisheries biologist that all fish have been removed from the site.

6. Captured fish from electrofishing (step 3) and seining (step 4) shall be placed in 5-gallon buckets with fresh, clear water and transported by foot to upstream release site(s) identified in step 1. Buckets containing native fishes shall be moved to the release site frequently, with no more than 200 fish in a bucket at one time and kept in buckets for no longer than 15 minutes. All native fish species shall be released in pools or slow moving currents and shall be allowed to gently swim out of the buckets. Nonnative aquatic species that can be legally captured shall be destroyed. A minimum of one representative

bucket sample from the entire translocation effort shall be counted for total individuals by species. Any potential fish mortalities shall also be noted.

7. Once all fish have been captured, transported, and released, the project fisheries biologist shall clear the site for dewatering. During the stream diversion and dewatering phase, the project fisheries biologist and a minimum of 5 assistants shall monitor the reach (with fish removal and transporting equipment) for any stranded fish that may have been missed during steps 3, 4, and 5. The stream diversion and subsequent wetting of one channel and dewatering of the other shall take place incrementally (a portion of the total flow will be diverted to allow the water to recede slowly in one channel while minimizing erosion potential and turbidity in the other channel). Any stranded fish shall be immediately captured, transported and released upstream as described above. Manual capture shall also include removal of native fish that are hiding or occurring under rocks in the dewatered channel. If it is deemed that additional personnel are necessary due to a large quantity of fish, the project fisheries biologist shall request assistance from Nevada Department of Wildlife or U.S. Fish and Wildlife Service staff. Once all potentially stranded fish have been removed, transported, and released, the site shall be thoroughly inspected for any potential stranded fish. If the site is deemed to be absent of fish after inspection, the project fisheries biologist shall clear the site for continued construction operations.

8. Nevada Department of Wildlife and U.S. Fish and Wildlife Service shall be notified two days prior to the expected date that the fish translocation and salvage will begin.

9. Within 10 business days after the fish translocation and salvage, the project fisheries biologist shall prepare a written report of findings for submittal to the appropriate resource agencies. The report shall include a description of all fish translocation and salvage activities and estimates for total fish translocated and salvaged by species (including any potential mortalities). State and Federal agency personnel shall be responsible for water quality, riparian, and aquatic invertebrate data collection, and analyzing and summarizing data collected during the triple-pass electrofishing survey (step 3).

Citation

EDAW, Inc. 2005. Letter transmitting Meadow Valley Wash Fish Translocation and Salvage Protocol and Electrofishing Survey Methodology to the Ely BLM Field Office, December 15, 2005.

Recommended equipment:

- 2 block nets of sufficient size to block channel (approximately 1/8-inch mesh)
- 1 backpack electrofishing unit
- Minimum of 2 electrofishing dip nets (long-handled, non-metallic, insulated handles)
- Eavy rubber gloves and/or other appropriate safety equipment for electrofishing
- Polarized glasses for dipnetters
- 5-gallon buckets, 10 minimum
- Minimum of 4 long-handled dip nets for general netting (dip nets should have a straight frame and a 90 degree angle to allow fishing in narrow places
- Minimum of 5 small aquarium nets

Electrofishing Survey Methodology

Transects are sampled with multiple-pass electroshocking in 25 meter transects. Block nets with 1/8-inch mesh are set at the bottom and top of each transect prior to sampling to prevent both immigration and emigration of fish during the sampling period. A three pass depletion sample for each transect is then implemented using a backpack electroshocker, with an output of approximately 1 ½ amps.

All fish captured during the sampling are stored in five gallon buckets, with fish from each pass in separate buckets. The captured fish are enumerated by species and a subset of approximately 100 individuals per species measured for total length (millimeters) prior to release below the lower block net. Population estimates based upon depletionj numbers at each transect are generated using the Zippin method (various references, e.g., Zippin 1956, Zippin 1958).

For each transect, water temperature and dissolved oxygen are recorded using a meter. A sample unit and location description is recorded for each transect including qualitative vegetation, substrate composition and aquatic invertebrate presence by order of family (where possible through field identification). The vegetation noted is divided into three subcategories: aquatic, riparian, and upland. Estimates of relative abundance of vegetation and invertebrates are described. Also, at each transect a digital picture is taken looking up and downstream from the downstream transect marker. These pictures are on file in the Nevada Department of Wildlife, Southern Region office in Las Vegas, Nevada.

References

Zippin, C. 1956. An evaluation of the removal method of estimating animal populations. Biometrics 12:163-189.

Zippin, C. 1958. The removal method of population estimation. Journal of Wildlife Management 22:82-90.

NEVADA DEPARTMENT OF
WILDLIFE Southern Region 4747 W. Vegas Drive,
Las Vegas, Nevada 89108 702 / 486-5127; 702 / 486-5133 FAX

17 November 2005

GILA MONSTER PROTOCOL FOR MINIMIZING IMPACTS IN THE CONSTRUCTION SITE

Background

- Per Nevada Administrative Code 503.080, the Gila monster is classified as a Protected reptile.
- Per Nevada Administrative Codes 503.090, and 503.093, no person shall capture, kill, or possess any part thereof of Protected wildlife without the prior written permission by the Nevada Department of Wildlife (NDOW).

This species is rarely observed relative to other species and is the primary reason for its Protected classification by the State of Nevada. The USDI Bureau of Land Management has recognized this lizard as a sensitive species since 1978. Most recently, the Gila monster was designated as an Evaluation species under Clark County's Multiple Species Habitat Conservation Plan (MSHCP). The evaluation designation was warranted because inadequate information exists to determine if mitigation facilitated by the MSHCP would demonstrably cover conservation actions necessary to insure the species' persistence without protective intervention as provided under the federal Endangered Species Act.

The Gila monster is the only venomous lizard endemic to the United States. Its behavioral disposition is somewhat docile and avoids confrontation. But it will readily defend itself if threatened. Most bites are considered illegitimate and consequential to harassment or careless handling.

The banded Gila monster (Heloderma suspectum cinctum) occurs in Clark, Lincoln, and Nye counties of Nevada. Found mainly below 5,000 feet elevation, its geographic range approximates that of the desert tortoise and is coincident to the Colorado River drainage. The Gila monster is recognizable by its striking black and orange-pink coloration. In keeping with its namesake, the banded Gila monster retains a black chain-link, banded appearance into adulthood. Other lizard species are often mistaken for the Gila monster. Of these, the western banded gecko (Coleonyx variegatus) and chuckwalla (Sauromalus obesus (= ater)) are most frequently confused with the Gila monster. All three species share the same habitats.

The banded gecko is often mistakenly identified as a baby or juvenile Gila monster. Banded geckos do have a finely granular skin and pattern that can be suggestive of the Gila monster to the untrained eye. However, banded gecko heads are somewhat pointed at the snout and the relatively large eyes have vertical pupils. Snouts of Gila monsters are bluntly rounded and the

smallish eyes have round pupils. Newly hatched Gila monsters are about 5-6 inches long with a vivid orange and black, banded pattern. Geckos are at best cream to yellow and brown in pattern and do not exceed 5 inches.

Both juvenile and adult chuckwallas are commonly confused with the Gila monster. Juvenile chuckwallas have an orange and black, banded tail. Although banding of the tail fades as chuckwallas mature, their large adult size (up to 17 inches) rivals that of the Gila monster. Adult chuckwallas have a body shape somewhat suggestive of the Gila monster, but they lack the coarsely beaded skin and black and orange body pattern of the Gila monster.

Gila monster habitat requirements center on desert wash, spring and riparian habitats that inter-digitate primarily with complex rocky landscapes of upland desert scrub. They will use and are occasionally encountered out in gentler terrain of alluvial fans (bajadas). Hence, Gila monster habitat bridges and overlaps that of both the desert tortoise and chuckwalla. Gila monsters are secretive and difficult to locate, spending >95% of their lives underground.

Gila monsters make use of deep crevices and caves of primarily rocky slopes for winter and summer refuge. When active they will also frequent animal burrows and other shallow refugia on more gentle slopes. Foraging Gila monsters seek nestlings of ground or low-shrub nesting birds (e.g. doves, quail), rodents (e.g. mice, kangaroo rats), lagomorphs (e.g. cottontail) and other reptiles which are found in highest concentration in greater productivity areas, such as along well-vegetated wash courses of bajadas.

Scant information exists on detailed distribution and relative abundance in Nevada. The Nevada Department of Wildlife (NDOW) has ongoing management investigations addressing the Gila monster's status and distribution, hence additional distribution, habitat, and biological information is of utmost interest. In assistance to gathering additional information about Gila monsters in Nevada, NDOW will be notified whenever a Gila monster is encountered or observed, and under what circumstances.

Construction Site Protocols

Helpful to any instructional program, workers and other personnel should at least know how to: 1) identify Gila monsters and be able to distinguish it from other lizards such as chuckwallas and banded geckos; 2) report any observations of Gila monsters to the Nevada Department of Wildlife (NDOW); 3) be alerted to the consequences of a bite resulting from carelessness or unnecessary harassment; and 4) be aware of protective measures provided under state law.

1) Live Gila monsters found in harms way on the construction site will be captured and then detained in a cool, shaded environment (≤85EF) by the project biologist or equivalent personnel until a NDOW biologist can arrive for documentation purposes. Despite that a Gila monster is venomous and can deliver a serious bite, its relatively slow gate allows for it to be easily coaxed or lifted into an open bucket or box carefully using a long handled instrument such as a shovel or snake hook (Note: it is not the intent of NDOW to request unreasonable action to facilitate captures; additional coordination with NDOW will clarify logistical points). A clean 5-gallon plastic bucket w/ a secure, vented lid; an 18"x 18"x 4" plastic sweater box w/ a secure, vented lid; or, a tape-sealed cardboard box of similar dimension may be used for safe containment. Additionally, written information identifying the mapped capture location (e.g. GPS record), date, time, and circumstances (e.g. biological

survey or construction) and habitat description (vegetation, slope, aspect, substrate) will also be provided to NDOW.

2) Injuries to Gila monsters may occur during excavation, blasting, road grading, or other construction activities. In the event a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Rehabilitation or euthanasia expenses will not be covered by NDOW. However, NDOW will be immediately notified during normal business hours. If an animal is killed or found dead, the carcass will be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, habitat, and mapped location.

3) Should NDOW's assistance be delayed, biological or equivalent acting personnel on site may be requested to remove and release the Gila monster out of harms way. Should NDOW not be immediately available to respond for photo-documentation, a 35mm camera or equivalent (5 mega-pixel digital minimum preferred) will be used to take good quality images of the Gila monster in situ at the location of live encounter or dead salvage. The pictures, preferably on slide film (.tif or .jpg digital format) will be provided to NDOW. Pictures will include the following information: 1) Encounter location (landscape with Gila monster in clear view); 2) a clear overhead shot of the entire body with a ruler next to it for scale (Gila monster should fill camera's field of view and be in sharp focus); 3) a clear, overhead close-up of the head (head should fill camera's field of view and be in sharp focus).

Please contact NDOW Biologist Polly Conrad at (702) 486-5127 x3718 or by e-mail at pconrad@ndow.org for additional information regarding these protocols.