A Conservation Alternative for the Management of the Four Southern California National Forests

Los Padres, Angeles, San Bernardino, Cleveland

Submitted by

Center for Biological Diversity

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COVER PHOTO:

Fulmor Lake, near Idyllwild (near the James Reserve) in the San Jacinto Mountains (SBNF)

Photographer: Monica Bond

EXECUTIVE SUMMARY

ISSUE STATEMENT

Southern California's national forests (Los Padres, Angeles, San Bernardino, and Cleveland) provide the backbone for the conservation of the natural beauty and remarkable diversity of plants and animals in the South Coast Ecoregion, including 3,000 plant and 500 animal species, many of which are endemic to southern California, occurring nowhere else on Earth.

Yet this region's natural wealth is relatively unsung. While perhaps not as world renowned as some of California's other crown jewels such as Yosemite National Park and Muir Woods National Monument, these forests are also national treasures, boasting the richest diversity of plant and animal life of any region in the continental United States.

Southern California's 4 national forests ("Forests") are part of the California Floristic Province, an 8-million-acre region that extends from southern Oregon to northern Baja, Mexico, and encompasses areas west of the interior deserts. The Santa Clara Watershed and the rugged crest of the Santa Ynez and Santa Lucia Mountains lie to the north. The towering peaks of the San Bernardino, San Jacinto, and Laguna Mountains form the boundary to the east. The region stretches as far south as the Tijuana River watershed, straddling the U.S.-Mexico border, and a series of scattered offshore islands and the Pacific Ocean form the distinct western boundary. The California Floristic Province is one of 25 global biodiversity hotspots, or areas that harbor such incredible diversity of species that they have been identified by conservationists as crucial to the survival of biodiversity on Earth. Indeed, while 25 hotspots cover less than 1.5% of the Earth's land surface, they account for roughly 60% or more of the remaining diversity of life on Earth (Mittermeier et al. 1998, 1999). The South Coast Ecoregion is a biological hotspot for nearly every taxonomic group, including plants, invertebrates, birds, mammals, and reptiles, in part due to the region's mild Mediterranean climate.

California supports the second-greatest number of species listed under the Endangered Species Act in the United States, following to Hawaii (USFWS 2001a). This concentration of endangered and threatened species is not surprising: the Forests are facing a growing number of threats and are pressed on all sides by a rapidly growing population and ever-expanding development. The Forests spill over into 9 counties: Ventura, Los Angeles, Orange, San Bernardino, Riverside, Kern, San Luis Obispo, Monterey, and San Diego. Two of the counties, Riverside and San Bernardino, are home to 14 of the 20 fastest-growing cities in California. Approximately 20 million people live within the metropolitan Los Angeles and San Diego areas, making this one of the most densely populated regions in North America. By 2020, the region's population is expected to expand to 35 million people.

These breathtaking mountain forests that are home to so many species are also accessible to millions of backpackers, hikers, and outdoor enthusiasts and serve as a hub for nature-based recreation in southern California. Each year, millions of people recreate in the mild mountainous climate, hiking the 2,000 miles of trails, fishing the 300 miles of streams, driving the 200-plus miles of Scenic Highways, and even climbing 10,000-foot summits. The campgrounds are full throughout the summer, and the Serrano Campground is the most popular in the entire National Forest System.

Recognizing that the Forests are critically important for an extraordinary variety of plants and animals, and that the number of imperiled species is escalating rapidly, the Center for Biological Diversity (CBD) sued the Forest Service in 1998 for violating the Endangered Species Act. The lawsuit claims that the Forest Service is failing in its obligation to protect a growing number of endangered plants and animals in the Los Padres, Angeles, San Bernardino, and Cleveland National Forests. In 1989, 17 species were federally listed as threatened or endangered throughout the Forests. Today, there are 76 federally and/or state-listed species, with several more species on the verge of becoming threatened or endangered. Many historic practices on the Forests have led to the deterioration of these federally protected lands and the rapid decline of their natural wealth of species. The 1998 lawsuit resulted in a landmark settlement that requires the Forest Service to begin updating its forest management plans by 2002.

Management Planning

The most recent management plans for the Forests date back to the mid to late 1980s and are riddled with weak and ambiguous standards and guidelines that resulted in inconsistent management among the 4 Forests. The plans also failed to emphasize riparian protection, despite the fact that a large number of the threatened, endangered, and sensitive species found in the Forests depend upon riparian and aquatic habitats for all or part of their life cycles.

Now, the Forest Service has the opportunity to design a blueprint for managing, restoring, and protecting the ecological integrity of these Forests for some of the country's most diverse and dynamic ecological and cultural communities.

Numerous national, state, and local environmental organizations, scientists, and technical experts throughout California have teamed up to develop a visionary plan for the future of these irreplaceable landscapes and their biological richness. We are presenting a plan to the Forest Service and the public at large that aims to ensure that these Forests are truly protected for the highest public interest and future generations.

"National Forests exist today because the people want them. To make them accomplish the most good, the people themselves must make clear how they want them run."

Gifford Pinchot, 1907

THE CONSERVATION ALTERNATIVE — ISSUE SUMMARIES

ECOSYSTEM FUNCTION & PROCESS

Watershed Management

This section calls for adequate watershed and aquatic protection at the landscape level, coupled with specific management strategies for sensitive habitats like riparian areas. Watershed-level analyses and strategies are useful as a tool for developing additional protection measures within watersheds and prioritizing the restoration of watershed health and riparian ecosystems. The emphasis is on preventing the causes of watershed degradation instead of perpetuating those destructive activities and having to continuously repair the damage.

Fire Management

This section prioritizes the restoration of natural fire patterns where possible and using strategies tailored to the needs and conditions of individual vegetative communities. It also establishes strategies for creating effective wildland-urban buffers to protect communities and property.

Airshed Management

This section calls upon the Forest Service to prevent its own emissions through a variety of strategies, allowing for short-term exceptions necessary to fulfill resource management goals (e.g. prescribed burning). This section also advises the Forest Service to seek out opportunities and collaborations to better protect Forest resources from southern California's air pollution, which is degrading visibility and impairing the ecological health of the Forests.

Global Warming and Climate Change

This section urges the Forest Service to reduce its contribution to global warming.

ELEMENTS OF BIOLOGICAL DIVERSITY

Vegetation Management

The Forests contain a diverse suite of vegetative communities in a global biodiversity hotspot. This section promotes tailored community-level protection and management.

Soils Management

All activities on the Forests must be evaluated for their impacts on soil structure and function, including the health of cryptobiotic crusts, microbes, invertebrate communities, and permeability to water.

Management Indicator Species/Focal Species

This section lists 11 animals that are carefully selected focal species, or "management indicator species." These species are identified as important barometers of forest and ecosystem health.

Listed Species and Sensitive Species

As the Forests are the last refuge for many imperiled species, these sections charge the Forest Service to ensure the protection and recovery of all such species based on the best available science. All activities on the Forests must be evaluated for their impacts to federal- and state-listed and sensitive species.

Invasive Species Management

Eradication and control of invasive species is a priority, coupled with subsequent restoration and monitoring to ensure successful restoration of native ecological communities. This section also challenges the Forest Service to aggressively prevent the introduction of additional invasive species.

LAND MANAGEMENT DESIGNATIONS

Wilderness and Wild and Scenic Rivers

These sections largely echo a multi-year strategy developed by leading wilderness organizations in the state and country. It provides for the protection of public access to some of our most spectacular, undeveloped wildlands in the state.

Roadless Areas

This section calls for a comprehensive roads inventory and the management of all unroaded areas as roadless reserves.

Habitat Linkages

This section provides direction on ensuring landscape-level connectivity both within and between the four forests. All activities on Forests must be analyzed for their potential impact on habitat linkages.

Research Natural Areas (RNAs)

RNAs are established to protect land in perpetuity as living learning centers for ecological research and restoration. This section outlines a strategy for the RNA system to include full representation of the ecological processes and diversity that occur on the Forests.

Special Interest Areas (SIAs)

SIAs are designated to protect the areas of extraordinary botanical, zoological, scientific, geological, cultural, and scenic values and other interests that deserve special recognition and management. This section proposes a suite of more than 20 additional SIAs that represent the unique resource value of the Forests.

Land Protection Opportunities

This section promotes the acquisition of lands from willing sellers and the establishment of conservation easements that would enhance resource protection and recreational opportunities.

RECREATIONAL & EDUCATIONAL OPPORTUNITIES

Cultural Resources

This section emphasizes the coordination of cultural resource protection with tribal uses. It calls for surveys and protection of culturally significant archeological resources. This section also addresses the preservation of non-tribal historical resources.

Environmental Education & Outreach

This section provides suggestions as to how the Forest Service can use a variety of strategies, venues, and partnerships to teach the public about the rich natural heritage of the region, and how to minimize impacts to the Forests. Emphasis is also on developing education and outreach programs that are multi-lingual and culturally accessible for the diverse populace served by the Forests.

Recreation/Recreational Opportunity Spectrum

This section outlines a wide spectrum of recreational opportunities that exist for the public, from primitive backcountry to more developed types of recreation, and discusses how to site activities to ensure resource protection. ORV use is restricted to signed trails only. Routes and trails for recreation will be redesigned or eliminated to protect sensitive resources. Areas and trails resulting in resource degradation will be restored after closure.

ECONOMIC ACTIVITIES

Special Use Permits (SUPs)

Certain permitted activities on the Forests have the potential to negatively impact resources and are regulated through SUPs. This section identifies conditions to attach to SUPs that will minimize and fully mitigate impacts.

Roads

This section calls for the Forest Service to conduct a comprehensive assessment of all current roads and to identify appropriate roads for removal and restoration. The emphasis is on maintaining remaining roads to minimize watershed degradation and to facilitate wildlife movement.

Transportation, Utility, and Telecommunications Corridors

This section prohibits the establishment of new transportation, utility, or telecommunications rights-of-way beyond the existing, sprawling network. Only existing footprints shall be used for any additional development. Companies need to pay fair market value for use of these areas, and that funding should be used for restoration. This section also calls for an evaluation of impacts of existing rights-of-way and provides for mitigation of those impacts.

Timber Harvest

This section steers the Forest Service towards the goal of ending commercial timber sales. Harvest activities will be limited to strictly defined undergrowth reduction for fire management purposes only, conducted by the agency. Commercial logging would not occur.

Domestic Livestock Grazing

This section steers the Forest Service towards the elimination of commercial domestic livestock grazing, through buyouts and allotment retirement, in areas found to be ecologically unsuitable for grazing. In the interim, specific mitigation measures include better overall grazing regulation, boundary modifications, and other measures that will minimize domestic livestock impacts to sensitive resources.

Oil and Gas Drilling

This section prohibits any additional oil and gas drilling activities.

Minerals Management

This section directs the Forest Service to regulate proposed hard-rock mining operations on public land based on a mine's impacts to environmental or cultural resources. The Forest Service must deny any operation that cannot ensure compliance with the basic environmental laws and standards. No suction dredging or sand and gravel mining is permitted.

MANAGEMENT APPROACH

Monitoring and Adaptive Management

This section refers back to all other sections by outlining criteria and parameters for monitoring and adaptive management. Activities that have the potential to adversely affect resources cannot go forward without sufficient preliminary research and analysis, and permitted actions must be accompanied by informed mitigation measures and an effective monitoring plan.

Funding

This section recognizes the necessity of sufficient funding for appropriate management. Thus, if the agency does not have existing or sufficient funding to fully manage and monitor activities that could degrade or undermine the protection of the Forests' natural and cultural resources, the Forest Service shall restrict that activity until such

funding is procured. Forest Service must prioritize the pursuit of funding for resource protection and recovery through a variety of strategies.

OUR APPROACH

Analysis of Existing Conditions

Extensive research and analyses of GIS data sources were conducted to assess existing conditions on the Forests. This included scientific literature, existing Land and Resource Management Plans, Recovery Plans, Special Technical Reports, etc. GIS data used in the analysis of existing conditions were based on data provided by the Forest Service.

Identification of Ecological Challenges

The Forests have suffered from the extirpation of native species, the degradation of their rivers and streams, fire suppression, exotic species introductions, and habitat fragmentation and destruction. The Conservation Alternative provides detailed management prescriptions for restoring the Forests' health by reintroducing extirpated species, restoring aquatic and upland areas, reinstating natural disturbance regimes, controlling exotic species, and building essential bridges between habitats.

Habitat restoration needs were identified by spatially analyzing existing land use (recreation, roads, extractive industries, etc.) in relation to the occurrence of sensitive and listed species and natural communities. Riparian restoration projects received special attention because southern California has already lost over 95% of its historic riparian communities, and more than 80% of terrestrial vertebrate species are dependent on these communities. Numerous listed and sensitive species are also associated with riparian communities.

EXPERT REVIEW AND INPUT

The Conservation Alternative was sent out to a number of scientists, including wildlife biologists, herpetologists, ornithologists, entomologists, botanists, hydrologists, fire scientists, foresters, etc., to elicit their input on sections of the Alternative within their respective disciplines. Upon completion of each section of the Conservation Alternative, a draft was sent to these scientists for their review; their comments and suggestions have been incorporated into this document.

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Section 1.0

WATERSHED MANAGEMENT

ISSUE STATEMENT

Watersheds are life support systems for the Forests' plants and animals and a major source of drinking water for southern California. A watershed is a well-defined land area with a system of recurring processes and a distinct assemblage of dependent plants and animals. There are several factors and activities that can degrade watershed and riparian resources, including mining, domestic livestock grazing, logging, roads, ORV use, invasive species, oil and gas drilling, dams, hydroelectric development, intensive recreational use, and extraction by bottled water companies.

Watershed management must encompass more than mitigation and restoration strategies. These strategies are important, but they only treat symptoms. Ultimately, the very causes of watershed degradation must be treated. Arresting and eliminating the causes of degradation is far more effective and efficient than treating symptoms.

The majority of large rivers in the Forests have been dammed or diverted, changing the very character of the rivers. The establishment of dams and diversions has disrupted natural flows and the distribution of sediments upon which native downstream species depend. Artificially large, sudden releases of water, especially in the summer, can wipe out an entire year's reproductive effort for native species such as the arroyo toad (*Bufo californicus*), red-legged frog (*Rana aurora draytonii*), southwestern pond turtle (*Clemmys marmorta pallida*), and California newt (*Taricha tarosa*). Artificially chronic low-level flows foster the spread of exotic predators such as bullfrogs, sunfish, bass, bluegill, catfish, and Asian clams into areas that were historically dry in late summer (Sweet 1992, MAFA). As these communities become invaded and dominated by non-native species they become less able to support native species. See Section 10.0, *Invasive Species Management*. In some drainages, even small improvements could greatly increase these streams' ability to support species that have suffered declines. On Piru Creek in the Los Padres National Forest, where unnaturally fluctuating spring and summer discharges were replaced with constant releases during the same period, many more arroyo toad larvae survived (Sweet 1993, Stephenson and Calcarone 1999). While the restoration of flow regimes can help, it doesn't address other persistent problems such as changes in vegetation, soils, or sediment loads.

Wetlands and riparian habitats throughout the Forests are truly among the rarest and most sensitive ecosystem types in the western U.S. These areas are also critical for biodiversity, harboring high concentrations of TES (threatened, endangered, and sensitive) species. Krueper (1992) estimates that wetland and riparian habitat occupies less than 1% of the total land area in the western U.S., yet is critical for up to 80% of terrestrial vertebrate species. Riparian habitats are relatively rare in southern California, but extensively degraded: more than 90% have already been lost. While there are fewer acres of riparian habitat than chaparral or grassland in the Forests, riparian areas sustain a disproportionately high number of aquatic and terrestrial wildlife species (Faber et al. 1989). Riparian communities in this region are typically surrounded by drier environments, and the water and riparian vegetation that they provide are vitally important to many species (Krueper 1992).

In addition to streams, rivers, and groundwater, the Forests also contain reservoirs and lakes. Deep-water reservoirs, created by dams, tend to be dominated by non-native species and promote the spread of these species into nearby habitats, especially downstream. Almost all large, man-made reservoirs in the Forests are stocked with fish including bass, trout, catfish, and sunfish. These sites are more popular with anglers than are the streams. While they are rich in non-native species, they also attract native and sometimes rare species, such as bald eagles and osprey, that were historically more widespread in the region.

The management of water issues in the Forests is jurisdictionally complex. All of the watersheds in the Forests include a va riety of ownerships and jurisdictions. Lower-elevation rivers tend to face a greater array of threats (including diversions/alterations, agricultural and urban development, and a greater abundance of non-native species) because they run through more privately held land. Due to the cumulative nature of impacts, lower-elevation rivers are also more adversely affected by the combined effects of these activities.

Watershed-based planning can provide an important framework for sound, conservation-based decision making. Recent reviews of water-related resource management by the National Academy of Sciences (National Research Council 1999) and by a Presidential commission on western water (Western Water Policy Review Advisory Commission 1998) recommend watersheds as the spatial framework for planning and management of water and water-related resources (USFWS 2001a).

Watershed analysis, wherever possible, should inform landscape management decisions. It is a planning tool, designed to gather information about the human, aquatic, riparian, and terrestrial features, conditions, processes, and interactions within a watershed. It provides a systematic way to understand and organize information about an ecosystem that can help implement the objectives, standards, and land allocations identified in the plan for the Forests. Watershed analysis and resulting management recommendations will also provide context and focus for site-specific project planning, implementation, and regulatory compliance within the Forests.

Proactive efforts and planning are key, as watershed management will only become more challenging as the regional population and demands for water and water-based recreation continue to grow. Watershed restoration should include both passive and active restoration efforts. Passive restoration includes allowing recovery to occur by simply restricting and/or ceasing the damaging activity (e.g. eliminating riparian livestock grazing). Active restoration involves actions to reduce impacts (e.g. road obliteration). While both are critical, passive restoration is more logistically and financially efficient.

AREA DESCRIPTION

Watersheds and riparian zones exist throughout the Forests. All areas are impacted and influenced by Forest watersheds. There are a few naturally-occurring, small water basins, including Jackson Lake, Elizabeth Lake, Lake Hughes, and Lost Lake as well as several natural lakes: Crystal Lake, Dollar Lake, Hidden Lake, and Baldwin Lake.

DESIRED CONDITION

Watershed and aquatic resources are protected at the landscape level, coupled with specific management strategies for sensitive habitats such as riparian areas. Watershed-level analyses and strategies are used to develop additional protection measures within watersheds and to prioritize the restoration of watershed health and riparian ecosystems. Watershed-level analysis and planning is conducted using the strategy detailed in Appendix A, *Watershed Analysis Framework*. Watershed analysis is used to increase protection measures and in no instance is used to downgrade existing protections.

Watershed management focuses on ecological restoration and not simply rehabilitation:

ECOLOGICAL RESTORATION	REHABILITATION
Focuses on entire communities	Focuses only on flowing water components
Corrects the primary causes of degradation	Treats the symptoms of degradation
Restores native species diversity	Retains populations of introduced species
Encourages natural recovery processes	Pursues structural engineering treatments
Uses adaptive approach: implement, monitor, and adjust	Implements actions without monitoring effects

Watersheds are managed for the protection, restoration, and maintenance of riverine and riparian habitat and the ecological elements and processes essential to the survival of native aquatic species. Management activities prioritize the rapid reduction of threats to ecosystem integrity. Additionally, restoration focuses on the reestablishment of more naturally functioning riverine-riparian ecosystem processes. Commercial/extractive uses that degrade water quality are eliminated from key watershed sites.

Riparian areas have a range of vegetative structural stages that provide a transitional zone between upland terrestrial habitats and aquatic habitats, and have the features necessary to promote healthy stream, floodplain, and diverse riparian and aquatic habitat conditions. Desirable native riparian vegetation occupies the historical floodplain. Native riparian plant species and assemblages such as willow, sycamore, alder, and coast live oak characterize riparian zones, with naturally occurring openings, meanders, and responses to high flow regimes that provide opportunity for early succes-

sional plant communities.

Ecosystem dynamics (such as flood and fire) and processes (such as nutrient cycling and water and sediment regimes) are within the natural range expected for the watershed. Historical aquatic species distribution is maintained or is expanding into previously occupied habitat, with inter-connectivity between local populations. The amount, distribution, and characteristics of habitats are present to maintain viable populations of historically present and currently present native species. A network of intact, or largely intact and recovering riparian areas represents known high biotic integrity waters and provides critical refuges for listed, special-concern, and endemic species.

An intact and naturally dynamic native plant community—including litter, downed wood, herbaceous understory, and shrub and tree layers—extends continuously the length of all perennial, intermittent, and ephemeral streams. Microhabitats for invertebrate species, intact riparian vegetation, and upland plant communities for wider-ranging species such as frogs, toads, and turtles are well distributed across the landscape. Habitat conditions contribute to the delisting of species under the Endangered Species Act, and prevent further listing of species under the Act, or adding species to the Forest Service sensitive species list.

OBJECTIVES

Watershed Restoration

Maintain and restore groundwater supplies to support the goals of forest resource protection and meet or exceed Clean Water Act standards.

Restore water quality and ensure that it remains at high levels, meeting Clean Water Act requirements, EPA-approved state and tribal water quality standards, and contributing to habitat quality and stream and lake conditions.

Use watershed analysis as a tool to identify and prioritize significant watershed restoration needs, identify areas of special biological or ecological significance, and identify areas of significant risk including areas with sensitive soils, unstable slopes, and a proclivity for landslides, gullying, or other erosive processes. Conduct stream-specific analyses to determine historic flows, relationship to native flora and fauna, and desired conditions on water releases. Use this analysis to: inform the public and decision-makers prior to making management decisions about permitting or continuing activities affecting the watershed; help enforce management objectives and standards; and design strategies to improve watershed health and integrity, soil function, and water quality in areas where natural watershed function and condition have been degraded.

Treat watershed analysis as a dynamic, long-term undertaking, updated at least every 10 years, or more frequently when significant new information or conditions exist.

Coordinate Forest Service resource managers' and specialists' watershed analysis and watershed-based actions with federal, state, county, and city officials, community-based watershed associations, private landowners, local, regional, and national stakeholder groups, and others to develop a watershed-based approach to land management decision-making in the Forests. The California Department of Fish and Game, the California State Water Resources Control Board, the Regional Water Quality Control Boards, and other appropriate public agencies will be considered cooperators with the Forest Service regarding watershed analysis and management.

Develop and implement restoration plans for degraded and hydrologically altered sites in TES habitats.

Riparian Conservation Areas

Establish Riparian Conservation Areas (RCAs) throughout the Forests, defined as all riparian areas, including the area adjacent to and upslope of perennial and intermittent drainages where the conservation of aquatic resources is the primary management emphasis and the RCA boundaries are delineated using the formula in Appendix A, or the drainage divide (whichever area is smaller).

Manage riparian area land allocations to ensure the presence and function of historic riparian communities and mechanisms, including microbial, invertebrate, and vertebrate populations essential to food web and water chemistry maintenance; canopies and shading; roots and their impacts on channel morphology; woody debris recruitment; and carbon and nutrient cycling. Restore depressed native aquatic species and restore connectivity in watersheds where populations of native aquatic species are presently fragmented because of habitat loss or disruption.

Emphasize passive restoration as a management priority. Where historic mismanagement has occurred, restoration activities should maintain necessary water temperatures, reduce pollutants such as sediment, create wetlands, nourish spawning gravel, and remove barriers to fish passage to enhance population and habitat connectivity.

Due to the rarity and vulnerability of natural, intact low-elevation streams, promote the restoration and recovery of these aquatic ecosystems to the public.

Prevent and limit activities that could cause channel incisions, and promote the recovery of incised slopes, meadows, and streams to improve late-season flows by eliminating the causes of degradation.

Restore 10% of historic and currently fish-bearing streams to native fishery communities annually. Within 10 years, all native fish communities shall be restored throughout the Forests.

Groundwater Management

Survey and identify interconnections among springs, streams, and groundwater aquifers. Use this information to guide the management of watersheds so that natural groundwater flows and recharge rates are restored. Manage groundwater recharge areas and aquifers to ensure sustainability of high quality and quantity of water for forest resources/ecosystems.

Water Rights and Permits

Apply for and secure reserved water rights (from all sources: in-stream, groundwater, etc.) necessary to fulfill Forests' resource protection objectives. Actively participate in the processes that allocate water and water rights to secure instream flow sufficient to sustain native populations of TES species.

Coordinate with appropriate agencies to improve water availability on the Forests, and acquire water rights whenever possible. Identify priorities for water rights acquisition based on an analysis of necessary resources and strategies to acquire water rights that help maintain and restore TES habitat. Collaborate with federal and state regulatory agencies to prioritize the maintenance of natural flow regimes in stream systems with currently unimpaired flows.

Water Quality

Curtail, modify, or eliminate activities affecting water quality as needed to meet water quality objectives and maintain and improve the quality of surface water in the Forests. Prevent pollutant sources from reaching surface and ground water. Identify methods and techniques for applying Best Management Practices (BMPs) during project-level environmental analysis and incorporate them into the associated project plan and implementation documents.

Meet or exceed state water quality protection and restoration and federal Endangered Species Act requirements through planning, application, and monitoring of water quality BMPs as an initial threshold. Where BMPs do not achieve compliance with the Clean Water Act and Endangered Species Act and objectives and standards in this and all related sections, more aggressive strategies and restrictions shall be implemented within 2 years of the adoption of this plan.

Water Development and Flood Control Projects

Evaluate all dams within the Forests within 5 years for potential dam removal, prioritizing those sites where removal and the deployment of less intrusive, natural flood control strategies would promote the recovery of TES species and the watershed generally.

Develop appropriate procedures with water and flood control agencies to pursue minimum flow requirements downstream of non-FERC impoundments (timing, duration, and volume of water releases; sediment transport and removal issues) for TES species.

Utilize management practices such as restoration and protection of wetlands, floodplains, native vegetative communities, and hydrologic properties of soils for flood management.

Restrict hillside development, especially in floodplains.

Naturalize streams and floodplains to provide viable riparian and aquatic niche opportunities while improving flood protection.

Natural flood control strategies replace, wherever possible, current dams.

Hydroelectric Impoundment Projects

Rigorously evaluate existing hydroelectric facilities for impacts to sensitive Forest resources, and modify operations accordingly. Releases from existing hydroelectric facilities should augment depreciated flows and restore natural flow conditions and cycles, ultimately moving aquatic habitats towards a more natural hydrograph.

Implement the existing national policy of protecting the free-flowing character and outstanding values of rivers from inappropriate hydroelectric and water resource development by completing studies and recommending to Congress the inclusion of eligible rivers and streams in the National Wild and Scenic Rivers Act.

Prohibit all new hydroelectric and all other surface water development proposals. For existing developments, require instream flows and habitat conditions that maintain or restore riparian resources, favorable stream and channel conditions for native biota including TES species, and fish passage, reproduction, and growth. Coordinate this process with the appropriate federal and state agencies. When these objectives cannot be met, provide recommendations to FERC that such ancillary facilities should be relocated or removed.

Monitoring and Evaluation

Use monitoring to track progress toward attainment of long-term health and integrity of the watershed, aquatic, riparian, and soil resources. Identify monitoring activities that are responsive to the issues and watershed management objectives identified in the analysis process. Establish thresholds for degree and direction of change in monitored variables. Use these thresholds to indicate the need to revisit management objectives and recommendations. Modify recommendations as needed to ensure that significant progress towards attainment of watershed management objectives is achieved.

Identify monitoring activities that are responsive to the issues and watershed management objectives identified in the analysis process, and establish thresholds for degree and direction of change in monitored variables.

Use the thresholds to indicate the need to revisit management objectives and recommendations, and modify recommendations as needed to ensure that significant progress towards attainment of watershed management objectives is achieved.

Monitoring should encompass the gathering of data at multiple scales both temporally (short, intermediate, and long term) and geographically (stream reach, sub-basin, catchment basin, and range-wide) for evaluation of implementation and effectiveness of watershed-related management practices.

Public Education

Provide public education programs to improve public awareness of and participation in surface and groundwater protection. The public will understand the connection between recreational restrictions and resource protection goals.

Hire a watershed coordinator for each Forest to develop partnerships with non-profits, community groups, schools, and other agencies to develop collaborative restoration projects.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding watershed management contained in other sections in this Alternative. If the standards in this section differ from the standards regarding watershed management in another section, the more environmentally protective standards shall apply.

Proactive strategies shall be developed and implemented to define the Forest Service's authority as water stewards. Conservation measures to implement these strategies shall be instituted at all Forest Service facilities and incorporated into contracts, permits, leases, etc.

Watershed Restoration

If watershed analysis has not been completed in a given watershed within 4 years of plan adoption, the following activities shall be suspended in that watershed until such watershed analysis is completed: domestic livestock grazing, timber harvest, roadbuilding, mining, oil and gas drilling, ORV use, and the issuance of Special Use Permits (SUPs) that are likely to adversely impact watershed resources. The outcome of the analysis can only inform and strengthen management objectives and standards to protect natural resources. It may not be used to weaken objectives and standards.

Watershed analysis shall be carried out using the framework in Appendix A and incorporated into any environmental assessment or environmental impact statement prepared for any forest activity. This analysis shall include but not necessarily be limited to:

a. characterization of the watershed;
b. identification of issues;
c. description of current conditions;
d. description of historic conditions;
e. the status of standards within the specific watersheds and identification of current watershed conditions or standards, and identification of ongoing activities or conditions conflicting with standards;
f. synthesis and interpretation of information;
g. recommended actions that are responsive to meeting standards of watershed processes identified in the analysis and any additional watershed-scale protection and/or restoration measures needed to meet standards and objectives.

Management activities not covered by restrictions described in this Alternative that are proposed for implementation prior to the completion of the watershed analysis will require supporting rationale, information, and data that demonstrate that the proposed project or activity will be consistent with Forest resource management standards and objectives.

The Forest Service shall facilitate a peer review of its watershed analyses to ensure the adequacy of the information presented, given the purpose, scale, and scope of the analysis. The peer review shall be accomplished by non-agency, independent, and qualified scientists. This may involve partnerships with regional universities and colleges.

The Forest Service shall conduct restoration activities that include rehabilitation of head cuts and gullies by implementing management restrictions to prevent and eliminate causes of head cuts and gullies, including but not limited to grazing and ORV use. Restoration also includes the closure and rehabilitation of illegal mining sites or poorly designed landings, roads, and trails; replacing native groundcover on erosive hillsides; reclaiming old mines; and assessing other surface-disturbing special uses.

The Forest Service shall implement BMPs as required but they shall never be used as a surrogate for restricting damaging activities to protect sensitive watershed areas from degradation. Elimination of activities that damage watersheds is favored as the most effective BMP. BMPs are accompanied by monitoring to ascertain effectiveness and revise practice when it is evidently impairing water quality and supply.

Riparian Conservation Strategy

Forest Service management objectives and standards shall apply to RCA boundaries as delineated according to the formula in Appendix A.

Other than for scientifically justifiable restoration purposes, the Forest Service shall allow no land-disturbing activities in RCAs. Watershed analysis must present compelling scientific and logical reasons supporting the alleged benefit of land-disturbing restoration activities, such as road obliteration, proposed within the riparian areas.

The Forest Service shall, where human-caused activities negatively impact riparian area function, prohibit, relocate, or otherwise modify these activities to eliminate adverse impacts.

The Forest Service shall sustain late-season stream flows through prohibitions of water extractions (both surface and groundwater), timing and amount of vegetation management, and by preventing incisions and restoring incised slopes, meadows, and streams.

Groundwater Management

No additional groundwater withdrawals shall be permitted for any purposes.

The Forest Service shall not renew any existing permits for the commercial extraction of groundwater.

The Forest Service shall limit any activities from taking place on defined recharge areas that would introduce contaminants likely to enter groundwater, prevent or significantly reduce infiltration of recharging water, or intercept groundwater from reaching wells.

The Forest Service shall challenge existing or proposed groundwater extractions that occur in or adjacent to National

Forest System lands that are likely to negatively impact aquifers or resources within the Forest.

Water diversions that impair hydrologic processes important for maintaining TES habitats shall be prohibited.

Water Rights and Permits

Water rights are not exchanged unless additional, higher-priority water rights can be obtained.

The Forest Service shall modify ongoing Special Use Permits (SUPs) to prevent additional degradation of sensitive resources in Wilderness, Wild and Scenic Rivers, Research Natural Areas (RNAs), Special Interest Areas (SIAs), Riparian Conservation Areas (RCAs), and any other area in the watershed that may be degraded by permitted activities.

New surface water diversions or increases in existing water diversion permits shall not be permitted, including alteration of ephemeral run-off upstream from habitats for TES species.

When issuing any leases, permits, rights-of-way, and easements, adverse effects on TES species, riparian areas, or aquatic resources shall be avoided.

For existing extraction activities, measures shall be taken to eliminate impacts to TES species by modifying existing permits.

Water Quality

The Forest Service shall place new sources of chemical and pathogenic pollutants where such pollutants shall not reach surface or ground water. Prohibit the storage of fuels and other toxicants within riparian areas. Prohibit refueling within riparian areas unless there are no other alternatives. Refueling sites shall be approved by the Forest Service and have an approved spill containment plan. Prevent introduction of toxic materials into or upstream from all aquatic habitats.

Within watersheds with Water Quality Limited Segments (as defined by Section 303(d) of the Clean Water Act), management activities shall be implemented to meet state-developed or, when applicable, EPA-developed total maximum daily loads (TMDLs), with the intent to restore water quality to meet state or tribal water quality standards. Ensure early Forest Service participation in the development of TMDLs.

Asphalt-related equipment shall not be rinsed in, or excess asphalt shall not be placed into any stream reach. All necessary precautions shall be taken to prevent release of asphalt or other toxic substances into surface waters.

Water Development and Flood Control Projects

The Forest Service shall prohibit new dams on the Forests.

Authorized diversions and impoundments (Federal Energy Regulatory Commission [FERC], FERC-exempt, and non-hydropower) shall incorporate cumulative watershed effects analyses and instream flow requirements (quantity and timing) to restore conditions for downstream aquatic species and their habitat and to mitigate potential impacts to sensitive resources.

The Forest Service shall discourage new developments in floodplains, wetlands, and riparian areas. Development includes bridges, approaches, water diversion structures, boat ramps, campgrounds, picnic areas, etc.

The Forest Service shall ensure that water is released from reservoirs in a manner that is conducive to appropriate habitat management (e.g. flash flows, gradual ramping down), when Forest Service has legal authority. The USFWS shall be notified when the Forest Service is aware of releases that are not under its jurisdiction that may affect TES species.

The Forest Service shall prohibit new SUPs for new structural flood control projects or water diversions.

Hydroelectric Impoundment Projects

No new hydroelectric development is permitted.

The Forest Service shall evaluate the application for relicensing of an existing hydroelectric project to include a comparison to conditions in which facilities, such as dams and water conveyance structures, are absent. Where the projected absence benefits the protection of otherwise degraded Forest resources, the relicensing will not be permitted.

During relicensing of hydroelectric projects, the Forest Service shall require downstream flows favorable to riparian resources on watercourses or reaches degraded by the project. This includes an evaluation of the natural hydrograph,

current and historic riparian conditions, and the biological needs of current and historic native species occupancy.

Monitoring and Evaluation

The Forest Service shall monitor throughout the Forests to detect, investigate, and eliminate unauthorized water diversions.

ISSUE STATEMENT

The southern California landscape has been shaped by fire over millennia. Fires ignited by Native Americans and lightning shaped, maintained, and renewed southern California's lands. The restoration of fire as a natural process where it is possible to do so is essential for the health of the Forests. Fire creates wildlife habitat and forage, nourishes the soil, and perpetuates the native plant communities that evolved with fire. Many native plant communities are fire-integrated; that is, they require fire for their survival. For example, laurel sumac (*Malosma laurina*) and many other shrubs sprout after fires; the seeds of many annuals require fire for germination; and some conifer seeds are trapped inside cones until released by the heat of fire (Sawyer and Keeler-Wolf 1995). In fact, most coniferous trees in the Forests are non-sprouters (except for bigcone Douglas-fir; *Pseudotsuga macrocarpa*) and must recolonize stand-replacement burns via seedling establishment (Minnich and Everett 2002). Examples of trees in the Forests with serotinous cones include Coulter pine (*Pinus coulterii*) and several species of cypress (*Cuypressus* spp.; section 5.0, *Vegetation Management*). Alteration of fire regimes has caused or contributed to the decline of many California plant and animal species such as the rufous-crowned sparrow (*Aimophila ruficeps canescens*) and Bell's sage sparrow (*Amphispiza belli belli*) in chaparral habitats, northern pygmy owls (*Glaucidium gnoma*) in bigcone Douglas-fir/Coulter pine/live oak associations, and the San Bernardino flying squirrel (*Glaucomys sabrinus californicus*) in montane conifer forests (Stephenson and Calcarone 1999). Fire suppression can also facilitate attack by forest pests. In the San Jacinto Mountains, for example, a combination of drought stress and fire suppression has increased the vulnerability of conifers to attack from the bark beetle (Sanborn 1996).

Over the last century, a host of factors, including domestic livestock grazing, logging, recreational use, residential development, invasion of non-native plants, and even changing climatic conditions and weather have altered the role of fire in this landscape. Perhaps the most significant factor affecting many vegetative communities has been the fire suppression policy of the Forest Service. Fire suppression has resulted in the development of unnaturally dense alliances of brush and other flammable fuels in some vegetative communities (e.g. mixed-conifer forests in mesic conditions), placing parts of the Forests at risk for unnaturally severe wildfire (Minnich et al. 1995). In addition, fire suppression in chaparral habitats has resulted in less frequent fires during the natural burning season (summer), and fires that escape control during the hot, dry fall Santa Ana winds. These fires burn larger and at higher intensities (Riggan et al. 1994, Minnich and Chou 1997, CPIF 2002a). Road construction, logging, trails, and other management activities often degrade ecosystem health and increase fire danger by generating flammable slash or debris, increasing erosion and reducing soil productivity, introducing highly flammable non-native species, encouraging human access thereby increasing human-caused ignitions, and damaging vegetation. Structures and human habitation are ignition sources and increase fire risk.

Historically, fires mediated the build-up of fuels that currently exists due to more than a century of fire suppression, particularly in mixed-conifer alliances; chaparral has been less affected in this way. Nonetheless, in southern California, particularly in the wildland-urban interface, human settlement and other human activities have unnaturally decreased fire return intervals (Keeley 1995, Haidinger and Keeley 1993). Urbanization has taken its toll on coastal sage scrub communities, most of which are in the frontcounty "foothills," where human-caused fires are prevalent. Most of California's coastal sage scrub has already disappeared throughout its range due to urban development, and more frequent fires have been promoted by invasions of non-native grasses and other exotic plants which impede the reestablishment of coastal sage scrub (Minnich and Dezzani 1998; section 5.0, *Vegetation Management*). This is an important plant community for the region, the primary habitat for the California gnatcatcher (*Polioptila californica*) and other imperiled species (Stephenson and Calcarone 1999). In other areas, the infrequency or even absence of fire due to suppression has taken a toll. Southern oak woodlands, with their grassland understory and oak overstory, evolved with frequent, low-intensity fires. Absent these fires, oaks have struggled to compete with hardwoods and grasses. For more in-depth discussion on fire regimes in different vegetative communities, see section 5.0, *Vegetation Management*.

By restoring natural fire cycles in areas where the alteration of these cycles has compromised forest health, and promoting the establishment of buffer zones between wildlands and urban development, the Forest Service can restore the Forests' ecological integrity and promote public safety. The reestablishment of natural fire regimes will also help protect the integrity of watersheds. One way they do this is by limiting stand-replacing fires, which are intense fires of such a magnitude that they actually burn down the existing plant community, including fire-dependent plants accustomed to

moderate fire. These are often a result of unnatural fuel loads. They destroy most vegetation and increase the likelihood of mudslides and erosion, which can result in the degradation of water quality (Riggan et al. 1994).

For the past several years, a great deal of public attention has been focused on fires throughout the West, and especially in southern California where economic development and private property are increasingly at stake. Therefore it is more challenging to manage wildland fire in a highly populated region. Ultimately the restoration of natural processes will benefit both long-term ecosystem health and community protection. Near heavily developed areas, large wildfires must be suppressed. Through the judicious use of "prescribed" or controlled burns during periods with acceptable burning prescriptions outside the growing season, the Forest Service can start restoring fire to the region to benefit wildlife and forest health, and to reduce the intensity and uncontrollability of future fires.

Traditional commercial logging does not prevent the spread of wildfire, as it tends to remove larger, more commercially valuable timber. "The removal of large, merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk. It also results in the removal of important habitat for species dependent on old-growth forest conditions. Targeting smaller trees and leaving both large trees and snags addresses the core of the fuel problem." (Report to the President in Response to Wildfires 2000.) Ironically, fire suppression also has encouraged the prevalence of larger and more severe fires that elude suppression efforts (section 5.0, *Vegetation Management*).

Prescribed burning can be more environmentally and financially cost-effective in mixed-conifer alliances: "The cheapest and most efficient way to thin a forest is with 'prescribed burns,' setting a controlled blaze to eliminate undergrowth and make room for mature trees." (10/6/01, *L.A. Times,* "The Good, the Bad and the Costly of Fighting Forest Fires".)

There is no formula for reintroducing and managing fire in the Forests. Fires appear to have burned in a variety of environmental conditions over time, resulting in a variety of burn patterns and plant communities (Webster and Bahre 2002). Each habitat type has different requirements and is habituated to different fire regimes. The wrong fire regime in a vegetation community can make matters worse. As mentioned earlier, more frequent fires in coastal sage scrub are promoted by the invasion of non-native plants that outcompete native plants in this community. In turn, the non-native plants quickly recolonize the burned areas, perpetuating the cycle. Where fire has been excluded by humans, ecosystems adapted to longer, natural fire intervals (e.g. high-elevation areas) have less need for prescribed fire or fuels reduction because fire suppression has not altered the natural fire regime as severely in these ecosystems. Ecosystems adapted to a shorter mean fire-return interval have experienced a more abnormal fuel buildup, and therefore the need for intervention may be more urgent (e.g. mixed-conifer alliances). Where fire intervals, intensity, and extent have been increased by humans, such as in coastal sage scrub, the use of prescribed fire should be conducted carefully in the late fall and early winter to eradicate brome grass, rip gut, and other invasive species before the seed sets and falls to the ground. Non-fire fuels reduction techniques may also be appropriate, particularly where these ecosystems abut the wildland-urban interface.

The goal of Forest Service fire and fuels management policy should be updated to address new data regarding fire regimes and fire condition classes for prescribed fire management (i.e., 1995 Federal Wildland Fire Management Policy and the 2001 Review and Update of the Federal Wildland Fire Policy). This updated direction should include the reestablishment of historical fire regimes wherever possible in fire-adapted ecosystems in a biologically appropriate manner both to reduce the danger of unwanted fires and to improve ecosystem health. This means reinstituting a natural burn season, burn interval, size, variability, and intensity that mimic the fire regime with which the ecosystem evolved and adapted. In ecosystems where humans have decreased fire frequency, normal fire regimes should be reestablished through use of prescribed fire or wildland fire, whenever burning is compatible with protection of human life and property.

AREA DESCRIPTION

See section 5.0, *Vegetation Management.*

DESIRED CONDITION

Vegetative communities in the Forests experience the natural pre-fire suppression burn cycles. The profile for fuels and the fire return interval is tailored to the Potential Natural Community of that site based on the best available science.

Forest ecosystem integrity (nutrient cycling, fire resiliency, vegetative community composition) is restored and enhanced by periodic low- to moderate-intensity prescribed fire in mixed-conifer alliances. Severe fires affecting large areas are infrequent and located in areas away from the wildland-urban interface.

Fire-dependent plant and animal species are flourishing. Prescribed burning is used to effectively restore habitat and promote recovery for Threatened, Endangered, and Sensitive species (TES) in the appropriate vegetative communities (i.e., excluding desert scrub, pinyon-juniper woodlands, etc.). The mosaic pattern of vegetation fostered by a natural fire regime restores and maintains the biodiversity expected for each vegetation type and provides refuge for a variety of listed and sensitive species. The reintroduction of fire significantly reduces the risk of unnaturally frequent stand-replacing and high-intensity fires.

Loss of life and property as a result of wildland fire is rare.

Public awareness about the ecological role of fire is increased, including an understanding of the fire risk of current fuel loading and the need for management changes. A public education campaign generates greater interest, support, and commitment from the public in managing fire risk and solving fire management problems. The public has a greater tolerance for temporary declines in air quality and visibility from occasional prescribed burns.

OBJECTIVES

Develop and approve fire management plans (regional, Forest-specific, and site-specific) that fully comply with the Federal Wildland Fire Policy within 3 years.

In regional and Forest-specific fire management plans, prioritize fuels treatments and the use of prescribed fire as the primary management strategy in middle- and lower-elevation forests (foothill oak-woodlands, conifer/hardwood forests, montane conifer forests, coastal sage scrub, chaparral, and grasslands). This does not include desert scrub, subalpine forests, and pinyon-juniper woodlands. The primary, initial focus of the fire and fuels management program, including the use of prescribed fire, should be the high-risk lands at lower and middle elevations, including oak woodlands, brushfields, ponderosa pine forests, and mixed-conifer alliances that contain high fuel loads and high potential-ignition ratings.

Prioritize for fire and fuels management as follows:

1. Protect life, property, and natural resources in that order of priority, in accordance with Forest Service policy. Fuels treatments should be initiated first and most intensively in the wildland-urban interface, and other developed areas.
2. Treat high-hazard areas first. Evaluation of fire hazard should examine the natural fire interval in each ecosystem; actual, quantitative assessments of fuel loading and fire probability in each area; presence of roads, timber harvest, or other management; and presence of structures and human habitation.
3. Minimize all manipulations (including fire suppression) in roadless areas, late successional forests, and wilderness areas where fire has been excluded. Allow fire where possible in these areas.
4. Close and obliterate appropriate roads in wildlands and restrict appropriate activities during high fire season.
5. Increase staffing for fire patrol technicians and recruitment of volunteer fire lookouts.
6. Commodity production (timber harvest and domestic livestock grazing) is not a valid reason to initiate or prioritize fuels reduction projects.

Minimize interference with normal succession, species composition, and structure of the target ecosystem, and avoid introduction of exotic species. Increase the acreage covered by wildland fire use plans that utilize natural ignitions.

Craft site-specific burn plans that describe the tradeoffs of winter/spring burning versus in-season burning (sections 5.0, *Vegetation Management*, and 7.0, *Focal Species*).

Planning

Integrate watershed and fire management planning, including an analysis of vegetation type, soil types, slope, topography, and climate, and how that translates into sediment loading. With fire suppression, post-fire watershed analysis should use the best available tools to minimize soil runoff and sediment load. Consider the cumulative effects of wildfire on potential flooding and sedimentation when planning, conducting, and scheduling vegetation treatments.

Evaluate riparian ecosystems for their susceptibility and vulnerability to fire effects and design necessary fire prescriptions to promote riparian ecosystem health and support the continued presence of native species within 3 years of the adoption of this plan.

Water, wildlife, botanical, ecological, and soils specialists should participate in all planning teams so fire and fuels management activities result in the maximum ecological benefits. Rare species and other resources will then not be inadvertently harmed during management activities.

Archaeologists and historians shall participate in planning teams to address cultural resource concerns.

Integrate invasive species management and fire management to assist in the eradication of invasive species.

By Forest, evaluate the fire risk and fire hazard of each vegetative community including the identification of areas with high potential for large, high-severity wildfires, based on mapping the best available data on hazardous fuels, fuel loads, and profiles (section 5.0, *Vegetation Management*). Use a database and GIS mapping to plan and establish management priorities. Regularly update the maps and database to track the changing nature of the fire-fuel relationship over time. Updated information includes the time elapsed since the last fire, successional changes, bark beetle outbreaks, and other shifts in forest health conditions.

Complete a spatially explicit map identifying priority treatment areas for each Forest within 2 years of the adoption of this plan and annually update with current information. Each Forest shall prioritize 10 areas for treatment each year based on the risk to life and property and other natural resources, especially TES species, using criteria such as the quantity of small and large- diameter fuels, fire ignition history, elevation, slope, and aspect.

Within 2 years, use the information from the maps and database to develop an action plan for each Forest that is based on an interdisciplinary assessment of resource needs. Treatment areas and appropriate treatment methods are listed and prioritized, and projected costs will be estimated. Include a schedule that sufficiently treats at least 10% of identified high-priority fire risk areas annually.

Use (and update) GIS technology for all aspects of planning—pre-attack; pre-suppression; and prescribed fire—incorporated into other resource management programs. Hire and maintain adequate staff to fulfill this objective.

Use manual fuels treatments (i.e., undergrowth reduction) on a limited basis, solely to reduce hazardous fuel loads before fire is reintroduced, or where prescribed fire cannot be used safely or effectively as the initial fuels treatment. Such treatments shall be expressly non-commercial and result in a measurable net reduction of the fuel load and of fire hazard.

Seek funding for prescribed fire and undergrowth reduction projects at a level that allows the objectives to be achieved. Prescribed fire shall be a priority allocation for fire suppression planning and funding.

Ensure that, on average, ambient air quality and visibility values across the Forests are within federal and state standards for particulate matter and visibility. Flexibility is permitted to implement burning programs that temporarily may exceed standards but reduce the risk of larger fires that would result in more prolonged and extreme degradation of air quality.

Cooperate and coordinate with other state and federal agencies and conservation entities in fire management planning and implementation to ensure the proper and comprehensive management of Forest resources, and to better provide for the protection of lives and property.

Monitor and match human-caused fires (either accidental or arson) against a previously determined prescribed burn plan. Under strictly determined circumstances, if compatible with fire management goals, the fire will be permitted to burn, provided the Forests have sufficient resources to manage it as such.

In accordance with the objectives described above, determine the allocation of fire management funds for the Region to each Forest. Allocate funds to treat areas of the highest priority first.

Coordinate prescribed fire projects with:

- Guidelines related to airshed and air quality designations and objectives
- Other activities to reduce forest fuel loading
- Protection and recovery of riparian vegetation
- Efforts to control the spread of exotic plant species
- Watershed restoration programs
- Recovery efforts for TES species

Undergrowth Reduction

In mixed-coniferous forests, use manual fuels treatments (i.e., undergrowth reduction) of small (<12-inch diameter) trees in late summer (August) before fire is reintroduced where prescribed fire cannot be used safely or effectively as the initial fuels treatment. Couple mechanical treatments with commitments (with timelines, funding, etc.) to do appropriate fire reintroduction within a year of undergrowth reduction. To the maximum extent possible, rake duff around the base of large (>12-inch diameter) trees to minimize risk of mortality during burning.

Where stack burning is used in the fuels reduction process, it shall only be conducted to the extent that excess soil sterilization does not occur. Consider alternate methods such as high-temperature incineration. Where chipping is used, spreading of chips in forest environments will be minimized or conducted in a way that will not retard natural forest regeneration.

Design and implement alternative, small-scale projects that support sustainable fuel reduction. For example, the Forest Service could stockpile the bulk fuels and other biomass collected during undergrowth reduction activities and have the fuelwood publicly available at a frontcountry site through a collection permit (see section 24.0, *Timber Harvest*). Retain large down debris on the forest floor at levels determined appropriate for arboreal salamanders (section 7.8), southern rubber boas (section 8.49), yellow-blotched salamanders (section 9.0), and other species.

Prescribed Burning

In the implementation of prescribed burning, transition from treating relatively small areas to treating large blocks of land. Vary the intensity and timing of treatments and mitigations across the landscape to provide adequate protection and meet the needs of resources.

When applying prescribed burning, start in low fuel buffer zones, then expand the application in bands from high elevation to lower elevations.

Taking into account plant phenology, prescribed fire operations would optimally occur during the period of plant dormancy, which varies by species and microclimate conditions. Monitoring phenology will be coordinated between fire and ecology staff personnel.

Prescribed fire will not pose an imminent threat to human lives and property, and will not result in detrimental effects to sensitive and listed species of plants, fish, and wildlife or scarce habitats, to the maxiimum extent possible.

Post-fire Management

Use the BAER program, where qualifying standards are met, to take timely actions to restore proper functioning of ecosystems after wildfire.

Consult, under contract, with local Native American Tribes regarding traditional use of fire for the purpose of modifying forest and grassland seral composition and restoring ecosystem function.

The Forest Service shall establish and implement project monitoring protocols for prescribed burns for both natural and cultural resources.

Threatened and Endangered Species and Sensitive Habitats

Provide training, information, and ways to avoid impacts to TES species for all permanent field-going Forest personnel.

Fire planners and fire bosses are responsible for knowing the locations and types of TES species, habitats, the requirements of the ESA, and penalties associated with violating the ESA, and relate necessary restrictions and strategies to ground personnel.

Locate incident bases, camps, helibases, staging areas, helispots, fuelbreaks, drop points, and other areas of human concentration and equipment outside riparian areas and habitat for TES species. Exemptions are granted if the only suitable and necessary site is in a riparian area, and that has been determined through a review and recommendation by a resource advisor and biologist. The advisor defines the location, use conditions, and rehabilitation requirements necessary to minimize adverse effects to aquatic resources.

Include resource advisors as part of the planning section of Fire Incident Command teams at the start of and throughout incidents. When sufficient qualified (red-carded) resource specialists are available, they shall serve as field observers attached to suppression operation division supervisors. Advisors shall make recommendations for the planning and operations sections relative to protecting TES species resources, and shall brief crew supervisors and equipment operators on locations and types of species and all TES habitats that occur in suppression areas.

To the extent feasible, wildfire suppression will occur outside wilderness and roadless areas to fulfill the mandate to preserve natural processes and maintain fully functioning ecosystems within those areas. Except in the case of an immediate threat to lives and property, a second level of review and approval will be required before the incident commander initiates suppression activities involving the use of any heavy equipment in a roadless or wilderness area. The incident commander shall complete a section in the incident report outlining the reason for any suppression activities in a wilderness or roadless area. This report will undergo an administrative review with findings and full public disclosure.

The life cycle and habitat requirements of TES species shall help inform the development of suppression tactics and strategies in riparian areas, including but not limited to water and chemical retardant drops; mop-up; and selection of water sites.

Use minimum-impact suppression tactics near habitat for TES species including: the widening of existing fire lines when possible in lieu of establishing new ones; using hand crews instead of bulldozers to establish new lines; establishing hand lines and backfiring around TES species and their habitat to the maximum extent possible as a protective measure; targeting water drops to protect but not destroy TES species and their habitat; avoidance of chemical retardant drops near riparian areas and watercourses; and minimization of chemical retardant drops elsewhere.

Maintain sufficient cover within riparian habitats to provide for filtering of sediment and ash from burned areas, and to minimize the loss of TES aquatic species during prescribed burning activities.

Burn plans that include riparian areas within their project boundaries or that are adjacent to sensitive riparian areas shall weigh the potential harm of mitigation measures, for example fire lines, to minimize the spread of fire into the riparian area against the risks and benefits of prescribed fire entering the riparian area. This analysis shall be disclosed during site-specific NEPA analysis for burn plans.

Air Quality

Closely coordinate with local agencies that monitor air quality to ensure meaningful evaluation of local meteorological conditions prior to burning.

Pursue innovative schemes that permit some flexibility with air quality laws and policies to successfully implement prescribed burning. The agency should design and pursue other strategies that ultimately permit burning at the most appropriate times and implement fire management that is more in keeping with historic fire patterns.

Develop a practicable set of guidelines to mitigate the health effects of frequent, long-term smoke exposure for workers. As the use of fire is increased, so are investments in protective equipment and safety training for workers.

Fire Suppression

Ensure that fire suppression activities minimize ecological harm and are generally discouraged in inappropriate areas, including wilderness, roadless areas, old-growth and riparian habitats, steep slopes, sensitive soils, and habitat for TES species. The costs associated with fire suppression shall be significantly reduced in the long term through the use of prescribed burning to reduce fuel build-up.

Where fire suppression operations are restricted or regulated, coordinate with appropriate agencies, tribal entities, landowners, public interest groups, and stakeholders to gain local support, ensure public safety, and minimize impacts to air quality.

Wildland-Urban Interface

The Forest Service, California Department of Forestry and Fire Protection, and local fire agencies shall work cooperatively to develop fire management standards for private property within or adjacent to Forest Service lands. Such standards shall minimize fire hazard and have the flexibility to be applied on a site-specific basis that accounts for topography, soil erodibility, existing fuels, and ease of access.

Each Forest will coordinate with adjacent landowners and local governments to prepare a prevention plan to reduce fuel loading, reduce the risk of ignition in the wildand-urban boundary, and improve overall ecosystem health. Pursue the use of fire-safe councils (see firesafecouncil.org) or citizens' groups that advocate and emphasize fire reduction and education within local communities.

Reduce the risk of moderate- to high-intensity wildfire within and immediately adjacent to the wildland-urban interface, major transportation routes, facilities and structures, and other areas where the fire risk is high through the use of undergrowth reduction and prescribed burning. Work with state and local transportation agencies to develop programs for the reduction of flashy fuels (less than ¼-inch diameter) along highway right of ways to reduce the potential for wildfire caused by vehicles, cigarettes, or other flammable materials.

The burden of fuel reduction is on the landowner, who is encouraged to install fire-resistant roofing, clear needles out of gutters, and reduce flammable undergrowth (fuels in the vicinity of their homes and other structures) within 200 feet of their home (Cohen 1999).

Prioritize high fire-risk inholdings for land acquisition. Discourage increased urban development in areas at high risk of fire.

Plan and implement annual treatments to reduce fire hazard in the wildland-urban interface in order to substantially reduce the existing fire hazard within 5 years of the adoption of this plan.

Techniques in the wildland-urban interface shall include, unless prohibited by resource protection goals, undergrowth reduction, prescribed fire, type conversion from brush and exotic species to lower-risk native communities, and treatments to break up the continuity of fuelbeds.

The goal of treatments will be to produce flame lengths averaging less than 8 feet on wildfires in urban interface zones under average fire season conditions (90th percentile of fire weather attributes at most representative fire weather station).

Public Education

Design and implement an active public awareness program that highlights the value of prescribed fire to improve the resiliency of forest landscapes and the importance of treating the excessive accumulation of fuels. Focus the educational program on local residents of the wildland-urban interface, nearby communities, and others likely to be affected by drifting smoke.

Raise awareness among the residents of the wildland-urban interface of the importance of reducing excessive accumulation of fuels and are taking steps to fire-proof their homes and create vegetative buffers, freeing the Forest Services' resources to reduce fuel loads and restore ecological communities in wildlands. Foster cooperation between private landowners and jurisdictional agencies to effectively reduce fire hazards and risks, and fire suppression costs. Discourage future development in areas particularly prone to wildfire.

Mitigate health and safety concerns for firefighters and the general public through education.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding fire management contained in other sections in this Alternative. If the standards in this section differ from the standards regarding fire management in another section, the more environmentally protective standards shall apply.

Planning

The Forest Service shall give fire and fuel hazard management highest priority at the interface between wildlands and urban areas, and in chaparral surrounding bigcone Douglas-fir stands.

Undergrowth Reduction

The Forest Service shall utilize "light touch" (i.e., no new road construction or reconstruction, minimized soil compaction, non-commercial, manual) undergrowth fuel reduction with prescribed burning to reduce fuels and improve habitat (see section 24.0, *Timber Harvest*).

Prescribed Burning

Prescribed fire in forests shall be used with the following constraints: only in areas where natural fuel breaks exist, or where temporary hand or wet lines can be constructed and later obliterated, and where fires can reasonably be contained within a predetermined unit.

Post-fire Management

The Forest Service shall prohibit post-fire logging (see section 24.0, *Timber Harvest*). Post-fire logging can cause significant damage to the post-fire ecosystem, including soil and seedbed disturbance, increased runoff and erosion potential, and increased access due to more roads that increases the likelihood of illegal activities.

Threatened and Endangered Species and Sensitive Habitats

The Forest Service shall limit management activities in habitat for TES species and specially designated areas to prescribed fire and hand removal of woody material as supported by watershed analysis, and shall comply with Timber Harvest standards (section 24.0).

Maps shall be provided of all known TES species locations to Forest Fire organizations and law enforcement personnel (these can be installed in Forest GIS layers). Maps of occupied habitats and briefings of LRMP standards and guidelines shall be discussed, along with the requirements of the Endangered Species Act (ESA).

The Forest Service shall preplan suitable routes for emergency responses to avoid or minimize effects to TES species in habitats.

Prior to, and after use in wildland fire suppression and rehabilitation, firefighting equipment shall be pressure-washed to remove dirt and seeds to prevent the introduction and spread of invasive plants.

If a fire is likely to be widespread and uniform in an area where a TES species has a small and restricted population, the Forest Service shall avoid prescribed burning in that area and/or gather seeds before a burn to ensure the species regeneration.

The Forest Service shall minimize backfiring as a fire suppression tactic in TES species habitats if negative impacts would result. Unburned islands within the fire perimeter will only be fired when they are a threat to fire containment or control.

The Forest Service shall minimize use of heavy equipment in TES desert species (desert tortoise, leopard lizard, giant kangaroo rat, kit fox) habitats to protect known burrow systems of these species from fire suppression-related damage.

The Forest Service shall prohibit water from saline sources (e.g. Baldwin Lake) for fire suppression or water dispersal on habitat for TES plant species.

The Forest Service shall limit disturbance of TES bird species nest sites when occupied, by employing appropriate measures determined in consultation with the regulatory agency(s) or jurisdiction and Forest Service resource specialists.

Air Quality

To improve predictions of smoke levels from burning, the Forest Service shall carefully measure on-site fuel loads prior to prescribed burning and carefully monitor smoke levels and wind and weather patterns during burn activities.

Fire Suppression

The Forest Service shall restrict fire suppression efforts in areas where fire will cause little to no ecological damage and where it poses little to no threat to human life or property.

For lightning-caused ignitions within wilderness or roadless areas and other large wildland tracts, the Forest Service shall carefully monitor the fire, and when conditions are acceptable, treat/declare it as a prescribed burn, and deploy minimal or modified suppression efforts in accordance with desired conditions and objectives, in an effort to restore natural fire frequency.

The Forest Service shall primarily pursue fire suppression in the wildland-urban interface.

Suppression activities such as retardant drops, bulldozed firelines, extensive backfires resulting in large burnouts, and extensive foam application shall be avoided to the maximum extent practicable. Firelines created by mechanical equipment shall be constructed outside riparian areas, sensitive soils, unstable or steep slopes upslope of ecologically sensitive areas, and other sensitive locations.

The Forest Service shall prohibit the use of fire retardant and Class A foam (NOI-125). Fire retardants poison the soil and water and do little to slow the spread of a fire, especially under severe weather conditions. Most fires stop burning due to a change in the weather, not due to fire suppression efforts.

Wildland-Urban Interface

Rather than defensible fuel profile zones, the Forest Service shall use shaded fuel breaks that encompass low fuel loadings with natural vegetation types, resulting in the preservation of species, benefiting the wildland-urban interface, and laying the groundwork for more successful landscape-level applications of prescribed fire. The Forest Service shall develop a list of native vegetation that can be used in fuel breaks for each Forest District.

Public Education

The Forest Service shall manage activities to reduce the risk of human-caused fires, including seasonal campfire prohibitions in both the frontcountry and backcountry, and closing and obliterating some roads.

ISSUE STATEMENT

The magnificent vistas afforded by the Forests are often invisible to the urban dwellers, as the ranges are shrouded due to both topography and air pollution. The South Coast region of California is the only region in the country that has had its air pollution defined as "extreme" by an act of Congress (Palmer 1993). Southern California's sullied atmosphere doesn't just impair the view; it takes its toll on both the region's public and ecological health. Ozone, metals, toxics, sulfur, and nitrogen deposition and particulate matter (PM-10) are generated by a variety of sources and are the pollutants of greatest concern, affecting both visibility and ecosystem functioning in the Forests (USDA 1994). Car exhaust alone in the San Bernardino National Forest has accelerated the aging of trees, with ponderosa pines (*Pinus ponderosa*) losing needles, sycamore tree leaves wilting and turning brown, and forests generally more susceptible to disease and bugs (*L.A. Times* 11/25/01). Millions of residents of the South Coast Basin (which includes Los Angeles, Orange, and parts of San Bernardino and Riverside counties) breathe dirty air some one-third the days of the year. Ozone levels here, or what most refer to as smog, are often twice the federal health standard. In 1995, the standard was exceeded on 98 days at one or more Basin locations, most frequently in the east San Gabriel Valley.

The Air Resources Board has overall responsibility for air quality management in the state of California. The Board, through Regional Air Quality Boards, enforces all air quality laws. On its face, managing air quality issues in the Forests is a herculean task, as it is both jurisdictionally and technically complex. Nonetheless, the Forest Service can actively control its own emissions and work with other agencies to influence the generation of pollutants from sources beyond the Forest Service boundaries and formal authorities.

Chronically high levels of ozone deposition in some areas of the Forests have reduced the vigor, structure, and composition of mixed-conifer alliances. Ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*Pinus jeffreyi*) and Bigcone Douglas-fir (*Pseudotsuga macrocarpa*) are especially affected, particularly in the western San Bernardino Mountains and eastern San Gabriel Mountains.

Nitrogen deposition is one of the more serious problems facing the Forests and indeed many ecosystems throughout the world. It threatens both terrestrial and aquatic ecosystems. Eutrophication (increased nutrient enrichment, usually leading to increased biological production, i.e., algal blooms) of ocean and lake waters from excess nitrogen is more readily apparent, but the impacts of artificially induced eutrophication on terrestrial resources are equally damaging.

Increased nitrogen from atmospheric deposition shifts ecosystems to weedy species and reduces biodiversity. In southern California, some watersheds in the mountain regions contain peak nitrate levels in water that are 300 times higher than those in nearby unpolluted mountain regions. Coastal sage scrub and mixed-conifer alliances of the western San Bernardino Mountains and eastern San Gabriel Mountains are highly sensitive to increased nitrogen levels, as are lowland areas on the coastal side of the mountains (western Riverside and San Bernardino counties).

These changes may appear gradually, and when the damage is advanced and difficult to repair, it potentially affects the very survival of trees and shrubs, and as a result, the species that depend upon them.

While it is more challenging for the Forest Service to find means to control air quality generated by the major urban areas of southern California, the agency can minimize its own generation of air pollution from vehicle use and industrial activities, and its dependence upon fossil fuels within the Forests. Paradoxically, some pollution (smoke from prescribed fire) may be occasionally necessary to ensure the health, quality, and resiliency of short-interval, fire-adapted ecosystems. (See section 2.0, *Fire Management.*)

AREA DESCRIPTION

Airsheds and air quality issues affect all of the Forests.

DESIRED CONDITION

The Forest Service upholds the mandate of the Clean Air Act (CAA) to protect natural resources from adverse effects of anthropogenic air pollution; ensure that Forest Service emissions do not violate federal or state health standards; and stringently protect the air quality of class I wilderness areas while simultaneously focusing on protecting the air quality of Class 2 lands (the bulk of the Forests).

Air resource management is an integral, effective part of ecosystem management. All Forest Service lands are fully protected by law from the adverse effects of air pollution. The California Air Resources Board (CARB) understands and supports the protection of sensitive ecosystems on National Forest land. Monitoring of air quality and pollution is state-of-the-art, coordinated with cooperators and sufficient to support the decision-making process.

All Forest managers routinely monitor the impact of management activities on air resources, addressing Forest Service emissions and their effects. The apparent contradiction between preserving air quality and using fire as an ecosystem management tool is resolved, and the need to create limited pollution as an "ounce of prevention" is understood and accepted by authorities and communities both within and outside the Forest Service. State agencies work closely with the Forest Service to develop State Implementation Plans (SIPs) that are consistent with resource protection goals. Agencies' actions conform to applicable laws and regulations.

Well-established relationships with academic and other research institutions, other agencies, other disciplines, non-profit environmental research organizations, and the public help the Forest Service efficiently and effectively address the agency's responsibilities as air resource stewards of the Forests.

Air resource managers receive and use techniques, technologies, and research findings in a timely manner, influencing the direction of research to achieve real airshed protection needs.

The skills and budget necessary to meet the demands of the air resources program are available, an effective information management system is in place, and program successes are duly acknowledged. Forest Service stewardship of air resources is based on science, integrated in internal and external management activities, and recognized as highly effective.

OBJECTIVES

Work with the California Air Resources Board (CARB) and all relevant Regional Air Quality Boards to solicit technical advice and field analytical monitoring for airborne contaminants.

Review state-processed permit applications for new point sources of air pollution (Prevention of Significant Deterioration Permits or PSDs). Review SIPs and operating permits.

Create an interagency monitoring network that provides air resource managers with access to current information on exposure, deposition, and impacts of pollutants on the Forests and that notifies managers of pending changes in policy, regulations, research activities, and monitoring network designs.

Within 3 years, design studies to determine if areas within the Forests suspected of nitrogen deposition damage should be treated with recalcitrant soil amendments with high lignin content.

Treat current areas within the Forests suspected of being damaged by increased nitrogen deposition (decreased vegetation biodiversity and/or damage from acid rain) and ozone depletion.

Review existing inter- and intragovernmental agreements, memorandums of understanding, and partnership agreements for their currency and relevancy; identify and establish new agreements as needed.

Initiate actions to affect the rules that dictate how the state determines the emissions a PSD permit applicant must include when determining downwind concentrations from a source to ensure inclusion of all types of emissions that could degrade aesthetic values and ecological health.

Identify and implement ways to provide Forest Service staff with easy access to new information and technologies related to air pollution effects and air resource management.

Characterize the natural range of variability for ecosystem functions that are influenced by poor air quality.

Identify areas where additional research is needed to characterize emissions from non-Forest Service management activities.

Develop, update, and review progress on research and monitoring needs for air quality and the effects of air pollution.

Develop technical and administrative tools to properly implement conformity rules and other applicable standards, guidelines, and regulations.

Develop an emissions inventory for agency activities in order to better manage pollution originating in the Forests. Develop emission inventories that allow land managers to consider the acute, chronic, and cumulative effects of Forest Service emissions. Identify areas where additional research is needed to characterize emissions from Forest Service management activities.

Coordinate with other resource managers and agencies to develop a policy on the role of fire and air quality in ecosystem management, and to carry out research, public education, and management strategies for air resources.

Initiate actions to efficiently transfer new research findings, technologies, and techniques to air resource managers and their partners and integrate air resource management into ecosystem management. Fashion basic research results into tools that can readily be used by resource managers and their partners.

Plan and implement a public awareness and communication program that explains the harmful effects of air pollution on natural and cultural resources. Amplify importance of the Forests as sites for carbon sequestration and emphasize why the Forests are an essential resource that must be protected in order to better protect regional air quality.

Formulate a plan for discovering and developing nongovernmental partners.

Review the air resource management workload and develop a plan to augment staff and raise skills to a level that is appropriate to perform efficiently the task of air resource management. Prioritize the air resource management workload to provide completed products within a reasonable timeframe using existing resources.

Pursue transportation planning with transportation agencies and contractors to develop mass transportation strategies to promote public access while minimizing traffic and crowding in the Forests. Within 2 years, commit to a public transit plan within the Forests.

Within 1 year, develop ads, brochures, and materials to promote and encourage non-motorized travel and enjoyment within the Forests. (See section 20.0, *Environmental Education.*)

Within 1 year, provide educational materials and/or training to Forest visitors, employees, residents, business owners, and regional industry to promote and educate about the importance of increased fuel efficiency and alternative sources of power. (See section 20.0, *Environmental Education.*)

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding global warming and climate change contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall limit air pollutant emissions from motorized use and fossil fuel-dependent facilities and industry within the Forests.

The Forest Service shall produce a plan to implement and phase in alternative energy sources—especially solar energy for facilities and public buildings—to be fully phased in by 5 years of the adoption of this plan.

The Forest Service shall switch to renewable energy sources (e.g. solar) for all energy needs within 10 years of adoption of this plan (see section 4.0, *Global Warming and Climate Change*).

GLOBAL WARMING AND CLIMATE CHANGE

ISSUE STATEMENT

The rate at which the planet is warming appears to have increased four-fold in the last century (Field et al. 1999). Scientists are still divided as to whether this increase in the rate of warming is caused partly by natural climate variability. However, the concentration of atmospheric carbon dioxide has increased in proportion with this temperature increase (Field et al. 1999). Carbon dioxide and other greenhouse gases increase heating at the Earth's surface by trapping solar energy within the atmosphere. Human activities such as burning of fossil fuels and timber cutting are considered responsible for much of the increase in greenhouse gases. California has the world's seventh-largest economy and accounts for 2% of the world's fossil fuel use (Field et al. 1999). California could be a model for the world by reducing its dependence on coal, oil, and gasoline, thereby reducing greenhouse gases that lead to climate change. Federal agencies such as the Forest Service should be at the forefront of this effort.

This section summarizes some of the predicted impacts of climate change on southern California, management challenges confronted by the Forest Service, and objectives and standards for meeting those challenges.

Studies indicate that California winters will become warmer and wetter during the next century (Field et al. 1999). Summers will also become warmer, but the temperature increase will not be as great as the winter increase; the projection for the next century shows an average 3-5° Fahrenheit increase in the winter and a 1-2° Fahrenheit increase in the summer (Field et al. 1999). Most of California's precipitation falls in winter, and in the future more of it is likely to fall as rain and less as snow, a change that is likely to lead to increased winter runoff and decreased summer stream flow (Field et al. 1999). The consequences for spring and summer soil moisture are difficult to predict, but the state's summers are likely to remain hot and dry, and perhaps become even hotter and drier. Such a consequence, combined with decreased summer stream flow, would exacerbate water shortages in the state (Field et al. 1999).

A large proportion of the effects of climate change on California ecosystems will be indirect; climate change may alter the frequency and/or intensity of extreme weather events such as severe storms, winds, droughts, and frosts in still-uncertain ways (Field et al. 1999). Similarly, the frequency and/or magnitude of some ecologically important processes such as wildfires, flooding, disease, and pest outbreaks are likely to alter as climate changes occur (Field et al. 1999). Altogether, these difficult-to-predict phenomena, driven by shifts in climate patterns, may be more important for the future of California ecosystems than changes in average temperature and precipitation. For example, an increase in Santa Ana wind conditions, combined with warmer, drier summers, could escalate wildfires in California (Field et al. 1999). Pests, such as pine bark beetles, could become more prominent or more destructive if shifts in climate stress trees (Field et al. 1999).

Another major expected consequence of climate change is the shift of vegetation types and habitat (Field et al. 1999). Tracking how and where ecosystems will move is not straightforward, because species move individually, and their fate may be altered by changes in the availability of water and nutrients or patterns of fire, drought, or pest attack (Field et al. 1999). Computer models suggest that the arid shrublands of southern California's foothills may give way to grassy savannas while shrubs replace forests on higher slopes (Neilson 1995; Haxeline and Prentice 1996). Trees, in turn, may gain ground upslope (Neilson 1995; Haxeline and Prentice 1996). In much of southern California, fragmentation of the landscape by human development, invasion by non-native species, nitrogen deposition, and air pollution may limit the reestablishment of native ecosystems (Neilson 1995; Haxeline and Prentice 1996).

When suitable habitat disappears or shifts, species are obviously affected. Predicting the impacts of future climate change on biological diversity is complex and challenging, but guided by key scientific principles. Perhaps the most important of these principles is the "species-area relationship." This is the trend for the number of species to decline as the size of available habitat decreases or its isolation increases (Rosenzweig 1999; see also section 14.0, *Habitat Linkages*). When suitable habitat disappears, so do species. The area occupied by a species could contract or expand with climate change, depending on which geographic zones still offer a suitable climate (UCS 1999). Climate change will cause a shift in the distribution of species toward the most favorable habitats (UCS 1999). Their expansion into new habitat will be controlled by the combination of their own dispersal ability and the barriers they face, both natural and human-created (UCS 1999). The large, slow-growing organisms that dominate many ecosystems may persist as non-reproducing adults

for extended periods, but they will, at least in theory, be the species most likely to disappear over time as patches of available habitat shrink (Tilman et al. 1994; UCS 1999.)

One study predicts that 5-10% of California's native plant species would no longer find suitable temperature conditions anywhere within the state if average temperatures warmed 5-6° Fahrenheit (Morse et al. 1995). Another study has documented an already-occurring shift in one species range: the Edith's Checkerspot butterfly. This study compared current survey results with museum records, and concluded that the species was 4 times more likely to become extinct at the southern extreme of its habitat than at the northern extreme (Parmesan 1996). Moreover, the study found that fewer populations disappeared at sites in the highest elevations (Parmesan 1996). Finally, the researcher found that about one third of the original survey sites could no longer be used for comparisons because they had become too degraded to qualify as suitable habitat (Parmesan 1996).

As the twenty-first century wears on, human-induced climate change will increasingly interact with other pressures that stress California's ecosystems. In the future, direct impacts generated by the state's rapidly growing human population will be intensified by the impacts of climate change. Global climate change is a critical factor to be considered in the management of the Forests.

While it is impossible to state with precision what climate change will bring to southern California, the changes will be far-reaching, complex, and pose difficult challenges for the preservation of biological diversity and ecosystem health. Even a relatively modest change in climate could have devastating effects. Because only 18% of land in the state receives protection as a public or private reserve managed at least in part for species protection (Field et al. 1999), the areas encompassed by the Forests will be absolutely critical in efforts to protect and maintain biological diversity in coming years.

AREA DESCRIPTION

Global warming is expected to affect all areas within the Forests.

DESIRED CONDITION

The Forest Service has minimized the disruptive impacts of climate change on southern California ecosystems in 2 main ways: minimizing the pace and intensity of the change in climate, and managing actions to strengthen and protect vulnerable ecosystems.

OBJECTIVES

Reduce the contribution to greenhouse gas production and global warming caused by the Forest Service's activities.

Protect, restore, and enhance existing biological diversity on Forest lands while recognizing that these lands will become an even more vital refuge for species impacted by global warming.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding global warming and climate change contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall reduce its greenhouse gas-producing activities with steps including, but not limited to:

- Converting its vehicle fleet to 100% zero and/or low (i.e., hybrid) emission vehicles within 2 years of adoption of the Forest plan;
- Switching to renewable energy sources (e.g. solar) for all energy needs within 10 years of adoption of the Forest plan.

The Forest Service shall study the effects of global warming throughout the Forests by implementing the following:

- Establish and maintain long-term research and monitoring plots on appropriate locations throughout the Forests to study and document the effects of global warming on the Forests;
- In consultation and in conjunction with other state and federal agencies and independent experts, conduct an analysis

of the projected impacts of global warming on the resources of the Forests. Such analysis shall be completed within 4 years of the adoption of the Forest Plan.

The Forest Service shall ameliorate the impacts of global warming on biological diversity and ecosystems of the southern California region by implementing the following:

- Any analysis conducted by the Forest Service shall include the contributed analysis of the activity or project to global warming as well as the projected impacts of global warming on the Forest resources affected by the activity or project. Activities to be evaluated for their impacts include, but are not limited to, oil leasing and drilling on forest lands, timber harvest on forest lands, and on- and ORV use on Forest lands.

Section 5.0

VEGETATION MANAGEMENT

ISSUE STATEMENT

The Forests encompass mountain ranges with extensive coastal and desert scrublands, montane meadows, and hardwood and conifer forests; the San Joaquin Valley; and the interior Mojave and Colorado deserts. The extraordinary diversity of plant and animal species in this global biodiversity hotspot is due in part to the wealth of plant community types, many of which are sensitive, rare, and unique. The primary vegetative communities in the Forests include hardwood forests and woodlands; conifer and conifer/hardwood forests; chaparral, coastal sage, and desert scrub; and meadows, grasslands, and herbaceous habitat types.

At least dozens of rare and/or sensitive vegetative communities occur in the Forests, including valley oak (*Quercus. lobata*), Engelmann oak (Q. *engelmannii*), and California black walnut (*Juglans californica var. californica*) woodlands; Cuyamaca (*Cupressus stephensonii*), Sargent (*C. sargentii*), and Tecate cypress (*C. forbesii*) groves; pebble plains; gabbro, serpentine, and limestone/carbonate outcrops; montane meadows; Santa Lucia fir (*Abies bracteata*); black cottonwood (*Populus balsamifera*); bigcone Douglas-fir (*Pseudotsuga macrocarpa*); and Torrey pine forests (*Pinus torreyana)*. Many of the rare and endangered vegetative communities in California are being destroyed or drastically altered. Sawyer and Keeler-Wolf (1995) note that without quantitative descriptions of California's vegetation types, it is not possible to distinguish the rare or endangered alliances from other, more common ones – and we cannot justify their protection if we cannot clearly define them. Most important in identifying sensitive communities is the development of accurate maps. Accuracy of existing maps developed by the Forest Service from remote sensing data could be as low as 50% (M. Bond, Center for Biological Diversity, unpublished data). Table 5-1 shows the percentage of rare community types in the Forests (from Stephenson and Calcarone 1999; page 41). However, many more sensitive alliances that occur in the Forests have been identified in *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (California Department of Fish and Game 2002).

TABLE 5-1

RARE COMMUNITIES	PERCENTAGE ON FORESTS *(ACRES)*
Valley oak woodlands (narrowly distributed plant community)	8% (680)
Engelmann oak woodlands (narrowly distributed plant community)	12% (6,461)
Black walnut woodlands (narrowly distributed plant community)	12% (2,828)
Cuyamaca cypress groves (narrowly distributed plant community)	100%
Tecate cypress groves (narrowly distributed plant community)	85% (5,744)
Gabbro outcrops (unusual soils)	41% (33,489)
Montane meadows (threatened in portion of range)	38% (21,070)
Pebble plains (unusual soils)	60% (227)
Limestone/carbonate outcrops (unusual soils)	87% (18,177)
Serpentine outcrops (unusual soils)	(31,470)
Sargent cypress groves (threatened in portion of range)	74% (1,173)
Santa Lucia fir forests (narrowly distributed plant community)	95% (7,197)
Bigcone Douglas-fir *	Unknown
Black cottonwood*	Unknown
Torrey, Monterey, and Bishop pine *	Unknown
Valley-Foothill riparian forest and scrub* (14 alliances)	Unknown
Gowen and Monterey cypress*	Unknown
Coast redwood*	Unknown
Incense-cedar*	Unknown
Limber pine*	Unknown
Parry pine*	Unknown
Coastal sage scrub* (6 alliances)	Unknown
Chaparral* (8 alliances)	Unknown
Desert scrub* (2 alliances)	Unknown
Grassland and Prairie* (9 alliances)	Unknown

* Not listed in Stephenson and Calcarone (1999) but identified as rare in the List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database (California Department of Fish and Game 2002).

The foundation of vegetative community management should be the identification of Potential Natural Community for a given vegetative alliance, and the objective of all management activities in the Forests should include the attainment of Potential Natural Community for each vegetation type. In this document, Potential Natural Community is defined as the original biotic community that occurred in a given vegetation type before European settlement, and that would be established if all natural successional sequences of its ecosystem were completed and were allowed to arrive at a dynamic balance. Grazing by native fauna and natural disturbances such as drought, floods, wildfire, insects, and disease are inherent in the development of Potential Natural Communities.

The acceptance of non-native invasive species into a system could seriously threaten the continued existence of many vegetative communities. For example, the spread of red brome (*Bromus rubens*) into coastal sage scrub has increased fire frequencies and caused type conversion from shrublands into grasslands. Thus, the prevention of invasion and the systematic eradication of non-native species should be incorporated into management of all vegetative communities. In addition, any activity in the Forests should be permitted only if it does not significantly deter progress towards Potential Natural Community.

In this section, our descriptions of the vegetative communities occurring in the Forests follow alliances as outlined in

A Manual of California Vegetation, by Sawyer and Keeler-Wolf (1995) and the *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (California Department of Fish and Game 2002). These systems are widely accepted, detailed classification systems, floristically based on lower units of plant associations, and compatible with other systems used in California, such as the California Biodiversity Council.

AREA DESCRIPTION – FOREST-WIDE

At least 5 major ecological communities occur in the Forests. Table 5-2 describes percentages of ecological communities in each mountain range that occur in the Forests (from Stephenson and Calcarone 1999; pages 27-34):

TABLE 5-2

PERCENTAGE OF ECOLOGICAL COMMUNITIES IN EACH MOUNTAIN RANGE

ACRES OF TYPE	CNF		SBNF		ANF		LPNF			
	San Diego	Santa Ana	San Jacinto	San Bernar-dino	San Gabriel	Castaic	S. Los Padres	S. Santa Lucia	N. Santa Lucia	
Foothill Oak Woodland	23%	53%	52%	0%	66%	48%	48%	31%	84%	45%
Chaparral and Scrub Habitat	54%	68%	62%	66%	86%	63%	82%	62%	78%	71%
Lower Montane Forest	28%	95%	81%	81%	97%	90%	91%	19%	57%	74%
Montane Conifer Forest	42%	0%	78%	79%	97%	93%	96%	1%	69%	79%
Desert-side Montane	75%	0%	59%	84%	72%	13%	85%	57%	0%	77%

See area descriptions below for detailed discussions of each vegetative community in the Forests.

DESIRED CONDITION – FOREST-WIDE

Potential Natural Community has been reached and fire regimes are restored to their historic range of variability in all vegetative communities. Any management or other activities occurring in the Forests are evaluated for their impacts on Potential Natural Communities prior to authorizing the activity, and impacts are monitored annually to ensure that vegetative communities are properly managed.

OBJECTIVES – FOREST-WIDE

Develop an accurate map of all vegetation types to the alliance level in the Forests, including sensitive communities, within 3 years of the adoption of this plan.

Manage each vegetative community according to its unique needs. Management includes conducting prescribed burns, eradicating non-native species, and prohibiting activities (e.g. domestic livestock grazing, oil and gas drilling, unmanaged recreation) that impede significant progress towards Potential Natural Community of a vegetation type.

Develop cooperative interagency agreements that analyze management of vegetative communities in consultation with local, state, federal, and non-governmental organizations. Impacts of any proposed management activity on adjacent or overlapping jurisdictions or otherwise affected lands shall be analyzed cooperatively. Examples include adjacent Multiple Species Habitat Conservation Plans and Natural Communities Conservation Plans.

In addition to tree and shrub species, include a native herbaceous component of both annuals (e.g. wildflowers) and perennials (e.g. bunchgrasses) in restoration efforts.

STANDARDS – FOREST-WIDE

The Forest Service shall complete a comprehensive, ground-based survey and develop a fine-scale map of all vegetation types to the alliance level in the Forests within 3 years of the implementation of this plan. Prioritize mapping of riparian areas. An example includes the vegetation map of Anza-Borrego State Park developed by the California Department of Fish and Game (J. Evans, CNPS, pers. comm.). The map should use the latest available alliance data recognized in the *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (California Department of Fish and Game 2002). Consider also classifying sites by vertical vegetation layers rather than a one-dimensional vegetation type. Layers could include canopy of conifers, midstory of oaks, understory of shrublands, and meadows, so that vegetation properties can be spatially correlated (R. Minnich, U.C. Riverside, pers. comm.).

The Forest Service shall describe the Potential Natural Community of each vegetative community in the Forests within 5 years of the implementation of this plan. Determination of appropriate species composition for the Potential Natural Community to use for revegetation and restoration shall be based on the following data:

- The presence of any residual native species
- Historical vegetation data such as the Wieslander Vegetation Type maps
- Historical accounts from the earliest explorers and settlers
- Undisturbed reference sites in each vegetative community for comparison with areas that are grazed, harvested, roaded, etc
- If no undisturbed areas exist in a vegetative community, ongoing monitoring in newly rested areas to compare with areas that were designated suitable for activity

In the Forests, the Forest Service shall identify and map all vegetative alliances identified as sensitive or rare in the *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (California Department of Fish and Game 2002). Examples include southern willow scrub, coast live oak riparian forests, and other riparian habitats, and Riversidean coastal sage scrub.

The Forest Service shall utilize the vegetation classification systems described in the *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (California Department of Fish and Game 2002), as well as in Holland (1986) and Sawyer and Keeler-Wolf (1995), and crosswalk to California Wildlife Habitat Relationship for classifying vertebrate habitat.

The Forest Service shall complete a spatially explicit map identifying priority fire-treatment areas for each Forest within 2 years of the adoption of this plan and annually update with current information (see section 2.0, *Fire Management*). Each Forest shall prioritize 10 areas for treatment each year, based on the risk to life and property and other natural resources, especially TES species, using criteria such as the quantity of small- and large-diameter fuels, fire ignition history, elevation, slope, and aspect.

The Forest Service shall designate a Research Natural Area for each vegetative community, including a reference site, to determine Potential Natural Community of each vegetation type/alliance. The Forest Service shall work cooperatively with the University of California and other research organizations to study and monitor Potential Natural Community and to conduct vegetation studies.

The Forest Service shall limit restoration or management activities, such as prescribed fire and undergrowth reduction, to the non-breeding season for birds, to the maximum extent practicable. This varies by region but typically extends from September through February in California. When such actions are absolutely necessary during the breeding season, the disturbance shall be timed to minimize impacts on nesting birds.

The Forest Service shall conduct restoration activities, such as soil stabilization in meadows, using BMPs (Best Management Practices) as outlined by the Regional Water Quality Control Board, to the maximum extent practicable.

The Forest Service shall use only locally harvested, native plant species in restoration activities.

Oak woodlands have been called the "quintessential landscape of California" (CPIF 2000a). Oak woodlands contain the richest wildlife species abundance of any habitat in California, harboring over 330 species of vertebrates alone, primarily because they produce acorns – a high-quality, abundant food supply (Verner 1980, Ostfeld et al. 1996). Hardwood ecosystems include lower-elevation (sea level to 3,600 feet) "closed canopy" woodlands, and may include species such as coast live oak (*Quercus agrifolia*), as well as "open oak" savanna woodlands, including species such as blue oak (*Q. douglasii*), Engelmann oak, valley oak, and coast live oak. Hardwood forests also include riparian forests and scrub from sea level to 4,500 feet, as well as higher-elevation (3,000 to 8,000 feet) montane hardwoods such as California black oak (*Q. kelloggii*), canyon live oak (*Q. chrysolepis*), interior live oak (*Q. wislizenii*), California bay (*Umbellularia californica*), and alder (*Alnus* spp.).

The major threat to valley and blue oak woodlands in California is the lack of regeneration over the past century (Borchert et al. 1989, Borchert et al. 1993, Standiford et al. 1997, Swiecki et al. 1997, CPIF 2000a). Historically, savanna woodlands in southern California may have had a ground layer of native wildflowers and/or perennial bunchgrasses, and the current ground layer of introduced Mediterranean annual grasses may be interfering with oak sapling recruitment (R. Minnich, pers. comm.). In oak woodlands, the water table is not generally accessible to the trees throughout the year, so competition for surface water from fast-growing grasses decreases recruitment. Domestic livestock grazing also reduces recruitment as livestock eat seedlings and trample acorns (see section 25.0, *Domestic Livestock Grazing*). Domestic livestock grazing is common in the Forests' oak woodlands – 60% of Engelmann oak woodlands and 87% of blue oak woodlands are within grazing allotments (Stephenson and Calcarone 1999). California black walnut, blue oak, and valley oak are adapted to regenerate after low- to moderate-intensity fires by stump sprouting, but the current herbaceous biomass in the understory may be more flammable than the original understory. As a consequence, shorter fire return intervals may be impacting these vegetative communities (R. Quinn, CalPoly Pomona, and R. Minnich, pers. comm.). Root damage is another potential threat to oak woodlands. California's native oaks have developed adaptations to survive the long, dry summers. When an acorn first sprouts, rapid root development occurs to reach moisture deep underground, with little growth occurring above the ground. An extensive lateral root system then spreads out well beyond the trunk as the tree matures. Soil compaction, trenching for underground utilities, and other activities near the roots impede water absorption and damage roots. Finally, oak woodlands in north-central coastal California have been falling victim to sudden oak death syndrome (SODS), a disease caused by a previously unknown species of *Phytopthora*, a fungus-like organism that has killed large numbers of oaks (coast live oak and black oak) and tanoaks (*Lithocarpus densiflorus*). Two incidences of SODS have occurred in Monterey County (Švihra et al. 2001, B. Tietje, UC Berkeley, pers. comm.).

AREA DESCRIPTION – HARDWOOD FORESTS AND WOODLANDS

VALLEY-FOOTHILL OAK SAVANNA/DENSE WOODLANDS

Blue oak; Valley oak
Engelmann oak
Coast live oak
Coast live oak–Engelmann oak

•Sensitive communities – Engelmann oak; Valley oak; California black walnut

Oak savanna woodlands are found on valley floors, foothill slopes, and raised stream terraces in riparian corridors (Sawyer and Keeler-Wolf 1995). They have widely scattered trees with grass or coastal scrub in between, and are typically dominated by blue or valley oak in the north and Engelmann oak in the south (Stephenson and Calcarone 1999). Adjacent upland slopes, steeper hillsides, and areas with shallow soils often support xeric and mesic chaparrals (USFS 2001a). Engelmann oak, valley oak, and California walnut woodlands are sensitive due to their limited distribution, and are rare in the Forests. In the Forests, blue oak woodlands occur in the Castaic Ranges (ANF), and in the South Los Padres and the South and North Santa Lucia Ranges (LPNF; Stephenson and Calcarone 1999). Engelmann oak woodlands occur in the San Diego Ranges and the Santa Ana Mountains (CNF), and valley oak woodlands occur in the Castaic Ranges (ANF) and in the South Los Padres and the South Santa Lucia Ranges (LPNF; Stephenson and Calcarone 1999). Small populations of California walnut occur on the ANF, SBNF, and LPNF, and face similar problems as oak woodlands with

lack of regeneration due to non-native grasses and livestock grazing, and perhaps disease (Stephenson and Calcarone 1999, R. Quinn, pers. comm.). Walnut trees are killed by most fires but are crown sprouters, so are adapted to fires.

Coast live oak is usually the dominant tree in dense, closed-canopy stands in canyons or along streams (Stephenson and Calcarone 1999). The coast live oak alliances often occur with dense chaparral, and can tolerate high-intensity fires (R. Minnich, pers. comm.). Regeneration does not appear to be a problem, and coast live oak is a vigorous crown sprouter after fires (Stephenson and Calcarone 1999). This vegetative community can often be found adjacent to pure xeric or mesic chaparral and coastal sage scrub. In the Forests, coast live oak woodlands are found in all the major mountain ranges, but only 18 acres occur in the SBNF (Stephenson and Calcarone 1999).

VALLEY-FOOTHILL RIPARIAN FOREST AND SCRUB

Black Cottonwood; Fremont cottonwood *(Populus fremontii);* Black willow *(Salix gooddingii);* Red willow *(S. laevigata);* Arroyo willow *(S. lasiolepis),* Mixed willow, Narrowleaf willow *(S. exigua),* Pacific willow *(S. lucida),* Sitka willow *(S. sitchensis);* Red alder *(Alnus rubra);* White alder *(A. rhombifolia);* California bay; California sycamore *(Plantanus racemosa);* Mulefat *(Baccharis salicifolia);* Buttonbush *(Cephalanthus occidentalis);* Mexican elderberry *(Sambucus mexicana)*

•Sensitive communities – Riparian coast live oak; all the above alliances except California bay, mulefat, and Mexican elderberry

Riparian forests and scrub in southern California occur where soils are seasonally flooded or saturated, and the water table is accessible to the trees throughout the year (Sawyer and Keeler-Wolf 1995). These forests are extremely productive and important habitats for wildlife – in fact, over 80% of terrestrial vertebrate species are dependent on these communities at some stage in their life cycle. Desert riparian forests are also found in desert canyons along streams, seeps, and springs. Valley-foothill riparian forests and scrub (sea level to 4,500 feet) are associated with fairly low-velocity flows, floodplains, and gentle topography in the lower foothills of the Coast Ranges (CPIF 2000d), but are catastrophically disturbed (scoured) by floods about 2 times per century, and generally do not burn in wildfires (R. Minnich, pers. comm.). However, they have declined dramatically due to channelization and diversion of streams, as well as domestic livestock grazing, unmanaged recreation, and development. While riparian habitats continue to be severely impacted by these activities, the most insidious threat may be the spread of invasive, exotic plant species such as Arundo (*Arundo donax*) and tamarisk (*Tamarix* spp.) as well as brown-headed cowbirds (*Molothrus ater*), bullfrogs (*Rana catesbeiana*), African clawed frogs (*Xenopus laevis*), red shiner (*Cyprinella lutrensis*), and other invasive animals (see section 10.0, *Invasive Species Management*).

MONTANE UPLAND AND RIPARIAN HARDWOODS

Black oak; Canyon live oak; Interior live oak; Coast live oak; Coast live oak–black oak; mixed oak; California buckeye *(Aesculus californica);* Aspen *(Populus tremuloides);* California bay; Canyon live oak, Interior live oak; White alder

Montane hardwood forests typically lack blue oaks and valley oaks. The characteristic oaks in the Forests are canyon live oak, interior live oak, and California black oak. This landscape often mixes with mesic chaparral on more xeric conditions. These habitats can tolerate fires, and are not currently at risk to stand-replacing fires.

DESIRED CONDITION – HARDWOOD FORESTS AND WOODLANDS

Oak woodlands are composed of the suite of herbaceous, shrub, and tree species identified as the Potential Natural Community. A diversity of age classes of oak trees occurs in oak woodlands throughout the landscape, and regeneration and recruitment of seedlings and saplings is sufficient to replace mortality of older trees. The understory is comprised of a diverse array of native perennial grasses and forbs (i.e., wildflowers). Ground cover also includes litter and rocks. Exotic grasses have been eradicated and fire regimes are within the normal variability of this habitat type. These vegetative communities are present in sufficient quality and quantity to provide habitat for native wildlife and plant species.

Riparian vegetation is multi-layered and is composed of the suite of herbaceous, shrub, and tree species identified as the Potential Natural Community. Vegetation is effectively stabilizing stream banks against excessive erosion, and enhancing floodwater retention and groundwater recharge. The vegetative component can provide for regeneration after

periodic floods, and seeds from wind-pollinated trees (e.g. Black cottonwood) are able to disperse between fragments. Populations of riparian-dependent wildlife species are thriving.

Vegetation in montane upland and riparian hardwood forests is multi-layered and is composed of the suite of herbaceous, shrub, and tree species identified as the Potential Natural Community. A diversity of age classes occurs, regeneration and recruitment of young hardwood trees is sufficient over time to replace mortality of older trees, and this vegetative community is present in sufficient quality and quantity to provide habitat for native wildlife and plant species.

OBJECTIVES – HARDWOOD FORESTS AND WOODLANDS

Maintain and restore structure and function of oak woodland habitats, including natural ecological processes and the Potential Natural Community.

If domestic livestock grazing occurs in oak woodlands, conduct it in a manner such that regeneration of oak species is promoted. Seasonal grazing restrictions, specially-timed grazing practices, and rest rotation practices that allow young seedlings and young oak trees to grow above the browse line are among the tools that shall be used to achieve the desired outcome.

Conduct research on California walnut regarding optimal size, intensity, timing, and frequency of prescribed fire, eradication of introduced annual grasses, and restoration of historic understory vegetation. Care must be taken not to disturb the trees during the reproductive period, as mature seeds are not produced until late summer (R. Quinn, pers. comm.).

Conduct ground-based vegetative surveys of riparian habitats throughout the Forests to assess condition and restoration needs within 2 years of the adoption of this plan.

VALLEY-FOOTHILL OAK WOODLANDS

Maintain and restore both structure and function (i.e., natural ecological processes) for each oak woodland vegetative type, including the appropriate suite and age classes of native species to the maximum extent practicable, snags and decay, acorn production, soil creation and erosion, wildfire regimes, detritivores, etc. (CPIF 2000a, T. Scott, UC-Riverside, pers. comm.).

Manage oak woodlands for at least 15 acorn woodpecker granary trees (large decaying oaks or softwood trees) per 10 acres (CPIF 2000a).

Initiate at least 1 hardwood ecosystem restoration project per year on each Forest. Include the following elements:

- Promote oak regeneration
- Restore native wildflowers, perennial grasses, and shrub components
- Restore natural fire regimes
- Restore oak woodlands to meet the requirements of cavity-nesting songbirds (western bluebird (Sialia mexicana), Bewick's wren (Thryomanes bewickii), ash-throated flycatcher (Myiarchus cinerascens), oak titmouse (Baeolophus inornatus), etc.)
- Remove brown-headed cowbirds via trapping, and remove facilities and pastures that encourage reestablishment of cowbirds

In blue oak and valley oak woodlands, reduce and attempt to eradicate introduced annual grass biomass through weeding and late springtime (late February) prescribed fire to promote oak seedling growth and survival.

Monitor and evaluate the advanced regeneration cohort in all oak woodlands every year, and the results shall be published in an annual monitoring report.

VALLEY-FOOTHILL RIPARIAN FOREST AND SCRUB

Maintain and restore both structure and function (i.e., natural ecological processes) for valley-foothill riparian forests and scrub habitats, including the appropriate suite and age classes of native species to the maximum extent practicable, soil integrity, wildfire regimes, etc.

Secure water rights to maintain the hydrology of the riparian system.

Immediately protect all pristine and least damaged habitats from human disturbance and domestic livestock grazing. See sections 25.0, *Domestic Livestock Grazing*, 8.0, *Listed Species*, and 7.0, *Focal Species* for more information on species-specific requirements and NEPA analyses of grazing allotments.

Initiate at least 1 restoration project per year in each Ranger District in degraded riparian habitats, beginning with those identified as the most degraded. Methods shall include, but are not limited to:

- Re-location of roads, trails, campgrounds, picnic areas, etc.
- Re-vegetation of degraded streambanks with locally harvested, native riparian shrubs where appropriate
- Eradication of exotic plant species, and revegetation with local native plants (see section 10.0, *Invasive Species Management*)
- Restoration of more early successional habitat such as willow/alder shrub habitats with dense understory cover that is created by flooding, soil deposition, and point bar formation (CPIF 2000b)
- Intensive trapping of brown-headed cowbirds using proven trapping methods

STANDARDS – HARDWOOD FORESTS AND WOODLANDS

VALLEY-FOOTHILL OAK WOODLANDS

The Forest Service shall prohibit fuelwood removal in oak woodlands to preserve habitat for the arboreal salamander and other debris-dependent species (see section 7.8, *Arboreal Salamander*).

The Forest Service shall survey for ground-nesting birds prior to conducting restoration activities such as prescribed fires and weeding for exotic grass removal.

The Forest Service shall conduct prescribed burning and weeding using the following restrictions:

- In areas not occupied by ground-nesting birds, prescribed burning shall occur in the late spring/early summer, before seedhead shattering of the introduced grasses.
- In areas occupied by ground-nesting birds, limit activities to the non-breeding season to the maximum extent practicable – i.e., conduct weeding from August through February, and conduct prescribed burning in the very early spring (February).
- Stands shall be burned in a mosaic pattern, and thinning of trees shall be prohibited, as the stands can tolerate moderate-intensity burning.

The Forest Service shall prohibit domestic livestock grazing in oak habitats if viability of the advanced regeneration cohort is found to be at risk from grazing (see section 25.0, *Domestic Livestock Grazing*). Any allotment or portion thereof shall be retired within 6 months of a determination of unsuitability.

If domestic livestock grazing is determined to be suitable in oak habitats, the Forest Service shall apply the following standards (from T. Swiecki):

- The grazing season shall be shortened from 4 months to 2 months.
- A "split" grazing season shall be implemented, involving a mid-to-late winter grazing season of 5 weeks (Feb 1 to March 7) and a mid-spring season of approximately 3 weeks (April 21 to May 4).
- A rest rotation system shall be implemented whereby the allotment (or parts of the allotment) is protected from the impacts of cattle grazing through complete rest for 1- to 3-year periods.
- Adjustment in the overall grazing system shall be based upon information relevant to plant phenology requirements and plant palatability issues. Such a grazing system would provide greater protection to oak seedlings during critical growth periods and allow saplings to grow beyond the browse level. Ground litter levels would be increased (thus enhancing seedling protection), yet light livestock grazing would prevent exotic annual grasses from outcompeting and overwhelming seedling and sapling growth, until such annual grasses can be eradicated through prescribed fire and the understory restored to the Potential Natural Community.

The Forest Service shall prohibit the construction of facilities and pastures that attract and provide foraging habitat for European starlings (*Sturnus vulgaris*) and brown-headed cowbirds.

The Forest Service shall train staff to recognize oak diseases as they perform other duties such as road maintenance, surveying, and range monitoring.

VALLEY-FOOTHILL RIPARIAN FOREST AND SCRUB

The Forest Service shall prohibit domestic livestock grazing in Riparian Conservation Areas. (See sections 1.0, *Watershed Management,* and 25.0, *Domestic Livestock Grazing.*)

The Forest Service shall prohibit surface water diversions and mining of groundwater in riparian woodlands within the Forests.

Conifer and Conifer-Hardwood Forests

About 45% of the land area of California is covered with coniferous forests, but such forests only cover 6% of the Bioregion, and occur primarily on public lands (Davis et al. 1998; see also Table 5-2). These forests support a rich array of habitat types at a variety of elevations. Montane hardwood forests described above can occur in pure stands but are also associated with conifers such as foothill pine (*Pinus sabiniana*) and knobcone pine (*P. attenuata*) in the northern ranges, and bigcone Douglas-fir and Coulter pine (*Pinus coulteri*) in the central and southern ranges, all ranging from 3,000 to 5,000 feet. Conifer forests also include true Douglas-fir (*Pseudotsuga menziesii*) in the northern central Coast Ranges, localized stands of cypress and coastal pines (*Pinus* spp.), and mixed-conifer alliances from 5,000 to 8,000 feet. Mixed-conifer alliances include various combinations of Jeffrey pine (*P. jeffreyi*), ponderosa pine (*P. ponderosa*), white fir (*Abies concolor*), sugar pine (*P. lambertiana*), and incense cedar (*Calocedrus decurrens*), with black oak and live oak common or even dominant in some areas, such as the southern Peninsular ranges. Coniferous ecosystems also include subalpine forests with limber pine (*P. flexilis*) and lodgepole pine (*P. contorta*) from 8,500 to > 10,000 feet, and singleleaf pinyon pine (*P. monophylla*) and juniper (*Juniperus* spp.) mixed woodlands from 3,000 to 8,500 feet on desert-side slopes (Stephenson and Calcarone 1999).

Some conifers grow primarily in chaparral (cypresses, Coulter pine, and knobcone pine) or in chaparral with canyon live oak. These trees are relatively short-lived because chaparral fires burn them up about twice a century. Foothill pine grows as part of foothill-oak woodlands. Bigcone Douglas-fir, true Douglas-fir, and coast redwoods (*Sequoia sempervirens*) are in "mixed evergreen" forests – they are long-lived trees growing with long-lived woodlands of canyon live oak, coast live oak, California bay, etc. Long-lived ecosystems should be distinguished from short-lived ecosystems because dynamics are driven by either surface or stand-replacement fires, respectively, which has large implications on fire management (R. Minnich, pers. comm.).

A century of intensive resource extraction, fire suppression, domestic livestock grazing, and other management activities has led to major changes in the structure and species composition of southern California's coniferous forests (Minnich et al. 1995, McKelvey and Johnston 1992; see also section 24.0, *Timber Harvest*). Wildlife populations have been altered by such changes, leading to declines and extirpations (CPIF 2002). Perhaps the most significant factor affecting coniferous forests has been the fire suppression policy of the Forest Service. Fire suppression in the Forests has not only resulted in less frequent fires during the natural burning season (summer), but when fires do escape "control" – generally in the hot, dry, fall Santa Ana winds – they burn at higher intensities (Minnich and Chou 1997, Stephenson and Calcarone 1999, CPIF 2002; see also section 2.0, *Fire Management*). Most of the fires that have occurred over the past 50 years in coniferous forests were driven by steep terrain and extreme winds, or were adjacent to mature chaparral stands that facilitated the spread of high-intensity fires into them (Stephenson and Calcarone 1999). Fire intensity is especially important because most coniferous trees in the Forests are nonsprouters (except for bigcone Douglas-fir) and must recolonize stand-replacement burns via seedling establishment (Minnich and Everett 2001). Thus, fuels reduction and the careful reintroduction of natural fire regimes (e.g. fire extent, intensity, and frequency) are critical to the protection and restoration of these coniferous forests.

AREA DESCRIPTION – CONIFER AND CONIFER-HARDWOOD FORESTS

CYPRESS AND COASTAL PINE FORESTS

Cuyamaca cypress; Gowen cypress *(Cupressus goveniana);* Monterey cypress *(C. macrocarpa);* Sargent cypress; Tecate cypress; Bishop pine *(Pinus muricata);* Monterey pine *(P. radiata);* Torrey pine

•Sensitive communities – all of the above

Two stands of Cuyamaca cypress occur near Cuyamaca Peak in San Diego County; it is the most narrowly distributed cypress in California (Sawyer and Keeler-Wolf 1995), but may be a variant of an Arizona cypress (Stephenson and Calcarone 1999). The tree grows in gabbro-derived clay soils on steep slopes along drainages and can be dominant in the canopy or co-dominant with Coulter pine. Groves of Cuyamaca cypress are generally surrounded by chaparral species such as manzanita *(Arctosaphylos* spp.), chamise (*Adenostoma fasciculatum*), and scrub oak (*Quercus berberidifolia*); (Stephenson and Calcarone 1999). While the trees are usually killed in fire, they are adapted to fire by producing serotinous cones at maturity (i.e., cones that require fire to open and disperse seed). Maturity is reached at about 40 years of age. Fire is also needed to prepare the soil for germination. Therefore, periodic fires are necessary for regeneration, but too frequent fire-return intervals (i.e. < every 30 years) may decrease stand densities and reduce the seed bank (Stephenson and Calcarone 1999). A 1950 fire extirpated the mature cypress over part of its range (Sawyer and Keeler-Wolf 1995); however, little evidence exists that recent high fire frequencies are endangering this species.

Four Tecate cypress populations exist in California (Sawyer and Keeler-Wolf 1995), but its range extends into Baja, Mexico, where its distribution is centered. The tree grows in gabbro- or metavolcanic-derived clay soils; it was once more widespread but is now restricted to these soils where it lacks competition (Stephenson and Calcarone 1999). Many scientists suggest that recent high fire frequencies threaten the Tecate cypress' existence, as maturity is reached at about 50 years. However, these cypress groves have burned 2 or 3 times in the past 100 years, which is well within natural variability (R. Minnich, pers. comm.). Reduced regeneration and stand densities may occur if groves burn at intervals significantly less than 30 years.

Sargent cypress is an abundant and widespread cypress: there are several large stands and many smaller ones scattered along the interior Coast Ranges. However, it is fairly limited in the Forests, where it occurs in the Santa Lucia Ranges and southern Los Padres area (Stephenson and Calcarone 1999). The cypress is an indicator of serpentine soils and occurs with several other sensitive plant species. Serpentine soils are clay soils high in magnesium and low in nitrogen, calcium, and phosphorus, and also contain heavy metals such as cobalt, iron, and nickel (Stephenson and Calcarone 1999). These soils support a unique array of species that are adapted to its particular chemistry, and in southern California they occur mostly in Monterey and San Luis Obispo counties. However, factors other than soil affect the distribution of Sargent cypress, as it occurs on only 3% of serpentine soils in the Forests. Throughout its range it occurs with foothill pine, Coulter pine, scrub oak, leather oak *(Quercus durata*), buck brush (*Ceanothus cuneatus*), California bay, interior live oak, and knobcone pine. Again, this cypress is adapted to fire but required fire-free intervals are not well defined for this species (Stephenson and Calcarone 1999).

Three populations of Torrey pines exist (about 9,000 trees), with the mainland population occurring at Torrey Pines State Reserve in San Diego County. This is the typical subspecies (*Pinus torreyana torreyana*), and it occurs with common and local coastal scrub and chaparral species. Local endemics include *Encinitas baccharis*, Nuttall's scrub oak (*Quercus dumosa*), sea-dahlia (*Coreopsis maritima*), and white coast ceanothus (*Ceanothus verrucosus*; Sawyer and Keeler-Wolf 1995). The 2 Santa Rosa Island Torrey pine populations (*P. t. insularis*) occur in Santa Barbara County. Torrey and Bishop pines are adapted to high-intensity fires (R. Minnich, pers. comm.).

NORTH CENTRAL COAST RANGE FORESTS

Douglas-fir; Ponderosa pine; Tanoak; Redwood; Santa Lucia fir; other mixed-conifer and conifer-hardwood alliances

•Sensitive communities – Santa Lucia fir; Redwood; some Douglas-fir associations

North Central Coast Range forest types occur only in the northern portion of the central coast. The northern Santa Lucia Range along the Monterey coast experiences significantly more precipitation than the southern portion of the Forests; thus, these vegetative communities contain plant communities that are more similar to those in northern California (Stephenson and Calcarone 1999). Along the coast, redwood stands occur in deep canyons surrounded by coastal scrub, chaparral, and grassland. Coast redwood alliances tend to have deep soils and the trees help stabilize areas by inhibiting erosion and absorbing groundwater that might create channels (USFS 2001a). The southernmost portion of the redwoods is found along Salmon Creek Canyon in the Santa Lucia Mountains (CPIF 2002). On the inland side of the mountains, ponderosa pine, true Douglas-fir, and Santa Lucia fir occur in a mosaic of chaparral, oak woodland, and mixed evergreen forests (i.e., forests containing 2 or more broad-leaved tree species such as tanoak, Pacific madrone,

coast, canyon, and interior live oak, California black oak, and California bay; USFS 2001a). Fires are generally smaller and less frequent due to the mesic nature of this area; however, a single fire (Marble Cone) burned 180,000 acres in 1977, probably due to introduced annual grasses and fire suppression (Stephenson and Calcarone 1999, R. Minnich, pers. comm.). Historical fire intervals were locally longer in the habitats of redwoods, Douglas-fir, and Santa Lucia fir, primarily because the terrain is hard to burn, and they grow on rock outcrops and cliffs and in deep canyons. Fires were probably modest in size when forbs and some bunch grasses used to cover this region, but still could be as large as thousands of acres. The chaparral surrounding these forests probably burned at similar intervals to that in southern California – about 2 to 3 per century.

The Santa Lucia fir alliance is endemic to montane areas of the Central Coast on steep north- and east-facing upland slopes and ridges, in canyon bottoms, and on raised stream benches and terraces. The Santa Lucia fir may co-dominate with canyon live oak. Coulter pine, Pacific madrone (*Arbutus menziesii*), ponderosa pine, sugar pine and/or tanoak may also be present. This alliance is best developed on fire-protected sites (Sawyer and Keeler-Wolf 1995).

LOWER MONTANE CONIFER-HARDWOOD FORESTS

Coulter pine; Foothill pine; Knobcone pine; Incense-cedar; Coulter pine-eastwood manzanita *(Arctostaphylos glandulosa);* other mixed-conifer and conifer-hardwood alliances

Bigcone Douglas-fir

•Sensitive communities – Bigcone Douglas-fir-canyon live oak; Bigcone Douglas-fir; Incense-cedar

Lower-elevation (1,000 to 5,000 feet) montane forests in the northern portion of the Forests contain California bay, Pacific madrone, foothill pine, and knobcone pine (Stephenson and Calcarone 1999). Foothill pine woodlands on public lands are found in the South Los Padres, South Santa Lucia, North Santa Lucia (LPNF), and Castaic Ranges (ANF; Stephenson and Calcarone 1999). Foothill pine is especially common in blue oak woodlands, and it often emerges from a shrub canopy in foothill locations or forms stands over grass in valleys (Sawyer and Keeler-Wolf 1995). Other trees such as black oak, California buckeye, coast live oak, Coulter pine, interior live oak, valley oak, and western juniper (*Juniperus occidentalis*) may mix with foothill pine locally. Knobcone pine is restricted to dry, rocky areas with shallow serpentine soils that limit competition from other conifers (Sawyer and Keeler-Wolf 1995). Knobcone pines in the Forests are found only in the northern Santa Lucia Range (LPNF) and in the San Bernardino (SBNF) and Santa Ana Mountains (CNF; Stephenson and Calcarone 1999).

Lower-elevation (3,000 to 5,500 feet) montane forests in central and southern portions of the Forests contain bigcone Douglas-fir, Coulter pine, canyon and coast live oak, and black oak. Bigcone Douglas-fir and Coulter pine are mostly endemic to the coastal mountains of central and southern California; they are rarely found together but are both usually associated with canyon live oak (Stephenson and Calcarone 1999). In the Forests, the Coulter pine-canyon live oak vegetative community occurs in the San Diego Ranges and the Santa Ana Mountains (CNF), the San Jacinto Mountains (SBNF), the San Gabriel Mountains (ANF), and the South Los Padres, South Santa Lucia, and North Santa Lucia Ranges (LPNF; Stephenson and Calcarone 1999). Bigcone Douglas-fir forests occur in the San Diego Ranges and Santa Ana Mountains (CNF), the San Jacinto and San Bernardino Mountains (SBNF), the San Gabriel Mountains and Castaic Ranges (ANF), and the South Los Padres Ranges (LPNF; Stephenson and Calcarone 1999).

Lower montane conifer-hardwood forests are often called “mixed evergreen” and are found in small, scattered patches in a mosaic of chaparral. Thus, they are highly subject to chaparral fire regimes (Stephenson and Calcarone 1999). Both Coulter pine and bigcone Douglas-fir trees are influenced by fire regimes in surrounding chaparral, but responses to fires differ between the two. Coulter pine forests are adapted to stand-replacement fires by having a short life span (50 to 100 years) and partly serotinous cones; they require fire to create openings and clear the seedbed for germination (Borchert 1985; Minnich 2001). Coulter pines also grow in dense mixed chaparral that has growth, fuel moisture, and fuel structure properties that make the chaparral resistant to fire for decades after a burn. Less than 1% of chaparral habitats experience return intervals <25 years, thus Coulter pine is not likely to be susceptible to short fire return intervals that kill mature trees before they can develop cones. The most likely way to remove Coulter pine from a system is through natural variability, especially the uncommon situation that a fire is followed by an extremely dry year and the post-fire recruits die for lack of water (R. Minnich, per. comm.). Coulter pine forests may also contain some knobcone pine and Sargent cypress trees, which have evolved under similar fire regimes and also depend on fire for seed dispersal (Vogl 1976, USFS 2001a). Fire regimes range from about 40 to greater than 100 years in these forests.

Bigcone Douglas-fir–canyon live oak associations, or in some interior areas pure stands of bigcone Douglas-fir, occur in upland areas in the Forests. The abundance of this vegetative community appears to be proportional to steep, rocky, north-facing slopes and cliffs (R. Minnich, pers. comm.). Bigcone Douglas-fir forests are found primarily in the montane and mesic chaparral zone, and in cool, mesic, shaded drainages on other aspects, where they were historically protected from stand-replacing crown fires (USFS 2001a). However, fire suppression in surrounding chaparral has resulted in selective extinguishing of small summer burns and skewing the fire season into the fall when fires burn more severely (R. Minnich, pers. comm.). Such fires have a greater possibility of entering adjacent bigcone Douglas-fir stands, especially in less steep terrain (USFS 2001a). As bigcone Douglas-fir is a long-lived bowl sprouter, it is not adapted to severe crown fires, and 18% of stands in the San Bernardino Mountains have been burned and are not recolonizing (Minnich 1999). Typical fire return intervals in this vegetative community are 75 to 200 years or more (J. Evans, CNPS, pers. comm.).

MONTANE CONIFER FORESTS

Jeffrey pine; Ponderosa pine; Incense-cedar; White fir; other mixed-conifer alliances

•Sensitive community – Incense-cedar

Montane conifer forests consist of combinations of Jeffrey pine, ponderosa pine, white fir, black oak, canyon live oak, sugar pine, incense-cedar, and western juniper. It is the dominant vegetative community between 5,000 and 8,500 feet in elevation in the southern mountain ranges, and above 3,000 feet on the Monterey coast (Stephenson and Calcarone 1999). Species distribution is dependent on mountain range, aspect, elevation, and fire history as well as harvest history (USFS 2001a). White fir alliances—where white fir is the sole or dominant tree—are found from 4,600 to 9,000 feet on upland slopes, raised stream benches, and terraces in well-drained soils. Mixed-conifer alliances intergrade with montane chaparral on shallow, rocky soils, or in areas that have experienced disturbances such as stand-replacing fire or landslides (USFS 2001a).

Species composition and forest structure of montane conifer habitats have been dramatically altered in the past century due to intensive logging and fire suppression, particularly in mesic forests (Stephenson and Calcarone 1999). Stand densities in arid, desert-side forests and rocky soils do not appear to be experiencing the same changes. Data from Californian mixed-conifer alliances in natural fire regimes (e.g. Baja California, Mexico) and from vegetation surveys conducted 60 years ago in the San Bernardino Mountains show that forests generally contained an average of 20 to 80 trees > 5 inches diameter per acre, with the majority being > 26 inches diameter (Minnich et al. 1995, Minnich et al. 2000). Comparing the above data with recent vegetation surveys, Minnich et al. (1995) found that the diameter of trees in the San Bernardino Mountains has shifted to smaller than 12 inches on average (primarily 4 to 12 inches, with a few trees from 12 to 24 inches). In addition, tree density has increased by 79% since the 1932 surveys. Finally, data from Californian mixed-conifer alliances in Baja, Mexico, that have not experienced fire suppression show that forests there experience moderate-intensity understory fires up to about 2,500 acres in size, at return intervals of about 20 to 50 years, as well as numerous small, low-intensity burns at return intervals of 5 or more years. Infrequently, some patches of stand-replacement burns occurred (Minnich et al. 2000, J. Evans, pers. comm.). Thus, outside the wildland-urban interface, high-intensity surface fires are necessary to maintain or restore open stands. Southern California mixed-conifer alliances have experienced more than a century of selective logging and fire suppression, resulting in fewer fires but an increase in stand-replacement burns, increased stand densities of trees > 5 inches, increased white fir and incense-cedar, a decrease in dominance of mature long-needled pines, and an overall reduction in average diameter at breast height (McKelvey and Johnston 1992, Minnich et al. 1995, Stephenson and Calcarone 1999, Minnich 2001). Fewer large trees are distributed across the landscape of the Forests; therefore, retaining trees > 12 inches diameter during thinning operations is critical for recruitment of future large trees (see section 24.0, *Timber Harvest*).

SUBALPINE CONIFER FORESTS

Limber pine; Lodgepole pine; mixed Subalpine

•Sensitive community – Limber pine

Subalpine conifer forests only occur in the highest ranges in the Forests, including the San Jacinto, San Bernardino, and San Gabriel Mountains and on Mount Pinos and Mount Abel. Mixed subalpine forests occur above 8,000 feet in elevation and consist of lodgepole pine and white fir as well as western juniper. Lodgepole pine alliances occur on

upland slopes at elevations ranging from 5,000 to 11,000 feet. It is the sole or dominant tree in continuous, intermittent, or open canopies as a shrub or tree, with sparse understory shrubs (Sawyer and Keeler-Wolf 1995). Limber pine occurs at the highest elevations.

Trees grow very slowly in subalpine forests due to short summers, and stands tend to be open (with the exception of dense lodgepole pine stands surrounding meadows). Fires occur infrequently in lodgepole pine forests because of limited productivity and fuel accumulation. While subalpine forests experience numerous small burns ignited by lightning, average fire return intervals are on the order of centuries. Where stand-replacement burns have occurred, however, forests are regenerating well (Minnich and Everett 2001). This vegetative community may become vulnerable to increasing human-caused fire ignitions (Stephenson and Calcarone 1999).

PINYON-JUNIPER WOODLANDS

California juniper *(Juniperus californica);* Western juniper; Parry pinyon *(Pinus quadrifolia);* Singleleaf pinyon

•Sensitive community – Parry pinyon

Pinyon/juniper woodlands occur in the interior central coast and in montane areas of the Transverse and Peninsular Ranges, from 3,500 to 8,500 feet on arid, desert-side slopes. Singleleaf pinyon is the dominant tree in these woodlands, forming nearly pure stands that are sometimes mixed with California juniper at lower elevations and western juniper at higher elevations (Wangler and Minnich 1996). Litter, woody fuels, and herbaceous cover are sparse, resulting in a fire regime restricted to uncommon stand-replacement burns during severe weather with a return interval on average of 480 years (Wangler and Minnich 1996, Minnich 2001). Fires that do occur are brief and short-lived, producing a mosaic of small, scattered burned patches within uniform old-growth stands. These patches are gradually colonized by basin sagebrush and desert chaparral until trees are able to reestablish after 100 to 150 years (Wangler and Minnich 1996).

Recently, several large fires in pinyon stands in the San Bernardino Mountains have occurred, raising concern about whether the spread of introduced grasses is causing more frequent fires in this vegetative community (Stephenson and Calcarone 1999). ORV use, oil and gas drilling, mining of limestone deposits, and target shooting cause habitat loss and affect sensitive resources in desert-side habitats (Stephenson and Calcarone 1999).

DESIRED CONDITION – CONIFER AND CONIFER-HARDWOOD FORESTS

Coastal pine and cypress forests are composed of the suite of herbaceous, shrub, and tree species identified as the Potential Natural Community for each area. Cypress habitats are protected from too-frequent fire intervals (i.e. < 30 years) but fire does occur within the historical range of variability for these habitat types.

North Central Coast Range forests are composed of the suite of herbaceous, shrub, and tree species identified as the Potential Natural Community. A diversity of age classes occurs, fire regimes are within the historical range of variability, regeneration and recruitment of young trees is sufficient over time to replace mortality of older trees, and this vegetative community is present in sufficient quality and quantity to provide habitat for native wildlife and plant species.

Lower-elevation montane forests are dynamic, thriving, and healthy, with fire intervals within the historical range of variability. Coulter pine communities experience patchy high-intensity crown fires at intervals of 40 to 100 years. Stands are open, with 40% to 60% canopy closure, with mature trees reaching at least 20 inches diameter at breast height (Stephenson and Calcarone 1999). The wildland-urban interface is adequately protected from high-intensity fires, and Coulter pine stands in wildlands are permitted to burn without human suppression. Natural insect and disease outbreaks occur but are held in check by fires.

High-intensity crown fires are minimized in the bigcone Douglas-fir community. Surrounding chaparral habitats experience numerous small (< 7,500 acres) wildfires during the summer, within the historical range of variability (75 to greater than 200 years), and thus the risk of large fall fires spreading into adjacent bigcone Douglas-fir is reduced. The low incidence of stand-replacement fires has led to the establishment of mixed-age groves (Minnich 2001).

Montane conifer forests in the wildlands are composed of the suite of herbaceous, shrub, and tree species identified as the Potential Natural Community. A diversity of age classes occurs, fire regimes are within the historical range of variability (i.e., fire return intervals of 20 to 50 years for moderate-intensity fires, with numerous smaller, low-intensity burns), regeneration and recruitment of young trees is sufficient over time to replace mortality of older trees, large trees

and snags and large downed wood are well-distributed throughout the landscape, and this vegetative community is present in sufficient quality and quantity to provide habitat for native wildlife and plant species.

Subalpine conifer forests are composed of the suite of herbaceous, shrub, and tree species identified as the Potential Natural Community. Fire regimes are within the historical range of variability (i.e., fire return intervals of several centuries for stand-replacement burns), regeneration and recruitment of young trees is sufficient over time to replace mortality of older trees, large trees and snags and large downed wood are well-distributed throughout the landscape, and this vegetative community is present in sufficient quality and quantity to provide habitat for native wildlife and plant species.

Pinyon-juniper woodlands are composed of the suite of shrub and tree species identified as the Potential Natural Community. Fire regimes are within the historical range of variability (i.e., fire return intervals of several centuries for stand-replacement burns), regeneration and recruitment of young trees is sufficient over time to replace mortality of older trees, mature trees are well-distributed throughout the landscape, and this vegetative community is present in sufficient quality and quantity to provide habitat for native wildlife and plant species.

OBJECTIVES – CONIFER AND CONIFER-HARDWOOD FORESTS

Maintain and restore structure and function of conifer-hardwood and conifer forests, including natural ecological processes and the Potential Natural Community.

Preserve specific attributes of conifer and conifer-hardwood old-growth forests. These elements include but are not limited to large snags, large live trees, large downed woody debris, and complex forest structure (i.e., mosaics of open forest and denser patches).

Restore natural fire regimes in these forests.

Conduct prescribed burning in montane forests and surrounding chaparral habitat to reintroduce natural fire regimes (with the exception of subalpine and pinyon-juniper woodlands).

COULTER PINE

Foster natural fire regimes in Coulter pine forest types. Fire return intervals of approximately 40 to 100 years shall be maintained to the maximum extent practicable (J. Evans, pers. comm.).

BIGCONE DOUGLAS-FIR

Aggressively conduct extensive-scale prescribed burning during the summer in chaparral habitats surrounding bigcone Douglas-fir forests to reduce risk of fall stand-replacement fires spreading into adjacent stands (see "Chaparral" section below). Fire regimes shall be maintained at 75 to 200 or more years, to the maximum extent practicable.

MIXED-CONIFER ALLIANCES

Identify relatively mesic montane conifer forest areas (relatively heavy rainfall with deep granite soils) that have experienced fire suppression and high stand densification, and are relatively close to human habitations (within the wildland-urban interface). Such "priority areas" shall be targeted for undergrowth reduction and subsequent prescribed burning. Examples include:

- Idyllwild/Pine Cove area – San Jacinto Mountains
- Lake Arrowhead area – San Bernardino Mountains
- Barton Flats area – San Bernardino Mountains
- Palomar area – San Diego Ranges
- Cuyumaca area – San Diego Ranges

Initiate at least 3 undergrowth-reduction and prescribed burning projects per "priority area" per year.

SUBALPINE FORESTS

Continue to expand education towards recreationalists regarding fire prevention in high-elevation alpine forests.

PINYON–JUNIPER WOODLANDS

Continue to expand educational efforts towards recreationalists regarding fire prevention in pinyon-juniper woodlands.

Conduct research on the spread of introduced grasses, such as cheatgrass (*Bromus tectorum*), in pinyon–juniper woodlands, and develop and implement methods for eradication and preventing the spread of existing populations.

STANDARDS – CONIFER AND CONIFER-HARDWOOD FORESTS

The Forest Service shall prohibit water diversions, domestic livestock grazing, habitat clearing, fire suppression, and other activities that are shown via monitering to be significantly impeding progress towards Potential Natural Community in conifer and conifer-hardwood forests.

COULTER PINE

The Forest Service shall apply the following standards with regard to management of Coulter pine forests:

- Fire suppression in Coulter pine forests shall be prohibited in wildland areas (i.e., outside the wildland-urban interface), as this vegetation type depends upon fire for regeneration.
- Human structures and habitations located within Coulter pine forests may be protected from wildfire within the wildland-urban interface (see section 2.0, *Fire Management*).
- Extensive-scale prescribed burning during the summer shall be aggressively conducted in chaparral habitats surrounding Coulter pine forests within the wildland-urban interface (see "Chaparral" section below).
- Extensive-scale prescribed burning shall be conducted by lighting moderate-intensity fires during the summer season, resulting in patches of stand-replacement burns.
- At least 3 prescribed burns in Coulter pine forests within the wildland-urban interface shall be conducted on each of the mountain ranges within the tree's range.
- Undergrowth reduction prior to prescribed burning shall be conducted before or after the breeding season for birds (typically September through February).

MIXED-CONIFER ALLIANCES

The Forest Service shall conduct undergrowth reduction only in the wildland-urban interface, and when it can be shown to benefit forest ecosystem integrity, soils, water, fish, and wildlife. In areas suitable for undergrowth reduction, the following elements shall be retained (see section 24.0, *Timber Harvest*):

- All trees and snags > 12 inches diameter at breast height (DBH)
- At least 5 live trees 6-12 inches DBH per acre
- A minimum density of 40 live trees/acre or maintain a basal area 75-150 square feet/acre
- At least 4-6 snags per acre > 14 inches DBH
- At least 6 down logs of all age and decay classes per acre, with a minimum log size > 12 inches DBH and 20 feet long, for species dependent on dead and down logs. If at least 6 logs do not naturally occur, then 6 trees > 12 inches DBH shall be left on the ground during harvest.
- At least 9 down logs of all age and decay classes per acre in southern rubber boa habitat (see section 8.49, *Southern Rubber Boa*)
- The Forest Service shall remove all slash offsite
- The Forest Service shall rake out litter and debris to prepare the site for reintroduction of fire

To the maximum extent practicable, the Forest Service shall conduct undergrowth reduction during the non-breeding season, from September through February, to avoid disturbance to nesting birds.

To the maximum extent practicable, the Forest Service shall conduct prescribed burning during August and September, during the natural burning season, but after the breeding season for forest-dwelling birds.

Coastal Sage Scrub and Chaparral

Shrublands are composed of associations of xerophytes, or species adapted to arid conditions, and more specifically drymophytes, which experience regimes of alternating short, wet winter seasons and long, dry summer seasons typical of southern California (Jigour et al. 2001). Shrubs themselves are woody, perennial plants with multiple stems growing from the base. Coastal scrub is the most diverse of all California shrublands, with a heterogeneous structure and low shrub density (McMinn 1939). Chaparral, composed of tall, woody shrubs with spring growing seasons, is the most widespread of California's shrublands, reaching its zenith in the South Coast Ecoregion. Chaparral, desert, and coastal scrub habitats are among the most threatened and least protected of California habitat types (Davis et al. 1998). Coastal sage scrub alone supports over 100 species of rare, sensitive, threatened, or endangered plants and animals (Atwood 1993, McCaull 1994).

Coastal sage scrub occurs where dry climates are moderated by coastal moisture during the summer drought season (USFS 2001a). It is often referred to as "soft chaparral," because the leaves of its dominant species typically lack the hard coatings associated with many chaparral plant species. Coastal sage scrub is generally characterized by drought-deciduous shrub species that drop their primary leaves during summer drought to conserve energy (O'Leary 1989); dominant species include California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), and several true-sage species (*Salvia* spp.). Several shrub-forming cacti also occur such as coastal prickly pear (*Opuntia littoralis*) and coastal cholla (*O. prolifera*; Stephenson and Calcarone 1999, CPIF 2000c). Coastal sage scrub is generally shallower-rooted, lower in stature, and more open in structure than chaparral (O'Leary 1989). That open structure allows for a greater number of herbaceous annual and perennial species than are able to persist in dense stands of mature chaparral, making coastal sage scrub sensitive to increases in fire frequency. While this vegetative community is resilient under periodic fire (i.e., seedlings establish from a pre-fire seed cache or germinate by wind), the invasion of red brome and other non-native Mediterranean grasses has increased frequency of fire in coastal sage scrub, often leading to type conversion to grassland (Minnich and Dezzani 1998). Regeneration of native shrubs and forbs in coastal sage scrub is often slow, particularly where invasive weeds, fires, and other disturbances are high (Stylinski and Allen 1999, Allen et al. 2000). Weed productivity and invasion may also be promoted by nitrogen deposition from vehicular exhaust in southern California (Allen et al. 1998, Allen et al. 2000).

In contrast to coastal sage scrub, true chaparral associations are characterized by the small, thick, stiff, evergreen leaves of its dominant plant species, such as chamise, ceanothus (*Ceanothus* spp.), and manzanita. This leaf feature is referred to as "schlerophyllous," meaning "hard-leaved"—a moisture-conserving adaptation to the summer droughts characterizing their geographic distributions (Jigour et al. 2001). As another adaptation, chaparral shrubs use a dual rooting system, with an extensive lateral system for exploiting surface moisture as well as a deeply penetrating vertical system suited to seeking groundwater during summer drought, as this vegetative community typically flourishes on steep slopes with porous, rocky soils (Hanes 1988). The effectiveness with which these shrubs maintain watershed integrity is evidenced by the dry erosion and mudslides that can follow severe burns that remove chaparral from the landscape (Riggan et al. 1994, Jigour et al. 2001).

Typical fire-return intervals for chaparral are variable depending on location. In coastal areas, fire-return intervals range from 20 to 60 years, and 50 to 100 years or longer in inland areas (J. Evans, pers. comm.). Decades of fire suppression and subsequent increases in fire intensity and size in this vegetative type may not have had much of a long-term impact, as chaparral can grow and recolonize from seed banks and sprouting (Minnich and Bahre 1995, Keeley and Fotherington 2001). However, very short fire intervals in chaparral facilitated by the invasion of exotic annual grasses can cause type conversion to grassland (Zedler et al. 1983, Stephenson and Calcarone 1999), although this has occurred in < 1% of the habitat type. Along with an abundance of fire-following annuals and perennials, coastal sage scrub species may serve as early seral (pioneer) colonizers of chaparral sites for a period of years after a burn because of faster growth rates and smaller, wind-dispersed seeds (Harrison et al. 1971). Thus, if fires occur too frequently—every 5 to 10 years—coastal sage scrub may replace chaparral (O'Leary 1989). In places where the two associations co-occur, coastal sage scrub may dominate on south to west-facing slopes, while the deeper-rooted chaparral species dominate on the more protected north to east-facing slopes.

Despite similarities in general growth form, there are important structural and physiological differences between coastal scrubs and chaparral that translate into key habitat elements for wildlife (CPIF 2000c). Sage scrub leaves contain higher amounts of certain nutrients important to herbivorous insects than chaparral shrubs (Mooney 1988). The lower, more

open growth of coastal sage scrub (similar to the structure of post-fire chaparral) is important to bird species such as the Bell's sage sparrow (see section 7.9, *Bell's Sage Sparrow*).

AREA DESCRIPTION – COASTAL SAGE SCRUB AND CHAPARRAL

COASTAL SAGE SCRUB

Black sage *(Salvia mellifera);* white sage *(S. apiana);* purple sage *(S. leucopylla);* mixed sage; California sagebrush *(A. californica);* California sagebrush–white sage; California sagebrush–black sage; California sagebrush–purple sage; California sagebrush–California buckwheat; California buckwheat–white sage; white sagebrush *(A. ludoviciana);* California buckwheat; California encelia *(Encilia californica)*; Coyote brush *(Baccharis pilularis);* Coast prickly-pear cactus; Black sage–coast prickly pear; Scalebroom *(Lepidospartum squamatum);* Salal *(Gaultheria shallon)*–huckleberry *(Vaccinium spp.)*; Chaparral yucca *(Yucca whipplei)*–California buckwheat; White coast ceanothus

•Sensitive communities – Black sage; White sage; Black sage—coast prickly-pear; California encilia; California buckwheat—white sage; Coast prickly pear succulent shrub

Coastal sage scrub occurs primarily at elevations below 2,500 feet and is most widespread in coastal valleys and foothills in southern California. The Forests encompass only the upper elevational limits of coastal sage scrub; approximately 38% of this habitat type occurs on public lands (Stephenson and Calcarone 1999). The low-elevation community is highly vulnerable to development and is home to many sensitive species (see section 8.60, *California Gnatcatcher*).

Fire frequency is a major factor affecting health of this vegetative community. Coastal sage scrub burns easily and can reburn only 1 or 2 years after a previous fire due to the invasion of red brome and *Bromus diandrus,* which drives the conversion of these shrublands into annual, non-native grasslands (Zedler et al. 1983). Native herbaceous vegetation was assumed to be perennial bunch grasses of *Nassella* species, but historical descriptions and phytolith and archaeological evidence suggest that some herbaceous cover may have been comprised mostly of forbs (Minnich and Dezzani 1998).

COASTAL MARITIME, CHAMISE, AND SOUTHERN MIXED CHAPARRAL

Chamise; Leather oak; Laurel sumac *(Malosma laurina);* Woolyleaf ceanothus *(Ceanothus tomentosus);* Mission manzanita *(Xylococcus bicolor);* Bigberry manzanita *(Arctostaphylos glauca);* Lemonade berry *(Rhus intergrafolia);* Sugarbush *(Rhus ovata);* Chamise–black sage; Black sage; Chamise–white sage; Chamise–mission manzanita; Chamise–mission manzanita–woolyleaf ceanothus; Chamise–California buckwheat–white sage; Chamise–Hoaryleaf ceanothus *(Ceanothus crassifolius);* Chamise–woolyleaf ceanothus; White coast ceanothus; Chamise–eastwood manzanita; Chamise–woolyleaf ceanothus–mission manzanita; Hollyleaf cherry *(Prunus ilicifolia);* Scrub oak–chamise

•Sensitive communities – Black sage; Chamise—mission manzanita—woolyleaf ceanothus; Chamise—woollyleaf ceanothus

NORTHERN MIXED CHAPARRAL

Bigberry manzanita; Eastwood manzanita; Bigpod ceanothus *(Ceanothus megacarpus);* Hoaryleaf ceanothus; Wedgeleaf ceanothus *(Ceanothus cuneatus);* Hollyleaf cherry; Bigpod ceanothus–hollyleaf redberry *(Rhamnus ilicifolia);* Birchleaf mt. mahogany *(Cercocarpus betuloides);* Blueblossom *(Ceanothus thyrsiflorus);* Hairyleaf ceanothus *(Ceanothus oliganthus);* Chamise–bigberry manzanita; Chamise–hoaryleaf ceanothus; Chamise–cupleaf ceanothus *(Ceanothus gregii);* Muller oak *(Quercus Cornelius-mulleri);* Chaparral whitethorn *(Ceanothus leucodermis);* Bigpod ceanothus–Birchleaf mt. mahogany; Bigpod ceanothus–hollyleaf cherry

CHAMISE CHAPARRAL (AND UPPER SONORAN MANZANITA CHAPARRAL)

Chamise; Chamise—cupleaf ceanothus; Chamise—eastwood manzanita; Chamise—bigberry manzanita; Chamise—hoaryleaf ceanothus; Chamise—wedgeleaf ceanothus

RED SHANK CHAPARRAL

Red shank *(Adenostoma sparsifolium);* Red shank–chamise; Red shank–birchleaf mt. mahogany

•Sensitive communities – Red shank; Red shank—birchleaf mt. mahogany; Red shank—chamise

SCRUB OAK CHAPARRAL

Low to mid elevations:
Scrub oak; Scrub oak–chaparral whitethorn; Scrub oak–Hairyleaf ceanothus–Toyon *(Heteromeles arbutifolia);* Scrub oak–birchleaf mt. mahogany; Interior live scrub oak–scrub oak

•Sensitive communities – Scrub oak—hairyleaf ceanothus; scrub oak—toyon

MONTANE CHAPARRAL

Bush chinquapin *(Chrysolepis chrysolphylla);* Deerbrush *(Ceanothus integerrimus);* Eastwood manzanita; Eastwood manzanita–birchleaf mt. mahogany; Greenleaf manzanita *(Arctostaphylos patula);* Wedgeleaf ceanothus; Mt. whitethorn *(Ceanothus cordulatus);* Huckleberry oak *(Quercus vaccinifolia);* Tobacco brush *(Ceanothus velutinus);* Chaparral whitethorn; Pink-bracted manzanita *(Arctostaphylos pringlei),* Basketbush *(Rhus trilobata)*

Chaparral occurs across a broad elevational range but is most abundant in lower montane and foothill areas (Stephenson and Calcarone 1999). There are many types of this vegetative community, and species composition varies. Soil depth may contribute to the distribution of chaparral types, with xeric chaparrals favoring shallow soils on low-elevation hillsides and ridge tops, montane chaparral found on similar sites at higher elevations, and mesic chaparrals preferring deeper soils on northerly aspects and in drainages (USFS 2001a). Montane shrublands occur within the elevation zone of coniferous forests and experience a climate of variable summer rain and winter snow. In general, chaparral is abundant in the Forests, with the exception of southern mixed chaparral, ceanothus chaparral, and serpentine chaparral (Stephenson and Calcarone 1999).

Fire regimes are an important issue in this vegetative type. Studies have suggested that historical fire regimes consisted of return intervals of 50 to 70 years, with most burns relatively small in size (< 7,500 acres) and occurring during normal weather in the summer (Minnich 1987, Keeley and Scott 1995). Because fires have been suppressed for more than a century (Minnich 2001), southern California chaparral now consists of unbroken sweeps of mature vegetation interspersed with a few watersheds denuded by large, severe fires that escaped control during the hot, dry, fall Santa Ana winds. Such fall fires have been much more difficult to control than smaller summer fires, and subsequently have burned very large areas (> 145,000 acres). Chaparral habitats are well-adapted to fire, though different chaparral species respond differently: some shrub species are short lived, others are long-lived, and some rely mostly on resprouting after fire, while others regenerate mostly from seed banks (Keeley and Scott 1995). Some scientists have postulated that fire severity in chaparral may affect the subsequent species composition with possible long-term effects (Riggan et al. 1994). As fuel structure in biomass accumulation depends on species composition, a change in composition could alter the nature of the next fire. An increase in *Ceanothus*, for example, could yield a structure more conducive to the propagation of infrequent, severe fires (Riggan et al. 1994). However, no formal field studies exist that document changes in chaparral composition as a result of fire. Both fire-return intervals and size may also be important. If exotic grasses enter the system, fire-return intervals could shorten and type conversion to grasslands could occur; however, this has not happened in chaparral except at very local scales. Because extremely large, very severe fires can have negative impacts on watersheds by increasing erosion, possibly the most critical restoration goal is a return to the fine-grained patch mosaic structure of chaparral age classes (since last burning) that existed prior to fire suppression efforts. This would potentially maintain both watershed integrity and wildlife habitat diversity (Minnich 1987, Riggan et al. 1994, Stephenson and Calcarone 1999, Minnich 2001).

INTERIOR LIVE OAK SCRUB

Mid to upper elevations:
Interior live scrub oak; Canyon live scrub oak; Interior live scrub oak—chaparral whitethorn; Interior live scrub oak—canyon live scrub oak; Interior live scrub oak—scrub oak

INTERIOR/DESERT SHRUB

Big sagebrush *(Artemisia tridentata),* black sagebrush *(A. arbuscula),* white sagebrush *(A. ludoviciana);* Black bush *(Coleogyne ramosissiona);* Bladderpod *(Isomeris arborea)*–California ephedra *(Ephedra californica)*–narrowleaf goldenbush *(Ericameria linearifolia);* Brittlebush *(Encelia falinosa);* Brittlebush–white bursage *(Ambrosia dumosa);* Creosote bush *(Larrea tridentata),* Cupleaf ceanothus–fremontia *(Fremontodendron californicum*)–oak; Fourwing saltbush *(Atriplex canescens);* Deerweed; Joshua tree *(Yucca brevifolia);* Mohave yucca *(Yucca schidigera);* Nolina spp.; Rubber rabbitbrush *(Chrysothamnus nauseosus);* Needleleaved rabbitbrush *(Chrysothamnus teretifolius);* Shadscale *(Atriplex canescens);* Allscale *(Atriplex polycarpa);* Mixed saltbush; Quailbush; Scalebroom *(Lepidospartum squamatum);* White bursage; Matchweed *(Gutierrezia spp.);* Birchleaf mt. mahogany–California buckwheat; Desert apricot *(Prunus fremontii);* Sugarbush; Wright's buckwheat *(Eriogonum wrightii);* California buckwheat; Tucker oak *(Quercus john-tuckeri);* Muller oak

•Sensitive communities – Desert apricot; Big sagebrush

Semi-desert chaparral, sagebrush, and desert scrub occur on the arid slopes of the desert side of the mountains. Four-needle pinyon pine is found in the San Jacinto Mountain desert transition zone near Thomas Mountain (Stephenson and Calcarone 1999). Semi-desert chaparral is more open than coastal-slope chaparral and has a different mix of species, including brittlebush and cupleaf ceanothus. Great Basin sagebrush includes big, black, and white sagebrush, and occurs in dry alluvial fans, meadows, and washes at low elevations around Mount Pinos and in Garner Valley. Desert chaparral habitats consist mostly of long-lived shrubs and no seed banks, and have evolved with infrequent fires. However, the invasion of non-native grasses has increased fire frequency in many areas of the desert floor.

ORV use, oil and gas drilling on the LPNF, mining of limestone deposits on the SBNF, and target shooting cause habitat loss and affect sensitive resources in desert-side habitats (Stephenson and Calcarone 1999).

DESIRED CONDITION – COASTAL SAGE SCRUB AND CHAPARRAL

Coastal sage scrub habitats are composed of the suite of herbaceous and shrub species identified as the Potential Natural Community. Fire regimes are within the historical range of variability (i.e., fire-free intervals of 25 years or more allow this vegetative community to reach structural maturity and remain there for an extended period of time). Shrub cover provides high-quality habitat for species associated with coastal sage scrub. The understory is lush with native forbs (i.e., wildflowers) and perennial grasses, and shrubs occur in openly spaced patches to provide cover for nesting birds and other native wildlife.

Chaparral habitats are composed of the suite of herbaceous and shrub species identified as the Potential Natural Community. A diverse array of native perennial grasses and forbs comprises the understory. A diversity of chaparral age classes occurs throughout the habitat type. Fires are numerous, relatively small (< 7,500 acres), and occur at a return interval of about 50 to 70 years; they can extend beyond stands to cover areas of 5,000 to 25,000 acres, and result in a mosaic of fine-grained patches over the landscape that differ in flammability, thereby reducing the likelihood, potential size, and severity of catastrophic fires—particularly those that might spread into bigcone Douglas-fir forests (Riggan et al. 1994, Minnich 2001).

Desert shrub habitats are composed of the suite of herbaceous, shrub, and tree species identified as the Potential Natural Community. A diverse array of native perennial grasses and forbs comprises the understory. A diversity of chaparral age classes occurs throughout the habitat type. Fires are within the historical range of variability (fire-return intervals of more than 300 years). These habitats are protected from human activities that affect sensitive resources (e.g. ORV use, target shooting, resource extraction).

OBJECTIVES – COASTAL SAGE SCRUB AND CHAPARRAL

COASTAL SAGE SCRUB

Manage for the historical understory of native forbs (i.e., wildflowers) and/or perennial grasses in coastal sage scrub habitats.

Monitor and encourage the post-fire reestablishment of native forbs and grasses in coastal sage scrub.

Prioritize coastal scrub sites for preservation and restoration, and adjacent lands for acquisition.

CHAPARRAL

Conduct prescribed burning in chaparral habitat to reintroduce natural fire regimes. Conduct prescribed burns in 5,000 to 10,000 acres per year in the CNF, ANF, and SFNF, and at least 20,000 acres per year in the LPNF.

Use short fire frequencies in ceanothus chaparral, burn in June and July, and allow the shrubs to burn at moderate intensity – if fires burn too hot, the site will convert to chamise, if too cool then the ceanothus seeds will not germinate (Phil Riggan, Forest Service, pers. comm.).

DESERT SCRUB

Eradicate and prevent reestablishment of non-native species into desert shrub to reduce risk of fire.

Eliminate or control exotic grasses and mustards. Actively restore the Potential Natural Community of interior/desert shrub habitat using native bunchgrasses and/or native wildflowers.

STANDARDS – COASTAL SAGE SCRUB AND CHAPARRAL

COASTAL SAGE SCRUB

The Forest Service shall conduct prescribed burning in degraded coastal sage scrub habitat in the late fall and winter to eradicate the introduced red brome and other invasive grass species. Burning shall occur in a mosaic pattern to maintain some vegetation for shrub-dependent species (see sections 8.0, *Listed Species*, 9.0, *Sensitive Species*, and 7.9, *Bell's Sage Sparrow*), and shall be conducted in November and December, when annuals begin to germinate but before shrubs begin leafing out (i.e., the "flushing" season; J. Evans, pers. comm.) and also to prevent disturbance to nesting birds during the breeding season (typically March through August). In the unburned patches, eradicate introduced plant species using hand-removal methods to prevent reestablishment into burned patches. Fall wildfires in coastal sage scrub shall be suppressed to the maximum extent practicable to prevent conversion to grasslands.

The Forest Service shall encourage buffer zone fire protections in urban developments adjacent to the Forests within this habitat type.

The Forest Service shall prohibit post-fire seeding of any non-native species, including ryegrass, in coastal sage scrub.

The Forest Service shall prohibit domestic livestock grazing in coastal sage scrub (see section 25.0, *Domestic Livestock Grazing*).

The Forest Service shall reduce overall density of roads in coastal sage scrub to decrease nitrogen deposition into the soil from exhaust, as part of a comprehensive Road Removal and Restoration (RRR) strategy (see section 22.0, *Roads*). Roads appropriate for removal within coastal sage scrub shall be identified within 3 years of the adoption of this plan, as required in the Roads standards.

CHAPARRAL

The Forest Service shall prohibit fire suppression in chaparral, unless occurring within the wildland-urban interface (see section 2.0, *Fire Management*) or threatening stands of bigcone Douglas-fir.

The Forest Service shall conduct broadcast patch-mosaic prescribed burning during the late summer (August), during relatively calm, humid weather. In these conditions, low- to moderate-intensity fires are most likely (Minnich 2001).

The Forest Service shall survey for nesting birds in chaparral prior to conducting prescribed burning. To the maximum extent practicable, avoid disturbing nesting areas. Conduct burning primarily in August, prior to the Santa Ana wind season but after fledging of young birds (see sections 8.0, *Listed Species*, 9.0 *Sensitive Species*, and 7.9, *Bell's Sage Sparrow*).

DESERT SCRUB

The Forest Service shall remove exotic grasses and mustards by hand in areas with fire-sensitive shrubs, or carefully

using prescribed fire in the spring season where few or no shrubs occur (C. Barrows, Coachella Valley Preserve, pers. comm.).

The Forest Service shall survey for desert tortoises and other sensitive species prior to prescribed burning, and shall avoid disturbance to these species to the maximum extent practicable.

The Forest Service shall prohibit commercial domestic livestock grazing on this habitat type, and all allotments or portions thereof shall be permanently retired from grazing (see section 25.0, *Domestic Livestock Grazing*).

The Forest Service shall conduct a feasibility study on the reintroduction of pronghorn (*Antilocapra americana*) into this vegetative community.

The Forest Service shall restrict or eliminate ORV use in sensitive desert habitats (see section 19.0, *Recreation*).

The Forest Service shall prohibit uncontrolled target shooting in the Forests.

Grasslands, Meadows, and Herbaceous Types

In southern California, grasslands and prairies—defined as habitats dominated by grasses and/or by forbs—occur primarily along the coast. Both annual and perennial grassland types occur in California, but there is no strong evidence that perennial grasses ever dominated except in the North Coast Ranges (Mayer and Laudenslayer 1988, Blumler 1993). Almost all of California's grasslands are annual, most of which are dominated by introduced species such as wild oats (*Avena fatua*), black mustard (*Brassica nigra*), *Erodium cicutarium*, *E. moschatum*, and clovers (*Medicago* spp., *Trifolium* spp.) which invaded herbaceous landscapes, forblands, and flower fields (CPIF 2000d, R. Minnich, pers. comm.). Because non-native species produce more fuel than indigenous vegetation, they reduce fire return intervals in herbaceous landscapes. Currently, the replacement of native perennial and annual grasses and forbs (including wildflowers) with non-native species is promoted by domestic livestock grazing, urban development, roads, and a host of other factors (Fredrickson and Laubhan 1995). However, in areas replaced by non-native annual grasses, a rich component of native forbs and grasses still occurs (J. Evans, pers. comm.).

Meadows are described as areas with shallow water tables in mid-summer and surface soils that are fine-textured and richly organic (Stephenson and Calcarone 1999). Meadows are characterized as wet, dry, or alkaline but are usually mesic, even in late summer. In montane areas, they occur where gentle gradients underlain with impervious bedrock are found downstream from relatively small drainages (Stephenson and Calcarone 1999). Wet meadows have poorly drained soils relative to the coarser soils in adjacent forests, and typically contain sedge, rush, and bent grass species (*Carex*, *Juncus*, and *Agrostis* spp.) as well as forbs and other annuals. Wet meadows often occur as ecotones between perennial grasslands and adjacent wetlands (CPIF 2000d).

Meadows are extremely sensitive to disturbances that affect the surface soil, especially during the winter and spring when the ground is most saturated with water, and are susceptible to gullies and headcuts when water runoff and soil erosion are increased. Such gullies are often associated with roads and trails, as well as trampling by domestic livestock, all of which increase runoff and cause soil erosion. Gullies then channel water out of the meadow, lowering the water table and removing topsoil, which in turn allows for the encroachment of trees and shrubs. Meadows have been degraded by the invasion of non-native species facilitated by domestic livestock grazing, especially in lower elevations (Stephenson and Calcarone 1999).

Vernal pools, or seasonal wetlands, are shallow depressions typically occurring on mesa tops and broad valley floors. Hard clay or sandstone bottoms prevent water from percolating into the ground. Consequently, the pools fill with water during the winter and spring rainy seasons. When filled, they are too wet to support upland, or non-wetland, species. When dry in the late spring, summer, and fall, the pools cannot provide habitat for marsh or aquatic species. As a result, only a few aquatic plant and invertebrate animal species are able to survive in the extreme environmental conditions characteristic of vernal pools (USFWS 1993, 1997).

California's vernal pools and the species dependent upon them are among the most threatened habitats of all of California's natural ecosystems. Ninety-seven percent of vernal pools have been lost in California. Urban development, flood control activities, highway and utility projects, agricultural use, livestock overgrazing, ORV use, and changes in the hydrological pattern in associated upland habitats have caused significant losses of vernal pool habitat.

AREA DESCRIPTION – GRASSLANDS, MEADOWS, AND HERBACEOUS TYPES

GRASSLANDS

Alkali sacaton *(Sporobolus airoides)*; Creeping ryegrass *(Lolium spp.)*; Desert, Foothill, Purple, and Nodding needlegrass *(Achnatherum spp.);* One-sided bluegrass *(Poa spp.);* California annual grassland and forbland (including *Bromus spp., Erodium spp., Lolium spp., Schismus spp.,* and native annual forbs); Saltgrass *(Distichlis spicata);* Giant reed *(Arundo donax);* Pampas grass *(Cortaderia jubata);* Bracken fern *(Pteridium aquilinum);* Matchweed

•Sensitive communities – Alkali sacaton grassland; Creeping ryegrass; Nodding needlegrass; Purple needlegrass; One-sided bluegrass

NORTH CENTRAL COASTAL PRAIRIE

Idaho fescue *(Festuca spp.);* Pacific reedgrass *(Calamagrostis spp.);* Tufted hairgrass *(Aira spp.);* California oatgrass *(Aegilops spp.)*

•Sensitive communities – All of the above

In the Forests, prairies and grasslands occur primarily in coastal areas. These vegetative communities were dominated by forbs (wildflower fields) and some bunch grasses.

MEADOWS AND VERNAL POOLS

Montane meadow (need further data); Nebraska and Shorthair sedge *(Carex spp.);* Sedge *(Carex alma);* Spikerush *(Eleocharis spp.);* Mexican rush *(Juncus mexicanus*)—baltic rush *(Juncus balticus)*

•Sensitive community – Montane meadow

Wet meadows occur from about 4,000 to 8,000 feet and occur in ecotones between fresh emergent wetlands and perennial grasslands. They have a simple structure consisting mainly of a layer of herbaceous plants, with trees and shrubs occurring around the edges (JRHV 2000). Meadows are found on all Forests. Montane meadows in particular on the CNF, SBNF, and ANF have been found to be impacted by cattle grazing, camping, roads and trails, equestrian activities, and non-native species (Stephenson and Calcarone 1999). Vernal pools have the potential to occur on the LPNF (Sawyer and Keeler-Wolf 1998).

DESIRED CONDITION – GRASSLANDS, MEADOWS, AND HERBACEOUS TYPES

Grasslands and coastal prairies are composed of the suite of herbaceous species identified as the Potential Natural Community. Fires are within the historical range of variability. These habitats are protected from human activities that disturb sensitive species (e.g. inappropriate domestic livestock grazing, urban development).

Meadow and vernal pool ecosystems are healthy and not degraded by human impacts. Natural hydrologic processes are at work. Disturbance species that are typically present on sites that are heavily grazed and/or compacted have been eradicated. Herbaceous layers are composed of at least 75% mid- to late-seral plant species, and plant species composition has attained Potential Natural Community.

OBJECTIVES – GRASSLANDS, MEADOWS, AND HERBACEOUS TYPES

Manage for the Potential Natural Community, including the historical suite of native forbs (wildflowers) and/or perennial grasses.

To the maximum extent practicable, eradicate and prevent reestablishment of non-native species into grasslands, prairies, and meadows.

Allow no degradation of meadow systems, and maintain complete ecological function.

In degraded meadows, restore proper hydrologic conditions and the Potential Natural Community of species.

Secure water rights to maintain the hydrology of the dry montane meadows systems.

STANDARDS – GRASSLANDS, MEADOWS, AND HERBACEOUS TYPES

GRASSLANDS

To eradicate non-native species, the Forest Service shall conduct widespread prescribed burning in the spring (February), before seedhead shattering of invasive grasses.

The Forest Service shall prohibit burning during the breeding season for birds, to the maximum extent possible (typically March through August).

MEADOWS

The Forest Service shall eliminate and prohibit water diversions in meadow ecosystems.

The Forest Service shall designate the following meadow areas as unsuitable for domestic livestock grazing, and shall prohibit grazing in such areas (see section 25.0, *Domestic Livestock Grazing*):

- Areas within 400 meters of a spring, seep, vernal pool, or wet montane meadow (i.e., meadows that have soils that remain saturated with water throughout the year)
- Seasonally saturated meadows with non-cohesive soils that lack deep-rooted woody vegetation
- Dry meadows in early seral status with greater than 10% of the meadow with bare soil and active erosion

The Forest Service shall restore the hydrologic condition of meadows in the Forests. Restoration methods include but are not limited to:

- Eliminating (and relocating where necessary) roads, trails, ORV use, facilities, etc., that put meadow ecosystems at risk
- Stabilizing gully erosion with grade-stabilizers, and revegetating with native, locally harvested species in the composition of the Potential Natural Community
- Prescribing fire to maintain forest or upland/meadow boundaries in cases where appropriate

Rare and Restricted Communities

ALPINE HABITAT

Alpine habitat flora is "xerophytic and depauperate" when compared to Sierran floras (Major and Taylor 1990, Thorne 1998). Alpine habitats are found only on three peaks in the ANF and SBNF. A rare and fragile alpine cushion plant community occurs above treeline where canopy cover is open (USFS 2001a). Naturally occurring limited habitat and harsh conditions for plants make any impact to this vegetative community a critical threat to the sensitive species located within it.

PEBBLE PLAINS

Another rare community occurs within a 92-square-mile area around Big Bear City in the SBNF. Pebble plains are remnant patches of an ice-age lake bottom within forest and woodlands often dominated by Jeffrey pine, pinyon pine, and juniper species. They are patches of treeless, deep clay/quartzite pebble and gravel deposits that support a rare suite of plants similar to alpine flora, including cushion-forming plants, annuals, grasses, and succulents (Stephenson and Calcarone 1999). Several of these plants are federally listed as threatened or sensitive (see sections 8.0, *Listed Species*, 7.0 *Focal Species*).

GABBRO OUTCROPS

Gabbro soil type is distributed primarily on the CNF but also occurs in the other 3 Forests. The rocks from which the gabbro soil is made were originally formed deep in the Earth's crust from molten rock, and as it weathers the soil is generally red, mildly acidic, rich in iron and magnesium, and often contains other heavy metals such as chromium. Gabbro soils support a unique suite of plant species. This habitat is rare in its natural occurrence. Many of the general threats to gabbro soils habitat affect the habitats that surround it as well, including chaparral, coastal sage scrub, etc. Threats to

the specific gabbro soils habitat include construction of communications sites on gabbro outcrops (mountain tops) and mining. Modification of this habitat has consequently impacted many gabbro soils-dependent rare plant species.

SERPENTINE OUTCROPS

The serpentine soil type is distributed exclusively on the LPNF. Serpentine soils occur from weathering of serpentine rock that can be recognized by its colorful pigments (red to blue to green). The soil is generally high in magnesium and low in many micronutrients that are essential to many plants. One benefit to plants is serpentine's ability to hold water, because it is a heavy clay-like soil. Serpentine soils are often high in heavy metals (cobalt, nickel, and iron) and the type is an indicator for economic metals (quicksilver, chromium, nickel, asbestos, talc, soapstone, and jadeite; Stephenson and Calcarone 1999). Serpentine soils often support a unique suite of plant species. This habitat is rare in its natural occurrence. Many of the general threats to serpentine soils are similar to the threats affecting surrounding habitats as well. Threats to the specific serpentine soils habitat include mining development, ORVs, and invasion by exotic species. Modification of this habitat has consequently impacted many serpentine soils-dependent rare plant species.

OBJECTIVES – RARE AND RESTRICTED COMMUNITIES

Preserve the unique, rare and restricted vegetative communities occurring in the Forests.

STANDARDS – RARE AND RESTRICTED COMMUNITIES

ALPINE HABITAT

See section 8.12, *Listed Species – Alpine Habitats*.

PEBBLE PLAINS

See section 8.12, *Listed Species – Pebble Plains.*

GABBRO OUTCROPS

See section 8.17, *San Diego Thorn-Mint*.

SERPENTINE OUTCROPS

The Forest Service shall preserve and manage serpentine outcrops for the protection of their associated plant communities, including the 10 sensitive plant species, as well as Sargent cypress and knobcone pine trees. Such protective measures shall include but not be limited to:

- Prohibiting ORV use on serpentine soils
- Relocating roads and trails off serpentine outcrops
- Prohibiting all mining activities on and/or in serpentine soils
- Reintroducing natural fire regimes

SEEPS/BOGS/MARSH

See section 8.12, *Southwestern Pond Turtle*.

LIMESTONE/CARBONATE OUTCROPS

See section 8.3, *Listed Species – Carbonate Plants*.

ISSUE STATEMENT

Soil resources are an essential component in the proper functioning of ecosystems. While often overlooked in management activities, soils maintain proper hydrologic processes, control sediment flux to streams, support the growth of vegetation, and sustain microorganisms and other invertebrates vital in the food web.

Healthy, non-compacted soils control water flow and discharge rates within an entire watershed. Drainage of snowmelt and rain from unsaturated upland soils creates temporary patches of saturated zones that route water downslope underneath the ground. Sub-surface water eventually emerges as seeps in stream banks. In upslope unsaturated zones, water moves so slowly that only downslope saturated zones near streams contribute significantly to peak discharges during storm events (Harr 1976, 1977). The proper hydrologic function of soils thus protects watersheds from elevated surface runoff and erosion, increased sedimentation, severe flooding, and landslides.

Adverse soil impacts are extremely persistent and difficult to reverse. Soil compaction and consequent reductions in hydrologic function and soil productivity persist for several decades (Beschta et al. 1995). Topsoil loss and consequent loss of productivity are essentially permanent (Beschta et al. 1995). The persistent nature and irreversibility of soil impacts makes prevention of soil damage the only effective way to maintain desirable soil conditions.

Soils provide minerals and other nutrients to plants, and protect their roots from exposure (Wilshire and Nakata 1978, Pica et al. 1998). Soils also support a diverse suite of microorganisms. The restoration of degraded vegetative communities requires the evaluation of soil type, slope gradient and aspect, as well as the rehabilitation of the soil microfauna, microflora, fungi, and other microorganisms that support the ecosystem. For example, conversions of coastal sage scrub to non-native annual grasslands have typically resulted in the loss of soil microorganisms that experienced mutualistic relationships with the native plant species (Jigour et al. 2001). Restoration of the full complement of native coastal sage scrub plant species would be expedited by some means of inoculation with mycorrhizal fungi, which are thought to function as keystone or catalytic elements in the restoration process. Reintroduction of other microorganisms, such as those involved with formation of cryptobiotic soil crusts, might also prove helpful in some cases. Cryptobiotic, or cryptogammic crusts, are assemblages of tiny organisms such as cyanobacteria, green algae, fungi, lichens, and mosses living on or just beneath the soil surfaces in the spaces between the larger vegetation (Crawford 1991). These crusts are critical to the productivity of many arid ecosystems, and damage to the crust can result in decreased water-holding capacity of the soil, increased soil erosion, diminished nutrient flows, and greater vulnerability to invasion by exotic plants (Belnap and Gardner 1993, Eldridge 1998, Memmot et al. 1998).

Careful attention to such details of soil ecology may be among the factors needed to restore habitats for native terrestrial arthropods (soil-dwelling insects) important in the structure of local food webs. Monitoring of terrestrial arthropod assemblages at coastal sage restoration sites and comparison sites revealed that the restoration sites lacked native assemblages and hosted significantly more invasive arthropods, including Argentine Ant (*Linepithema humile*), European Earwig (*Forficula auricularia*), and Dooryard Sowbug (*Armadillidium vulgare*; Longcore 2000). Habitat connectivity for terrestrial arthropods was believed to be a factor in this distribution (Longcore 2000), and should be among the factors addressed in coastal sage scrub and other ecosystem revegetation efforts.

AREA DESCRIPTION

Soils occur throughout the Forests.

DESIRED CONDITION

Soils have natural amounts of native protective ground cover, soil organic matter, and coarse woody debris. Soils support vegetative growth where appropriate, and hydrologic function. Physical, chemical, and biological processes in soils function similarly to soils that have not been disturbed by harmful human activities.

OBJECTIVES

Maintain short- and long-term soil productivity, and prevent additional degradation of soils.

Involve soils specialists in planning efforts for fire management, vegetative community management, and watershed management, as well as monitoring impacts of domestic livestock grazing and roads. (See sections 1.0, 2.0, 5.0, 22.0, 25.0, *Watershed Management, Fire Management, Vegetation Management*, *Roads,* and *Domestic Livestock Grazing.*)

Set the watershed scale in relation to Forest Plan standards for cumulative soil damage.

At the watershed scale, limit detrimentally affected soils to < 5% of the watershed area. Detrimentally affected soil includes: compacted soils caused by any and all activities, including past and present roads, grazing, logging, mining, and ORV impacts, areas where erosion has removed the A-horizon, intense fire (removal of litter layer), puddling, and displacement. Where the extent of detrimentally affected soils is > 5%, ongoing activities that damage soils (grazing, etc.) shall be suspended, and roads and landings will be actively restored through obliteration.

Rehabilitate sites where soil has been adversely impacted by human activities.

Reference sites in RNAs and each vegetative community shall evaluate physical, chemical, and biological processes of soil to determine Potential Natural Community with respect to soil structure and function.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding soils management contained in other sections of this alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

Any activity undertaken by the Forest Service shall evaluate the impact on soil structure and function, including but not limited to:

- Soil microbes
- Native terrestrial arthropods and other soil-dwelling invertebrates
- Cryptogammic crusts
- Soil erosion/sedimentation
- Extent and degree of soil damage

Heavy machinery shall be prohibited for log yarding during undergrowth reduction, due to adverse impacts on soil resources (see section 24.0, *Timber Harvest*).

The Forest Service shall inoculate soils with native mycorrhizal fungi at appropriate sites to assist in restoration and revegetation efforts.

Native microorganisms involved with formation of cryptobiotic soil crusts shall be reintroduced at appropriate sites to assist in restoration and revegetation efforts.

MANAGEMENT INDICATOR/FOCAL SPECIES

ISSUE STATEMENT

The National Forest Management Act of 1976 recognized the complexity of monitoring large numbers of species and habitats individually, and directed the National Forests to identify Management Indicator Species (MIS). MIS are selected based on their habitat requirements, and they serve as surrogates for other species with less stringent requirements. Their status can indicate, to some measure, the general health of the ecological communities in which they reside. MIS populations are to be monitored to determine if existing or proposed management activities will adversely impact other fish and wildlife species with similar habitat requirements. Each MIS is intended to represent at least one of the following categories: 1) recovery species; 2) featured species; 3) species habitat indicators; and 4) ecological indicators. Although it is simpler and less expensive to monitor a few species than to monitor everything that might suggest the health of the 4 Forests, the use of MIS doesn't eliminate the need for site-specific planning for TES species. (See section 8.0, *Listed Species*, and section 9.0, *Sensitive Species.*)

All 4 of the Forests have identified management indicator species—some overlap but many do not. Amphibians and reptiles were only identified as Management Indicator Species (MIS) on 1 forest, despite the fact that amphibians are highly sensitive to changes in aquatic, riparian, and upland habitat quality, and water quality and quantity. In addition, some current MIS (largemouth bass, brown trout) are stocked species, not indigenous to the Forests or even the region. Since the Forests are fundamentally part of one interdependent system, spanning 2 ecoregions, it seems logical to identify MIS that will ensure ecosystem representation and that are indicative of habitat quality, quantity, and/or connectivity throughout the ecoregions.

Conservation biologists are using a similar approach to MIS. Focal species are being used in planning and managing regional reserve networks to ensure habitat quality and ecosystem representation. Focal species are used because their requirements for survival represent factors important to maintaining ecologically healthy conditions (Miller et al. 1998). Various focal species categories currently being used include umbrella, keystone, flagship, habitat quality indicator, wilderness quality indicator, and prey species.

Umbrella species are wide-ranging species, such as large carnivores. Because of their need for expansive wildlands, protecting enough habitat for a viable population benefits other species with less extensive spatial requirements (Noss and Cooperrider 1994, Noss et al. 1996, Meffe and Carroll 1997).

Keystone species are those species whose influence on community structure and function is out of proportion to their abundance (Paine 1980, Terborgh 1988, Mills et al. 1993 in Miller et al. 1998). Large carnivores are often keystone species (Terborgh 1988), because maintaining viable populations of these species will provide opportunities to maintain or restore ecosystem processes (Miller et al. 1994).

Flagship species are charismatic creatures that appeal to a wide range of people. Flagship species can be utilized in education and outreach campaigns to raise the awareness level and draw attention to conservation objectives (Noss and Cooperrider1994, Meffe and Carroll 1997).

Habitat Quality Indicator species are those species that essentially act as barometers because of their sensitivity to ecological changes, so they are useful in monitoring ecosystem integrity (Verner et al. 1992).

Wilderness Quality Indicator species are species that are sensitive or vulnerable to human disturbance and require remote, wilderness habitat (Foreman et al. 2000).

Prey Species are the primary prey for focal predators in the above categories (Foreman et al. 2000).

This Alternative carefully selected umbrella and habitat indicator focal species whose viability or recovery is tied to conservation goals: native species recovery, stream and riparian recovery, restoration of natural processes, protection and restoration of landscape connectivity, elimination or control of exotic species, and protection and restoration of natural habitats. The following species have been identified as MIS/focal species. More detailed information and recommendations for protection and management of each species are in the following sub-sections.

- Mountain lion (*Felis concolor*): an umbrella, wilderness quality indicator, keystone, and flagship species. The largest remaining carnivore in the ecoregion; its primary requirements are large core habitat areas, abundant prey, and habitat connectivity among subpopulations. The mountain lion is an umbrella species because of its extensive spatial requirements, a wilderness quality indicator because it requires extensive wildlands to thrive, a keystone species because of its role in top-down regulation, and a flagship species because they are important symbols of wildness to a diverse public (section 7.1).
- Mule deer (*Odocoileus hemionus*): chosen as a habitat quality indicator, flagship, and prey species. The primary prey of mountain lion and the most important big game animal in southern California. This habitat quality indicator is dependent on meadows and riparian habitat for fawning areas and moves seasonally. In addition, since mule deer are sensitive to ecological process such as fire, its status can reflect the effects of different fire management strategies (section 7.2).
- Bighorn sheep (*Ovis canadensis*): an umbrella, flagship, habitat quality indicator, and wilderness quality indicator species. Two subspecies occur in the ecoregion, the Nelson bighorn in the northern part of the region and the Peninsular bighorn in the southern portion. The Peninsular bighorn have significant populations in the United States and Mexico, allowing for cross-border dispersal, since biologically the ecoregion extends 200 miles down into Baja. Both subspecies have specialized habitat requirements and move seasonally between different elevations. They are also dependent on fire to shape their habitat (section 7.3).
- Southern steelhead trout (*Oncorhynchus mykiss*): chosen as an aquatic habitat quality indicator, umbrella, and flagship species. It rates as an aquatic habitat quality indicator because it requires structurally complex riparian habitat with stream shading to regulate water temperatures. It is also sensitive to water quality changes. This species is dependent on all reaches of riparian systems, at different life stages, from the ocean to the headwaters, for spawning and rearing. The steelhead is also considered an umbrella species because its presence is an indication of overall watershed integrity, and a flagship species because of its popularity among anglers (section 7.4).
- Arroyo southwestern toad (*Bufo californicus*): chosen as an aquatic habitat quality indicator because of its dependence on riparian and adjacent upland habitat, high water quality, and native ants. Due to its sensitivity to a variety of activities and uses, it helps monitor for appropriate flow regimes, water quality and quantity, sedimentation issues, eradication and control efforts regarding non-native species, including invasive plants, and predators (section 7.5).
- Least Bell's vireo (*Vireo bellii pusillus*): chosen as a habitat quality indicator for structurally complex riparian communities. This neotropical migrant requires habitat connectivity to South America, via high-quality riparian habitat. It is sensitive to disturbance and habitat degradation and therefore useful in monitoring activities and uses on the Forests. It was identified as an umbrella species because protection and restoration of adequate riparian woodlands for a viable population of vireos throughout southern California will protect habitat for other riparian-dependent species. It was also identified as a flagship species because of its popularity among birders (section 7.6).
- California spotted owl (*Strix occidentalis occidentalis*): identified as a flagship, habitat quality indicator, and an umbrella species. The spotted owl is a well-recognized species, having played a flagship role for years in helping to protect ancient forests. The owl was identified as a habitat quality indicator for mature and old-growth forests, with multi-layered canopies of hardwood and coniferous trees; the owl is closely associated with large old trees and snags. The owl has extensive spatial requirements of up to 300 acres per pair in the South Coast ecoregion. This species requires connectivity within and between the 4 forests; though genetic exchange is infrequent, there is persistent interchange (section 7.7).
- Arboreal salamander (*Aneides lugubris*): chosen as a habitat quality indicator for mature oak woodlands; downed wood and leaf litter are essential habitat components. Because this species requires oak woodlands, which have a patchy distribution, it is considered a resource-limited species (section 7.8).
- Bell's sage sparrow (*Amphispiza belli belli*): identified as a habitat quality indicator for coastal sage scrub and lower-montane chaparral habitats; the species prefers habitat mosaics of varying age-classes (section 7.9).
- Townsend's big-eared bat (*Corynorhinus townsendii*): identified as a habitat quality indicator for caves and crevices; its roosting habitat is restricted to well-developed caves and abandoned mines (section 7.10).
- Red-diamond rattlesnake (*Crotalus exsul*): chosen as a habitat quality indicator species for chaparral, brush, and scrub habitats occurring on the lower elevations of the Forests (section 7.11).
- Southwestern pond turtle (*Clemmys marmorata pallida*): chosen as a habitat quality indicator for aquatic ecosystems and surrounding upland habitat because they are negatively impacted by predatory invasive species, alteration of

aquatic and surrounding terrestrial habitats, and water pollution – impacts that are also causing the decline of numerous other aquatic wildlife species (section 7.12).

AREA DESCRIPTION

The Forest Service currently uses Management Indicator Species, as shown in Table 7-1.

TABLE 7-1

EXISTING MANAGEMENT INDICATOR SPECIES

MIS SPECIES	LPNF	ANF	SBNF	CNF
BIRDS				
Bald eagle	X		X	
California condor	X	X	X	
Peregrine falcon	X		X	
Least Bell's vireo	X	X		
California Spotted owl	X	X	X	
California quail	X			
Riparian bird assemblage	X	X	X	
Conifer and oak woodland bird assemblage		X	X	
Chaparral bird assemblage		X	X	
Pinyon/juniper bird assemblage		X	X	
Cavity nesters	X		X	
REPTILES AND AMPHIBIANS				
Red-legged frog			X	
Foothill yellow-legged frog			X	
Mountain yellow-legged frog			X	
Western pond turtle			X	
Coast horned lizard			X	
Southern rubber boa			X	
MAMMALS				
Bighorn sheep		X	X	
Mule deer	X	X	X	
Gray squirrel	X		X	
California leaf-nosed bat			X	
Townsend's big-eared bat			X	
Northern flying squirrel			X	
Los Angeles pocket mouse			X	
White-eared pocket mouse			X	
Badger			X	
Mountain lion			X	
Black bear **			X	
FISH				
Steelhead trout	X			
Rainbow trout	X	X		

Unarmored 3spine stickleback			X	
Santa Ana sucker			X	
Speckled dace			X	
Mojave tui chub			X	
Arroyo chub	X			
Native fish assemblage		X		
Brown trout **			X	
Largemouth bass **			X	

*** denotes non-native species*

DESIRED CONDITION

MIS or focal species (umbrella, flagship, habitat quality indicator, etc.) are used as barometers to monitor the collective ecological health of the Forests. Proper selection, protection, and monitoring of MIS, from all focal species categories, ensure ecosystem representation, habitat connectivity, and the ecological integrity of the Forests. Managing for the protection of focal species aids the 4 forests in attaining goals of native species recovery, stream and riparian recovery, restoration of natural processes, protection and restoration of landscape connectivity, elimination or control of exotic species, and protection and restoration of natural habitats.

OBJECTIVES

Ensure ecosystem representation through the careful selection of MIS or focal species.

Consult local biologists from all taxonomic groups to ensure that all appropriate MIS/focal species have been identified.

Monitor indicator species to provide information to help restore and protect natural habitats and processes.

Utilize charismatic flagship species for education and outreach campaigns.

Identify linkages required for dispersal-limited species, such as salamanders, and determine minimum width, length, and vegetative structure necessary to use for success dispersal.

Develop and distribute education and outreach materials for all MIS/focal species, especially flagship species.

STANDARDS

The Forest Service shall develop a standardized and consistent monitoring protocol for all MIS/focal species throughout the Forests.

The Forest Service shall conduct and/or support ongoing research and monitoring for all MIS/focal species. The resulting data for each Forest should be exchanged with the other 3 forests and a collective annual report compiled.

MIS species not indigenous to the area (brown trout, largemouth bass, etc.) shall be monitored, by the Forest Service, for their impacts on native species and ecological function.

The Forest Service shall maintain the MIS/focal species status of all species identified as MIS in previous forest plans in addition to those identified in this plan, and continue to monitor these species on the Forests.

Section 7.1

MOUNTAIN LION

ISSUE STATEMENT

Justification for Selection

The mountain lion (*Felis concolor*) was chosen as a Management Indicator Species (MIS)/focal species because protection of mountain lions will help achieve the goal of protecting and restoring connectivity. The mountain lion was selected as an umbrella, keystone, flagship, and wilderness quality indicator species. *Umbrella:* Because of its extensive spatial requirements and use of a variety of habitat types, protecting enough habitat for a viable population of mountain lion will protect interconnected habitat for an array of other species. *Keystone:* As the major predator of deer and other species, the mountain lion is vital for top-down regulation. *Flagship*: Top predators are also important symbols of wildness to a wide range of people, from urban dwellers to hunters, thereby serving a flagship role in conservation efforts. *Wilderness Quality Indicator:* Mountain lions require large core wilderness areas if they are to thrive.

Life History, Status, and Habitat

At 6 to 8 feet in length and weighing 75-170 pounds, the mountain lion is the largest remaining native mammalian carnivore in the ecoregion. Most lions are a tawny brown color with short coarse fur. Both limbs are extremely powerful, especially the hind limbs, which are much larger. Their heavy black-tipped tail averages 2-3 feet long and serves as a balancing-aid when footing is precarious (McDougall 1997). Mountain lions have short, blunt snouts that conceal powerful jaws (Currier 1983). Like other felids, they are sexually dimorphic; females on average are 15% smaller than males (Hall 1981).

The mountain lion has the largest natural range of any terrestrial mammal in the new world (Jameson and Peeters 1988). There are 30 recognized subspecies, 15 of which occur in North America (Hall 1981), though several subspecies may now be extinct (Barone et al. 1994). Historically, mountain lion were only absent from northern and eastern Canada and eastern Alaska (Hall 1981). Today, they are virtually extirpated east of the Rockies, with small populations in Florida, Missouri, South Dakota, and Texas (Currier 1983), but they are still present in suitable habitat throughout roughly one third of the western United States (McDougall 1997). The subspecies that occurs in California is *Felis concolor californica*.

From 1907 to 1963, the mountain lion was a bountied predator in California; records indicate that 12,461 lions were killed during this period. It remained unprotected until 1969 when it became a game animal, but in 1972 there was a moratorium on lion hunting, and finally in 1990, a ballot initiative that prohibited hunting (Torres 2000). As a result of the passage of Proposition 117, mountain lion are given special protection under the California Department of Fish and Game code 4800-4809 as a California Specially Protected species. California is the only western state where lion hunting is prohibited, though depredation permits are still issued for "problem" lions. Approximately 2,500-5,000 mountain lions are estimated to currently live in California (CDFG 1990).

The mountain lion is active yearlong; it is mostly nocturnal and crepuscular. They are considered habitat generalists, meaning they can occupy a wide range of habitat types, though they are absent from extremely xeric regions, such as the Mojave and Colorado deserts. The species has extensive spatial requirements and utilizes brushy stages of a variety of habitat types, including riparian corridors (CDFG 1990). Den sites may be located on cliffs, rocky outcrops, in caves, or in dense thickets or under fallen logs (Chapman et al. 1982, Ingles 1965). In southern California, most cubs are reared in thick brush (Beier et al. 1995). They prefer vegetated ridgetops and stream courses; both are used as travel corridors and hunting routes (Spotwart et al. 1986).

The mountain lion is a formidable predator upon larger game, especially mule deer, which comprise 50-80% of their diet. Other prey in southern California include rabbits, hares, skunks, porcupines, coyotes, bobcats, opossums, raccoons, and domestic stock (Ingles 1965, Beier and Barrett 1993). Modern ecological theory and empirical evidence strongly suggest that top predators, such as mountain lions, exert a controlling (top-down) influence over entire ecosystems through a cascade of regulatory effects across the various trophic levels of the ecosystem (Terborgh et al. 1999:41). Mountain lions may play an important role in top-down regulation of ungulates (Logan and Sweanor 2001). By preying on deer, elk, and other ungulates and killing mesopredators such as coyotes and bobcats, mountain lions may contribute to the top-down regulation of ecosystems by the suite of top predators present. Mountain lion predation may 1) dampen oscillations of prey populations and cause a more even distribution of prey across the landscape, thus reducing potential habitat damage (Hornocker 1970, Logan et al. 1996; Logan and Sweanor 2001); 2) enhance biological diversity by contributing to the suppression of mesopredator populations; and 3) promote ecosystem stability (Hornocker 1970; Seidensticker et al. 1973). Mountain lions kill bobcats and coyotes when they associate near kills made by lions (Boyd and O'Gara 1985; Koehler and Hornocker 1991; Beier and Barrett 1993; Logan and Sweanor 2001). Potential immediate effects of removing top predators include increases in the abundance of large herbivores (e g. deer and elk) and mesopredators

(e.g. bobcats and coyotes) (Terborgh et al. 1999). These proximate ecological changes may then generate a cascade of effects operating through ecosystem processes such as herbaceous consumption, predation, competition, and behavioral exclusion ultimately resulting in ecosystem simplification, loss of ecosystem stability, and loss of biological diversity (Terborgh et al. 1999).

Mountain lion are good wilderness quality indicators, since they require large core habitat areas if they are to thrive. Home range size varies by sex, age, and the distribution of prey. Home ranges in southern California averaged 36 mile2 (SD = 19) for 12 adult female and 140 mile2 (SD = 24) for 2 adult male cougars (Dickson and Beier, in press). Male home ranges appear to reflect the density and distribution of females (Maehr 1992). Males occupy distinct areas and are tolerant of transients of both sexes, while the home range of females may overlap completely (CDFG 1990, Beier and Barrett 1993).

Because the mountain lion has such extensive spatial requirements, demanding needs for connectivity, and utilizes a variety of habitat types, it serves as an ideal umbrella for other species and for large-scale ecological processes. Essentially, protection of habitat for a viable population of mountain lions should protect interconnected habitat for countless other species; it may also provide the basis for reintroduction of extirpated species that also require extensive expanses of un-fragmented habitat (Sweanor 1990). Although a reserve designed for a cougar meta-population would not suffice for habitat specialists (such as the gnatcatcher), an area-sensitive species such as the cougar is an appropriate umbrella species (Noss 1991) for a regional conservation plan, because its low density renders it most sensitive to habitat fragmentation (Beier 1996). It is at least partly the dispersing males' need for large expanses as they move between patches of resident females that makes mountain lions good umbrella species.

The mountain lion is polygamous and breeds year round in southern California (Beier et al. 1995). Females breed at 2.5 years and produce litters every other year or at 3-year intervals (Chapman et al. 1982; CDFG 1990). The gestation period lasts 82-96 days and the litter size ranges from 2 to 4 cubs (Beier and Barrett 1993; Beier et al. 1995). In California, most cubs are born during the spring, but they may be born in any month (Ingles 1965; Beier et al. 1995). Young typically don't become independent until their second year; at 12-23 months they increasingly hunt without maternal assistance and by 14-24 months they move into a new and often unfamiliar home range (Beier 1991; Beier et al. 1995).

Dispersal plays a crucial role in cougar population dynamics because recruitment into a local population occurs mainly by immigration of juveniles from adjacent populations, while the population's own offspring emigrate to other areas (Beier 1995; Weaver et al. 1996, Sweanor et al. 2000). Juvenile dispersal distances average 17 miles (range 5-76 miles) for females and 46 miles (range 12-148 miles) for males (Anderson et al. 1992). Dispersing lions may cross large expanses of nonhabitat, though they prefer not to do so (Logan and Sweanor 1999). Because they can tolerate dispersing through areas of nonhabitat, cougars may not be useful indicators of the quality of habitat in core areas or landscape linkages. To allow for dispersal of juveniles and the immigration of transients, lion management should be on a regional basis (Sweanor et al. 2000). Linkages to other subpopulations must be protected, allowing for continued genetic exchange and recolonization of vacated habitat. A viable metapopulation requires a landscape encompassing a set of large habitat patches and linkages among them. Mountain lions in parts of southern California have lost nearly all their dispersal corridors (Beier 1993), so recent population dynamics may be unstable with a temporary increase in local population densities due to intense development (Smallwood 1994).

The needs of large mammalian carnivores such as mountain lion are critical to address habitat fragmentation at the landscape scale (Soulé and Terborgh 1999). Habitat fragmentation caused by urbanization and the extensive road network has had detrimental effects on mountain lions by restricting movement, increasing mortality, and increasing association with humans. Roads are a significant factor in habitat suitability for mountain lions (Hunter 1999; Dickson and Beier 2003). In the Santa Ana Mountains 33% of radio-tagged individuals were killed on roads (Beier 1995); roads were especially dangerous near riparian areas preferred by mountain lions (Dickson and Beier 2003). There are also indirect effects because the presence of roads correlates well with other human disturbances, including artificial lighting, subdivisions, livestock grazing, and other factors that increase mortality risks for lions. Roads also provide a vector for future disturbance; an inholding in a national forest with a road has more likelihood of subdivision than does an unroaded one (Hunter 1999). Different types of roads have varying effects on lions; they may traverse and travel on small dirt roads, but highways, residential, and even country roads can impede movement. See Section 22.0, *Roads*.

In November 2000, some 200 land managers and conservation ecologists participating in the Missing Linkages conference in San Diego identified 60 critical linkages within the South Coast Ecoregion, and 20 critical linkages in the Central

Coast Ecoregion; the Forests span these 2 ecoregions. A large portion of these landscape linkages is directly associated with the Forests, providing intra- and inter-forest connectivity between and among the 4 Forests (Penrod et al. 2000). A number of these linkages were identified as being critical to mountain lion movement. See Section 14.0, *Habitat Linkages.*

In southern California, several core habitat areas are clearly at risk of isolation (Hunter 1999). An expert scientific workshop in 1999 identified cores areas and critical connectivity zones, and conducted GIS analyses on habitat suitability and road impact. Results of the analysis (Hunter 1999) show 75% of core habitat in multiple-use management or private ownership, and more than 50% could be protected through improved management of public lands, including mostly Forest Service and BLM lands. However, some private land is critical for connectivity (Hunter 1999). To be managed effectively, cougars and other large mammals must be managed at the regional or statewide (ecosystem) scales. Cougar/prey habitat complexes must be identified, and at-risk components (winter ranges, connecting corridors) must be functionally maintained (Utah Division of Wildlife Resources 1999). The Forests are major core areas that are critical to the regional conservation reserve network. Maintaining and/or restoring connectivity between the Forests will help to ensure the viability of the mountain lion in the region.

AREA DESCRIPTION

Mountain lion persist on all Forests. Regional population counts have not been conducted but in the Santa Ana Mountain Range, Beier (1993) estimated about 1.05-1.2 adults per 64,000 ac. The mountain lion was identified as a connectivity indicator for a number of the linkages identified at the Missing Linkages Conference, including all linkages associated with the 4 southern forests (Penrod et al. 2000). Please refer to section 14.0, *Habitat Linkages*, for more specific direction on connectivity issues.

DESIRED CONDITION

Large carnivores have been used as a planning tool to identify critical linkages and to conserve a broad range of ecosystem processes. The network of wildlands is able to preserve populations of large predators and conserve other biological and ecological processes such as mutualisms and competition, gene flow, plant dispersal mechanisms, vegetational succession patterns, and pathways of energy flow and nutrient cycling resembling conditions of the last several millennia.

OBJECTIVES

Maintain populations of mountain lions in the region that not only ensure survival of local populations, but ensure persistence in sufficient numbers to allow mountain lions to function as regulators of deer populations and smaller predators, with cascading effects on other trophic levels.

Ensure connectivity both within and between the Forests and other protected lands in the ecoregion. Use mountain lions to identify probable locations of important linkages, but design linkages to accommodate movement by a broad spectrum of plants and animals.

Minimize paved roads in or on the periphery of core habitat areas, especially near riparian areas, because of their potential for direct mortality, inducement of urban growth, and habitat fragmentation, all of which impact this species. Protect habitat for lion, an umbrella for other species.

Ensure the survival and viability of mountain lion populations, while minimizing conflicts.

Manage at the province and regional scales by developing inter-agency agreements with other federal and state agencies and cooperating closely with the other Forests to protect migration/travel corridors and cooperatively manage land in large contiguous habitat blocks. Where critical linkages are identified, cooperate with NGOs and government agencies to acquire key parcels for conservation purposes.

Identify cougar/prey habitat complexes and at-risk components by GIS, available scientific literature, ongoing research, agency personnel observations in the field, houndsmen, and other individuals to ensure functional habitat connectivity is maintained (Utah Division of Wildlife Resources 1999). See section 14.0, *Habitat Linkages*.

Develop and encourage cost-share agreements with nongovernmental organizations to implement restoration projects in connectivity zones.

Identify and protect critical parcels in linkage zones between the Forests, through conservation agreements, acquisition, fee title agreements, etc. See section 17.0, *Land Protection Opportunities*.

Encourage research projects to learn more about predator-prey relationship (Utah Division of Wildlife Resources 1999).

Encourage and support research to develop a methodology to determine accurate population estimates of mountain lion populations.

Protect mule deer habitat, and increase population density in larger nodes of connectivity zones using prescribed fire to stimulate growth. See section 2.0, *Fire Management*.

Coordinate and cooperate with other agencies to educate the public on cougar biology and management, and to develop and distribute multi-lingual educational materials on the species life history, extensive spatial requirements, the threats it faces, and necessary conservation and protective measures. See section 20.0, *Environmental Education*.

Develop and implement outreach programs on living with lions (e.g. lighting, pets, livestock husbandry) to residents in communities within Forest Service boundaries and at the wildland-urban interface. Outreach "Living with Lions." Discourage rural inholders from hobby livestock operations, and encourage them to keep any livestock and pets in roofed pens at night. Negotiate grazing leases (if any) to include predator-friendly clauses.

Educate livestock operators on best management practices for reducing conflicts with cougar.

Fund and encourage academic research to develop husbandry methods that reduce conflicts with livestock, etc.

Educate the public on the risks of recreating in cougar habitat and how to reduce the likelihood of encounters.

Educate landowners within Forest Service boundaries and at the wildland-urban interface on the dangers of living in cougar habitat and how to reduce the likelihood of encounters.

STANDARDS

The Forest Service shall collect data on road kill, occurrences, and travel routes and work with California Department of Transportation (CalTrans) to incorporate wildlife passages into infrastructure upgrades.

No depredation permits shall be issued on Forest Service system lands.

California Department of Fish and Game (CDFG) shall perform necropsies, not the Forest Service.

Section 7.2
MULE DEER

ISSUE STATEMENT

Justification for Selection

The mule deer (*Odocoileus hemionus*) was chosen as a MIS/focal species because ensuring viable populations of mule deer will help achieve the goals of carnivore recovery (as prey), riparian restoration, and restoration of natural fire dynamics. The mule deer was chosen as a habitat quality indicator, flagship, and prey species. *Habitat Quality Indicator:* This species is dependent on meadows and riparian habitat for fawning areas and moves seasonally. In addition, since mule deer are sensitive to ecological process such as fire, its status can reflect the effects of different fire management strategies. *Flagship:* The mule deer is very popular with the public and hunters. Prey Species: It is the primary prey of mountain lion and the most important big game animal in southern California.

Life History, Status, and Habitat

Mule deer are a common abundant mammal, widely distributed throughout California. Deer favor a mosaic of forest, woodland, brush, and meadow habitat in early to intermediate successional stages (CDFG 1983a). Vegetation in a mosaic of different age classes is required to provide cover, foraging and watering areas (K. Brennan, CDFG, pers. comm.).

Deer feed on a number of plant species but browse on shrubs and brush or grasses. Deer feed upon lower-growing plants and shrubs but will feed on brush and trees as high as they can reach. Grasses are consumed in the late winter and early spring. Forbs are consumed primarily in the spring and summer months and provide important nutrients and proteins for lactating does. During the fall and winter months browse plants and mast make up a greater portion of their diet. The younger new shoots and leaders on browse plants tend to provide better forage quality and are preferred. A 100-pound deer requires approximately 3 quarts of water per day (K. Brennan, pers. comm.).

A variety of brush cover and tree thickets interspersed with meadows and shrubby areas is important for food and escape cover. Thick cover that can provide shade in the summer months or shelter from wind, rain, and snow is a critical habitat component for survival. Varying slopes and topography relief are also import for providing cover and shade or exposure to the sun. Fawning occurs in moderately dense cover in chapparal, forests, willow riparian areas, and meadow edges (CDFG 1983a).

Mule deer are classified by the California Department of Fish & Game as a big game animal. Deer are managed in separate deer herd management zones. For each deer herd, the Department has prepared deer herd management plans that define specific goals and objectives. The Department cooperates with federal, state, and private landowners to implement deer herd plan objectives. Hunting regulations are established for each deer herd zone. With the exception of special archery hunts and junior hunts, most deer herd zones offer buck-only hunting opportunities (K. Brennan, CDFG, pers. comm.).

Mule deer can be active day and night but are generally crepuscular in their activity patterns. Severe weather changes and extreme temperature changes can trigger a change in movement patterns for deer. Mule deer can be migratory or resident animals with limited range movements. Most migratory behaviors are observed in mountainous regions where deer migrate up and down slope to avoid heavy snows at high elevations in winter, or to seek moisture during the summer months. Deer will also move up and down slope on a daily basis to seek food and shelter (CDFG 1983a).

Mule deer does and fawns have small home ranges that measure 0.4-1.1 square miles and can be as large as 1.9 square miles (Taber and Dasmann 1958 *in* CDFG 1983a). Bucks typically have larger home ranges and are known to wander longer distances. In California, deer densities vary between 7 and 23 deer per 18-60 square miles (Longhurst et al. 1952 *in* CDFG 1983a). Home ranges are comprised of many small habitat areas that provide deer with various life history requirements. Some of these areas are used only seasonally or under extreme conditions (K. Brennan, pers. comm.).

While fawning in the spring and summer months, adult does may defend small areas. These areas usually comprise the immediate areas surrounding the fawns and may change with daily movements. Does may defend these areas from other does or predators. Bucks tend to be more solitary in nature but may form small groups or associations. During the spring and summer months several groups of bucks may come together to form feeding herds; however, each group maintains a distance from other groups within the herd. When the rut begins, individuals begin to disperse and tend to avoid each other during mating activities (K. Brennan, pers. comm.).

Mule deer are serially polygynous and breed in the autumn months (rutting season). Bucks will attend to an estrous doe until mating is completed, or until the buck is displaced by another buck. Bucks do not maintain harems or herds of breeding does. Gestation periods are approximately 195-212 days long with the fawns being born in early April until mid June. Bucks and does are sexually mature at a year and a half. Twins are common after the first or second fawning attempts, but triplets are rare. Mule deer can live to be 10 years old in the wild, or longer in captivity (Taylor 1956, Wallmo 1981, Anderson and Walmo 1984 *in* CDFG 1983a).

Periodic over-population of deer herds, followed by resultant winter die-offs and destruction of habitat, occurs throughout the state. Natural predators of deer have been reduced in number in most areas of the state. Mule deer are preyed upon regularly by mountain lions and coyotes and occasionally by bobcats and black bears. In rural and developed portions of the state bordering wildland areas feral dogs can be a problem. Deer herds can respond rapidly to habitat improvements; conversely, deer populations can decline in response to fragmentation, degradation, or destruction of habitat from urban expansion, incompatible land uses (timber, grazing, ORV), and other human activities. Mule deer compete potentially for food with domestic cattle, sheep, wild horses, and black bears (Ingles 1965, Hall 1981 *in* CDFG 1983a).

AREA DESCRIPTION

Mule deer occur on all 4 Forests. Regional population estimates range between 40,000 and 60,000 deer on the Forests

based on the amount of available habitat (K. Brennan, pers. comm.).

DESIRED CONDITION

Mule deer are an abundant, widespread species on the Forests, utilizing a mosaic of vegetation types of differing seral stages. Deer provide the necessary prey base for healthy viable populations of mammalian carnivores.

OBJECTIVES

Maintain viable populations of mule deer as the primary prey for mountain lion in the region and deer herd management zones..

Maintain habitat connectivity for mule deer between and within the Forests, and for seasonal movement to fawning areas and important water sources.

Maintain and enhance meadows and riparian habitat.

Utilize mule deer as an indicator to reflect the effects of different fire management strategies.

Provide public education and outreach. Develop and distribute multi-lingual educational materials on mule deer life history and the animal's role as an important prey species. See section 20.0, *Environmental Education*.

Encourage research projects to learn more about predator-prey relationships (Utah Division of Wildlife Resources 1999).

Promote connectivity both within and between the Forests and other publicly protected and privately conserved lands. Use mule deer to identify probable locations of important linkages, but design linkages to accommodate movement by a broad spectrum of plants and animals. See section 14.0, *Habitat Linkages*.

Minimize paved roads in or on the periphery of core habitat areas, especially near riparian areas, because of their potential for direct mortality, inducement of urban growth, and habitat fragmentation, all of which impact this species. See section 22.0, *Roads*.

Develop and encourage cost-share agreements with nongovernmental organizations to implement restoration projects in connectivity zones.

Identify and protect critical parcels in linkage zones among the 4 forests, through conservation agreements, acquisition, fee title agreements, etc. See section 17.0, *Land Protection Opportunities*.

Conduct prescribed burns and allow some natural fires to burn, in order to promote a mosaic of diverse habitat types of varying ages. See section 2.0, *Fire Management*.

STANDARDS

The Forest Service shall comply with management direction in the local deer herd plans.

The Forest Service shall collect data on road kill, occurrences, and travel routes and work with the California Department of Transportation (CalTrans) to incorporate wildlife passages into infrastructure upgrades.

Section 7.3

BIGHORN SHEEP

ISSUE STATEMENT

Justification for Selection

The bighorn sheep *(Ovis canadensis)* was chosen as a Management Indicator Species (MIS)/focal species because recovery and protection of bighorn would help achieve the goals of ungulate recovery and protection and restoration of habitat connectivity between mountain ranges. The bighorn was selected as an umbrella, habitat quality indicator, wilderness quality indicator, and flagship species. *Umbrella:* Bighorn have extensive spatial requirements, make

pronounced seasonal movements, and require habitat connectivity among subpopulations. *Habitat Quality Indicator:* Bighorn are highly vulnerable to diseases carried by domestic sheep and thus need habitat free of such species. They also have demanding habitat requirements for lambing and feeding. They are vulnerable to road kill when moving between mountain ranges or to seasonal water sources. *Wilderness Quality Indicator:* Bighorn need large core wilderness areas for refuge and security. *Flagship:* Both subspecies of bighorn present on the Forests are very popular with the public, hunters, and wildlife managers.

Life History, Status, and Habitat

Three subspecies of bighorn sheep live in California: California bighorn sheep (*Ovis. c. californiana*), Peninsular bighorn sheep (*O. c. cremnobates*), and Nelson bighorn sheep (*O. c. nelsoni*); the Peninsular and Nelson bighorn sheep are found on the Forests. Peninsular bighorns are present in the Peninsular Ranges on the east side of the San Jacinto and Santa Rosa Ranges, and south into Mexico (CDFG 1983b). The historic distribution of this subspecies once included additional areas along the Mexican border and in the northern San Jacinto Mountains, but these populations disappeared in the 1980s (USFWS 2000a). Nelson bighorn sheep, also called desert bighorn, occur in the desert mountain ranges from the White Mountains south to the San Bernardino Mountains, and southeastward to the Mexican border. An isolated population of this subspecies occurs in the San Gabriel Mountains (CDFG 1983b); this population was, at one time, considered the largest in California (DeForge 1980; Torres et al. 1994 *in* Stephenson and Calcarone 1999).

The three subspecies are only distinguished by their geographic distribution. Male bighorn sheep are larger than females; they have large thick curved horns, while the horns of females are shorter, slender, and only slightly curved. There are color variations from dark brown in the northern mountains to pale in the deserts; the belly, rump patches, back of legs, muzzle, and eye patch are white, and the tail is dark brown in all variants (CDFG 1990).

The decline of populations of bighorn sheep began in the 1800s, primarily due to unregulated commercial hunting; in 1873 bighorns in California were granted protection from hunting (Thelander et al. 1994). The major factors in the decline of bighorn sheep are habitat loss, degradation, and fragmentation due to urbanization, mining operations, roads, and recreational activities (USFWS 2000a; Thelander et al. 1994). The bighorn is also extremely sensitive to diseases, especially those transmitted by livestock, which have contributed significantly to the decline of some populations; livestock also compete with desert bighorns for water and forage. Lambing and feeding areas, escape terrain, water sources, and seasonal travel routes must be maintained to deter further loss of populations (Hicks and Elder 1979, Jessup 1981, Seegmiller and Ohmart 1981, DeForge et al. 1982, DeForge and Scott 1982, Dunn and Douglas 1982, Ginnett and Douglas 1982, Wehausen 1983, Shackleton 1985 *in* CDFG 1983b). The Peninsular bighorn sheep was federally listed as an endangered species in March 1998 (63 FR 13134) and was state-listed as threatened in June 1971; critical habitat was designated in February of 2001 (66 FR 8650).

The species may utilize a number of habitat types including alpine dwarf shrub, low sage, sagebrush, pinyon-juniper, palm oasis, desert riparian, desert succulent shrubs, desert scrub, subalpine conifer, perennial grassland, montane chapparal, and montane riparian (CDFG 1990). Water is a critical habitat component; they use springs, seeps, and will also utilize man-made water sources (Leslie and Douglas 1979 *in* CDFG 1983b). They forage on a variety of plant species consisting of shrubs, forbs, cacti, and grasses (CDFG 1990). Valley floors between mountain ranges are important habitat linkages for foraging, seasonal movement, and genetic exchange between subpopulations (USFWS 2000a). Bighorn make seasonal movement between winter and summer ranges. Montane populations spend the summer in higher-elevation alpine habitats, and move downslope to winter in secluded canyons. Desert bighorn are restricted to the vicinity of water during the hot summer, dispersing at other times of year (Leslie and Douglas 1979, Monson and Sumner 1980, Wehausen 1980, Tilton and Willard 1982, Wehausen 1983 *in* CDFG 1983b). They also exhibit seasonal differences in habitat use; they may have a smaller home range in summer and an extended range in the cooler wet months, when water is not a limiting factor (USFWS 2000a). Bighorn breed in the late summer and fall months, while lambing season usually lasts from February through August (CDFG 1990).

AREA DESCRIPTION

Within the Forests, Peninsular bighorn occur in the San Jacinto and Santa Rosa Mountains. A total of 17,982 acres of critical habitat has been designated within the SBNF. Three of the 8 ewe groups at least partially occur on the SBNF; they include San Jacinto, Santa Rosa west of Highway 74 (northern), and Santa Rosa east of Highway 74 (southern).

The San Jacinto and Santa Rosa Mountains are estimated to contain 25 and 117 sheep, respectively. Seven acres are overlapped by roads, 60 acres by trails, 7 acres by developed recreation, and 5,467 acres by a now-inactive grazing allotment (USFWS 2000a).

Nelson bighorn populations are concentrated in the eastern San Gabriel Mountains and eastern San Bernardino Mountains, with a repatriated population in the San Rafael Peak and Cobblestone Mountain area, which lies in the southern part of the LPNF (Torres et al. 1994 *in* Stephenson and Calcarone 1999). Several distinct herds have been documented: Bear Creek drainage (San Gabriel wilderness), the upper East Fork of the San Gabriel River and Cattle Canyon (both in Sheep Mountain Wilderness), San Antonio Canyon, Cucamonga Canyon, and the South and Middle Forks of Lytle Creek (Holl and Bleich 1983 *in* Stephenson and Calcarone 1999).

DESIRED CONDITION

To meet the desired condition of viable populations of bighorn sheep, activities that are incompatible with the recovery of both subspecies in existing and historic localities have ceased. Seasonal movement corridors have been restored and secured; bighorn sheep populations are once again flourishing in existing and historically occupied habitat.

OBJECTIVES

Ensure viable populations of both subspecies of bighorn that occur on the Forests.

Maintain habitat connectivity for bighorn sheep between and within the Forests, and for seasonal movement to lambing areas and important water sources.

Eliminate activities that threaten the survival of the species.

Provide public education and outreach. Develop and distribute multi-lingual educational programs and pamphlets on the bighorn ecology, the threats to the species, and the necessary conservation measures.

Ensure connectivity both within and between the Forests and other publicly protected and privately conserved lands. Use bighorn sheep to identify probable locations of important linkages, but design linkages to accommodate movement by a broad spectrum of plants and animals. See section 14.0, *Habitat Linkages*.

Minimize paved roads in or on the periphery of core habitat areas, especially near riparian areas, because of their potential for direct mortality, inducement of urban growth, and habitat fragmentation, all of which impact bighorn sheep. See section 22.0, *Roads*.

Develop and encourage cost-share agreements with nongovernmental organizations to implement restoration projects in connectivity zones.

Identify and protect critical parcels in linkage zones for bighorn, through conservation agreements, acquisition, fee title agreements, etc. See section 17.0, *Land Protection Opportunities*.

STANDARDS

The Forest Service shall implement all relevant portions of the Peninsular bighorn sheep recovery plan with respect to bighorn sheep in the Peninsular ranges, and apply those standards to other populations of bighorn sheep elsewhere in the Forests, if applicable.

The Forest Service shall collect data on road kill, occurrences, and travel routes and work with the California Department of Transportation (CalTrans) to incorporate wildlife passages into infrastructure upgrades.

The Forest Service shall prohibit cattle grazing on the Forests in bighorn sheep habitat. Prohibit domestic sheep grazing within 9 miles of habitat to reduce the potential for disease transmission (USFWS 2000a). See section 25.0, *Domestic Livestock Grazing*.

The Forest Service shall follow fence specifications in US Department of the Interior Bureau of Land Management (1989) when constructing livestock fences within or immediately adjacent to key, occupied, or modeled habitat to preclude cattle from straying into bighorn habitat (USFWS 2000a).

The Forest Service shall require all dogs to be under restraint at all times in bighorn sheep habitat (USFWS 2000a).

The Forest Service shall prohibit designation of existing roads as ORV routes in bighorn habitat (USFWS 2000a).

The Forest Service shall prohibit upgrading of roads or construction of new roads in key, occupied, or modeled habitat (USFWS 2000a). See section 22.0, *Roads*.

The Forest Service shall prohibit usage of trails leading to or bisecting lambing habitat or summer water sources during lambing and watering periods in key, occupied, and modeled habitats. Minimize use on all other trails in bighorn sheep habitat (lambing: Jan. 2 to June 30; watering: June 1 to September 30) (USFWS 2000a).

The Forest Service shall assess the use of trails in key, occupied, and modeled habitat leading to or bisecting lambing habitat (Jo Pond, Palm Canyon Trails) (USFWS 2000a).

The Forest Service shall maintain artificial water sources that are currently in place and used by bighorn sheep (USFWS 2000a).

Section 7.4
SOUTHERN STEELHEAD TROUT

ISSUE STATEMENT

Justification for Selection

The southern steelhead trout (*Oncorhynchus mykiss*) was chosen as a Management Indicator Species (MIS)/focal species because recovery and protection of this species would help achieve the goals of stream restoration, watershed protection, restoration of natural fire and flood disturbance regimes, restoration and protection of connectivity, elimination or control of exotic species, and protection and restoration of the Forests. The steelhead was chosen as an umbrella, flagship, and habitat quality indicator species. *Umbrella:* Restoration of the steelhead throughout core and recovery watersheds will protect habitat for many other aquatic and riparian-dependent species. *Flagship*: The steelhead is extremely popular with anglers, who are strong supporters of its restoration and habitat protection. *Habitat Quality Indicator:* The main threat to steelhead comes from dams, diversions, and stream degradation; the secondary threat is non-native species, including exotic aquatic predators and invasive plant species.

Life History, Status, and Habitat

Southern steelhead trout can be identified by its coloring during the ocean phase in and adults on the spawning run only, with distinct black spots that cover the dorsal (upper) part of the body. They have a large mouth, white gums, and well-developed teeth on the upper and lower jaws. Weight can reach up to 24 pounds (CDFG 1995).

Historically, the southern steelhead trout was found in most major coastal streams in Southern California, and they have been caught in the lower Tijuana River, bordering Mexico. In addition, runs have been known to occur in Baja California streams, and native coastal rainbow trout still exist in some Baja streams. It is estimated that since the 1950s, populations of steelhead have been reduced by 90% statewide. In southern California, southern steelhead trout populations have been reduced by 99% since the 1900s (Titus et al. 1994, as cited in Finney and Edmonson, undated material).

The persistence of the southern steelhead is reliant upon successful spawning and rearing in the streams and rivers. Successful spawning requires clean, adequately sized substrate and cool, well-oxygenated water. The decline in populations over the past century occurred largely because of pollution, development, water extractions, and dams. Pollution and development can degrade riparian and aquatic habitat conditions, disrupt migration, and limit the productivity of spawning and rearing habitat. Dams and other in-stream structures can completely or partially obstruct anadromous fish from migrating upstream (Moyle et al., 1995). Other factors that contributed to the decline of steelhead include special use activities including access and use of roads, oil and gas pipelines, power transmission lines, recreation residences, and water diversions (USFWS 1998a). In addition, non-native invasive plant and wildlife species can put additional pressures on steelhead populations (See section 10.0, *Invasive Species*); exotic aquatic predators cause direct mortality and intense competition for limited resources (CDFG 1996; Matt Stoecker, pers. comm.). Watershed restoration and protection are essential to restoring historic steelhead runs.

West coast steelhead populations have been divided into 15 Evolutionary Significant Units (ESUs); the National Marine

Fisheries Service treats each ESU as a distinct population (NMFS 1997). The Forests span 2 ESUs, the south-central California coast ESU, which is listed as threatened, and the southern California coast ESU, which is listed as endangered (NMFS 1997). Critical habitat was designated for all ESUs in February of 2000 and includes "all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassable barriers" (NFMS 2000a).

The south-central coast ESU encompasses streams that drain the Santa Lucia Ranges down to (but not including) the Santa Maria River in San Luis Obispo County. Designated critical habitat for this ESU includes all river reaches and estuarine areas accessible to listed steelhead from the Pajaro River (inclusive) to, but not including, the Santa Maria River; areas have been excluded which lie above specific dams or other barriers to movement. The southern California ESU encompasses streams extending from the Santa Maria River south to Malibu Creek (NFMS 2000a). Critical habitat for this ESU includes all river reaches and estuarine areas accessible to listed steelhead from the Santa Maria River to Malibu Creek (NFMS 2000a). In December of 2000, NFMS proposed a range extension for the endangered steelhead in the southern California ESU, to include areas where steelhead have been recently documented, including Topanga Creek and San Mateo Creek (NFMS 2000b); the proposed range extension has not yet been finalized.

This species requires well-oxygenated streams, riparian woodland, and thickets of herbaceous understory, and spawns in higher-elevation headwaters (Moyle et al., 1995). The southern steelhead juvenile feeds on invertebrates and insects. Where available, steelhead may feed on salmon and trout eggs, caddis larvae, and mayfly and black stone fly nymphs. Southern steelhead trout are able to survive in warmer (> 70° F) isolated pools due to a greater physiological tolerance to higher water temperatures and lower dissolved oxygen levels than has been shown in northern steelhead populations (of the same species; CDFG 1995). While southern steelhead are more tolerant of warm temperatures than other populations, they must swim upstream to spawn in cool and well-oxygenated free-flowing waters. These ideal spawning conditions are usually found in the headwaters of watersheds, and cause the steelhead to travel further upriver to spawn than other anadromous fish (Finney and Edmonson, undated material). Cool water and clean gravel are important for successful reproduction and development.

The southern steelhead trout are a sea-run rainbow trout that exhibit anadromy, meaning they migrate from fresh waters to the ocean, and return to spawn in fresh water (NMFS 1997). The California southern steelhead are known to spawn from December to May, with most spawning taking place from January to March (CDFG 1995). They require 1 to 2 feet of water depth, with a medium-sized gravel substrate and free-flowing water currents to provide dissolved oxygen to developing eggs. Juveniles live 1-3 years in freshwater habitats and then migrate to the ocean to mature for an additional 2-3 years (Emmett et al. 1991, *in* CDFG 1995). Juveniles may also migrate from fresh water to the ocean sooner than normal if conditions are suitable, such as warm waters and productive streams, which allow for rapid growth at a younger age. Spawning may occur as late in life as 5-6 years of age. This can be due to drought conditions or high temperatures, making some streams inaccessible and therefore forcing the southern steelhead to spend additional time in the ocean (CDFG 1995).

Fish movements both upstream and downstream generally coincide with flow pulses from storms. Adults need water approximately 4 to 8 inches deep to move upstream and downstream. The jump height capability for steelhead is dependent on several factors such as size and health of the fish, depth of the jump pool, how far the fish had to swim to the barrier, and jump height of the barrier.

Water levels usually increase following the second or third major storm event, which usually occur from January to March. During peak stream flows, smolts, which were born in previous years, are ready to make their one-way trip downstream to the ocean. Smolts will remain in their natal stream as long as possible to mature, but leave when water levels are still high enough to travel downstream (usually March through April). Mature adults must be able to reach the spawning areas and return to the ocean within the same time period or they may become trapped in the stream and have to over-summer.

AREA DESCRIPTION

For the south-central ESU, streams specified in the final rule that occur at least partially on Forest Service land in the LPNF include Little Sur River, Big Sur River, Big Creek, Alder Creek, San Carpoforo Creek, and Morro Creek. The primary streams in the southern ESU supporting steelhead include Santa Ynez River, Gaviota Creek, Ventura River, Santa Clara River (including Sespe Creek), and Malibu Creek; there have also been recent sightings in Topanga Creek and San Mateo Creek. Adult steelhead have also been documented in recent years (1996-2002) in additional Santa Barbara

County streams including Jalama, Maria Ygnacio (Atascadero Creek Tributary), Mission Creek, and Carpinteria Creek (Matt Stoecker, pers. comm.).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Since the Forests contain the headwaters of nearly every major stream in the region, they have developed management prescriptions to reflect the needs of the many listed and sensitive species dependent on upon riparian and aquatic habitats. The southern steelhead trout is once again flourishing in existing and historically occupied habitat.

All habitat components necessary for steelhead are restored and maintained: 1) water quality needed for stable and productive riparian and aquatic systems; 2) stream channel integrity, processes, and sediment regime under which the aquatic ecosystem developed; 3) instream flows needed to support healthy riparian and aquatic habitats; 4) natural timing and variability of water table elevations in meadows and wetlands; 5) diversity and productivity of native plant communities in riparian zones; 6) riparian vegetation needed to provide natural levels of large woody debris, water temperature regulation, and erosion and sedimentation control; 7) aquatic habitats needed to protect locally adapted fish stocks; 8) habitat to support populations of well-distributed native plants, vertebrates, and invertebrates that contribute to the viability of riparian-dependent communities; and 9) restoring steelhead access to Forest stream reaches by eliminating migration barriers downstream of the Forests' boundaries.

OBJECTIVES

Determine extent of occupied habitat through comprehensive surveys in key, occupied, and modeled habitats. Annually monitor existing populations and potential habitat to document abundance and distribution.

Restore, maintain, and protect instream habitat for steelhead, and restore connectivity to historic spawning and rearing habitat.

Ensure compliance of laws, regulations, and Forest Service policies that benefit the conservation and recovery of the species.

Prohibit activities that degrade or destroy habitat.

Promote the recovery of the species through education and outreach.

Monitoring and Research

Conduct both effectiveness and implementation monitoring in every watershed where land-disturbing activities continue to be implemented in existing or potential steelhead habitat. Further, there should be explicit guidance for adjusting land management actions where the results of effectiveness monitoring indicate that degradation is occurring or degraded conditions are not improving.

Annually monitor basic habitat attributes that are affected by land management and that affect steelhead survival, including, at a minimum, the following core attributes of steelhead habitat: structure (including pool frequency, residual volume, and quality, channel width/depth ratio, bank stability, etc.), water temperature, fine sediment levels, channel substrate, and riparian vegetation.

Monitor all habitat attributes prior to initiating or continuing any activity that could potentially affect these habitat attributes. Baseline and trend monitoring are also required for large woody debris, pool frequency, and residual pool volume. Annual monitoring is required at an intensity such that the minimum detectable effect is no greater than a 10% deterioration in the state of the variable monitored. Monitoring of fines at depth in spawning areas concurrent with monitoring of surface fine sediment is highly recommended, though not required as part of the screening process. Data on land use attributes necessary to determine compliance with land use standards are also required. Data are required on the amount and type of riparian disturbances (road density, etc.).

Monitor overall conditions of steelhead habitat as part of the Forest-wide integrated aquatic surveys (USFWS 1998a).

Conduct or encourage and support research on life history and genetic characteristics of steelhead populations to determine management actions and needs (McEwan and Jackson 1996).

Conduct or encourage and support research to determine the relationship between steelhead and resident rainbow trout forms, specifically: do isolation mechanisms other than spatial exist; can anadromous progeny arise from resident parents? (McEwan and Jackson 1996).

Conduct research on current and historic instream flows to determine stream flow requirements for steelhead on individual streams where they occur, or have the potential to occur on the Forests.

Establish panels with broad expertise to develop management guidelines and coordinated strategies to protect steelhead occupied and potential habitat, and overall watershed health. The panels should be composed of ecologists, wildlife and fishery biologists, hydrologists, soil scientists, entomologists, and forest pathologists and silviculturists, as well as members from state and federal agencies, tribes, academia, scientific societies, and groups with appropriate expertise. A major priority of the panel charged with developing coordinated restoration strategies should be the development of a framework for monitoring and assessing ecological trends (Henjum et al. 1994). The panels shall be created consistent with the Federal Advisory Committee Act.

Funding Resources

Work to attain funds administered by CDFG, Wildlife Conservation Boards, and other agency funding to manage steelhead habitat. Potential funding through CDFG includes Proposition 99, Proposition 70, the Steelhead Trout Catch Report—Restoration Card funds, the Boscoe-Keene Renewable Resources Investment Fund, and the Fisheries Restoration Account. Wildlife Conservation Board Funding: Wildlife Restoration Fund, California Riparian Habitat Conservation Program, California Wildlife Protection Act of 1990. Other agency funding sources: CalTrans Environmental Enhancement and Mitigation Program, Environmental Protection Agency Wetlands Protection Grants, Environmental Protection Agency Near Coastal Waters Program, Bring Back the Natives (McEwan and Jackson 1996). See section 29.0, *Funding*.

Restoration/Protection

Restore, maintain, and protect all occupied and potential habitat. Implement watershed and fish habitat restoration by addressing the causes of habitat degradation to restore and enhance spawning and rearing habitat conditions, promote ecosystem integrity, conserve native species, and contribute to the attainment of riparian management objectives. Arresting and eliminating the causes of habitat degradation is the highest priority for habitat restoration (Rhodes 1995).

Work to restore and maintain the following habitat attributes/conditions: watershed complexity, connectivity, integrity, and structure (no decreasing trend in pool frequency and residual pool volume, and bank stability > 90%), water quality (compliance with water quality standards, and overall reduction in summer water temperatures, < 60° F in spawning and rearing habitat, and an increasing trend in stream shade), sediment regime (consistent reductions in sediment delivery from anthropogenic sources and surface fine sediment levels < 20% in spawning and rearing habitat with no increases when substrate is below this level), hydrologic and material transfers, floodplain and wetland hydrology, composition and diversity of riparian vegetation complexes for thermal regulation and material transfers, and habitat for well-distributed populations of riparian-dependent species, including steelhead.

Implement an invasive species management program to eliminate or control exotic aquatic predators of steelhead, and invasive plants. Exotic species eradication should begin at the top of the infested watershed. See section 10.0, *Invasive Species*.

Identify opportunities to restore habitat in campgrounds and other developed sites, and provide protection for restored areas and interpretation of the activities (USFWS 1998a).

Design, construct, and operate fish and wildlife restoration, enhancement, and interpretive activities in a manner that contributes to attainment of riparian conservation objectives, standards, and guidelines (USFWS 1998a).

Develop cooperative agreements with appropriate agencies to develop a surface and groundwater management program to restore and recover properly functioning aquatic/riparian conditions based on parameters developed by NMFS (1996) (USFWS 1998a).

Coordinate with NMFS, CDFG, and USFWS to reintroduce steelhead into steams where the run has been extirpated, using the most genetically similar donor populations (McEwan and Jackson 1996).

Use land acquisition to facilitate restoration of fish stocks and other aquatic species at risk of extinction. See section 17.0, *Land Protection Opportunities*.

Salmonid Habitat Connectivity

Maintain or restore suitable fish passage at all road crossings of TES species fish-bearing streams (USFWS 2001a).

Upgrade existing structures according to the priority and sensitivity of the fishery resources. Repair road stream crossings in riparian areas. Implement in all TES species habitats (USFWS 2001a).

In cooperation with the Army Corps of Engineers and other pertinent agencies, analyze all dams to determine the feasibility of restoring habitat connectivity for steelhead, and address potential for dam removal, or fish passage (McEwan and Jackson 1996).

Coordinate with CalTrans to upgrade culverts, stream crossings, bridges, and roads that impede steelhead movement within CalTrans right-of-ways (USFWS 1998a).

Administrative Water and Special Use Activities

Manage leases, permits, rights-of-way, and easements to eliminate adverse effects on steelhead populations (Rhodes 1995). See section1.0, *Watershed Management*.

Within 3 years, assess direct and indirect impacts of all 127 permits for water uses and 40 Forest Service-administered wells. Identify and eliminate water diversions affecting steelhead populations (USFWS 1998a). The Forest Service shall also identify and eliminate any illegal water diversions.

Review all surface water diversions to ensure compliance with management direction provided by USFWS to ensure the protection and recovery of steelhead (USFWS 1998a).

Apply BMPs to protect water quality on all projects, and ensure that BMPs are incorporated into Forest projects and are implemented and monitored (USFWS 1998a).

Coordinate with CDFG, NMFS, and USFWS to develop instream flow requirements for sensitive waterways on the Forests. Utilize R5 Stream Survey habitat classification data, IFIM analyses, and FHR/WHR models to help determine flow needs for the assemblage of species present in each major watershed (USFWS 1998a).

Develop cooperative agreements and management plans to secure instream flows to maintain or restore favorable channel conditions, and fish passage, reproduction, and growth (Rhodes 1995); this includes providing adequate stream flow for adults and juvenile migration, and mainstem spawning and rearing habitat (McEwan and Jackson 1996).

Coordinate with the State Water Resources Control Board to secure needed water rights, and when possible amend existing SUPs to provide suitable flows to restore and protect fish, wildlife, and other resources (USFWS 1998a).

Fire Management

Manage fuel treatments and fire suppression activities so that attainment of riparian management objectives is not prevented (Rhodes 1995).

Ensure that prescribed burns avoid impacts upon soils and watershed resources to the maximum extent feasible (USFWS 1998a). See section 2.0, *Fire Management*.

Coordinate with state and other federal fish and wildlife management agencies to identify and eliminate unacceptable impacts associated with habitat manipulation, population stocking, harvest, and poaching that threaten steelhead populations (USFWS 1998a).

Roads

Initiate a management plan for road operation, construction, maintenance, traffic regulation, drainage, erosion control, monitoring, and mitigation. Activities should avoid sediment delivery and hydrologic disruption from roads; all plans must determine the effect of roads. Reconstruct roads not meeting design standards or retarding attainment of riparian management objectives prioritized by the current or potential damage to anadromous fish, riparian resource value, and feasibility of other transportation options. Prioritize roads not needed for future management for closure and obliteration based on their damage to anadromous fish and habitat (Rhodes 1995). See section 22.0, *Roads*.

Domestic Livestock Grazing

Evaluate grazing activities in tributaries associated with TES fish species in key, modeled, and occupied habitat and implement corrective actions to eliminate downstream habitat degradation from sedimentation and water quality impacts (USFWS 2001a).

Modify or eliminate grazing activities that retard attainment of riparian management objectives or adversely affect anadromous fish listed under the ESA (Rhodes 1995).

Minerals

Update Plans of Operations and other mining direction to bring them into compliance with existing riparian conservation objectives, standards, and guidelines (USFWS 1998a).

Extractive and Other Land-Disturbing Activities

Prohibit timber harvest, road construction, mining, and other habitat-degrading activities at locations with native aquatic species at risk of extinction and sensitive to additional land disturbance, in intact watersheds with high-quality aquatic ecosystems, and in aquatic corridors that provide critical links to habitats needed by fish during important lifestages (Rhodes 1995).

Prohibit road construction in roadless areas greater than 1,000 acres or in biologically significant roadless areas smaller than 1,000 acres (Rhodes 1995). See section 15.0, *Roadless Areas*.

Recreation

Develop multi-lingual informational and regulatory signing at appropriate campgrounds (Blue Point, Lion, Beaver, Hardluck, Mono, and others as identified) and along stretches of streams identified as essential to the survival of steelhead and other sensitive riparian species and habitats (USFWS 1998a). See section 19.0, *Recreation*.

The Forest Service shall enforce restrictive angling regulations – reduction in daily bag limit to 0 steelhead trout and terminal gear restricted to artificial lures with barbless hooks (McEwan and Jackson 1996).

Manage recreation facilities and practices so that attainment of riparian management objectives is not retarded (USFS et al. 1993).

Install signing and fencing or other barriers as appropriate to protect sensitive steelhead habitat areas (USFWS 1998a).

Enact and enforce complete use closures of identified campgrounds or other high-use recreation areas when other actions fail to provide needed protection for steelhead; pursue relocation of such facilities to other, more suitable areas (USFWS 1998a).

Seek opportunities to pro-actively design and locate recreational facilities and trails to distribute human uses away from riparian areas (USFWS 1998a).

Develop interpretive trails and signs to educate the public about sensitive resources and habitats present and which do not themselves result in impacts upon riparian resources (USFWS 1998a).

Utilize results of monitoring to further modify types and locations of recreational uses to minimize impacts to steelhead and other sensitive riparian resources (USFWS 1998a).

Protect designated Wild and Scenic River segments, which overlap with the range of steelhead and include developed recreation sections, such as the Carmel and Sespe drainages (USFWS 1998a). See section 12.0, *Wild and Scenic Rivers*.

Meet or exceed state water quality standards for aesthetics, and for propagation of fish and wildlife normally adapted to habitat of the stream (USFWS 1998a).

Identify concentrated recreational use areas that overlap with steelhead habitat and develop and implement management actions to ensure no adverse impact. On LPNF, the USFWS has identified the following areas: Arroyo Seco on the Arroyo Seco River, Cerro Alto on Morrow Creek, Wheeler Gorge on the North Fork of the Ventura River, and several campgrounds (Rose Valley, Middle Lion, Lion, Beaver) on the Sespe River. There is also heavy use of Kirk Creek and Plaskett campgrounds, Mill Creek, Willow (day use areas), La Brea (Barrel Springs and Wagon Flat campgrounds), and

Sisquoc (Nira) (USFWS 1998a).

Identify ORV areas and trails that have the potential to directly or indirectly impact steelhead, and relocate ORV areas or reroute trails to ensure no impact. On LPNF, the USFWS identified the following ORV use areas that require further study: portions of the Arroyo Seco, Naciamento, upper Salinas, Cuyama, Santa Ynez, Sespe, and Piru watersheds. Unauthorized use overlaps steelhead or their habitat in the Piney Creek area of the lower Arroyo Seco watershed, and the Cherry Creek area of the upper Sespe (USFWS 1998a).

Close or reroute all trails that adversely impact steelhead habitat (USFWS 1998a).

STANDARDS

Monitoring and Research

The Forest Service shall conduct an assessment of barriers to movement for all areas known to currently or historically support steelhead (McEwan and Jackson 1996).

The Forest Service shall, in conjunction with best management practices, monitor special use permits for compliance with standards (USFWS 1998a).

The Forest Service shall coordinate annually with local CDFG personnel regarding illegal collection of TES fish species (USFWS 2001a).

Restoration/Protection

The Forest Service shall conduct or otherwise obtain field assessments to document baseline conditions of occupied and potential steelhead habitat to ascertain the consistency of ongoing or new activities with efforts to protect and restore aquatic habitat for steelhead. Therefore, monitoring direction must ensure that activities are contingent on the collection of baseline data on habitat conditions that could be affected by the activity.

The Forest Service shall, where average surface fine sediment in spawning habitat exceeds 20% or cobble embeddedness exceeds 30% in rearing habitat, curtail or defer all land-disturbing activities that can increase on-site erosion (e.g. domestic livestock grazing, mining, etc.) until estimated sediment delivery from all anthropogenic sources is < 20% over natural and substrate conditions, and either meets standards or has exhibited a statistically significant improving trend (Rhodes et al. 1994a).

The Forest Service shall, where maximum daily water temperature exceeds 60^{o} F in historically used spawning and rearing habitat, prohibit activities that can potentially forestall vegetative and water temperature recovery. Activities should be suspended and deferred within riparian reserves until water temperatures either meet the 60^{o} F standard or exhibit a statistically significant improving trend. In all cases, statistically significant improving trends must be documented through monitoring over at least 5 years (Rhodes et al. 1994a).

The Forest Service shall, in watersheds where bank stability is less than 90%, or there is a decreasing trend in bank stability, prohibit activities that can potentially decrease bank stability or forestall recovery until the standard has been reached or a statistically significant ($p<0.05$) improving trend over at least 5 years has been documented through monitoring. Once an improving trend has been established but the standard is not met, activities should only be allowed if they do not impede continued improvement in bank stability.

Where habitat standards are not met, the Forest Service shall pursue active watershed restoration aimed at ameliorating or eliminating the persistent impacts of past activities to accelerate recovery and attainment of habitat attributes amenable to steelhead production. Examples of recommended restoration include suspension of domestic livestock grazing and obliterating and revegetating roads or improving sediment control and drainage on existing roads (Rhodes 1995). See section 22.0, *Roads.*

The Forest Service shall ensure that the design and implementation of watershed and fish habitat restoration projects are fully coordinated with other state and federal regulatory agencies with jurisdiction within riparian areas prior to implementation of projects (USFWS 1998a).

Salmonid Habitat Connectivity

The Forest Service shall identify and evaluate existing stream crossing/fish passage problems and remove or modify barriers to migration. Areas specifically identified by the USFWS to be corrected include Hardluck (LPNF) and San Francisquito Canyon and Motorway (ANF) (USFWS 2001a). See section 14.0, *Habitat Linkages*.

The Forest Service shall utilize strategies identified in *Guidelines for Salmonid Passage at Stream Crossings* (NMFS 2000c), including information on preferred crossings, designing new culverts, retrofitting or replacing culverts, general recommendations, post-construction evaluation, and maintenance and long-term assessment.

Administrative Water and Special Use Activities

The Forest Service shall comply with the following: Standards for water withdrawals must include both groundwater and surface water withdrawals, since groundwater is commonly important to both the quantity and quality of baseflow in spawning and rearing habitat. Second, water withdrawals shall not be allowed prior to full assessment of existing flow conditions and their effects on habitat conditions and passage. The assessment of habitat conditions must include evaluation of the role of flow in maintaining channel morphology, sediment routing, and temperature control. Assessments of passage conditions shall evaluate the cumulative effects of water withdrawals and flows on passage conditions including water temperature. Third, because water withdrawals in tributaries can exert a cumulative effect on flows and passage survival in the mainstem, additional water withdrawals in tributaries shall not be permitted prior to assessing cumulative effects and flow needs in the mainstem. Fourth, some direction should be provided for acquiring additional instream flows where existing instream flows are inadequate for habitat maintenance, habitat conditions, tributary passage, and mainstem passage.

Any projects with the potential for direct or indirect impacts on steelhead require reinitiation of consultation prior to approval, permitting, and implementation (USFWS 1998a).

The Forest Service shall ensure all Special Use Permit (SUP) applicants have secured the appropriate Corps of Engineers 404 permit, State Fish and Game 1601 Streambed Alteration Agreement, and RWQCB 401 certification before issuing a SUP. In addition, a Biological Evaluation addressing potential adverse impacts to steelhead shall accompany each application. SUPs shall only be granted when the terms and conditions stated above are conditions of the SUP (USFWS 1998a). See section 21.0, *Special Use Permits*.

The Forest Service shall ensure, as a condition of the permit, that all water diversions are adequately screened, and the diversion is placed in a location where fish will not be attracted to eliminate potential for direct impacts to steelhead by the uptake of fry (USFWS 1998a).

The Forest Service shall prohibit proposals for new reservoirs or enlargement of existing reservoirs, which have the potential to impact existing or potential steelhead habitat (USFWS 1998a).

Domestic Livestock Grazing

The Forest Service shall prohibit domestic livestock grazing within riparian conservation areas (RCAs) including all perennial streams, lakes, wetlands, and ephemeral and intermittent streams. See section 25.0, *Domestic Livestock Grazing*.

The Forest Service shall fully implement and enforce existing laws, policies, and requirements to protect public lands from harmful grazing practices (McEwan and Jackson 1996).

The Forest Service shall, where steelhead are likely present within or downstream from grazed areas, monitor through winter-spring redd and spawning surveys (USFWS 1998a).

Minerals

The Forest Service shall prohibit siting mining activities within RCAs, and it shall require BMPs, monitoring, and reclamation bonds for mining activities likely to affect riparian management objectives or anadromous fish (Rhodes 1995). See section 27.0, *Minerals Management*.

Extractive and Other Land-Disturbing Activities

Other than for scientifically justifiable restoration purposes, the Forest Service shall prohibit timber harvest (undergrowth reduction), road construction, and fuelwood cutting within RCAs or within 300 ft as measured from the outer edge of the

100-year floodplain in all streams (perennial or not), whichever is larger. Watershed analysis must present compelling scientific and logical reasons supporting the alleged benefit of land-disturbing restoration activities proposed within the riparian areas (see section 1.0, *Watershed Management*).

The Forest Service shall prohibit timber harvest in areas prone to mass failures and erosion to eliminate excessive delivery of sediment to streams. See section 24.0, *Timber Harvest*.

The Forest Service shall prohibit mechanical bank stabilization methods (e.g. riprap or gabions) and pool excavation.

Recreation

The Forest Service shall, when voluntary controls are ineffective, enact and enforce official Forest Closure Orders to protect essential steelhead habitat and other sensitive species (USFWS 1998a).

Section 7.5

ARROYO TOAD

ISSUE STATEMENT

Justification for Selection

The arroyo toad (*Bufo californicus*) was chosen as an MIS because recovery and protection of this species would help achieve the goals of stream restoration, watershed protection, and elimination or control of exotic species. The arroyo toad was chosen as an aquatic habitat quality indicator because of its dependence on riparian and adjacent upland habitat, high water quality, and native ants. Due to its sensitivity to a variety of activities and uses, it helps monitor for appropriate flow regimes, water quality and quantity, sedimentation issues, and eradication and control efforts regarding non-native species, including invasive plants, and predators.

Life History, Status, and Habitat

The arroyo toad is a small species (0.2 to 0.3 inches snout-urostyle length). The species is cryptically colored and may be a light gray-green, buff, brown, or salmon (Camp 1915 in CDFG 1994). Small dark-colored markings are present on the dorsum (back). Ground color can change somewhat with temperature and emotional state. Incomplete and faint stripes on the back are rarely present; then usually only on the posterior one-third of the dorsum. The belly is unmarked. There is usually a light-colored stripe along the raised cranial boss. Pupils appear horizontal when viewed in profile (D. Holland, pers. comm.).

The arroyo toad is a southern California regional endemic. The species is discontinuously distributed from the Salinas River system south through the Los Angeles Basin and the coastal drainages of Orange and Riverside counties to the San Diego River system (Myers 1930, CDFG 1994); desert populations have also been recorded from the Mojave River, Little Rock Creek, Whitewater River, San Felipe Creek, Vallecito Creek, and Pinto Canyon (CDFG 1994), although the last 3 records are not considered valid (E. Ervin unpubl. data). Populations also exist in drainages in Baja California Norte south to the Rio Santo Domingo (Sweet 1991). This species has disappeared from approximately 76% of its historic range in the United States. Populations have been eliminated or severely reduced throughout the range of the species (CDFG 1988).

Development and alteration of the stream channel, associated terraces, and upland habitat are the major factors contributing to the decline of this species. Arroyo toads are known to utilize upland habitats up to ¾ mile beyond the edge of the upland-riparian ecotone (Holland and Sisk 2000a). Other major factors include excessive human use of campgrounds near streams, manipulation of hydrologic regime (dams and water diversions, changes in the timing and extent of water flow), urban development, mining, ORV use, introduction of non-native predators, cattle grazing, and wildfire (Jennings and Hayes 1994). The arroyo toad was federally listed as an endangered species on January 17, 1995; it is also a California State Species of Special Concern (CDFG 2001). The USFWS proposed 478,400 acres of critical habitat on June 8, 2000, in Monterey, San Luis Obispo, Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego counties, much of which lies within Forest boundaries (USFWS 2000b). However, this hardly encompasses the true extent of habitat utilized by the species (D. Holland, pers. comm.).

The arroyo toad has perhaps the most specialized habitat requirements of any amphibian occurring in California (Jennings and Hayes 1994). It prefers washes, streams, rivers, and arroyos in the semiarid parts of the southwest. Breeding adults require overflow pools adjacent to the inflow channel of 1st order or greater streams; the species strongly favors exposed shallow pools with a sand or gravel base, a low velocity, and a minimum of marginal woody vegetation (CDFG 1994; Sweet 1991, 1993; D. Holland, pers. comm.). Shoreline or central terraces with some emergent vegetation seem to be preferred, particularly those with a moderately well developed but scattered shrub and tree canopy of mulefat, California sycamore, Fremont's cottonwood, or coast live oak (Myers 1930, Cunningham 1962, CDFG 1994).

The arroyo toad feeds at night, primarily on ants (Sweet 1991); beetles, snails, Jerusalem crickets, caterpillars, and moths are also occasionally consumed. Arroyo toad larvae are highly specialized feeders, gleaning the substrate for organic matter and interstitial algae, and fungi, bacteria, and protozoans (Jennings and Hayes 1994), while young toads feed almost exclusively on ants.

Adults are primarily nocturnal, but are occasionally diurnally active, with peak activity occurring between the first substantial rains (January to February) and mid-summer (early August). Males arrive at the breeding pools before females and begin calling at night from March to June; breeding occurs anytime between January-February (in San Diego County) and July. Approximately 2,000 to 10,000 eggs are laid on mud, sand, or gravel in calm areas of clear streams (CDFG 1988). Larvae are unable to swim for the first few days after hatching. It takes about 65-85 days for metamorphosis to occur; metamorphic toads often remain on sand or gravel bars for approximately 8 to 9 weeks, but even recent metamorphs may burrow into sand (Jennings and Hayes 1994; Holland and Sisk 2000a). Juveniles remain in the vicinity of their natal pool until they reach 20-25 mm, when they begin to move away from the pool and become nocturnal (Holland and Sisk 2000a). At 0.12 inches in size, they may disperse into surrounding riparian vegetation around breeding pools and burrow into sandy pockets (Jennings and Hayes 1994; Holland and Sisk 2000a, 2000b). This species is an obligate riparian breeder, but requires upland habitats for foraging, movement, and overwintering sites (Holland and Sisk 2000a, 2000b).

AREA DESCRIPTION

The 4 Forests support approximately 36% of the total range-wide population. There are only 22 drainages, in central and southern California, that contain arroyo toad habitat, and parts of 12 of the 22 drainages are located on Forest lands. The total LPNF-wide population is estimated to be 300-400 individuals, in SBNF the population is estimated at only 40 individuals, while estimates for CNF range from 120 to 300. No estimates are available for ANF (USFWS 2000b). In general, reliable population data or estimates are lacking on this species due to sampling difficulties and the extremely variable nature of survivorship and recruitment (Holland and Sisk 2000a, b; D. Holland, pers. comm.).

TABLE 7-5

KEY, OCCUPIED, AND MODELED HABITAT ON THE FOUR FORESTS

(USFWS 2001a)

	LPNF	ANF	SBNF	CNF
KEY	8,035	2,560	1,055	7,232
OCCUPIED	33	1,584	446	773
MODELED	55,340	21,079	15,096	15,226

The USFWS has proposed 478,400 acres for critical habitat, 145,881 acres of which occur on NFS lands, including 54,290 acres on LPNF, 28,355 acres on ANF, 50,918 acres on CNF, and 12,318 acres on SBNF (USFWS 2000b).

Los Padres National Forest

- Sespe Creek – This is the largest known population on LPNF (estimated at 130 adults); it covers 12 miles of occupied habitat (USFWS 2000c). The proposed recovery unit (northern #4) includes Sespe Creek and adjacent uplands, from the lower end of Sespe Gorge downstream to the confluence with Alder Creek; it encompasses 14,300 acres, 13,728 acres of which occur on LPNF (USFWS 2000c).
- Santa Ynez River – Population estimated at 20 adults (USFWS 2000c). The proposed recovery unit (northern #3) is

located upstream of Gibraltar Reservoir and incorporates portions of the upper Santa Ynez River, Indian Creek, and Mono Creek, and adjacent uplands; it encompasses 14,100 acres, 12,690 acres of which occur on LPNF (USFWS 2000b).

- Sisquoc River – Population estimated at 10+ adults (USFWS 2000c). The proposed recovery unit (northern #2) encompasses 28,900 acres, 9,537 acres of which is on LPNF. Upper stretches of the river are within LPNF and mostly in the San Rafael Wilderness Area (USFWS 2000b).
- Upper Piru Creek – Population estimated at 80 adults (USFWS 2000c). The proposed recovery unit (subunit A) includes Piru Creek and adjacent uplands from the confluence with Lockwood Creek downstream to Pyramid Reservoir; the total acreage proposed for this unit (northern #5) is 19,300 acres, 18,335 acres of which occur on LPNF (USFWS 2000b).
- Lower Piru Creek – Population estimated at 40 adults (USFWS 2000c). The proposed recovery unit (subunit B) includes Piru Creek and adjacent uplands from Piru Gorge downstream to Lake Piru, it also includes Agua Blanca Creek from Devils Gateway downstream to the confluence with Piru Creek; the total acreage proposed for this unit (northern #5) is 19,300 acres, 18,335 acres of which occur on LPNF (USFWS 2000b).

Cleveland National Forest

- Arroyo Seco – Tadpoles detected in 1993 and 1998 (USFWS 2000c). The proposed recovery unit (southern #13) includes portions of Arroyo Seco Creek, Temecula Creek, and Wilson Creek and adjacent uplands; it encompasses 24,200 acres, 4,356 of which occur on CNF (USFWS 2000b).
- Cottonwood Drainage – the species has been documented in Upper Cottonwood, Kitchen, and Morena Creeks; no population estimates are available (USFWS 2000c). The proposed recovery unit (southern #19) includes portions of Cottonwood Creek, adjacent uplands, and the following tributaries: Potrero Creek, Pine Valley Creek, Scove Canyon, Morena Creek, La Posta Creek, and Kitchen Creek; it encompasses 44,500 acres, 24,030 acres of which occur on CNF (USFWS 2000b).
- Pine Valley—Arroyo toad adults, juveniles, and tadpoles have been seen in this drainage from Noble Canyon, Pine Valley, and a small tributary west of Scove Canyon. The largest number of arroyo toads recorded in this drainage was in 1992, when over 60 adults were detected (USFWS 2000c). This area is also included in the proposed recovery unit (southern #19) (USFWS 2000b).
- San Luis Rey—Arroyo toad adults, tadpoles, and egg masses have been recorded from the San Luis Rey River (USFWS 2000c). Historical records exist to within 0.6 miles of the ocean, and toads have recently been documented west of Bonsall (D. Holland, pers. comm.). The proposed recovery unit (southern #15) includes the upper San Luis Rey River above Lake Henshaw, 2 of its headwater tributaries, and adjacent uplands; it encompasses 18,300 acres, 5,856 acres of which occur on CNF (USFWS 2000b).
- Temescal – In 1993, twelve adult arroyo toads were recorded from Temescal Creek on Forest Service lands but a number of individuals occur on adjacent private lands; the Forest Service estimates 120 individuals may be present within the entire drainage (USFWS 2000c). The proposed recovery unit (southern #16) includes portions of Santa Ysabel Creek, Santa Maria Creek, Guejito Creek, Temescal Creek, and adjacent uplands; it encompasses 23,500 acres, 4,700 acres of which occur on CNF (USFWS 2000b).
- San Juan—Thirty-five juveniles and fifty tadpoles were detected (USFWS 2000c). The proposed recovery unit (southern #10) includes portions of San Juan Creek, Bell Canyon, Trabuco Creek, and adjacent uplands; it encompasses 21,300 acres, 4,260 acres of which occur on CNF (USFWS 2000b).
- Silverado—Only 35 juveniles were observed.
- San Mateo – population not estimated (USFWS 2000c). The proposed recovery unit (southern #11) includes portions of San Mateo, San Onofre, Cristianitos, Talega, Gabino, and La Paz Creeks, and adjacent uplands; it encompasses 27,600 acres but this recovery unit includes no land within CNF (USFWS 2000b). Toads are known from CNF lands upstream of MCB Camp Pendleton (D. Holland, pers. comm.).
- San Diego River/San Vicente Creek – This recovery unit (southern #17) includes portions of the San Diego River and San Vicente Creek and adjacent uplands; it encompasses 12,600 acres, 2,772 of which occur on CNF (USFWS 2000b).
- Sweetwater River Basin – This recovery unit (southern #18) includes portions of the Sweetwater River, Peterson Canyon, Viejas Creek, and adjacent uplands; it encompasses 28,200 acres, 4,794 acres of which occur on CNF

(USFWS 2000b).

San Bernardino National Forest

- Mojave River Drainage—(Population size approximately 40 adults.) The Forest Service manages most of Deep Creek from the Mojave Forks Dam to its headwaters. This equates to a total distance of approximately 6 miles of habitat occupied by arroyo toads. Arroyo toads are known from 0.5 mile below Devils Hole to immediately below the Mojave Forks Dam (USFWS 2000c). Only 2 other populations are known on the SBNF. One occurs in Little Horsethief Creek, which flows into the West Fork of the Mojave River. Another population exists on Cucamonga Creek, a tributary to the Santa Ana River (USFWS 2000c). The proposed recovery unit (southern #21) includes portions of the Mojave River, the West Fork of the Mojave River, Horsethief and Little Horsethief creeks, Deep Creek, and adjacent uplands; it encompasses 35,100 acres, 9,126 acres of which occur on SBNF (USFWS 2000b).
- An additional recovery unit (southern #9) has been proposed that includes portions of the San Jacinto River and Bautista Creek and adjacent uplands; it encompasses 13,300 acres, 3,192 acres of which occur on SBNF (USFWS 2000b).

Angeles National Forest

- Upper Big Tujunga Creek—(Population not estimated.) The arroyo toad was first observed in Mill Creek in the upper Big Tujunga Canyon watershed in 1991. Follow-up surveys conducted between 1993 and 1998 have failed to relocate toads at this location. In 1996, arroyo toads were observed in Upper Big Tujunga Creek just downstream from the confluence with Alder Creek. Additional sightings have been made between Alder Creek confluence and Wickiup Canyon in 1997 and 1998. No population estimate is available (USFWS 2000c). The proposed recovery unit (northern #7) includes portions of Big Tujunga, Mill, Alder, and Arroyo Seco creeks, and adjacent uplands; it encompasses 21,500 acres, 14,620 acres of which occur on ANF (USFWS 2000b).
- Upper Santa Clara River Basin—The proposed recovery unit (northern #6) includes portions of Castaic Creek, San Francisquito Creek, the upper Santa Clara River, and adjacent uplands; it encompasses 34,300 acres, 7,889 of which occur on ANF (USFWS 2000b). Toads were recently (2001) discovered in Soledad Canyon where previous surveys had failed to locate them (D. Holland, unpubl. data).
- Little Rock Creek – The proposed recovery unit (southern #20) includes portions of Little Rock Creek below Little Rock Reservoir (Subunit A) and from the South Fork confluence downstream to Little Rock Reservoir (Subunit B); it encompasses 35,100 acres, 9,126 acres of which occur on ANF.

DESIRED CONDITION

To meet the desired condition of maintaining genetically viable populations of toads, activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Arroyo toads are flourishing and expanding their current range; they are present in adequate numbers to sustain breeding populations on the Forests.

OBJECTIVES

Develop and implement conservation and restoration plans within their historic and current range (USFWS 2000c).

Monitor the status of existing arroyo toad breeding populations and conduct dispersal studies (USFWS 1999a).

Conduct comprehensive surveys in all areas on the Forests known to historically support arroyo toad to determine (1) if any additional populations exist; (2) if suitable habitat exists; and (3) which historic localities are in need of restoration. Work with the USFWS to develop an arroyo toad survey protocol.

Establish protected buffer zones around habitat utilized by the species, based on research of dispersal habits and habitat needs of arroyo toads. Protect all occupied and suitable habitat with appropriately sized buffers in perpetuity; work with scientific experts to determine buffer size.

Develop and implement management plans to secure existing populations by protecting, maintaining, restoring, and enhancing breeding and upland habitats.

Maintain adequate water flow regimes downstream of impoundments, water diversions, and residential or industrial

developments; develop inter-agency agreements where necessary to meet this objective.

Eliminate Forest Service activities that are incompatible with the recovery and conservation of this species.

Eliminate or control non-native species, predators, and competitors, including plants, vertebrates, and invertebrates.

Protect stream reaches up and downstream of known populations, as well as adjacent uplands.

Continue to pursue opportunities to acquire inholdings within the Forests that would contribute to the recovery of the species, including inholdings that occur within currently or historically occupied drainages (USFWS 1999a). See section 17.0, *Land Protection Opportunities*.

Develop and implement watershed management and protection strategies for arroyo toads using cooperative agreements and incentive programs with local, state, and federal agencies with overlapping jurisdictions and local residents. See Section 1.0, *Watershed Management*.

Develop and implement inter-agency agreements to manage dams, water releases, and diversions consistent with arroyo toad reproduction and survival and maintenance of habitat; review historical rainfall records and hydrologic data to determine appropriate flows (USFWS 1999a). The USFWS (2000) specifically identified Pyramid Lake on LPNF and Big Tujunga on ANF as affecting arroyo toad populations.

Analyze the current hydrologic regime, and the recruitment of sand and gravel downstream of all diversions, dams, and impoundments on the Forests to determine if such activities and structures impact the arroyo toad or associated species (USFWS 2000c).

Within 5 years, analyze the removal of all diversions, dams, impoundments that are decreasing the extent and suitability of arroyo toad habitat.

Conduct environmental assessments on each grazing allotment that overlaps key, occupied, and modeled habitat. See section 25.0, *Domestic Livestock Grazing*.

Continue to take actions to eliminate potential impacts from livestock grazing to arroyo toads, including reductions in allotment sizes, non-renewals of permits, and excluding grazing in critical habitat, riparian habitat, and other sensitive areas.

Develop and implement management plans to eliminate impacts associated with campgrounds. Actions may include posting of informational signs, fencing of essential areas, seasonally closing or restricting use of campgrounds, and closing or relocating campgrounds, as appropriate. The USFWS (2000) identified the following campgrounds as potentially threatening arroyo toad populations: On LPNF, Lion, Beaver, Mono, Upper Piru Creek, and Blue Point campgrounds; on CNF, Dripping Springs, Boulder Oaks, Cibbets Flat, Corral Canyon, Indian Flats, and Upper San Juan campgrounds, and Lower San Juan Picnic Ground.

Eliminate ORV impacts in suitable and occupied habitats to reduce impacts to arroyo toad and other sensitive species. Develop and implement sediment-monitoring guidelines (USFWS 2000c). Enforce road and trail closures to ORV vehicles.

Identify stands of exotic vegetation and prioritize riparian restoration projects for the benefit of the species. See section 10.0, *Invasive Species Management*.

Identify breeding sites (e.g., stock ponds, reservoirs, etc.) of introduced fishes and aquatic predators in arroyo toad habitat to develop priorities for eradication and control efforts.

Coordinate with CDFG to eliminate stocking of non-native fish into natural habitats (including mosquitofish) (USFWS 2000c,c). If reservoirs are stocked with non-native fish for recreational use, install barriers to ensure these non-native predators do not move up or downstream of the reservoir. Monitor these areas regularly to ensure that barriers are effective; if they are breached, implement effective methods for eradication.

Coordinate with the California Department of Fish and Game to develop and implement plans for exotic fish-free drainages to eliminate the cost of maintenance.

Develop information and education programs and brochures explaining threats to the species and provide detailed actions to minimize impacts. See section 20.0, *Environmental Education*.

STANDARDS

The Forest Service shall eliminate impacts from livestock grazing in key, occupied, and modeled habitat. USFWS (2000) identified the following allotments as potentially affecting the species: on LPNF, the South Fork La Brea allotment and the Sisquoc allotment. The Sisquoc allotment has been in non-use status since 1994 and should be permanently retired.

The Forest Service shall eliminate mining and prospecting activities in drainages in key, occupied, and modeled habitat. Evaluate opportunities for withdrawal of existing or potential mining claims in any drainages with existing or historic populations. See section 27.0, *Minerals Management*.

The USFWS (2000) identified the following areas where mining activities are adversely affecting the arroyo toad and its habitat: on LPNF, in Piru Creek from Pyramid Lake upstream to Bear Gulch, and on the Sisquoc River (suction dredging), and on SBNF, in Little Horsethief Creek (placer mining). The Forest Service shall permanently withdraw these areas from mineral entry.

The Forest Service shall continue to close and restore all illegal non-system roads in key, occupied, and modeled habitat (USFWS 2000). See section 22.0, *Roads*.

The Forest Service shall continue to defer road repair and maintenance in arroyo toad habitat to avoid the breeding season (USFWS 2000).

The Forest Service shall seasonally close roads to regular vehicles and ORVs, bicycle, horse, and foot traffic during critical times of the year in key, occupied, and modeled habitat. The USFWS (2000) identified the following roads as potentially threatening arroyo toad populations on the LPNF and CNF: On LPNF, Camuesa Road, and the access road to Ogilvy Ranch; on CNF, the Dripping Springs access road, Corral Canyon and Boulder Oaks Campground roads, Buckman Springs road (SUP), Miner's, Pine Creek, Noble Canyon, Horsethief, Skye Valley, and Las Bancas roads, a special use permit (SUP) for a conference camp road, Indian Flats Road, Orosco Ridge Road, Hot Springs Canyon, San Juan South Tract and Ortega Trailhead roads, Maple Springs Road, a volunteer fire station road SUP, and a private access road SUP, both near Silverado and Wildomar road.

The Forest Service shall analyze developed recreation sites and areas of high concentrations of public use in key and occupied habitat to eliminate impacts to the species. See section 19.0, *Recreation*.

The Forest Service shall design new recreational facilities to concentrate public use away from key, occupied, and modeled habitat.

The Forest Service shall seasonally close trails to ORVs, bicycle, horse, and foot traffic during critical times of the year in key, occupied, and modeled habitat.

The Forest Service shall restrict fishing and other recreational activities in breeding habitat when arroyo toads are present in the stream channel and on sand and gravel bars (late spring and summer).

The Forest Service shall ensure SUPs are not adversely affecting the species or its habitat (key, occupied, and modeled). See section 21.0, *Special Use Permits*.

Section 7.6
LEAST BELL'S VIREO

ISSUE STATEMENT

Justification for Selection

The least Bell's vireo (*Vireo bellii pusillus*) was chosen as a MIS/focal species because recovery and protection of the least Bell's vireo would help achieve the goals of species recovery, riparian forest and stream restoration, protection and restoration of riparian habitat connectivity, and elimination and/or control of exotic species (brown-headed cowbird (*Molothrus ater*), Arundo (*Arundo donax*), etc.). The least Bell's vireo was selected as an umbrella, habitat quality indicator, and flagship species. *Umbrella:* Protection and restoration of adequate riparian woodlands for a viable population of vireos throughout southern California will protect habitat for other riparian-dependent species. *Habitat Quality Indicator:*

The vireo requires high-quality riparian woodland habitat for nesting and foraging. The species is vulnerable to nest invasion by brown-headed cowbirds, and the degradation and fragmentation of riparian habitat. *Flagship:* This bird is popular with bird watchers, who will support conservation measures.

Life History, Status, and Habitat

The least Bell's vireo is a small migratory songbird that is gray above and whitish below; it has indistinct white spectacles and two faint wing bars. Males and females are sexually monomorphic (National Geographic Society 1987). It is one of 4 subspecies of Bell's vireo, 2 of which occur in California. The *V.b. pusillus* subspecies was once very common and was the major breeding subspecies in California. Its historic range in the state was from near Red Bluff in Tehama County south through the San Joaquin Valley and Sierra Nevada foothills, the inner southern Coast Range from Santa Clara County south to approximately San Fernando, and the southern California coastal and interior valleys west of the deserts to the Mexican border; populations also were found in the Owens Valley and Death Valley and at scattered oases and canyons throughout the Mojave Desert (USFWS 1998b). Least Bell's vireos are rarely noted in migration; they primarily winter along the Pacific coast of southern Mexico but have been documented as far south as Honduras (Garrett et al., 1981, Brown 1993). Most have left the United States by October (Brown 1993).

As early as the 1920s and '30s, populations throughout California began to decline; biologists reported virtually every least Bell's vireo nest had been parasitized by brown-headed cowbirds (Small 1994, Steinhart 1990). Causes for the decline have been attributed to habitat destruction due to river channelization, water diversions, lowered water tables, gravel mining, agricultural development, livestock grazing, and cowbird parasitism (USFWS 1998b). Suitable nesting habitat appears to be the primary factor limiting recovery of the species at this time, with cowbird parasitism being secondary (Brown 1993).

The significant reduction in the population size and range of the vireo resulted in it being listed as a state endangered species in June 1980, and federally listed as endangered in May 1986 (USFWS 1986a). On February 2, 1994, the USFWS designated 38,000 acres of critical habitat in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties (USFWS 1998b).

Recently, breeding pairs have been documented in Monterey, San Benito, Inyo, San Bernardino, Ventura, Los Angeles, Orange, Riverside, and San Diego counties, with the highest concentration in San Diego County along the Santa Margarita River (Small 1994). Breeding occurs in riparian habitats, from sea level to 1,500 feet above mean sea level in the interior (Small 1994). The most critical structural component of breeding habitat is a dense shrub layer, preferably where flowing water exists (USFWS 1998b). Nests are typically built in areas with relatively dense riparian shrubs in the understory and with willow, cottonwood, sycamore, or oak in the canopy layer (Small 1994).

The breeding season is between March and September (USFWS 1998b). Most pairs of least Bell's vireo are monogamous, with both sexes partaking in the construction of the nest, incubation of the eggs, and feeding of the young. Males establish breeding territories ranging from 0.7 to 3.2 acres and maintain them with song (Brown 1993). Peak egg-laying begins in May and continues into early June (CDFG 1990). They feed on insects ranging from bugs, beetles, and grasshoppers to moths and caterpillars in riparian communities and adjacent uplands (USFWS 1998b).

AREA DESCRIPTION

Least Bell's vireos are known to occur in the LPNF, CNF, SBNF, and ANF. Distribution or abundance surveys have not been completed for all potential areas in each Forest (USFWS 2001a).

Los Padres National Forest

- Santa Ynez River—Approximately 2,500 acres of designated critical habitat are located on the upper Santa Ynez River of the Santa Barbara District on the LPNF. The major occupied habitat on the LPNF is centered within 800 acres of the 2,500 acres of designated critical habitat around the upper end of Gibraltar Reservoir and at the confluence of Indian and Mono Creeks with the Santa Ynez River (USFWS 2000c).

Cleveland National Forest

- Cottonwood Creek Drainage – Known least Bell's vireo population in Hauser Canyon. This drainage is located in the Descanso District; it extends from upstream of Morena Reservoir downstream to Barrett Reservoir including

Hauser Creek. Cottonwood Creek is a tributary of the Tijuana River in Mexico (USFWS 2000c).

- Pine Creek Drainage (Descanso District)—Known least Bell's vireo locations in the Pine Creek Drainage include Pine Valley Creek and Horsethief Canyon Creek. Pine Valley Creek lies within Pine Creek Wilderness; all streams within the wilderness are intermittent (USFWS 2000c).
- Santa Ysabel Creek – Known least Bell's vireo locations in Santa Ysabel Creek, including Carney, Temescal, and Black Canyon creeks, near upper Santa Ysabel Road (#I 2SO7) (USFWS 2000c).
- San Luis Rey River (Palomar District) – Least Bell's vireo have been recorded in the lower San Luis River System (Fenton/Pala Borrow Site) near a Forest Service picnic area adjacent to Highway 76 (USFWS 2000c).

San Bernardino National Forest

- In the summer of 1998, least Bell's vireos were recorded nesting in Cajon Wash, west of Interstate 15, approximately 1.5 miles south of Highway 138 (USFWS 2000c).

Angeles National Forest

- No least Bell's vireos are known to exist on the ANF (USFWS 2000c). Sporadic sightings during the breeding season on ANF in San Francisquito Creek, Big Tujunga Creek, and the upper Santa Clara River – breeding not documented but possible (USFWS 2001a). Several pairs breed just outside the forest boundary along Big Tujunga Wash in the vicinity of Hansen Dam, and could be expected to occur farther upstream into the forest.

TABLE 7-6

KEY, OCCUPIED, AND MODELED HABITAT ON THE FORESTS

(USFWS 2001a)

	CNF	SBNF	ANF	LPNF
KEY HABITAT	712 acres			1,207 acres
OCCUPIED HABITAT	308 acres	11 acres	56 acres	888 acres
MODELED HABITAT	11,235 acres	4,460 acres	18,095 acres	49,983 acres

DESIRED CONDITION

To meet the desired condition of viable breeding populations of vireos, activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Least Bell's vireo populations are flourishing and expanding their breeding range; they are present in adequate numbers to sustain breeding populations on the Forests.

OBJECTIVES

Protect, restore, and manage riparian and adjacent upland habitats within least Bell's vireo's current and historic range.

Survey, monitor, and conduct research to track and aid in the recovery of the species. Conduct annual monitoring of least Bell's vireo populations and habitat following established protocols (USFWS 1998b). Collect demographic data by color-banding least Bell's vireo for demographic and dispersal analyses (USFWS 1998b).

Develop and implement management plans to eliminate threats and promote desired processes that facilitate recovery of habitat. Address major threats – unauthorized clearing of vegetation, placement of fill materials, ORV use, exotic species, sand and gravel mining, flood control projects, channelization, hiker and horse traffic, equestrian corrals, agriculture, water supply projects, grazing, and dams (USFWS 1998b).

Evaluate progress of recovery, effectiveness of management and recovery actions, and revise management plans.

Provide public education and outreach to Forest visitors and Forest Service personnel.

The Forest Service shall conduct a Forest-wide inventory of riparian habitat to identify additional and potential habitat within the historic range of the species on National Forest lands (USFWS 1998b).

Investigate the status of wintering habitat and identify current or potential threats (USFWS 1998b).

Implement riparian restoration projects within the current and historic range of the species, outside the breeding season.

Develop and evaluate restoration techniques and implement long-term monitoring of restoration sites and their use by least Bell's vireo and other riparian species, including invertebrates (USFWS 1998b).

Develop interagency agreements to implement management plans that restore and maintain a hydrologic regime that mimics natural cycles and flows. See section 1.0, *Watershed Management*.

Eradicate or control non-native plant species using ecologically sound methods, starting with eradication efforts upstream (USFWS 1998b). See section 10.0, *Invasive Species Management*.

Prohibit all ground-disturbing activities within key, modeled, and occupied TES riparian bird habitats that result in habitat loss or alteration (USFWS 2001a).

Implement aggressive cowbird removal programs to trap adults and juveniles and monitor least Bell's vireo nests to remove any cowbird eggs or young (USFWS 1998b). Reduce cowbird foraging areas and euthanize all trapped cowbirds using humane methods.

Modify land uses adjacent to breeding areas including exclusion of livestock and equestrian facilities (USFWS 1998b).

Install signs, fencing, and/or other barriers for seasonally or permanently closed developed recreation areas occurring in occupied habitat (USFWS 2000c).

Develop and distribute multi-lingual educational material on the threats this species faces, and the necessary conservation measures (e.g. seasonal closures). See section 20.0, *Environmental Education*.

STANDARDS

The Forest Service shall prohibit further channelization of streams, including confinement of flow to concrete or rip-rap channels.

The Forest Service shall prohibit the use of mechanized equipment (e.g. bulldozers) in riparian zones, to the maximum extent practicable. These serve to encourage exotic plant invasions.

The Forest Service shall minimize disturbance from prescribed burn activities within ¼ mile of all TES bird nest sites (USFWS 2001a). See section 2.0, *Fire Management*.

The Forest Service shall, prior to any maintenance activities occurring in potentially occupied habitat, have a qualified biologist conduct presence/absence surveys to determine that no listed birds are nesting.

The Forest Service shall prohibit maintenance activities in occupied habitat during the breeding season, March 15 to September 15.

The Forest Service shall install animal-proof garbage cans to reduce likelihood of attracting predators to the area.

The Forest Service shall determine suitability of modeled habitat areas that are within or near developed recreation sites and grazing allotments and survey for occupancy where appropriate (USFWS 2001a). If the species is determined to be present, implement immediate measures to protect the species (including permanent and seasonal closures, permanent closure of allotments, etc.).

The Forest Service shall eliminate all grazing activities within key, occupied, and modeled habitat until thorough environmental assessments have been completed. See section 25.0, *Domestic Livestock Grazing*.

The Forest Service shall, during the nesting season, March 15-September 15, permanently or seasonally close recreation sites to avoid disrupting active TES riparian bird nests in key and occupied habitats. Identified locations include, but are not limited to, San Luis Rey Picnic Area (CNF), Mono Campground, Juncal Campground, P-Bar Campground, and

Middle Santa Ynez Campground (LPNF), and Thurman Flats Picnic Area (SBNF) (USFWS 2001a).

The Forest Service shall permanently close or reroute trails known to occur in occupied or modeled habitat. Trails identified as occurring within occupied habitat include: Mono-Alamar, Indian Creek, Blue Canyon trails (LPNF), Pacific Crest National Scenic trail where it crosses Hauser Creek, Secret Canyon and Espinosa trails (CNF).

For those roads subject to seasonal or permanent closures, the Forest Service shall visit the site at least bi-monthly to ensure that no vehicles have accessed the closed area. If vehicles are entering the area, the Forest Service shall implement additional measures to ensure closure (USFWS 2000c). Roads identified as occurring within occupied habitat include: Camuesa and Matilija Roads (LPNF), and Upper Santa Ysabel and Hauser Creek Roads (CNF).

The Forest Service shall route ORV trails around potential breeding areas (e.g. Santa Clara River drainage), and monitor and ticket riders in areas known to have high least Bell's vireo potential (e.g. Soledad Canyon).

Section 7.7
CALIFORNIA SPOTTED OWL

ISSUE STATEMENT

Justification for Selection

The California spotted owl (*Strix occidentalis occidentalis*) was chosen as a Management Indicator Species (MIS)/focal species because recovery and protection of this species would help achieve the goals of species recovery, recovery of riparian areas, restoration of natural fire regimes, protection and restoration of native forest, and protection and restoration of habitat connectivity. The spotted owl was chosen as an umbrella, flagship, and habitat quality indicator species. *Umbrella:* Restoration of the spotted owl and its habitat throughout the Forests will protect habitat for many other species that are dependent on old forests. *Flagship*: The spotted owl is widely known, though controversial. It has become an icon for forest protection by conservationists. *Habitat Quality Indicator:* The California spotted owl is dependent on the presence of old-growth and mature stands for nesting habitat.

Life History, Status, and Habitat

The California spotted owl is a resident of woods in canyons or in deep coniferous forests of the Sierra Nevada and southern California coastal, Transverse, and Peninsular ranges (Remsen 1978). This subspecies is associated with mature and old-growth forests, and incorporates large tracts of these forests into its home range (Moen and Gutiérrez 1997, Gutiérrez et al. 1995, and LaHaye et al. 1997). Conservation of the owl is controversial due to the commercial value of such forests to the timber industry. It is a California Species of Special Concern and Forest Service Sensitive, and recently has been proposed for listing under the federal Endangered Species Act.

Spotted owls have large, dark brown eyes, rounded tails, and mottled plumage (Johnsgard 1988, Verner et al. 1992). The back is brown with irregular white spots, and the underparts are lighter, with white spots and brown barring. Pale "eyebrows" and "whiskers" merge into a whitish "X" between the eyes and above the beak (Verner et al. 1992). The plumage of females is indistinguishable from that of males, but females tend to be slightly larger in size, and their calls are higher-pitched (Blakesely et al. 1990). Spotted owls in general are considered to be monogamous, and usually do not breed every year – indeed, the proportion of pairs that nest each year is highly variable, and annual rates of population change are closely linked to climatic conditions (LaHaye et al. 2001).

In southern California, the spotted owl is associated with pure hardwood, hardwood-conifer, and pure conifer habitats, depending on elevation (Stephenson and Calcarone 1999). The elevational range of the owl extends from lower than 1,000 feet to as high as 8,500 feet. Four general types characterize spotted owl habitat in this region: riparian/hardwood forests, live oak/bigcone Douglas-fir forest, mixed-conifer alliances, and redwood/California-laurel forest. The following table describes these habitat types:

TABLE 7-7A

CALIFORNIA SPOTTED OWL HABITAT TYPES

(from Verner et al. 1992; page 7)

FOREST TYPE	DESCRIPTION
RIPARIAN/HARDWOOD	Varies by location. Tree species include coast live oak along the coast, canyon live oak in the interior, California sycamore, white alder, California-laurel, and cottonwood.
LIVE OAK/BIGCONE DOUGLAS-FIR	Mid-elevation in mountains of all Forests. Dominant tree species are canyon live oak, coast live oak, and bigcone Douglas-fir.
MIXED CONIFER	Relatively high elevations in the San Gabriel/San Bernardino and San Jacinto Mountains. Tree species composition consists of white fir, ponderosa pine, Jeffrey pine, incense-cedar, sugar pine, black oak, Coulter pine, and bigcone Douglas-fir.
REDWOOD/CALIFORNIA-LAUREL	Restricted to the Coast Range. Tree species include coast redwood, California-laurel, tanoak, Pacific madrone, red and white alder, coast live oak, Santa Lucia fir, and bigleaf maple.

While the spotted owl occurs in all the major mountain ranges in this region, some ranges appear to have very low numbers of owl pairs. The population of spotted owls in southern California is believed to operate as separate isolated subpopulations on each mountain range that rarely exchange individual owls, a phenomenon known as "metapopulation dynamics" (LaHaye et al. 1994, McCullough 1996, LaHaye et al. 2001). The owls occur in areas of suitable habitat surrounded by large areas of unsuitable habitat, although within a given mountain range separate blocks of suitable habitat may be relatively near to each other (Beck and Gould 1992).

Generally, the California spotted owl occurs only in habitats with substantial tree cover and particularly with large, old trees present (Verner et al. 1992, Moen and Gutiérrez 1997). Forest stands used for nesting typically have greater than 70% total canopy cover and contain a multiple layer of tree canopies as well as very large old trees and snags (Gutiérrez et al. 1992, Moen and Gutiérrez 1997). These old trees and snags have large, natural cavities, broken tops, or dwarf mistletoe brooms. Cavities form where large branches tear out of the trunk of the tree, and broken-topped trees and snags may develop depressions through decay. Owls nest in these cavities and broken top depressions, and – particularly in southern California – in platforms from abandoned raptor nests, squirrel nests, mistletoe brooms, and accumulations of duff in branches (Verner et al. 1992). Nest trees are usually larger than the other trees within the same stand (Gutiérrez et al. 1992). Nest stands also contain an accumulation of downed woody debris, although debris is not a major component of nest sites in lower-elevation riparian/hardwood forests. This downed woody debris may provide key habitat components for some of the owl's major prey species. Northern flying squirrels (*Glaucomys saubrina*), for example, are strongly associated with the presence of a well-developed soil layer and a high volume of decaying logs (Verner et al. 1992). California spotted owl roosting habitat is similar to nesting habitat. Large old trees may play an important role in regulating the microclimate of the stand, and multiple layers of canopy may allow the owls to respond to fluctuations in temperature by moving higher or lower in the canopy. The California spotted owl is an appropriate indicator species for which to focus management of mature and old-growth forests in terms of multiple canopies, downed woody debris and, perhaps most importantly, densities of large, old trees and snags.

California spotted owls are "perch and pounce" predators, locating prey by sight or sound from an elevated perch, and swooping down and capturing the prey in their talons from vegetation or from the ground (Remsen 1978). Owls often cache excess food on branches and in broken tops of trees. They forage mostly at night, and eat a variety of prey including flying squirrels, woodrats, mice, voles, and occasionally rabbits (Johnsgard 1988, Gutiérrez et al. 1992, Smith et al. 1999). To a lesser degree, they eat small birds, bats, reptiles, and large arthropods (Johnsgard 1988, Gutiérrez et al. 1992). An analysis in the San Bernardino Mountains found that about 80% of spotted owl diets consisted of dusky-footed woodrats (*Neotoma fuscipes*) and about 10% was northern flying squirrels and pocket gophers (*Thomomys bottae;* Verner et al. 1992). Prey availability may influence spotted owl survival and reproductive success in southern California, where those two demographic parameters can vary based on the habitat type. In the San Bernardino Mountains, the average number of fledglings per nest was higher in lower-elevation bigcone Douglas-fir/canyon live oak forests than in middle-

elevation conifer/hardwood and high-elevation mixed-conifer sites (LaHaye et al. 1997). Lower-elevation habitats may be more productive due to higher woodrat densities in the surrounding chapparal and perhaps more moderate weather. At lower elevations, owls tend to occupy narrow patches of dense, mature forest on north-facing slopes and deep canyons (Stephenson and Calcarone 1999). Unfortunately, lower-elevation live oak and bigcone Douglas-fir habitat is more at risk to human fragmentation and human-caused wildfires in surrounding chaparral than high-elevation areas.

The California spotted owl appears to be declining in southern California. The most recent estimate of the finite rate of population change from 1988 to 2000 is 0.90 (SE = 0.01), indicating that the populations declined at a rate of 10% per year (LaHaye, pers. comm.). Several factors are implicated in this decline. Habitat destruction is probably the major threat to the California spotted owl. Large-scale commercial timber harvest in southern California essentially ended about a decade ago (see section 24.0, *Timber Harvest*), but thinning and salvage operations and personal fuelwood cutting continue to negatively impact owl habitat. Nest sites within parks are potentially threatened by increased human use and associated disturbances (Remsen 1978). In addition, urbanization is expanding into lower-elevation suitable owl habitat, further fragmenting relatively isolated subpopulations (Verner et al. 1992). Habitat patches in the riparian/hardwood forests, particularly in the Los Padres National Forest, may dry up due to water mining and diversions, thus threatening the survival of owls in that habitat type. Finally, large wildfires also may damage habitat, although recent evidence suggests that fire may be less of a threat to spotted owls than previously thought (Bond et al. in review, Stacey and Hodgson, unpublished data). The table below summarizes major factors of concern in habitats of California spotted owls in southern California.

TABLE 7-7B

FACTORS IMPACTING CALIFORNIA SPOTTED OWL HABITAT

(FROM VERNER ET AL 1992; PAGE 14)

FACTOR	REASONS FOR FACTOR	IMPACT ON SPOTTED OWL
Fragmented distribution of suitable owl habitat into small, relatively isolated "islands."	Mainly a natural result of topography, precipitation patterns, and fire regime in southern California.	Creation of a metapopulation structure – overall population is fragmented into numerous relatively small populations.
Small population units are relatively unstable.	Demographic stochasticity (random events in breeding, such as most or all young in a given year being males).	Increased likelihood of local extinctions of small population units.
Extent of demographic rescue of small populations by immigration of owls from other populations is relatively impeded.	Distances between isolated populations, and the nature of the habitat between them, directly affect the likelihood of successful dispersal among populations by owls.	Increased likelihood of local extinction of small population units.
Wildfires.	Natural fire regimes in southern California; additional human-caused fires; difficulty of fire suppression in rugged, remote terrain.	Loss of suitable habitat will exacerbate problems of small owl populations and restrict dispersal among populations.
Expansion of communities and dispersed housing developments in suitable owl habitat, especially in dispersal areas between isolated owl populations.	Human population growth in southern California.	Further decline in effective dispersal among isolated owl populations; possible loss of suitable breeding habitat.

Increasing recreational impacts in owl habitats.	Human population growth in southern California.	Possible loss of additional owl habitat; possible disturbance effects inducing owls to leave otherwise suitable habitat.
Surface and subterranean mining of riparian water sources.	Human population growth in southern California.	Loss of suitable owl habitats in riparian/hardwood forests.

The distribution of California spotted owls in suitable habitat patches across the landscape indicates that most of the population is concentrated in the San Gabriel/San Bernardino Mountains, with smaller populations in surrounding "islands" continuing to function only if they can remain connected through dispersal (Noon & McKelvey 1992, LaHaye et al. 1994). If the smaller populations become completely isolated, the chance of local subpopulation extinction increases.

AREA DESCRIPTION

Spotted owls in southern California occupy 11 mountain ranges in all 4 Forests, including the Santa Ana, San Diego (Laguna, Cuyamaca, Pine Hill/Vulcan, and Palomar), San Jacinto, San Bernardino, San Gabriel, Liebre/Sawmill, Tehachapi, Tecuya, Los Padres, southern Santa Lucia, and northern Santa Lucia ranges (Beck and Gould 1992). The owls occupy discrete areas of suitable habitat distributed discontinuously across the ranges, which reflects topography, natural patchiness of vegetation, and human fragmentation of habitat. The largest subpopulation occurs in the San Bernardino Mountains.

DESIRED CONDITIONS

Sufficiently large blocks of suitable spotted owl habitat (i.e. high-quality mature and old-growth forest) occur in reserves that are well distributed across the landscape and have been restored to pre-logging structure and function. Controlled and natural fire of low to moderate intensity at periodic intervals limits the excessive build-up of small woody material and the intrusion of shade-tolerant tree species. Severe crown fires are infrequent and limited in size.

All forested areas include large, old, decadent trees, snags, and downed logs that are well distributed throughout the landscape. The level of human activity has decreased or been eliminated in key habitat, thereby reducing the disturbance to spotted owl nest and roost sites.

Spotted owl populations are thriving, and human-caused threats to their habitat have been eliminated. Metapopulation dynamics among the various subpopulations are properly functioning.

OBJECTIVES

Preserve all remaining stands of mature and old-growth forest.

Ensure that large trees, snags, and downed logs are well distributed throughout the Forests.

Conduct and encourage ongoing research into California spotted owl demography, population dynamics, habitat use and selection, and prey relationships. Continue to expand demography and ecological studies of spotted owl subpopulations and their primary prey species throughout the Forests. Encourage coordination and cooperation with state and federal agencies, academics, and consulting biologists.

Prioritize land acquisition in valleys between mountains to maintain dispersal linkages among the subpopulations. See section 14.0, *Habitat Linkages*, and section 17.0, *Land Protection Opportunities*.

STANDARDS

TThe Forest Service shall protect known nest sites from human disturbance, and access shall be restricted to the maximum extent practicable.

The Forest Service shall identify and preserve any remaining stands of mature and old-growth, multi-canopied forest at all elevations throughout the Forests to maintain suitable habitat for nesting, roosting, foraging, and dispersal (i.e., canopy > 70% and all large trees > 24 inches in diameter). Undergrowth reduction and prescribed burning for fuels management may be conducted where appropriate, while meeting spotted owl habitat requirements, and shall comply

with Timber Harvest standards (see sections 2.0, *Fire Management,* and 5.0, *Vegetation Management*).

The Forest Service shall survey lands proposed for undergrowth reduction and/or prescribed burning according to standard protocols to determine whether spotted owls are present. If owls are present, conduct undergrowth reduction during the non-breeding season and burning after the breeding season has finished (August).

The Forest Service shall prohibit surface water diversions and mining of groundwater in riparian woodlands within the Forests. See section 1.0, *Watershed Management*, and section 27.0, *Minerals Management*.

Section 7.8
ARBOREAL SALAMANDER

ISSUE STATEMENT

Justification for Selection

The arboreal salamander (*Aneides lugubris*) was chosen as a Management Indicator Species (MIS)/focal species because protection of this species would help achieve the goals of protection and restoration of the oak woodlands, riparian forests, and chaparral habitats. The salamander was chosen as a habitat quality indicator species. *Habitat Quality Indicator:* Protection of habitat for the salamander throughout oak woodlands, riparian forests, and chaparral will ensure key structural elements such as litter, downed logs, and large live and dead oak trees. The main threat to the arboreal salamander is disturbance of oak forests, including removal of dead, dying, or downed oak trees for firewood and other purposes.

Life History, Status, and Habitat

The arboreal salamander occurs in yellow pine and black oak (*Quercus kelloggi*) forests in the Sierra Nevada, and in coastal oak and interior live oak forests from northern California to Baja California, Mexico (Petranka 1998), as well as in chaparral, coastal sage scrub, and riparian woodlands in southern California. In addition, it has been recorded on the Los Coronados, Catalina, Año Nuevo, and South Farallon islands off the coast of California (Stebbins 1951). However, the species is rarely seen and population trend is not known. The salamander is a local species of concern because it is relatively uncommon and much of its distribution is at low elevations on private lands (Stephenson and Calcarone 1999).

The largest species of *Aneides*, *A. lugubris* is a stocky, brownish salamander with enlarged toe tips and a prehensile tail to assist with climbing (Holland and Goodman 1998, Petranka 1998). They are active year-round, although observed on the ground most often during and shortly after the rainy season, when temperatures are low and soil moisture is high (i.e., December – April; Holland and Goodman 1998, Petranka 1998). They are primarily nocturnal and can be observed on rainy nights foraging for small invertebrates such as spiders, beetles, isopods, larval lepidoptera, ants, sow bugs, caterpillars, and centipedes on the ground or on the trunks of trees (Stebbins 1951, Holland and Goodman 1998). They are also known to eat slender salamanders, and may feed to some extent upon fungus (Stebbins 1951). Arboreal salamanders are found in tree cavities as well as beneath rocks, logs, boards, and other surface objects when the surface is damp. They have even been observed in woodrat nests. The arboreal salamander is more tolerant of dry conditions than other lungless salamanders, and is often the last to go beneath ground as the summer dry season begins (Petranka 1998). Individuals often move into tree holes when conditions become dry (Petranka 1998).

Most females oviposit in June and July during the dry season and guard their eggs through hatching (Petranka 1998). They often lay their eggs in moist microhabitats such as in tree holes, under rocks and logs, or in leaf litter (Holland and Goodman 1998). The timing of breeding allows hatchlings to disperse from their arboreal nests after the arrival of rains in the fall.

The arboreal salamander occurs primarily in oak woodlands, especially where coast live oak (*Q. agrifolia*) is a dominant component (Stebbins 1951, Holland and Goodman 1998). It has also been found in riparian areas where sycamores (*Platanus occidentalis*) are common as well as in chaparral habitats (Holland and Goodman 1998). Although relatively few sensitive animal species are restricted to foothill oak woodlands (see section 9.0, *Sensitive Species*), species diversity and richness are very high in these vegetative communities (Stephenson and Calcarone 1999). Thus, managing for the arboreal salamander and its habitat will provide protection for many additional species. Aside from large live, dead,

or dying oak trees, leaf litter and downed logs are believed to be important habitat elements for the salamander. The arboreal salamander is an appropriate focal species to manage for the health of oak woodlands habitat because it may be impacted by disturbance of oak forests, including removal of dead, dying, or downed oak trees for firewood and other purposes.

AREA DESCRIPTION

The arboreal salamander likely occurs in the foothills and lower elevations of every mountain range in southern California, on all Forests (Stephenson and Calcarone 1999).

DESIRED CONDITION

Large, old, standing oak trees and snags, as well as large downed logs are well distributed across the landscape of foothill-oak woodlands in the Forests. Oak woodland habitats have healthy recruitment of seedlings to provide future habitat for arboreal salamanders and other oak-dependent species such as acorn woodpeckers (*Melanerpes formicivous*), yellow-billed magpies (*Pica nuttalli*), western screech owls (*Otus kennicottii*), long-eared owls (*Asio otus*), and Monterey salamanders (*Ensanita eschscholtzii eschscholtzii*). Live, dead, and dying oak trees are retained during management. Harvest of trees for fuelwood is extremely rare, conducted solely by the Forest Service, and only when such harvest is determined to pose no threat to the arboreal salamander or other species.

Arboreal salamanders have ample tree cavities, leaf litter, and downed logs in which to breed and aestivate. Surveys for salamanders are conducted annually and prior to any proposed activity to occur in foothill-oak woodlands on the Forests.

OBJECTIVES

Manage oak woodlands for the retention of all large oak trees, snags, and downed logs.

Conduct surveys throughout the range of *A. lugubris* to determine distribution and population status.

Manage oak woodlands for the retention of all large oak trees, and allow for natural recruitment of snags and downed logs.

Assess all ongoing activities and impacts in oak woodlands for adverse effects on the arboreal salamander. Such activities include but are not limited to:

- Domestic livestock grazing
- Recreation
- Illegal fuelwood harvest
- Roads
- Likely spread of sudden oak death syndrome and potential short- and long-term effects on arboreal salamanders and other species
- Patterns of recruitment in oaks in selected areas and long-term implications for maintenance of this and other species
- Potential effects of global warming on local distribution of oaks and other species

Replace the dead and down personal fuelwood program, within 1 year of the adoption of this plan, with the removal of green and dead wood from undergrowth reduction projects designed to restore pre-fire suppression conditions. This wood shall be taken off site and made available to the public through a permitting process. See section 24.0, *Timber Harvest*, and 2.0, *Fire Management*.

STANDARDS

The Forest Service shall conduct annual surveys for the arboreal salamander throughout its range on the Forests using standard protocols to be developed by herpetologists familiar with the habitat and habits of the species. Surveys shall also be conducted prior to any proposed activity to occur within its habitat.

BELL'S SAGE SPARROW

ISSUE STATEMENT

Justification for Selection

The Bell's sage sparrow (*Amphispiza belli belli*) was chosen as a MIS because recovery and protection of this species would help achieve the goals of species recovery, protection and recovery of native coastal sage scrub and chaparral habitats, restoration of natural fire regimes, and protection and restoration of habitat connectivity. The Bell's sage sparrow was chosen as a *Habitat Quality Indicator* species. The Bell's sage sparrow requires extensive low open brush in coastal sage scrub and chaparral for nesting, can tolerate herbaceous mosaic, and is very sensitive to fragmentation of habitat, indicating sensitivity to management activities.

Life History, Status, and Habitat

The Bell's sage sparrow is a subspecies of sage sparrow (*Amphispiza belli*). The breeding range of the species lies primarily in the western portion of North America, from Washington State to Baja California and as far to the east as southwestern Wyoming and Colorado (Bent 1968). Within this region, however, the distribution is patchy, with sage sparrows often missing from habitats that appear to be otherwise suitable (Unitt 1984). The highest densities of sage sparrow occur in northern and southern Nevada and along the border between Arizona and New Mexico—basically all in areas that receive less than 16 inches of annual rainfall (Root 1988). Four races (or subspecies) are found within northern through Baja California and the surrounding islands: *clementae, canescens, nevadensis* and *bellii* (Grinnell and Miller 1944). The Bell's sage sparrow is a characteristic chaparral and coastal sage scrub bird currently found in drier, more inland areas of the coastal slopes of the Coast Ranges and southern California (Stephenson and Calcarone 1999, CPIF 2001), though historically it was common along the coast, including the Channel Islands (Grinnell and Miller 1944). This subspecies is distributed from Trinity to San Diego counties and as far south as northwestern Baja California, Mexico (Bent 1968). It is reportedly absent from the desert slopes of the San Gabriel and San Bernardino mountain ranges (Garrett and Dunn 1981). Normal elevational range for this species is from sea level to approximately 5,000 feet with sporadic observations of birds venturing as high as 9,200 feet (Willett 1933). Although sage sparrows migrate in the more northerly portions of their range, *A. b. bellii* is highly sedentary and non-migratory, and thus especially susceptible to extirpation.

Sage sparrows are gray with a distinct dark brown breast spot and dark whiskers on both sides of the throat. The wings are barred with brown, and the sides are conspicuously striped (Grinnell and Miller 1944). There is both a white eye ring and a whitish line over the eye. Coastal subspecies tend to be much darker in coloration than inland ones (Grinnell and Miller 1944). Sage sparrows often run with their tails held vertically. Sage sparrows are secretive birds and in general are difficult to detect (Bent 1968).

Sage sparrows forage predominantly on the ground, gleaning seeds from the surface of sand or gravel or beneath low bushes (Bent 1968). During winter they feed almost exclusively on seeds, with a pronounced dietary shift in the spring towards insects (Rotenberry 1980). During the breeding season, for example, the diet is composed of at least 70% arthropods. Sage sparrows seem to prefer beetles but also consume wasps, grasshoppers, ants, caterpillars, and spiders (Bent 1968). Towards the latter part of the breeding season they shift to a diet dominated by grasshoppers (Rotenberry 1980).

In most migratory passerine birds, males arrive at the breeding site first, establish territories, and attract mates. In sage sparrows, however, many birds have pair-bonded prior to their return to the breeding site (Rich 1980). Once established, males demonstrate strong site fidelity, returning to the same area even if it has altered appreciably (Rich 1980). Territory size is extremely variable and dependent on local environmental conditions. Boundaries are generally not vigorously defended, with defense consisting primarily of singing displays (Rich 1980). Typical sage sparrow nests are located in the canopy of a dense shrub within 12 to 20 inches of the ground. Very infrequently, nests may be built on the ground (Ehrlich et al. 1988). The nests are constructed out of twigs, grass, forbs, and bark and lined with finer versions of these materials.

In southern California, the Bell's sage sparrow is associated with dry chaparral and sage scrub, and appears to be most

common in semi-open chaparral with areas of bare ground free from heavy leaf litter. As is true for many species inhabiting southern California, habitat alteration is negatively affecting all subspecies of sage sparrows (Unitt 1984). The most profound factor threatening the Bell's sage sparrow is direct and permanent loss of habitat resulting from human land uses or associated factors such as unnaturally high fire frequencies in shrublands (CPIF 2001). Sage sparrows in coastal shrublands are highly sensitive to habitat fragmentation and show reduced abundance near developed edges (Bolger et al. 1997). Thus, large areas of suitable habitat must be preserved to benefit sage sparrow populations. However, even if the habitat remains essentially intact, nesting patterns are negatively impacted by anthropogenic activities such as wildfires or grazing (Winter and Best 1985).

Bell's sage sparrows seem particularly tied to specific vegetation communities in southern California. Within the Coast, Transverse and Peninsular ranges, they seem partial to pure stands of mature chamise (*Adenostoma fasciculatum*) chaparral growing on very well-drained (gravelly or sandy) soils, with very little grasses in between plants. At lower elevations, they occur in coastal sage scrub of a similar structure – widely spaced plants on sandy soils with little invasion of exotic grasses. Commonly seen plants on breeding territories include mature California sagebrush (*Artemesia californica*) and, particularly in western Riverside County, Brittlebush (*Encelia californica*) (D. Cooper, National Audubon, pers. comm.).

Surveys from the CNF show that the subspecies is most abundant in open, recently burned chaparral than in denser, older stands (Stephenson and Calcarone 1999). However, studies have also documented that when areas were grazed or burned, sage sparrows constructed significantly more nests on the ground than in the canopy, perhaps because the remaining shrubs were too small to provide complete concealment. Such ground nesting resulted in high predation (Winter and Best 1985). As the subspecies requires evenly spaced shrubs 3 to 7 feet high for nesting, the timing, extent, intensity, interval length, and patchiness of fire are important in determining its effect on the bird. Too-frequent fires can convert shrubland habitat to grassland and may have contributed to the decline in sage sparrows throughout the west, including from most of southwestern California. On the other hand, long-term fire suppression allows taller, thicker chaparral to develop, probably reducing their habitat. In addition, fire suppression pushes the timing of wildfires towards the fall, when fires in dry weather, facilitated by the hot Santa Ana winds, burn far larger and more intensely than natural summer burns – further reducing sparrow habitat (Minnich 2001). Therefore, the Bell's sage sparrow may benefit from intermediate fire frequencies, and an age-class mosaic interspersed with open, young stands may be the optimal habitat (Stephenson and Calcarone 1999, CPIF 2000c). Sage sparrows are also an infrequent cowbird host (Ehrlich et al. 1988). Parasitism may be becoming more frequent, however, as grazing clears adjacent lands and enables cowbirds to more easily spot sparrow nests.

The Bell's sage sparrow requires extensive low open brush for nesting, can tolerate herbaceous mosaic, is very sensitive to fragmentation of habitat, and may be socially facilitated. Thus, *A. b. bellii* is an appropriate indicator species for which to focus management of coastal scrub and chaparral because it uses that habitat as its primary breeding habitat, and has experienced a reduction from its historical breeding range, indicating sensitivity to management activities.

AREA DESCRIPTION

The Bell's sage sparrow occurs on all Forests, in coastal foothill and lower montane chaparral and coastal sage scrub.

DESIRED CONDITION

To meet the desired condition of viable breeding populations of Bell's sage sparrows, activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Bell's sage sparrow populations are flourishing and expanding their breeding range; they are present in adequate numbers to sustain breeding populations on the Forests.

OBJECTIVES

Manage chaparral and coastal sage scrub habitats to promote high-quality habitat for the Bell's sage sparrow. Such management shall include, but not be limited to, prescribing fire, eradicating non-native species, and prohibiting activities that degrade habitat for the sparrow.

Use the most current information regarding the quality of existing habitat and Bell's sage sparrow populations to prioritize acquisition and preservation of suitable habitat.

Develop an accurate GIS vegetation map within 2 years of the adoption of this plan to assist with prioritization of coastal sage scrub and chaparral sites for protection and acquisition. The Forest Service shall cooperate with other federal, state, and local agencies, the State of California's Natural Community Conservation Planning program (NCCP), the Nature Conservancy, the Wildlands Conservancy, and other private organizations to create the GIS map, identify remaining tracts of suitable habitat, and develop plans for acquisition and protection of the habitat.

Prioritize coastal scrub sites for preservation and restoration, and adjacent lands for acquisition. Habitat preservation for the Bell's sage sparrow should focus on inland coastal sage scrub associations and chaparral that contains chamise with low levels of invasion by exotic grasses.

Ensure that the patch size, configuration, and connectivity of restored chaparral and coastal sage scrub habitats adequately support populations of Bell's sage sparrows, using data on territory size requirements, behavior, and community dynamics.

Conduct ongoing annual capture-mark-recapture demographic studies of Bell's sage sparrow populations using standardized protocols (mist netting, banding, and nest searching; see Ralph et al. 1993) to determine survival and reproductive success by site. As the sage sparrow is sensitive to activity near its nest, caution shall be used to minimize disturbance (B. Carlson, Motte Rimrock Reserve, pers. comm.).

Reduce human-caused fires in coastal sage scrub by enforcing regulations requiring buffer zones and fuel management around developments (see section 2.0, *Fire Management*) as well as aggressive education efforts (see section 20.0, *Environmental Education*).

Using proven trapping methods, instigate and continue brown-headed cowbird removal programs in habitat suitable for Bell's sage sparrows. See section 10.0, *Invasive Species Management*.

Systematically trap and remove feral and domestic cats in suitable Bell's sage sparrow habitat, and educate residents bordering the Forests about cats.

Manage camping and picnic areas to minimize access to trash by corvids and mesopredators such as raccoons and foxes. These predators can depress sparrow populations.

STANDARDS

The Forest Service shall carefully utilize prescribed fires to enhance habitat for the Bell's sage sparrow. The following protocol shall be followed:

- In coastal sage scrub, prescribed fires will be conducted in November and December, before the breeding season, to assist in the eradication of red brome, rehabilitation of the understory, and reintroduction of natural fire regime.
- In chaparral, prescribed fires shall be conducted in the summer (natural fire season).
- Broadcast patch mosaic prescribed burning shall be emphasized.
- Surveys for breeding Bell's sage sparrows shall be undertaken prior to conducting prescribed burns, and burning confined to areas not occupied by breeding sparrows, to the maximum extent practicable. Emphasize burning in mid-August to mid-September, after the breeding season but before the hot Santa Ana winds begin (Minnich 1987).
- All natural or human-caused ignitions in chaparral during the summer season shall be allowed to burn, as suppression skews fires towards larger, more intense burns in the fall.

The Forest Service shall prohibit domestic livestock grazing in all coastal sage scrub (see section 28.0, *Domestic Livestock Grazing*), and in chaparral habitat for the Bell's sage sparrow.

The Forest Service shall prohibit elimination of shrubby vegetation in scrub habitats for the purposes of increasing domestic livestock forage.

The Forest Service shall prohibit all livestock and associated facilities in chaparral during the breeding season to reduce populations of cowbirds. Such facilities include corrals, pack stations, salting areas, and feedlots.

TOWNSEND'S BIG-EARED BAT

ISSUE STATEMENT

Justification for Selection

The Townsend's big-eared bat (*Corynorhinus townsendii = Plecotus townsendii)* was chosen as a Management Indicator Species (MIS)/focal species because recovery and protection of this species would help achieve the goals of protection of roost and hibernacula sites for all bat species. The Townsend's big-eared bat was chosen as a habitat quality indicator species. *Habitat Quality Indicator:* Protection of caves, abandoned mines, buildings, and other adequate roosting and hibernacula structures will ensure roosting locations for other bat species.

Life History, Status, and Habitat

The Townsend's big-eared bat occurs throughout California and the Channel Islands, but the details of its distributions are unknown (Zeiner et al. 1990a). Its geographic range extends from Mexico to British Columbia, the Rocky Mountain states, and some parts of the central Appalachians (Williams 1986, Jameson and Peeters 1988). There are 2 subspecies within California: *P. t. townsendii* occupies the humid, coastal regions of northern and central California, and *P. t. pallescens* occurs in the remainder of the state (Wilson and Ruff 1999). Occurrences of this taxon are distributed between Siskiyou, Modoc, Shasta, Lassen, Mendocino, Tehama, Tuolumne, Mono, Mariposa, Inyo, Santa Barbara, Kern, San Bernardino, Riverside, San Diego, and Imperial counties (CDFG 2001). The Townsend's big-eared bat is a Forest Service Sensitive and a California Species of Special Concern, as population numbers have declined rapidly (Zeiner et al. 1990a).

Weighing from 0.2 to 0.4 ounces, this medium-sized light brown bat has a brown belly, hairless tail membranes, and very large ears joined at the top of its head (Burt and Grossenheider 1976, CDFG 2001). It has large glandular swellings between the nostrils and the eyes (Ingles 1965). Townsend's big-eared bats are nocturnal, emerging late in the evening to forage for small moths, beetles, and various soft-bodied insects (Jameson and Peeters 1988, Zeiner et al. 1990a). The bats capture their prey while flying using echolocation or gleaning from the vegetation (Zeiner et al. 1990a).

Townsend's big-eared bats hibernate during the winter. Both sexes hibernate in buildings, caves, and mine tunnels, either singly (usually males) or in small groups and, rarely, in large clusters up to > 1,000 individuals (Wilson and Ruff 1999). They travel short distances to reach their hibernation sites and are not territorial (Zeiner et al. 1990a). Their colonies are at least 10 to 12 miles away from each other. In the spring and the summer, males live individually while females live in maternity colonies of up to 100 animals in warm sites (Zeiner et al. 1990a). Females arrive at the maternity sites from mid-March to mid-April (Wilson and Ruff 1999). Mating takes place in the autumn, and sperm is stored by the female during winter hibernation until ovulation occurs in the spring. Usually 1 young is born in the early summer, and only 1 litter is produced each year (Zeiner et al. 1990a). Young bats fly 3 weeks after birth and are weaned at 6 weeks (Zeiner et al. 1990a). The maternity groups begin to break up in late August and the bats spend the rest of the year alone or in small clusters (Zeiner et al. 1990a).

Townsend's big-eared bats are found in mesic areas within all habitats including coastal conifer and broad-leaf forests, oak and conifer woodlands, arid grasslands and deserts, and high-elevation forests and meadows except alpine and subalpine habitats (Burt and Grossenheider 1976, Kunz and Martin 1982). They forage in edge habitat between forested and open areas, feeding primarily on moths but occasionally on beetles and small flies (Wilson and Ruff 1999). During winter hibernation, bats may move to warmer areas within their hibernacula site if temperatures become extreme (Wilson and Ruff 1999). They require caves, mines, tunnels, buildings, or other human-made structures for roosting, and their distribution is strongly correlated with the availability of these cave and cave-like structures (Burt and Grossenheider 1976, Stephenson and Calcarone 1999). Known roosting sites in California include the warmer parts of limestone caves, lava tubes, abandoned mine tunnels, and buildings (Williams 1986). Habitat for Townsend's big-eared bats must include appropriate roosting, maternity, and hibernacula sites free from disturbances by humans, as a single visit by humans can cause the bats to abandon a roost (Pearson et al. 1952, Graham 1966, Barbour and Davis 1969, Humphrey and Kunz 1976, Williams 1986, Pierson and Rainey 1998, Wilson and Ruff 1999). Female maternity colonies are particularly susceptible to disturbances by humans: males usually roost singly or in small groups and are probably not affected as much as females by disturbances (Barbour and Davis 1969). Besides being highly sensitive to disturbances to their

roosting sites, Townsend's big-eared bats are also at risk for injury resulting from the banding of their wings (Zeiner et al. 1990a).

Little specific information is available on population trends, although a marked decline in numbers appears to have occurred over the last 40 years. Pearson et al. (1952) postulated that there was an increase in numbers prior to the 1950s due to increased roosting sites available in human-made structures. In recent years, however, populations of Townsend's big-eared bats seem to have declined in numbers in most areas of the United States (Barbour and Davis 1969; Humphrey and Kunz, 1976). Populations of *P. t. pallescens* in the desert area of southeastern California are also declining, and they no longer occupy any of the roosts used prior to the 1960s (Williams 1986). As long ago as the 1960s, no extant colonies in California's limestone caves were found, all likely having been abandoned due to human activities (Graham 1966). A recent survey of the current status of the bat in California found a 52% loss in the number of maternity colonies, and 44% decline in the number of available roosts, a 55% decline in the total number of animals, and a 32% decline in the average size of remaining colonies over the past 40 years – and of 37 known colonies, only 3 have adequately protected roost sites (Pierson and Rainey 1998). The following table shows the current status of pre-1980 Townsend's big-eared bat nursery roosts:

TABLE 7-9

CURRENT STATUS OF PRE-1980 TOWNSEND'S BIG-EARED BAT NURSERY ROOSTS

(from Pierson and Rainey 1998; page 10)

	STRUCTURE				
STATUS	Building	Cave	Mine	Other	Total
Occupied	1	12	6	1	20
Available, unoccupied	1	7	6	1	15
Burned	4	0	0	0	4
Entrance closed	1	3	1	1	6
Demolished	6	2	1	0	9
Renovated	4	0	0	0	4
TOTAL	17	24	14	3	58

Pierson and Rainey (1998) state that "the Forest Service has been…reluctant to recognize the biological significance of caves and mines. The decision makers within this agency continue, often against the advice of their own biologists, to give first priority to recreational interests, despite the documented incompatibility between recreational caving and cave roosting bat populations." They further noted that "although the National Forest Management Act mandates the Forest Service maintain viable populations of native wildlife and the 1988 Cave Resources Protection Act directs the Secretaries of Interior and Agriculture to identify, protect and maintain significant caves, 2 of the historically most significant, and now apparently extirpated, populations of *C. townsendii*…occupied caves promoted by the Forest Service as tourist caves…."

AREA DESCRIPTION

On the Forests, the Townsend's big-eared bat was detected at 6 of 76 sites surveyed from 1996 to 1998 in the mountains and foothills of southern California, including 1 site on SBNF and 5 sites on CNF (Stephenson and Calcarone 1999). The bat was documented at 14 abandoned mine locations in the northeastern San Bernardino Mountains, and in several abandoned mines in the Laguna Mountains (Stephenson and Calcarone 1999).

DESIRED CONDITION

Populations of *P. townsendii* are thriving throughout their historic range in the Forests. Roost and hibernacula sites are permanently protected from human disturbance, and bats move freely between roost and hibernation sites. The public is sensitive to disturbance of bat colonies in caves and abandoned mines.

OBJECTIVES

Protect all roosts and hibernacula located on public lands from human disturbances.

Monitor bat populations on a bi-annual basis to determine status and habitat use.

Use extreme caution in gathering the data, and entry into the roost sites shall be prohibited. Such methods to estimate colony size shall include (but are not limited to): Counting animals upon emergence from the roost, using night vision equipment and electronic monitoring devices.

Monitor key bat populations on a bi-annual basis.

Implement a carefully designed campaign to inform the public of the usefulness of bats and their sensitivity to disturbances, and shall post educational signs at entrances to the Forests.

STANDARDS

The Forest Service shall train agency personnel in field positions to recognize the Townsend's big-eared bat (and other bat species), and instruct agency personnel on non-intrusive methods of estimating colony size of bats in all roost and maternity sites, using approved protocol for observation.

The Forest Service shall prohibit human entry into Townsend's big-eared bat roosts, maternity, and hibernacula sites at all times of the year. Approved methods of human control shall be used to prevent entry into roost sites, including but not limited to:

- Hardened metal "bat friendly" gates at the entrances to caves and mines.
- In caves with multiple holes, fit expanded metal sheets to the shape of the holes *not* used by bats (as determined by surveying). These expanded sheets can be welded to pins in the rock, and small diamond-shaped holes can be put into the metal to allow air circulation. These sheets are intended to help prevent vandalism but allow air circulation (Frontier Environmental Solutions, Ridgecrest, California-Sam Edwards 760-371-4927).
- Securing building roosts against vandalism.

Section 7.11
RED-DIAMOND RATTLESNAKE

ISSUE STATEMENT

Justification for Selection

The red-diamond rattlesnake (*Crolatus exsul = Crotalus ruber ruber*) was chosen as a MIS/focal species because the species is distributed in a relatively wide range of habitat types within its range in the Forests. At the same time it is a very sensitive species that has been eliminated from much of the private-land portions of its range and therefore requires well-managed public lands if it is to persist in California. The red-diamond rattlesnake is a relatively long-lived species, and individuals generally have large home ranges. These attributes of the species' life history, combined with the general propensity of snakes to bask on roads, make the species highly susceptible to road mortality and, consequently, to the effects of habitat fragmentation caused by roads. Road mortality is probably the largest source of mortality for the species on otherwise protected Forest lands. The rattlesnake was chosen as a habitat quality indicator species. *Habitat Quality Indicator:* Management to maintain viable populations of the red-diamond rattlesnake on the Forests it inhabits will serve to help prevent further fragmentation of the chaparral, brush, and scrub habitats occurring on the lower elevations of the Forests. As such, designation of the red-diamond rattlesnake as a MIS/focal species would contribute significantly to Forest Plan objectives.

Life History, Status, and Habitat

The known range of *Crotalus exsul* extends from near Pioneertown and Morongo Valley (San Bernardino County) southward on both sides (coastal and desert slopes) of the Peninsular Ranges (including the Santa Ana Mountains) to Loreto, Baja California, Mexico (Stebbins 1985). Although it occurs only in the Californias, the red-diamond rattlesnake

occupies areas where the rainfall ranges from about 3 to 30 inches per year, and the soils and vegetation are likewise variable. It ranges from sea level to about 5,000 feet though it is usually found below about 4,000 feet (Jennings and Hayes 1994). The snake occurs on the easterly (transmontane) slope, which is much more xeric and rocky, and continues its range well out onto the floor of the desert (Klauber 1997).

The red-diamond rattlesnake is a large, heavy-bodied rattlesnake with a tan, pink, brick-red, or reddish dorsal color, and obscure, usually light-edged brick or pinkish diamond-shaped blotches (Stebbins 1985). Desert-"phase" animals tend to be lighter in overall ground color with less distinct markings. The tail base is prominently "coontail" marked with broadly spaced, but relatively narrow, distinct black rings contrasting with the rest of the body color. The belly is white to pale yellow, and the undersurface of the tail is pinkish buff. No attempts have been made to characterize genetic variation across the geographic range of *C. exsul* – an understanding of that variation is needed to determine whether genetically differentiated populations exist within the subspecies (Jennings and Hayes 1994).

Although granitic/granodiorite outcrops (usually with significant shrub cover) and patches of cactus are favorite basking places, red-diamond rattlesnakes are not restricted to them (Klauber 1997). They are found in grassy fields, orchards, amid brush of all kinds, beneath bare rocks on the lower desert slopes, and in sandy desert washes (Klauber 1997). Although this species has been documented in several vegetative associations, such as coastal sage scrub and desert slope scrub, they occur most frequently in habitats with heavy brush associated with large rocks or boulders, especially in chamise- and red shank-dominated associations (Jennings and Hayes 1994, Klauber 1997). It retreats into rodent burrows, cracks in rocks, or under surface objects (Klauber 1997).

Despite its size and proximity to one of the largest urban sprawls in the world, the red-diamond rattlesnake is one of the more poorly known species of rattlesnake (Jennings and Hayes 1994). The docile, secretive subspecies is active year-round, although a peak in observations occurs during the mating season in April and May (Klauber 1972, D. Holland, pers. comm.). Mating may take place as early as March. Females carry developing young for about 140-150 days, and 3 to 20 young are born live between late July and September (Wright and Wright 1957). Adult red-diamond rattlesnakes eat mostly squirrels, e.g. white-tailed antelope ground squirrels (*Ammospermophilis leucurus*), California ground squirrels (*Spermophilis beecheyi*); and rabbits, e.g. desert cottontails (*Sylvilagus audubonii*), brush rabbits (*Sylvilagus bachmani*); but lizards (e.g. western whiptails) are significant in the diet of juveniles (Klauber 1997). Although *C.exsul* frequently takes live prey, it may also eat relatively fresh carrion (Patten and Banta 1980). Red-tailed hawks (*Buteo jamaicensis*) are known to prey upon red-diamond rattlesnakes (Klauber 1972), while owls, roadrunners (*Geococcyx californianus*), and kingsnakes may also be predators (Marlow 1984). A recent movement study determined that these snakes have large home ranges (up to 1 square mile) and move regularly throughout their habitats (S. Sweet, pers. comm.).

The red-diamond rattlesnake has a fairly restricted range in California, and a significant portion of its prime habitat has been developed over the last 30 years – especially in much of western San Diego County and southwestern Riverside County (Jennings and Hayes 1994). Existing evidence (R. Fisher, unpubl. data) indicates that the species is essentially extirpated from most coastal localities except at MCB Camp Pendleton. A combination of urban development and increased drip irrigation of orchards (avocados) on steeper, rocky slopes has significantly decreased the amount of suitable habitat in southern California (Jennings and Hayes 1994). Jennings and Hayes (1994) estimated that the rattlesnake has lost at least 20% of suitable habitat within its range due to urban and agricultural development. In addition, the negative image of rattlesnakes held by many people may have accelerated the local extirpation of this shy species where rapid development is occurring, especially since large adult snakes have become increasingly rare since the early 1960s (Jennings and Hayes 1994). The large size, low population densities, relatively low fecundity, large home range, and restricted habitat affinities of this species make it especially susceptible to a variety of negative impacts.

AREA DESCRIPTION

On the Forests, the species occurs on the CNF and the San Jacinto District of the SBNF (Stephenson and Calcarone 1999).

DESIRED CONDITION

The red-diamond rattlesnake persists in healthy numbers throughout its historic range on the Forests. Road density in the species' range is significantly reduced so as to reduce fragmentation of the red-diamond rattlesnake's habitat and consequent road mortality.

OBJECTIVES

Ensure the persistence of red-diamond rattlesnakes throughout its historic range on the Forests.

Significantly reduce road density in the species' range.

Seek to acquire habitat from willing sellers for the red-diamond rattlesnake within and adjacent to the Forests. See section 17.0, *Land Protection Opportunities*.

Develop public education programs for all Forest areas to decrease direct human persecution of this and other rattlesnake species. See section 20.0, *Environmental Education*.

Minimize disturbance to suitable habitat for the species.

Reduce the overall density of roads in suitable habitat for the red-diamond rattlesnake to an average of no more than 1 mile of road per section.

Conduct research to determine the habitat parameters critical to red-diamond rattlesnakes, and how these are important to its ecology. In particular, examination of the relationship between population viability, habitat variability, and habitat patch size is critically important.

STANDARDS

The Forest Service shall, prior to authorizing, permitting, or allowing any ground disturbance in suitable habitat for the red-diamond rattlesnake, conduct surveys for the presence of the species. Prior to any ground disturbance in such habitat, the Forest Service shall erect and maintain for at least 30 consecutive days during the activity season of the species (generally April though October) snake exclusion fencing that allows snakes to escape but not reenter the project site.

Section 7.12
SOUTHWESTERN POND TURTLE

ISSUE STATEMENT

Justification for Selection

The Southwestern pond turtle (Clemmys marmorata pallida) was chosen as a MIS/focal species because protection of this species would help achieve the goals of stream restoration, watershed protection, restoration of flood disturbance regimes, restoration and protection of connectivity, and elimination or control of exotic species. The pond turtle was chosen as a habitat quality indicator species. *Habitat Quality Indicator:* The southwestern pond turtle is an ideal barometer for the health of aquatic ecosystems because they are negatively impacted by predatory invasive species, alteration of aquatic and surrounding terrestrial habitats, and water pollution – impacts that are also causing the decline of numerous other aquatic wildlife species. The main threat to the southwestern pond turtle is the alteration and loss of both terrestrial and aquatic habitats, resulting from dams, water diversions, and stream channelization and development in adjacent upland areas.

Life History, Status, and Habitat

Historically, the western pond turtle had a relatively continuous distribution in most Pacific slope drainages from Klickitat County, Washington, along the Columbia River to northern Baja California, Mexico (Zeiner et al. 1988, Jennings and Hayes 1994). The species ranges from sea level to approximately 4,500 feet in elevation, although there are a few records for higher altitudes. The southwestern subspecies occupies the area from central coastal California southward into northern Baja California Norte (Stebbins 1954; Holland 1992, 1994; Holland and Bury in press). The area of the central valley is considered a zone of intergradation between the two subspecies, the northwestern pond turtle (Clemmys marmorata marmorata) and the southwestern pond turtle (Clemmys marmorata pallida; Seeliger 1945), although more recent work (Holland 1992) indicates that there may be 3 species-level entities within the currently recognized single species. Loss of suitable aquatic and terrestrial habitat via dams, diversions, stream channelizations, and development in adjacent upland areas, especially in lower-elevation foothills and valleys, has significantly decreased numbers of C.

marmorata pallida. The southwestern pond turtle is now listed as federally Sensitive and a California Species of Special Concern, and has been recommended for listing as State Endangered (Jennings and Hayes 1994).

The southwestern pond turtle is found in a variety of fresh and brackish-water habitats, including the edges of salt marsh and estuarine areas (Jennings and Hayes 1994). They are most common in coastal streams and lagoons, and interior streams, and sometimes in vernal pools and other ephemeral habitats. In southern California, pond turtles were thought to occur mostly in rivers and streams with persistent deep pools, (Stephenson and Calcarone 1999); however, their preferences are actually more complex than indicated (D.Holland, pers. comm.). Habitats can be either rocky or mud-bottomed (Zeiner et al. 1988, Jennings and Hayes 1994). The extent and nature of emergent basking sites is highly variable. In some systems, this species may exceed 2,470 individuals per acre of water surface and may constitute the dominant element of the vertebrate biomass (D. Holland, pers. comm.).

C. marmorata pallida is a highly aquatic turtle, but individuals leave the water to bask, lay eggs, overwinter, and disperse overland (Stebbins 1954, Holland and Bury in press). Turtles engage in both terrestrial and aquatic thermoregulation (Holland 1994); in the latter case they may engage in emergent basking or bask in thermoclines at the water's surface (aquatic basking) (Holland 1994, Holland and Bury in press). Turtles engage in a complex repertoire of use of terrestrial and aquatic habitats; in many lacustrine systems they may overwinter in the water, often in large concentrations in preferred microsites. In palustrine systems they may leave the water in the late fall or winter and overwinter in a variety of vegetation types. While post first-year animals occur in a wide range of aquatic habitats, hatchling/first-year animals are most typically found in shallow water microenvironments, often with a significant amount of emergent vegetation (sedges, reeds, cattails, tules) that provide both cover and foraging sites. Nests occur on slopes from 0-45o F, up to 400 m+ from the water's edge. Nest sites may be extremely localized and clustered, and are usually characterized by compact soils, sparse vegetative cover, and a south-, east-, or west-facing aspect.

Factors that threaten the southwestern pond turtle include the extensive loss and alteration of both aquatic and terrestrial habitats, the continuing (illegal) capture and sale of wild turtles for food and the pet trade, and predation and/or competition by non-native species such as largemouth bass, other centrarchid and ictalurid fishes, and bullfrogs. Numerous species of non-native aquatic turtles have been recovered from western pond turtle habitat (D. Holland, pers. comm.) and may pose a threat through transmission of pathogens or parasites, competition, or interference with normal behavior (Holland 1994, Jennings and Hayes 1994). The collection of pond turtles remains a significant problem in some areas easily accessible to humans (Stephenson and Calcarone 1999). However, the alteration and loss of both terrestrial and aquatic habitats, resulting largely from dams, water diversions, and stream channelization and development in adjacent upland areas, is possibly the greatest threat to the subspecies. *C. m. pallida* can occasionally be found in reservoirs, stock ponds, and sewage treatment ponds, but there is evidence that reproductive success there is low and that these habitats may be sinks (Jennings and Hayes 1994). The reduced availability of water makes pond turtles particularly vulnerable to extended droughts, and small populations on highly intermittent streams can be wiped out. Existing evidence (Holland and Bury in press) indicates that declines in some southern California populations during the drought of 1987-1991 approached 85%. Existing “conservation” plans such as Multiple Species Habitat Conservation Plans do not provide adequate protection for southwestern pond turtle populations (D. Holland, pers. comm.).

The southwestern pond turtle is an ideal barometer for the health of aquatic ecosystems because they are negatively impacted by predatory invasive species, alteration of aquatic and surrounding terrestrial habitats, and water pollution – impacts that are also causing the decline of numerous other aquatic wildlife species. Protecting and restoring habitat for the long-lived turtle will benefit the entire aquatic ecosystem.

AREA DESCRIPTION

On the Forests, the southwestern pond turtle occurs in 40-50 streams in the LPNF, including Piru Creek, Sespe Creek, Indian Creek/Mono Creek area, Sisquoc River/Manzana Creek area, Alamo Creek, Nacimiento River, and Arroyo Seco Creek. South of the Santa Clara River, the subspecies has declined to only about 6-8 sites with populations of 30 or more turtles. One large population occurs on the ANF on the west fork of the San Gabriel River below Cogswell reservoir, and some small populations occur on upper Castaic Creek, Aliso Canyon, Pacoima Creek, Little Tujunga Creek, Big Tujunga Creek, east fork of the San Gabriel River, and maybe Big Dalton Creek. On the SBNF, some small populations may occur in Cajon Wash, Deep Creek, and the west fork of the Mojave River below Silverwood Lake, and 2 large populations occur on the CNF at San Mateo Creek and Pine Valley Creek (Stephenson and Calcarone 1999).

DESIRED CONDITION

Pristine aquatic habitat is preserved and degraded habitat has been restored to where persistent, pooled water occurs within free-flowing, low- to mid-elevation streams throughout the Forests. Water quality is high, and water availability is sufficient to maintain viable populations of southwestern pond turtles throughout their historic range. Terrestrial habitats adjacent to aquatic habitats have a buffer zone of at least 1,700 feet (500 m) on both sides from the edge of the water to protect nesting, overwintering, and dispersal habitat.

Aquatic habitats are also free from exotic invasive fauna that prey on or compete with southwestern pond turtles as well as other sensitive and endangered native fish such as the southern steelhead, Santa Ana speckled dace, the partially unarmored threespine stickleback, and the Arroyo chub, as well as other listed species (California red-legged frog, arroyo toad). See sections 8.0, *Listed Species,* and 9.0, *Sensitive Species Management*.

OBJECTIVES

Preserve and rehabilitate historic aquatic habitat sites of the southwestern pond turtle, along with the maximum amount of necessary terrestrial habitat associated with those breeding sites.

Preserve and rehabilitate areas broad enough to allow the movement of adult females to and from the nesting location and the movement of hatchlings from the nest to the aquatic site.

Remove exotic aquatic fauna that may prey on or compete with southwestern pond turtles.

Preserve and rehabilitate historic aquatic habitat sites of the southwestern pond turtle, along with the maximum amount of necessary terrestrial habitat associated with those breeding sites. A minimum buffer of 1,700 feet (500 m) shall be protected on both sides of any watercourse holding southwestern pond turtles.

Preserve and rehabilitate areas broad enough to allow the movement of adult females to and from the nesting location and the movement of hatchlings from the nest to the aquatic site. These areas shall be fenced to ensure necessary movement and that nests will not be trampled during incubation.

Aggressively remove/eradicate exotic aquatic fauna that may prey on or compete with southwestern pond turtles. See section 10.0, Invasive Species Management.

Conduct studies to examine mortality linked to upper respiratory disease syndrome, and possible environmental causes.

Work co-operatively with property owners to eliminate or minimize habitat for exotic species on private lands adjacent to or within the Forests.

Increase patrols/law enforcement efforts in areas where turtles are likely heavily harvested for food.

STANDARDS

The Forest Service shall prohibit use of translocation/relocation as a mitigation strategy.

The Forest Service shall require use of raccoon/bear-proof garbage receptacles in campgrounds and recreational residences to prevent increases in local meso- and macro-predator populations.

The Forest Service shall prohibit dumping of raccoon/opossum/skunk on National Forest lands by local animal control agencies.

The Forest Service shall prohibit fishing in areas that harbor significant turtle populations, as pond turtles will bite on non-baited hooks such as lures.

The Forest Service shall prohibit human translocation or introduction of exotic organisms into aquatic habitats. This includes mosquitofish, non-native trout, and all other exotic fish species.

ISSUE STATEMENT

California supports the second-greatest number of federally listed species in the United States, exceeded only by Hawaii (USFWS 2001a). Southern California, in particular, is a hotspot of diversity for nearly every taxonomic group; in fact, many listed species are endemic to the region, meaning they occur nowhere else on Earth. This is the most threatened hotspot of biodiversity in the U.S., with more than 200 species of plants and 200 species of animals considered threatened or sensitive by government agencies and conservation groups (Hunter 1999). The 4 southern California national forests (Forests) provide the last refuge for many of the listed plant and wildlife species that occur in the bioregion. In 1989, 17 species were listed as threatened or endangered throughout the Forests. Today, there are 76 federally and/or state-listed species, and several more sensitive species that are in need of additional protection. In fact, Stephenson and Calcarone (1999) identified 181 species that occur on or near the 4 Forests that warrant special consideration.

The high concentration of listed and sensitive species occurs primarily because 20 million people live within the metropolitan Los Angeles and San Diego areas, making this one of the most densely populated regions in North America. As such, the natural landscape has dramatically changed; fragmentation, degradation, and outright destruction of habitat have occurred throughout the bioregion, and continue daily. Conversely, the Forests have remained relatively unfragmented in nature and have become a refuge for many indigenous plant and animal species, many of which are federally and/or state-listed species. The Forests are the largest publicly protected lands in the archipelago of remaining natural open space amid one of the world's largest metropolitan areas.

The Forests are fundamentally part of one ecological system, yet development within and between the forests is threatening to sever natural connections. While populations of some listed species have naturally isolated distributions, others require habitat connectivity for their survival (see section 14.0, *Habitat Linkages*). Ensuring connectivity among the 4 Forests and proper management of these lands is crucial to the conservation and recovery of numerous federally and/or state-listed plant and wildlife species, as well as sensitive species and natural communities (see section 9.0, *Sensitive Species,* and section 5.0, *Vegetation Management*).

The USFWS is required to designate critical habitat concurrently with a species being listed under the Endangered Species Act. However, critical habitat has never been designated for many listed species, such as the unarmored three-spined stickleback. The stickleback was federally listed as an endangered species in 1970, and was state-listed as endangered in 1971; a proposal for critical habitat was issued in 1980 (CDFG 2000), but twenty years later, critical habitat has still not been designated. Public or privately held land may be designated as critical habitat. The current Administration has recently asked a federal judge to invalidate several hundred thousand acres of land deemed essential for the survival or two southern California endangered species, the coastal California gnatcatcher, and the San Diego fairy shrimp. In addition, the USFWS has been ordered to reevaluate millions of acres of critical habitat already designated for ten species, a number of which occur in southern California, such as the arroyo southwestern toad and California red-legged frog (LAT 2001). This type of rollback on federal habitat protections will not likely eliminate Forest Service lands that have been designated as critical habitat, but the importance of Forest Service lands to the conservation and recovery of these species will dramatically increase, should these reductions in critical habitat be executed.

In 1998, the U.S. Forest Service was charged with being in violation of the Endangered Species Act, as the agency was not taking necessary management actions or precautions to protect and ensure the recovery of listed and sensitive species that occur in the Forests. The settlement required the Forest Service to update its management plans to reflect the needs of these imperiled species. The Forests have already begun to implement conservation measures recommended by the USFWS, but much remains undone. Please see sections on individual species that follow for specific objectives and guidelines.

AREA DESCRIPTION

A total of 36 federally and/or state-listed plant species occur or have the potential to occur on one or more of the four Forests (Table 8-1), while 40 federally and/or state-listed wildlife species are present or likely to occur (Table 8-2) (Stephenson and Calcarone 1999).

TABLE 8-1

FEDERALLY AND/OR STATE-LISTED PLANT SPECIES

Status			Occurrence by Forest			
FEDERAL	**STATE**	**LISTED PLANT SPECIES**	**CNF**	**SBNF**	**ANF**	**LPNF**
FT	CE	Encinitas baccharis	Y			
PE	CT	La Graciosa thistle				Y
FE		San Bernardino Mtns bladderpod		Y		
FE		Cushenbury milk-vetch		Y		
FE		Cushenbury buckwheat		Y		
FE		Cushenbury oxytheca		Y		
FT		Parish's daisy		Y		
SC/S	CE	Mojave tarplant	Y	Y	P	
FE		California taraxacum		Y		
FE	CE	Nevin's barberry	Y	H/P	Y	
FE	CE	California jewelflower				P
FE		Gambel's water cress	P	P		
FE	CE	Slender-petaled thelypodium		Y		
	CE	Cuyamaca Lake downingia	P			
FE	CE	Marsh sandwort		P		
FT		Big Bear Valley sandwort		Y		
FT		Southern mountain buckwheat		Y		
FT		Ash-gray Indian paintbrush		Y		
FT		Santa Monica Mtns dudleya	Y		P	
FE		Braunton's milk-vetch	P		P	
FE		Coachella Valley milk-vetch		P		
FE		Triple-ribbed milk-vetch		P		
FT	CE	San Diego thorn-mint	Y			
SC/S	CE	Parish's meadowfoam	Y			
FE		Kern mallow				P
FE	CE	Bird-footed checkerbloom		Y		
FE	CE	Santa Ana River woollystar		H/P		
FT		Hoover's eriastrum				Y
FE	CE	Slender-horned spineflower	Y	Y		
FT	CE	Vail Lake ceanothus	Y			
FE	CR	Mexican flannelbush	P			
FE	CT	Munz's onion	Y			

FT	CE	Thread-leaved brodiaea	Y	P	P	
PT	CR	Camatta Canyon amole				Y
	CE	Dehesa nolina	P			
FE		San Bernardino blue grass	Y	Y		

FEDERAL STATUS CODES:

FE = Federally Listed Endangered
FT = Federally Listed Threatened
SC = Federal Species of Concern
S = Forest Service Sensitive List
PE = Federally Proposed Endangered
PT = Federally Proposed Threatened
C = Candidate

STATE STATUS CODES:

CE = State-Listed Endangered
CT = State-Listed Threatened
SSC =State Species of Special Concern
CR = State-Listed Rare

FOREST OCCURRENCE CODES:

Y = occurs
P = potentially occurs
H = historically occurred

TABLE 8-2

FEDERALLY AND/OR STATE-LISTED WILDLIFE SPECIES

Status			Occurrence by Forest			
FEDERAL	**STATE**	**SPECIES**	**CNF**	**SBNF**	**ANF**	**LPNF**
INVERTEBRATES						
FE		Conservancy fairy shrimp				P
FE		Longhorn fairy shrimp				P
FT		Vernal pool fairy shrimp	P			P
FE		Smith's blue butterfly				Y
FE		Quino checkerspot butterfly	H/P	P	P	
FE		Laguna Mountains skipper butterfly	Y			
FISH						
FE/T	SSC	Southern steelhead	H/P	H	H	Y
FE	CE	Mojave tui chub		Y (H)		
FT	SSC	Santa Ana sucker	H	H/P	Y	Y
FE	CE	Unarmored 3-spined stickleback			Y	
FE		Shay Creek stickleback		Y		
FE	SSC	Tidewater goby				P
AMPHIBIANS						
PE		California tiger salamander				P
	CT	Tehachapi slender salamander			P	P

FE	SSC	Arroyo toad	Y	Y	Y	Y
FT	SSC	California red-legged frog	H/P	H/P	Y	Y
PE		Mountain yellow-legged frog	H	Y	Y	
REPTILES						
FT	CT	Desert tortoise		P	P	
FE	CE	Blunt-nosed leopard lizard				P
S	CT	Southern rubber boa		Y		
BIRDS						
FE	CE	California brown pelican				Y
FT	SSC	Snowy plover				P
FE	CE	Least tern				Y
FT	CE	Marbled murrelet				Y
FE	CE	California condor	H	H	H	Y
FT	CE	Bald eagle	W	Y	W	W
S	CT	Swainson's hawk	T	T	P	P
FE	CE	American peregrine falcon	Y	Y	Y	Y
S	CE	Yellow-billed cuckoo				P
FE		Southwestern willow flycatcher	Y	Y	Y	Y
FT	SSC	California gnatcatcher	Y	P		
FE	CE	Least bell's vireo	Y	P	P	Y
MAMMALS						
	CT	San Joaquin antelope squirrel				P
SC	CT	Mojave ground squirrel		P	P	
FE	SSC	Pacific pocket mouse	P			
FE	CE	Giant kangaroo rat				P
FE	CT	Stephen's kangaroo rat	Y	P		
FE	SSC	San Bernardino kangaroo rat		Y	P	
FE	CT	San Joaquin kit fox				T
FT		Southern sea otter				Y
FT		Stellar sea lion				Y
FE	CT	Peninsular bighorn sheep		Y		

FEDERAL STATUS CODES:

FE = Federally Listed Endangered
FT = Federally Listed Threatened
SC = Federal Species of Concern
S = Forest Service Sensitive List
PE = Federally Proposed Endangered
PT = Federally Proposed Threatened

STATE STATUS CODES:

CE=State-Listed Endangered

FOREST OCCURRENCE CODES:

Y = occurs; breeds or probably breeds
H = historically occurred and bred
P = potentially occurs and breeds
T = transient, migrates through forest
W = winters on forest

CT=State-Listed Threatened

SSC=State Species of Special Concern

DESIRED CONDITION

The Forest Service actively participates in the conservation and recovery of listed and sensitive plant and wildlife species, through habitat protection, restoration and enhancement projects, research and monitoring, inter-agency coordination, conservation measures, production of education and outreach materials and planning of activities for Forest Service personnel and visitors, and resolution of resource conflicts.

OBJECTIVES

Identify potential resource conflict areas for all listed species to prioritize management actions.

Identify and protect additional land supporting key populations of all listed species and/or facilitating movement between subpopulations, by acquisition of title, conservation easement, or other mechanisms (USFWS 1998c, see section 17.0, *Land Protection Opportunities*, and section 14.0, *Habitat Linkages*).

STANDARDS

The Forest Service shall conduct a GIS analysis for each listed species by overlaying key, occupied, and modeled habitat for each listed species with activity coverages (range allotments, road and trail crossings, campgrounds, etc.) to identify potential resource conflict areas in order to prioritize management actions and restoration priorities.

The Forest Service shall conduct a GIS analysis that overlays all data layers for listed species' key, occupied, and modeled habitat as generated in the above standard.

The Forest Service shall treat all applicable recommendations of a recovery plan for any listed species as enforceable standards within the Forest Plan.

The Forest Service shall prohibit adverse modification of any designated critical habitats.

The Forest Service shall not permit filming in sensitive plant habitat.

Please refer to the sections that follow for specific guidelines for each listed species.

Section 8.1

ENCINITAS BACCHARIS

ISSUE STATEMENT

Federally listed as threatened October 7, 1996 (61 FR 52370)
State-listed as endangered, January 1987
CNPS 1B, 2-3-3

Historically the Encinitas baccharis (*Baccharis vanessae*) was known from 22 different occurrences. Three populations are known to be extirpated and many others are on private lands that are being developed. Currently this species is known from 14 populations including Encinitas, Carmel Mountain, Mt. Israel-Del Dios, 4S Ranch, Mt Woodson-Iron Mountain, Poway, and Mira Mesa, and the San Mateo wilderness (USFWS 2001a). Development is the primary threat to this species. It is considered one of the rarest shrubs in southern California (Reiser 1994). The CDFG, within the CNF, has identified this species as having a declining population and low vulnerability on Forest Service lands (USFS 1999; CDFG 2000).

AREA DESCRIPTION

Only one recorded occurrence has been located on Forest Service lands within San Mateo Wilderness Area in CNF, and that occurrence is currently made up of only one shrub (USFS 2002). When first located, the population was estimated

to be 8-12 individuals (Boyd et al. 1992). Occupied habitat for this species is 1 acre, while modeled habitat is 7,169 acres (USFWS 2001a). The Encinitas baccharis is included in a conservation strategy for coastal sage scrub (Forest Service/FWS/CDFG 1997).

DESIRED CONDITION

Strongest conservation of populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for Encinitas baccharis. Introduction of the species into appropriate areas. Maintain hydrology upon which the species is dependent.

OBJECTIVES

Establish SMA(s) for the Encinitas baccharis to be managed for conservation and recovery of the species.

Allow no impact to any Encinitas baccharis population.

Maintain and enhance potential and occupied habitat for Encinitas baccharis through a variety of techniques.

Complete a feasibility study for introduction to suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from "jeopardy." Introduce the species into appropriate historically occupied areas.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Implement control burns at the appropriate time of year, and within appropriate intervals, to allow for chaparral regeneration. Maps of known locations will be provided to all Forest fire personnel.

Use interpretive signing, fencing, barriers, and/or parking delineations, as well as brochures to direct uses and discourage impacts.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall initiate surveys in modeled habitat to detect presence of species, and if found, implement management as noted above.

Section 8.2
LA GRACIOSA THISTLE

ISSUE STATEMENT

Listed as federally endangered on March 20, 2000 (65 FR 14888)
State-listed as threatened in February 1990
CNPS 1B, 3-3-3

La Graciosa thistle (*Cirsium loncholepis*) is endemic to the central and south central coast of California. It is currently restricted to Guadalupe Dune system in southern San Luis Obispo and northern Santa Barbara counties. In 1998, the species was found near Willow Creek on the Monterey Ranger District of LPNF in Monterey County (USFWS 2001a).

AREA DESCRIPTION

The single population of La Graciosa thistle in LPNF is estimated at 50 plants in the Willow Creek area (USFWS 2001a). It is located in a different habitat than the rest of the populations further south, occurring on serpentine grasslands (versus back dune riparian areas), where it exploits "winter-wet" openings in the coastal scrub. It is identified as a declining

population on Forest Service lands with low vulnerability (Stephenson and Calcarone 1999). Because of the unclear habitat requirements for this species, no modeling of habitat has been completed at this time (USFS 2002). Threats in the LPNF include invasive exotics (especially pampas grass), road maintenance, and recreation. Because of this population's small size, it is identified as "particularly vulnerable to extinction from naturally occurring events" in the LPNF (USFWS 2001a).

DESIRED CONDITION

Strongest conservation of populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for La Graciosa thistle. Introduction of the species into appropriate areas. Maintain hydrology upon which the species is dependent.

OBJECTIVES

Establish SMAs for La Graciosa thistle to be managed for conservation and recovery of the species.

Allow no impact to any La Graciosa thistle population.

Maintain and enhance potential and occupied habitat for La Graciosa thistle through a variety of techniques.

Complete a feasibility study for introduction to suitable habitat or reintroduction into historic locations. Implementation of a successful introduction/re-introduction program will augment the species, moving it farther from "jeopardy." Introduce the species into appropriate areas.

Maintain hydrology upon which La Graciosa thistle is dependent.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Implement exotic species control where La Graciosa thistle occurs. This is particularly important because of the fact that this population is adjacent to a county road, and roads are known vectors for exotic species dispersal. This project should be coordinated with the county's Weed Management Area.

Evaluate the impact of grazing on the La Graciosa thistle and manage accordingly for the thistle's conservation.

Evaluate hydrological regime of the species and maintain appropriate hydrology.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall continue to coordinate with the Monterey County Road Department to eliminate impacts to the plants from road maintenance activities along Willow Creek Road. This can include exotic species issues (see below).

The Forest Service shall minimize backfires within habitat (USFWS 2001a).

The Forest Service shall prohibit establishment of helibases, staging areas, firebreaks, or other areas of high human concentration and equipment in habitat (USFWS 2001a). Include resource advisors at the beginning of fire incidents for species protection (USFWS 2001a).

The Forest Service shall provide maps of known locations to Forest fire personnel (USFWS 2001a).

The Forest Service shall protect burned areas from vehicle damage (USFWS 2001a).

The Forest Service shall use localized fire suppression strategies that minimize effects on known habitat (USFWS 2001a).

The Forest Service shall eliminate dispersed recreation in the location of La Graciosa thistle and use interpretive signing, fencing, barriers, and/or parking delineations, as well as brochures to direct uses and discourage impacts.

The Forest Service shall persevere with modeling habitat for the La Graciosa thistle in the LPNF. When modeled habitat

is derived, initiate surveys in those areas.

Section 8.3
CARBONATE PLANTS

ISSUE STATEMENT

Cushenbury milk-vetch (*Astragalus albens*), Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*), Cushenbury oxytheca (*Oxytheca parishii* var. *goodmaniana*), and San Bernardino Mountains bladderpod (*Lesquerella kingii* ssp. *bernardina*) were federally listed as endangered on August 24, 1994 (59 FR 43652). Parish's daisy (*Erigeron parishii*) was federally listed as threatened on August 24, 1994 (59 FR 43652). Draft Recovery Plan was issued in 1997. Draft Critical Habitat was issued in February 2002.

CNPS
Cushenbury milk-vetch, Cushenbury buckwheat, Cushenbury oxytheca, and San Bernardino Mountains bladderpod 1B, 3-3-3
Parish's daisy 1B, 2-3-3

The carbonate plants are endemic to the transmontane slopes of the San Bernardino Mountains. "The carbonate plants are sensitive to disturbance due to the fact that they are habitat specialists with restricted ranges. Also, they occur in a naturally fragmented landscape that has been increasingly fragmented by human use. Finally, all remaining occurrences of the carbonate plants are at risk because of their small population sizes." (USFWS 2001a)

AREA DESCRIPTION

Cushenbury milk-vetch is known from 33 occurrences throughout a 15-mile range of the eastern part of the carbonate belt, from the east side of Dry Canyon southeast to Lone Valley. Top Spring-*Smarts Ranch Road is a primary population center (USFWS 2001a). The primary threat to the species is limestone mining; 97% of habitat is under a mining claim or patent. Secondary threats include roads, ORVs, and grazing.

Parish's daisy is the most wide-ranging of the five carbonate plants; it is known from 50 occurrences. Historic locations outside of range of other carbonate plants include Long Canyon in the Little San Bernardino Mountains; Rattlesnake Canyon south of Old Woman Springs; the Burns Pinyon Ridge Reserve; and a site near Pioneertown (USFWS 2001a). The primary threat is limestone mining; 73% of known occurrences are under mining claim or patent. Secondary threats are the same as for the Cushenbury milk-vetch, listed above.

Cushenbury buckwheat is limited to the carbonate belt on the northern slopes of the San Bernardino Mountains, ranging about 25 miles. On limestone substrate, it occurs in the White Knob area, and from Arctic/Bousic Canyon west to Terrace Springs, south to Top Spring, and along the north side of Lone Valley to Tip Top Mountain. On dolomite substrate, it occurs at Bertha Ridge, north Holcomb Valley, Jacoby Canyon, and along Nelson Ridge. In Furnace Canyon it is found on a mixed substrate of limestone, dolomite, and granite. It is also found on Heartbreak Ridge on unspecified carbonate soils. Recent botanical surveys have found additional populations in Jacoby Springs, north of Mineral Mountain, and the west side of White Mountain. Twelve additional populations were also noted within the current known range of the species (USFWS 2001a). The primary threat is limestone mining; 75% of habitat is under mining claim or patent. Secondary threats are the same as above.

Cushenbury oxytheca is the most restricted of the carbonate plants with the fewest number of occurrences. Occurrences include: near Cushenbury Spring; near Cushenbury, Marble, Arctic, Wild Rose, and Furnace Canyons; on Blackhawk Mountain; at Terrace Springs; and near abandoned Green Lead gold mine. Three recently recorded occurrences are found along Helendale Fault near Tip Top Mountain, Mineral Mountain, and Rose Mine (USFWS 2001a). The primary threat to Cushenbury oxytheca is limestone mining; 79% is under mining claim or patent. Secondary threats are the same as above.

San Bernardino Mountains bladderpod occupies smallest known range of the 5 carbonate plant species. It exists in two areas on either side of Bear Valley, one cluster at the east end of Bertha Ridge, the other on the north-facing slope of Sugarlump Ridge (USFWS 2001a). The Bertha Ridge occurrence is under mineral claim.

There are 30,201 acres of key habitat and 340 acres of occupied habitat identified in SBNF (USFWS 2001a).

DESIRED CONDITION

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for the carbonate plants. reintroduction of the species into appropriate areas from which they were extirpated. Maintain hydrology upon which the species is dependent.

OBJECTIVES

Establish SMAs for the carbonate plants to be managed for conservation and recovery of the species.

Allow no impact to any of the carbonate plant populations.

Maintain and enhance potential and occupied habitat for the carbonate plants through a variety of techniques.

Re-introduce the species into appropriate areas from which it was extirpated.

Maintain ecological processes upon which the carbonate plants are dependent.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Develop a reserve design that will provide for long-term protection, survival, and recovery of the carbonate plants in key, occupied, and modeled habitat (USFWS 2001a). Continue to work with USFWS, BLM, state agencies, mining interests, and environmental groups to implement the Carbonate Habitat Management Strategy (CHMS). This ongoing planning effort will provide plant conservation through a variety of strategies, including withdrawal from mineral entry, conservation-oriented project design, and restoration.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

Work with Sportsman's Club Shooting Range, Lakeview Recreation Residence tract, and Lutheran Church to minimize impacts from trails originating on private lands and continuing onto National Forest Service lands in areas north of the Whispering Forest, which is known to contain the San Bernardino Mountains bladderpod and the Cushenbury buckwheat. Use interpretive signing, fencing, barriers, brochures, and/or parking delineations to direct uses and discourage impacts.

STANDARDS

The Forest Service shall minimize impacts in the engineering and maintenance of haul access roads. Eliminate sidecasting by meeting annually to approve maintenance plans (USFWS 2001a).

The Forest Service shall review known occurrences and investigate modeled habitat in or adjacent to active mining operations and assessment sites to determine on-site avoidance measures. Consider in key, occupied, and modeled habitat (USFWS 2001a).

The Forest Service shall eliminate burros from the CHMS area.

The Forest Service shall, with 16 miles of system roads known to occur in known habitat, place interpretive signs at the roadside regarding the site and special plant habitat. Continue coordination/briefing with road maintenance staff on the location and sensitivity of the carbonate plant habitat.

The Forest Service shall close the 4 miles of non-system roads that occur in known carbonate plant habitat within 1 year of plan adoption.

The Forest Service shall work with BLM to prevent cattle trespass from Rattlesnake Allotment onto National Forest Service lands by constructing and maintaining fencing.

MOJAVE TARPLANT

ISSUE STATEMENT

State-listed as endangered in August 1981
CNPS 1B, 2-1-3

The Mojave tarplant (*Deinandra [Hemizonia] mohavensis*) is restricted to moist drainages on the arid slopes of the Peninsular range in Riverside and San Diego counties, on the north side of the San Bernardino mountains in San Bernardino County, and on the desert slopes of the southern Sierra Nevada in Kern County (Sanders 1998). Threats to the species include alteration of hydrology, ORVs, development, and grazing (Sanders 1998). The Mojave tarplant is identified as having a stable population trend (Stephenson and Calcarone 1999), and the CDFG has also identified it as stable (CDFG 2000).

AREA DESCRIPTION

The Mojave tarplant is known to occur in the CNF and SBNF. Potential habitat has been modeled in the ANF as well (Stephenson and Calcarone 1999).

DESIRED CONDITION

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for Mojave tarplant. reintroduction of the species into appropriate areas from which it was extirpated. Maintain hydrology upon which the species is dependent.

OBJECTIVES

Establish SMAs for the Mojave tarplant to be managed for conservation and recovery of the species.

Allow no impact to any Mojave tarplant populations.

Maintain and enhance potential and occupied habitat for Mojave tarplant through a variety of techniques.

Implement weed abatement throughout Mojave tarplant's range on Forest Service land. Implement exotic species control where Mojave tarplants occur. These projects will be coordinated with the counties' Weed Management Areas.

Complete a feasibility study for introduction to suitable habitat or reintroduction into historic locations. Implementation of a successful introduction/re-introduction program will augment the species, moving it farther from "jeopardy." Re-introduce the species into appropriate areas from which it was extirpated. Initial and ongoing weed abatement of the exotic dandelion should be strongly emphasized.

Maintain hydrology upon which the Mojave tarplant is dependent.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Secure water rights to ensure persistence of the Mojave tarplant. Establish natural hydrological regimes that support populations of the Mojave tarplant.

Continue review of all system roads in known occupied habitat to determine actions to completely avoid impacts in those areas. Eliminate redundant or unauthorized routes or trails in Mojave tarplant habitat and reroute existing trails if they may have a detrimental effect on the species, including an evaluation of the effect of the disturbance regime on establishment/spread of exotic species.

Eliminate any activities that would cause fugitive dust/mud deposition on the Mojave tarplant. Dust/mud deposition could potentially negatively impact metabolic processes such as photosynthesis, transpiration, etc., thereby effectively lowering overall plant productivity (Farmer 1993).

Minimize/eliminate conflicts with recreationists at the high-impact areas through installation of interpretive signs and by directing activities away from Mojave tarplant habitat.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall implement surveys in modeled habitat.

The Forest Service shall remove organizational facilities or portions of permitted areas from mesic areas in the Mojave tarplant's occupied and modeled habitats to eliminate or minimize impacts. The layout of campgrounds/developed areas and automobile and interpretive stops will be evaluated to determine their appropriateness of interface with sensitive species protection, especially where conflicts have been identified. Place interpretive signs at the roadside regarding the site and special plant in occupied and modeled habitats.

The Forest Service shall monitor existing known populations on Forest Service lands at least once every 5 years, or whenever rainfall is adequate to allow a complete annual lifecycle, so that trends in the populations can be evaluated.

The Forest Service shall eliminate grazing of all feral/domestic animals from Mojave tarplant habitat, except where it can be proven to be beneficial to the species.

Section 8.5

CALIFORNIA TARAXACUM

ISSUE STATEMENT

Federally listed as endangered September 14, 1998 (63 FR 49006)
CNPS 1B, 3-2-3

California taraxacum (*Taraxacum californicum*) is endemic to the San Bernardino Mountains, ranging from Holcomb and Big Bear Valleys to the South Fork Meadows in the Santa Ana River watershed. Roughly 20-25 occurrences are currently known – half within or adjacent to urbanized areas such as Big Bear City, Big Bear Lake Village, and Sugarloaf (USFWS 2001a). On Forest Service lands, 11 extant locations are in SBNF, and 6 historic locations have also been documented (a). This species is identified as having a declining trend with high vulnerability on Forest Service lands (Stephenson and Calcarone 1999). Threats to the species include genetic swamping by the weedy exotic dandelion (*Taraxacum officinale*), which is the greatest threat, as well as roads, mining, and recreational activities. SBNF indicates that even if most of the remaining meadow habitat were protected, that may not be enough to maintain the species in the long term without additional recovery efforts (USFS 2000a).

AREA DESCRIPTION

This species occurs in moist meadows. Extant occurrences in SBNF include areas on N. Shore Big Bear Lake, Belleville Meadow, North Baldwin, W. Hitchcock Ranch, Big Meadow, Green Spring, S. Fork Santa Ana River, Wildhorse Meadow, Bluff Lake Area, Fish Creek, San Y Ca Spring, Cedar Lake, Bluff Lake Area, South Baldwin Lake, and Juniper Point Meadow (USFWS 2001a). Historic occurrences in SBNF include Converse Station, Heartbar Creek, Section 18 (north of S. Fork Campground), Lost Creek, and Seven Oaks (USFWS 2001a).

DESIRED CONDITION

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for California taraxacum. reintroduction of the species into appropriate areas from which it was extirpated. Maintain hydrology upon which the species is dependent.

OBJECTIVES

Establish SMAs for the California taraxacum to be managed for conservation and recovery of the species.

Allow no impact to any California taraxacum populations.

Maintain and enhance potential and occupied habitat for California taraxacum through a variety of techniques.

Develop habitat management guidance for montane meadows (USFWS 2001a).

Remove organizational facilities or portions of permitted areas from meadow areas in TES species key, occupied, and modeled habitats when opportunities arise to eliminate or minimize impacts (USFWS 2001a). Evaluate the layout of campgrounds/developed areas and automobile and interpretive stops to determine their appropriateness of interface with sensitive species protection, especially where conflicts have been identified. Place interpretive signs at the roadside regarding the site and special plant in key, occupied, and modeled habitats (USFWS 2001a). Campgrounds in or adjacent to known or modeled habitat include Holcomb Valley (key), Coldbrook (modeled), Serrano (key), Hanna Flat (modeled), Heartbar (key), Converse (modeled), and Horse Springs (modeled) (USFWS 2001a). Special analysis of the disturbance regimes and potential for the exotic dandelion establishment and spread will also be considered.

Implement weed abatement of the exotic dandelion (*Taraxacum officinale*) throughout California taraxacum's range in the Forests, prioritizing California taraxacum locations that have controllable exotic dandelion populations and minimal disturbance. Genetic swamping is the greatest danger to this species, so a phased, prioritized, adaptive management strategy is necessary. Prioritization of implementation may be based on the size of the population of California taraxacum, the size of the population of the exotic dandelion, and the protection of the site from ground-disturbing activities. This project should be coordinated with the county's Weed Management Area.

Complete a feasibility study for introduction to suitable habitat or reintroduction into historic locations. Successful implementation of an introduction/re-introduction program will augment the species, moving it farther from "jeopardy." Re-introduce the species into appropriate areas from which it was extirpated. Initial and ongoing weed abatement of the exotic dandelion should be strongly emphasized.

Eliminate any activities that would cause fugitive dust/mud deposition on the California taraxacum. Dust/mud deposition could potentially negatively impact metabolic processes such as photosynthesis, transpiration, etc., thereby effectively lowering overall plant productivity (Farmer 1993).

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Eliminate redundant or unauthorized routes or trails in California taraxacum habitat and reroute existing trails if they may have a detrimental effect on the species, including an evaluation of the effect of the disturbance regime on establishment/spread of the exotic dandelion. Trails in or adjacent to habitat include: North Baldwin Ecological Reserve trail (key), Alpine Pedal Path (key), Sugarloaf (key), Gray's Peak Trail (modeled) Santa Ana River trail (key), Gold Fever automobile trail (key), and Siberia Creek Trail (key) (USFWS 2001a). At least 120 acres of key and 680 acres of modeled habitat are known to be overlapped by roads, ORV trails, stream crossings, and trails (USFWS 2001a).

Maintain hydrology upon which the California taraxacum is dependent.

Evaluate the effects of existing commercial water extraction from drainages supporting TES meadow plant habitat. Adjust extraction levels to eliminate impacts (USFWS 2001a).

Install boardwalks to protect TES meadow and pebble plains species and their habitat (USFWS 2001a). Replace unauthorized trials with boardwalks at appropriate locations in the Belleville Meadow Area (SBNF). Place interpretive signs at the roadside regarding the site and special plant in key, occupied, and modeled habitats (USFWS 2001a).

Minimize/eliminate conflicts with recreationists at the high-impact areas (Big Bear Lake and Baldwin Lake affect species (USFWS 2001a]) through installation of boardwalks and interpretive signs.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall implement surveys in ANF and SBNF in modeled habitat. In SBNF, implement a monitoring scheme so that all known locations (extant and historic) are monitored at least every 3 years, so that trends in the

populations can be addressed.

The Forest Service shall only permit driving on system and permitted roads through all meadow species habitat for emergencies and essential administrative purposes. Administrative uses shall occur only when meadows are dry (USFWS 2001a).

The Forest Service shall disguise rehabilitating trails from Holcomb Valley Campground (SBNF) that pass through occurrences or habitat. The area will be protected through barricading and signing. Trails connecting the campground to road 3N05, but which do not go through listed plant habitat, will be delineated and signed to encourage visitors to use those trails (USFWS 2001a).

The Forest Service shall continue review of all system roads in known occupied meadow plant habitat to determine actions to completely avoid impacts in those areas. As proposed in 1999, implement decision to close 3N16B and 3N16C (USFWS 2001a).

The Forest Service shall revise dispersed camping policy to eliminate meadow habitat from areas open to dispersed camping. Use interpretive signing, fencing, barriers, brochures, and/or parking delineations to direct uses and discourage impacts (USFWS 2001a).

The Forest Service shall initiate mineral withdrawal of claims at locations of key (7.2 acres) or modeled habitat. In the interim, monitor the prospecting activities (that require no federal notification). This activity could be in conjunction with weed abatement or monitoring activities. Under no circumstances would any claims be patented that are within key, occupied, or modeled habitat.

The Forest Service shall eliminate grazing of all feral/domestic animals from California taraxacum habitat, except where it can be proven to be beneficial to the species.

Section 8.6
NEVIN'S BARBERRY

ISSUE STATEMENT

Federally listed as endangered October 13, 1998 (63 FR 54956)
State-listed as endangered in January 1987
CNPS 1B, 3-3-3

Historically, Nevin's barberry (*Berberis nevinii*) was known from Riverside, San Bernardino, and Los Angeles counties. Currently, its range extends from the Castaic foothills northwest of the San Gabriel Mountains (San Francisquito Canyon) to near the foothills of the Santa Ana Mountains and Palomar Mountain. Extant occurrences are found at Dripping Springs (near Aguanga) and Scott Canyon. The largest known occurrence of Nevin's barberry is in Vail Lake/Oak Mountain area (USFWS 2001a). Nevin's barberry occurs on coarse soils along the margins of washes or in chaparral. Threats to Nevin's barberry include development, fire suppression, ORVs, and brush clearance (USFS 2002). A natural threat is sporadic viable seed production (Mistretta and Brown 1989). This species is identified as having declining population trends and low vulnerability on Forest Service lands (Stephenson and Calcarone 1999).

AREA DESCRIPTION

One population of Nevin's barberry in San Francisquito Canyon (ANF) has been fenced to prevent road maintenance impacts to some of the plants in this population. Other individuals occur upslope and are isolated from Forest Service activities. The population in Lopez Canyon (ANF) consists of a single individual right on the forest boundary (USFS 2002). Together these occurrences consist of approximately 138 acres in the ANF. Nevin's barberry also occurs on approximately 7 acres near the Agua Tibia Wilderness Area of the CNF and State Highway 79. This area burned in 1996 and vigorous resprouting and seedlings have been noted from this site (USFS 2002). There are historic records in SBNF and potential habitat still exists, but Nevin's barberry has not been observed recently (USFWS 2001a).

DESIRED CONDITION

Strongest conservation of populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for Nevin's barberry. Introduction of the species into appropriate areas.

OBJECTIVES

Establish SMAs for the Nevin's barberry to be managed for conservation and recovery of the species.

Allow no impact to any Nevin's barberry populations.

Maintain and enhance key and modeled habitat for Nevin's barberry through a variety of techniques.

Use interpretive signing, fencing, barriers, and/or parking delineations, as well as brochures to direct uses and discourage impacts along roads.

Eliminate vehicle trespass in the CNF.

Complete a feasibility study for introduction to suitable habitat. Introduce the species into appropriate areas. Implementation of a successful introduction program will augment the species, moving it farther from "jeopardy."

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Maintain appropriate fire regimes.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall maintain fencing at the San Francisquito roadside site.

The Forest Service shall continue surveys in modeled habitat to detect presence of species, and if found, implement management as noted above. Continue monitoring known populations at least every 3 years.

The Forest Service shall implement appropriate fire regimes to conserve Nevin's barberry. No fuel breaks or other fire-related activities (e.g. earth-moving) will be allowed within the key or modeled habitat for the Nevin's barberry.

Section 8.7
CALIFORNIA JEWELFLOWER

ISSUE STATEMENT

Federally listed as endangered on July 19, 1990 (55 FR 29361)
Recovery Plan completed in 1998
CNPS 1B, 3-3-3

There are 3 naturally occurring California jewelflower (*Caulanthus californicus*) populations in existence today, including Santa Barbara Canyon on the terraces west of Cuyama River (30 acres occupied) in Santa Barbara County; on the western side of the Carrizo Plain (10 acres) in San Luis Obispo County; and in four small colonies in the Kreyehagen Hills in Fresno County (USFWS 2001a). While no occurrences are currently known from any Forest Service lands, the Santa Barbara Canyon is less than 3 miles from Forest Service (LPNF) lands. Threats to the species include agricultural practices, urbanization, energy development, and grazing (USFS 2002). The California jewelflower is identified as having a declining population trend (Stephenson and Calcarone 1999). Attempts to establish the California jewelflower in LPNF lands at two locations ultimately failed after a few years.

AREA DESCRIPTION

A population of this species occurs within 3 miles of LPNF in Santa Barbara Canyon in 19 discrete sites along a 6-mile stretch of terraces on the west side of the Cuyama River. The Forest Service attempted to establish a population in LPNF on 18 acres of suitable habitat by broadcasting seed. The seeds germinated and produced seed in 1989 but by 1995 no plants were found there. Therefore in LPNF, there are 18 acres listed as occupied habitat as a result of this introduction effort and 161 acres of modeled habitat (USFWS 2001a).

DESIRED CONDITION

Maintenance and enhancement of potential and occurring habitat for California jewelflower. Introduction of the species into appropriate areas from which it was extirpated. If California jewelflower is found in the future, maintain the strongest conservation of these populations on Forest Service land.

OBJECTIVES

Maintain and enhance potential and occupied habitat for California jewelflower through a variety of techniques.

Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

If the California jewelflower is located or successfully established on Forest Service lands:

- Establish SMAs for the California jewelflower to be managed for conservation and recovery of the species
- Allow no impact to any California jewelflower populations
- Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall survey remaining modeled habitat in Castro, Goode, and Tennison watersheds (USFWS 2001a).

The Forest Service shall schedule prescribed fire and fire suppression activities after seed-set and before germination in or within 500 feet of occupied habitat. For suppression activities, use Minimum Impact Suppression Tactics (USFWS 2001a).

The Forest Service shall implement additional studies needed to evaluate the effect of grazing on this species, as it is a palatable species for livestock grazing (Cypher 1994, USFWS 2001a). In the absence of these data, grazing shall be restricted in these areas..

Section 8.8

GAMBEL'S WATERCRESS

ISSUE STATEMENT

Federally listed as endangered on August 3, 1993 (58 FR 41378)
Recovery Plan issued on September 28, 1998
State-listed as threatened in February 1990
CNPS 1B, 3-3-2

Historically, Gambel's watercress (*Rorippa gambellii*) had been known from 4 sites in coastal San Luis Obispo County, 2 sites in Santa Barbara County, 3 occurrences in Mexico, and 1 site in San Bernardino County. Currently it is known from only 3 locations, all in San Luis Obispo County including Oso Flaco Lake, Black Lake Canyon, and Vandenberg Air

Force Base (USFWS 2001a), with the total number of plants being 700. This species is identified as having an unknown trend in population (Stephenson and Calcarone 1999). However, CDFG evaluates the status of Gambel's watercress as declining (CDFG 2000). Threats from encroachment of *Eucalyptus* trees and drilling of water wells are threats to the Black Lake Canyon location, and that population has not been seen since 1997.

AREA DESCRIPTION

This species occurs in wetland areas with standing water or saturated acidic soils. Currently, Gambel's watercress is not known to occur on any Forest Service lands. Therefore, no key, occupied, or modeled habitat has been identified. There is potential for Gambel's watercress to occur at Arrowhead Hot Springs in SBNF (USFWS 2001a), because the historic location in San Bernardino County is south of this location (Urbita Hot Springs). Arrowhead Hot Springs currently supports many of the same species that were historically collected at Urbita Hot Springs (USFS 2002).

DESIRED CONDITION

Maintenance and enhancement of potential habitat for Gambel's watercress. Introduction of the species into appropriate areas. If Gambel's watercress is found in the future on Forest Service lands, maintain the strongest conservation of these populations.

OBJECTIVES

Maintain and enhance potential habitat for Gambel's watercress through a variety of techniques.

Complete a feasibility study for introduction into suitable habitat. Introduce the species into appropriate areas. Implementation of a successful introduction program will augment the species, moving it farther from "jeopardy." Initial and ongoing weed abatement of exotic species should be strongly emphasized.

Acquire additional habitat for conservation, preferably with extant populations.

If the Gambel's watercress is located or successfully established on Forest Service lands:

- Establish SMAs for the Gambel's watercress to be managed for conservation and recovery of the species.
- Allow no impact to any Gambel's watercress populations.
- Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Develop habitat management guidance for wetland areas.

Evaluate the effects of existing water extraction/diversion from drainages supporting potential habitat for Gambel's watercress. Secure water rights for species conservation.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall develop models for potential habitat for Gambel's watercress throughout its historic range (all 4 southern California forests), then survey modeled habitat for species occurrence, as well as Arrowhead Hot Springs in the SBNF.

The Forest Service shall eliminate grazing of all feral/domestic animals from potential habitat for Gambel's watercress, except where it can be proven to be beneficial to the species.

SLENDER-PETALED MUSTARD

ISSUE STATEMENT

Federally listed as endangered on August 31, 1984 (49 FR 34500)
State-listed as endangered in 1989
CNPS listed as 1B, 3-3-3

Slender-petaled mustard (*Thelypodium stenopetalum*) is extant at 6, possibly 8, locations ranging from margins of Baldwin Lake and Erwin Lake to Eagle Point at the eastern end of Big Bear Lake. There is only one fully protected population at the north end of Baldwin Lake at the CDFG site. Eagle Point occurrence is on private, deed-restricted land governed by the City of Big Bear. Upper Holcomb Valley and Belleville Meadow occurrences are in SBNF. These sites are fenced but vandalism has occurred. Mining claims and recreational use are also issues. Pan Hot Springs population and the population at the south end of Baldwin Lake near Shay Road are owned by Big Bear City's Community Services District and other private land (USFWS 2001a).

AREA DESCRIPTION

There are 2 known occurrences in SBNF. Belleville Meadow in Holcomb Valley is the largest occurrence. The other occurrence is at the south end of Baldwin Lake, which extends onto private land (USFWS 2001a). There are 455 acres of key habitat and 4,258 acres of modeled habitat in SBNF (USFWS 2001a).

DESIRED CONDITION

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for slender-petaled mustard. reintroduction of the species into appropriate areas from which it was extirpated. Maintain hydrology upon which the species is dependent.

OBJECTIVES

Establish SMAs for the slender-petaled mustard populations to be managed for conservation and recovery of the species.

Allow no impact to any slender-petaled mustard populations.

Work with adjacent land managers to minimize illegal ORV trails.

Remove organizational facilities or portions of permitted areas from meadow areas in TES species key, occupied, and modeled habitats when opportunities arise to eliminate or minimize impacts (USFWS 2001a). The layout of campgrounds/developed areas in or adjacent to habitat in Holcomb Valley Campground, and recreational/automobile and interpretive stops, will be evaluated to determine their appropriateness of interface with species conservation in or adjacent to the sites. Changes in layout and directed interaction will be acted on, especially where conflicts are identified. Interpretive signing, fencing, barriers, parking delineations, and brochures will be used to direct uses and discourage impacts.

Maintain and enhance potential and occurring habitat for slender-petaled mustard through a variety of techniques.

Develop habitat management guidance for montane meadows (USFWS 2001a).

Maintain hydrologic conditions beneficial to the slender-petaled mustard, including retention of water flow into Baldwin Lake, except during flood years when water level will exceed 100-year floodplain level.

Evaluate the effects of existing commercial water extraction from drainages supporting TES meadow plant habitat. Adjust extraction levels to eliminate impacts (USFWS 2001a).

Eliminate activities that may adversely affect the surface or subsurface hydrology of the habitats that support the slender-petaled mustard, including grazing of domestic stock and burros, camping, routes of travel, and water extraction/diversion.

Install a boardwalk to protect TES meadow and pebble plains species and their habitat (USFWS 2001a). Replace unau-

thorized trails with boardwalks at appropriate locations in the Belleville Meadow Area. In key, occupied, and modeled habitats, place interpretive signs at the roadside regarding the ecological uniqueness of the site and special plant concerns (USFWS 2001a).

Re-route access trails and consolidate trails to a minimum number around existing populations of slender-petaled mustard.

Eliminate any activities that would cause fugitive dust deposition on the slender-petaled mustard. Dust deposition negatively impacts metabolic processes (such as photosynthesis, transpiration, etc.), thereby effectively lowering overall plant productivity (Farmer 1993).

Use interpretive signing, fencing, barriers, and/or parking delineations, as well as brochures to direct uses and discourage impacts (USFWS 2001a).

Control exotic plant invasions adjacent to the occurrences. Reduction of competition from exotics will aid plant persistence. Removal will not disturb the soil profile, and will be done prior to exotic flowering/fruiting.

Identify and prioritize habitats for TES species and sites for acquisition and designation into full conservation protection.

Create a management endowment fund for protection/restoration projects for the slender-petaled mustard.

Re-introduce the species into appropriate areas that are managed for conservation from which it was extirpated.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

STANDARDS

The Forest Service shall only permit driving on system and permitted roads through all TES meadow species habitat for emergencies and essential administrative purposes. Administrative uses shall occur only when meadows are dry (USFWS 2001a).

The Forest Service shall conduct surveys of Heartbar, Converse, and Deer Lick meadow areas for TES species by the end of 2002 (USFWS 2001a). Based on the results of those surveys, implement protective measures if plants are located. If plants are located or if the sites have restoration potential to achieve recovery goals for the species, camp Development Plans should carefully consider efficacy of new proposals and potential conflicts with plant conservation.

The Forest Service shall disguise or rehabilitate trails from Holcomb Valley Campground (SBNF) that pass through habitat. The area will be protected through barricading and signing. Trails connecting the campground to road 3N05 but which do not go through listed plant habitat will be delineated and signed to encourage visitors to use those trails (USFWS 2001a).

The Forest Service shall continue review of all system roads in known occupied meadow plant habitat to determine actions to completely avoid impacts in those areas. As proposed in 1999, implement decision to close 3N16B and 3N16C (USFWS 2001a).

The Forest Service shall establish meadow refugia incorporating at least 6 viable, upward-trending populations of the slender-petaled mustard into full protection, in accordance with the Recovery Plan for the species (USFWS 1998d).

The Forest Service shall permanently close the Coldbrook campground, to reduce potential impacts to the slender-petaled mustard that are known to occur in campground's perimeter. Rehabiliate the retired facilities to reduce the opportunity for casual use.

The Forest Service shall continue to monitor the Belleville Meadow site to assess trends in populations.

The Forest Service shall eliminate domestic livestock grazing in key, occupied, and modeled habitat in support of species conservation.

The Forest Service shall initiate mineral withdrawal of claims from areas of key, occupied, and modeled habitat in

support of species conservation.

The Forest Service shall avoid all roads and road maintenance activities that impact the slender-petaled mustard or its potential habitat. Hydrological impacts from road next to Belleville meadow site needs to be addressed and mitigation implemented.

The Forest Service shall eliminate turkeys from the forest due to their potential for destruction to TES species, especially those located in more mesic areas like meadows, which would be attractive to turkeys looking for adequate forage and water.

Section 8.10
CUYAMACA LAKE DOWNINGIA

ISSUE STATEMENT

Federally proposed for listing as endangered on August 4, 1994 (59 FR 39879)
Withdrawn from listing on February 6, 1997 (62 FR 5560)
State-listed as endangered in February 1982
CNPS 1B, 3-3-3

The Cuyamaca Lake downingia (*Downingia concolor* var. *brevior*) is endemic to Cuyamaca Valley in San Diego County. This annual plant species inhabits the margins of the spring ephemeral pools, which dry out substantially by late summer (Reiser 1994). It is now sequestered to the Cuyamaca Lake (a human-made reservoir) edges. Threats to this species include grazing (CDFG 2000), altered hydrology, recreation, and trails. This species is identified as having an increasing trend (Stephenson and Calcarone 1999), and CDFG identifies the population trend as stable (CDFG 2000).

AREA DESCRIPTION

No populations of the Cuyamaca Lake downingia are known to occur in the Forests, but potential habitat is identified in the CNF (Stephenson and Calcarone 1999).

DESIRED CONDITION

Maintenance and enhancement of potential habitat for Cuyamaca Lake downingia. Introduction of the species into appropriate areas. If Cuyamaca Lake downingia is found in the future on Forest Service lands, maintain the strongest conservation of these populations.

OBJECTIVES

Maintain and enhance potential habitat for Cuyamaca Lake downingia through a variety of techniques.

Conserve meadow habitat and prevent fragmentation of montane meadows (USFS 1991a).

Complete a feasibility study for introduction into suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from federal listing. Introduce the species into appropriate areas.

Acquire additional habitat, preferably with extant populations for conservation.

If the Cuyamaca Lake downingia is located or successfully established in the Forests:

Establish SMAs for the Cuyamaca Lake downingia to be managed for conservation and recovery of the species.

Allow no impact to any Cuyamaca Lake downingia populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Maintain appropriate hydrological regimes.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

Evaluate the effects of existing water retention from reservoirs supporting potential habitat for Cuyamaca downingia. Secure appropriate hydrology for species conservation.

STANDARDS

The Forest Service shall survey modeled habitat for species occurrence in the CNF.

The Forest Service shall update and reinstitute the Conservation Agreement for the Preservation of Cuyamaca Lake Downingia (*Downingia concolor* var. *brevior*), Parish's meadowfoam (*Limnanthes gracilis* var. *parishii*), and Cuyamaca larkspur (*Delphinium hesperium* ssp. *cuyamacae*) that formally expired in 1999.

The Forest Service shall eliminate grazing of all feral/domestic animals from potential habitat for Cuyamaca Lake downingia, except where it can be proven to be beneficial to the species.

The Forest Service shall assess the locations of all campgrounds/developed areas, roads, trails, and automobile and interpretive stops on Forest Service lands for their impact on sensitive species. If any of these facilities are identified to cause adverse impacts on the Cuyamaca Lake downingia, they will be eliminated or, if possible, relocated.

The Forest Service shall restrict driving in Cuyamaca Lake downingia habitat in support of species conservation.

Section 8.11
MARSH SANDWORT

ISSUE STATEMENT

Federally listed as endangered on August 3, 1993 (58 FR 41378)
Recovery Plan issued on September 28, 1998
State-listed as endangered in 1990
CNPS 1B, 3-3-2

Historic locations of the marsh sandwort (*Arenaria paludicola*) are known from 4 sites in coastal San Luis Obispo County, 1 site near Tacoma, Washington, and single sites in San Francisco, Santa Cruz, and San Bernardino counties. Currently the marsh sandwort is known from 3 populations: one at Black Lake Canyon and the second at Oso Flaco Lake, both in San Luis Obispo County, and Inglenook Fen in Mendocino County (USFWS 2001a). This species is identified as having a declining trend in population (Stephenson and Calcarone 1999), and the CDFG evaluates the status of the marsh sandwort as declining as well (CDFG 2000).

AREA DESCRIPTION

This species occurs in wetland areas with standing water or saturated acidic soils. Currently, marsh sandwort is not known to occur on any National Forest Service lands. Therefore, no key, occupied, or modeled habitat has been identified on National Forest Service lands. There is potential for marsh sandwort to occur at Arrowhead Hot Springs in SBNF (USFWS 2001a), because the historic location in San Bernardino County is south of this location (Urbita Hot Springs). Arrowhead Hot Springs currently supports many of the same species that were historically collected at Urbita Hot Springs (USFS 2002). This species has also been reported to occur in central Mexico (USFS 2002).

DESIRED CONDITION

Maintenance and enhancement of potential habitat for marsh sandwort. Introduction of the species into appropriate areas. If the marsh sandwort is found in the future on Forest Service lands, maintain the strongest conservation of these populations.

OBJECTIVES

Maintain and enhance potential habitat for marsh sandwort through a variety of techniques.

Complete a feasibility study for introduction into suitable habitat. Implementation of a successful introduction program

will augment the species, moving it farther from "jeopardy." Initial and ongoing weed abatement of the exotic species should be strongly emphasized. Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

If the marsh sandwort is located or successfully established on Forest Service lands:

- Establish SMAs for the marsh sandwort to be managed for conservation and recovery of the species.
- Allow no impact to any marsh sandwort populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Develop habitat management guidance for wetland areas.

Evaluate the effects of existing water extraction/diversion from drainages supporting potential habitat for marsh sandwort. Secure water rights for species conservation.

STANDARDS

The Forest Service shall develop models for potential marsh sandwort habitat throughout its historic range (all 4 southern California forests), then survey modeled habitat for species occurrence, as well as Arrowhead Hot Springs in the SBNF.

The Forest Service shall eliminate grazing of all feral/domestic animals from potential habitat for marsh sandwort, except where it can be proven to be beneficial to the species.

Section 8.12

PEBBLE PLAINS PLANTS

ISSUE STATEMENT

Federally listed as threatened 1998 (63 FR 49006)
CNPS 1B, 2-2-3

Bear Valley sandwort, southern mountain buckwheat, and ash-gray paintbrush were federally listed as threatened on September 14, 1998 (63 FR 49006).

These species inhabit the unique habitat known as pebble plains, or treeless openings in the forest that are present due to high clay content in the soil (Neel and Barrows 1990). A suite of unique plant species occurs in this habitat, with 3 threatened species addressed in more detail below. SBNF manages 514 acres of pebble plains within the Big Bear Ranger District (BBRD), which is 0.3% of the total BBRD jurisdictional area. All 3 of these species are identified to have a declining trend with high vulnerability on Forest Service lands (Stephenson, J.R., and G.M. Calcarone 1999).

AREA DESCRIPTION

BEAR VALLEY SANDWORT *(ARENARIA URSINA)*

This endemic species is known from Big Bear and Holcomb Valleys in the San Bernardino Mountains. It is known from 8 pebble plain complexes and adjacent juniper woodlands in the vicinity of Big Bear and Baldwin Lakes, including the Big Bear Lake, Sawmill, Gold Mountain, North Baldwin, Arrastre/Union Flat, Holcomb Valley, South Baldwin Ridge, Onyx Peak, and Sugarloaf Mountain pebble plains complexes. Roads and utility corridors are land uses that overlap with known occurrences (USFWS 2001a). Threats to this species include trampling, vehicles, and development.

Southern mountain buckwheat *(Eriogonum kennedyi* var. *austromantanum)*

This endemic species occurs in Big Bear and Holcomb Valleys and surrounding areas, mostly in SBNF. It is known from 7 pebble plain complexes: Big Bear Lake, Sawmill, Gold Mountain, North Baldwin, Arrastre/Union Flat, Holcomb

Valley, and South Baldwin Ridge, and possibly in Coxey Meadow complex (USFWS 2001a). Threats to this species include vehicles, trash dumping, and unauthorized routes and trails.

ASH-GRAY PAINTBRUSH *(CASTILLEJA CINEREA)*

This species is endemic to the San Bernardino Mountains and is known from Snow Valley and Fish Camp, east to Onyx Peak, and from South Fork Meadows in the south to Holcomb Valley in the north. It occurs at the following pebble plains complexes: Big Bear Lake, Sawmill, North Baldwin, Arrastre/Union Flat, Holcomb Valley, South Baldwin, Onyx Peak, Pan Hot Springs, Aspen Glen, Metcalf Bay, Eagle Point, and Lightning Gulch. This species also occurs off the pebble plains habitat near Snow Valley on Sugarloaf Peak, on the north shore of Big Bear Lake, and in the San Gorgonio Wilderness (USFWS 2001a). Threats to this species include grazing, development, exotic plant species, and vehicles.

DESIRED CONDITION

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for all 3 species. reintroduction of the species into appropriate areas from which it was extirpated. Maintain soils and hydrology upon which the species are dependent.

OBJECTIVES

Establish SMAs for the pebble plains to be managed for conservation and recovery of the suite of unique species that occurs there.

Allow no impact to any pebble plains.

Maintain and enhance potential and occupied habitat for pebble plains species through a variety of techniques.

Implement weed abatement of the red brome (*Bromus madritensis* ssp. *rubens*), cheatgrass (*Bromus tectorum*), and other invaders that have the capacity to seriously alter the ecological functioning of the pebble plains.

Complete a feasibility study for introduction to suitable habitat or reintroduction into historic locations and implement it as recommended (Neel and Barrows 1990). Re-introduce the species into degraded habitat areas from which it has been extirpated.

Eliminate soil disturbance and maintain hydrology of the pebble plains.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Develop a rehabilitation plan for Snow Forest that includes stabilization of ski runs, revegetation, and restoration of pebble plains plant key and occupied habitats. Install and maintain erosion control devices (USFWS 2001a).

Implement exotic species control of red brome, cheatgrass, and other invading species in the pebble plains. This project should be coordinated with the county's Weed Management Area, and be executed at the time of year that will cause the least disturbance to the pebble plains morphology, and prior to the target species maturing/dispersing seed.

Update the habitat management guide and action plan for pebble plains and incorporate the results in the LRMP revision.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall prohibit ground-disturbing activities within key, occupied, and modeled pebble plains plant habitat except where habitat would be improved (USFWS 2001a).

The Forest Service shall pre-plan suitable routes for emergency responses to avoid or minimize effects to pebble plains plants in key, occupied, and modeled habitats (USFWS 2001a).

The Forest Service shall prohibit use of water from saline sources (e.g. Baldwin Lake) for fire suppression or water dispersal activities on pebble plains plants in key, occupied, and modeled habitats (USFWS 2001a).

The Forest Service shall prohibit vehicles, including emergency vehicles, in pebble plains plant key, occupied, and modeled habitats (USFWS 2001a).

The Forest Service shall cooperatively identify emergency routes around all areas of key and occupied TES pebble plains plant habitats (USFWS 2001a).

The Forest Service shall continue habitat restoration activities at the North Baldwin pebble plain (USFWS 2001a).

The Forest Service shall prohibit any activity that causes damage to host plants or host plant key, occupied, and modeled habitats (USFWS 2001a).

The Forest Service shall continue coordination with Snow Valley Ski Area permittee to protect key and occupied habitats within the permitted areas. Prohibit stockpiling of snow from parking lot into habitat, and protect upland occurrences on north side of parking area and any new occurrences. Work with permitee to repair, maintain, and extend fencing to protect habitat. Consider in modeled habitats (USFWS 2001a).

The Forest Service shall continue to work with Juniper Point Marina permittee to implement protection measures and educate the public about pebble plains species and habitat (USFWS 2001a).

The Forest Service shall conduct surveys for species/habitat in modeled habitat for the ash-gray paintbrush in SBNF and ANF.

The Forest Service shall evaluate the layout of campgrounds/developed areas and automobile and interpretive stops to determine their appropriateness of interface with pebble plains/sensitive species protection, especially where conflicts have been identified. Interpretive signs should be placed at the roadside regarding the site and special habitat in key, occupied, and modeled habitats. Campgrounds in or adjacent to known or modeled habitat include Holcomb Valley (occupied/key), Coldbrook (modeled), Serrano (key/occupied), Hanna Flat (modeled), Heartbar (key/occupied), Pineknot (key/modeled), San Gorgonio (modeled), and South Fork (modeled) (USFWS 2001a). Special analysis of the disturbance potential and exotic invasion will also be considered.

The Forest Service shall reroute trails that pass through occurrences or habitat around the pebble plains. Retired trails will be disguised and rehabilitated. The area will be protected through barricading and signing. Interpretive signs can be placed at the roadside/parking areas regarding the site and special habitat in key, occupied, and modeled habitats. Designated trails overlapping key and occupied habitat that need to be addressed include Alpine Pedal Path, Gold Fever Trail, Sugarloaf/Green Canyon Trail, Pineknot Trail, Bristlecone Trail, Lost Creek Trail, and Little Green Valley Trail.

The Forest Service shall eliminate feral/domestic grazing in areas where the pebble plains occur to prevent disturbance of the soils, except when grazing can be shown to benefit the habitat (e.g. possibly directed grazing of exotic grasses).

The Forest Service shall initiate mineral withdrawal of claims at locations of key or modeled habitat. Bear Valley sandwort has claims on 14 acres of habitat. Southern mountain buckwheat has claims on 42 acres, and ash-gray paintbrush has claims on 27 acres. In the interim, monitor the prospecting activities (that require no federal notification). This activity could be in conjunction with weed abatement or monitoring activities. Under no circumstances would any claims be patented that are within key, occupied, or modeled habitat.

The Forest Service shall review all system roads in pebble plains habitat to determine actions to completely avoid impacts in those areas. Eliminate redundant or unauthorized routes and reroute existing trails if they may have a detrimental effect on the species. Routes of special concern because they go through pebble plains include parts of 3N69 near Baldwin Lake, 3N75, 3N13, 3N01, 3N30, 3N79, and 3N70, as well as parts of 3N02 and 3N04 in Arrastre Flat/Union Flat, the low point on 3N16 that causes road widening into the pebble plain in Holcomb Valley, 2N65Y on Onyx Ridge/Broom Flat, and 1N01 which is behind a gate, but should be evaluated for restoration potential.

The Forest Service shall continue to implement cooperation with utility companies to avoid impacts to pebble plains during maintenance/emergency repairs (USFS 2000b).

SANTA MONICA MOUNTAINS DUDLEYA

ISSUE STATEMENT

Federally listed as threatened on January 29, 1997 (62 FR 4172)
Recovery Plan issued September 30, 1999
CNPS 1B, 3-2-3

The Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *ovatifolia*), also known as the oval-leaved dudleya, is distributed within the Santa Monica Mountains and the Santa Ana Mountains (USFWS 2001a). This species is known from only 10 locations. It is found on unstable talus slopes and north-facing cliffs on substrates of sedimentary conglomerates or volcanic breccia (Stephenson and Calcarone 1999). Threats to the Santa Monica Mountains dudleya include development, horticultural collecting (Stephenson and Calcarone 1999), and recreation (Soza and Boyd 1999). The Santa Monica Mountains dudleya is identified as having a declining population trend and moderate vulnerability on Forest Service lands (Stephenson and Calcarone 1999).

AREA DESCRIPTION

The Santa Monica Mountains dudleya is known from 2 occurrences in CNF, which account for 22% of known occurrences. These populations are on the Trabuco District in Modjeska Canyon near Modjeska Peak (USFWS 2001a).

DESIRED CONDITION

Strongest conservation of populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for the Santa Monica Mountains dudleya. Introduction of the species into appropriate areas.

OBJECTIVES

Establish SMAs for the Santa Monica Mountains dudleya to be managed for conservation and recovery of the species.

Allow no impact to any Santa Monica Mountains dudleya populations.

Maintain and enhance key and modeled habitat for the Santa Monica Mountains dudleya through a variety of techniques.

Complete a feasibility study for introduction to suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from "jeopardy." Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Implement weed abatement in areas where species occur.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall continue surveys in modeled habitat to detect presence of species, and if found, implement management as noted above. Continue monitoring known populations at least every 3 years.

The Forest Service shall use fencing, barriers, and/or parking delineations to direct uses and discourage impacts in areas of the Santa Monica Mountains dudleya habitat. Do not encourage visitation in these areas to preclude vandalism by horticultural collection.

The Forest Service shall restrict vehicle (including mountain bike) access along the Main Divide Road and the road

leading off Main Divide Road towards Modjeska Peak.

The Forest Service shall not permit communication facilities on Modjeska Peak.

The Forest Service shall eliminate grazing from occupied habitat for the Santa Monica Mountains dudleya if surveys locate the species within the allotment(s).

Section 8.14
BRAUTON'S MILK-VETCH

ISSUE STATEMENT

Federally listed as endangered in 1997 (62 FR 4172)
Recovery plan issued on September 30, 1999

Historic and current range for this southern California endemic species: Currently known from 4 general areas in Ventura, Los Angeles, and Orange counties. One location is along the south slope of the Simi Hills. Two occurrences of Braunton's milk-vetch (*Astragalus brauntonii*) are known from Santa Ynez Canyon in the Santa Monica Mountains, with the largest known population at upper Trailer Canyon, a tributary to Santa Ynez Canyon. The species also occurs on the south flank of the San Gabriel Mountains in Clamshell Canyon and has the potential to occur on adjacent Forest Service land. In addition, there are 2 occurrences known from Coal and Gypsum Canyons in the Santa Ana Mountains (USFWS 2001a). Field observations indicate that this species requires periodic disturbance, traditionally by fire, flood scouring and/or earth slippage (Mistretta 1992).

AREA DESCRIPTION

Potential habitat occurs in the Santa Ana Mountains and in the foothills of the San Gabriel Mountains. In the San Gabriel Mountains, potential habitat occurs near the town of Monrovia, on the lower Clamshell Truck Trail, and the Van Tassel Truck Trail (USFWS 2001a). Extant populations occur very near the CNF boundary north and west of Sierra Peak (Mistretta 1992).

DESIRED CONDITION

Conservation, maintenance, and enhancement of potential habitat for Braunton's milk-vetch, including establishment/conservation of seed bank.

OBJECTIVES

Maintain and enhance modeled habitat for Brauton's milk-vetch through a variety of techniques.

Implement a feasibility study on the introduction or reintroduction into the northwestern corner of Trabuco Ranger District in the CNF (Mistretta 1992). Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

If the Brauton's milk-vetch is located or successfully established on Forest Service lands:

- Establish SMAs for the Brauton's milk-vetch to be managed for conservation and recovery of the species, including the seed bank.
- Allow no impact to any Brauton's milk-vetch populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Maintain habitat within the modeled area for known Braunton's milk-vetch pollinators including native megachilid bees and native bumble bees. Habitat requirements for these species include chamise (*Adenostoma fasciculatus*), California encelia (*Encelia californica*), arroyo lupine (*Lupinus succulentus*), black sage (*Salvia mellifera*), and cliff aster (*Malocothrix glabrata*) (Fotheringham and Keeley 1998).

Suppress fire frequencies greater than 70 years in modeled habitat. This interval is based on the best estimate of natural fire intervals for communities that support Braunton's milk-vetch (Minnich 1989, O'Leary 1990). More frequent fires could negatively impact the seed bank of Braunton's milk-vetch over time. More frequent fires can alter the habitat through exotic invasion which could out-compete Braunton's milk-vetch.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall survey recruitment of this species when stimulated by fire and other scarifying events (rock slides, trail maintenance, earth disturbance) in modeled habitat within 1 year of these types of events, to search for occurrences of this species.

The Forest Service shall under no circumstances introduce exotic erosion control species into modeled habitat after scarifying events occur.

The Forest Service shall document when plants are detected, and an intensive monitoring program implemented. Data to be monitored should include seedling survival, flower production, seed production, and plant viability over time.

The Forest Service shall prescribe burn in modeled habitat consistent with management for Braunton's milk-vetch as long as the control burn frequency is not greater than a 70- to 100-year interval (Mistretta 1992). Consider that the plant may need hotter burns than prescribed burns because of evidence of herbivory when germination occurs and fauna—such as pocket gophers, ground squirrels, rabbits, and deer-- are not killed or driven away. Observations at Zuma Canyon Ab population and botanist's reports on Oak Park population in Simi Hills.

Section 8.15

COACHELLA VALLEY MILK-VETCH

ISSUE STATEMENT

Federally listed as endangered on October 6, 1998 (63 FR 53596)
CNPS 1B, 2-2-3

The Coachella Valley milk-vetch (*Astragalus lentuginosus* var. *coachellae*) was known from 20 to 25 occurrences, 90% of which were found between Indio and Cabazon at the time the species was listed. A quarter of known occurrences are in 3 preserves in Coachella Valley Preserve System, 7% on Southern California Edison lands, 7% on the Agua Caliente Indian Reservation, and the rest on privately owned land (USFWS 2001a). Additional populations of the Coachella Valley milk-vetch have been identified off highway 177, north of Desert Center (BLM 2001). The Coachella Valley milk-vetch occurs in the coarser sands on the edge of dunes and sandy flats, or along the edges of sandy washes. Threats to the species include development, ORVs, trampling, and exotic species (CV MSHCP 2002).

AREA DESCRIPTION

No known occurrences of the Coachella Valley milk-vetch have been located on Forest Service lands. Habitat modeling has identified 236 acres of potential suitable habitat in the SBNF (USFS 2002).

DESIRED CONDITION

Maintenance and enhancement of modeled habitat for Coachella Valley milk-vetch. Introduction of the species into appropriate areas. If Coachella Valley milk-vetch is found in the future on Forest Service land, maintain the strongest conservation of these populations.

OBJECTIVES

Maintain and enhance modeled habitat for Coachella Valley milk-vetch through a variety of techniques.

Acquire additional habitat for conservation, preferably with extant populations.

If the Coachella Valley milk-vetch is located or successfully established on Forest Service lands:

- Establish SMAs for the Coachella Valley milk-vetch to be managed for conservation and recovery of the species.
- Allow no impact to any Coachella Valley milk-vetch populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Maintain Aeolian and fluvial processes in the Forests that are necessary to sustain the Coachella Valley milk-vetch habitat, and benefit downstream populations, including episodic flooding events.

Implement exotic species control in the Coachella Valley milk-vetch modeled habitat. This is particularly important because of the fact that routes are known vectors for exotic species dispersal. One targeted species is Russian thistle (*Salsola tragus*), which exploits disturbed areas (both human-caused and natural), and has been identified as a threat to this species (CV MSHCP 2002). This project should be coordinated with the county's Weed Management Area.

Complete a feasibility study for introduction of the Coachella Valley milk-vetch into suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from "jeopardy." Introduce the species into appropriate areas.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall survey modeled habitat for the Coachella Valley milk-vetch.

The Forest Service shall close unauthorized roads in the Coachella Valley milk-vetch habitat (USFS 2002).

Section 8.16

TRIPLE-RIBBED MILK-VETCH

ISSUE STATEMENT

Federally listed as endangered on October 6, 1998 (63 FR 53596)

The triple-ribbed milk-vetch (*Astragalus tricarinatus*) is known from Riverside and San Bernardino counties. It is endemic to the Big Morongo Canyon and its tributaries, Whitewater Canyon, Mission Creek, and 40 miles to the south of Agua Alta Canyon. Other historical occurrences include Thousand Palms and Keys Ranch (USFS 2002). The triple-ribbed milk-vetch is found on sandy and gravelly soils of dry washes, or on decomposed granite at the base of canyon slopes. This species is threatened by ORVs, pipeline construction, and maintenance (Sanders 1998), and flood control activities (CV MSHCP 2002).

AREA DESCRIPTION

The triple-ribbed milk-vetch is not known to occur in the Forests. Habitat modeling indicates that 462 acres of habitat occur along the northeastern base of the San Jacinto Mountains. Modeled habitat suggests that potential habitat could occur in Snow Canyon, Blaisdell Canyon, and Chino Canyon (USFS 2002).

DESIRED CONDITION

Maintenance and enhancement of modeled habitat for triple-ribbed milk-vetch. Introduction of the species into appropriate areas. If triple-ribbed milk-vetch is found in the future on Forest Service land, maintain the strongest conservation of these populations.

OBJECTIVES

Maintain and enhance modeled habitat for triple-ribbed milk-vetch through a variety of techniques.

Maintain hydrological and geomorphological processes (including episodic flooding events) on National Forest Service lands that are necessary to sustain the triple-ribbed milk-vetch habitat and to benefit downstream populations.

Complete a feasibility study for introduction of the triple-ribbed milk-vetch into suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from "jeopardy." Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

If the triple-ribbed milk-vetch is located or successfully established on Forest Service lands:

- Establish SMAs for the triple-ribbed milk-vetch to be managed for conservation and recovery of the species.
- Allow no impact to any triple-ribbed milk-vetch populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

STANDARDS

The Forest Service shall survey modeled habitat for the triple-ribbed milk-vetch in Snow Canyon, Blaisdell Canyon, and Chino Canyon (USFS 2002).

The Forest Service shall close unauthorized roads in the triple-ribbed milk-vetch habitat (USFS 2002).

Section 8.17
SAN DIEGO THORNMINT

ISSUE STATEMENT

Federally listed as threatened on October 13, 1998 (63 FR 54937)
State-listed as endangered on January 1982
CNPS 1B, 2-3-2

Historically the San Diego thornmint (*Acanthomintha ilicifolia*) was known from 52 historic populations. Currently, 40% of those have been extirpated in the U.S. There are estimates of 150,000-170,000 individuals in 32 populations in the U.S., ranging from Carlsbad and San Marcos east to Alpine and south to Otay Mesa in San Diego County. Of those, 60% of the individuals are concentrated in 4 areas (Sycamore Canyon, Slaughterhouse Canyon, Viejas Mountain, and Poser Mountain). Populations also occur in Carlsbad, Encinitas, San Marcos, Sycamore Canyon, Poway, the Lake Hodges area, El Capitan, and Jamul. There are also sites in Baja California, Mexico (USFWS 2001a). The species is endemic to mesas and clay soil areas around San Diego County and adjoining Mexico (USFS 2002). The substrate is heavy clays or gabbro soils (USFWS 2001a). Threats to the San Diego thornmint include development, invasion by exotic species, ORVs, and grazing (CDFG 2000). The San Diego thornmint is identified as having a declining population trend and moderate vulnerability on Forest Service lands (Stephenson and Calcarone 1999), and CDFG has identified the San Diego thornmint as declining as well (CDFG 2000).

AREA DESCRIPTION

Eleven of the extant populations are considered major occurrences, and of these, 4 occur in CNF. They are located on Viejas and Poser Mountains, and comprise about 9% of known populations. Two Forest Service populations occur on Viejas Mountain, which is proposed as RNA. All of the CNF populations occur near the urban interface and adjacent to Indian Reservation land (USFWS 2001a). They require monitoring and protection due to potential incursions by ORVs (including bicycles) and cattle (USFS 2002).

DESIRED CONDITION

Strongest conservation of populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for San Diego thornmint. Introduction of the species into appropriate areas.

OBJECTIVES

Establish SMAs for the San Diego thornmint to be managed for conservation and recovery of the species.

Allow no impact to any San Diego thornmint population.

Maintain and enhance key and modeled habitat for San Diego thornmint through a variety of techniques.

Complete a feasibility study for introduction into suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from "jeopardy." Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Implement exotic species control (especially of *Centaurea melitensis*) where San Diego thornmint occurs. This species has been documented to reduce the seed production in the San Diego thornmint (E. Bauder, unpublished data). This project should be coordinated with the county's Weed Management Area.

Use interpretive signing, fencing, barriers, brochures, and/or parking delineations to direct uses and discourage impacts at the urban interface and along Viejas Grande Road.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall initiate surveys in modeled habitat to detect presence of species, and if found, implement management as noted above.

The Forest Service shall maintain and augment fencing on Poser and Viejas Mountains at the forest boundary to prevent grazing trespass (USFS 1991a).

The Forest Service shall not develop new campgrounds, trails, or other recreation developments in the Poser and Viejas Mountain area near the San Diego thornmint key or modeled habitat.

The Forest Service shall implement appropriate fire regimes to conserve the San Diego thornmint. No fuel breaks or other fire-related activities (e.g. earth-moving) will be allowed within the key or modeled habitat for the San Diego thornmint.

The Forest Service shall prohibit livestock grazing in key, occupied, and modeled San Diego thornmint habitat until after seed-set and dispersal.

Section 8.18
PARISH'S MEADOWFOAM

ISSUE STATEMENT

Federally proposed for listing as threatened on August 4, 1994 (59 FR 39879)
Withdrawn from listing on February 6, 1997 (62 FR 5560)
State-listed as endangered in July 1979
CNPS 1B, 2-2-3

The Parish's meadowfoam (*Limnanthes gracilis* var. *parishii)* is endemic to southern California from the Cuyamaca Valley, the Laguna Mountains, and the Palomar Mountains in San Diego County north to the Santa Rosa Plateau in

Riverside County. This annual plant species inhabits moist habitats, often found in vernal pools, wet meadows, and near seeps and springs (CDFG 2002). Threats to this species include grazing, road maintenance, altered hydrology, recreation, and trails (CDFG 2000). This species is identified as having a declining to stable population trend by the USFS (1999) and the CDFG (2000).

AREA DESCRIPTION

Parish's meadowfoam occurs in approximately 15 populations that cover about 159 acres in the CNF (Stephenson and Calcarone 1999). The largest populations occur in the Cuyamaca Valley.

DESIRED CONDITION

Strongest conservation of these populations on National Forest Service lands. Maintenance and enhancement of occurring and potential habitat for Parish's meadowfoam. Introduction of the species into appropriate areas.

OBJECTIVES

Establish SMAs for the Parish's meadowfoam to be managed for conservation and recovery of the species.

Allow no impact to any Parish's meadowfoam populations.

Maintain and enhance occurring and potential habitat for Parish's meadowfoam through a variety of techniques.

Conserve meadow habitat and prevent fragmentation of montane meadows (USFS 1991b).

Complete a feasibility study for introduction into suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from federal listing. Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Evaluate the effects of existing water retention from reservoirs supporting potential habitat for Parish's meadowfoam. Secure appropriate hydrology for species conservation. Maintain appropriate hydrological regimes.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall survey modeled habitat for species occurrence in the CNF.

The Forest Service shall update and reinstitute the Conservation Agreement for the Preservation of Cuyamaca Lake Downingia (*Downingia concolor* var. *brevior*), Parish's meadowfoam (*Limnanthes gracilis* var. *parishii*), and Cuyamaca larkspur (*Delphinium hesperium* ssp. *cuyamacae*) that formally expired in 1999.

The Forest Service shall eliminate grazing of all feral/domestic animals from potential habitat for Parish's meadowfoam, except where it can be proven to be beneficial to the species.

The Forest Service shall assess the locations of all campgrounds/developed areas, roads, trails and automobile and interpretive stops on Forest Service lands for their impact on sensitive species. If any of these facilities are identified to cause adverse impacts on the Parish's meadowfoam, they will be eliminated or, if possible, relocated.

The Forest Service shall restrict driving in Parish's meadowfoam habitat in support of species conservation.

KERN MALLOW

ISSUE STATEMENT

Federally listed as endangered on July 19, 1990 (55 FR 29361)
Recovery Plan completed on September 30, 1998
CNPS 1B, 3-3-3

The Kern mallow (*Eremalche parryi* ssp. *kernensis*) is part of a species complex of *Eremalche parryi*, whose taxonomic disposition is unresolved (Stephenson and Calcarone 1999). This species complex ranges from the San Joaquin Valley in western Kern County into southern interior South Coast ranges in the LPNF (Hickman 1993). Based on the current taxonomic treatment, no Kern mallow occur on or near any Forest Service lands. However, if the taxonomic treatment changes, populations in the LPNF may be designated as the Kern mallow. It is prudent then, to treat these plants as sensitive. Threats to the species include agriculture, petroleum development, grazing, invasion by exotic species, and ORVs (Sandoval and Cypher 2002). The Kern mallow species complex is identified as having an unknown population trend (Stephenson and Calcarone 1999).

AREA DESCRIPTION

The Kern mallow species complex that occurs in the LPNF is currently treated as *E. parryi* ssp. *parryi*. The Foothills and Mountains Assessment (1999) does conclude that the Kern mallow has the potential to occur in the LPNF.

DESIRED CONDITION

Maintenance and enhancement of potential and occurring habitat for Kern mallow species complex. Introduction of the species into appropriate areas from which it was extirpated. If Kern mallow is found in the future, maintain the strongest conservation of these populations on Forest Service land.

OBJECTIVES

Maintain and enhance potential and occupied habitat for Kern mallow species complex through a variety of techniques.

Implement exotic species control in areas where the Kern mallow species complex occurs.

Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

If the Kern mallow is found in the future on Forest Service lands:

- Establish SMAs for the Kern mallow species complex to be managed for conservation and recovery of the species.
- Allow no impact to any Kern mallow species complex populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall survey potential habitat of Kern mallow in the LPNF.

The Forest Service shall schedule prescribed fire and fire suppression activities after seed-set and before germination in or within 500 feet of occupied habitat.

The Forest Service shall eliminate grazing of all feral/domestic animals from Kern mallow species complex habitat, except where it can be proven to be beneficial to the species.

BIRD-FOOTED CHECKERBLOOM

ISSUE STATEMENT

Federally listed as endangered on August 31, 1984 (49 FR 34500)
State-listed as endangered in 1989
CNPS listed as 1B, 3-3-3

There are 22 historic occurrences of the bird-footed checkerbloom (*Sidalcea pedata*), 5 of which have been extirpated. Historically, the species occurred near Arrowbear, Bear Valley Golf Course, Big Bear Lake near Trout Lake, Fawnskin Meadow at Grout Bay, and near Big Bear City Airport. Several populations have been extirpated due to inundations around Big Bear Dam. Of 17 sites presumed to exist, only 1 is fully protected (North Baldwin Lake site); 5 sites have partial protection (Bluff Lake, Eagle Point, Pan Hot Springs, Metcalf Bay, and Ski Beach); and 11 are unprotected, degraded, or threatened sites. Bluff Lake Meadow is the largest occupied site, with the species covering 3.3 acres out of 120 acres (USFWS 2001a).

AREA DESCRIPTION

On Forest Service lands, there are only 7 documented locations of bird-footed checkerbloom, all of which are in SBNF. Ski Beach supports approximately 50 individuals on a half acre that is relatively undisturbed. Coldbrook Campground was documented to support 3 plants in the ‘80s but has not been censused. One transplanted population occurs at Belleville Meadow. The west shore of Baldwin Lake has 6 plants that are impacted due to their proximity to the road. Locations on the south end of Baldwin Lake are de facto protected because access to the Forest Service lands is through private lands. Lodgepole Meadow supports approximately 10 individuals.

DESIRED CONDITIONS

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for bird-footed checkerbloom. reintroduction of the species into appropriate areas from which it was extirpated. Maintain hydrology upon which the species is dependent.

OBJECTIVES

Establish SMAs for the bird-footed checkerbloom populations to be managed for conservation and recovery of the species.

Allow no impact to any bird-footed checkerbloom populations. Eliminate activities that may adversely affect the surface or subsurface hydrology of the habitats that support the bird-footed checkerbloom, including grazing of domestic stock and burros, camping, routes of travel, and water extraction/diversion.

Maintain and enhance potential and occurring habitat for bird-footed checkerbloom through a variety of techniques.

Identify and prioritize habitats for TES species, as well as sites for acquisition and designation into full conservation protection.

Create a management endowment fund for protection/restoration projects for the bird-footed checkerbloom.

Eliminate any activities that would cause fugitive dust deposition on the bird-footed checkerbloom. Dust deposition negatively impacts metabolic processes (such as photosynthesis, transpiration, etc.), thereby effectively lowering overall plant productivity (Farmer 1993).

Control exotic plant invasions adjacent to the occurrences. Reduction of competition from exotics will aid plant persistence. Removal will not disturb the soil profile, and will be done prior to exotic flowering/fruiting (USFWS 1998d).

Re-introduce the species into appropriate areas from which it was extirpated.

Maintain hydrologic conditions beneficial to the bird-footed checkerbloom, including retention of water flow into Baldwin Lake, except during flood years when water level will exceed 100-year floodplain level.

Acquire additional habitat for conservation, preferably with extant populations.Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall continue to annually monitor populations at Ski Beach and coordinate with Big Bear Municipal Water District (USFWS 2001a) to maintain those populations, and to assess effectiveness of protection measures.

The Forest Service shall remove organizational facilities or portions of permitted areas from meadow areas in TES species key, occupied, and modeled habitats when opportunities arise to eliminate or minimize impacts (USFWS 2001a). The layout of campgrounds/developed areas in or adjacent to habitat, and recreational/automobile and interpretive stops, will be evaluated to determine their appropriateness of interface with species conservation in or adjacent to the sites. Changes in layout and directed interaction will be acted on, especially where conflicts are identified. Interpretive signing, fencing, barriers, brochures, and/or parking delineations will be used to direct uses and discourage impacts.

The Forest Service shall initiate mineral withdrawal of claims at locations of key (7.2 acres) or modeled habitat. In the interim, monitor the prospecting activities (that require no federal notification). This activity could be in conjunction with weed abatement or monitoring activities. Under no circumstances would any claims be patented that are within key, occupied, or modeled habitat.

The Forest Service shall not permit filming in sensitive plant habitat.

The Forest Service shall only permit driving on system and permitted roads through all TES meadow species habitat for emergencies and essential administrative purposes. Administrative uses shall occur only when meadows are dry (USFWS 2001a).

The Forest Service shall conduct surveys of Heartbar, Converse, and Deer Lick meadow areas for TES species by the end of 2004 (USFWS 2001a). Based on the results of those surveys, implement protective measures if plants are located. If plants are located or if the sites have restoration potential to achieve recovery goals for the species, camp Development Plans should carefully consider efficacy of new proposals and potential conflicts with plant conservation.

The Forest Service shall develop habitat management guidance for montane meadows (USFWS 2001a).

The Forest Service shall disguise or rehabilitate trails from Holcomb Valley Campground (SBNF) that pass through habitat. The area will be protected through barricading and signing. Trails connecting the campground to road 3N05, but which don't go through listed plant habitat, will be delineated and signed to encourage visitors to use those trails (USFWS 2001a).

The Forest Service shall evaluate the effects of existing commercial water extraction from drainages supporting TES meadow plant habitat. Adjust extraction levels to eliminate impacts (USFWS 2001a).

The Forest Service shall replace unauthorized trails with boardwalks at appropriate locations. In key, occupied, and modeled habitats, place interpretive signs at the roadside regarding the ecological uniqueness of the site and special plant concerns (USFWS 2001a).

The Forest Service shall continue review of all system roads in known occupied meadow plant habitat to determine actions to completely avoid impacts in those areas. As proposed in 1999, implement decision to close 3N16B and 3N16C (USFWS 2001a).

The Forest Service shall establish meadow refugia, incorporating at least 13 viable, upward-trending populations of the bird-footed checkerbloom into full protection, in accordance with the Recovery Plan for the species (USFWS 1998d).

The Forest Service shall reroute access trails and consolidate trails to a minimum number around existing populations of bird-footed checkerbloom, including occurrences #56 (South end of Baldwin Lake), #57 (East Fork of Shay Creek), and #39 (Belleville Meadow).

The Forest Service shall permanently close the Coldbrook Campground, to reduce potential impacts to the bird-footed checkerbloom that are known to occur in the campground's perimeter. Rehabilitate the retired facilities to reduce the opportunity for casual use. Implement protective measures to reduce use from the adjacent Oak Knoll Lodge.

The Forest Service shall continue to monitor the Belleville Meadow site to assess success of transplantation efforts. Threats from prospecting and gold mining should be eliminated by curtailing those activities in the parts of the watershed that affect the hydrology of the meadow, and hence the plants.

The Forest Service shall avoid all roads and road maintenance activities that impact the Bird-footed checkerbloom or its potential habitat. Hydrological impacts from a road next to the Belleville Meadow site need to be addressed and mitigation implemented as part of the LRMP strategy.

The Forest Service shall eliminate turkeys from the forest due to their potential for destruction to TES species, especially those located in more mesic areas like meadows, which would be attractive to turkeys looking for adequate forage and water.

The Forest Service shall not allow grazing, including burros, in key, occupied, or modeled habitat (USFWS 1998d).

Section 8.21
SANTA ANA RIVER WOOLLY-STAR

ISSUE STATEMENT

Federally listed as endangered on September 28, 1987 (52 FR 36270)
State-listed as endangered in January 1987
CNPS 1B, 3-3-3

The Santa Ana River woolly-star (*Eriastrum densifolium* ssp. *Sanctorum)* is endemic to San Bernardino and Riverside counties. Historically, this species occurred along 60 miles of the Santa Ana River from the base of the San Bernardino Mountains in Riverside County to Santa Ana Canyon in Orange County. The species could have occurred as far south as Santiago Canyon. Currently, it is restricted to alluvial fan habitat along the Santa Ana River in San Bernardino County (USFWS 2001a). The Santa Ana River woolly-star occurs on sandy, relatively young alluvial benches. Threats to this species include development and associated flood control resulting in altered hydrology, sand and gravel mining, exotic species invasion, ORVs, and agriculture. The Santa Ana River woolly-star is identified as having a declining population trend (Stephenson and Calcarone 1999), and CDFG has identified it as declining as well (CDFG 2000).

AREA DESCRIPTION

There are no known occurrences of the Santa Ana River woolly-star on Forest Service lands. Historically, this species was known to occur in SBNF, and potential habitat still exists along the base of the San Bernardino Mountains along the Santa Ana River (USFWS 2001a). No key, occupied, or modeled habitat is currently available for the Forest Service lands (USFS 2002).

DESIRED CONDITION

Maintenance and enhancement of potential habitat for the Santa Ana River woolly-star. Introduction of the species into appropriate areas from which it was extirpated. If Santa Ana River woolly-star is found in the future, maintain the strongest conservation of these populations on Forest Service land.

OBJECTIVES

Maintain and enhance potential habitat for Santa Ana River woolly-star through a variety of techniques.

Complete a feasibility study for introduction to suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from “jeopardy.” Introducethe species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

Establish SMAs for the Santa Ana River woolly-star to be managed for conservation and recovery of the species.

Allow no impact to any Santa Ana River woolly-star populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential

restoration.

Maintain natural hydrological/geomorphological processes to benefit downstream populations. Maintain natural hydrological and sedimentary regimes on Forest Service lands (including episodic flooding events), thereby benefiting the downstream populations.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall conduct surveys in potential habitat for the Santa Ana River woolly-star. If populations are located, manage as indicated above.

Section 8.22

HOOVER'S WOOLLY-STAR

ISSUE STATEMENT

Federally listed as threatened on July 19, 1990 (55 FR 29361)
Recovery Plan issued on September 30, 1998
Removed from the Threatened list on March 6, 2001 (66 FR 13480)
CNPS 4, 1-2-3

The Hoover's woolly-star (*Eriastrum hooveri*), a California endemic species, is known from 4 metapopulations plus other small isolated populations. The metapopulation locations include from largest to smallest: a) Kettleman Hills in Fresno and Kings counties; b) Carrizo Plain-*Elkhorn Plain-*Temblor Range-*Caliente Mountains-*Cuyama Valley-*Sierra Madre Mountains in San Luis Obispo, Santa Barbara, and western Kern counties; c) Lokern-*Elk Hills-*Buena Vista Hills-*Coles Levee-*Taft-*Maricopa in Kern County; and d) Antelope Plain-*Lost Hills-*Semitropic in Kern County. A majority of known locations occur on BLM land or combinations of BLM and private lands (USFWS 2001a). On Forest Service lands, this species is identified as stable for population trends and low vulnerability (Stephenson and Calcarone 1999). A range extension of 140 km to the southeast in Los Angeles County was reported in 1999 (Boyd and Porter 1999).

AREA DESCRIPTION

In the LPNF, Hoover's woolly-star occurs at 6 locations on the Mt. Pinos Ranger District. They are located in 3 canyons south of the Cuyama Valley: Castro, Goode, and Tennison Canyons (USFS 2002). All locations are associated with dirt roads, which are not part of the Forest Service road system, and are accessed through private land and used by range permittees and adjoining landowners. Access is somewhat limited to the general public. All occurrences are located within Santa Barbara Potreros grazing allotment, which is grazed year round, though cattle are moved throughout the year. Although this species is not palatable to livestock, it could be impacted through trampling, resulting in mortality or reduced vigor (USFWS 2001a).

This species is identified to have 62 acres of occupied habitat and 955 acres of modeled habitat in the LPNF (USFWS 2001a). Additional populations are likely to occur in adjacent Ventura County in similar habitats.

DESIRED CONDITION

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for Hoover's woolly-star. reintroduction of the species into areas where it was historically present.

OBJECTIVES

Establish SMAs for the Hoover's woolly-star to be managed for conservation of the species.

Maintain and enhance potential and occupied habitat for Hoover's woolly-star through a variety of techniques.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall restrict grazing and access to the population locations during the flowering/fruit production and dispersal.

The Forest Service shall minimize backfires and burnouts within or adjacent to Hoover's woolly-star habitat.

The Forest Service shall prohibit establishment of staging areas, helibases, base camps, fire breaks, or other heavy-use areas within occupied Hoover's woolly-star habitat.

Section 8.23

SLENDER-HORNED SPINEFLOWER

ISSUE STATEMENT

Federally listed as endangered on September 28, 1987 (52 FR 36270)
Draft Recovery Plan released in 1997
State-listed as endangered in January 1982
CNPS 1B, 3-3-3

The slender-horned spineflower (*Dodecahema leptoceras*) is a southern California endemic species. Historically, it was known to occur in alluvial fan habitat and chaparral in cismontane southern California in Los Angeles, Riverside, and San Bernardino counties. Currently, the slender-horned spineflower is known from 9 occurrences including Bee Canyon and Big Tujunga Canyon in Los Angeles County, Cajon Creek and the Santa Ana River Wash in San Bernardino County, and Temescal Canyon, Bautista Canyon, Vail Lake, San Jacinto River, and Dripping Springs in Riverside County (USFWS 2001a). This species occurs on sandy alluvial benches and terraces in alluvial fan scrub and on well-drained slopes in chaparral in the southern end of its range, often in association with cryptobiotic crusts (Dudek 2002). Threats to this species include development and associated hydrological/fluvial changes (flood control), ORVs, trash dumping, and exotic species competition. The slender-horned spineflower is identified as having an unknown/declining population trend and moderate/high vulnerability on Forest Service lands (Stephenson and Calcarone 1999), and CDFG has identified it as stable to declining (CDFG 2000).

AREA DESCRIPTION

On Forest Service lands there are 3 slender-horned spineflower occurrences: one in Bautista Canyon in the San Jacinto Mountains in the SBNF, a second along Arroyo Seco Creek near Dripping Springs in CNF, and a third in the Castaic District of the ANF. Additionally, potential habitat occurs on all those National Forests. The Bautista Canyon location has had the adjacent shooting area removed and the location fenced (USFS 2002). The habitat in the CNF is within the Agua Tibia Wilderness (USFS 2002). In the ANF, 1 acre of occupied habitat occurs in the Castaic District. Occurrences at Bee Canyon, Big Tujunga Canyon, Cajon Creek, Santa Ana River, Temescal Creek, San Jacinto River, and Dripping Springs are on alluvial fans downstream of Forest Service lands (USFWS 2001a).

DESIRED CONDITION

Strongest conservation of populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for slender-horned spineflower. Introduction of the species into appropriate areas.

OBJECTIVES

Establish SMAs for the slender-horned spineflower to be managed for conservation and recovery of the species.

Allow no impact to any slender-horned spineflower populations. Maintain fencing and barriers that eliminate vehicle trespass at all locations.

Use interpretive signing, fencing, barriers, brochures, and/or parking delineations to direct uses and discourage impacts in areas of slender-horned spineflower habitat, especially near the Dripping Springs Campground (CNF). Seasonal closure of this campground area to protect arroyo toads will also benefit the slender-horned spineflower by providing protecting during flowering and seed-set (USFWS 2001a).

Maintain and enhance key and modeled habitat for slender-horned spineflower through a variety of techniques.

Maintain the natural hydrologic/geomorphologic regime at all Forest Service locations, as well as all upstream reaches on Forest Service lands that will benefit downstream populations. This includes episodic flooding events.

Complete a feasibility study for introduction to suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from "jeopardy." Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall continue surveys in modeled habitat to detect presence of species, and if found, implement management as noted above. Continue monitoring known populations at least every 3 years.

The Forest Service shall not allow fuel breaks or other fire-related activities (e.g. earth-moving) within the key or modeled habitat for the slender-horned spineflower.

The Forest Service shall continue coordination/briefing with the Dripping Springs Fire Station staff on the location and sensitivity of the slender-horned spineflower (USFWS 2001a).

The Forest Service shall monitor new populations located within grazing allotments, and eliminate grazing from the slender-horned spineflower habitat.

The Forest Service shall remove fire trails from all slender-horned spineflower habitat. Fire teams will be provided with maps of slender-horned spineflower occurrences for planning/avoidance purposes. No rehabilitation of the area after fire will be implemented.

Section 8.24

VAIL LAKE CEANOTHUS

ISSUE STATEMENT

Federally listed as threatened October 13, 1998 (63 FR 54956)
State-listed as endangered in January 1994
CNPS 1B, 3-3-3

Vail Lake ceanothus (*Ceanothus ophiochilus*) is endemic to southwestern Riverside County. It is known from only 3populations, located in the hills west of Vail Lake, on the lower north-facing slopes of the Agua Tibia Mountains (USFS 2002). This species grows on shallow soils originating from ultra-basic parent rock and deeply weathered gabbro (Boyd et al. 1991) and it reproduces by seed. Threats to Vail Lake ceanothus primarily include development, alteration of fire regime, and fire suppression efforts (bulldozing) (Stephenson and Calcarone 1999). It is also known to create hybrid swarms with *C. crassifolius* where two species co-occur (USFS 2002). The Vail Lake ceanothus is identified as having

a declining/stable population trend and low vulnerability on National Forest Service lands (Stephenson and Calcarone 1999), and CDFG has identified the Vail Lake ceanothus as stable (CDFG 2000).

AREA DESCRIPTION

Two populations occur in the CNF-Palomar District. Both are located in the northern portion of the Agua Tibia Wilderness, although one location overlaps onto private land. These CNF populations include about 50% of known plants. About 4,000 plants occur in two populations covering an area of about 67 acres. Some of the known occurrences were graded as a fuel break (Stephenson and Calcarone 1999). Additional acreage, based on soil type, has been identified to occur in the CNF (USFS 2002).

DESIRED CONDITION

Strongest conservation of populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for Vail Lake ceanothus. Introduction of the species into appropriate areas.

OBJECTIVES

Establish SMAs for the Vail Lake ceanothus to be managed for conservation and recovery of the species.

Allow no impact to any Vail Lake ceanothus populations.

Use interpretive signing, fencing, barriers, brochures, and/or parking delineations to direct uses and discourage impacts in areas of Vail Lake ceanothus habitat.

Eliminate vehicle trespass in the CNF.

Maintain and enhance key and modeled habitat for Vail Lake ceanothus through a variety of techniques.

Complete a feasibility study for introduction to suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from "jeopardy." Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Implement studies on the effect of fire frequency on establishment, survival, and reproduction of the Vail Lake ceanothus. As a result of that research, implement the appropriate fire regimes to conserve Vail Lake ceanothus. This species reseeds vigorously after fire and responds positively to occasional fire (USFS 2002), so fire intervals will be adjusted to maximize the seedling recruitment of this species.

STANDARDS

The Forest Service shall continue surveys in modeled habitat to detect presence of species, and if found, implement management as noted above. Continue monitoring known populations at least every 3 years.

The Forest Service shall not allow fuel breaks or other fire-related activities (e.g. earth-moving) within the key or modeled habitat for the Vail Lake ceanothus.

The Forest Service shall permanently close the Woodchuck Road to prevent inadvertent use by ORVs.

The Forest Service shall monitor grazing allotments for new populations, and domestic livestock grazing will be eliminated from habitat containing Vail Lake ceanothus.

MEXICAN FLANNELBUSH

ISSUE STATEMENT

Federally listed as endangered on October 13, 1998
State-listed as rare in July 1982
CNPS 1B, 3-3-2

The Mexican flannelbush (*Fremontodendron mexicanum*) is currently restricted in the United States to chaparral and cypress woodland in Cedar Canyon on Otay Mesa in San Diego County. Threats to the species include altered fire regime (CDFG 2000). The Mexican flannelbush is identified as having a declining population trend (Stephenson and Calcarone 1999), and the CDFG has identified it as declining as well (CDFG 2000).

AREA DESCRIPTION

The Mexican flannelbush is not known to occur on any Forest Service lands. Potential habitat has been modeled in the CNF (Stephenson and Calcarone 1999).

DESIRED CONDITION

Maintenance and enhancement of potential habitat for Mexican flannelbush. Introduction of the species into appropriate areas. If Mexican flannelbush is found in the future, maintain the strongest conservation of these populations on Forest Service land.

OBJECTIVES

Maintain and enhance potential habitat for Mexican flannelbush through a variety of techniques.

Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

If the Mexican flannelbush is located or successfully established on Forest Service lands:

- Establish SMAs for the Mexican flannelbush to be managed for conservation and recovery of the species.
- Allow no impact to any Mexican flannelbush populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Participate in efforts to evaluate the effect of fire on the Mexican flannelbush. The habitat for Mexican flannelbush is subject to human-caused fires, but no information on this species' response to fire is available. Therefore, a conservative fire regime, including suppression of human-caused fires, will likely benefit the species.

Implement exotic species control in areas where Mexican flannelbush potential habitat occurs.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall survey potential habitat of Mexican flannelbush in the CNF.

The Forest Service shall eliminate grazing of all feral/domestic animals from Mexican flannelbush potential habitat, except where it can be proven to be beneficial to the species.

ISSUE STATEMENT

Federally listed as endangered on October 13, 1998 (63 FR 54975)
State-listed as threatened in January 1990
CNPS 1B, 3-3-3

Munz's onion (*Allium munzii*) is endemic to western Riverside County. Of the 16 historic populations, 13 are currently extant. Many of these are small and/or threatened by development. This species is typically associated with mesic clay soils identified as Alo, Altamont, Bosanko, and Auld soils (NRCS 1971). Threats include development, dryland farming, invasion by exotics, ORVs, fire suppression activities (bulldozing), inappropriate fire intervals (causing type conversion to exotic grasslands), and clay mining (USFS 2002).

AREA DESCRIPTION

Forest Service lands contain 1 occurrence of Munz's onion near Elsinore Peak on the Trabuco District, CNF. This occurrence accounts for 8% of known occurrences. Forest Service lands may contribute substantially to recovery of the species due to this single large population in CNF. The Service estimates total population is 20,000 to 70,000 individuals, of which 10% occur on Forest Service lands (USFWS 2001a). Recently the Elsinore Peak area was closed to vehicular traffic to provide additional protection for Munz's onion (USFS 2002). In the CNF, 25 acres of key habitat and 31 acres of modeled habitat have been identified (USFWS 2001a). Munz's onion is recognized as having a declining population trend and moderate vulnerability on Forest Service lands (Stephenson and Calcarone 1999), and CDFG has identified Munz's onion as declining as well (CDFG 2000).

DESIRED CONDITION

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for Munz's onion. reintroduction of the species into appropriate areas from which it was extirpated. Maintain soils upon which the species is dependent.

OBJECTIVES

Establish SMAs for Munz's onion to be managed for conservation and recovery of the species

Allow no impact to any Munz's onion.

Implement exotic species control in areas where Munz's onion occurs. This project should be coordinated with the county's Weed Management Area.

Place interpretive signs at strategic locations regarding the site and special plants in key and modeled habitats.

Maintain and enhance potential and occupied habitat for Munz's onion through a variety of techniques.

Implement weed abatement of the exotic species that degrade the habitat quality of Munz's onion.

Complete a feasibility study for introduction to suitable habitat or reintroduction into historic locations (USFS 1992). Implementation of a successful introduction/re-introduction program will augment the species, moving it farther from "jeopardy." Initial and ongoing weed abatement of exotic species should be strongly emphasized. Introduce Munz's onion into appropriate areas and areas where it was historically present.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Implement appropriate fire management in Munz's onion habitat. While fire is part of the natural regime in the area, no fuel breaks or other ground-disturbing fire suppression will occur on this site (USFS 1992). Fire teams will be provided with maps of Munz's onion occurrences for planning/avoidance purposes. No rehabilitation of the area after fire will

be implemented. Fire will be suppressed if the fire interval is greater than every 70 years to avoid type conversion to exotic grasslands.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall conduct surveys at appropriate times of year and in all key and modeled habitat to determine species occurrence.

The Forest Service shall maintain route closure of road adjacent to the Munz's onion site. Continue to implement monitoring of site and control illegal use. Maintain protective fencing. Restrict driving on road through Munz's onion habitat and restore existing roads.

The Forest Service shall revise dispersed camping policy to eliminate Munz's onion habitat from areas open to dispersed camping. Use interpretive signing, fencing, barriers, brochures, and/or parking delineations to direct uses and discourage impacts.

The Forest Service shall eliminate grazing of all feral/domestic animals in Munz's onion habitat, except where it can be proven to be beneficial to the species (USFS 1992).

The Forest Service shall not permit development at the Elsinore Peak electronic site unless it is shown to have no impact on the Munz's onion habitat (USFS 1992).

The Forest Service shall limit vehicle access on roads and trails whenever possible and encourage hiking access to the communications site on Elsinore Peak, as it is adversely affecting species (USFWS 2001a).

The Forest Service shall complete a mineral withdrawal for land in Munz's onion habitat.

Section 8.27
THREAD-LEAVED BRODIAEA

ISSUE STATEMENT

Federally listed as threatened on October 13, 1998 (62 FR 54975)
State-listed as endangered in January 1982
CNPS 1B, 3-3-3

The thread-leaved brodiaea (*Brodiaea filifolia*) is endemic to southwestern cismontane California. Historically the thread-leaved brodiaea occurred from foothills of the San Gabriel Mountains at Glendora, east to Arrowhead Hot Springs in the western foothills of the San Bernardino Mountains, south through eastern Orange and western Riverside counties to Carlsbad and just south of Lake Hodges in San Diego County. Currently, remaining populations occur near the cities of Vista, San Marcos, and Carlsbad in San Diego County, on the Santa Rosa Plateau (USFWS 2001a), and along the San Jacinto River in Riverside County, near Glendora in Los Angeles County, and at several locations in Orange County. This species is always associated with vernal pools, wet meadows, and vernal seepages (USFS 2002). Threats to this species include development, genetic introgression (in southwestern San Bernardino Mountains (facilitated by exotic honeybees) (CDFG 2000), agriculture, fire clearance (USFS 2002), competition from exotics, alteration of hydrology, ORVs, and trampling (Dudek 2002). The thread-leaved brodiaea is identified as having an unknown population trend and low vulnerability on National Forest Service lands (Stephenson and Calcarone 1999). CDFG has identified the thread-leaved brodiaea as declining (CDFG 2000).

AREA DESCRIPTION

The only known occurrence of the thread-leaved brodiaea in the Forests is in the CNF. This site occupies 270 acres of habitat and supports the hybridized population of *B. filifolia* X *B. orcuttii*, so it does not represent the "pure" species. Ninety-three percent of this location is in San Mateo Wilderness in CNF, although it is within the Miller Mountain grazing allotment (USFWS 2001a). Another population occurs near SBNF, but it is outside the National Forest boundary.

In the ANF, no occurrences have been recorded, although one extant and one historic location occur south of the ANF boundary. Habitat has been identified to occur in the ANF (Soza and Boyd 1999). Modeled habitat has also been identified in the LPNF.

DESIRED CONDITION

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for thread-leaved brodiaea. reintroduction of the species into appropriate areas.

OBJECTIVES

Establish SMAs for the thread-leaved brodiaea to be managed for conservation and recovery of the species.

Allow no impact to any thread-leaved brodiaea populations.

Maintain and enhance potential and occupied habitat for thread-leaved brodiaea through a variety of techniques.

Implement exotic species control in areas where thread-leaved brodiaea occur. This project should be coordinated with the county's Weed Management Area.

Complete a feasibility study for introduction to suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from "jeopardy." Initial and ongoing weed abatement of exotic species should be strongly emphasized. Introduce the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Implement appropriate fire regimes to conserve thread-leaved brodiaea. No fuel breaks or other fire-related activities (e.g. earth-moving) will be allowed within the key or modeled habitat for the thread-leaved brodiaea.

STANDARDS

The Forest Service shall continue to survey for the thread-leaved brodiaea in modeled habitat and at the known occurrence.

The Forest Service shall restrict bee-keeping activities on public lands within 25 miles of populations. Introgression in the CNF population makes this population unavailable for conservation of the thread-leaved brodiaea. The introgression occurs because of the exotic honeybee as a pollination vector. Feral hives shall be removed within this zone as well. By eliminating the hybridization vector, the plants may cease outcrossing with *B. orcuttii.*

The Forest Service shall only permit driving on system and permitted roads through all meadow species habitat for emergencies and essential administrative purposes. Administrative uses shall occur only when meadows are dry (USFWS 2001a).

The Forest Service shall eliminate grazing of all feral/domestic animals from thread-leaved brodiaea habitat in the CNF, except where it can be proven to be beneficial to the species. Grazing animals are vectors for exotic plant species dispersal, and they disrupt the soils/ ecological regimes. During the growing season, stock may potentially trample/graze the thread-leaved brodiaea plants.

The Forest Service shall eliminate or re-align the roads that go through any occurrences of the thread-leaved brodiaea.

The Forest Service shall implement a mineral withdrawal in all modeled or occurring areas of thread-leaved brodiaea habitat.

CAMATTA CANYON AMOLE

ISSUE STATEMENT

Federally listed as threatened on March 20, 2000 (63 FR 15158)
Draft Critical Habitat on November 8, 2001
CNPS 1B, 3-3-3

Camatta Canyon Amole (*Chlorogalum purpureum* var. *reductum*) is endemic to the La Panza Range of San Luis Obispo County. One large population covering between 10 and 12 acres spans LPNF, state, and private land. A second smaller population is located on private lands that are conserved under The Nature Conservancy's private landowner protection program. This species is identified as having a stable population trend and low vulnerability on Forest Service lands (Stephenson and Calcarone 1999). USFWS issued draft critical habitat on 11/8/01 that proposed 1,170 acres of National Forest Service land, 3,580 acres of private land, and 20 acres of state land as critical habitat (USFWS 2001b). No final rule has been issued. CalTrans has identified the Navajo Road Botanical Management Area on their Right-of-Way on both sides of Highway 58 that includes part of the large occurrence of Camatta Canyon Amole. Threats identified to this species include ORVs and grazing.

AREA DESCRIPTION

In the LPNF, the plants occupy an estimated 8 acres in sparse annual grasslands that are surrounded by blue oak woodlands and gray/foothill pines. The sparse vegetation is presumably due to the heavy clay soils or serpentinite soils that occur there (USFS 1999, CNPS 2000). A 30-foot-wide graded dirt road (Forest Road 29S15) that accesses inholdings and residences bisects a population in LPNF. The Camatta Canyon Amole is substrate-specific, occurring on the Travesto Series, a coarse-loamy, mixed, thermic Lithic Haploxeroll (USFS 2001a). Key habitat has been identified based on this soil type, and no additional occupied or modeled habitat has been identified. Cryptobiotic crusts are present in many areas of occupied habitat and are known to play an important ecological role in maintaining the habitat (USFWS 2001a). The Camatta Canyon Amole is found usually on shallow soils that are less suitable to non-native Mediterranean grasses.

DESIRED CONDITION

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat.

OBJECTIVES

Establish SMAs for the Camatta Canyon Amole to be managed for conservation and recovery of the species.

Allow no impact to any Camatta Canyon Amole populations.

Maintain and enhance potential and occupied habitat for Camatta Canyon Amole through a variety of techniques.

Acquire additional habitat for conservation, preferably with extant populations.

Continue research into basic habitat and life history requirements for this species to aid in species conservation.

Implement studies to evaluate the effect of the road that bisects the population on the hydrology of the system.

Continue funding the investigation on the efficacy of establishing new individuals in areas subjected to soil compaction (Koch 1997) and the demography of the Camatta Canyon Amole (Borchert 1999).

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

Implement exotic species control. This project should be coordinated with the county's Weed Management Area.

STANDARDS

The Forest Service shall eliminate grazing of all feral/domestic animals from Camatta Canyon Amole habitat, except

where it can be proven to be beneficial to the species. This LPNF site is included in the Navajo grazing allotment, and this type of activity impacts the habitat and plants by trampling, soil compaction, herbivory, and introduction of exotic plant species.

The Forest Service shall eliminate ORV trespass into the area by maintaining and augmenting the existing pipe fence barrier. Because this area is a historic staging area for ORV activity and cattle operations, the use of interpretive signing, fencing, barriers, brochures, and/or parking delineations to direct uses and discourage impacts is particularly appropriate and important.

Road maintenance activities will not stray into the conservation area for the Camatta Canyon Amole, nor will the road be widened beyond its existing width.

Section 8.29
DEHESA NOLINA

ISSUE STATEMENT

Federally proposed for listing as threatened on October 2, 1995 (60 FR 51443)
Withdrawn from listing on October 13, 1998 (63 FR 54972)
State-listed as endangered in November 1979
CNPS 1B, 3-3-2

Dehesa nolina (*Nolina interrata*) is endemic to southwestern San Diego County and adjacent Baja California. It is known from only 6 occurrences in San Diego County and 3 occurrences in Baja (CDFG 2000). This species grows in chaparral. Threats to Dehesa nolina primarily include development, alteration of fire regime (CDFG 2000), and horticultural collection (CNPS 2001). The Dehesa nolina is identified as having a stable population trend (Stephenson and Calcarone 1999), and CDFG has identified the Dehesa nolina as stable to declining (CDFG 2000).

AREA DESCRIPTION

No populations of the Dehesa nolina are known to occur in the Forests, but potential habitat is identified in the CNF (Stephenson and Calcarone 1999).

DESIRED CONDITION

Maintenance and enhancement of potential habitat for Dehesa nolina. Introduction of the species into appropriate areas. If Dehesa nolina is found in the future in the Forests, maintain the strongest conservation of these populations.

OBJECTIVES

Maintain and enhance potential habitat for Dehesa nolina through a variety of techniques.

Complete a feasibility study for introduction to suitable habitat. Implementation of a successful introduction program will augment the species, moving it farther from federal listing under the Endangered Species Act. Introduction of the species into appropriate areas.

Acquire additional habitat for conservation, preferably with extant populations.

If the Dehesa nolina is located or successfully established on Forest Service lands:

- Establish SMAs for the Dehesa nolina to be managed for conservation and recovery of the species.
- Allow no impact to any Dehesa nolina populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Implement studies on the effect of fire frequency on establishment, survival, and reproduction of the Dehesa nolina. As a result of that research, the Forest Service shall implement the appropriate fire regimes to conserve Dehesa nolina. Fire intervals will be adjusted to maximize the seedling recruitment of this species.

Use interpretive signing, fencing, barriers, brochures, and/or parking delineations to direct uses and discourage impacts in areas of Dehesa nolina habitat.

Eliminate vehicle trespass in the CNF.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall continue surveys in modeled habitat to detect presence of the Dehesa nolina, and if found, implement management as noted above.

The Forest Service shall not allow fuel breaks or other fire-related activities (e.g. earth-moving) within the key or modeled habitat for the Dehesa nolina.

The Forest Service shall monitor the locations of new populations within grazing allotments, and grazing will be eliminated from the Dehesa nolina habitat.

Section 8.30

SAN BERNARDINO BLUEGRASS

ISSUE STATEMENT

Federally listed as endangered on September 14, 1998 (63 FR 49006)
CNPS 1B, 2-2-3

San Bernardino bluegrass (*Poa atropurpurea*) has declined due to urbanization, ORVs, and alteration of hydrological regime, all of which have directly destroyed or degraded and fragmented meadow habitat (USFS 2000a). Approximately 91% of the meadow habitat for the San Bernardino bluegrass has been eliminated since 1900 in the Big Bear region, and currently 70% of the remaining occurrences are unprotected there. None of the occurrences in San Diego County are currently protected. In total, less than 20 populations are documented throughout this species range. This species is dioecious, so an adequate mix of male and female plants is necessary to ensure genetic outcrossing and vigor. In San Diego, the populations have few male plants and are suspected of being apomictic (not needing fertilization), however, this reproductive regime will likely lead to the loss of genetic diversity (USFS 2000a).

AREA DESCRIPTION

Fewer than 100 acres of habitat remain in the San Bernardino Mountains. Of the total 11 known locations, 4 sites with known occurrences are in the SBNF lands. The Belleville Meadow site has the greatest amount of occupied habitat. The Wildhorse Meadow site has good habitat, but no plants were located in 1999 or 2000. The Pan Hot Springs site is partially on private and public land. The Hitchcock Ranch area of public land has less than 1 acre of habitat, and no plants were located in 1999. One small 5-acre site is administered by the California Department of Fish and Game. One 20-acre site is owned by a private youth camp (Hitchcock Ranch), and the remaining 7 sites totaling 50 acres are privately owned as well. This limited range for the species in the SBNF will not ensure the long-term viability of the species without additional measures (USFS 2000a). Fourteen percent of the known population area within the SBNF is under mining claims. This species can also hybridize with *Poa pratensis,* an exotic species that can exploit similar habitat when introduced and poses a “genetic swamping” issue.

In CNF, there are 9 occurrences: 7 locations in the Laguna Mountains near Laguna Meadow, one in Mendenhall Valley reported in 1981, and one in Bear Valley Meadow (USFWS 2001a).

DESIRED CONDITION

Strongest conservation of remaining populations on Forest Service land. Maintenance and enhancement of potential and occurring habitat for San Bernardino bluegrass. reintroduction of the species into appropriate areas. Maintain hydrology upon which the species is dependent.

OBJECTIVE

Establish SMAs for the San Bernardino bluegrass populations to be managed for conservation and recovery of the species.

Allow no impact to any San Bernardino bluegrass populations on public lands.

Maintain and enhance potential and occurring habitat for San Bernardino bluegrass through a variety of techniques.

The Forest Service shall develop habitat management guidance for montane meadows (USFWS 2001a) that specifically addresses sensitive species habitats in the SBNF and CNF.

The Forest Service shall prohibit driving in meadow habitat (USFWS 2001a).

The Forest Service shall implement watershed improvement projects to stabilize meadows with erosion problems or altered hydrologic conditions, and immediately correct existing drainage problems (USFWS 2001a).

Re-introduce the species into appropriate areas that are managed for conservation.

Maintain hydrology upon which the San Bernardino bluegrass is dependent.

Acquire additional habitat for conservation, preferably with extant populations.

Research basic habitat and life history requirements for this species to aid in species conservation and potential restoration.

Allow no patenting of public lands that contain key, occupied, or modeled habitat for San Bernardino bluegrass.

Establish photo monitoring points with GPS coordinates for all occurrences to monitor ecological processes over time. Monitor annually.

STANDARDS

The Forest Service shall conduct annual surveys at Heartbar, Convers, and Deer Lick Meadows (SBNF), during the appropriate time of year to detect the species (USFWS 2001a).

The Forest Service shall close trails leaving Holcomb Valley Campground that go through Belleville Meadow (USFWS 2001a). These trails from Holcomb Valley Campground (SBNF) that pass through habitat shall be disguised and rehabilitated. The area will be protected through barricading and signing.

The Forest Service shall fence various areas to restrict ORV traffic (USFWS 2001a) and implement routine monitoring and maintenance of those fences.

The Forest Service shall close/re-direct roads in Holcomb Valley that affect hydrological functioning of Belleville Meadow (USFWS 2001a); 3N12, which bisects the Hitchcock Ranch occurrence and sequesters water flow in culverts; and 2N93 and 1N19, which encircle and bisect the Wildhorse Meadow occurrence.

The Forest Service shall, in coordination with the USFWS (2001), recommend revising dispersed-camping policy to eliminate meadow habitat from areas open to dispersed camping. The Forest Service shall use interpretive signing, fencing, barriers, brochures, and/or parking delineations to direct uses and discourage impacts (USFWS 2001a). In addition, to protect the resource and fragile habitat, all camping should be prohibited in meadow habitats.

The Forest Service shall prohibit dispersed target shooting (USFWS 2001a).

The Forest Service shall prohibit livestock grazing in key, occupied, and modeled San Bernardino bluegrass habitat until after seed-set (approximately mid-July, but should be determined annually) (USFWS 2001a) and dispersal.

The Forest Service shall remove organizational facilities or portions of permitted areas from meadow areas in TES species key, occupied, and modeled habitats when opportunities arise to eliminate or minimize impacts (USFWS 2001a).

The Forest Service shall only permit driving on system and permitted roads through all TES meadow species habitat for emergencies and essential administrative purposes. Administrative uses shall occur only when meadows are dry (USFWS 2001a).

The Forest Service shall delineate and sign trails connecting the campground to road 3N05, but which do not go through listed plant habitat, to encourage visitors to use those trails (USFWS 2001a).

The Forest Service shall evaluate the effects of existing commercial water extraction from drainages supporting TES meadow plant habitat. Adjust extraction levels to eliminate impacts (USFWS 2001a).

The Forest Service shall replace unauthorized trails with boardwalks at appropriate locations in the Belleville Meadow area (SBNF). Place interpretive signs at the roadside regarding the site and special plant in key, occupied, and modeled habitats (USFWS 2001a).

The Forest Service shall continue review of all system roads in known occupied meadow plant habitat to determine actions to completely avoid impacts in those areas. As proposed in 1999, implement decision to close 3N16B and 3N16C (USFWS 2001a).

The Forest Service shall evaluate the layout of campgrounds/developed areas in or adjacent to habitat in Holcomb Valley Campground (key), Coldbrook Campground (modeled), Serrano Campground (modeled), Hanna Flat Campground (modeled), Heartbar Campground (modeled), Converse Campground (m), Big Pine Falls (m), Horse Springs Campground (m), Grout Bay Picnic Area (modeled), Gold Fever automobile and interpretive stops (key), and campgrounds in Laguna Mountain area (key and modeled) to determine their appropriateness of interface with species conservation in and adjacent to the sites. Changes in layout and directed interaction will be acted on, especially where conflicts are identified. Interpretive signing, fencing, barriers, brochures, and/or parking delineations will be used to direct uses and discourage impacts.

The Forest Service shall preclude the introduction of *P. pratensis* to key, occupied, and modeled habitat areas, to preclude additional threats to the species from genetic swamping.

The Forest Service shall initiate mineral withdrawal claims in key, occupied, or modeled habitat area for San Bernardino bluegrass. In the interim, monitor the prospecting activities (that require no federal notification). This activity could be in conjunction with annual monitoring of the populations or monitoring of fencing.

The Forest Service shall allow no patenting of public lands that contain key, occupied, or modeled habitat for San Bernardino bluegrass.

The Forest Service shall not permit filming in sensitive plant habitat.

Section 8.31
CONSERVANCY FAIRY SHRIMP

ISSUE STATEMENT

The conservancy fairy shrimp (*Branchinecta conservation*) have large compound eyes, 11 pairs of swimming legs, and elongated, distinctly segmented bodies lacking a hard protective outer cover. The ends of the antennae segments furthest from the body are distinctive when compared with other fairy shrimp species. The second pair of antennae in adult females is cylindrical and elongated. In males, the second antennae are greatly enlarged and specialized for clasping females during copulation. The female shrimp's brood sac is tapered towards each end, and usually ends under abdominal segment 8. These distinctive characteristics are difficult to discern with the naked eye, as this species' total length is only 14 to 17 mm/0.6 to 1.1 inches (Eng et al. 1990 in USFWS 1997ba).

This tiny crustacean is known from 6 disjunct populations: Vina Plains in Tehama County; south of Chico in Butte County; Jepson Prairie in Solano County; Sacramento National Wildlife Refuge in Glenn County; near Haystack Mountain northeast of Merced in Merced County; and in the Lockwood Valley in northern Ventura County (USFWS 1994a; USFWS 2001a). In southern California, vernal pool habitat has never been abundant, and it has been reduced by an estimated 95% in San Diego, Riverside, and adjacent counties (Thelander et al. 1994).

Urban, water, flood control, highway, and utility projects, along with agricultural development, are the primary reasons cited for the conversion of vernal pool habitat, and the consequential decline of the conservancy fairy shrimp (Jones and Stokes Associates 1987 *in* USFWS 1994a). Other factors that threaten the species' continued existence include livestock grazing, ORVs, trampling, and trash and toxic dumping (Thelander et al. 1994). The conservancy fairy shrimp was federally listed as an endangered species under the Endangered Species Act on September 19, 1994 (59 FR 48136).

Conservancy fairy shrimp inhabit vernal pools (ephemeral or temporary pools of fresh water), with highly turbid water;

these develop in the cool, wet months of the year (USFWS 2001a). The shrimp are ecologically dependent upon and adapted to seasonal fluctuations in their habitat, such as the presence or absence of water, the period of inundation, and specific environmental factors such as salinity, conductivity, dissolved solids, and pH levels. Differences in water chemistry often determine the distribution of different types of fairy shrimp (Belk 1977; Jamie King, University of California, in litt., 1992; Marie Simovich, University of San Diego, in litt., 1992 *in* USFWS 1994a).

Fairy shrimp activity is strongly correlated with peaks in precipitation, which in southern California are typically November to April. The conservancy fairy shrimp has been observed from November to early April (Barclay and Knight 1984; Eng et al. 1990 *in* USFWS 1994a). The inactive eggs of all fairy shrimp are known as cysts. The soil in vernal pools may harbor cysts from several years of breeding; cysts can withstand temperature extremes and extended dry periods. When the rains come, in the same or subsequent seasons, some of the cysts may hatch (USFWS 2001a).

Fairy shrimp play an important role in the community ecology of vernal pools (R. Brusca, pers. comm., 1992; Loring et al. 1988 *in* USFWS 1994a). Fairy shrimp are an important food source for waterfowl (Ahl 1991; Driver 1981; Krapu 1974; Swanson et al. 1974 *in* USFWS 1994a) and other vertebrates, such as western spadefoot toad (*Scaphiopus hammondi*) tadpoles (M. Simovich, pers. comm., 1991 *in* USFWS 1994a).

AREA DESCRIPTION

Conservancy fairy shrimp were recently rediscovered on Mount Pinos Ranger District in LPNF. The ponds are located within an active grazing allotment, but the Forest Service has fenced off the habitat to exclude livestock. There are several potreros in the mountains north of Santa Barbara in LPNF that are likely occupied by this species, but comprehensive surveys are needed to determine the distribution of this species in the Forests. A total of 751 acres has been identified as potential habitat on the southern Los Padres for vernal pool and conservancy fairy shrimp. However, grazing allotments overlap 542 acres of the 751 acres of potential habitat (USFWS 2001a).

DESIRED CONDITION

To meet the desired condition of viable populations of fairy shrimp, activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Vernal pool habitat restoration and enhancement projects implemented in historically occupied habitat have encouraged the recovery and conservation of the species.

OBJECTIVES

Determine extent of occupied vernal pool habitat through comprehensive surveys in key, occupied, and modeled habitats.

Ensure compliance of laws, regulations, and Forest Service policies that benefit the conservation and recovery of the species.

Protect all remaining habitat, and work to restore historic habitat.

Prohibit activities that degrade or destroy vernal pool habitat.

Promote the recovery of the species through education and outreach activities.

Conduct or encourage and support research to determine the historic distribution of the species to guide restoration efforts.

Conduct or encourage and support research on the ecology of the species, their physical and chemical tolerance limits and biotic associations, including the role of herbivory, pollinators, and vectors.

Conduct or encourage and support research on disturbances associated with fire, grazing, and non-native species. See section 2.0, *Fire Management;* section 25.0, *Domestic Livestock Grazing;* and section 10.0, *Invasive Species Management*.

Prevent adverse effects on water quantity and quality, and maintain hydrological conditions and water quality of the individual vernal pools and their associated watersheds (USFWS 1998c).

Include resource advisors as part of fire incident command teams to make recommendations regarding how to protect fairy shrimp and their habitat and to brief crew supervisors and equipment operators in suppression areas (USFWS 2001a).

Emphasize prevention of undesirable non-native plant and animal establishment and spread in vernal pool habitat (USFWS 2001a).

Develop and distribute educational pamphlets on the ecology of vernal pools, the threats this species faces, and the necessary conservation measures

STANDARDS

The Forest Service shall conduct comprehensive wet-season surveys to document the status and distribution of this species in the Forests.

The Forest Service shall design and establish vernal pool habitat preserves where they occur in the Forests. Inventory each complex to determine the amount and configuration of vernal pools and their associated watersheds necessary to maintain habitat function and species viability (USFWS 1998c).

The Forest Service shall inventory each pool within each complex to determine species composition and abundance. Recognize that absence of a species in any particular year doesn't mean that the pool or complex does not provide habitat or that the species is not present; the species may be viable as cysts (USFWS 1998c).

The Forest Service shall prohibit any activities (e.g. construction, road maintenance and use, grazing, ORV use, water diversion) that would alter the hydrology or cause sedimentation of key and occupied vernal pool habitats (USFWS 2001a).

The Forest Service shall prohibit establishment of staging areas, helibases, base camps, fuel breaks, or other areas of human concentration and equipment use within listed species key and occupied habitat (USFWS 2001a).

The Forest Service shall prohibit drafting or dipping water from vernal pools (USFWS 2001a).

The Forest Service shall include provisions in contracts and permits for use of National Forest Service lands and resources as necessary to prevent introduction and spread of exotics in vernal pool habitat (USFWS 2001a).

If listed fairy shrimp are detected in a recreation area, the Forest Service shall take steps to eliminate impacts to species (USFWS 2001a).

Section 8.32
LONGHORN FAIRY SHRIMP

ISSUE STATEMENT

The longhorn fairy shrimp (*Branchinecta longiantenna*) closely resembles the conservancy fairy shrimp (section 8.31). One distinguishing characteristic is the portion of the distal segment of its antennae, which is flattened in the antero-posterior plane rather than the latero-medial plane. This species ranges in size from 12.1 to 20.8 mm/0.5 to 0.8 inches (USFWS 1994a).

This species is known only from 4 disjunct populations along the eastern margin of the central coast range from Concord, Contra Costa County, south to Soda Lake in San Luis Obispo County: the Kellogg Creek watershed, in the Altamont Pass area; the western and northern boundaries of Soda Lake on the Carrizo Plain (Eng et al. 1990 *in* USFWS 1994a); and in the Kesterson National Wildlife Refuge (Dennis Woolington, U.S. Fish and Wildlife Service, in litt. 1993 *in* USFWS 1994a).

The reasons for the decline of this species and the threats to its continued existence are similar to those for the conservancy fairy shrimp. On September 19, 1994, the longhorn fairy shrimp was federally listed as an endangered species under the Endangered Species Act (59 FR 48136) (USFWS 1994a; USFWS 2001a).

This species has habitat requirements and adaptations similar to the conservancy fairy shrimp. However, longhorn fairy shrimp may reside in clear to turbid grass-bottomed vernal pools in grasslands and clear-water pools in sandstone depressions. All vernal pools inhabited by this species are filled by winter and spring rains and may remain inundated until June. The longhorn fairy shrimp has been observed from late December until late April. The water in grassland pools inhabited by this species has very low conductivity, TDS, and alkalinity (Eng et al. 1990 *in* USFWS 1994a). This

species is also an important food source for waterfowl and other invertebrates (Ahl 1991; Driver 1981; Krapu 1974; Swanson et al. 1974 *in* USFWS 1994a).

AREA DESCRIPTION

There are no known locations of longhorn fairy shrimp in the Forests; the closest location is at Soda Lake in San Luis Obispo County near LPNF. There is potential habitat for the species in the Sierra Madre Mountains but habitat is not modeled (USFWS 2001a).

DESIRED CONDITION

To meet the desired condition of viable populations of fairy shrimp, activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Vernal pool habitat restoration and enhancement projects implemented in historically occupied habitat have encouraged the recovery and conservation of the species.

OBJECTIVES

See section 8.31, *Conservancy Fairy Shrimp*, for objectives related to listed fairy shrimp species.

STANDARDS

See section 8.31, *Conservancy Fairy Shrimp*, for applicable standards related to listed fairy shrimp species.

Section 8.33

VERNAL POOL FAIRY SHRIMP

ISSUE STATEMENT

The vernal pool fairy shrimp (*Branchinecta lynchi*) closely resembles the conservancy and longhorn fairy shrimps (sections 8.31 and 8.32, respectively). One distinguishing characteristic is the antennae, which in males include a ridge-like basal segment. This small translucent crustacean ranges in size from 10.9 to 25.0 mm/0.4 to 1.0 inches (USFWS 1994a).

Vernal pool fairy shrimp occur in California and southern Oregon (USFWS 2001a). In California, there are 32 known populations of vernal pool fairy shrimp, which are distributed from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County, and along the central coast range from northern Solano County to Pinnacles in San Benito County (Eng et al. 1990; M. Fugate, pers. comm., 1991; Sugnet & Associates 1993b *in* USFWS 1994a). Four additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County, one in the mountain grasslands of northern Santa Barbara County, one near the Santa Rosa Plateau in Riverside County, and one near Rancho California in Riverside County. Three of these 4 isolated populations contain only a single occupied pool (USFWS 1994a).

The reasons for the decline of this species and the threats to its continued existence are similar to those for the conservancy and longhorn fairy shrimp. On September 19, 1994, the vernal pool fairy shrimp was federally listed as a threatened species under the Endangered Species Act (59 FR 48136) (USFWS 1994a; USFWS 2001a).

This species has habitat requirements and adaptations similar to the conservancy and longhorn fairy shrimp. However, vernal pool fairy shrimp occur in alkaline pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal swales, and other seasonal wetlands (USFWS 2001a). Although the speices has a relatively wide range, the majority of occurrences are in vernal pools with clear to tea-colored water, most commonly in grass or mud-bottomed swales, or basalt flow depression pools in unplowed grasslands. However, a single population has been documented in sandstone rock outcrops and another was found in alkaline vernal pools.

The vernal pool fairy shrimp has been collected from early December to early May. The water in pools inhabited by this species has low TDS, conductivity, alkalinity, and chloride (Collie and Lathrop 1976 *in* USFWS 1994a). The vernal pool fairy shrimp is usually found at low population densities (Simovich et al. 1992 *in* USFWS 1994a); it rarely co-occurs with other fairy shrimp species, and is never numerically dominant (Eng et al. 1990 *in* USFWS 1994a). This species is

also an important food source for waterfowl and other invertebrates (Ahl 1991; Driver 1981; Krapu 1974; Swanson et al. 1974 *in* USFWS 1994a).

AREA DESCRIPTION

Vernal pool fairy shrimp were recently rediscovered on Mount Pinos Ranger District in LPNF. The ponds are located within an active grazing allotment, but the Forest Service has fenced off the habitat to exclude livestock. One additional occurrence of vernal pool fairy shrimp has been recorded in LPNF, 5 miles southeast of the other site; this population is presumed extant but was last verified in 1989. There are several potreros in the mountains north of Santa Barbara in LPNF that are likely occupied by this species, but comprehensive surveys are needed to determine the distribution of this species in the Forests. A total of 751 acres has been identified as potential habitat in the southern Los Padres National Forest for vernal pool and conservancy fairy shrimp. However, grazing allotments overlap 542 acres of the 751 acres of potential habitat (USFWS 2001a).

DESIRED CONDITION

To meet the desired condition of viable populations of fairy shrimp, activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Vernal pool habitat restoration and enhancement projects implemented in historically occupied habitat have encouraged the recovery and conservation of the species.

OBJECTIVES

See section 8.31, *Conservancy Fairy Shrimp*, for objectives related to listed fairy shrimp species.

STANDARDS

See section 8.31, *Conservancy Fairy Shrimp*, for applicable standards related to listed fairy shrimp species.

Section 8.34
SMITH'S BLUE BUTTERFLY

ISSUE STATEMENT

The Smith's blue butterfly (*Euphilotes enoptes smithi*) is an endemic California subspecies. A relatively small butterfly, it has a wingspan of less than 1 inch across with wings fully spread. The males are a brilliant blue color, while the females are brown; both sexes have a red-orange band across the underside of the hind wings. Unlike other *Euphilotes enoptes*, the Smith's blue has a light undersurface ground color with noticeable black markings and a dull black terminal line (USFWS 1984a).

Historically, the species has always been restricted to the coastal areas of central California, primarily known from the coastal sand dunes of the Salinas River to Del Rey Creek. Currently, the known distribution is restricted to portions of Monterey, San Mateo, and Santa Cruz counties (USFWS 1984a). Since two species of buckwheat serve as their host plants, the continued existence of these plants is the key limiting factor for the butterfly. Threats include habitat loss and degradation due to development, grazing, wildfire suppression, invasion of exotic plants, sand mining, ORVs and bikes, foot traffic, and the maintenance, repair, and use of roads and trails (USFWS 1984a; USFWS 2001a). Even fugitive dust may cause adults to leave habitat and may reduce palatability of buckwheat for feeding larvae (USFWS 2001a). The Smith's blue butterfly (*Euphilotes enoptes smithi*) was federally listed as an endangered species on June 1, 1976; critical habitat was proposed on February 8, 1977.

The species occurs in scattered populations in association with coastal dunes, inland sand dunes, cliffside coastal scrub and chaparral, and grassland habitats. They spend their entire lives in association with two buckwheat plants in the genus Eriogonum—seacliff buckwheat and coast buckwheat—which provide food for the larvae and nectar, resting, basking, mate location, and copulation for the adults. Some research specialists suspect this species could use additional hosts such as *Eriogonum nudum* and *Eriogonum elongatum* (G. Pratt, pers. comm.). The Smith's blue has been recorded to

feed upon *Eriogonum parvifolium* and *E. latifolium.* The most important variable is the bloom time, height of the plant, and perhaps the relationship to *Eriogonum latifolium*. Both sexes stay relatively close to their host plants; studies show they remain within 200 feet (Arnold 1978).

The flight season of the Smith's blue is closely associated with the flowering period of the buckwheat plants, from mid-June to early September. Males emerge first, followed by the females about a week later. Adults live for about one week, but emergences are dependent on climatic variations in the flowering time of host plants. Only one generation per year is produced. Courtship and mating occur on or near buckwheat flower heads (Arnold 1978).

AREA DESCRIPTION

Currently, there are no recovery units for the Smith's blue butterfly. Eleven occupied sites are in or near the Los Padres National Forest, including Big Sur Park, Monterey Ranger District, Burns Creek, along the Nacimiento-Ferguson Road, Kirk Creek, and Gorda Horse Pasture (USFWS 1984a).

The species' current range encompasses an 80-mile linear strip along coast of central California, 45 miles of which lie within LPNF. On the Monterey Ranger District, there is an estimated 2,000 acres of potential habitat, based on the distribution of seacliff buckwheat. A total of 518 acres has been identified as key habitat, and modeled habitat is 10,856 acres in LPNF. No comprehensive surveys have been conducted on the Monterey Ranger District (USFWS 2001a).

TABLE 8-1

OBSERVATIONS ON OR ADJACENT TO MONTEREY RANGER DISTRICT

NOT ON FOREST SERVICE LAND	OCCURRENCE
X	Pfeiffer Big Sur State Park
X	Lafler Canyon/Highway 1
X	Torre Canyon/Highway 1
X	Partington Canyon/Highway 1
X	Anderson Canyon/Highway 1
X	Burns Creek
X	Buck Creek
X	4 miles N of Dolon Creek
X	Big Creek/Highway 1
X	Dolan Creek/Highway 1—Dolan Rock/Highway 1
X	Vicente Creek/Highway 1
	3-4 miles SE of Lucia
	1st and 2nd creeks S of Limekiln
	4 miles N of Point Gorda
	Wild Cattle Creek
	Cone Peak Road
	Kirk Creek
	Nacimiento-Ferguson Road
	Gorda Horse Pasture
	Pacific Valley Unit
	Pacific Valley
	Jade Cove/Highway 1
	Willow Creek/Highway 1

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration and enhancement projects implemented in historically occupied habitat have encouraged the dispersal of individuals. The spatial extent of healthy buckwheat stands has increased significantly on Forest Service lands, and the Smith's blue butterfly is flourishing, once again breeding in historic localities.

OBJECTIVES

Determine extent of occupied habitat through comprehensive surveys in key, occupied, and modeled habitats.

Ensure compliance of laws, regulations, and Forest Service policies that benefit the conservation and recovery of the species.

Permanently protect, manage, and secure the habitat patches supporting known extant population (USFWS 1984a).

Restore habitat patches and enhance landscape connectivity within the distribution of the habitat complexes (USFWS 2001a).

Prohibit activities that degrade or destroy Smith's blue butterfly habitat.

Promote the recovery of the species through education and outreach activities.

Coordinate recovery needs with other Forest Service activities and develop inter-agency agreements where necessary (USFWS 1984a).

Determine ecological needs and apply results to Forest Service activities, such as vegetation management (USFWS 1984a).

Conduct an area analysis in Smith's blue butterfly range to identify opportunities to use prescribed fire to maintain and enhance habitat structure and species composition of buckwheat stands (USFWS 2001a).

Carry out prescribed burns in the species habitat, but only on a 30- to 50-year rotation (USFWS 2001a).

Develop and implement restoration programs to eliminate exotic plants and revegetate degraded dunes with native plants, including seacliff buckwheat and coast buckwheat, using seed stock from surrounding areas to ensure genetic integrity (USFWS 1984a).

Initiate and implement a multi-lingual education and outreach program using flyers, interpretive signs, and other formats (USFWS 1984a).

STANDARDS

The Forest Service shall develop a survey protocol for Smith's blue butterfly in cooperation with the U.S. Fish and Wildlife Service (USFWS 2001a).

The Forest Service shall conduct comprehensive surveys to document existing colonies and the area necessary for their recovery (USFWS 1984a).

The Forest Service shall conduct annual field surveys to determine the distribution and abundance of habitat (seacliff buckwheat and coast buckwheat), in the following order: 1) areas that are in or adjacent to suitable rangelands within active grazing allotments; 2) trail and road corridors that have documented occurrences of invasive, non-native plants; 3) trail and road corridors for which we have incomplete knowledge regarding the distribution and abundance of buckwheat. Determine status of medium- to high-quality buckwheat stands that were identified by Norman in 1994 (USFWS 2001a).

The Forest Service shall enforce existing laws and regulations, and implement applicable policies to promote the conservation and recovery of the species.

The Forest Service shall avoid activities that result in removal, crushing, burying, or mowing of host plants; or long-term damage to habitat (e.g. erosion, rutting); or result in soil compaction around host plants (USFWS 2001a).

The Forest Service shall prohibit removal of host plants when conducting plant sampling in all TES butterfly habitats (USFWS 2001a).

The Forest Service shall monitor and coordinate agency compliance with the recovery plan and Section 7 consultations (USFWS 1984a).

The Forest Service shall prohibit concentrating livestock in Smith's blue butterfly key, occupied, and modeled habitats (USFWS 2001a). Address impacts from Salmon Creek Allotment, Alder Creek Allotment, Buckeye Allotment, and Pacific Valley Unit of the Gorda Allotment (USFWS 2001a).

The Forest Service shall fence or control livestock in medium- to high-quality buckwheat stands in key, occupied, and modeled habitats. Livestock are to be removed from these areas (USFWS 2001a).

The Forest Service shall locate water developments a minimum of 0.25 mile from Smith's blue butterfly key, occupied, and modeled habitats to minimize livestock entry into those areas (USFWS 2001a)

The Forest Service shall prohibit ORV activity within key, occupied, and modeled habitat. Increase law enforcement to ensure compliance (USFWS 1984a).

The Forest Service shall limit recreational activities on trails, in key and occupied habitat, particularly during the active season for Smith's blue butterfly larvae and adults (USFWS 1984a).

The Forest Service shall transplant buckwheat by hand, only when absolutely necessary, when conducting trail maintenance activities within key, occupied, and modeled habitat. Place uprooted plants adjacent to living plants to facilitate transfer of caterpillars to food sources (USFWS 2001a).

The Forest Service shall control foot traffic on dunes by constructing boardwalks for beach access (USFWS 1984a).

Section 8.35
QUINO CHECKERSPOT BUTTERFLY

ISSUE STATEMENT

The quino checkerspot butterfly (*Euphydryas editha quino*) has short, rounded wings, with a wingspan of 1.5 inches (USFWS 2001aa). The dorsal side (top) of the wings is a complex checkered pattern with vibrant colors of orange, black, and cream, while the ventral side (bottom) is dominated by orange and cream color. Mature larvae are black, approximately one inch in length, and have a row of nine orange tubercles (spines) on their backs (Ballmer et al., 2000).

Historically, this species was distributed throughout the coastal slopes of southern California, from Los Angeles, Orange, Riverside, San Diego, and San Bernardino counties, southward to northern Baja California, Mexico. The historic distribution included the westernmost slopes of the Santa Monica Mountains, the Los Angeles plain, and the Transverse Ranges to the edge of the upper Anza-Borrego desert, and south to El Rosario in Baja California, Mexico. Currently, the butterfly is known from high inland elevations such as Dictionary Hill, Otay Lakes, and San Miguel Mountain in San Diego County, and the Gavilan Hills in Riverside County. Recent information indicates that the butterfly has been extirpated from Los Angeles, Orange, and San Bernardino counties (USFWS 2000d).

The quino checkerspot butterfly is threatened by several factors including but not limited to elimination, fragmentation, and degradation of habitat caused by development, increases in fire frequencies, unauthorized trash dumping, distribution and abundance of exotic plants, ORVs, and over-collection (USFWS 1997aa). On National Forest Service lands the species is threatened by displacement of larval host plants and adult nectar sources, invasive of alien grasses and forbs, livestock grazing, predation by exotic invertebrates, ORV activity, and fire management practices (USFWS 2001aa). The quino checkerspot butterfly (*Euphydryas editha quino*) was federally listed as an endangered species on January 16, 1997; the U.S. Fish and Wildlife Service proposed the designation of critical habitat on February 7, 2001 (USFWS 2000e). There are no known quino checkerspot habitat complexes that are permanently protected. Although some habitat is under public ownership, this species continues to decline throughout its range (USFWS 2000e). Therefore, public lands with potentially suitable or restorable habitat are critical to the survival of the species.

Recovery units and habitat complexes have been identified by the U.S. Fish and Wildlife Service in the following areas: Northwest Riverside Recovery Unit, containing the Gavilan Hills habitat complex; Southwest Riverside Recovery Unit, containing the Warm Springs Creek and Skinner/Johnson habitat complexes; South Riverside Recovery Unit, containing the Oak Mountain/Vail Lake, Sage Road/Billygoat Mountain, and Brown Canyon habitat complexes; South

Riverside/North San Diego Recovery Unit, containing the Silverado and Dameron Valley/Oak Grove habitat complexes; Southwest San Diego Recovery Unit, containing the San Diego National Wildlife Refuge, containing Otay Lakes, Otay Foothills, Otay Mesa, Marron Valley, and Tecate habitat complexes; and Southeast San Diego Recovery Unit, containing the Jacumba Peak habitat complex (USFWS 2000e). This species is currently being bred and reared in captivity, with great success (G. Pratt, personal communication); larvae have been collected from all recovery units but the Gavilan Hills, and each recovery unit is being independently reared to prevent cross-contamination. The recovery units are areas known to support extant populations, areas with potential habitat, and areas of stepping-stone habitat to allow connectivity among habitat patches.

The quino checkerspot butterfly may occupy a variety of habitat types that support native species of plaintain (*Plantago erecta*, *P. patagonica*), the primary larval host plant. Larval clusters have also been found on *Antirrhinum coulterianum*, which appears to be preferred in some areas over *Plantago patagonica*; post-diapause larvae have also been observed to feed on *A. coulterianum*. This species could be an important food plant on Forest property, particularly at the higher-elevation sites, potentially used as a food plant by the species in Mint Canyon (Gordon Pratt, pers. comm.). Quino checkerspot butterfly prediapause larvae have also been found on *Cordylanthus rigidus;* oviposition has been observed on this plant. This plant may be an important prediapause food plant in areas of low-quality *Plantago;* in other words *Plantago* on shallow soils. These *Plantago* populations will not support prediapause larvae to diapause. *Castilleja exserta* could be important in some cases as a supporting host. Oviposition occurs on this food plant. We do not presently know where QCB larvae diapause. We suspect that larvae diapause in the leaf litter, but lab studies suggest that some larvae may diapause in bushes a foot or more above the ground (Pratt et al. 2001).

The species may occupy meadows, grasslands, coastal sage scrub, chamise chaparral, red shank chaparral, juniper woodland, and semi-desert scrub (USFWS 2000e). They can be found at the lower edge of the chaparral, in desert canyons, and in canyon washes (Ballmer et al., 2000). Suitable habitat may contain soils that are loamy with a moderate to heavy clay content or with cryptogamic crusts (i.e., composed of fungi, mosses, and lichens), a sparse to moderate distribution of shrubs, presence of larval food plants interspersed with nectar sources (*Lasthenia* spp., *Layia* spp., *Ericameria* spp., *Cryptantha* spp., *Gilia* spp., *Salvia columbariae*, and *Allium* spp.), low levels of non-native vegetation (e.g. *Bromus* spp. and *Avena* spp.), and ridges, rounded hilltops, or other topographic features within approximately 0.8 km. Quino checkerspot butterfly generally flies slowly, close to the ground, with a meandering flight pattern, and tends to avoid flying over objects taller than 6-8 feet. The male quino, and to a lesser extent the females, are frequently observed on hilltops and ridge lines (USFWS 2000e).

This species may spend several years in a dormant period, briefly breaking and reentering diapause over and over before reaching maturity, depending largely on precipitation patterns. Time available for this species to reach larval maturation, adult flight, and reproduction is extremely limited and dependent on appropriate conditions (Ballmer et al., 2000). Adults are generally active in March and April, depending on weather patterns. Mating occurs during peak activity (March and April), and the female lays her eggs at the base of the host plant, where the larvae later feed on the leaves. When the plants become desiccated, the larvae seek shelter among leaf litter until the following winter. Fall and winter rains spark the germination of the host plant, which also causes the larvae to break diapause (Ballmer et al., 2000).

AREA DESCRIPTION

There are no documented populations in the Forests. Historically it occurred on the south side of Palomar Mountain and in the Pine Valley area within or adjacent to the CNF. The U.S. Fish and Wildlife Service has proposed 1,650 acres of critical habitat on National Forest Service lands in two areas: near the community of Oak Grove (CNF), and in the Hixon Flat Area (SBNF). Additional surveys are needed to assess the significance of National Forest Service lands to the butterfly (USFWS 2001c).

Much of the CNF is situated between two metapopulations: Vail Lake and Otay. Due to the Oak Mountain source population, potential habitat along the north side of Palomar Mountain may be recolonized. There have been confirmed sightings at Oak Grove just outside of CNF, and an unconfirmed sighting near the Dripping Springs campground in CNF (USFWS 2001c); the species likely occurs at Dripping Springs due to the presence of high-quality habitat (G. Pratt, personal communication). Near the Palomar District, there are historic quino locations at Oak Grove. On the Trabuco District, potential habitat occurs at Elsinore Peak and in Black Star Canyon. Other potential habitat on National Forest Service lands may occur at Los Pinos, Guatay, Lawson, Poser, and Viejas Mountains (USFWS 2001b).

TABLE 8-35

KEY, OCCUPIED, AND MODELED HABITAT ON NATIONAL FOREST SERVICE LAND

(USFWS 2001a)

	LOS PADRES	ANGELES	SAN	CLEVELAND
KEY				
OCCUPIED				
MODELED			15,436	244,135

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration and enhancement projects implemented in historically occupied habitat have encouraged the dispersal of individuals. The spatial extent of host plant and nectar sources has increased significantly on Forest Service lands, and the quino checkerspot butterfly is flourishing, once again present in historic localities.

OBJECTIVES

Determine extent of occupied habitat through comprehensive surveys in key, occupied, and modeled habitats.

Ensure compliance of laws, regulations, and Forest Service policies that benefit the conservation and recovery of the species.

Protect all remaining habitat and work to restore historic habitat.

Prohibit activities that degrade or destroy quino checkerspot butterfly habitat.

Promote the recovery of the species through education and outreach activities.

Conduct biological research needed to refine recovery criteria and guide conservation efforts (USFWS 2000e).

Protect habitat patches supporting known extant population distributions (USFWS 2000e).

Survey for habitat and undocumented metapopulations in undeveloped areas outside of Recovery Units (USFWS 2000e).

Restore habitat patches and enhance landscape connectivity within the distribution of the habitat complexes (USFWS 2000e).

Locate or introduce two populations or metapopulations in the remaining undeveloped coastal areas of the quino checkerspot's historic range (USFWS 2000e).

Erect barriers to prevent dispersal from habitat patches into adjacent high-traffic surface roads (USFWS 2000e).

Reduce fire frequency and illegal trash dumping in habitat areas (USFWS 2000e).

Promote the recovery and conservation of the species through the distribution of multi-lingual education and outreach materials (USFWS 2000e).

STANDARDS

The Forest Service shall conduct annual surveys in key, occupied, and modeled habitat using established survey protocols.

The Forest Service shall survey for exotic predatory invertebrates during presence-absence surveys.

The Forest Service shall prohibit activities within key, occupied, and modeled habitats that result in removal, crushing, burying, or mowing host plants; that may cause long-term damage to habitat (e.g. erosion, rutting); or that result in soil compaction around host plants (USFWS 2001a).

The Forest Service shall eliminate ORV activity within the habitat complexes and identified metapopulations (USFWS 2000e).

The Forest Service shall eliminate livestock from key, modeled, and occupied habitat and retire grazing allotments in those areas.

The Forest Service shall limit activity on trails where habitat occurs in recreational use areas, particularly during the active season for quino checkerspot larvae and adults (USFWS 2000e).

The Forest Service shall prohibit removal of host plants when conducting plant sampling in all TES butterfly habitats (USFWS 2001a).

The Forest Service shall conduct surveys for host plants and quino prior to fuel break maintenance activities within 3 miles of historic or occupied habitat (USFWS 2001a).

Section 8.36
LAGUNA MOUNTAINS SKIPPER

ISSUE STATEMENT

The Laguna Mountains skipper (*Pyrgus ruralis lagunae*) is considered one of the rarest butterflies in San Diego County. It's a small butterfly with a wingspan of approximately 1 inch; it has a distinctive white wing pattern with banding on the hind wings.

Historically, the Laguna Mountains skipper was found in montane meadows and forest clearings throughout the Laguna and Palomar Mountains. Currently, the species is known to occur in Mendenhall and Laguna Meadows and at the Observatory Campground in the CNF; a small population also occurs in Palomar Mountain State Park. The largest known population occurs at Mendenhall Meadow within the CNF.

There are a number of factors affecting the distribution of the species; land use activities occurring in or near occupied habitat include cattle grazing and developed recreation sites. In addition, privately owned meadows are grazed and may be subject to residential development. CNF has implemented measures to protect occupied and potential habitat; some recreational activities have been banned and fences erected to exclude grazing in certain habitat areas in Mendenhall Valley. The species was federally listed as endangered on January 16, 1997 (62 FR 2313); critical habitat has not been designated. Recovery of the Laguna Mountains skipper is dependent on further studies of its distribution, abundance, and ecology (Levy 1997).

The Laguna Mountains skipper is associated with open montane meadows of yellow pine forest between 4,000 and 6,000 feet in elevation (USFWS 1997a). It prefers habitat in open areas with some bare ground, where grass cover is low in height, soils are shallow and rocky, and where its larval host plant, *Horkelia clevelandii*, occurs. The preferred nectar source appears to be the small annual composite, *Pentachaeta aurea,* and *Horkelia clevelandii* (Levy 1997). Adults prefer searching for food and sunning in areas of open bare ground where *Horkelia clevelandii* is present (Levy 1994).

The Laguna Mountains skipper is biovoltine, meaning it has two generations per year. The adult flight season occurs from April to May with a subsequent flight in late June and late July (Levy 1994). Eggs are laid on the underside of large horkelia leaves and hatch approximately 14 days later. Development from ovipostion to adult takes about 7 weeks (Pratt 1999).

AREA DESCRIPTION

CNF supports about 95% of the known population. As such, Forest Service lands may contribute substantially to the recovery of this species. Particular emphasis should be given to potential habitat areas on the CNF that are near extant population distributions such as Laguna Mountain, Observatory Campground, and portions of Mendenhall Valley (USFWS 2001a).

The U.S. Fish and Wildlife Service (2001) identified 1,822 acres of key habitat and 2,771 acres of modeled habitat in CNF.

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration and enhancement projects implemented in historically occupied habitat have encouraged the dispersal of individuals. The spatial extent of host plant and nectar sources has increased significantly on Forest Service lands, and the Laguna Mountains skipper is flourishing, once again present in historic localities.

OBJECTIVES

Determine extent of occupied habitat through comprehensive surveys in key, occupied, and modeled habitats.

Ensure compliance of laws, regulations, and Forest Service policies that benefit the conservation and recovery of the species.

Protect all remaining habitat and work to restore historic habitat. Protect habitat patches supporting known extant populations.

Prohibit activities that degrade or destroy Laguna Mountains skipper habitat.

Promote the recovery of the species through education and outreach activities.

Conduct biological research to further define recovery criteria and guide conservation efforts.

Survey potential habitat to identify undocumented populations.

In cooperation with a specialist on the species, establish and maintain a captive propagation program.

Conduct studies to identify adverse effects of cattle grazing and fire suppression on the Laguna Mountains skipper.

Design and implement appropriate fire management prescriptions in meadow areas within CNF with input from specialists and the USFWS (Levy 1994).

Remedy erosion problems resulting in impacts to Laguna Mountains skipper habitat and adjacent area (USFWS 2001a).

Erect barriers to prevent dispersal from habitat patches into adjacent high-traffic surface roads and trails.

Initiate and implement a multi-lingual education and outreach program on the ecology, conservation, and recovery of the species.

STANDARDS

The Forest Service shall encourage or conduct research and monitoring studies of the skipper and its habitat in the Laguna and Palomar Mountains at the appropriate time of year.

The Forest Service shall restore habitat to enhance landscape connectivity within the distribution of existing and historic habitat complexes.

The Forest Service shall, in cooperation with the USFWS, develop a survey protocol for the Laguna Mountains skipper (USFWS 2001a).

The Forest Service shall prohibit removal of host plants when conducting plant sampling in all TES butterfly habitats (USFWS 2001a).

The Forest Service shall, within key, occupied, and modeled habitats, avoid activities that result in removal, crushing, burying, or mowing of host plants; that may cause long-term damage to habitat (e.g. erosion, rutting); or that result in soil compaction around host plants (USFWS 2001a).

The Forest Service shall evaluate existing domestic livestock grazing management practices to identify potential threats to the species, and shall eliminate activities that adversely impact the species.

The Forest Service shall eliminate ORV activity within habitat complexes and identified populations.

The Forest Service shall manage recreational activity in occupied and potential habitat, particularly during the active season for larvae and adults. reroute trails or other recreational activities that occur in habitat.

The Forest Service shall relocate campgrounds and trails to eliminate impacts to the species. Colonies adjacent to El Prado/Laguna Campground, Observatory Campground and Trail, and lower French Valley are subject to impacts from recreation (USFWS 2001a).

Section 8.37
SOUTHERN STEELHEAD TROUT

See section 7.0, *Management Indicator/Focal Species,* and section 7.4*, Southern Steelhead Trout*, for specific objectives and guidelines for this listed species.

Section 8.38
MOHAVE TUI CHUB

ISSUE STATEMENT

The Mohave tui chub (*Gila bicolor mohavensis*) is olive brown above, silvery white below, and laterally speckled with fine gold spots. It has a chunky body shape, small mouth, and a dip in the lateral line, which distinguishes this species from other members of the minnow family. Adults measure 2-8 inches in standard length; there is no difference in appearance between the sexes (Thelander 1994).

Historically, the Mohave tui chub was the only native minnow in the Mojave River, ranging from the headwaters in the San Bernardino Mountains to Soda Lake, all within San Bernardino County. The Mohave tui chub is now absent from the Mojave River, with introduced populations only occurring at 4 sites: Soda Springs near the western edge of Soda Dry Lake, the DFG's Camp Cady Wildlife Area, and the Barstow Desert Information Center in San Bernardino County, and China Lake Naval Air Weapons Center in Kern County (USFWS 1984b, Swift et al 1993).

During the 1930s, arroyo chub were illegally introduced into the headwater reservoirs of the Mojave River as bait; they quickly spread throughout the drainage (CDFG 2000). Mohave tui chub population numbers began to significantly decrease due to competition and hybridization with arroyo chubs, and by 1979 the Mohave tui chub was replaced in their natural habitat by the arroyo chub (CDFG 2000). Although the introduction of arroyo chub into the Mojave River was the primary cause of the species decline, other threats include genetic contamination, introduction of exotic species, habitat alteration, water diversion, and pollution (USFWS 1985a, CDFG 2000).

The Mohave tui chub was federally listed as an endangered species on October 13, 1970; it was state-listed as endangered on June 27, 1971. No critical habitat has been designated by the USFWS. A recovery plan was prepared in 1984 and the Mohave Tui Chub Advisory Committee meets periodically, which continues to investigate future refuge and reintroduction sites, provides recommendations to USFWS, and updates the recovery plan.

The Mohave tui chub was formerly found in deep pools and slough-like areas of the Mojave River; it now only occurs in artificial ponds and possibly one natural pool in San Bernardino County (Thelander 1994). Large chub are typically solitary and found in deeper water, while medium-sized tui chub (1 to 3 inches) school in water 1 to 2 inches deep (CDFG 2000).

Mohave tui chub breed from March-April to October. Females lay approximately 4,000 to 50,000 adhesive eggs over aquatic vegetation. Larval tui chub hatch within 9 days, feeding on tiny crustaceans and rotifers; they typically congregate in shallow waters. Adults feed primarily on aquatic insects and their larvae, small bottom invertebrates, plankton, and detritus (Thelander et al. 1994).

AREA DESCRIPTION

The only population that exists within any of the 4 Forests is a hybridized Mohave tui chub/arroyo chub population within lower Deep Creek on the San Bernardino National Forest (Stephenson and Calcarone 1999).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Since Forest Service lands contain the headwaters of nearly every major stream in the region, they have developed management prescriptions to reflect the needs of the many listed and sensitive species dependent on upon riparian and aquatic habitats. The Mohave tui chub is once again flourishing in existing and historically occupied habitat.

OBJECTIVES

Determine extent of occupied habitat through comprehensive surveys in key, occupied, and modeled habitats.

Ensure compliance of laws, regulations, and Forest Service policies that benefit the conservation and recovery of the species.

Protect all remaining habitat and work to restore historic habitat. Contribute to the recovery of the species by preserving and enhancing occupied and potential habitat for Mohave tui chub.

Prohibit activities that degrade or destroy habitat.

Promote the recovery of the species through education and outreach activities.

Determine Mohave tui chub life history and ecology for application to management and recovery.

Prepare and implement a species management plan, peer-reviewed by chub specialists.

Work with the USFWS to reestablish Mohave tui chub in the mainstem of the Mohave River.

Maintain suitable fish passage at all road crossings of TES fish-bearing streams (USFWS 2001a).

Monitor water quality in occupied and potential habitat of the Mohave tui chub.

Determine the water requirements of the species and implement a water management plan in occupied and potential habitat.

Develop and implement a Land Protection Plan to secure habitat in perpetuity for this species.

Prevent further introduction of arroyo chub in occupied and potential habitat areas.

Eradicate or control exotic predatory species of Mohave tui chub.

Develop and distribute multi-lingual information pamphlets on the ecology of the species, the threats it faces, and the necessary conservation measures.

STANDARDS

The Forest Service shall determine population status and monitor annually at the appropriate time(s) of year.

The Forest Service shall coordinate annually with local CDFG personnel regarding fish stocking in watersheds with listed and sensitive species, and illegal collection of TES fish species (USFWS 2001a).

The Forest Service shall upgrade existing structures according to the priority and sensitivity of the fishery resources in all TES species habitats. Repair road-stream crossings in riparian areas. Identified priority areas include Hardluck (LPNF) and San Francisquito Canyon and San Francisquito Canyon Motorway (ANF) (USFWS 2001a).

The Forest Service shall evaluate existing road crossings of TES fish-bearing streams to identify fish passage problems and update infrastructure for suitable passage (USFWS 2001a).

The Forest Service shall evaluate grazing activities in tributaries associated with TES fish species in key, modeled, and occupied habitat and implement corrective actions to eliminate downstream habitat degradation from sedimentation and water quality impacts (USFWS 2001a).

The Forest Service shall enforce existing laws and regulations and develop additional conservation measures to protect the Mohave tui chub and its habitats.

SANTA ANA SUCKER

ISSUE STATEMENT

The Santa Ana sucker (*Catostomus santaanae*) is silvery below, darker along the back with irregular blotches, with pigmented membranes connecting the rays of the tail. Adult Santa Ana suckers are usually less than 6.9 inches in length. Santa Ana suckers also possess a broad mouth with notches at the junctions of the upper and lower lips.

This species is endemic to southern California; its historic native range included the Santa Ana, Los Angeles, San Gabriel, and Santa Clara river drainages. Currently, this species is restricted to 3 non-contiguous populations in lower Big Tujunga Creek, the East, West, and North Forks of the San Gabriel River, and the lower and middle portions of the Santa Ana River (USFWS 2001a).

The Santa Ana sucker is threatened by elimination or alteration of its stream habitats (from channelizing and dewatering), reduction or alteration of stream flows (from dams and diversions or accidental high-water releases with heavy sediment flows), mass erosion of destabilized hillsides (from road-building, ORV use, gravel extraction, forest fires, and development), gold dredging and other mining activities, grazing and other heavy uses of riparian areas, pollution, predation from introduced species such as predatory brown trout, green sunfish, and red shiner, and hybridization with introduced Owens suckers (USFWS 2001a). The species was federally listed as a threatened species on May 12, 2000, and is also a California Species of Special Concern. The USFWS has not yet proposed designation of critical habitat or developed a recovery plan for the species.

Santa Ana suckers are adapted to living in slight- to swift-flowing streams subject to periodic, severe flooding that results in drastic decreases in population densities, and they are able to repopulate the rivers following floods. Adaptations to such a life history include short generation time, high reproduction, and relatively long spawning period. Their small size also enables individuals to utilize a greater range of in-stream refuges such as deep holes and riffles, which would be unavailable to larger fish during high flows. Preferred substrates are generally coarse gravel, rubble, and boulder, but occasionally Santa Ana suckers are found on sand/mud substrates. Overhanging riparian plants, mainly alders and sedges, provide cover for the fish. Further studies are required to determine the Santa Ana sucker's space use in its preferred habitat. What is known is that Santa Ana suckers utilize all areas of the stream and do not require streamside cover when larger, deeper holes and riffles are present for refuge, particularly for adult fish (Moyle et al. 1995). Santa Ana suckers probably do not successfully inhabit reservoirs, as they are not known to occur in Piru, Morris, and San Gabriel reservoirs, or Hansen Dam (C. Swift, pers. comm. in Moyle et al. 1995). Even though Santa Ana suckers seem to be quite generalized in their stream habitat requirements, they are intolerant of polluted or highly modified streams (Moyle et al. 1995).

Spawning occurs from April until early July, with peaks from late May through early June (Moyle et al. 1995). Females are highly fertile and produce between 4,423 to 16,151 eggs depending on the female's size (CDFG 1995). Santa Ana suckers are relatively short-lived. They become reproductively mature by the first year and spawn during the first and second years. There is no sexual dimorphism and the sex ratio is 1:1 (CDFG 1995). The majority of the Santa Ana sucker's diet consists of detritus, algae, and diatoms; aquatic insect larvae, fish scales, and fish eggs constitute a small portion of their diet.

AREA DESCRIPTION

The ANF contains the primary refugia for the Santa Ana sucker (Stephenson and Calcarone 1999). They have been eliminated from the San Bernardino Mountains as a result of introduced species. In the ANF, it occurs in the East, North, and West Forks of San Gabriel River (including Cattle Canyon and Bear Creek), and in Big Tujunga Creek. The Soledad Canyon area and the San Gabriel River have the largest remaining populations of Santa Ana suckers (Moyle et al. 1995). There are introduced populations in the Santa Clara River, and in Sespe, Piru, and San Francisquito Creeks, though these are not considered listed populations. Historically, the species occurred in the upper Santa Ana River within SBNF, though it has not been recently observed (USFWS 2001a; Stephenson and Calcarone 1999).

In the San Gabriel River, the species occurs upstream of the confluence of the East and West Forks of San Gabriel River, which provides the best remaining habitat (USFWS 2001a). It also survives in the lower portions of the Santa Ana River,

from Imperial Highway to Rubidoux near the city of Riverside, but apparently is absent from the upper reaches of the river in the San Bernardino Mountains. Evidence indicates that suckers are using tributaries, including Tequesquite Arroyo, Sunnyslope Channel, and Anaza Park Drain, for spawning and nurseries (USFWS 2001a).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Since Forest Service lands contain the headwaters of nearly every major stream in the region, they have developed management prescriptions to reflect the needs of the many listed and sensitive species dependent on upon riparian and aquatic habitats. The Santa Ana sucker is once again flourishing in existing and historically occupied habitat.

OBJECTIVES

Determine extent of occupied habitat through comprehensive surveys in key, occupied, and modeled habitats.

Ensure compliance of laws, regulations, and Forest Service policies that benefit the conservation and recovery of the species.

Protect all remaining habitat and work to restore historic habitat.

Prohibit activities that degrade or destroy habitat.

Promote the recovery of the species through education and outreach activities.

Conduct or encourage and support research to study Santa Ana sucker and Santa Ana speckled dace life history requirements and habitat utilization (USFWS 2001a).

Develop and implement a Land Protection Plan to secure habitat for the sucker. See section 17.0, *Land Protection Opportunities*.

Implement non-native species eradication and control programs to control invasive aquatic predators in occupied and potential habitat including bullfrogs, red shiners, green sunfish, and any other exotic aquatic species (USFWS 2001a). See section 10.0, *Invasive Species Management*.

Prevent further introduction of non-native fish species in the existing populations and potential habitat areas of the Santa Ana sucker.

Conduct ongoing quantitative habitat and water quality monitoring in areas of occupied and potential habitat. Such studies should be implemented immediately on the West Fork of the San Gabriel River, below Cogswell Dam (USFWS 2001a).

Determine an appropriate water budget and implement a water management plan to aid in the recovery of the species. Address stream flow regulation and sediment releases below existing dams in occupied and potential habitat.

Maintain suitable fish passage at all road crossings of TES fish-bearing streams (USFWS 2001a).

Develop and distribute multi-lingual educational materials and install signs in appropriate locations to encourage visitors to leave no trace.

STANDARDS

The Forest Service shall work with appropriate agencies and academic sources to develop protocols and survey guidelines for the Santa Ana sucker (USFWS 2001a).

The Forest Service shall conduct annual or biennial surveys of existing populations to determine long-term population trends.

The Forest Service shall coordinate annually with local CDFG personnel regarding illegal collection of TES fish species (USFWS 2001a).

The Forest Service shall utilize and enforce all laws and regulations governing the protection and recovery of the Santa Ana sucker and its habitat.

The Forest Service shall implement slope stabilization projects along the East and Main Forks of the San Gabriel River

to limit access to the stream and provide erosion and sediment control (USFWS 2001a).

The Forest Service shall identify and evaluate existing stream crossing/fish passage problems and correct as needed. Areas to be corrected include Hardluck (LPNF) and San Francisquito Canyon and San Francisquito Canyon Motorway (ANF) (USFWS 2001a).

The Forest Service shall upgrade existing structures according to the priority and sensitivity of the fishery resources. Repair road stream crossings in riparian areas. Implement in all TES species habitat (USFWS 2001a).

The Forest Service shall coordinate with CDFG on the application and enforcement of state suction dredge regulations on the San Gabriel River. Participate with the State to identify for the public those sections of streams that are open or closed to dredging (USFWS 2001a).

The Forest Service shall discontinue suction dredging along East Fork, San Gabriel River both within and upstream of occupied habitat (USFWS 2001a).

The Forest Service shall direct visitors engaged in in-stream and streamside recreational activities away from sensitive riparian areas, particularly in the lower stretches of the West and East Forks of the San Gabriel River. See section 19.0, *Recreation*.

The Forest Service shall work with the ORV community in the San Gabriel River area to assess impacts of ORV use, particularly on the lower West Fork, with respect to the Santa Ana sucker (USFWS 2001a).

The Forest Service shall work with the ORV community to implement actions to eliminate adverse impacts caused by ORV use, and if necessary identify an appropriate site to relocate the existing ORV areas (USFWS 2001a).

Section 8.40
UNARMORED THREE-SPINE STICKLEBACK

ISSUE STATEMENT

The unarmored three-spine stickleback (*Casterosteus aculeatus williamsoni*)is a small, scale-less, streamlined fish, measuring less than 2.4 inches standard length. It is a greenish-gray color with a pinkish-silver belly; during the breeding season, the males take on a strikingly brilliant courting coloration, from the normally drab olive body color to a scarlet belly and throat, pale blue sides, and iridescent blue to bluish green eyes (Thelander 1994).

Historically, this species was distributed throughout the Santa Clara, Los Angeles, and San Gabriel river systems in Los Angeles County, and the Santa Ana River system in Orange, Riverside, and San Bernardino counties. Currently, the unarmored three-spine stickleback is restricted to the upper Santa Clara River drainage in Los Angeles and Ventura counties, and a transplanted isolated population in San Felipe Creek in San Diego County. A remnant genetically distinct population of stickleback exists in Shay Creek, San Bernardino County (USFWS 2001a).

The primary reasons for the decline of the species are habitat loss from urbanization, stream channelization, water diversions, competition with and predation by non-native species, and the introduction of other subspecies of stickleback (USFWS 1985). In 1993, a 40,000-barrel oil spill occurred on the Santa Clara River, the only remaining river system with a naturally occurring unarmored three-spine stickleback population. The spill impacted approximately 17 river miles of stickleback habitat. In 1997, a settlement was reached for about $7 million to be used for restoration activities within the Santa Clara River, but to date no restoration projects have been conducted (CDFG 2000). The stickleback's last stronghold is the upper Santa Clara River, a river that is currently under increasing threats from rampant urban sprawl, water pumping, and a massive proposed gravel mine in Soledad Canyon (P. Galvin, pers. comm.).

The unarmored three-spine stickleback was federally listed as an endangered species on October 13, 1970, and was state-listed as endangered on June 27, 1971. A proposal for critical habitat was issued on November 17, 1980, for two reaches of the Santa Clara River, San Francisquito Creek, and San Antonio Creek (CDFG 2000), but 20 years later, critical habitat has still not been designated.

In the Santa Clara River, unarmored three-spine stickleback occur in fresh water in the upper portions of the Los Angeles basin (USFWS 1985a). Habitat can be found in all areas of the stream, but stickleback tend to gather in areas

of slower-moving or standing water, especially at the edges of the stream and under aquatic vegetation. The species feeds primarily on insects, which are mostly benthic, though some are terrestrial. Snails, small crustaceans, and to a lesser degree flatworms and nematodes make up a portion of their diet, though males have also been found to digest stickleback eggs (USFWS 1985a).

The breeding season may last all year, though from October to January there is a dip in breeding activity. Males tend to the nest by fanning the eggs; they guard the nest and surrounding territory from potential predators. The number of eggs and survival rates depend on the strain of stickleback and environmental conditions (USFWS 1985a).

AREA DESCRIPTION

All 3 of the remaining naturally occurring populations that exist in the Santa Clara River watershed are located within or near the ANF, including an 8-mile stretch of Soledad Canyon, a portion of upper San Francisquito Canyon (6miles of occupied habitat), Escondido Canyon, and a tributary in Agua Dulce Canyon (Swift et al. 1989 in USFWS 2001a).

In or near the SBNF, populations occur in Shay Creek, Sugarloaf Meadows, and in wet years at Baldwin Lake, which is a tributary to Shay Creek. Shay Creek is not in SBNF but is affected by water collection and transport activities conducted under SUPs in the upper watershed. The Sugarloaf Meadows population in the upper Santa Ana River watershed was transplanted in the late 1980s.

TABLE 8-40

KEY, OCCUPIED, AND MODELED HABITAT IN THE FORESTS

(USFWS 2001a)

	LOS PADRES	ANGELES	SAN BERNARDINO	CLEVELAND
KEY			1,452	
OCCUPIED		31		
MODELED		636	829	

Critical habitat for the species was proposed in 1980 and includes:

- Del Valle zone—Santa Clara beginning at its confluence with San Martinez Grande Canyon, at a point .9 of a mile southwest of the Del Valle settlement, and extending upstream approximately 5.6 miles to the overcrossing of Interstate Highway 5.
- San Francisquito Canyon zone—San Francisquito Canyon watercourse beginning at a point where the Angeles National Forest boundary intersects the San Francisquito Canyon watercourse approximately 2.5 miles southwest of San Francisquito Powerhouse No. 2, and extending upstream in San Francisquito Canyon approximately 8.4 miles to San Francisquito Powerhouse No. 1, near its junction with Clearwater Canyon.
- Soledad Canyon zone—Santa Clara River beginning at a point 1.4 miles upstream in Soledad Canyon from the community of Lang, at the downstream end of the area called River's End Park thence extending upstream approximately 8.5 miles to its confluence with Arrastre Canyon, at a point located about .6 of a mile southwest of Los Angeles County Rehabilitation Camp, thence upstream in Arrastre Canyon approximately .8 of a mile.
- San Antonio Creek Zone—San Antonio Creek watercourse, beginning at the Pacific Ocean beach boundary and including natural dunes or sandbars in the stream mouth, thence upstream approximately 8.4 miles in Barka Slough.

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Since the Forests contain the headwaters of nearly every major stream in the region, they have developed management prescriptions to reflect the needs of the many listed and sensitive species dependent on upon riparian and aquatic habitats. The unarmored three-spine stickleback is once again flourishing in existing and historically occupied habitat.

OBJECTIVES

Determine extent of occupied habitat through comprehensive surveys in key, occupied, and modeled habitats.

Restore, maintain, and protect all occupied and potential habitat.

Ensure compliance of laws, regulations, and Forest Service policies that benefit the conservation and recovery of the species.

Protect all remaining habitat and work to restore historic habitat.

Prohibit activities that degrade or destroy habitat.

Promote the recovery of the species through education and outreach activities.

Conduct or encourage and support research to determine life history, and to obtain needed ecological and genetic information.

Monitor and regulate water and land use to restore, maintain, and protect occupied and potential habitat for the species. Develop cooperative agreements as appropriate to ensure this objective is met.

Work to develop and implement invasive species eradication programs to eliminate African clawed frogs, Arundo, and other invasive species affecting populations in occupied and potential habitat, including both Soledad and San Francisquito Canyons. Please see section 10.0, *Invasive Species*.

The ANF will coordinate with specialists to eradicate the Ich parasite (*Ichthyopthirius multifilis*) affecting populations due to introduced goldfish.

Maintain suitable fish passage at all road crossings of TES fish-bearing streams (USFWS 2001a).

Work with private landowners to eliminate Arizona crossings creating barriers to upstream movement. Arizona crossings are slabs of concrete laid across a stream.

Evaluate all existing utility corridors in occupied habitat to identify adverse impacts to the species. Develop and implement solutions to ensure the protection and recovery of the species.

Develop and distribute multi-lingual educational materials to inform the public of the species ecology, the threats it faces, and the necessary conservation measures.

STANDARDS

The Forest Service shall annually monitor existing populations and potential habitat to document abundance and distribution.

The Forest Service shall utilize and enforce all laws and regulations governing the protection and recovery of the species and its habitat.

The Forest Service shall evaluate SUPs in Shay Creek Watershed – including water diversion, storage, and transport facilities—through consultation with USFWS (USFWS 2001a). See section 21.0, *Special Use Permits*.

The Forest Service shall evaluate water diversion, hydropower generation facilities in San Francisquito Canyon, and Utility Corridors in San Francisquito and Soledad Canyons to ensure that maintenance activities do not adversely affect the species (USFWS 2001a).

The ANF shall coordinate with the private Thousand Trails Campground in Soledad Canyon regarding the channelization and withdrawal of water to eliminate impacts to the species and its habitat.

The Forest Service shall evaluate water collection and transport activities in the upper watershed of Shay Creek in SBNF. See section 21.0, *Special Use Permits*.

The Forest Service shall coordinate with local landowners in the vicinity of Shay Creek to eliminate adverse impacts resulting from extensive groundwater pumping in the basin, streambed alterations, and livestock grazing.

The Forest Service shall coordinate annually with local CDFG personnel to eliminate and prohibit fish-stocking in all TES fish-bearing streams.

The Forest Service shall coordinate annually with local CDFG personnel regarding illegal collection of TES fish species (USFWS 2001a).

The Forest Service shall identify and evaluate existing stream crossing/fish passage problems and correct as needed. Areas to be corrected include Hardluck (LPNF) and San Francisquito Canyon and San Francisquito Canyon Motorway (ANF) (USFWS 2001a).

The Forest Service shall upgrade existing structures according to the priority and sensitivity of the fishery resources. Repair road stream crossings in riparian areas. Implement in all TES species habitats (USFWS 2001a).

The Forest Service shall control traffic or close system road 5N16 to protect stickleback (USFWS 2001a).

The Forest Service shall construct a bridge to replace existing stream crossing in San Francisquito Canyon (USFWS 2001a).

The Forest Service shall evaluate grazing activities in tributaries associated with TES fish species in key, modeled, and occupied habitat and implement corrective actions to eliminate downstream habitat degradation from sedimentation and adverse water quality impacts (USFWS 2001a).

The Forest Service shall eliminate 18 acres of active mining in Soledad Canyon near occupied habitat (USFWS 2001a).

The Forest Service shall continue partnership with CDFG and the USFWS, with permission from landowners, to clean out the encroaching aquatic and meadow vegetation in the Shay Creek ponds to maintain habitat (USFWS 2001a).

The Forest Service shall continue partnership with local, state, and federal agencies to fund solutions to the problems causing negative impacts to unarmored three-spine sticklebacks in Shay Creek (USFWS 2001a).

The Forest Service shall continue to look for opportunities to establish Shay Creek unarmored three-spine sticklebacks at new locations, including opportunities to create artificial habitats (USFWS 2001a).

Section 8.41
TIDEWATER GOBY

ISSUE STATEMENT

The tidewater goby (*Eucyclogobius newberryi)* is a California endemic; it is a small fish, rarely exceeding 5 cm. The elongated body is a mottled dark olive with the tail, anal, and dorsal fins ranging in color from yellow to orange. The head is blunt with an oblique, large, terminal mouth. The pelvic fins are typically connected, the pectoral fins are large, and the caudal fin is elongated and round. Scales are present but don't form a lateral line (Moyle et al. 1995; McGinnis 1994).

The historic range for this species extended along the entire California coastline, from Del Norte County, near the Oregon border, to San Diego County. Although once common in coastal lagoons statewide, since 1900 the tidewater goby has disappeared from 74% of its historic range. It has been extirpated from 53 of the 94 historic museum specimen locations and has also disappeared from other locations with formerly suitable habitat (Moyle 1995).

The loss of tidewater goby habitat is attributed to human development, dams and diversions, dredging, road and highway construction, and other anthropogenic activities (Thelander et al. 1994). This has resulted in changes in water salinity, pollution, and vegetative growth, reducing the extent of coastal lagoons and eliminating tidewater goby habitat. The combination of natural and human-induced obstacles has caused populations to fall 75-90% since 1950. The tidewater goby was listed as an endangered species on March 7, 1994; critical habitat was designated on November 20, 2000 (USFWS 2001a).

This species is unique among fishes along the Pacific coast in its restriction to sparsely vegetated, semi-closed estuaries or lagoons in low-salinity waters. The tidewater goby resides in estuaries, wetlands, and coastal lagoons, although it sometimes swims upstream to freshwater habitats. Though the species is able to complete its entire life cycle within fresh or brackish water, they prefer still, backwater areas with marshy habitats and avoid currents and wave action (Moyle et al. 1995). The tidewater goby is a benthic species occurring in waters not more than a meter deep (Thelander 1994).

They ingest a substantial amount of inorganic matter but the majority of the diet consists of small crustaceans, aquatic insects and larvae, invertebrates and mollusks (Moyle et al. 1995).

Females can achieve ovarian maturation throughout the year, so larvae may be found in any season. However, the peak spawning period is from April to June, in temperatures ranging from 59 to 68 degrees Farenheit, with a salinity of 0-25 parts per thousand (Thelander et al. 1994). The male initiates reproduction by digging a 3- to 4-inch-deep hole in clean, coarse sand or mud, where the female then lays her eggs. After the male fertilizes the eggs, he guards them until they hatch, usually within 9-10 days (Thelander et al. 1994). This species is considered an annual species, however, they've been documented to live up to three years in the northern part of their range (Moyle et al. 1995).

AREA DESCRIPTION

There are no documented locations of tidewater goby habitat on the 4 southern California National Forests, but activities that occur in the Forests could affect occupied habitat downstream, outside Forest Service boundaries. There are 7 known and 2 potential locations that occur downstream from the LPNF boundary in southern Santa Barbara and Monterey counties. In Santa Barbara County, tidewater goby are known to occur in the following drainages: Bell (Winchester), Tecolote, Eagle Canyon, Refugio, Arroyo Quenmado, Arroyo Hondo, and Gaviota. In Monterey County, potential habitat exists at Pfeiffer Beach and in San Carpoforo Creek. There is potential for the species to migrate upstream onto LPNF lands but there is a low probability because of the topographical steepness (USFWS 2001a).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Since Forest Service lands contain the headwaters of nearly every major stream in the region, the Forest Service has developed management prescriptions to reflect the needs of the many listed and sensitive species dependent on upon riparian and aquatic habitat. The tidewater goby is once again flourishing in existing and historically occupied coastal lagoons.

OBJECTIVES

Ensure that upstream activities on National Forest Service lands don't affect occupied, potentially suitable, or restorable habitat outside Forest Service boundaries.

Evaluate progress of recovery, as well as effectiveness of management and recovery actions, and revise management plans as necessary.

Eradicate or control exotic aquatic species (green sunfish, black bullheads, bullfrogs, etc.) that have colonized ponds, reservoirs, and streams upstream of occupied habitat in LPNF (USFWS 2001a).

Maintain suitable fish passage at all road crossings of TES fish-bearing streams (USFWS 2001a).

Provide public information and education.

STANDARDS

The Forest Service shall coordinate annually with local CDFG personnel regarding illegal collection of TES fish species (USFWS 2001a)

The Forest Service shall evaluate grazing activities in tributaries associated with TES fish species in key, modeled, and occupied habitat and shall implement corrective actions to eliminate downstream habitat degradation from sedimentation and adverse water quality impacts (USFWS 2001a). For tidewater goby, grazing allotments occur in watersheds of occupied and potential habitat; two allotments (Matias Potrero and Pasture) are inactive but located upstream of occupied habitat (USFWS 2001a).

The Forest Service shall identify and evaluate existing stream crossing/fish passage problems and correct as needed. Areas to be corrected include Hardluck (LPNF) and San Francisquito Canyon and San Francisquito Canyon Motorway (ANF) (USFWS 2001a).

The Forest Service shall upgrade existing structures according to the priority and sensitivity of the fishery resources. Repair road stream crossings in riparian areas. Implement in all TES species habitat (USFWS 2001a).

The Forest Service shall evaluate potential impacts from recreational activities and ORV use and take appropriate actions to rectify the situation to the benefit of the species.

Section 8.42
CALIFORNIA TIGER SALAMANDER

ISSUE STATEMENT

The California tiger salamander (*Ambystoma californiense*) is a large, stocky, terrestrial salamander with a broad, rounded snout. Adults may reach a total length of 8.2 inches; for both sexes, the average snout to vent length is approximately 3.6 inches. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. The belly varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae (a common chamber into which the intestinal, urinary, and reproductive canals discharge), more developed tail fins, and larger overall size (Stebbins 1951, 54; Loredo and Van Vuren 1996).

The California tiger salamander is endemic to the San Joaquin-*Sacramento river valleys, bordering foothills, and coastal valleys of central California (Barry and Shaffer 1994; Shaffer et al. 1993; Stebbins 1985; Storer 1925). Genetically distinct populations are found in the foothills of the Coast Range in Santa Barbara County and in Sonoma County. The species' range historically followed the low-elevation grassland-*oak woodland plant and coastal sage scrub communities of the valleys and foothills from at least Colusa County south to Santa Barbara and Tulare counties (Shaffer et al. 1993; USFWS 2000f). Within this large area, California tiger salamanders occur only where their habitat requirements are met. Necessary habitat for the California tiger salamander can be succinctly described as low-elevation vernal pools surrounded by upland habitat containing rodent burrows or other suitable dry season refugia. The California tiger salamander is generally restricted to low elevations, typically below 1400 feet (USFWS 2000f).

The California tiger salamander is threatened with a variety of factors throughout its range including habitat destruction and fragmentation due to urban development, agricultural development including vineyards, road building, and increased traffic volumes. Introduced predators and non-native tiger salamanders are also of major concern, as well as other factors such as contaminants and natural stochastic events such as drought (Center for Biological Diversity 2001). The CTS has already lost approximately 75% of its former natural habitat in California (Shaffer et al. 1993).

The disjunct Santa Barbara population is listed as federally endangered (USFWS 2000f). Litigation is currently ongoing over federal and California Endangered Species Act listing for the species throughout the rest of its range. The species is likely to be both state and federally listed throughout California within the near future.

For breeding, the California tiger salamander requires long-lasting rain pools. Although California tiger salamanders are adapted to natural vernal pools, manmade or modified ephemeral and permanent pools are now frequently used (Fisher and Shaffer 1996). Permanent lowland aquatic sites may be used for breeding (Stebbins 1985; Ziener et al. 1998), but persistence at such sites is unlikely if they contain fish predators (Shaffer and Stanley 1992; Shaffer et al. 1993). Fish, bullfrogs, and mosquito fish are all biological indicators of ponds that have been sufficiently disturbed so as to exclude California tiger salamanders as well as most other native vernal pool species (Shaffer et al. 1993; Seymour and Westphal 1994).

The California tiger salamander is a species with relatively low recruitment. California tiger salamander adults are often 6 years old before breeding for the first time (Trenham et al. 2000). Less than 50% of California tiger salamanders breed more than once in their lifetime. Migration to breeding ponds is concentrated during a few rainy nights early in the winter (Shaffer et al. 1993; Loredo and Van Vuren 1996; Trenham et al. 2000). In years where rainfall begins late in the season, females may forego breeding altogether (Loredo and Van Vuren 1996; Trenham et al. 2000). After breeding, adults leave the pond and return to estivation sites (Loredo et al. 1996), although they may continue to come out nightly for approximately the next 2 weeks to feed (Shaffer et al. 1993).

The number of eggs laid by a single female ranges from approximately 400 to 1,300 per breeding season (Trenham et al. 2000). Larvae feed on algae, small crustaceans, and mosquito larvae for about 6 weeks after hatching, when they switch to larger prey (P.R. Anderson 1968). Larger larvae will consume smaller tadpoles of frogs and toads, as well as

many aquatic insects and other aquatic invertebrates (J.D. Anderson 1968; P. R. Anderson 1968).

In the late spring or early summer, before the ponds dry completely, metamorphosed juveniles leave the ponds and enter small mammal burrows after spending up to a few days in mud cracks or tunnels in moist soil near the water (Zeiner et al. 1988; Shaffer et al. 1993). Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925; Shaffer et al. 1993) before settling in their selected estivation sites for the dry summer months. Many of the pools in which California tiger salamanders lay eggs do not hold water long enough for successful metamorphosis. Generally, 10 weeks is required to allow sufficient time to metamorphose.

For all the reasons discussed above, the literature indicates that reproductive output for California tiger salamanders in most years is not sufficient to maintain populations. Therefore, large blocks of connected habitat containing multiple breeding pools are essential to prevent extirpation or extinction (Trenham et al. 2000).

AREA DESCRIPTION

There are no known occurrences of the California tiger salamander within any of the 4 Forests; however, there is potential for the species to occur within LPNF in the foothills of the Coast Range near Santa Barbara.

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. California tiger salamanders are flourishing; they are present in adequate numbers to sustain breeding populations in all historically occupied habitat in the Forests.

OBJECTIVES

Protect and manage potential California tiger salamander breeding pools and uplands habitat within the current and historic range of the species in the LPNF, for the benefit of the species.

Protect habitat patches supporting extant populations to maintain and increase the current population.

Protect habitat between extant populations to maintain habitat connectivity and diversity of the gene pool.

Conduct the biological research needed to refine recovery criteria and guide conservation efforts.

Encourage or conduct studies on the ecology of the species and its limiting factors to better understand the animal's role in the ecosystem.

Designate habitat reserves where the species occurs and develop management programs for those areas to aid in the recovery and conservation of the species.

Eliminate activities that could adversely affect the species or its habitat.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

The Forest Service shall initiate and implement a multi-lingual public education and outreach program on the ecology of the species, the threats it faces, and the necessary conservation measures.

STANDARDS

The Forest Service shall conduct or otherwise obtain comprehensive surveys in all occupied and modeled habitat to determine population levels in LPNF.

The Forest Service shall eliminate ORV activity within habitat complexes of occupied and modeled habitat in LPNF.

The Forest Service shall initiate mineral withdrawal of any mining claims in occupied and modeled habitat.

The Forest Service shall prohibit road or pipeline construction in occupied and modeled habitat.

The Forest Service shall enforce laws and regulations to protect the species.

TEHACHAPI SLENDER SALAMANDER

ISSUE STATEMENT

The Tehachapi slender salamander (*Batrachoseps stebbinsi*) is relatively large and robust, ranging up to 5 inches from snout to tail. It has a relatively broad head and webbing between toes. The back is dark brown with lighter patches sometimes forming an indistinct band. The underside surface is dark gray to black.

This species is known to occur in scattered localities of the Piute and Tehachapi mountains in Kern County, although there may also be extant populations in Los Angeles and Ventura counties (CDFG 1984a). The primary factors contributing to the decline of this salamander are flood control projects, fuelwood collection, removal of downed wood, and grazing (Thelander 1994). The Tehachapi slender salamander was state-listed as threatened on June 27, 1971. It is also considered a Forest Service Region 5 Sensitive species (Stephenson and Calcarone 1999).

Its preferred habitats include valley-*foothill hardwood-*conifer and valley-foothill-*riparian in moist canyons and ravines, usually on north-facing slopes, at elevations ranging from 2,500 to 5,000 feet (CDFG 1984a). Mesic forests are prime habitat for this species, providing the microclimates it requires; therefore maintaining, protecting, and preserving mesic conditions, downed logs, and leaf cover are critical to the persistence of this species.

Surface activity is strongly correlated with periods of fall, winter, and spring precipitation. During moist periods individuals seek cover under surface objects, especially rock talus (Brame and Murray 1968 *in* CDFG 1984a). This species retreats to moist underground niches or seepage areas during drier periods. This salamander forages primarily under surface objects such as pieces of bark or flat talus rocks in moist areas or in areas with considerable leaf litter (Stebbins 1985). There is little documented information on this species' food habits, but related species take small arthropods such as spiders, mites, and insects (especially collembolans, coleopterans, and hymenopterans), earthworms, and snails (Cunningham 1960 *in* CDFG 1984a).

Research is also lacking on the reproductive behavior of this species, including the specific habitat requirements for breeding or egg laying. It is believed to lay its eggs during the rainy periods of winter and early spring. Eggs of similar species are laid underground or on moist substrates underneath or within surface objects, especially pieces of bark (Stebbins 1972). Related forms lay eggs in clusters of 4 to 21 (Stebbins 1954).

AREA DESCRIPTION

There are no documented occurrences on Forest Service lands, but areas near the Tehachapi Mountains that contain potential habitat include the Mount Pinos/Frasier Mountain area and also the north sides of Liebre and Sawmill mountains. Surveys are needed to determine if this species is present in potential habitat in the Forests that is near known populations (Stephenson and Calcarone 1999).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Tehachapi slender salamanders are flourishing; they are present in adequate numbers to sustain breeding populations in all historically occupied habitat in the Forests.

OBJECTIVES

Protect and manage potential breeding pools and uplands habitat within the current and historic range.

Survey for populations and conduct research on the ecology of the species.

Eliminate activities that could adversely affect the species or its habitat.

Evaluate progress of recovery, effectiveness of management recovery actions, and revise management plans as necessary.

Initiate and implement a multi-lingual public education and outreach program on the ecology of the species, the threats

it faces, and the necessary conservation measures.

Encourage adjacent landowners, both private and public agencies, to seek advice on zoning or development that could cause mortality or habitat destruction.

Protect habitat patches supporting extant populations to maintain and increase the current population.

Maintain, protect, and preserve mesic conditions, downed logs, and leaf litter.

Protect habitat between extant populations to maintain habitat connectivity and diversity of the gene pool.

Determine Tehachapi slender salamander's life history and ecology for application to management and recovery.

Conduct the biological research needed to refine recovery criteria and guide conservation efforts.

Encourage or conduct studies on the ecology of the species and its limiting factors to better understand the animal's role in the ecosystem.

Designate habitat reserves where the species occurs and develop management programs for those areas to aid in the recovery and conservation of the species.

STANDARDS

The Forest Service shall conduct comprehensive annual surveys in all potential habitat to determine population abundance and distribution on the Forests.

The Forest Service shall eliminate ORV activity within habitat complexes of occupied and modeled habitat.

The Forest Service shall prohibit wood-collecting activities in occupied and suitable habitat.

The Forest Service shall utilize and enforce all laws and regulations designed to protect the Tehachapi slender salamander and its habitat.

Section 8.44
ARROYO TOAD

See section 7.0, *Management Indicator/Focal Species*, and section 7.5, *Arroyo Toad*, for specific objectives and standards for this listed species.

Section 8.45
CALIFORNIA RED-LEGGED FROG

ISSUE STATEMENT

The California red-legged frog (*Rana aurora draytonii*) is the largest native frog in the western United States, and is one of two subspecies of the red-legged frog (*Rana aurora*). It may have red on its lower abdomen and underside of the hind legs, though this is highly variable. The dorsal surface may be brown, gray, olive, or reddish and is often covered with small black flecks and larger, irregular dark spots. Males are substantially smaller than females and possess more webbing between their toes (USFWS 2000h).

The historic range of the California red-legged frog extended from the vicinity of Redding in Shasta County west to the coast and southward to northwestern Baja California, Mexico (Jennings and Hayes 1994). Historically, the California red-legged frog occupied 46 counties; it is now present in 31 counties, having been eliminated from 70% of its former range (USFWS 2000h). Currently, the California red-legged frog is locally abundant in a few localities in the San Francisco Bay Area and along the central coast; it also occurs in one isolated locality in the Sierra Nevada, with a small number of localities along the northern coast, and in the northern Transverse Ranges. In southern California, it has been extirpated from nearly every historic locality (USFWS 2000h). At present, the known populations south of the Santa Clara River include Cole Creek (Riverside County) (approximately 2 male frogs), east fork Las Virgenes Creek (Los Angeles County) (approximately 25 adult frogs), and San Francisquito Creek (Los Angeles County) (estimated

10-12 adult frogs). Extensive surveys elsewhere in southern California and the Sierra Nevada have failed to detect any additional populations (Dan Holland, pers. comm.).

The species is threatened within its remaining range by a wide variety of human-induced impacts including agriculture, urbanization, mining, domestic livestock grazing, recreation, timber harvesting, water impoundments and diversions, degraded water quality, invasion of non-native plants, and introduced predators such as bullfrogs *(Rana catesbeiana),* African clawed frogs *(Xenopus laevis)*, mosquitofish *(Gambusia affinis)*, bass *(Micropterus salmoides)*, carp *(Carassius auratus)*, green sunfish *(Lepomis cyanellus)*, red swamp crayfish *(Procambarus clarkii)*, and other exotic species (USFWS 2000h,g). In 1996, the U.S. Fish and Wildlife Service listed the California red-legged frog as a federally threatened species. The species is also identified as a California Species of Special Concern and a fully Protected Species by the California Department of Fish and Game.

California red-legged frogs utilize several types of aquatic, riparian, and upland habitats including ephemeral ponds, riparian corridors, intermittent streams, seasonal wetlands, springs, seeps, permanent ponds, lake margins, perennial creeks, dune ponds, marshes, lagoons, blackberry *(Rubus sp.)* thickets, non-native annual grasslands, oak savannas, and some man-made aquatic features. The species favors slow-moving streams, pools, and ponds greater than 2.3 feet deep, surrounded by dense herbaceous or shrubby riparian vegetation that provides stream shading, an important habitat component (USFWS 2000h; Hayes and Jennings 1986). The species' diet is highly variable and includes aquatic and terrestrial insects, crustaceans, worms, fish, tadpoles, smaller frogs, and mammals such as deer mice *(Peromyscus maniculatus)* (CDFG 1988). Larvae foraging ecology is not well known but it is assumed that they are algal grazers (USFWS 2000b). Larvae typically metamorphose in May-August, and very rarely may overwinter and transform in their second year (Dan Holland, pers. comm.).

Adults are recognized for making substantial shifts within their local aquatic habitats (Jennings and Hayes 1994). However, during wet periods, some individuals may disperse and/or move through upland habitats (USFWS 2000g). The species has been recorded within streams at distances more than 2 miles from the breeding site, and has been observed up to 100 feet from water in adjacent dense riparian vegetation, for up to 77 days (USFW 2000b). Other evidence indicates that in some areas the species may move extensive distances (well over 1 mile) overland between water sources.

The breeding season for California red-legged frogs is between late November and April (USFWS 2000g). The location where eggs are deposited in winter and early spring is often different from the feeding habitat occupied during spring and summer. Juveniles commonly utilize shallow water with dense submergent or emergent vegetation in the vicinity of breeding pools (CDFG 1988). Juvenile frogs are active diurnally and nocturnally, whereas the adult frogs are often but not invariably nocturnal (USFWS 2000g).

AREA DESCRIPTION

Historically, California red-legged frogs occurred on all 4 southern California National Forests. LPNF contains 20 to 30% of the remaining populations in Monterey, San Luis Obispo, and Santa Barbara counties. Evidently, the species has been extirpated from CNF and SBNF, but comprehensive surveys are needed to determine conclusively that no populations remain on these 2 forests. It was presumed extirpated from ANF as well, until a population was discovered in 1999 on San Francisquito Creek (Stephenson and Calcarone 1999).

LOS PADRES NATIONAL FOREST

California red-legged frogs are known to occur in Branch Creek, La Brea, Santa Ynez, Sespe, Sisquoc, Piru Creek, Carmel River, Ventana, and Morro Creek drainages. The largest known populations occur on the upper Carmel River, Mono Creek upstream of Mono Campground, and near Juncal Campground on the Santa Ynez River (USFWS 2000c). The species is also present in Alamo Creek and a number of systems further north in the Los Padres in San Luis Obispo and Monterey counties (Dan Holland, pers. comm.).

- Branch Creek – Confirmed in oxbow ponds approximately 0.5 mile upstream of the road crossing, near Cable Corral. Other populations are likely but no thorough surveys have been conducted (USFWS 2000c).
- North Fork La Brea Creek – In wet years, the stretch of creek near the road between Barrel Springs and Wagon Flat campgrounds can support up to 12 pool habitats. A 7-mile stretch of LA Brea Creek in the South Fork La Brea grazing allotment is occupied habitat (U.S. Fish and Wildlife Service 2000c).

- Santa Ynez River – The largest known population in the LPNF, majority of known locations upstream of Gibraltar Reservoir. Fox, Alder, Blue Canyon, Agua Caliente, and Mono Creeks (all tributaries of the Santa Ynez River) and Gibraltar and Jameson reservoirs have documented California red-legged frog populations. The Mono Creek population is 2 miles upstream of the campground (30 adults). A major breeding site is within 100 yards of Juncal Campground. Aqua Caliente population is adjacent to the hot springs and may exist in scattered pools at the base of the Caliente debris dam. A population of 26 individuals was located in the lower Santa Ynez River, from the Forest Service boundary upstream to Gibraltar Dam (U.S. Fish and Wildlife Service 2000c).
- Sespe Creek – Presence confirmed but detailed survey lacking (U.S. Fish and Wildlife Service 2000c).
- Sisquoc River – In Sisquoc drainage along the Sisquoc River and Manzana Creek. Manzana Creek contains scattered pools, likely breeding habitat (U.S. Fish and Wildlife Service 2000c).
- Morro Creek – No thorough survey data (U.S. Fish and Wildlife Service 2000c).
- Piru Creek – Known from approximately 0.75 mile upstream of Blue Point Campground (U.S. Fish and Wildlife Service 2000c).

ANGELES NATIONAL FOREST

One population of approximately 12 adults was recently discovered within San Francisquito Canyon (U.S. Fish and Wildlife Service 2000c).

CLEVELAND AND SAN BERNARDINO FORESTS

No California red-legged frogs are known to currently exist on either forest (U.S. Fish and Wildlife Service 2000c).

TABLE 8-45

KEY, OCCUPIED, AND MODELED HABITAT IN THE FORESTS

(USFWS 2001a)

	LOS PADRES	ANGELES	SAN BERNARDINO	CLEVELAND
KEY	10,627	627	41	201
OCCUPIED				
MODELED	120,743	21,841	9,901	14,919

DESIRED CONDITION

To meet the desired condition of maintaining genetically viable populations of red-legged frogs, activities that are incompatible with the maintenance and/or recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Red-legged frogs are flourishing and expanding their current range; there are multiple populations with adequate numbers to sustain viable breeding populations on all 4 southern Forests.

OBJECTIVES

Protect all occupied and suitable habitat with appropriately sized buffers in perpetuity; buffer size will be determined based on best available research on dispersal habits and influences of habitat type and gradient (USFWS 2000gg).

Maintain adequate water flow regimes and transport of sediment, sand, and gravel downstream of impoundments, water diversions, and residential or industrial developments (USFWS 2000gg). Develop inter-agency agreements where necessary to meet this objective.

Eliminate Forest Service activities that are incompatible with the recovery and conservation of the species.

Eliminate or control non-native species and predators (plants, vertebrates, invertebrates) of California red-legged frog (USFWS 2000g).

Develop and implement site-specific management guidelines for recreational activities, where these activities pose an ongoing threat, to eliminate impacts to the California red-legged frog and their habitat (USFWS 2000gg).

Develop guidelines for fire management practices (e.g. prescribed burns, emergency fire suppression, emergency water use) that eliminate incidental impacts to California red-legged frogs (USFWS 2000gg).

Develop and implement watershed management and protection strategies for California red-legged frogs using cooperative agreements and with federal, state, and local agencies, as well as non-governmental organizations, and incentive programs with private citizens (USFWS 2000g).

Minimize opportunities for establishment and spread of exotic species from private properties adjacent to or within National Forest lands through conservation easements and control agreements with private landholders.

Develop and implement conservation and restoration plans for the California red-legged frog within its historic and current range (USFWS 2000g).

Fully protect all high-quality or restorable habitat within designated core areas and high-priority watersheds to increase opportunities to maintain metapopulation structure (dispersal, population expansion, recolonization). Delineated core areas and other watersheds targeted for implementation of management and protection plans that occur partially or entirely in the Forests include:

LOS PADRES NATIONAL FOREST:

- Carmel River watershed
- Little Sur and Big Sur watersheds
- Alamo Creek
- San Juan Creek
- Upper Salinas River above Margarita Lake
- La Brea Creek
- Sisquoc River watershed
- Santa Ynez River and San Antonio Creek watersheds
- Indian Creek
- Mono Creek
- Agua Caliente Canyon
- Blue Canyon
- Piru Creek
- Sespe Creek
- Ventura-Matilija and San Antonio tributaries

ANGELES NATIONAL FOREST

- Big Tujunga Canyon
- East Fork of San Gabriel River
- West Fork of San Gabriel River
- Upper Mojave near Silverwood Lake

SAN BERNARDINO NATIONAL FOREST

- Upper Mojave near Silverwood Lake

CLEVELAND NATIONAL FOREST

- San Mateo Creek
- Holy Jim Creek

- San Juan Creek
- Doane Creek
- Water of the Woods in Laguna Mountains

In the above-mentioned designated core areas and other watersheds, work with private landowners and other agencies to ensure protection and recovery of the species (USFWS 2000g).

Evaluate lands not designated as core areas using a landscape approach to determine their possible importance to recovery efforts (USFWS 2000g).

Conduct and/or support research on population viability analysis and metapopulation dynamics (USFWS 2000g).

Conduct and/or support research on habitat utilization, home range analysis, and dispersal ability.

Conduct, support and/or encourage research on the ecology and effects of non-native aquatic predators (USFWS 2000g).

Pursue opportunities to acquire inholdings within the 4 southern Forests that would contribute to the recovery of the species (USFWS 2000g). This would include inholdings that occur within any drainages currently or historically occupied by the California red-legged frog. See section 17.0, *Land Protection Opportunities*.

Establish protected buffer zones for occupied habitat based on research of dispersal habits and habitat needs of California red-legged frog (USFWS 2000g).

Collect historic and current data to identify stream flow parameters where dams or diversions currently exist. Obtain necessary data to restore natural flow regimes that maintain optimal habitat for protection and recovery of California red-legged frog and cohabiting species (USFWS 2000g).

Devise and implement interagency agreements to ensure appropriate flood control measures. Guidelines may include but are not limited to maintaining appropriate flows levels; retaining downed woody material in riparian zones; avoiding seeding and/or revegetating treated areas with non-native species; and monitoring and adapting to ensure the effectiveness of these guidelines (USFWS 2000g).

Manage impoundments to increase habitat suitability in reaches up and downstream of dams (USFWS 2000g). Monitor for the presence of exotic aquatic predators.

Analyze all diversions, dams, and impoundments on the 4 southern Forests to determine if such activities and structures impact the California red-legged frog or associated species (USFWS 2000g).

Analyze the feasibility of removing key diversions, dams, and impoundments that are decreasing the extent and suitability of California red-legged frog habitat and cohabiting species within 5 years (USFWS 2000g).

Work to maintain all watersheds that are free from non-native predators (USFWS 2000g). Educate Forest users on the detrimental effects of introduced species. See section 10.0, *Invasive Species Management*.

Remove non-native plant species that threaten habitat suitability (USFWS 2000g). Identify specific habitat restoration opportunities within 5 years.

Coordinate with California Department of Fish and Game and local Mosquito Abatement/Vector Control Agencies to eliminate stocking of non-native fish into natural habitats (USFWS 2000c,g). If reservoirs are stocked with non-native fish for recreational use, install barriers to ensure that these non-native predators do not move up or downstream of the reservoir. Monitor these areas regularly to ensure that barriers are effective; if they are breached, implement effective methods for eradication to maintain predator-free drainages.

Identify and survey streams where gravel mining and suction dredging have occurred. If these activities have altered the creeks' morphology and hydrology, increased sedimentation, or facilitated the proliferation of non-native aquatic species, develop and implement measures to eliminate these impacts (USFWS 2000g). Evaluate opportunities for withdrawal of existing or potential mining claims in any drainages known to historically or currently support California red-legged frog.

Eliminate water quality degradation associated with livestock grazing and horse corrals (USFWS 2000g).

Develop and implement plans to eliminate contaminant exposure to the California red-legged frog and its habitat

(USFWS 2000g).

Identify point and non-point source pollution, and develop and implement guidelines to reduce these impacts (USFWS 2000g).

Develop and implement habitat restoration plans at or near historic localities. Habitat should be restored to conditions that are known to support California red-legged frog. Where feasible, reestablish extirpated populations (USFWS 2000g).

Conduct and/or support ecological research on the California red-legged frog (USFWS 2000g).

Develop and implement education and outreach plans for Forest employees and Forest users on the ecology of the species, the threats it faces, and the necessary conservation measures (USFWS 2000g).

Develop and conduct annual educational programs for road maintenance crews working in or near California red-legged frog habitat. Road maintenance should only be conducted outside the breeding season and after juveniles have metamorphosed.

STANDARDS

The Forest Service shall develop a standardized survey protocol in cooperation with USFWS to be used on all 4 Forests. Conduct surveys in all areas on the 4 southern Forests known to historically support California red-legged frog to determine (1) if any undocumented populations exist; (2) if suitable habitat exists for translocation efforts; and (3) which historic localities are in need of restoration.

The Forest Service shall monitor known California red-legged frog populations. Conduct qualitative surveys (presence/absence of suitable habitat, habitat modification, disturbance, threats, etc.) and quantitative surveys (numbers of individuals per age class, reproductive rates, survival, recruitment rates, immigration and emigration rates). Provide survey and monitoring information to California Department of Fish and Game and U.S. Fish and Wildlife Service (USFWS 2000g).

The Forest Service shall carry out prescribed burning in upland habitats during seasons when frogs or other sensitive species (western pond turtles) are not likely to be dispersing or aestivating in uplands (USFWS 2000g). See section 2.0, *Fire Management*.

The Forest Service shall implement guidelines for emergency fire suppression including restricting fire retardant drops in wetland habitat areas; avoiding water withdrawals from breeding pool habitat; prohibiting staging areas within a minimum of 150 meters (500 feet) from occupied habitat; and educating all hand crews and personnel on locations and types of frog habitats (USFWS 2000g).

The Forest Service shall eliminate mining activities in drainages with known California red-legged frog populations (USFWS 2000g). See section 27.0, *Minerals Management*.

The Forest Service shall conduct impact analyses for streams where mining is identified as a threat to habitat suitability for California red-legged frog. Develop mitigation measures to eliminate these impacts (e.g. removal of artificial pools, bank stabilization, reduction and containment of sediments, reduction or elimination of highbanking, and removal of gravels and soils above the high-water mark and on adjacent terraces) (USFWS 2000g).

The Forest Service shall eliminate grazing activities that are not compatible with California red-legged frog breeding, survival, and habitat suitability in occupied and potential habitat. See section 25.0, *Domestic Livestock Grazing*.

The Forest Service shall work with the permittee of the La Brea Allotment to ensure no direct or indirect "take" of the species; the permit should not be renewed and the allotment permanently retired upon completion of the permit. The U.S. Fish and Wildlife Service (2000c) specifically identified the following grazing allotments as occurring within drainages occupied by California red-legged frog: Rockfront Allotment (vacant) and La Brea Allotment. The Rockfront Allotment should be permanently retired.

The Forest Service shall analyze developed recreation sites and areas of high concentrations of public use in key and occupied habitat to eliminate impacts to the species.

The Forest Service shall design new recreational facilities to concentrate public use away from key, occupied, and modeled habitat.

The Forest Service shall maintain and retrofit roads in a manner that reduces impacts. Exclude vehicular activities from riparian and other wetland areas unless adequate stream crossings exist to prevent sedimentation (USFWS 2000g). See section 22.0, *Roads.*

The Forest Service shall eliminate ORV impacts in suitable and occupied habitats to reduce impacts to California red-legged frog and other sensitive species. Develop and implement sediment-monitoring guidelines (USFWS 2000g). Enforce road and trail closures to ORVs.

The Forest Service shall close roads near known populations permanently or annually, from late winter through spring, to prevent killing of subadult and adult frogs on roads (USFWS 2000g).

The Forest Service shall close the following roads in LPNF, identified by the U.S. Fish and Wildlife Service (2000c) as occurring in drainages occupied by California red-legged frog: North Fork La Brea Road, Camuesa Road, Caliente Road, Pendola (Juncal) Road, Paradise Road, Matilija Road, Lion Canyon Road, Sunset Valley Road. These roads should be closed, obliterated, and revegetated, or closed seasonally, as appropriate.

The Forest Service shall reduce the impacts of trail and road use by rerouting trails and roads to avoid stream crossings and wetlands, at a distance of at least 500 feet (USFWS 2000g).

The Forest Service shall close the following trails on Los Padres National Forest specifically identified by the U.S. Fish and Wildlife Service (2000c) as occurring in drainages occupied by California red-legged frog: South Fork La Brea Trail, Mono-Alamar Trail, Indian Trail, Blue Canyon Trail, Aqua Caliente Trail, Juncal Trail, Sespe Creek Trail, Sisquoc Trail, Manzana Trail, and Aqua Blanca Trail. These trails should be either closed, obliterated and revegetated, or closed seasonally, as appropriate.

The Forest Service shall close, relocate, or restrict the use of all campgrounds to areas that are at least 500 feet from riparian and wetlands within the range of the species (USFWS 2000g).

The Forest Service shall restrict season of use, close and/or relocate campgrounds and day use areas in drainages with known populations of California red-legged frog.

Section 8.46
MOUNTAIN YELLOW-LEGGED FROG

ISSUE STATEMENT

The mountain yellow-legged frog (*Rana muscosa*) is a moderate-sized true frog, measuring 1.5 to 3 inches in length. The pattern is highly variable, ranging from large discrete dark spots to smaller, more numerous ones with a mixture of sizes and shapes, to irregular lichen-like patches (USFWS 1999b). The body color is also highly variable, usually a mix of brown and yellow, but often with gray, red, or green-brown; the underside of the belly and hind limbs are yellow or orange with yellow, often extending to the forelimbs (Jennings and Hayes 1994). Dorsolateral folds are present, but not usually prominent (Stebbins 1985).

The mountain yellow-legged frog is essentially a California endemic and occurs primarily in the Sierra Nevada from Plumas County to southern Tulare County; there is an isolated population in Butte County that is separated from the Sierra population by Feather River Canyon (Stebbins 1985). In southern California, the species historically occurred in drainages in the San Gabriel, San Bernardino, and San Jacinto Mountains and in at least one area on Palomar Mountain (USFWS 2001a). The species still persists in isolated populations in the San Gabriel, San Bernardino, and San Jacinto Mountains. The southern-most group is an isolated population on Mt. Palomar in San Diego County (Stebbins 1985), which is now extirpated (Jennings and Hayes 1994; D. Holland, pers. comm.).

In southern California, the mountain yellow-legged frog has been extirpated from 99% of its historic range (Jennings and Hayes 1994). Some factors adversely affecting the species include non-native predators (particularly introduced salmonid fishes), mining, recreational activities, large wildfires, and post-fire flooding. Contamination (either chronic or acute) from roads that traverse or parallel mountain yellow-legged frog habitat (such as City Creek) is a matter of major concern (D. Holland, pers. comm.). The introduction of predatory non-native fishes has eliminated the species from lakes and streams throughout southern California. The presence of pathogens suggests that a primary causative

agent may exist that makes frogs susceptible to pathogens (CDFG 1994). The possibility also exists that declines are linked to non-acidification-mediated atmospheric effects (CDFG 1994); this needs further investigation. In December of 1999, the U.S. Fish and Wildlife Service proposed endangered status for the southern California distinct vertebrate population of the mountain yellow-legged frog.

In southern California, populations are restricted to rocky streams in ponderosa pine, montane hardwood-coniferous forests, and montane riparian habitat types (CDFG 1988). The species feeds primarily on aquatic and terrestrial invertebrates and favors terrestrial insects. Tadpoles graze on algae and diatoms along rocky bottoms in shallow water of streams, lakes, and ponds (CDFG 1988).

At higher elevations, breeding and egg-laying usually occur from June to August, depending on local conditions; in southern California, reproduction takes place earlier, from March to June (Stebbins 1985). Roundish clusters of up to 500 eggs (usually 200 to 300) are deposited in shallow water and attached to gravel or submerged rocks. Tadpoles usually over-winter at all localities, and may take 2+ years to achieve metamorphosis.

AREA DESCRIPTION

All occurrences in southern California are located in the Forests; there are currently 13 known populations. In the San Gabriel Mountains, populations occur in upper Little Rock Creek, Big Rock Creek, Devil's Canyon, and in 4 upper tributaries of the San Gabriel River. Five of the 7 occurrences in the ANF are within designated Wilderness Areas. In the San Jacinto Mountains, populations occur in Hall Canyon, Black Mountain Creek, Dark Canyon, Fuller Mill Creek, and in the North Fork San Jacinto River. In the San Bernardino Mountains, a population was recently located on the East Fork of City Creek. The Doane Valley population on Palomar Mountain appears to have been extirpated (USFWS 2001a).

TABLE 8-46

KEY, OCCUPIED, AND MODELED HABITAT IN THE FORESTS

(USFWS 2001a)

	LOS PADRES	ANGELES	SAN BERNARDINO	CLEVELAND
KEY		1,547	693	
OCCUPIED				
MODELED		17,865	22,428	

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Mountain yellow-legged frogs are flourishing; they are present in adequate numbers to sustain breeding populations in all historically occupied habitat on the 4 southern Forests.

OBJECTIVES

Protect and manage mountain yellow-legged frog habitat within the current and historic range in the Forests, for the benefit of the species.

Monitor extant populations, survey for additional populations, and conduct research on the ecology of the species.

Eliminate activities that could adversely affect the species or its habitat.

Analyze stream flow regulation and water diversions in key, occupied, and modeled habitat, particularly in areas affecting opportunities for recolonization, such as the West Fork of San Gabriel (ANF) and Mill Creek (SBNF).

Conduct or encourage research on the basic life history of mountain yellow-legged frog, its movement ecology, recolonization potential, and determination of whether the same oviposition sites are repeatedly used.

Conduct or encourage research on non-acidification-mediated atmospheric conditions that may affect the species. See section 3.0, *Airshed Management*.

Protect habitat supporting extant populations and restore habitat that has the potential to support populations in the future.

Conduct biological research needed to refine recovery criteria and guide conservation efforts.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Assign additional patrols to prevent suction dredging and placer mining to protect mountain yellow-legged frog and their habitat; specifically, prevent suction dredging within the East Fork San Gabriel River (ANF), upstream of the wilderness boundary.

Initiate and implement a multi-lingual public education and outreach program on the ecology of the species, the threats it faces, and the necessary conservation measures.

STANDARDS

The Forest Service shall conduct a range-wide survey for extant populations in key, occupied, and modeled habitat. Surveys shall be conducted over several years to validate the accuracy of survey methods and to provide an indication of the degree of recolonization.

The Forest Service shall discontinue the policy of planting trout (*Oncorhynchus aguabonita*, *O. mykiss*, and *Salmo trutta*), charr (*Salvelinus fontinalis*), and other fishes in historically fishless high-elevation lakes or streams. Develop inter-agency agreements with CDFG to ensure that this happens.

The Forest Service shall conduct a thorough inventory of sites currently or potentially supporting mountain yellow-legged frog. Such an inventory should be capable of identifying fish-linked recruitment failures. Where the inventory suggests fish-induced demographic changes, termination of stocking and eradication of exotics shall be initiated (e.g. Dark Canyon and Fuller Mill Creek).

The Forest Service shall subject roads that occur adjacent to or that cross riparian zones in key, occupied, or modeled habitat to the following guidelines. A qualified biologist shall survey all project sites to determine if the species is present. Surveys shall be conducted no more than 3 days prior to any ground-disturbing activity. Road maintenance or other ground-disturbing activities shall not occur if frog eggs, larvae, metamorphs, or adults are present. See section 22.0, *Roads*.

The Forest Service shall analyze and eliminate adverse impacts occurring from runoff and crash fuel spills on Highway 330 in the San Bernardino Mountains, near the East Fork City Creek population.

The Forest Service shall continue eradication programs in San Francisquito Canyon (ANF) for goldfish and giant reed and initiate other efforts to control and eliminate exotic species. See section 10.0, *Invasive Species Management*.

Forest Service projects designed to protect the species, such as fencing of frog breeding pools, will include a qualified biological monitor on site during project activities.

The Forest Service shall reduce or eliminate recreational activities in occupied habitat if those activities threaten the survival and recovery of the species.

The Forest Service shall sign the Sheep Mountain Wilderness trail along the East Fork San Gabriel River (ANF) and Black Mountain and Seven Pines trails (SBNF) to encourage hikersto stay on designated trails to protect the species.

The Forest Service shall relocate picnic tables and barbeque pits presently located adjacent to the creek at Fuller Mill Creek Picnic Area (SBNF) to areas outside the sphere of influence to protect the species.

The Forest Service shall relocate campsites adjacent to the creek at Dark Canyon Campground (SBNF) to areas outside the sphere of influence to protect the species.

The Forest Service shall eliminate unauthorized trails used to access the creek from Dark Canyon campground.

The Forest Service shall install interpretive signs at Dark Canyon Campground and Fuller Mill Creek Picnic Area and

install protective barriers to reduce access to the creeks. See section 20.0, *Environmental Education*.

The Forest Service shall inspect habitat conditions of potential breeding pools at Dark Canyon and Fuller Mill Creek Picnic Area as specified in the Programmatic Biological Opinion.

The Forest Service shall re-route that portion of an existing trail located in Little Rock Canyon (ANF) that is used to access Williamson's Rock, in order to protect mountain yellow-legged frog. Develop methods for mountain climbers to avoid TES habitat on trails to Williamson's Rock, Upper Big Tujunga.

The Forest Service shall locate equipment storage, fueling and staging areas at least 500 feet from the outside edge of all riparian zones (perennial and intermittent). The Forest Service shall relocate the following areas to reflect this standard within 1 year: For ANF – Upper Little Rock Creek, Devil's Canyon, East Fork San Gabriel River, Alder Gulch, Prairie Fork, Vincent Gulch; SBNF – Mill Creek, City Creek, Indian Creek/Lake Fulmor, Black Mountain Creek, Fuller Mill Creek and North Fork San Jacinto River (Dark Canyon).

The Forest Service shall eliminate impacts related to the Organizational Camp on the North Fork San Jacinto River in Dark Canyon that are adversely affecting the population.

The Forest Service shall, in consultation with the USFWS, analyze potential effects and determine whether remedial action is required if unanticipated conflicts between mountain yellow-legged frog and permitted special uses are identified.

Section 8.47
DESERT TORTOISE

ISSUE STATEMENT

The desert tortoise (*Gopherus agassizii*) is the official state reptile of California (Thelander et al. 1994). This armored, terrestrial tortoise has a mature shell length of about 8 to 14 inches; it ranges in color from light yellow-brown to dark gray-brown. Males are typically larger than females and are distinguished by having a concave plastron, longer gular horns, larger chin glands, and a longer tail (CDFG 2000).

Since the early 1900s, the species has declined due to a variety of direct and indirect impacts that have destroyed, degraded, and/or fragmented individuals and their habitat. Between 1975 and 1988, the human population in the western Mojave Desert increased by an estimated 300%, thus eliminating a substantial portion of the species habitat. Other threats include mining and energy-related exploration and development, road building, off-highway vehicles, and livestock grazing. Grazing animals reduce food availability and may crush tortoises and their burrows. Since 1988, a highly contagious upper respiratory disease has caused a number of mortalities; in one area the disease spread to 40% of the population in one year. Extensive garbage dumps and sewer ponds have attracted large flocks of ravens that prey upon juvenile tortoise; USFWS estimated that raven populations in the desert have increased 1,500% between 1968 and 1988 (Thelander et al. 1994; USFWS 1997b). Natural predators of eggs include foxes, coyotes, badgers, and gila monsters (Thelander et al. 1994). The species grows very slowly, on average about 1 inch a year. Their flexible shells make them vulnerable to a number of predators including ravens, roadrunners, snakes, bobcats, kit foxes, and coyotes until the tortoises reach 5-8 years of age, when shell hardening occurs (Thelander et al. 1994).

Historically, this species was distributed throughout the Mojave and Sonoran deserts of southeastern California, southern Nevada, western Arizona, the southwestern tip of Utah, and northern Mexico (USFWS 1997b). The species still occupies the same range; however, its habitat has been significantly reduced and what remains is highly fragmented. The desert tortoise was federally listed as threatened in April of 1990 and state-listed as threatened in August of 1989. In February of 1994, the USFWS designated 6 million acres of critical habitat in the Mojave and Colorado deserts; 6 recovery units exist, 3 in the Colorado Desert and 3 in the Mojave Desert. The species is especially imperiled in the western Mojave, the part of its range that borders LPNF, ANF, and SBNF. The USFWS and the USFS assert that desert tortoises do not occur above 4,000 feet, but they have been seen above 5,000 feet in elevation (Daniel Patterson, pers. comm.).

The desert tortoise inhabits sandy or gravelly soil in river washes, rocky hillsides, and flat areas in the desert. Scattered shrubs such as creosote bush, saltbush, Mojave yucca, and Joshua tree may be present in their habitat (CDFG 2000; USFWS 1997b). They commonly dig their burrows, which may be up to 10 feet in length, beneath creosote bush; the burrow entrance, like the profile of the tortoise, is a half moon shape (Thelander et al. 1994). Tortoises are herbivores,

eating annual forbs and grasses; forbs are preferred over grasses, and green vegetation is preferred over dry. They have also been observed eating carrion and feces as well as excavating and eating calcium carbonate mineral deposits (CDFG 1984b). The species may go for years without drinking water, taking most of their moisture from plants they feed on and storing water in their bladders (Thelander et al. 1994).

The species is mostly active in late winter and spring (Thelander et al. 1994). In mid-March tortoises begin to emerge from hibernation and courtship begins shortly thereafter (Stebbins 1985). There is no well-defined mating season, though much occurs in April. However, few survive the 15-20 years it takes to reach sexual maturity (Thelander et al. 1994). Eggs are laid in late May to July, with clutches averaging 2-9 eggs; it takes 3-4 months for eggs to hatch (Stebbins 1985). The scarcity of annual plants, due to inadequate precipitation, may result in reproductive failure (CDFG 1984b).

AREA DESCRIPTION

The species may occur along the northern edge of the San Gabriel and San Bernardino Mountains. Sightings and diagnostic signs have been found in the Baldy Mesa area, which straddles the mapped boundary between the San Bernardino and San Gabriel Mountains. In the SBNF, approximately 2,700 acres of occupied habitat exists in the Baldy Mesa area. An additional 41,587 acres of modeled habitat has been identified along the northern boundary of ANF and SBNF. No designated critical habitat exists in the Forests (USFWS 2001a).

TABLE 8-47

KEY, OCCUPIED, AND MODELED HABITAT IN THE FORESTS

(USFWS 2001a)

	LOS PADRES	ANGELES	SAN BERNARDINO	CLEVELAND
KEY				
OCCUPIED		473	2,223	
MODELED		3,847	37,741	

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Desert tortoise populations are flourishing; they are present in adequate numbers to sustain breeding populations in historically occupied habitat in the ANF and SBNF.

OBJECTIVES

Protect and manage desert tortoise habitat within the current and historic range in the Forests, for the benefit of the species.

Monitor extant populations, survey for additional populations, and conduct research on the ecology of the species.

Eliminate activities that are incompatible with the conservation and recovery of the species or that could adversely affect the species or its habitat.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Protect occupied and potential habitat in the Forests by designating habitat reserves to ensure long-term population viability.

Develop and implement a comprehensive research, monitoring, and management plan.

Obtain baseline data on desert tortoise densities in the Forests.

Research population structure, particularly recruitment and survivorship of younger age classes.

In consultation with the USFWS, initiate epidemiological studies of URTD and other diseases.

Identify potential sources of mortality, initiate protective measures, and assess the effectiveness of those measures in reducing anthropogenic causes of mortality.

Encourage private and public agencies to seek advice on zoning or development that could prevent desert tortoise mortality or habitat destruction.

Establish, develop, and implement a multi-lingual environmental education program that explains the ecology of the species, the threats it faces, and conservation measures to ensure its protection and recovery. See section 20.0, *Environmental Education*.

Inform visitors to Bighorn Wilderness about desert tortoise regulations and habitat protection measures (USFWS 2001).

STANDARDS

The Forest Service shall minimize use of heavy equipment to protect known burrow systems from fire suppression-related damage and other activities (USFWS 2001). See section 2.0, *Fire Management*.

The Forest Service shall use temporary fences or other protective measures to exclude desert tortoise from open trenches left overnight from project activities. Remove fences immediately after trenches are filled (USFWS 2001).

The Forest Service shall ensure that potential barriers are desert tortoise-friendly in key, occupied, and modeled habitat (USFWS 2001).

The Forest Service shall eliminate livestock grazing in key, occupied, and modeled habitat. Existing grazing allotments occur in 1,386 acres of modeled habitat; the allotments are currently vacant and should be permanently retired. See section 25.0, *Domestic Livestock Grazing*.

The Forest Service shall eliminate mining activities in key, occupied, and modeled habitat. See section 27.0, *Minerals Management*.

The Forest Service shall eliminate ORV activity within key, occupied, and modeled habitat.

The Forest Service shall eliminate utility corridors in key, occupied, and modeled habitat to the maximum extent practicable. See section 23.0, *Transportation, Utility, and Telecommunication Corridors*.

The Forest Service shall enforce regulatory laws and regulations to protect the desert tortoise.

Section 8.48

BLUNT-NOSED LEOPARD LIZARD

ISSUE STATEMENT

Dark blotches on its back and tail and its short, blunt snout give this species its common name, Blunt-Nosed Leopard Lizard (*Gambelia silus*). It is grayish yellow above, with dark spots and whitish crossbars on the dorsal side; it measures 3-5 inches long from snout to vent. During the breeding season, the male's head becomes even more blunt and they develop a pink, salmon, or rust coloring on their chest and throat. Breeding females develop reddish orange spots on their head, sides, and on the underside of their thighs and tail (Stebbins 1985).

Historically, this species was distributed throughout the arid lands of the San Joaquin Valley and the adjacent Sierra foothills from Stanislaus County southward to the Tehachapi Mountains in Kern County. Only fragmented populations still exist from southern Merced County south to western Kern County. Within the western portions of the San Joaquin Valley, the species still occupies habitat in the foothills of the Kettleman Hills, Antelope Hills, Panoche Hills, and Temblor Range (USFWS 1980). In the southern San Joaquin Valley, extant populations are known from Kern and Pixley National Wildlife Refuges, Liberty Farms, Allensworth, Antelope Plains, Buttonwillow, Elk Hills, Tupman Essential Habitat Areas, on the Carrizo and Elkhorn Plains, north of Bakersfield around Poso Creek, and in western Kern County

around the towns of Maricopa, McKittrick, and Taft (USFWS 2001). However, historically occupied lowland habitats have been extensively lost in the Cuyama Valley, Carrizo Plain, and Kettleman Plain (USFWS 1980).

The blunt-nosed leopard lizard is threatened by several factors that have reduced, fragmented, and degraded its habitat including but not limited to urban development, grazing, mining, road and pipeline construction, agricultural conversion and the associated pest control, and ORVs (USFWS 1980). The blunt-nosed leopard lizard was federally listed as threatened on March 11, 1967, and was state-listed as endangered on June 27, 1971 (32 FR 4001). No designation of critical habitat has been issued; however, the Department of Fish and Game has established several ecological reserves with occupied habitat including Alkali Sink, Allensworth, and the Antelope Plains Ecological Reserves. A coordinated effort by the DFG, The Nature Conservancy (TNC), the California Energy Commission, USFWS, and the Bureau of Land Management (BLM) is underway to identify and protect important remaining habitats in the San Joaquin Valley and Carrizo Plain. Additional recovery efforts include the combined coordination of BLM, TNC, and the DFG to establish the Carrizo Plain Natural Area (CDFG 2000).

The blunt-nosed leopard lizard primarily inhabits semiarid grasslands or sparsely vegetated plains in low foothills, on canyon floors, and in Valley Sink scrub habitat in large washes and arroyos (USFWS 1980). This species seeks refuge in small mammal burrows, under exposed rocks, or along banks. It's primarily an insectivore, feeding on grasshoppers and cicadas, though it opportunistically preys on small lizards.

The species hibernates during the winter and is active from mid-spring to mid-fall (CDFG 1982). Courtship occurs from early May to mid-June and the majority of hatchlings emerge by early August; the species may stay active as late as mid-October. Males are extremely territorial and aggressive, though several females may inhabit one male's territory (USFWS 1980).

AREA DESCRIPTION

There are no known occurrences of the full species, *G. silus*, within any of the 4 Forests; however, there is a narrow region within LPNF in the upper Cuyama Valley where this species hybridizes with the species *G. wislizeni*, which is scientifically significant as a hybrid (Stephenson and Calcarone 1999). The occurrence in LPNF encompasses approximately 100 acres, along the western boundary of the Ventucopa administrative site. Potential habitat also occurs in Ballinger and Quatal Canyons; 1,826 acres of modeled habitat is estimated to occur in LPNF (USFWS 2001).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Blunt-nosed leopard lizards are flourishing; they are present in adequate numbers to sustain breeding populations in all historically occupied habitat in the Forests.

OBJECTIVES

Protect and manage blunt-nosed leopard lizard habitat within the current and historic range in the Forests, for the benefit of the species.

Monitor extant populations, survey for additional populations, and conduct research on the ecology of the species.

Protect habitat patches supporting extant populations to maintain and increase the current population.

Protect habitat between extant populations to maintain habitat connectivity and diversity of the gene pool.

Conduct the biological research needed to refine recovery criteria and guide conservation efforts.

Encourage or conduct studies on the ecology of the species and its limiting factors to better understand the animal's role in the ecosystem.

Designate habitat reserves where the species occurs and develop management programs for those areas to aid in the recovery and conservation of the species.

Eliminate activities that could adversely affect the species or its habitat.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as

necessary.

Initiate and implement a multi-lingual public education and outreach program on the ecology of the species, the threats it faces and the necessary conservation measures. See section 20.0, *Environmental Education*.

Encourage adjacent landowners, both private and public agencies, to seek advice on zoning or development that could cause mortality or habitat destruction. See section 17.0, *Land Protection Opportunities*.

STANDARDS

The Forest Service shall conduct comprehensive surveys in all occupied and modeled habitat to determine population levels in LPNF.

The Forest Service shall eliminate ORV activity within habitat complexes of occupied and modeled habitat in LPNF.

The Forest Service shall initiate mineral withdrawal of any mining claims in occupied and modeled habitat. See section 27.0, *Minerals Management*.

The Forest Service shall prohibit road or pipeline construction in occupied and modeled habitat. See section 23.0, *Transportation, Utility, and Telecommunication Corridors.*

The Forest Service shall enforce laws and regulations to protect the species.

Section 8.49

SOUTHERN RUBBER BOA

ISSUE STATEMENT

The southern rubber boa (*Charina bottae umbratica*) is a heavy-bodied snake with a short, blunt tail that resembles the head; the skin is smooth and shiny. The plate-like scales on top of the head are large and sometimes asymmetrical, which differentiate the southern rubber boa from other subspecies. Coloration is camel tan to olive on top and cream or yellow underneath, and there may be a few dusky flecks on the lower sides; juveniles are generally lighter, pink or tan on top and light yellow to pink underneath. Adults measure from 14 to 33 inches in length (Stebbins 1985).

This snake is known from several localities in the San Bernardino Mountains in San Bernardino County, in the San Jacinto Mountains in Riverside County, and on Mount Pinos in Kern County. The southern rubber boa is threatened by development and increased recreational use in forested areas where it occurs. Habitat loss and degradation due to increased resort development, ORV activities, logging, and wood gathering are the principal causes of this species' decline. The southern rubber boa was state-listed as a rare subspecies in 1971, and was later redesignated by the state as threatened.

In the early 1980s, academic researchers and representatives of federal, state, and local agencies formed the Southern Rubber Boa Advisory Committee (SRBAC) to coordinate studies and management of this snake and to develop recommendations to reduce impacts on the snake from habitat degradation. Habitat degradation continues to pose a significant threat to the southern rubber boa on National Forest land. As a result, the Forest Service, with the help of SRBAC, developed habitat management guidelines to protect the southern rubber boa (Thelander 1994). The USFS has investigated the distribution of the southern rubber boa in the ANF, LPNF, and SBNF.

The species occurs in oak-*conifer and mixed-*conifer forests, at elevations from 4,925 to 8,200 feet (Thelander 1994). It is usually found in the vicinity of streams or wet meadows. This snake prefers areas with rotting logs, rocks, or other debris that can provide a safe refuge from the environmental elements. Prey items consist primarily of small mammals, birds, and lizards, which are taken by means of constricting or swallowing (Stebbins 1954). No information is available on the home range or territory behavior of this species, further studies are warranted. The Southern rubber boa breeds from April to June; females lay 2 to 8 live young in August to late November (Stebbins 1985).

AREA DESCRIPTION

This species is known from scattered localities in the Mount Pinos, Mount Abel, and Alamo Mountain ranges in LPNF.

These populations are known to be intergrades between the northern and southern rubber boa subspecies (Stewart 1988). In the SBNF, there are approximately 8 known localities in the San Jacinto Mountains, and 35 to 40 known occurrences in the San Bernardino Mountains (Stephenson and Calcarone 1999).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. The southern rubber boas are flourishing and expanding their current range; they are present in adequate numbers to sustain breeding populations in all historic localities.

OBJECTIVES

Protect and manage habitat within the current and historic range in the Forests, for the benefit of the species.

Monitor extant populations, survey for additional populations, and conduct research on the ecology of the species.

Eliminate activities that are incompatible with the conservation and recovery of the species or that could adversely affect the species or its habitat.

Protect and preserve existing southern rubber boa populations and prime habitat, including mesic forest conditions, downed logs, and leaf litter.

Conduct or encourage and support research to determine southern rubber boa life history and ecology for application to management and recovery.

Coordinate with CDFG to develop and implement a comprehensive management plan to ensure the recovery of the species.

Coordinate with landowners within or adjacent to the forests, whose land supports the species or suitable habitat.

Identify and eliminate activities that are incompatible with the conservation and recovery of the species.

Develop and implement a Land Protection Plan. Identify and protect additional land supporting key populations by acquisition of title, conservation easement, or other mechanisms (USFWS 1998c). See section 17.0, *Land Protection Opportunities,* for more specific information on this topic.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Provide public information and education.

STANDARDS

The Forest Service shall conduct comprehensive annual surveys to monitor the population status and distributional extent of this species in the Forests.

The Forest Service shall develop GIS layers for this species that identify occupied, key, and modeled habitat, and update the data annually.

The Forest Service shall utilize and enforce all laws and regulations governing the protection and recovery of the southern rubber boa and its habitat.

The Forest Service shall prohibit ORV activities in occupied and suitable habitat.

The Forest Service shall minmize undergrowth reduction activities in known localities and suitable habitat, and implement appropriate retention standards. See section 24.0, *Timber Harvest*.

The Forest Service shall prohibit wood-gathering activities in occupied or potential habitat for the southern rubber boa.

The Forest Service shall develop and distribute multi-lingual educational pamphlets on the ecology of the species, the threats it faces, and the necessary conservation measures.

CALIFORNIA BROWN PELICAN

ISSUE STATEMENT

The California brown pelican (*Pelecanus occidentalis californicus*) is a large, grayish-brown bird with a bright red gular pouch under the bill during the breeding season. The adult has a white head and dark body, but immature birds are brownish with a white belly (CDFG 2000).

In the late 1960s and early 1970s, the California brown pelican suffered widespread pollutant-related reproductive losses (USFWS 1983). As a result, the species was state-listed as endangered on October 13, 1970, and federally listed as endangered on June 27, 1971; critical habitat has not been designated. Significant threats limiting the distribution of the species include high levels of DDT residues, oil spills, and other pollutants, human and non-native mammal disturbance at post-breeding roosts, physical injury and mortality due to fish hooks and entanglement in abandoned fishing line, El Niño events that cause forage-fishes to move away from pelican nesting islands, and dependence on the northern anchovy as the primary food source (USFWS 1983; CDFG 2000). The brown pelican is also subject to disease outbreaks affecting local populations; in 1996 and 1997, more than 1,400 brown pelicans died of an avian botulism outbreak at the Salton Sea (CDFG 2000).

Colonial breeding populations occur on predator-free islands from the Channel Islands of southern California—Anacapa, Santa Barbara, and Santa Cruz—to scattered offshore islands along the Baja California coast and in the Gulf of California to coastal southern Mexico (Garrett and Dunn 1981). Nesting habitat varies from relatively dense shrubby vegetation to xeric sparsely vegetated habitats, though nests may also be placed on steep, rocky slopes. The species requires a disturbance- and predator-free area, appropriate roosting sites for residents and migrant pelicans, and offshore habitat with an adequate food supply (USFWS 1983). Being coastal and pelagic, the species feeds primarily on fish and occasionally crustaceans, scooping them up in its pouch (Palmer 1962).

Breeding begins on nesting islands from March to early August (Palmer 1962). The species is monogamous and both parents participate in the rearing process (CDFG 1983c). Their home range during the nesting season occurs within 12 miles of nesting islands (Briggs et al. 1981). Outside the breeding season, they wander along the entire west coast of North America as far north as British Columbia (CDFG 2000).

AREA DESCRIPTION

There are approximately 20 miles of coastline within the Monterey District of LPNF where the California brown pelican can be found during the non-breeding season (USFWS 1983). No breeding occurs in the Forests; however, roosting and foraging habitat occur along a 20-mile stretch at Pfeiffer Beach, especially during the summer months. There are 770 acres of occupied habitat in LPNF (USFWS 2001a).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Brown pelicans are flourishing and expanding their current range; they are present in adequate numbers to sustain breeding populations in all historic localities.

OBJECTIVES

Protect and manage habitat within the current and historic range for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and implement multi-lingual education and outreach plans to distribute to fishermen, Forest users, and local communities (USFWS 1983).

Develop and maintain public awareness programs.

Secure roosting and foraging habitat.

Eliminate human-related disturbances at roosting and foraging sites.

Inventory, monitor, and research populations to obtain adequate knowledge for developing and evaluating management programs.

Provide seasonal surveillance at selected habitats where pelicans are vulnerable to human disturbance or harassment.

Monitor non-breeding pelicans to assess population status (USFWS 1983).

Restore population size and productivity to self-sustaining levels (USFWS 1983).

Determine essential roosting and foraging habitat on Forest Service lands and ensure long-term protection for those areas (USFWS 1983).

Pohibit water diversions that impair hydrologic processes important for maintaining key and occupied open beach and estuarine habitats (USFWS 2001a).

Avoid implementation of beach stabilization or beach nourishment activities during season of use by TES beach species in all habitats (USFWS 2001a).

Evaluate the present human impacts to habitat and inform concessionaires on how to avoid negative impacts in key, occupied, and modeled habitats (USFWS 2001a).

Develop and implement a plan to protect colony sites from human disturbance (USFWS 1983).

Minimize activities that interfere with the ability of TES beach species to feed or rest in all habitats (USFWS 2001a).

Ensure that non-native species control projects maintain or enhance all TES beach species habitats and do not contribute toxic substances (USFWS 2001a).

Ensure that trash does not attract predators by encouraging Forest users to leave no trace (USFWS 2001a).

STANDARDS

The Forest Service shall eliminate adverse effects to roosting and foraging habitat at Kirk Creek Campground and Sand Dollar and Pfeiffer Beach day use areas through seasonal closures or educational signage, pamphlets, and law enforcement to ensure that the species is not harassed (USFWS 2001a).

The Forest Service shall eliminate negative impacts (human use, dog-walking) within occupied nest sites in key and occupied habitats; consider in modeled habitats (USFWS 2001a).

The Forest Service shall prohibit night-lighting of roosting areas (USFWS 2001a).

The Forest Service shall analyze the effects of 4 grazing allotments that occur within upland habitats adjacent to occupied habitat (Twitchell, Gorda, Alder Creek, and Buckeye); take appropriate actions to eliminate any adverse impacts (USFWS 2001a).

The Forest Service shall, during the breeding season, inform the public of the presence of pelicans and measures to avoid impacts. Require that dogs be on leashes in habitat areas (USFWS 2001a).

Section 8.51

WESTERN SNOWY PLOVER

ISSUE STATEMENT

The western snowy plover (*Charadrius alexandrinus nivosus*) is a small, compact shorebird with a short neck and large eyes. It is a pale gray-brown above, with a white belly, and dark patches on either side of the upper breast. The bill and legs are blackish. During the breeding season males have black markings on the head and breast while female markings are dark brown.

Historically, the western snowy plover bred or wintered along the Pacific coast, including Washington, Oregon, and

California southward into Baja California, Mexico. At present, the range remains the same although heavily fragmented and sparse, with the highest number of individuals occurring in southern and central California (Thelander 1994, USFWS 2001a).

The western snowy plover has experienced widespread loss of nesting habitat and reproductive success in the past 30 years. Human disturbance, coastal urban development, invasion of exotic plant species, and the increasing risk of predators have resulted in the decline of nest sites and breeding habitat for the western snowy plover. With only 8 major breeding sites continuing to support 78% of the remaining California coastal population, loss of just one of these locations could be tragic (Thelander 1994; USFWS 2001a; USFWS 2001d). The species was federally listed as threatened on April 5, 1993 (58 FR 68508), and is classified by the California Department of Fish and Game as a "species of special concern". Designation of critical habitat was issued by the USFWS on December 7, 1999 (64 FR 68508).

The western snowy plover prefers coastal beaches; it nests and forages in sand-spits, coastal dune-*back beaches, beaches at creek and river mouths, and other salt-influenced habitats such as estuarine salt ponds and alkali lakes. It is a visual predator that uses the "run and peck" method for foraging on invertebrates in wet sand. It gleans insects and amphipods from the dry sandy areas above high tide. At salt ponds and alkali lakes, it feeds primarily on brine flies.

In California, arrival and courtship begin January and continue into April, with the majority of the migrants arriving in March. The breeding season for the western snowy plover extends from March to late September with peak breeding occurring from mid-April to mid-June (Ehrlich et al. 1988). During the breeding season, adults generally do not wander far from the nest (Page et al. 1977). At Mono Lake, breeding adults feed at freshwater seeps up to 0.94 mile away from the nest site (Page et al. 1983). Nesting density and territorial defense appear to depend on predators. Nesting density was 1 nest/15 acres at Mono Lake, where predatory pressure was high, while density was 20 nests/15 acres at Monterey Bay, where predators were infrequent (Page et al. 1983).

AREA DESCRIPTION

The LPNF has the greatest potential to support nesting. The Sand Dollar and Pfeiffer beaches within the Monterey Ranger District consist of 8 acres of suitable breeding habitat located along a narrow band of beach above the splash zone and into the foredune area. The USFWS has identified 34 acres of key habitat in the northern Santa Lucia Mountains in LPNF (USFWS 2001a).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Western snowy plovers are flourishing and expanding their current range; they are present in adequate numbers to sustain breeding populations in all historic localities.

OBJECTIVES

Protect and manage suitable habitat on the Forests for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Conduct or encourage and support scientific investigations that facilitate recovery efforts.

Develop mechanisms for long-term management and protection of snowy plovers and their breeding and wintering habitat, and monitor and manage wintering and migration areas to maximize snowy plover population survival (USFWS 2001d).

Minimize activities that interfere with the ability of TES beach species to feed or rest in all habitats (USFWS 2001a).

Maintain natural coastal processes that perpetuate high-quality breeding habitat (USFWS 2001d).

Prohibit water diversions Forest-wide that impair hydrologic processes important for maintaining key and occupied open beach and estuarine habitats (USFWS 2001a).

Avoid implementation of beach stabilization or beach nourishment activities during season of use by TES beach species in all habitats (USFWS 2001a).

Replace exotic dune plants with native dune vegetation where it is likely to improve breeding habitat for snowy plovers

(USFWS 2001d).

Ensure that non-native species control projects maintain or enhance all TES beach species habitats and do not contribute toxic substances (USFWS 2001a).

Prevent excessive predation of snowy plovers by allowing, in some cases, predator control to protect occupied sites in key and occupied habitats; consider in modeled habitats (USFWS 2001a).

Protect snowy plovers and their breeding habitat from oil or chemical spills. Please see section 26.0, *Oil and Gas Drilling,* for more specific information related to this topic.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and distribute multi-lingual educational information on the species ecology, the threats it faces, and the necessary conservation measures.

STANDARDS

The Forest Service shall conduct annual monitoring of snowy plover breeding populations that occur in the Forests.

The Forest Service shall build plover exclosures where necessary to protect nesting areas from human and other disturbance (USFWS 2001d).

The Forest Service shall evaluate the present human impacts to habitat and inform concessionaires on how to avoid negative impacts in key, occupied, and modeled habitats (USFWS 2001a).

The Forest Service shall eliminate negative impacts (human use, dog-walking) within occupied nest sites in key and occupied habitats; consider in modeled habitats (USFWS 2001a).

The Forest Service shall, during the breeding season, inform the public of the birds' presence and measures to avoid impacts. Require that dogs be on leashes in habitat areas (USFWS 2001a).

Section 8.52

CALIFORNIA LEAST TERN

ISSUE STATEMENT

The California least tern (*Sterna antillarum browni*) is the smallest member of the subfamily Sterninae, measuring about 9 inches long with a wingspan of 20 inches. The species is distinguished from other terns by their black cap, gray wings with black wingtips, orange legs, and black-tipped yellow bill.

Historically, California least tern nested along the Pacific Coast from Moss Landing, Monterey County, California, to San Jose del Cabo, Baja California Sur, Mexico (Grinnel and Miller 1944). Current nesting grounds have been limited to one colony in the San Francisco Bay and discontinuous colonies along the coast from San Luis Obispo County to San Diego County, with the greatest concentration of breeding pairs nesting in Los Angeles, Orange, and San Diego counties (Thelander 1994).

The California least tern was once abundant throughout central and southern California; it is now one of the rarest and most imperiled seabirds in California. The loss of both nesting and foraging habitat and high levels of human disturbance are the primary reasons for the decline (USFWS 1985). The Pacific Coast Highway, built in the early 1900s, brought residential and commercial development that seriously eliminated or disrupted tern nesting grounds. By the 1940s, most terns were gone from the beaches of Orange and Los Angeles counties, and considered sparse everywhere else (USFWS 1985b). In addition, human activities have enhanced populations of scavengers and predators (e.g. crows, ravens, kestrels, other birds of prey, domestic cats, and non-native red foxes), which continue to place nesting colonies at risk. Most existing tern colonies are subjected to serious predation, often precluding nesting. Human disturbance also continues to disrupt existing colonies.

The California least tern was federally listed as endangered on October 13, 1970 (35 FR 8495); it was state-listed as

endangered in June of 1971. No designation of critical habitat has been issued by the USFWS; however, a recovery plan does exist.

Preferred nesting habitat consists of open, sandy beaches with sparsely vegetated flat substrates. Currently, nesting sites are located on isolated or specially protected sand beaches or on natural or artificial open areas in remnant wetlands. These sites are typically near estuaries, bays, or harbors where small fish are abundant. The species feeds in shallow estuaries and lagoons, and nearshore ocean waters. The main prey items vary from colony to colony, but usually include northern anchovy and topsmelt. Other locally or temporally important prey species include skiner surfperch, several gobies, the longjaw mudsucker, California killifish, jacksmelt, and mosquitofish (USFWS 1985b).

California least terns are colonial but do not nest in dense concentrations as do other tern species.º The species arrives at their nesting grounds from mid-April to early May. Nesting season extends from approximately mid-May to early August, with a second wave occurring from mid-June to early August (USFWS 1985b). The minimum distance between nests is 10-15 feet, with averages usually much greater (USFWS 1985b; CDFG 1983d). After breeding, family groups regularly occur at lacustrine waters near the coast of southern California (Garrett and Dunn 1981). Wintering areas are unknown, but suspected to include the Pacific Coast of South America (Massey 1977).

AREA DESCRIPTION

In LPNF, 34 acres of key habitat exist in the northern Santa Lucia Mountains. Within the Monterey Ranger District in the LPNF, a total of 8 acres on 2 beaches, Sand Dollar and Pfeiffer, could be used by the California least tern.

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. California least tern nesting colonies are flourishing, and the species is breeding in historic localities.

OBJECTIVES

Protect and manage habitat within the current and historic range for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Secure and manage nesting colonies.

Work with other agencies to assess population status of California least tern and factors influencing population stability and expansion on Forest Service lands.

Provide seasonal surveillance at selected habitats where least terns are vulnerable to human disturbance or harassment.

Develop and maintain public awareness programs.

Preserve and manage nesting habitat of existing colonies.

Coordinate with other agencies to develop and implement least tern management plans to establish secure nesting habitat on National Forest Service lands in Alameda, San Mateo, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego counties.

Provide nesting habitat in former, potential, or newly identified breeding areas.

Protect important non-nesting, foraging, and roosting habitats from detrimental land or water use changes in San Luis Obispo, Santa Barbara, Los Angeles, and San Diego counties.

Conduct research on the California least tern to provide additional necessary information for tern management (e.g. determine effects of environmental pollutants on least terns).

Prohibit water diversions on the Forests that impair hydrologic processes important for maintaining key and occupied open beach and estuarine habitats (USFWS 2001a).

Avoid implementation of beach stabilization or beach nourishment activities during season of use by TES beach species in all habitats (USFWS 2001a).

Ensure that non-native species control projects maintain or enhance all TES beach species habitats and do not contribute toxic substances (USFWS 2001a).

Allow predator control to protect occupied sites in key, occupied, and modeled habitats (USFWS 2001a).

Minimize activities that interfere with the ability of TES beach species to feed or rest in all habitats (USFWS 2001a).

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and implement a multi-lingual conservation education program.

STANDARDS

The Forest Service shall inventory, monitor, and research California least tern habitat and populations to obtain adequate knowledge for developing and evaluating management programs.

The Forest Service shall monitor least tern population to determine status, distribution, and progress of management during the breeding season.

The Forest Service shall eliminate negative impacts (human use, dog-walking) within occupied nest sites in key, occupied, and modeled habitats (USFWS 2001a).

The Forest Service shall evaluate the present human impacts to habitat and inform concessionaires on how to avoid negative impacts in key, occupied, and modeled habitats (USFWS 2001a).

The Forest Service shall, during the breeding season, inform the public of the birds' presence and measures to avoid impacts (USFWS 2001a).

The Forest Service shall require dogs to be on leashes in habitat areas (USFWS 2001a).

The Forest Service shall utilize existing laws and regulations protecting California least tern and its habitat.

Section 8.53
MARBLED MURRELET

ISSUE STATEMENT

The geographic range of the marbled murrelet (*Brachyramphus marmoratus*) extends from southern Alaska to the Monterey coast in central California. In California, Oregon, and Washington, gaps in distribution between breeding populations may result from timber harvest practices (Ralph et al. 1995). The birds spend most of their lives at sea but nest onshore in large, old trees in coastal coniferous forests within 60 miles of the shore. Marbled murrelets occupy the nearshore environment in the ocean and feed on zooplankton, squid, and fish, primarily Pacific sand lance, northern anchovy, Pacific herring, smelt, and Pacific sardine (CDFG 2000). Forests used for nesting are generally characterized by large trees (> 32 inches diameter at breast height), a multistoried canopy, moderate to high canopy closure or an open crown canopy, large snags, and numerous downed snags in all stages of decay (Marshall 1988, Hamer and Nelson 1995). Marbled murrelets tend to nest in the oldest trees in the stand (0 = 83 inches diameter at breast height; Hamer and Nelson 1995).

The marbled murrelet is a small seabird of the puffin or alcid family (Alcidae). Like most alcids, they are chunky in appearance with a short neck and thick body. Breeding plumage is camouflaged, dark brown-black above with some cinnamon and some white in the shoulder area, and the underside mostly a dark brown and white marbled pattern.

The tree nesting habit of marbled murrelets is unique among the alcids, and is unique among seabirds in the use of older-age conifer forests (Ralph et al. 1995). Marbled murrelets lay a single egg high in old-growth trees on large, moss-covered, horizontal limbs, in a small depression or a layer of duff. Most nest sites have been found in large intact stands of old-growth forest, but some nest sites have been found in smaller stands of large trees, or in areas where a few old-growth trees still exist in a second-growth landscape (Hunter and Bond 2001). Their nesting season runs from late March through mid-September, though not all adult pairs nest every year (Nelson and Hamer 1995a). The egg is incubated by

both parents for about one month, and adults fly from ocean feeding areas to inland nest sites, mostly at dusk and dawn (Nelson and Hamer 1995a). To minimize the attraction of predators, visits to the nest are discreet, with adults entering and exiting the nest during low light levels without vocalizations, and the nestling depends on cryptic plumage and nest location for protection (Nelson and Hamer 1995b). The juvenile flies directly from the nest to the ocean.

A review of all known marbled murrelet nests in North America by Nelson and Hamer (1995b) found that 72% of nests were unsuccessful, and the major cause of nest failure was predation. This observation generally matches the low number of juveniles seen at sea. Based on this information, and using information from other alcids to estimate marbled murrelet breeding age, reproduction, and survival, population modeling has indicated that marbled murrelet populations are declining from 2-4% per year, and possibly even higher (CDFG 2000).

The loss of old-growth forest habitat is believed to be the primary reason for the decline of the marbled murrelet (Ralph et al. 1995, CDFG 2000). Aside from causing absolute loss of potential nest sites and genetic isolation of populations, habitat fragmentation increases the amount of edge habitat, resulting in higher predation rates. Successful nests are significantly further from edges and are better concealed than unsuccessful nests (Nelson and Hamer 1995b). Most of the remaining marbled murrelet habitat is in state and national parks. Habitat in many park settings receives high visitor use, which unfortunately can be incompatible with marbled murrelet reproductive success. Recreational use on the forest floor may not directly disturb birds nesting high in the canopy, but indirect effects may be substantial. The greatest impact appears to be from the increased artificial food sources associated with human use of parks, which leads to elevated numbers of 2 major marbled murrelet predators: Steller's jays (Cyanocitta stelleri) and common ravens (Corvus corax; CDFG 2000). These opportunistic foragers have been demonstrated to occur in higher numbers when associated with recreational park settings, a consequence of inadequate garbage management practices and intentional and unintentional feeding (CDFG 2000). Ravens are known to nest and roost in old-growth forests, and their numbers have generally increased in the west in recent times. Other marbled murrelet predators include the peregrine falcon, sharp-shinned hawk, red-shouldered hawk, northern goshawk, great horned owl, American crow, and Cooper's hawk (Nelson and Hamer 1995b, CDFG 2000). Increased levels of predation can seriously impact long-lived, low-reproducing species like marbled murrelets. A breeding pair only produces one young per year and may not breed every year. Abnormally high predation means that more nests will fail in parks than in wilderness situations. Relying on the existing park situation alone will result in an inability of the population to replace itself (Larsen 1991).

Murrelets are vulnerable to large and small oil spills, as well as the build-up of other pollutants such as pesticides and their residues, heavy metals, and by-products of industry (Larsen 1991, CDFG 2000). Marbled murrelets are long-lived and feed at the top of the oceanic food chain and thus are more subject to the bioaccumulation of toxics up the food chain (Larsen 1991). In fact, marbled murrelets have been rated as having the highest oil vulnerability index of any seabird in southeast Alaska. When combined with habitat loss, the low reproductive rate of the birds, and the long time period required for the development of old-growth forests, the recovery problem is compounded (CDFG 2000). In addition, gill and drift netting has adversely impacted the bird: marbled murrelets are the alcid most frequently killed by gill nets (Larsen 1991).

Finally, El Niño events result in lack of nutrient upwelling and collapse of the anchovy populations, which are a major food source for the marbled murrelet. During one El Niño event, marbled murrelets were dispersed widely out on the ocean, and lower breeding activity was recorded (Larsen 1991). Although this is a natural event that a healthy population of seabirds can withstand, the reduced numbers of marbled murrelets puts them at special risk.

In 1991, a status review of available scientific information stated that the marbled murrelet is seriously endangered throughout its range in California due to loss,alteration, and fragmentation of coastal coniferous old-growth forests that formerly extended along the western Coast Range from the Oregon border to Monterey County. Loss of genetic viability, danger of oil spills or environmental contamination, and predation are other major threats to the species (Larsen 1991).

The marbled murrelet was federally listed as threatened under the Endangered Species Act in 1992, and the Final USFWS Recovery Plan was completed in September 1997. This document recommends management plans for each population zone in California and annual at-sea surveys to better assess population trend. In 1999, the status of the marbled murrelet was determined to be declining (CDFG 2000).

AREA DESCRIPTION

Reports of marbled murrelets along the central California coast have been concentrated within a 6-mile radius of Point Año Nuevo in Santa Cruz County, but it is not known whether they nest in the coastal forests of the northern Santa Lucia Range.

DESIRED CONDITION

Old-growth coastal coniferous forest areas of a size sufficient to maintain self-sustaining populations of the marbled murrelet have been identified and permanently preserved in the Forests and adjacent lands. These areas include dispersal corridors of suitable habitat along the western slope of the Coast Range to allow for increased gene flow between genetically isolated populations. Isolation of fragmented populations has been physically eliminated by expanding existing habitat and by developing connecting habitat via land acquisitions, protection from habitat alteration and human-caused increases in predation, and restoration of suitable habitat.

OBJECTIVES

Protect and manage habitat within the current and historic range for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Conduct ongoing basic research on the marbled murrelet, in coordination with other federal, state, and private partners, to determine population status in the Forests and actions needed to recover the species.

Coordinate with other agencies to stop the continued loss and deterioration of marbled murrelet habitat and ensure the preservation of habitat essential to maintaining the species in perpetuity.

Develop cooperative efforts with federal, state, and local agencies and private landowners to connect the population in the Forests with the north coast population via land acquisitions. See section 17.0, *Land Protection Opportunities*.

Monitor populations of predatory corvids to determine methods of control.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Provide public information and education.

STANDARDS

The Forest Service shall eliminate disturbance to breeding adults and existing or potential nest trees during land management and maintenance activities.

The Forest Service shall prohibit the deposition of human food and garbage and aggressively monitor marbled murrelet nesting areas to control populations of predatory corvids. Fines for littering shall be instigated and strictly enforced. Other methods of corvid control shall be investigated and implemented.

Section 8.54

CALIFORNIA CONDOR

ISSUE STATEMENT

With a wingspan approaching 10 feet and weighing 18-23 pounds, the California condor *(Gymnogyps californianus)* is the largest flying bird in North America. Adults are all black except for the white linings on the underwing and edges of the upper secondary coverts. The head and neck are naked; the neck is gray, the head various shades of yellow, red, and orange. Males and females are not sexually dimorphic and cannot be distinguished by size (USFWS 2001a).

During the Pleistocene era (10,000 to 100,000 years ago) the California condor ranged from British Columbia, Canada, to Baja California, Mexico, and through the southwest to Florida and north to New York State. With the extinction of the large Pleistocene megafauna, condors declined in range and numbers (USFWS 2001e). After European settlement,

populations declined steeply due to indiscriminate shooting, lead poisoning, loss of habitat, capture in traps, predation of eggs and young by ravens, and over-collection by museums and zoos (Thelander et al. 1994). Two anthropogenic factors, lead poisoning and shooting, contributed disproportionately to the decline of the species. Collisions with man-made structures were also a factor in the decline (USFWS 1996).

The species was federally listed as endangered in 1967, but specific legal protection wasn't granted until 1972 when the US Migratory Bird Treaty Act was amended to include vultures. In 1973, with the passage of the Endangered Species Act, taking of any endangered species was considered a violation of federal law (USFWS 1996). The species is also state-listed as an endangered species and is Fully Protected by the Department of Fish and Game (CDFG 2001). In 1976, 570,400 acres were designated as critical habitat in 6 southern California counties: Ventura, Los Angeles, Santa Barbara, San Luis Obispo, Kern, and Tulare. There are 9 designated Condor Critical Habitat Areas in southern California (USFWS 1996).

In 1981, a captive breeding program was established to assist in recovery of the condors. The last wild condor was captured in 1987 (Thelander et al. 1994). Prior to 1987, condors used a horseshoe-shaped area in southern California that included the coastal mountain ranges of San Luis Obispo, Santa Barbara, and Ventura counties; a portion of the Transverse Range in Kern and Los Angeles counties; and the Southern Sierra in Tulare County. The California Condor Recovery Team had designated this area as the range of primary concern in 1984 (USFWS 1996).

The USFWS began repatriating California condors to the wild in 1992; they've been released in western Monterey County, eastern San Luis Obispo County, eastern Santa Barbara County, and eastern Ventura County in California, and near the Grand Canyon in Arizona (Thelander et al. 1994). As of January 2001, the total population included 162 birds; 25 free-flying condors in southern and central California, 24 in northern Arizona, and 113 are still in captivity (USFWS 2001e). The estimated date of reclassification to threatened status is 2010; repatriation programs must be successful for reclassification to occur (USFWS 1996).

At present, sufficient habitat remains in California to support a large number of condors, if density-independent mortality factors, including shooting, lead poisoning, and collisions with man-made objects, can be controlled (USFWS 1996). Because of deaths from contact with power lines, condors started undergoing power line aversion training in 1995 before their release; still in 1997, 2 more died from power line collisions (UFSWS 2001e).

Condors require suitable habitat for nesting, roosting, and foraging (USFWS 1996). Typical roosting and nesting sites are at high elevations in deep canyons (CDFG 2001). Nests may be located in various rock formations, and more rarely, in cavities in giant sequoia trees. Traditional roost sites include cliffs and tall conifers, as well as dead snags (USFWS 1996). California condors reach sexual maturity between 5 and 6 years of age (Thelander et al. 1994). Courtship and nest site selection take place from December through spring, and a single egg is laid between late January and early April; condors are known to lay replacement clutches if the first, or even second, are lost. Condor chicks don't take their first flight until 6-7 months of age and aren't fully independent until the following year (USFWS 1996). Little research has been conducted on territories during any given season. However, nest sites have been known to occur within 0.5 mile of one another and no display of nest defense was observed (CDFG 1990).

Foraging primarily occurs in open terrain in grasslands or oak savannahs (USFWS 1996). The California condor is strictly an opportunistic scavenger of carrion (CDFG 1990). Prior to the arrival of European man, food items consisted of mule deer, tule elk, pronghorn antelope, and smaller mammals, as well as whales, sea lions, and other marine species along the coast. By 1953, there was a dramatic shift in food items to domestic cattle and sheep, ground squirrels, mule deer, and horses (USFWS 1996).

AREA DESCRIPTION

Potential condor nesting habitat still exists over a relatively large portion of the coastal and interior mountains in central and southern California, though all recent condor nest sites were located on public lands within the Los Padres, Angeles, and Sequoia National Forests (USFWS 1996).

Today, California condors reintroduced as part of the recovery program are found primarily in the LPNF and surrounding lands. Releases have taken place on or near designated California condor sanctuaries or wilderness areas including Sespe Condor Sanctuary, Ventana Wilderness, and the San Rafael Wilderness Area (USFWS 2001a).

Approximately 250,000 acres of designated critical habitat occur on National Forest Service lands; 5 of the 9 separate

units of critical habitat are located in the LPNF.

TABLE 8-54

KEY, OCCUPIED, AND MODELED HABITAT IN THE FORESTS

(USFWS 2001a)

	LOS PADRES	ANGELES	SAN BERNARDINO	CLEVELAND
KEY	294,659	4,799		
OCCUPIED	1,478,045	124,845		
MODELED				

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased (e.g. lead bullets). Habitat restoration and enhancement projects implemented in historically occupied habitat have encouraged the dispersal of individuals. Condor populations are flourishing and the species is once again breeding in the wild throughout its historic range.

OBJECTIVES

Protect and manage habitat within the current and historic range for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Protect occupied and modeled habitats from disturbance.

Provide nesting, roosting, and foraging habitat for condor recovery in the wild (USFWS 1996).

Monitor for potential impacts of all surface activities within historic condor range (USFWS 1996).

Minimize known mortality factors (USFWS 1996).

Provide adequate law enforcement to minimize direct losses of wild condors (USFWS 1996).

Develop and implement management strategies to minimize contaminant-related mortality factors, such as lead poisoning (USFWS 1996).

Eliminate or minimize mortality due to collisions with man-made structures, particularly wind turbines (USFWS 1996).

Implement information and education programs on condor habitat use and protection needs (USFWS 1996).

Work with USFWS to establish additional release sites.

Re-establish extirpated native ungulate populations on historical foraging habitats. Work with CDFG to initiate native ungulate reintroduction within the range of the California condor (USFWS 1996).

Work with the public to use non-lead bullets or archery when hunting for game or predators within the range of the California condor in key, occupied, and modeled habitat (USFWS 2001a).

Implement effective strategies to protect suitable nesting, roosting and foraging sites on public lands (USFWS 1996).

Identify, assess, and monitor potential development threats in historical condor foraging area (USFWS 1996).

Identify all known mortality factors and develop strategies to eliminate them (USFWS 1996).

Develop a cooperative law enforcement program among the CDFG, Forest Service, BLM Rangers, and the USFWS to patrol key condor areas (USFWS 1996).

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Distribute educational material about condor habitat, species identification, legal protection, and conservation measures to forest users and key private landowners (USFWS 1996), including information on appropriate behavior should one encounter a condor (USFWS 2001a).

STANDARDS

The Forest Service shall continue current Forest Service restriction of human activities within 1.5 miles of nest sites on Forest Service lands (USFWS 1996).

The Forest Service shall regulate SUPs, use of non-motorized trails, and general forest recreation up to 1.5 mile from occupied California condor nest sites in key and occupied habitats to minimize impacts to the species. Consider in California condor modeled habitats (USFWS 2001a). See section 21.0, *Special Use Permits*.

The Forest Service shall prohibit constructing new roads within 1.5 miles of current and historic California condor nest sites (USFWS 2001a).

The Forest Service shall restrict aircraft in key condor areas (USFWS 1996).

The Forest Service shall minimize low-altitude helicopter/airplane flights below 3,000 feet over occupied condor nests or day perches in key and occupied habitat. Provide for the use of helicopters and other motorized equipment as appropriate to conduct the reintroduction and feeding programs for the California condor, or in case of emergency. Consider in modeled habitats (USFWS 2001a).

The Forest Service shall, up to 1.5 miles from California condor nest sites in key and occupied habitats: (a) prohibit high noise-producing activities during occupancy of nesting sites, including SUP group events, except for emergency situations; and (b) maintain administrative sites, forest roads, and trails during non-nesting season. Consider in modeled habitats (USFWS 2001a).

The Forest Service shall prohibit special use permit group events within 1.5 miles of occupied California condor roost sites in key habitat. Consider in occupied and modeled habitats (USFWS 2001a).

The Forest Service shall document avian mortality resulting from collisions with wind turbines and power and transmission lines (USFWS 1996).

The Forest Service shall, as existing power line authorizations expire, only issue authorizations that include provisions that require all power lines to be raptor safe, within 5 years of issuance (USFWS 2001a).

The Forest Service shall, where overhead transmission lines occur in California condor habitat, work with utility companies or permit holders to install high-visibility or avoidance devices and raptor guards on poles and other structures potentially used as perching sites (USFWS 2001a).

The Forest Service shall ensure that all power lines and associated facilities in the Forests are raptor-proof; communications towers are to be free-standing. Existing towers shall have bird collision avoidance devices on guy wires when permit is re-issued (USFWS 2001a).

The Forest Service shall implement a phase-out of lead bullets and shot within 5 years of plan adoption, and prohibit use of lead bullets and shot on all Forest Service lands thereafter.

The Forest Service shall require burying offal (gut piles) from hunter-killed game, and require disposal of spent shot (USFWS 2001a).

Section 8.55
BALD EAGLE

ISSUE STATEMENT

With a wingspan of 6 to 8 feet, the bald eagle (*Haliaeetus leucocephalus*) is one of the largest raptors in the United States, second only to the California condor. The adult has brown plumage, with a striking white head, neck, and tail; it has a massive yellow bill, piercing yellow eyes, and yellow feet and legs (Alsop III 2001).

The breeding range formerly included most of the continent but is now restricted to Alaska, Canada, the Pacific Northwest, Florida, and Chesapeake Bay (USFWS 1986b). The bald eagle began to decline during the late 1800s and early 1900s, primarily due to logging (Evans 1982). By 1950, habitat destruction and direct persecution had resulted in the extirpation of much of the southern and central California nesting population (USFWS 1986b). In the 1960s, the eggshell-thinning effects of DDE further contributed to the decline. However, the most frequently recorded cause of mortality has been attributed to illegal shooting; of all recorded deaths, roughly 50% resulted from gunfire (Evans 1982). Secondary lead poisoning has also been documented where eagles feed on dead waterfowl. A number of other environmental contaminants have been shown to be detrimental to eagles including dioxin, endrin, heptachlor epoxide, mercury, and polychlorinated biphenyls (PCBs). Eagles have also died from ingesting organophosphate insecticides, which are used for treating warble fly in cattle. Finally, there's been at least one death in California due to strychnine poisoning associated with control of ground squirrels in rangelands (USFWS 1986b).

The bald eagle was federally listed as an endangered species in 1978, in 1995 it was reclassified as threatened, and in July of 1999 it was proposed for de-listing (USFWS 1986b; 2001). The species is also state-listed as endangered and is a Fully Protected species by the California Department of Fish and Game. It is also protected by a variety of other laws, including the Migratory Bird Treaty Act of 1918; the Lacy Act; and the Bald and Golden Eagle Protection Act of 1940 (USFWS 1986b).

The Pacific Recovery Area includes 7 states: Idaho, Nevada, Oregon, Washington, Montana, Wyoming, and California. Recent studies indicate that this area contains critical migration and wintering habitat for the continental breeding population; in fact, 25% of all wintering bald eagles occur in the Pacific Recovery Area (USFWS 1986b). Current threats in the south coast ecoregion are disturbance to wintering grounds and residential development (USFWS 1986b). On National Forest Service lands, recreational activities and power lines, particularly around lakes, are the primary disturbance factors (USFWS 2001a). Recreational activities have caused nest and territorial abandonment and reproductive failure (Thelander et al. 1994).

Bald eagles require suitable habitat for nesting, roosting, and foraging. In southern California, the recent range has been restricted mostly to forested areas surrounding reservoirs and lakes. Formerly, they occurred more widely along the coast, rivers, large freshwater lakes, and marshes (USFWS 1986b). Nests are typically placed near water bodies, in uneven-aged stands of coniferous forests with old-growth components (CDFG 1990). In California, the majority of nests occur in ponderosa pine, but sugar pine is also used. Historically, cliffs along the coast were also used for nesting. Bald eagles usually nest in the same territories each year and often construct alternate nests within a territory and vary use between them from year to year (USFWS 1986b). In southern California, the majestic bird currently only occurs as a winter visitor, though it has recently attempted to breed (CDFG 1990; USFWS 2001a).

Bald eagles may breed as early as 4-5 years of age; they are monogamous and thought to pair for life (CDFG 1990; Alsop III 2001). They breed from February through July, with peak activity occurring between March and June (CDFG 1990). They hunt solitary or cooperatively feeding upon fish, waterfowl, small mammals, and carrion (CDFG 1990). Sufficient forage is a critical component of breeding and wintering habitat (USFWS 1986b).

AREA DESCRIPTION

Bald eagles nest regularly in the vicinity of Nacimiento Lake, San Antonio Lake, and Cachuma Lake, near LPNF, and suitable habitat exists on the National Forest Service lands (USFWS 2001a).

Wintering populations appear in late October and are gone sometime in April; they occur in SBNF, CNF, and ANF, with the largest concentrations occurring in the San Bernardino Mountains. In SBNF, populations occur at Big Bear Lake, Lake Arrowhead, Silverwood Lake, and Lake Hemet. In CNF, they occur at Lake Henshaw and Lake Morena. In ANF, they occur at Castaic Lake. A few remain in the area into summer months, and sporadic nesting attempts have been documented near Silverwood Lake and Lake Hemet (USFWS 2001a).

TABLE 8-55

KEY, OCCUPIED, AND MODELED HABITAT IN THE FORESTS

(USFWS 2001a)

	LOS PADRES	ANGELES	SAN BERNARDINO	CLEVELAND
KEY HABITAT			3, 349 acres	
OCCUPIED HABITAT			914 acres	107 acres
MODELED HABITAT	78,001 acres	19,312 acres	101,589 acres	19,973 acres

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Bald eagle wintering populations are flourishing, and the species is once again breeding in historic localities. Habitat restoration and enhancement projects implemented in historically occupied habitat have encouraged the dispersal of individuals.

OBJECTIVES

Protect and manage habitat within the current and historic range for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Secure and manage breeding and non-breeding habitat (USFWS 1986b).

Maintain and enhance food sources (USFWS 1986b).

Maintain and improve forested habitat in both the breeding and wintering range (USFWS 1986b).

Maintain and develop nesting and roosting habitat (USFWS 1986b).

Restrict human disturbance at eagle use areas (USFWS 1986b).

Work with other agencies to assess population status of bald eagles and factors influencing population stability and expansion on Forest Service lands (USFWS 1986b).

Develop and maintain public awareness programs (USFWS 1986b).

Provide seasonal surveillance at selected habitats where eagles are vulnerable to human disturbance or harassment (USFWS 1986b).

Reduce bald eagle mortality (USFWS 1986b).

Secure inholdings with high-quality habitat (occupied or modeled) through lease, trade, easement, cooperative agreement, or purchase (USFWS 1986b). See section 17.0, *Land Protection Opportunities*.

Develop and implement plans to protect in perpetuity individual nest sites, roosts, and foraging areas (USFWS 1986b).

Maintain forested habitat and preserve snags in existing and potential eagle use areas (USFWS 1986b).

Provide artificial perches and nest structures where natural sites are not available (USFWS 1986b).

Protect and restore natural spawning populations of important fish, such as steelhead, to increase availability to eagles (USFWS 1986b). See section 7.4, *Management Indicator/Focal Species – Southern Steelhead Trout*.

Maintain and improve habitat for fish by reducing siltation from roads and overgrazing (USFWS 1986b).

Maintain and enhance wetland areas for waterfowl on wintering areas used by eagles (USFWS 1986b).

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop specific information programs and pamphlets for communities in eagle areas (USFWS 1986b).

Use signs, brochures, and/or interpretive programs to increase public awareness of the bald eagle and management methods, including seasonal closures where implemented. Avoid disclosure of specific use areas (night roost groves, nest areas, etc.) to discourage harassment, vandalism, or poaching (USFWS 2001a).

STANDARDS

The Forest Service shall inventory, monitor, and research bald eagle habitat and populations to obtain adequate knowledge for developing and evaluating management programs (USFWS 1986b).

The Forest Service shall establish protected reserves, with appropriately sized buffers, around existing nest sites, communal roosts, foraging areas, and areas used during migration; buffer sizes shall be determined based on the best available research on bald eagle nesting and foraging habits and influences of habitat type (USFWS 1986b).

The Forest Service shall conduct annual monitoring of threats and changes to nesting territories, foraging areas, communal roosts, and associated winter habitat (USFWS 1986b).

The Forest Service shall inventory and monitor the size and distribution of breeding and wintering populations (USFWS 1986b).

The Forest Service shall, during the nesting season, prohibit human activities within 1,300 feet of active nests (USFWS 2001a).

The Forest Service shall, on each Forest, implement at least 2 projects per year to enhance habitat features important to bald eagles (e.g. artificial perches, perch windows, signing, barriers) during the non-breeding season (USFWS 2001a).

The Forest Service shall prohibit and exclude activities that are known to disturb eagles during critical periods (USFWS 1986b).

The Forest Service shall prohibit stream channelization and levee projects and preserve and restore winding, braided river stretches (USFWS 1986b).

The Forest Service shall prohibit chemical control of aquatic insects in eagle use areas and develop interagency agreements to ensure that this happens (USFWS 1986b).

The Forest Service shall prohibit any construction near occupied bald eagle nesting and wintering habitats (USFWS 1986b).

The Forest Service shall prohibit vehicle traffic at key areas during periods of eagle use by closing roads and enforcing closures (USFWS 1986b).

The Forest Service shall conduct maintenance of existing administrative sites, recreation sites, roads, and trails in key bald eagle habitat (occupied and modeled) during season of non-occupancy (USFWS 2001a).

The Forest Service shall prohibit outdoor construction in recreation residence tracts up to 1,300 feet from nests and occupied and modeled habitat during the season of occupancy (USFWS 2001a).

The Forest Service shall maintain facilities closures up to 1,300 feet from occupied bald eagle wintering habitat. Increase buffer if direct line-of-sight occurs with human activity. Consider in modeled and occupied habitat (USFWS 2001a).

The Forest Service shall maintain closures on trails and trailheads located within frequently used bald eagle perch areas and nest sites during occupancy; consider in occupied and modeled habitat (USFWS 2001a).

The Forest Service shall document mortality factors of adult and sub-adult eagles (USFWS 1986b).

The Forest Service shall promote the use of nontoxic shot for hunting and prohibit the use of lead on Forest Service lands within 5 years of plan adoption (after a phase-out period) (USFWS 1986b).

The Forest Service shall promote and enforce regulations that provide severe penalties for shooting bald eagles (USFWS 1986b).

The Forest Service shall develop consistent and enforceable interpretations of laws and regulations protecting bald eagles and their habitat (USFWS 1986b).

The Forest Service shall prohibit the use of poisons detrimental to eagles in predator and rodent control programs within nesting and wintering habitat on Forest lands (USFWS 1986b).

The Forest Service shall require permittees to replace or modify all power line structures to be raptor-safe within 5 years, using accepted designs (USFWS 1986b).

The Forest Service shall restrict power line construction within flight lanes near occupied and modeled habitat (USFWS 1986b).

Two mortalities from collision with power lines were documented in SBNF – east side of Baldwin Lake, and north side of Stanfield Marsh by Big Bear Lake (USFWS 2001a). The Forest Service shall require these power lines to be raptor-safe within 2 years of plan adoption.

Section 8.56

SWAINSON'S HAWK

ISSUE STATEMENT

The Swainson's hawk (Buteo swainsoni) is a medium-sized hawk, with a wingspan of about 1.2 m (4 ft). As with most birds of prey, females are larger than males; adult females weigh 28 to 34 ounces and males 25 to 31 ounces (Thelander et al. 1994; CDFG 2000). There are 3 different color morphs—light, rufous, and dark; all have bicolored underwings, with dark gray flight feathers and lighter wing linings (Thelander et al. 1994).

Swainson's hawks breed in California but fly south to winter in Mexico and South America in September and October; they migrate north from March through May (Grinnell and Miller 1944 in CDFG 1990; CDFG 2000). Swainson's hawks once bred throughout lowland California and were absent only from the Sierra Nevada, north Coast Ranges and Klamath Mountains, and portions of the desert regions of the state. Today, they are restricted to portions of the Central Valley and Great Basin regions where suitable nesting and foraging habitat is still available (CDFG 2000). Very limited breeding has been reported from Lanfair Valley, Owens Valley, Fish Lake Valley, Antelope Valley, and in eastern San Luis Obispo County (Bloom 1980, Garrett and Dunn 1981 *in* CDFG 1990).

Historically, the population was estimated to be in excess of 17,000 pairs; a study conducted in 1994 estimated the statewide population to be 800 pairs (CDFG 2000). The steep decline in the population resulted in large part from loss of nesting habitat. Conversion of habitat to various residential and commercial developments is a serious threat to Swainson's hawks throughout California. Additional threats include riverbank protection projects, shooting, pesticide poisoning of prey animals and hawks, overgrazing, fire suppression, and human disturbance at nest sites (CDFG 2000). Recently, there has been massive die-off of several thousand Swainson's hawks and other raptors attributed to pesticide use at agricultural fields in Argentina (CDFG 2000). The species was listed as threatened by the state of California in 1983, and is also a Forest Service Region 5 Sensitive Species (Thelander et al. 1994; Stephenson and Calcarone 1999). The Swainson's Hawk Technical Advisory Committee (TAC) is currently developing a draft recovery plan for the species (CDFG 2000).

The primary habitat requirements of this species are large, open grasslands with abundant prey in association with suitable nest trees. Suitable foraging habitat includes native grasslands or lightly grazed cropland containing scattered large trees or groves. The Swainson's hawk preys upon mice, gophers, ground squirrels, rabbits, large arthropods, amphibians, reptiles, birds, and, rarely, fish (Brown and Amadon 1968, Dunkle 1977 in CDFG 1990; CDFG 2000). Competitors for food include northern harriers, red-tailed hawks, black-shouldered kites, burrowing owls, and golden eagles (Craighead and Craighead 1956 in CDFG 1990). Suitable nest sites may be found in mature riparian forest, lone trees or groves of oaks, other trees in agricultural fields, and mature roadside trees. Breeding occurs late March to late August, with peak activity late May through July (Beebe 1974 in CDFG 1990). The species typically roosts in large trees, but will also roost on the ground (Bloom 1980 *in* CDFG 1990; CDFG 2000).

AREA DESCRIPTION

Historically, this species commonly nested in the coastal lowlands of southern California in places like Santa Monica, Temecula, Corona, and Santee (Garrett and Dunn 1981; Unitt 1984 *in* Stephenson and Calcarone 1999). There is potential

for this species to occur on or near the Forests; they may still nest in the Antelope Valley north of the Castaic Ranges and in eastern San Luis Obispo County (Garrett and Dunn 1981 *in* Stephenson and Calcarone 1999). Comprehensive surveys are needed to determine the presence or absence of this species in the Forests.

DESIRED CONDITION

To meet the desired condition of genetically viable populations, activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Swainson's hawk populations are flourishing, and the species is once again breeding in historic localities. Habitat restoration and enhancement projects implemented in historically occupied habitat have encouraged the dispersal of individuals.

OBJECTIVES

Conduct a forest-wide inventory of riparian habitat to identify additional and potential habitat within the historic range of the species on National Forest Service lands (USFWS 1998e).

Secure and maintain potential nesting, roosting, and foraging habitat.

Protect, restore, and manage riparian and adjacent upland habitats.

Assess population status and factors influencing population stability and expansion on Forest Service lands.

Ensure the availability of suitable nesting and foraging habitat through preservation of riparian systems, grasslands, oak woodlands, and groves of and lone mature trees in agricultural fields (CDFG 2000).

Implement riparian restoration projects within the current and historic range of the species, outside of the breeding season.

Coordinate with the Swainson's Hawk Technical Advisory Committee (TAC) to develop restoration and management strategies for the conservation and recovery of the species.

Provide artificial perches and nest structures where natural sites are not available (USFWS 1986b).

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and distribute educational pamphlets on the species' ecology, the threats it faces, and the necessary conservation measures for Forest visitors and Forest Service personnel.

STANDARDS

The Forest Service shall inventory, monitor, and research Swainson's hawk habitat and populations to obtain adequate knowledge for developing and evaluating management programs.

The Forest Service shall prohibit stream channelization and levee projects, and preserve and restore winding, braided river stretches (USFWS 1986b).

The Forest Service shall prohibit chemical control of insects in areas utilized by hawks and develop interagency agreements to ensure that this happens (USFWS 1986b).

The Forest Service shall promote the use of nontoxic shot for hunting and prohibit the use of lead on Forest Service lands within 5 years of plan adoption (after a phase-out period) (USFWS 1986b).

The Forest Service shall prohibit the use of poisons detrimental to hawks in predator and rodent control programs within occupied and potential habitat.

The Forest Service shall require permittees to replace or modify all power line structures to be raptor-safe within 5 years, using accepted designs (USFWS 1986b).

The Forest Service shall restrict power line construction within flight lanes near occupied and modeled habitat (USFWS 1986b).

The Forest Service shall develop consistent and enforceable interpretations of laws and regulations protecting Swainson's hawk and their habitat.

AMERICAN PEREGRINE FALCON

ISSUE STATEMENT

The American peregrine falcon *(Falco peregrinus anatum)* has a distinct black cap and a bold black moustache; it is blue-gray to slaty above, and whitish to buff below (Farrand 1988). This falcon is roughly crow-size, about 15-21 inches long with a wingspan of about 40 inches (USFWS 1999c). As with many raptors, the females are larger than the males.

The American peregrine falcon is one of three subspecies that occur in North America. In California, the peregrine falcon ranges the length of the state and is fairly widespread. During the winter, the falcon's range extends along the entire length of the California coast, and into adjacent mountains, valleys, and lowlands (USFWS 1999d). They prefer coastal areas and are very rare east of the Sierra crest, and in the eastern and southeastern desert regions.

From a historical perspective, the falcon faced catastrophic declines. Prior to 1940, the statewide breeding population was estimated at 100-300 pairs (Small 1994). During the 1950s and 1960s, the population was reduced to 2 known nesting pairs, due to ingestion of chlorinated hydrocarbons (DDT). The American peregrine falcon was federally listed as endangered in 1970 by the USFWS due to precipitous declines in reproduction and survival. Although DDT has been restricted in the United States since 1972, a very high level of DDE contamination still exists in California. DDT and its metabolite DDE have been proven to cause eggshell thinning and poor productivity. The presence of this contaminant eventually led to the peregrine's drastic decline and near-extinction. Analyses conducted through the 1990s on peregrine falcon eggs concluded that DDE levels have failed to show significant reductions since the late 1960s (Walton 1998). Use of dicofol, which contains DDT, as a miticide in the Central Valley may be a continuing factor (Johnsgard 1990). Many other contaminants, such as dioxins and PCBs, have polluted peregrine eggs. However, impacts or effects on mortality are undocumented (Walton 1998).

The American peregrine falcon began a dramatic comeback in the 1980s; the current population in California is estimated at 219 pairs (Kaufman 1996). As a result, the USFWS proposed to remove the American peregrine falcon from the Federal List of Endangered and Threatened Wildlife on August 26, 1998; on August 25, 1999, it was de-listed (USFWS 1999d). The peregrine falcon's recovery and maintenance have been attributed to the banning of DDT, and the reintroduction of the species into temperate areas of North America (Kaufman 1996). However, this species is still protected under the State Endangered Species Act.

Peregrine falcons have a very large home range and territory (Johnsgard 1990). Habitat is characterized by the presence of tall cliffs, ridges, and rock promontories, which are used for nesting and perching. Nests are often placed on steep ledges, potholes, or in small caves for shelter from the elements and protection from mammalian predators (Johnsgard 1990). Other components of viable habitat include an adequate prey base and a nearby source of water (Kaufman 1996). The diet consists of 70-100% birds, with small mammals and insects being secondary (Johnsgard 1990).

The Peregrine breeds from early March to late August; most pairs are monogamous throughout their lifetime (Johnsgard 1990). Some pairs of falcons nest on the same cliff each year due to a strong bond formed between the two falcons (Johnsgard 1990). Juveniles spend their first year learning hunting and flying skills (CDFG 1990). It takes approximately 2-3 years to reach sexual maturity (USFWS 1999e). The peregrine falcon is capable of laying a second clutch if its eggs are destroyed or removed early in the breeding season (CDFG 1990).

AREA DESCRIPTION

This species occurs in LPNF, in the northern and southern Santa Lucia Ranges and the Santa Ynez Mountains. In the 1980s, reintroductions were attempted on southern Forests, but the birds didn't remain in the vicinity of release sites (Stephenson and Calcarone 1999). However, this species has the potential to occur on all four Forests, as it has been recorded south of the Santa Lucia Ranges (personal observation).

DESIRED CONDITION

To meet the desired condition of viable populations of falcons, activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration and enhancement projects implemented in

historically occupied habitat have encouraged the dispersal of individuals. Peregrine falcon populations are flourishing and the species is once again breeding in the wild throughout its historic range.

OBJECTIVES

Protect and manage habitat within the current and historic range for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Protect nesting, foraging, and wintering habitat from disturbance.

Conduct comprehensive annual surveys to monitor the population status and distributional extent of this species in the Forests.

Assess population status of peregrines and factors influencing population stability and expansion on Forest Service lands (USFWS 1986b).

Develop and implement plans to protect in perpetuity individual nest sites, and foraging areas (USFWS 1986b).

Provide artificial perches and nest structures where natural sites are not available (USFWS 1986b).

Secure inholdings with high-quality habitat through lease, trade, easement, cooperative agreement, or purchase (USFWS 1986b). See section 17.0, *Land Protection Opportunities*.

Develop and implement effective strategies to protect suitable nesting, foraging, and wintering areas (USFWS 1996).

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and distribute multi-lingual educational material about the species' ecological requirements, the threats it faces, and conservation measures to forest users and key private landowners (USFWS 1996).

STANDARDS

The Forest Service shall inventory, monitor, and research peregrine habitat and populations to obtain adequate knowledge for developing and evaluating management programs (USFWS 1986b).

The Forest Service shall develop GIS layers for this species that identify occupied habitat, and update the data annually.

The Forest Service shall maintain closures on trails, trailheads, and facilities located within frequently used nest sites during occupancy.

The Forest Service shall assess avian mortality resulting from collisions with wind turbines and power and transmission lines (USFWS 1996).

The Forest Service shall, as existing power line authorizations expire, only issue authorizations that include provisions requiring all power lines to be raptor-safe within 5 years of issuance (USFWS 2001a).

The Forest Service shall, where overhead transmission lines occur, work with utility companies or permit holders to install high-visibility or avoidance devices and raptor guards on poles and other structures potentially used as perching sites (USFWS 2001a).

The Forest Service shall require all power lines and associated facilities to be raptor-safe, and communications towers are to be free-standing. Existing towers must have bird collision avoidance devices on guy wires when permit is issued (USFWS 2001a).

The Forest Service shall work with the public to use non-lead bullets or archery when hunting for game or predators (USFWS 2001a).

WESTERN YELLOW-BILLED CUCKOO

ISSUE STATEMENT

Named for its yellow mandible, the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is a slender grayish-brown bird with white underparts; in flight, it displays its cinnamon-colored upper wings, and its striking black-and-white undertail (Thelander et al. 1994; CDFG 2000).

This migratory songbird flies south in winter, to the lowland regions of South America; it returns to breed in California, Arizona, and New Mexico in summer (Thelander et al. 1994). Historically, this species bred in all regions of California, except the central and northern Sierra Nevada, the higher elevations of the Coast Ranges, the Great Basin, and the Colorado Desert. Populations in California currently exist along the upper Sacramento Valley portion of the Sacramento River, the Feather River, the south fork of the Kern River, and along the Santa Ana, Amargosa, and lower Colorado rivers (CDFG 2000).

It is estimated that 15,000 pairs bred in California historically; by 1977 that number had been reduced to approximately 150 pairs; by 1987, less than 45 nesting pairs were recorded statewide (Thelander et al. 1994). Habitat loss and degradation are the primary reasons cited for the decline (Grinnell and Miller 1944, Garrett and Dunn 1981 *in* CDFG 1990). Adverse impacts to cuckoo habitat have occurred as a result of urban and suburban development, agriculture, human disturbance, fire in riparian habitat, ORVs, livestock grazing, invasion of non-native plants (e.g. tamarisk and Arundo or giant reed), flood control projects, pumping of groundwater, and diversion of surface water (CDFG 2000). Pesticides have also been implicated in the decline. The use of chlorinated hydrocarbon insecticides (DDT) resulted in eggshell thinning; in fact, eggs collected in the early 1980s were 21% thinner than those measured prior to the 1940s, when the use of DDT became more widespread (Thelander et al. 1994). The western yellow-billed cuckoo was state-listed as threatened on June 27, 1971; it was redesignated as endangered on March 26, 1988 (CDFG 2000). The species is also considered a Forest Service Region 5 Sensitive Species (Stephenson and Calcarone 1999).

The cuckoo is associated with riparian gallery forests dominated by deciduous trees, such as willow and cottonwood, with a dense, low-level understory. Dense foliage, especially willows, is required for roosting sites (Bent 1940 *in* CDFG 1990; CDFG 2000). The cuckoo forages in cottonwood thickets, feeding primarily on grasshoppers, cicadas, caterpillars, and other larger insects from foliage; occasionally it preys on frogs, lizards, and bird eggs (CDFG 1990). In California, home range is approximately 42 acres, including a minimum of 7.5 acres closed-canopy, broad-leafed forest (Layman and Halterman 1987 *in* CDFG 1990).

The cuckoo is a monogamous bird; both sexes incubate and care for the young. The nest is typically built on the horizontal branch of a willow, in a hidden location. In California, breeding season begins in summer, with most eggs laid between mid-June and mid-July; clutch size averages 3-4 eggs (CDFG 2000). Yellow-billed and black-billed cuckoo often lay their eggs in the other's nest. Yellow-billed cuckoo eggs have also been documented in American robin, gray catbird, dickcissel, cedar waxwing, wood thrush, mourning dove, and red-winged blackbird nests (Harrison 1979 *in* CDFG 1990).

AREA DESCRIPTION

The yellow-billed cuckoo has not been recently documented in the Forests (Stephenson and Calcarone 1999). However, the species has been documented at various locations along the central and southern California coast, in relatively close proximity to the Forests (e.g. Prado Basin, lower San Luis Rey River, lower Santa Ysabel Creek above Lake Hodges). Although this species hasn't been seen in recent times, potential habitat does exist in the Forests (Garrett and Dunn 1981 *in* Stephenson and Calcarone 1999).

DESIRED CONDITION

To meet the desired condition of genetically viable populations of cuckoos, activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Restoration projects implemented in historically occupied habitat have encouraged colonization of those areas. Yellow-billed cuckoo populations are flourishing and expanding their breeding range; the birds are present in adequate numbers to sustain breeding populations on all 4 southern Forests.

OBJECTIVES

Protect, restore, and manage riparian and adjacent upland habitats.

Survey, monitor, and conduct research to track and aid in the recovery of the species. Conduct a forest-wide inventory of riparian habitat to identify additional and potential habitat within the historic range of the species on Forest Service lands (USFWS 1998e).

Develop and implement management plans to eliminate threats and promote desired processes that facilitate recovery of habitat.

Address major threats – unauthorized clearing of vegetation, placement of fill materials, ORV use, exotic species, sand and gravel mining, flood control projects, channelization, hiker and horse traffic, equestrian corrals, agriculture, water supply projects, grazing, dams (USFWS 1998e).

Implement riparian restoration projects within the current and historic range of the species, outside the breeding season.

Develop and evaluate restoration techniques and implement long-term monitoring of restoration sites and their use by riparian-dependent species, including invertebrates (USFWS 1998e).

Develop interagency agreements to implement management plans that restore and maintain a hydrologic regime that mimics natural cycles and flows.

Eradicate or control non-native invasive plant species using ecologically sound methods and starting eradication efforts upstream (USFWS 1998e). See section 10.0, *Invasive Species Management,* for more information.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and distribute multi-lingual educational material on the threats this species faces, and the necessary conservation measures (e.g. seasonal closures) for Forest visitors and Forest Service personnel.

STANDARDS

The Forest Service shall conduct annual monitoring in the Forests following established protocols.

The Forest Service shall prohibit further channelization of streams, including confinement of flow to concrete or rip-rap channels.

The Forest Service shall prohibit the use of mechanized equipment (e.g. bulldozers) in riparian zones. These serve to encourage exotic plant invasions.

The Forest Service shall minimize disturbance from prescribed burn activities within ¼ mile of all TES bird nest sites (USFWS 2001a).

Prior to any maintenance activities occurring in potentially occupied habitat, a qualified biologist shall conduct presence/absence surveys to determine that no listed birds are nesting.

The Forest Service shall prohibit maintenance activities in occupied habitat during the breeding season.

The Forest Service shall prohibit all ground-disturbing activities within key, modeled, and occupied TES riparian bird habitats that result in habitat loss or alteration (USFWS 2001).

The Forest Service shall modify land uses adjacent to breeding areas and exclude livestock and equestrian facilities (USFWS 1998e).

The Forest Service shall determine suitability of modeled habitat areas that are within or near developed recreation sites and grazing allotments and survey for occupancy where appropriate (USFWS 2001a). If the species is determined to be present, the Forest Service shall implement immediate measures to protect the species (including permanent and seasonal closures, permanent closure of allotments, etc.).

The Forest Service shall eliminate all grazing activities within key, occupied, and modeled habitat until thorough environmental assessments have been completed.

The Forest Service shall install signs, fencing, and/or other barriers for seasonally or permanently closed developed recreation areas occurring in occupied habitat (USFWS 2000c).

Section 8.59
SOUTHWESTERN WILLOW FLYCATCHER

ISSUE STATEMENT

Of the 3 subspecies of willow flycatcher in California—*Empidonax trailii brewsteri, Empidonax trailii extimus,* and *Empidonax trailii adastus*—only the southwestern willow flycatcher *(Empidonax trailii extimus)* occurs in southern California (Unitt 1987). The southwestern willow flycatcher is brownish-olive above with a whitish throat, pale olive breast, pale yellow belly, and two white wing bars; it lacks the conspicuous eye ring of the rest of the *Empidonax* flycatchers and has been confused with the western wood pewee (Sogge et al. 1997).

Southwestern willow flycatchers are neotropical migratory birds; they winter in Veracruz and Oaxaca, Mexico, and south to Panama (Ehrlich et al. 1988). The historic breeding range included southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico (USFWS 2001a). Historically, the bird occurred in virtually all lower-elevation riparian areas in southern California (USFWS 2001a).

Currently, there is a maximum of 120 known flycatcher territories in coastal southern California in 11 watersheds, including Santa Ana, Pilgrim Creek, Santa Margarita, San Luis Rey, San Timeteo Creek, Santa Clara, Santa Ynez, Sweetwater, San Diequito, and Temecula Creek, as well as a number of territories in inland southern California, on the Colorado, Owens, Mojave and Kern rivers (USFWS 2001f). Most breeding sites harbor fewer than 5 territories and are widely separated. Relatively large populations (>10 territories) occur on the San Luis Rey, Santa Margarita, and Santa Ynez Rivers *(*USFWS 2001f*).* Range-wide, there are only approximately 550-915 territories spread across 100 sites in 6 states, demonstrating the flycatcher's critical status (Marshall 2000, USFWS 2001f).

The primary causes for the decline of the southwestern willow flycatcher are loss and degradation of riparian habitat due to urban, recreational, and agricultural development, water diversions, impoundments, and channelization, exotic plant invasion, and domestic livestock grazing (Garrett et al. 1981; Sogge et al. 1997). These factors continue to threaten the survival of the flycatcher (Greenwald 1998, Marshall and Stoleson 2000). For example, livestock grazing is ongoing at approximately half of all occupied sites (Greenwald 1998). Other factors that contributed significantly to the decline include fire and brown-headed cowbird parasitism (Serena 1982). Cowbird parasitism, particularly in the lowland populations, is considered to have heavily impacted nesting success (Grinnell and Miller 1944; Gaines 1977). However, at many sites where cowbird trapping has occurred for numerous years, southwestern willow flycatcher populations have not recovered. In addition, unlike the least Bell's vireo *(Vireo bellii pusillus)*, willow flycatchers appear to have several defense mechanisms to offset cowbird attempts to parasitize nests (e.g. they may bury eggs, they may abandon parasitized nests and then renest, etc.). Along the Kern River, cowbird trapping appears to have produced some initial benefit; however, that local population has been in decline over the past few years even with trapping, so it is difficult to determine the specific effects of cowbird trapping. The two primary reasons for the willow flycatcher's failure to recover are the isolation of current meta-populations from suitable nearby habitats of appropriate breadth and composition, and attendant disturbance to even those areas that have been restored or protected (e.g. by failure to provide for buffer zones and open areas to forage near potential nest areas) (W. Haas, pers. comm.). The southwestern willow flycatcher *(Empidonax trailii extimus)* was federally listed as endangered on March 29, 1995 (USFWS 1995). Critical habitat was designated July 2, 1997.

Southwestern willow flycatchers require dense riparian vegetation for nesting, foraging, and roosting, often consisting of willow (*Salix* spp.) with an overstory of cottonwood (*Populus* spp.) or alder (*Alnus* spp.) (CDFG 1990; USFWS 2001f). They are primarily insectivores, but occasionally eat berries and seeds (Ehrlich et al. 1988; USFWS 1995). Male southwestern willow flycatchers arrive on breeding grounds between late April and early June, with females arriving on a schedule delayed between 1 and 2 weeks of the male arrival dates. Adults and fledglings remain, in general, in breeding areas into early September; migrants are seen in California through the middle of September (CDFG 1990). Migrating willow flycatchers occur in habitats like those they breed in, as well as in desert washes and oases and open canyon woodlands near watercourses (Small 1994).

AREA DESCRIPTION

Southwestern willow flycatchers are known to occur in the LPNF, CNF, and SBNF. Comprehensive distribution or abundance surveys have not been completed for all potential areas in each Forest (USFWS 2000c).

LOS PADRES NATIONAL FOREST

Solitary southwestern willow flycatchers have been documented in the upper Santa Ynez River drainage, within the Mono-Gibraltar area of the Santa Barbara District. All sightings have been recorded as migrants and to date no nesting has been observed (USFWS 2000c).

CLEVELAND NATIONAL FOREST

Pine Valley and Cottonwood Creek (Descanso District)—Adult southwestern willow flycatchers have been recorded southeast of Pine Valley outside National Forest Service land boundaries on private land. The Forest Service has conducted surveys in both Pine and Cottonwood creeks (I995, 1997, 1998) but no southwestern willow flycatchers were detected (USFWS 2000c).

San Luis Rey River (Palomar District) – This is part of the largest meta-population in the state of California, and one of the most important populations rangewide due to the sheer number of birds and the high reproductive rates of greater than 60% (W. Haas, in press). Since 1993, between 11 and 15 pairs of southwestern willow flycatchers have annually occupied Forest Service lands along the upper San Luis Rey River. During that time period between 41 and 49 pairs have been documented along the entire 7.6-kilometer length of occupied habitat that includes the forest lands (Haas, *ibid*.).

SAN BERNARDINO NATIONAL FOREST

Mill Creek – The only known nesting site on Mill Creek is in the Thurman Flats Picnic area in the developed picnic site and within 32 feet of the main trail; occurrences were reported in 1996 and 1997 (USFWS 2000c).

A second nesting site for southwestern willow flycatchers was recently discovered in meadow/willow habitat in the SBNF above the Seven Oaks Resort near the Santa Ana River (USFWS 2000c).

ANGELES NATIONAL FOREST

No southwestern willow flycatchers are known to exist in the ANF (USFWS 2000c). However, they have been detected in summer along San Francisquito Canyon and Soledad Canyon along the Santa Clara River just north of National Forest Service lands (USFWS 2001a).

TABLE 8-59

KEY, OCCUPIED, AND MODELED HABITAT IN THE FORESTS

(USFWS 2001a)

	LOS PADRES	ANGELES	SAN BERNARDINO	CLEVELAND
KEY		1,288	3,261	226
OCCUPIED			31	
MODELED	136,871	48,401	39,376	31,907

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Southwestern willow flycatchers are flourishing and expanding their breeding range; they are present in adequate numbers to sustain breeding populations on all 4 southern Forests.

OBJECTIVES

Increase and improve occupied, suitable, and potential habitat.

Work with private landowners, state agencies, municipalities, and nongovernmental organizations to conserve and enhance habitat (USFWS 2001f).

Increase meta-population stability and improve demographic parameters (USFWS 2001f).

Survey, monitor, and conduct research to track and aid in the recovery of the species (USFWS 2001f).

Determine habitat characteristics in occupied sites including plant species composition and structure, habitat area needed, and effects of conspecifics on occupancy and reproductive success (USFWS 2001f). Incorporate information into restoration projects.

Provide technical assistance to conserve and enhance occupied habitats on non-federal lands within the boundaries (inholdings) or adjacent to National Forest Service lands (USFWS 2001f). See section 17.0, *Land Protection Opportunities*.

Increase size, number, and distribution of population by fully protecting all existing breeding sites and restoring habitat near extant populations (USFWS 2001f).

Work to facilitate dispersal and establishment of new populations in historically occupied areas through restoration. Enhance connectivity to currently isolated occupied sites, and restore and expand riparian migration and stopover habitat on National Forest Service lands (USFWS 2001f).

Manage biotic elements and processes to restore biotic interactions and natural disturbance regimes (USFWS 2001f).

Develop interagency agreements with appropriate agencies to mimic natural fluvial processes by modifying dam operating rules and operations to maximize downstream habitat (USFWS 2001f).

Identify projects to restore adequate hydrogeomorphic elements (i.e., expand river channels, flow zones, and connectivity) (USFWS 2001f). Identify and initiate specific projects in key areas within 5 years.

Manage existing dams to preserve native riparian habitat. This can be accomplished by timing flooding above and below dams to cohere to the habitat requirements of cottonwood and willow (Greenwald 1998).

Restore groundwater, base flows, and flood flows to encourage scouring events and natural community regenerative processes (USFWS 2001f)

Within 5 years, analyze the removal of all diversions, dams, and impoundments that are decreasing the extent and suitability of southwestern willow flycatcher habitat.

Work to establish in-stream flow rights for all rivers and streams in the Forests. In-stream flow rights will protect against over-utilization by groundwater pumping, water diversion, and urban sprawl, and will allow for the maintenance and restoration of large blocks of native riparian habitat.

Develop fire management plans to maintain and enhance habitat quality and quantity, including steps to reduce flammable exotics (USFWS 2001f).

Prohibit activities in key and occupied habitat that would result in habitat loss or alteration (USFWS 2001a).

Develop and implement management plans to eliminate threats to the southwestern willow flycatcher and cohabiting species and promote desired processes that facilitate recovery of habitat (USFWS 2001f).

Increase reproductive success by managing brown-headed cowbird parasitism through the implementation of a comprehensive trapping program to pursue long-term landscape objectives for cowbird reduction. Exterminate adult and juvenile cowbirds using the most humane method (USFWS 2001f).

Develop and distribute multi-lingual educational materials on the ecology of the species, the threats it faces, and the necessary conservation measures for Forest visitors and Forest Service personnel.

Implement goals and objectives of the southwestern willow flycatcher recovery plan once it is finalized.

STANDARDS

The Forest Service shall determine present and historical distribution of southwestern willow flycatcher and integrate recovery efforts with those of other riparian obligate species (USFWS 2001f).

The Forest Service shall conduct comprehensive surveys in all areas on the 4 southern Forests known to historically support southwestern willow flycatcher to determine (1) if any additional populations exist; (2) if suitable habitat exists; and (3) which historic localities are in need of restoration.

The Forest Service shall institute a comprehensive annual monitoring program, using established protocols, in all key, occupied, and modeled habitat and integrate survey data at the state and regional levels (USFWS 2001f).

The Forest Service shall monitor and evaluate compliance with Biological Opinions and effects of management and restoration practices, and review data to improve effectiveness through adaptive management (USFWS 2001f)

The Forest Service shall prohibit flood-control activities that destroy or degrade limited riparian habitat. Flood-control activities, such as channelization and construction of levees or dams, are a direct threat to existing and potential flycatcher habitat.

The Forest Service shall minimize disturbance from prescribed burns within ¼ mile of key, occupied, or modeled habitat (USFWS 2001a). See section 2.0, *Fire Management*.

The Forest Service shall permanently retire all vacant grazing allotments in the Forests. See section 25.0, *Domestic Livestock Grazing*.

The Forest Service shall conduct environmental assessments on each grazing allotment that overlaps key, occupied, and modeled habitat. Eliminate potential impacts from livestock grazing to southwestern willow flycatcher by reductions in allotment sizes, non-renewals of permits, and excluding grazing in riparian habitat and other sensitive areas.

The Forest Service shall prohibit domestic livestock grazing in riparian areas, including all potential, suitable, and occupied southwestern willow flycatcher habitat. Modeled habitat is considered occupied until proven otherwise. On the San Jacinto Range, grazing allotments occur on 7,124 acres (51%) of modeled habitat (USFWS 2001a).

The Forest Service shall eliminate feeding sources for cowbirds. Activities that provide feeding areas for cowbirds, such as domestic livestock grazing, shall be prohibited in at least a 5-mile radius adjacent to current flycatcher populations or in areas targeted for restoration of populations and habitat (Greenwald 1998).

The Forest Service shall develop exotic species management plans and eliminate factors that favor exotics (USFWS 2001f). See section 10.0, *Invasive Species Management*.

The Forest Service shall provide protection and reduce recreational impacts to occupied areas through permanent or seasonal closures and restore habitat impacted by recreational activities (USFWS 2001f).

The Forest Service shall institute area closures, seasonal closures, and facility closures in all occupied and key habitat and install barriers to ensure closures (USFWS 2001a).

The Forest Service shall seasonally close roads to regular vehicles and ORVs, as well as bicycle, horse, and foot traffic during critical times of the year in key, occupied, and modeled habitat.

The Forest Service shall prohibit construction of new facilities in key, occupied, or modeled habitat (USFWS 2001a).

The Forest Service shall ensure implementation of laws, policies, and agreements that benefit the flycatcher (USFWS 2001f).

Section 8.60

COASTAL CALIFORNIA GNATCATCHER

ISSUE STATEMENT

The coastal California gnatcatcher *(Polioptila californica californica)* is a small, non-migratory, dark blue-gray songbird. Distinguishing characteristics include the black underside of the tail with a white line on the outer tail feather and a

white eye-ring. Males are slightly larger than females but are nearly identical during the winter; however, during the breeding season males develop a distinctive black cap.

Historically, the coastal California gnatcatcher ranged from southern coastal Ventura County to Los Angeles, Orange, San Diego, San Bernardino, and Riverside counties (USFWS 1993). Suitable habitat in the historic range of the species has been severely reduced and fragmented by urbanization and agricultural development (USFWS 1993). By the 1960s, researchers considered this species rare. It is estimated that approximately 80% of historic habitat has been destroyed or modified (Atwood 1980, 1988; Unit 1984 in USFWS 2000c). Due to the elimination and fragmentation of habitat, remaining populations may become genetically isolated due to the increased difficulty in juvenile dispersal (Atwood 1980 in USFWS 2000c).

The coastal California gnatcatcher was federally listed as threatened on March 30, 1993 (58 FR 16742); it is also a State Species of Special Concern. Critical habitat was designated on October 24, 2000 (65 FR 63680). Currently, the species is restricted to scattered locations in Los Angeles, Orange, San Diego and Riverside counties; populations in Ventura and San Bernardino counties have been extirpated (USFWS 1993).

This species requires moderately dense stands of coastal sage scrub for nesting and foraging; coastal sage scrub communities dominated by California sagebrush, California buckwheat, and white sage seem to be preferred. The species is insectivorous, with 98% of the diet containing beetles, wasps, bugs, and caterpillars, flies, grasshoppers, and spiders (Ehrlich et al. 1988). It is very territorial, especially during the breeding season, with home ranges varying in size from 14 to 39 acres (USFWS 1993). The breeding season usually begins in March and extends through June; two broods may be reared per season. Nests are placed within a few meters of the ground in thick stands of sage or California buckwheat (Atwood 1980; Bent 1949 in USFWS 2000c; Ehrlich et al. 1988). Outside of the breeding season this species is known to utilize a wide variety of habitats, but usually near the breeding territory.

AREA DESCRIPTION

Critical habitat in the Forests includes portions of the SBNF along the foothills of the San Gabriel Mountains and portions of the CNF along the upper San Diego River and western foothills of the Santa Ana Mountains (USFWS 2001a).

Recent sightings at Sycamore Flat (near Lytle Creek), at the confluence of Lytle Creek and Cajon Wash, and on the Etiwanda Fan indicate that a possible population may exist along the lower foothills of the eastern San Gabriel Mountains that may extend onto the SBNF and ANF. Historically, the species was common in these areas. Gnatcatchers also potentially occur on the lower western slopes of the San Jacinto Mountains. Critical habitat occurs along the foothills of the San Gabriel Mountains and within the Jurupa Hills; 58,800 acres overlaps the SBNF and Norton Air Force Base (USFWS 2001a).

The CNF population occurs in the upper portion of the San Diego River watershed. On the Palomar Ranger District, a population of 30 pairs is located in the upper San Diego River valley, and 2 are located in the northern portion of Pamo Valley. On the Trabuco Ranger District, potential habitat exists along the eastern and western margins of the district, including portions of Black Star and the Verdugo range allotments. Two pairs were recorded near the San Juan fire station (USFWS 2001a).

The upper San Diego River occurrence is largest population on National Forest Service lands; it has been proposed as a Research Natural Area (USFWS 2001a).

TABLE 8-60

KEY, OCCUPIED, AND MODELED HABITAT IN THE FORESTS

(USFWS 2001a)

	LOS PADRES	ANGELES	SAN BERNARDINO	CLEVELAND
KEY		1,457	2,180	9,515
OCCUPIED				240
MODELED		8,163	1,153	25,844

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Coastal California gnatcatchers are flourishing and expanding their current range; they are present in adequate numbers to sustain breeding populations on all 4 southern Forests.

OBJECTIVES

Protect and manage coastal sage scrub habitats within the gnatcatcher's current and historic range for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Identify additional and potential habitat within the historic range of the species in the Forests.

Investigate the status of breeding habitat and identify and address current or potential threats.

Prohibit all ground-disturbing activities within key, modeled, and occupied habitat that result in habitat loss or alteration.

Prevent type-conversion of key and occupied California gnatcatcher habitat via fuel management activities (e.g. conversion of coastal sage to annual grasslands). Consider in California gnatcatcher modeled habitat (USFWS 2001a).

Conduct research on the gnatcatcher's existing and historical habitat.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Provide public information and education.

STANDARDS

The Forest Service shall conduct annual monitoring of coastal California gnatcatcher populations and habitat following established protocols.

Other than for scientifically justifiable purposes, the Forest Service shall prohibit fuel treatments in coastal sage scrub within the range of the coastal California gnatcatcher, except for fire clearance around structures and on fuelbreaks (USFWS 2001a).

The Forest Service shall minimize disturbance from prescribed burn activities within ¼ mile of all TES bird nest sites (USFWS 2001a).

The Forest Service shall determine suitability of modeled habitat areas that are within or near developed recreation sites and grazing allotments, and survey for occupancy where appropriate (USFWS 2001a). If the species is determined to be present, the Forest Service shall implement immediate measures to protect the species (including permanent and seasonal closures, permanent closure of allotments, etc.).

The Forest Service shall address high levels of dispersed recreation use in the upper San Diego River and Cedar Creek Falls Area. Close those areas during the breeding season and monitor to ensure closure.

The Forest Service shall eliminate all grazing activities within occupied and modeled habitat until thorough environmental assessments have been completed. See section 25.0, *Domestic Livestock Grazing*.

The Forest Service shall, in San Diego Ranges, in CNF, eliminate domestic livestock grazing in allotments covering 30 acres of known occupied habitat. Conduct assessments on 3,435 acres of modeled habitat (USFWS 2001a).

The Forest Service shall permanently close or reroute trails known to occur in occupied habitat. Identify unauthorized trails, and permanently close and revegetate trails in occupied, key, or modeled habitat.

The Forest Service shall install signs, fencing, and/or other barriers for seasonally or permanently closed developed recreation areas occurring in occupied habitat (USFWS 2000c).

Forest Service maintenance activities shall be prohibited in occupied habitat during the breeding season.

The Forest Service shall, prior to any maintenance activities occurring in potentially occupied habitat, have a qualified biologist conduct presence/absence surveys to determine that no listed birds are nesting.

Section 8.61
LEAST BELL'S VIREO

See section 7.0, *Management Indicator/Focal Species*, and section 7.6, *Least Bell's Vireo*, for specific objectives and standards for this listed species.

Section 8.62
SAN JOAQUIN ANTELOPE SQUIRREL

ISSUE STATEMENT

The San Joaquin antelope squirrel (*Ammospermophilus nelsoni*) is light brown, with a distinctive white stripe on its sides; its tail is light gray or whitish on the underside, relatively short, and is typically held vertically when sitting or curled over the back when running. The ears are small and rounded, and the antelope squirrel has relatively short legs (USFWS 1998e). This species is smaller in size than the California ground squirrel (*Spermophilus beecheyi*), measuring 218-240 mm (8.6-9.4 inches) in length, and weighing a mere 130-170 grams (4.6-6.0 ounces) (Brown and Williams, undated material).

Historically, this species ranged from northwestern Merced and eastern San Benito counties south to the northern border of Santa Barbara County; their distribution included the western and southern portions of the Tulare Basin, San Joaquin Valley, and contiguous areas to the west in the upper Cuyama Valley, and on the Carrizo and Elkhorn Plains (USFWS 1998e). Recorded occurrences encompassed approximately 1,398,600 hectares (3,456,000 acres) prior to cultivation; by 1979, it was reduced to an estimated 275,200 hectares (680,000 acres), of which only 41,300 hectares (102,000 acres) was considered fair to good-quality habitat (USFWS 1998e; Brown and Williams, undated material). As of 1979, substantial populations were still extant in areas around Lokern and Elk Hills in western Kern County and on the Carrizo and Elkhorn Plains in eastern San Luis Obispo County. However, since 1979, many of the populations in the smaller habitat patches on the Valley floor have been extirpated (Brown and Williams, undated material).

Outright destruction, degradation, and fragmentation of habitat as a result of agricultural developments, urbanization, petroleum extraction, and livestock grazing are the principal reasons cited for the decline. In addition, the use of rodenticides for ground squirrel control has resulted in direct mortality, and the use of insecticides indirectly impacts the species by reducing its prey base (USFWS 1998e; Brown and Williams, undated material). The species was designated as threatened by the State of California in 1980, and is considered a federal species of concern (USFWS 1998e).

This small ground-dwelling squirrel inhabits the arid grassland, shrubland, and alkali sink habitats of the San Joaquin Valley and adjacent foothills (Brown and Williams, undated material; USFWS 1998e). Characteristic habitat is distributed over broken terrain with small gullies and washes, and is composed of widely scattered shrubs, annual forbs, and grasses (CDFG 1983e). The squirrels live in burrows that either they or kangaroo rats (*Dipodomys* spp.) construct; nests are usually associated with shrubs such as Atriplex or Ephedra (Brown and Williams, undated material; CDFG 1983e). They are omnivores whose diets consist of green vegetation, fungi, seeds, and more commonly, insects (Brown and Williams, undated material). They are active year-round, mostly diurnally, but retreat to their burrows to avoid hot midday temperatures; adults may aestivate in summer, but most young squirrels remain active (CDFG 1983e).

The antelope squirrel lives in family groups and breeds from late winter to early spring; young are born between March and April. The young emerge from the burrows at about 30 days of age (Brown and Williams, undated material); timing, nature, and distance of dispersal are poorly understood (USFWS 1998e).

AREA DESCRIPTION

Although there are no documented occurrences in the Forests, the antelope squirrel's range approaches and possibly extends onto LPNF, along the upper margins of the Cuyama Valley (Stephenson and Calcarone 1999). Additional surveys

are needed to conclusively determine the presence or absence of this species in LPNF.

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. San Joaquin antelope squirrels are flourishing and expanding their current range into historically occupied habitat.

OBJECTIVES

Identify, protect, and manage habitats within the current and historic range for the benefit of the species.

Preserve and protect populations identified in surveys. See section 17.0, *Land Protection Opportunities*.

Develop, implement, and evaluate a San Joaquin antelope squirrel population monitoring protocol.

Conduct or encourage and support research on the timing, nature, and distance of dispersal.

Eliminate activities that threaten the conservation and recovery of the species and prohibit the destruction of occupied and potential habitat.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and implement a multi-lingual public outreach program designed to inform Forest Service visitors and employees of the species' ecological requirements, the threats it faces, and necessary conservation measures.

STANDARDS

The Forest Service shall obtain baseline information on the presence or absence of this species in the Forests and surrounding areas, including distribution and abundance; the Forest Service shall inventory all potential habitat on the Forests.

The Forest Service shall evaluate livestock grazing allotments to identify adverse impact to the species, and develop and implement conservation measure to eliminate impacts. See section 25.0, *Domestic Livestock Grazing*.

The Forest Service shall prohibit petroleum extraction in occupied or potential habitat. See section 26.0, *Oil and Gas Drilling*.

The Forest Service shall prohibit rodent control efforts and prevent the use of rodenticides and other pesticide use in occupied and potential habitat.

Section 8.63

MOHAVE GROUND SQUIRREL

ISSUE STATEMENT

The Mohave ground squirrel (*Spermophilus mohavensis*) has a pinkish-cinnamon or brownish-gray upper coat with a cream-colored belly. Its body measures about 9 inches long, but the tail adds an additional 2-3 inches.

This small burrowing mammal is rare throughout its range. It is restricted to the western Mojave Desert, occurring in the northwestern portion of San Bernardino County, the extreme northeastern section of Los Angeles County, and also in eastern Kern and southwestern Inyo counties. Populations in southwestern San Bernardino County appear to be extirpated (CDFG 1990).

The squirrel is threatened by the loss and degradation of its habitat due to agriculture, military activities, livestock grazing, ORVs, and urban, suburban, and rural development. This species was state-listed as threatened on June 27, 1971; critical habitat has not been designated. Since 1984, Kern officials have argued that the Mohave ground squirrel population may not warrant current listing status. However, CDFG maintains that the continued destruction and fragmentation of the species' habitat warrants the squirrel's state listing as a threatened species (Thelander 1994). The CDFG in conjunction

with the U.S. Department of the Interior Bureau of Land Management and the U.S. Fish and Wildlife Service are in the process of developing the West Mojave Desert Coordinated Management Plan, which the squirrel and the desert tortoise should benefit from.

Optimal conditions for this species are found in open desert scrub habitats, which include alkali desert scrub, saltbush scrub, and Joshua tree woodland, though it also utilizes annual grasslands for foraging. It prefers open terrain with loose, sandy to gravelly soils and avoids steep slopes or rocky areas (CDFG 1990). The Mohave ground squirrel forages on the ground or in shrubs and Joshua trees, and caches food underground; the primary diet consists of a wide variety of green vegetation, seeds, and fruits (CDFG 1990).

The squirrels emerge from their burrows between mid-February and March, after a 7-month summertime dormancy. Young are born from March to May with a peak in April. Litter size is usually 4-6. Nests are built in the burrow system (CDFG 1990).

Home range size averages 0.91 acres with home range boundaries including the outer extent of the burrow system (Recht 1977). Burt (1936) estimated density at 15-20 animals per square mile. The species defends most of the home range, with little overlap between home ranges (Recht 1977).

AREA DESCRIPTION

This species has not been documented on National Forest land; however, potential habitat exists. Currently, the known distribution of this species is in the Mojave Desert, north of the San Gabriel and San Bernardino mountains (Best 1995 *in* Stephenson and Calcarone 1999). Historical records place the species in Apple Valley and Lucerne Valley, which are close to the San Bernardino Mountains where potential habitat exists (Whitaker 1991 *in* Stephenson and Calcarone 1999).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in historically occupied habitat have encouraged immigration to those areas. Mojave ground squirrels are flourishing and expanding their current range into historically occupied habitat.

OBJECTIVES

Identify, protect, and manage habitats within the current and historic range for the benefit of the species.

Develop, implement, and evaluate a Mohave ground squirrel population monitoring protocol.

Eliminate activities that could adversely impact the species or its habitat.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and implement a multi-lingual public outreach program designed to inform Forest Service visitors and employees of the species' ecological requirements, the threats it faces, and necessary conservation measures.

STANDARDS

The Forest Service shall obtain baseline information on the distribution and abundance of the Mojave ground squirrel in the Forests and surrounding areas; preserve and protect these populations.

The Forest Service shall evaluate livestock grazing allotments to identify adverse impacts to the species; develop and implement conservation measure to eliminate impacts.

The Forest Service shall eliminate activities that threaten the conservation and recovery of the species and prohibit the destruction of occupied and potential habitat.

The Forest Service shall prohibit rodent control efforts and prevent the use of rodenticides and other pesticide use in occupied and potential habitat.

PACIFIC POCKET MOUSE

ISSUE STATEMENT

The Pacific pocket mouse (*Perognathus longimembris pacificus*) has silky brown to pinkish-buff fur on top, and whitish fur below; it has external fur-lined cheek pouches (Hall 1981 *in* USFWS 1998f). There are typically two small patches of lighter hairs at the base of the ear, and the tail is bicolored. Of the little pocket mice, this is the smallest subspecies, ranging up to 5.2 inches in its entirety, and weighing only 0.25 to 0.33 ounce.

The Pacific pocket mouse is 1 of 19 recognized subspecies; it is endemic to coastal southern California. Historically it ranged from Marina del Rey and El Segundo in Los Angeles County south to the vicinity of the Mexican border in San Diego County (Hall 1981; Williams et al. 1986; Erickson 1993 *in* USFWS 1998f). There are 3 historic records of this species from Los Angeles County, though it has not been recorded in that county since 1938. In Orange County, there are 2 confirmed occurrences: the San Joaquin Hills and Dana Point Headlands; it is extant at the Dana Point site. In San Diego County, there are 4 historic localities: San Onofre, near the Santa Margarita River Estuary, Penasquitos Lagoon, and the Lower Tijuana River Valley (Erickson 1994; Erickson 1998 *in* USFWS 1998f). Two additional populations were discovered on Camp Pendleton in 1995, one in the vicinity of San Mateo Creek, and one just north of the Santa Margarita River, which are considered extant (USFWS 1998f).

Populations of this species suffered precipitous declines from the 1940s to the 1960s, as a result of extensive coastal development and highway construction (Thelander et al. 1994). The primary factors that led to the decline continue to threaten the species: destruction, degradation, and fragmentation of habitat due to urban, suburban, and agricultural development. Other threats include but are not limited to vegetation clearing and trampling, ground manipulation, fire and fuel abatement, dumping/littering, bicycles, ORVs, pets, exotic plants and animals, and trails (USFWS 1998f). This subspecies was considered extinct, having last been recorded in 1971, until it was rediscovered in 1993 in Orange County (Thelander et al. 1994). The Pacific pocket mouse was emergency listed in February of 1994 (59 FR 5306); the USFWS listed the subspecies as federally endangered in September of 1994 (USFWS 1998f). The USFWS has yet not designated critical habitat.

This species has been recorded in a variety of habitat types including coastal strand, coastal dunes, river alluvium, and coastal sage scrub on marine terraces; however, all recent occurrences have been in coastal sage scrub. Characteristic habitat includes fine-grain, sandy or gravelly substrates. During the winter, this species may reside in burrows for up to 5 months, switching between periods of dormancy and feeding on stored seeds (Thelander et al. 1994). This nocturnal granivore feeds primarily on seeds, with leafy vegetation and insects comprising only a small portion of the diet (Thelander et al. 1994). Reproduction is largely dependent on the availability of green vegetation, but typically this subspecies breeds from April through July.

AREA DESCRIPTION

This species is not expected to occur in the Forests, since known locations have been within 2.5 miles of the coast and below 600 feet in elevation (Stephenson and Calcarone 1999). However, protocol surveys have not been conducted in the Forests to identify potential habitat, or to confirm the presence or absence of this species.

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in connectivity zones and historically occupied habitat have encouraged immigration to those areas. Pacific pocket mice are flourishing and expanding their current range; they are present in adequate numbers to sustain breeding populations throughout their historic range.

OBJECTIVES

Identify, protect, and manage habitats within the current and historic range of the Pacific pocket mouse for the benefit of the species.

Conduct or encourage and support research on life history, ecology, and population biology of the Pacific pocket mouse, particularly habitat relations and diet (USFWS 1998f).

Prepare and implement species and habitat management plans (USFWS 1998f).

Enhance and expand habitat, select target sites for restoration, and evaluate and monitor the success of habitat restoration efforts (USFWS 1998f).

Work with the USFWS to identify and implement measures to create additional populations (USFWS 1998f).

The Forest Service (CNF) will work with Camp Pendleton to develop a participation plan to implement specific recovery tasks (USFWS 1998f).

Distribute information on recovery plan actions and results to appropriate agencies, jurisdictions, landowners, land managers, and other interested parties (USFWS 1998f).

Integrate implementation of a recovery plan with local agencies, including appropriate NCCP lead agencies (USFWS 1998f).

Eliminate or control exotic plants (exotic grasses and forbs) in potential coastal sage scrub habitat (USFWS 1998f). See section 10.0, *Invasive Species Management*.

Evaluate Argentine ant invasions in existing and potential habitat (USFWS 1998f).

Eliminate activities that threaten the conservation and recovery of the species and prohibit the destruction of potential habitat in the Forests.

Work to control depredation by house and feral cats and other exotic predators. Establish management plans that will minimize and preferably prevent the effects of such predation; research potential and known predator ecology (USFWS 1998f).

Evaluate the role of fire and fire management (USFWS 1998f). Protect occupied and potential habitat for Pacific pocket mice from fire and fire abatement measures (USFWS 1998f). See section 2.0, *Fire Management*.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and implement multi-lingual educational pamphlets on the ecology of the species, the threats it faces, and the necessary conservation measures.

STANDARDS

The Forest Service shall identify and protect all potential habitat; undertake surveys to locate unknown populations and potential habitat in the Forests (USFWS 1998f).

The Forest Service shall prohibit rodent control efforts and prevent the use of rodenticides and other pesticide use.

The Forest Service shall fence occupied Pacific pocket mouse habitat where necessary (USFWS 1998f).

The Forest Service shall evaluate effects of artificial night-time lighting on Pacific pocket mice (USFWS 1998f).

Section 8.65

GIANT KANGAROO RAT

ISSUE STATEMENT

The giant kangaroo rat (*Dipodomys ingens*) is the largest of the kangaroo rats, weighing from 4.6 to 6.4 ounces. The total length is 12 to 13 inches, including a tail that is 6 to 8 inches long. The tail is longer than the combined head and body length and has a tuft of long hair at the end. The giant kangaroo rat has large hind limbs for which it is adapted for bipedal locomotion. It has a short neck with a large flattened head, and large eyes. It is buff-colored above with a white belly, with a white hip stripe (Thelander 1994).

Historically, this species was widespread over hundreds or thousands of acres of continuous habitat from northeastern

Santa Barbara County and western Kern County, from the base of the Tehachapi Mountains northward to an area near Los Banos in Merced County. Historically occupied habitat is estimated at 1,561,017 acres. Currently this species is restricted to very small and scattered populations within its former range, with the largest extant colony occurring on the Carrizo Plain (Thelander 1994). Extant habitat is estimated at 27,540 acres, roughly 1.8% of historic habitat, covering 6 major geographic units. Units in southern San Joaquin Valley include Kettleman Hills in Kings County, and western Kern County in the area of Lokern, Elk Hills, and other uplands around McKittrick, Taft, and Maricopa (USFWS 2001a).

The conversion of native habitat to agricultural uses remains the greatest threat to the species; as much as 98% of historically occupied habitat has already been lost as a result. However, the use of rodenticides has also contributed to the decline. The species was federally listed as an endangered species on January 5, 1987, and was state-listed as endangered on October 2, 1980. No designation of critical habitat has been issued by the USFWS; however, this species is covered in the Recovery Plan for Upland Species of the San Joaquin Valley (USFWS 1998e).

The species is found on a variety of soil types and on slopes up to 22% and 2,850 feet above sea level. It prefers fine sandy loam soils, supporting sparse annual grasses and forbs on gentle slopes; it may be found in low-density alkali desert scrub. The seeds of peppergrass and filaree are primary foods of giant kangaroo rats. Seeds are buried in small, shallow holes in winter and spring where they are dried and later cached in the burrows (Shaw 1934). Green vegetation also is consumed, especially in spring (Shaw 1934).

Williams (1980) reported a population density of 21 individuals per acre. Giant kangaroo rats have a territory range, which is known as a precinct, that averages 20 feet in diameter, centered on a 12-inch-deep burrow system. Each kangaroo rat maintains and defends an individual territory in a colony that may consist of two to thousands of precincts (CDFG 2000). The species breeds from January to May with peak activity probably occurring in early spring. The young are born and reared in the burrows (CDFG 1990).

AREA DESCRIPTION

More survey work is needed to fully assess the probability of occurrence and range of the species in the LPNF and at the fringes of suitable habitat in the valleys below (Stephenson and Calcarone 1999). The species has not been recorded in the Forests, but potential habitat occurs in LPNF adjacent to Cuyama Valley. The USFWS has identified 1,819 acres of modeled habitat in LPNF, of which grazing allotments overlap 1,668 acres (USFWS 2001a).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in connectivity zones and historically occupied habitat have encouraged immigration to those areas. Giant kangaroo rats are flourishing and expanding their current range; they are present in adequate numbers to sustain breeding populations throughout their historic range.

OBJECTIVES

Identify, protect, and manage habitats within the current and historic range of the giant kangaroo rat for the benefit of the species.

Develop, implement, and evaluate a population monitoring protocol; monitor populations annually.

Develop a long-term program to periodically monitor populations range-wide to better understand the ecology of the species (USFWS 1998e).

Conduct or encourage research on the species ecology, habitat management, and restoration.

Identify and protect additional land supporting key populations by acquisition of title, conservation easement, or other mechanisms (USFWS 1998c). See section 17.0, *Land Protection Opportunities*.

Investigate how fire management can enhance kangaroo rat habitat and shall conduct prescribed burns as appropriate. See section 2.0, *Fire Management*.

Eliminate activities that threaten the conservation and recovery of the species and prohibit the destruction of occupied and potential habitat.

Conduct research on effects of livestock grazing on the species, including effects on habitat quality, and the potential for habitat restoration on retired allotments. See section 25.0, *Domestic Livestock Grazing*.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and implement a multi-lingual public outreach program designed to inform visitors and Forest Service employees of the species' ecological requirements, the threats it faces, and necessary conservation measures.

STANDARDS

The Forest Service shall obtain baseline information on the distribution and abundance of the species in the Forests and in surrounding areas; preserve, protect, and monitor these populations.

The Forest Service shall prohibit rodent control efforts and prevent the use of rodenticides and other pesticide use.

The Forest Service shall prohibit ORVs in occupied and historic habitat and enforce closures.

Section 8.66

STEPHENS' KANGAROO RAT

ISSUE STATEMENT

The Stephens' kangaroo rat (*Dipodomys stephensi*) has a dusky, cinnamon-buff overcoat with a pure white undercoat. It has a large head and eyes, a hip stripe, and a crested bicolor tail. As their name implies, they have large hind limbs, which enable them to bounce across the soil; they use their tail for balance. The average adult weights approximately 2 ounces and measures 9-12 inches from head to tail (Thelander et al. 1994).

The geographical distribution of the Stephens' kangaroo rat ranges from San Jacinto Valley and adjacent areas of western Riverside to southwestern San Bernardino and northwestern San Diego counties. Although historically present, Stephens' kangaroo rat may no longer inhabit San Bernardino County (USFWS 1997bb). In San Diego County, documented populations occur at Camp Pendleton, Fallbrook Naval Weapons Station, around Lake Henshaw near Warner Springs, and in the Guejito and Santa Maria Valleys (USFWS 2001a). Much of this species' historical range has been eliminated and what remains is highly fragmented; it is unlikely that the smaller fragments will be able to support the species indefinitely (USFWS 1997bb).

The decline of the Stephens' kangaroo rat is attributed primarily to the destruction, degradation, and fragmentation of its habitat, as a result of urbanization and certain agricultural activities throughout the species' range (USFWS 1997bb). In addition, predation by domestic animals, especially feral cats, at the urban-wildland interface threatens extant populations. Furthermore, overly intensive grazing, agricultural discing, ORVs, rodent control efforts, and disease are all significant factors reducing habitat suitability or causing direct mortality of Stephens' kangaroo rats (USFWS 1997bb). The species was state-listed as threatened in June of 1971, and federally listed as endangered in September of 1988 (53 FR 38469). No designation of critical habitat has been issued by the USFWS.

The Stephens' kangaroo rat requires well-drained loamy or sandy soils within sparsely vegetated habitats; it is associated with open grasslands and sparse coastal sage scrub plant communities. It is frequently found in disturbed areas with a high percentage of bare ground (USFWS 1997bb). The species forages at night on native and non-native annual herbs, grasses, and forbs (Thelander et al. 1994).

Documented densities of Stephens' kangaroo rat range from 3 to 23.7 individuals per acre during the summer months and 2 to 6 individuals per acre during the fall and winter months (USFWS 1997bb). Home range size appears to be a function of population density, with male home ranges being significantly larger than those of females (Thomas 1975).The species reaches sexual maturity and may breed during its first year of life (Thelander et al. 1994). The breeding season is variable and is believed to be dependent on the timing and quantity of rainfall, though it usually occurs from early spring to early summer. Litter size averages 2.5 a year (CDFG 1990).

AREA DESCRIPTION

Little is known about the actual distribution of this species in the Forests. It is believed to occur in CNF along the margins of Warner Basin above Lake Henshaw (USFWS 2001a). The recovery plan for the species identified isolated populations as occurring in CNF in the Warner Springs/Lake Henshaw area, the Guejito Valley, and the Santa Maria Valley (USFWS 1997bb). The USFWS recognized 767 acres of occupied habitat in CNF, with grazing allotments covering 658 of the 767 acres, though the disturbance is said to increase habitat suitability for the species (USFWS 2001a).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in connectivity zones and historically occupied habitat have encouraged immigration to those areas. Stephens' kangaroo rats are flourishing and expanding their current range; they are present in adequate numbers to sustain breeding populations throughout their historic range.

OBJECTIVES

Identify, protect, and manage habitats within the current and historic range of the Stephens' kangaroo rat for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Develop, implement, and evaluate a Stephens' kangaroo rat population monitoring protocol.

Conduct or encourage research on the species' ecology.

Investigate the role of pathogens in the ecology of the Stephens' kangaroo rat.

Investigate how fire management can enhance kangaroo rat habitat and shall conduct prescribed burns as appropriate. See section 2.0, *Fire Management*.

Develop management plans that include the management of exotic plants, including European grasses. See section 10.0, *Invasive Species Management*.

Eliminate activities that threaten the conservation and recovery of the species and prohibit the destruction of occupied and potential habitat.

Conduct research on optimal livestock grazing programs (seasonal restrictions and optimal stocking levels and rotations) to manage habitat to the benefit of the species, recognizing potential for soil degradation and compaction and crushing of burrows, at least during wet seasons. See section 25.0, *Domestic Livestock Grazing*

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and implement a multi-lingual public outreach program designed to inform Forest visitors and employees of the species' ecological requirements, the threats it faces, and necessary conservation measures.

STANDARDS

The Forest Service shall obtain baseline information on the distribution and abundance of the Stephens' kangaroo rat in the Forests and surrounding areas; preserve and protect these populations.

The Forest Service shall eliminate ORVs in occupied and historic habitat and enforce closures.

The Forest Service shall prohibit rodent control efforts and prevent the use of rodenticides and other pesticide use.

SAN BERNARDINO KANGAROO RAT

ISSUE STATEMENT

The San Bernardino kangaroo rat (*Dipodomys merriami parvus*) is one of 19 known subspecies of Merriam's kangaroo rat. Key distinguishing characteristics include a darker body coloration and smaller body size than other kangaroo rat species. The fur is a pale yellow and dusky brown with dark brown tail stripes, footpads, and tail hairs.

Historically, this species ranged from the San Bernardino Valley in San Bernardino County to the Menifee Valley in Riverside County, covering approximately 326,000 acres. Once considered common in California's San Bernardino and San Jacinto valleys, the rat's habitat had already been reduced to about 28,000 acres by the 1930s; today, about 95% of the habitat has been lost. By 1997, the species was known to occupy 3,247 acres divided unequally among 7 locations (McKernan 1997; USFWS 2001a). Four of these sites support small remnant populations including City Creek, Etiwanda, Reche Canyon, and South Bloomington; three sites support higher-density populations, located in the Santa Ana River, Lytle and Cajon washes, and San Jacinto River (USFWS 2001a).

Significant factors that threaten this species' survival include but are not limited to habitat loss, degradation, and fragmentation due to sand and gravel mining operations, flood control projects, groundwater recharge activities, urban development, ORV use, and vandalism. The species was emergency listed as federally endangered on January 27, 1998 (62 FR 51005) and critical habitat designated on December 8, 2000 (65 FR 77178). The USFWS has not yet developed a Recovery Plan for this species.

The San Bernardino kangaroo rat can be found in river and creek floodplains/washes. It prefers well-drained, sandy soils in alluvial fan sage scrub. It can also be found in *Encelia*-dominated coastal sage scrub where soils are suitable. The species is a seed-eating mammal, uniquely adapted to the southwestern deserts of the United States. They primarily eat seeds of grasses and forbs and on a seasonal basis, green vegetation and insects. Further information is needed on home range and territory sizes. What is known is that San Bernardino kangaroo rats are primarily nocturnal and reside in burrow systems with one occupant surrounded by other adult burrow systems. Mating season occurs from January to May with peak reproductive activities in June and July.

AREA DESCRIPTION

Additional information is needed on the distribution of the San Bernardino kangaroo rat on National Forest land. The species may occur in SBNF along lower Lytle Creek, Cajon Wash, and Bautista Creek. The Santa Ana River population covers 1,725 acres, extending up to a mile from SBNF, near the Greenspot Road bridge. A total of 1,875 acres of proposed critical habitat occur in the SBNF and ANF (USFWS 2001a).

TABLE 8-67

KEY, OCCUPIED, AND MODELED HABITAT IN THE FORESTS

(USFWS 2001a)

	LOS PADRES	ANGELES	SAN BERNARDINO	CLEVELAND
KEY		284	76	
OCCUPIED				
MODELED		53	331	

DESIRED CONDITION

To meet the desired condition of viable populations of kangaroo rats, activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in connectivity zones and historically occupied habitat have encouraged immigration to those areas. San Bernardino kangaroo rats are

flourishing and expanding their current range; they are present in adequate numbers to sustain breeding populations throughout their historic range.

OBJECTIVES

Identify, protect, and manage habitats within the current and historic range of the San Bernardino kangaroo rat for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Develop, implement, and evaluate a population monitoring protocol.

Conduct or encourage research on the species' ecology.

Investigate how fire management can enhance kangaroo rat habitat and conduct prescribed burns as appropriate. See section 2.0, *Fire Management*.

Eliminate activities that threaten the conservation and recovery of the species and prohibit the destruction of occupied and potential habitat.

Coordinate with ACOE in their evaluation of the operation of Seven Oaks Dam, though it is not operated or permitted by the Forest Service. The Forest Service shall inform the ACOE of the effects of flood control on the dynamics that maintain alluvial fan sage scrub habitat; dams preclude scouring events and reestablishment of alluvial scrub vegetation.

Conduct research on the potential for livestock grazing to adversely affect the species, including information on soil degradation and compaction and the result this has on plant regeneration. See section 25.0, *Domestic Livestock Grazing*.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and implement a multi-lingual public outreach program designed to inform visitors and employees of the species' ecological requirements, the threats it faces, and necessary conservation measures.

STANDARDS

The Forest Service shall obtain baseline information on the distribution and abundance of the species in the Forests and surrounding areas; preserve, protect, and monitor these populations.

The Forest Service shall evaluate all SUPs related to transportation and utilities along Cajon Wash to identify adverse impacts from numerous linear, long-distance projects, including effects on range from excavation of habitat and diversion of water to crushing individuals and their burrows from vehicle traffic during maintenance activities. No SUPs shall be re-permitted until appropriate mitigation measures are designed and implemented to ensure the protection and recovery of the species. See section 21.0, *Special Use Permits*.

The Forest Service shall prohibit rodent control efforts and prevent the use of rodenticides and other pesticides.

The Forest Service shall prohibit rock collecting and not issue permits for legal rock collection in Lytle Creek, due to resulting changes in habitat structure and the crushing of burrows.

The Forest Service shall prohibit ORVs in occupied and historic habitat and enforce closures.

The Forest Service shall block all vehicular access to Lytle Creek to protect the existing population.

The Forest Service shall prohibit any new flood control or other structures that interrupt natural flood/scour/deposition processes in occupied or historic habitat areas.

SAN JOAQUIN KIT FOX

ISSUE STATEMENT

The San Joaquin kit fox (*Vulpes macrotis mutica*) is the smallest member of its family in North America. It has an average body length of 20 inches, an average tail length of 12 inches, and stands about 9 to 12 inches at the shoulder. Adult males weigh about 5 pounds, and adult females weigh about 4.6 pounds. These slender-built mammals have relatively long legs and large, conspicuous ears (USFWS 1998e).

Historically, the San Joaquin kit fox was widely distributed on the valley floor and adjacent low foothills of the San Joaquin Valley, from the vicinity of Byron in Contra Costa County extending southward to the foothills of the Tehachapi Mountains, south of Bakersfield in Kern County. Currently, the fox inhabits the east side of the San Joaquin Valley floor, north of the Tehachapis to Visalia in Tulare County, and in the surrounding foothills of the coastal ranges and valleys of the interior Coast Ranges, to the Cuyama Valley north to Soledad in Monterey County. The San Joaquin kit fox range includes 14 counties, of which three—Santa Clara, Monterey, and Santa Barbara—may not have been historically utilized (Thelander 1994). The range is mostly continuous, with the exception of two disjunct populations near Hollister in San Benito County, and La Grange in Stanislaus County (Thelander 1994).

Significant factors that led to the decline of this species include but are not limited to agricultural, industrial, and urban development in the San Joaquin Valley. Loss of native habitat to various kinds of agriculture (e.g. cotton fields and vineyards) and residential and commercial developments remain the principal threats to this species (USFWS 1998e; CDFG 2000). On the 4 southern California National Forests, potential habitat for the kit fox is affected by grazing allotments, roads, non-recreational special uses, camping areas, trails, and recreational special uses (USFWS 2001a). The species was federally listed as an endangered species on March 11, 1967, and was state-listed as threatened on June 27, 1971. The USFWS has not yet designated critical habitat. However, the species is covered in a 1983 recovery plan, which was later revised in the Recovery Plan for Upland Species of the San Joaquin Valley. In the recovery plan, the kit fox is described as a keystone species, and efforts to save habitat for this species will result in benefits to other native plant and animal populations (CDFG 2000).

This species primarily inhabits grasslands and sparsely vegetated scrub habitats, though it is also known to live in and adjacent to some kinds of agriculture and urban areas. This small mammalian carnivore preys upon black-tailed rabbits, desert cottontails, rodents, insects, reptiles, some birds, bird eggs, and some vegetation (CDFG 1990). Studies indicate that a density of 1 kit fox per square mile is a reasonable figure to use to estimate populations based on known acreage of habitat, although densities can range from less than 1 to more than 6 foxes per square mile (CDFG 2000).

The San Joaquin kit fox most often mates during winter. Pups are born in February or early March, and after 4 to 5 months the young will start to forage by themselves. Juvenile dispersal can be less than 5 miles or up to 60 miles from their natal dens (Thelander 1994).

AREA DESCRIPTION

Further survey work is need to fully assess the distribution of the San Joaquin kit fox in the LPNF and at the fringes of suitable habitat in the valleys below (Stephenson and Calcarone 1999). The species is known to occur within LPNF, in the upper Cuyama Valley watershed, and along the eastern slope of the La Panza Range. The USFWS has identified 727 acres of occupied habitat, and 35,302 acres of modeled habitat (USFWS 2001a).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Habitat restoration projects implemented in connectivity zones and historically occupied habitat have encouraged immigration to those areas. San Joaquin kit foxes are flourishing and expanding their current range; they are present in adequate numbers to sustain breeding populations throughout their historic range.

OBJECTIVES

Identify, protect, and manage habitat within the current and historic range for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Identify, map, and protect core populations and habitat connectivity zones.

Maintain and enhance connecting corridors for movement of kit foxes. See section 14.0, *Habitat Linkages*.

Identify and protect additional land supporting key populations by acquisition of title, conservation easement, or other mechanisms (USFWS 1998c). See section 17.0, *Land Protection Opportunities*.

Determine habitat restoration and management prescriptions for kit foxes.

Establish a scientifically valid population monitoring program range-wide at representative sites.

Promote conservation of kit foxes on agricultural lands within and adjacent to the Forests through conservation initiatives and cooperative agreements.

Conduct or encourage and support research on habitat management and restoration, including the effects of management activities on habitat quality and habitat restoration.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and distribute multi-lingual educational pamphlets on the species' ecological requirements, the threats it faces, and necessary conservation measures. See section 20.0, *Environmental Education*.

STANDARDS

The Forest Service shall determine the current geographic distribution and population status of kit foxes in the Forests.

The Forest Service shall determine the direct and indirect effects of rodent and rabbit control programs, and take all management actions necessary to eliminate adverse impacts to the kit fox.

The Forest Service shall prohibit the use of rodenticides and pesticides in rodent and rabbit control programs in occupied and potential habitat.

The Forest Service shall not permit any special uses that would adversely affect the species, including recreational and non-recreational activities. See section 21.0, *Special Use Permits*.

Section 8.69

SOUTHERN SEA OTTER

ISSUE STATEMENT

The southern sea otter (*Enhydra lutris nereis*) is the largest member of the family Mustelidae and the smallest species of marine mammal in North America. Males average 51 inches long and weigh about 65 pounds, while females are typically 47 inches long and weigh roughly 45 pounds. The southern sea otter's dense fur varies in color from dark brown to black, but its head, chest, and throat become fringed with white as it attains adulthood. It depends on its fur to maintain body temperature. It has a small round head with a stunted face, and diminutive ears. Its front feet are small and used to grasp food and to groom, while its larger hind feet are webbed for swimming and diving (Thelander et al. 1994)

In the 18th and 19th centuries, fur trappers decimated populations of sea otters in the Northern Hemisphere. By the turn of the century, only 1,000-2,000 remained of the historic 150,000-300,000. In 1911, the International Fur Seal Treaty was signed, protecting the species from further commercial exploitation. By that time, the southern sea otter, one of 3 isolated subspecies, was thought to be extinct. But a remnant population remained, and in 1915, 32 otters were observed near Point Sur in Monterey County. Currently, the southern sea otter population contains about 2,000 individuals, in

contrast to historic levels of 16,000-20,000 (Thelander et al. 1994).

Historically, this non-migratory subspecies occurred along the Pacific coast from central Baja California, Mexico, to Washington (Thelander et al. 1994). Currently, sea otters are found between Half Moon Bay and Gaviota along the coast of central and southern California; the population is declining roughly 5% per year (USFWS 2000i). The southern sea otter was federally listed as a threatened species under the Endangered Species Act of 1973, as amended, and therefore recognized as depleted under the Marine Mammal Protection Act in 1977. A Recovery Plan was developed and finalized by the USFWS in 1982; other draft revised recovery plans have been completed, the most recent of which was released in January of 2000 (USFWS 2000i)

The primary threats today are oil contamination and entanglement in gill nets. An oil spill could instantly devastate the population (USFWS 2000i; Thelander et al. 1994). Other threats include chemical pollution, human take (shooting and harassment), competition with humans for shellfish, and habitat degradation caused by activities such as kelp harvesting and dredging (Thelander et al. 1994).

As one of few marine representatives of the order Carnivora, the sea otter evolved to inhabit a narrow ecological zone. They occupy near-shore marine environments from the littoral zone and protected bays to exposed outer coasts (USFWS 2000i). Sea otters play an important role in kelp forest ecology; they regulate sea urchin populations that if left unchecked could destroy the kelp beds (Thelander et al. 1994). They also prey upon abalones, crabs, clams, snails, mussels, scallops, squid, octopuses, and starfishes (CDFG 1990).

They are active yearlong, day or night, with peak feeding in early morning and late afternoon (CDFG 1990). Females generally reach sexual maturity at 6 years of age. They give birth to a single pup each year, with most births occurring from late February to early April, though the birth peak could extend over several months (USFWS 2000i).

AREA DESCRIPTION

The southern sea otter is present along the central coast in the coastal zone. In Monterey County, LPNF reaches the coast in two areas. One is along a 20-mile stretch from the San Luis Obispo County line, north to an area between Lopez Point and the Kirk Creek Campground; the second area is a discrete area in northern Monterey County at Pfeiffer Beach. Surveys conducted in 2001 documented 233 sea otters along the 20-mile stretch and 3 at Pfeiffer Beach; occupied habitat consists of 28 acres on National Forest Service lands (USFWS 2001a).

DESIRED CONDITION

Activities that are incompatible with the recovery of the species in existing and historic localities have ceased. Protection of existing and historically occupied habitat has encouraged immigration to those areas. Southern sea otters are flourishing along the coast; they are present in adequate numbers to sustain breeding populations throughout their historic range.

OBJECTIVES

Identify, protect, and manage habitat within the current and historic range of the southern sea otter for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Eliminate negative impacts, such as harassment by humans or dogs, within key, occupied, and modeled habitats (USFWS 2001a).

Eliminate activities that hinder the ability of the sea otter to feed or rest in all habitats (USFWS 2001a).

Ensure that non-native species control projects do not contribute toxic substances (USFWS 2001a). See section 10.0, *Invasive Species Management*.

Implement measures to minimize factors causing stress or disease in the population (USFWS 2000i).

Prohibit water diversions that impair hydrologic processes important for maintaining key and occupied open beach and estuarine habitats (USFWS 2001a).

Eliminate beach stabilization or beach nourishment activities during season of use by TES beach species in all habitats (USFWS 2001a).

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and implement a multi-lingual public education and outreach program on the ecology of the species, the threats it faces, and the necessary conservation measures.

STANDARDS

The Forest Service shall monitor the abundance and distribution of existing populations that occur in the Forests (USFWS 2000i).

The Forest Service shall evaluate potential human impacts to habitat and inform concessionaires of necessary conservation measures in key, occupied, and modeled habitats (USFWS 2001a). See section 21.0, *Special Use Permits*.

The Forest Service shall assess recreational activities at Kirk Creek Campground, Sand Dollar Day Use Area, and Pfeiffer Beach Day Use Area to determine how ongoing activities adversely impact the species or its habitat; modify or eliminate those activities for the benefit of the species (USFWS 2001a).

The Forest Service shall, during the breeding season, inform the public of the otters' presence and measures to avoid impacts (USFWS 2001a).

The Forest Service shall require dogs to be on leash at all times in occupied habitat areas (USFWS 2001a).

Section 8.70

STELLER SEA LION

ISSUE STATEMENT

The Steller sea lion (*Eumetopias jubatus*) is the largest of the eared seals, a group that includes all sea lions and fur seals. It has coarse, creamy tan to reddish-brown fur, and large, blackish front and hind flippers (Thelander et al. 1994). They are sometimes confused with California sea lions, but are much more massive and lighter in color. Males can reach up to 11 feet in length and weigh almost 2,500 pounds; females are much smaller, growing up to 9 feet in length and weighing up to 1,000 pounds. They have a blunt face, a boxy head, and a thick neck, which resembles a lion's mane, hence the name "sea lion" (Marine Mammal Center 2001).

Steller sea lions are distributed throughout the North Pacific Rim from Japan to central California. They typically remain offshore or haul out in unpopulated areas. Currently, they breed along the North Pacific Rim from Año Nuevo Island in central California to the Kuril Islands north of Japan, with the greatest concentration of rookeries (breeding grounds) in the Gulf of Alaska and Aleutian Islands (Marine Mammal Center 2001). The central California coast is the southern limit of the species' range. Historically, there was a rookery on San Miguel Island, one of the northern Channel Islands, but Steller sea lions have not bred there since the early 1980s (Marine Mammal Center 1997 *in* Stephenson and Calcarone 1999). The southernmost active rookery is currently on Año Nuevo Island in San Mateo County.

Steller sea lion populations have experienced a precipitous decline, and the animals are now rare along the Monterey coast. In 1960, the worldwide population was estimated at 240,000-300,000, with 6,000 animals in the California population; by 1989 the worldwide population had plummeted to 68,000, with 2,000 animals in California (Thelander et al. 1994). The current population of Steller sea lions is about 40,000, with only about 500 residing in California. The species was listed as federally threatened in 1990; it is also protected under the Marine Mammal Protection Act, which forbids the killing, harming, or harassing of any marine mammal (Marine Mammal Center 2001).

Steller sea lions inhabit shorelines and rocky islands along exposed coasts that are inaccessible to humans; they usually keep within 24 km (15 miles) of shore. The species forages mostly at night, near shore, at depths up to 180 m (600 ft); in California, they eat rockfish, hake, flatfish, squid, and octopus (Thelander et al. 1994). Pups are born on offshore islands from mid-May to mid-July, and weigh 35-50 pounds (16-23 kg); they usually nurse for a year (Marine Mammal Center 1997).

AREA DESCRIPTION

Although the central California coast is the southern limit of the species' range, Steller sea lions are not expected to occur in the Forests. Populations of this species are declining precipitously worldwide; they are now rare along the Monterey coast (Stephenson and Calcarone 1999).

OBJECTIVES

Identify, protect, and manage coastal habitats within the current and historic range for the benefit of the species.

Eliminate activities that could adversely affect the species or its habitat.

Minimize activities that interfere with the ability of TES beach species to feed or rest in all habitats.

Evaluate progress of recovery and effectiveness of management recovery actions, and revise management plans as necessary.

Develop and implement a multi-lingual public education and outreach program on the ecology of the species, the threats it faces, and the necessary conservation measures.

STANDARDS

The Forest Service shall monitor the abundance and distribution of existing populations that occur in the Forests (USFWS 2000i).

The Forest Service shall evaluate the present human impacts to habitat and inform concessionaires on how to avoid negative impacts in key, occupied, and modeled habitats.

The Forest Service shall, during the breeding season, inform the public of the animals' presence and measures to avoid impacts. Require dogs to be on leashes in occupied habitat areas.

Section 8.71

PENINSULAR BIGHORN SHEEP

See section 7.0, *Management Indicator/Focal Species,* and section 7.3, *Bighorn Sheep,* for specific objectives and guidelines for this listed species.

ISSUE STATEMENT

The Forests are home to, and in many cases the last refuge for, hundreds of rare, threatened, and endangered species, as detailed in the previous sections. Thirty-six of these species are listed as endangered or threatened under the federal and/or California Endangered Species Acts. However, hundreds more species of plants and animals in the Forests are considered to be at risk. At the federal level, Stephenson and Calcarone (1999) document 33 animals listed as "Forest Service Sensitive" and 34 as "Species of Concern" (former Candidate 2 species under the Endangered Species Act), and 85 plant species listed as "Forest Service Sensitive/Species of Concern" and 47 as "Forest Service Sensitive." In addition, 68 animals are state-listed as California "Species of Special Concern" and 15 plants are listed as "California Rare." Alteration of historical fire regimes throughout the region, rapid urbanization in areas adjacent to the Forests, dramatic escalation of recreational use of the Forests following a booming human population in southern California, continued domestic livestock grazing in oak woodlands, meadows, grasslands, and other vulnerable habitats, and a host of other factors have increasingly threatened the continued existence of these sensitive species.

AREA DESCRIPTION

Seventy-four sensitive animal species and 132 sensitive plant species (not including species already listed under the federal and/or state Endangered Species Act) currently occur (resident or migrant), potentially occur, and/or historically occurred in all vegetative communities throughout the Forests. The following tables document the sensitive plants and animals that occur in each major habitat type on each of the 4 Forests (source: Stephenson and Calcarone 1999; Appendix A):

TABLE 9-1

LOS PADRES NATIONAL FOREST

	RIPARIAN/ AQUATIC	OAK WOODS/ GRASSLAND	SHRUB/ SCRUB	HARDWOOD/ CONIFER	MONTANE CONIFER	DESERT MONTANE	VALLEY FLOOR	DESERT FLOOR	HABITAT GENERALIST
PLANTS	1	3	16	-	2	4	-	-	4
INVERTEBRATES	1	-	-	-	-	1	-	-	-
FISH	3	-	-	-	-	-	-	-	-
AMPHIBIANS	2	-	-	1	-	-	2	-	-
REPTILES	1	-	2	-	1	-	-	-	1
BIRDS	4	1	1	1	3	-	2	1	2
MAMMALS	-	-	-	-	4	1	-	-	5
TOTAL	12	4	19	2	10	6	4	1	12

TABLE 9-2

ANGELES NATIONAL FOREST

	RIPARIAN/ AQUATIC	OAK WOODS/ GRASSLAND	SHRUB/ SCRUB	HARDWOOD/ CONIFER	MONTANE CONIFER	DESERT MONTANE	VALLEY FLOOR	DESERT FLOOR	HABITAT GENERALIST
PLANTS	1	1	9	-	1	3	-	-	3
INVERTEBRATES	-	-	-	1	-	1	-	-	-
FISH	3	-	-	-	-	-	-	-	-
AMPHIBIANS	3	-	-	1	-	-	1	-	-
REPTILES	1	-	3	-	3	-	-	-	2
BIRDS	4	1	2	1	3	1	1	2	2
MAMMALS	-	-	1	-	4	2	2	-	5
TOTAL	12	2	15	3	11	7	6	2	12

TABLE 9-3

SAN BERNARDINO NATIONAL FOREST

	RIPARIAN/ AQUATIC	OAK WOODS/ GRASSLAND	SHRUB/ SCRUB	HARDWOOD/ CONIFER	MONTANE CONIFER	DESERT MONTANE	VALLEY FLOOR	DESERT FLOOR	HABITAT GENERALIST
PLANTS	1	-	8	-	14	12	-	-	2
INVERTEBRATES	1	-	-	1	1	1	-	-	-
FISH	3	-	-	-	-	-	-	-	-
AMPHIBIANS	2	-	-	3	-	-	1	-	-
REPTILES	1	-	5	-	2	-	-	-	4
BIRDS	4	1	2	1	3	2	2	3	2
MAMMALS	-	-	1	-	5	2	2	1	5
TOTAL	12	1	16	5	25	17	5	4	13

TABLE 9-4

CLEVELAND NATIONAL FOREST

	RIPARIAN/ AQUATIC	OAK WOODS/ GRASSLAND	SHRUB/ SCRUB	HARDWOOD/ CONIFER	MONTANE CONIFER	DESERT MONTANE	VALLEY FLOOR	DESERT FLOOR	HABITAT GENERALIST
PLANTS	3	1	8	-	1	6	-	-	6
INVERTEBRATES	1	-	-	-	-	-	-	-	-
FISH	3	-	-	-	-	-	-	-	-
AMPHIBIANS	2	-	-	1	-	-	1	-	-
REPTILES	1	-	5	-	2	-	-	-	4
BIRDS	4	1	2	1	3	1	2	1	2
MAMMALS	-	-	1	-	3	2	1	1	5
TOTAL	14	2	16	2	9	9	4	2	17

In addition, the Monterey Coast has 1 mammal; valley-oak foothill/savanna habitat has 1 bird; Gabbro habitat type has 1 invertebrate; and Lake habitat has 1 bird listed as sensitive.

The various species covered below have not been listed nor proposed for listing as endangered or threatened under either the state or federal Endangered Species Acts, nor have they been chosen as a Management Indicator (MIS) / Focal Species in this document. For information on listed, proposed, and focal species, please see those respective sections (section 7.0, *Management Indicator/Focal Species*, and section 8.0, *Listed Species*).

DESIRED CONDITION

Sensitive species are flourishing in their native habitats. The Forests are managing to maintain viable populations of all species in perpetuity while providing recreational opportunities to visitors.

OBJECTIVES

Maintain viable, well-distributed plant, invertebrate, and vertebrate populations in all habitat types in the Forests.

Assess the distribution and abundance of every species on the list of vulnerable species occurring in the Forests.

Assess all current and proposed activities and facilities in the Forests for their impacts on sensitive species, and allow no negative impacts.

Interim Management

Apply the National Forest Management Act viability requirements to invertebrates, vertebrates, and plant species occurring throughout the Forests.

Immediately preserve and protect from degradation all known suitable habitat for any sensitive species in the Forests.

Sensitive Species Assessment

Assess the distribution and abundance of every species on the list of vulnerable species occurring in the Forests (Stephenson and Calcarone 1999; Appendix A, Table A), and survey for every species within 8 years of the adoption of this plan.

For every vulnerable species, develop models for the quantitative assessment of habitat suitability, in combination with comprehensive databases. These databases shall contain efficient retrieval systems of site-specific natural history information for each species, and identify information gaps and priority areas for research.

Model key and occupied habitat for every vulnerable species occurring in the Forests, and develop and ground-truth a comprehensive GIS map of these habitats to assist with land-use management decisions (see section 5.0, *Vegetation Management*).

Monitor the distribution and abundance of all sensitive species on an annual basis using standard protocols designed by biologists familiar with the habitats and habits of a particular species. Monitoring results shall be made available to the public, and coordination with state and federal agencies, academia, and consulting researchers shall be encouraged.

Systematically assess all current and proposed activities in the Forests with respect to impacts on sensitive species, including plants and invertebrates.

Assess all current campgrounds/developed areas, trails, roads, and interpretive stops in the Forests for their impact on sensitive species. The Forest Service shall also eliminate any developments determined to cause adverse impacts on any sensitive species or, if possible, reposition the development to a location with no or little impact.

Sensitive Species Management

Prohibit activities that are determined to cause significant adverse impacts on any sensitive species.

Prioritize for acquisition any high-quality remaining sensitive species' suitable habitat occurring within or adjacent to the Forests (see section 17.0, *Land Protection Opportunities*).

Preserve and protect all butterfly larval host plants occurring in the Forests.

Using proven trapping methods, instigate and continue brown-headed cowbird removal programs in habitat suitable

for yellow warblers, yellow-breasted chats, rufous-crowned sparrows, gray vireos, Bell's sage sparrows, and other bird species. Removal programs are already in progress for the endangered least Bell's vireo and the southwestern willow flycatcher (see section 8.0, *Listed Species*).

Implement a carefully designed campaign to inform the public of the usefulness of bats and their sensitivity to disturbances, as well as the importance of cave closures. The Forest Service shall strictly enforce prohibitions on entry of caves closed for bats, with penalties including fines, forfeiture of vehicles, and criminal charges.

STANDARDS

Interim Management

The Forest Service shall manage all species currently designated as Forest Service Special Concern (SC) as Forest Service Sensitive (S) until surveys are completed and designations can be updated.

Sensitive Species Management

The Forest Service shall prohibit the collection of butterflies in the Forests in order to protect rare and declining species of Lepidoptera.

The Forest Service shall strictly enforce prohibitions on the collection of butterflies, reptiles, and raptors (for falconry), with penalties including fines, forfeiture of vehicles, and criminal charges.

The Forest Service shall train agency personnel in field positions to recognize all bat species, and instruct agency personnel on non-intrusive methods of estimating colony size of bats in caves, lava tubes, man-made structures, and other roosting, maternity, and hibernacula sites, using approved protocol for observation.

The Forest Service shall strictly prohibit entry into caves and mines inhabited by any sensitive bat species during the season of occupation. Approved methods of human control shall be used to protect roost sites, including but not limited to:

- Hardened metal "bat friendly" gates at the entrances to caves and mines
- In caves with multiple holes, fit expanded metal sheets to the shape of the holes *not* used by bats (as determined by surveying). These expanded sheets can be welded to pins in the rock, and small diamond-shaped holes can be put into the metal to allow air circulation. These sheets are intended to help prevent vandalism but allow air circulation. (Frontier Environmental Solutions, Ridgecrest, California, Sam Edwards, (760) 371-4927)
- Securing building roosts against vandalism.

RIPARIAN, AQUATIC, AND AQUATIC/UPLAND HABITAT

Species/Status	Habitat Description	Threats
INVERTEBRATES		
CALIFORNIA	Information is scarce on this species, but other species of caddisfly occur in fast-running parts of small, cool streams. Benthic to creeks, springs, brooks, herbaceous wetlands, in shallow water. In the Forests, from Claremont and in Mill Creek in the SBNF.	Threats are currently unknown, but water diversions and channelizations may impact this species.

GREENEST TIGER BEETLE *Cicindela tranquebarica virudissima* **FED: SC**	Occurs near running water where there is fine sand. Larvae live in burrows in the sand at the edge of streams. Known to occur in the upper Santa Ana River at the base of the San Bernardino Mountains, and in Bautista Canyon, but whether the species is found in the Forests is not known (Stephenson and Calcarone 1999).	Threats are currently unknown, but alteration of stream habitats may impact this species.
HARBISON'S DUN SKIPPER BUTTERFLY *Euphyes vestries harbisoni* **FED: SC**	Occurs in partly shaded riparian oak woodland in a matrix of chamise chaparral or southern mixed chaparral, where seeps or springs provide water to support the larval host plant, San Diego sedge (Carex spissa). In the Forests, found in Silverado Canyon in the Santa Ana Mountains, San Pasqual Valley, Ramona, Flinn Springs, Old Viejas Grade, Otay Mountain, and Tecate Peak (Stephenson and Calcarone 1999).	Threats are unknown.
FISH		
ARROYO CHUB *Gila orcutti* **FED: S** **CA: SSC**	Lives and spawns in slow-moving or backwater sections of warm to cool streams with mud or sand substrates and depths greater than about 16 inches. Native to the Los Angeles, San Gabriel, San Luis Rey, Santa Ana, and Santa Margarita rivers and to Malibu and San Juan creeks. Successfully introduced into the Santa Ynez, Santa Maria, Cuyama, and Mojave river systems and other smaller coastal streams. The most northern introduced population is in Chorro Creek, San Luis Obispo County. Now absent from much of their native range and abundant only in the upper Santa Margarita River and its tributary De Luz Creek, Trabuco Creek below O'Neill Park and San Juan Creek, Malibu Creek, and the West Fork of the upper San Gabriel River below Cogswell Reservoir (Moyle et al. 1995). In the Forests, occurs in Pacoima Creek, Big Tujunga Creek, the west, east, and north forks of the San Gabriel River, Cattle Canyon, Bear Creek (ANF), in San Juan Creek, Trabuco Creek, the west fork of the San Luis Rey River, and Agua Caliente Creek above Lake Henshaw (CNF; Stephenson and Calcarone 1999).	Scarce within their native range because the low-gradient streams that represent their optimal habitat have largely disappeared or been degraded, and populations have been fragmented. Recently, the red shiner has been introduced into arroyo chub streams and may competitively exclude them from many areas (Moyle et al. 1995).

SANTA ANA SPECKLED DACE *Rhinichthys osculus* **FED: S** **CA: SSC**	Inhabits shallow cobble and gravel riffles in permanent flowing streams with summer water temperatures of 63-68° F. Optimal habitat consists of streams that are maintained by outflows of cool springs with overhanging riparian plants such as alders and sedges to provide cover. Once distributed throughout the upland portions of the Santa Ana, San Gabriel, and Los Angeles river systems of southern California, but today has a very limited distribution in the headwaters of only the Santa Ana and San Gabriel rivers. Apparently recently extirpated from the Los Angeles River drainage, and now so diminished in numbers that it is in danger of extinction (Moyle et al. 1995). In the Forests, occurs in lower reaches of the east, north, and west forks of the San Gabriel River including Cattle Canyon, Bear Creek, and Fish Canyon, and may have recently been extirpated in Pacoima Creek, Little Tujunga Creek, and Big Tujunga Creek (ANF). Also occurs from the North Fork of Lytle Creek, Cajon Wash, Lone Pine Canyon, Strawberry Creek, Plunge Creek, City Creek, and the south fork of the San Jacinto River (SBNF) as well as the Santiago Creek and possibly Silverado Canyon (CNF; Stephenson and Calcarone 1999).	Has severely declined due to water diversions and dams; urbanization and associated degradation of water quality; competition with non-native species such as red shiner; heavy human recreational use of areas that can alter stream habitats and disturb spawning and feeding behavior; and a myriad other factors associated with expanding human populations in the Los Angeles region. Considered to be one of the most rare native fishes in coastal southern California (Moyle et al. 1995).
PARTIALLY ARMORED THREE-SPINE STICKLEBACK *Gasterosteus aculeatus microcephalus* **FED: S**	Inhabits low-gradient, low-elevation streams with slow-water habitat including pools with abundant aquatic vegetation, backwater areas, and stream margins with low water velocity. Recently documented south of the Los Angeles Basin from the Santa Ana Mountains (Trabuco Creek in and below O'Neil Park, upper San Juan Creek near the mouths of Hot Spring and Cold Spring canyons, and upper reaches of Bell Canyon on Starr Ranch) and the south fork of the San Jacinto River below Lake Hemet. To the north, occurs in the Santa Clara, Ventura, and Santa Ynez rivers and many coastal streams in Santa Barbara and San Luis Obispo counties. Historically occurred in San Mateo Creek, Santa Margarita River, and the San Luis Rey River and possibly absent from streams in the Los Angeles Basin inhabited by the unarmored three-spine stickleback (*Moyle et al. 1995).* In the Forests, the fish has been introduced into Big and Little Rock creeks (ANF), Holcomb Creek, Lake Arrowhead, and Big Bear Lake (SBNF), and the Sweetwater River and Pine Creek (CNF; Stephenson and Calcarone 1999).	Threats are similar to those described for other native fish, mainly the maintenance of permanent year-round surface water (*Moyle et al. 1995*).

AMPHIBIANS		
COAST RANGE NEWT *Taricha torosa torosa* **CA: SSC**	Visits terrestrial habitats, but breeds in ponds, reservoirs, and slow-moving streams. Prefers rocky canyons that contain streams with well-developed pools. Historically distributed in coastal drainages from central Mendocino County in the North Coast Ranges, south to Boulder Creek in San Diego County. Populations in southern California appear to be highly fragmented, even historically (Zeiner et al. 1988, Jennings and Hayes 1994). In the Forests, occurs in Lopez Canyon, east fork of Morro Creek, Rincon Creek, and possibly the upper end of streams in the Santa Ynez Mountains (Stephenson and Calcarone 1999).	Depleted by large-scale historical commercial exploitation coupled with the loss and degradation of stream habitats, especially in Los Angeles, Orange, Riverside, and San Diego counties. Breeding habitat has been severely degraded over much of its range, largely due to sedimentation that has resulted in greater filling and less frequent scouring of pools (Jennings and Hayes 1994).
FOOTHILL YELLOW-LEGGED FROG *Rana boylii* **FED: S** **CA: SSC**	Requires shallow, flowing water in small to moderate-sized streams with at least some cobble-sized substrate. This type of habitat seems best suited to oviposition and likely provides important refuge habitat for larvae and postmetamorphs. A highly aquatic frog that is rarely found "more than one or two leaps" from a stream. Historically occurred in most Pacific drainages from the Santiam River in Oregon to the San Gabriel River in southern California (Zeiner et al. 1988, Jennings and Hayes 1994). In the Forests, has not been seen in or south of the southern Los Padres ranges since 1978, but still occurs in several coastal drainages along the so uthern Monterey coast, including Big Sur River and Willow Creek (Stephenson and Calcarone 1999).	Virtually extirpated from habitats with introduced predators such as bullfrogs, mosquitofish, and bluegill. Increased sedimentation due to logging, road-building, and domestic livestock grazing has likely contributed to declines. May be impacted by aseasonal storms and decreases in annual rainfall that result in decreased waterflows. Weather-related impacts may be linked to local and global anthropogenically influenced climatic changes (Jennings and Hayes 1994).

REPTILES		
TWO-STRIPED GARTER SNAKE *Thamnophis hammondii* **FED: S** **CA: SSC**	One of the most aquatic of garter snakes, found in or near permanent and intermittent fresh water, often along pools in streams with rocky beds bordered by willow thickets or other dense vegetation in oak woodland, mixed oak, and chaparral habitats. It can also inhabit large sandy riverbeds, stock ponds and other artificially created aquatic habitats if a strip of riparian vegetation and its amphibian and fish prey are present. During summer, snakes use streamside areas, and they winter in coastal sage scrub and grassland areas adjacent to riparian areas. They may occupy small mammal burrows in winter. The range of this species extends through the South Coast and Peninsular ranges west of the San Joaquin Valley and deserts from Salinas south to Baja California, Mexico (Zeiner et al. 1988, Jennings and Hayes 1994). In the Forests, this species occurs in all the mountain areas but has disappeared from many historic locations in the coastal basins. The Forests and coastal region to the west comprise nearly the entire range of the species (Stephenson and Calcarone 1999).	One of the primary causes of decline is the extensive loss of wetland habitats in southern California. Other factors include loss of amphibians (food source), water pollution, urbanization, creation of large reservoirs, and concrete lining of stream channels for flood control. Much of the remaining riparian habitat is degraded, and could rapidly become unsuitable if present trends towards drier climatic conditions for southern California continue (exacerbated by domestic livestock grazing). Increased recreation in the Forests has increased the probability of human contact and incidental take. Often killed by hikers, fishermen, and ORV users who mistakenly believe that garter snakes consume large numbers of trout (Jennings and Hayes 1994).

BIRDS		
COOPER'S HAWK *Accipiter cooperii* **CA: SSC**	Occupies deciduous and mixed forests, and open woodland habitats such as woodlots, riparian woodlands, semiarid woodlands of the southwest, and other areas where woodlands occur in patches or groves, as spaced trees (Remsen 1978, Garrett and Dunn 1981, Johnsgard 1990, Zeiner et al. 1990b, Small 1994). In the Forests, found in all mountain areas but occur at very low densities (Stephenson and Calcarone 1999).	DDT led to a 25% estimated nation-wide decline. Destruction of riparian woodlands by deforestation and flood-control measures is probably the main threat, although direct or indirect human disturbance at nest sites can be detrimental. Illegal take of nestlings for falconry is a potential threat, especially in populated areas. The replacement of native shrubs by the exotic *Arundo* reduces nesting and foraging habitat (Remsen 1978, Johnsgard 1990).
BLACK SWIFT *Cypseloides niger* **CA: SSC**	Occurs in mountain and foothill canyons that contain waterfalls. Nests have been found only on cliffs behind or adjacent to waterfalls or steep coastal cliffs. Breeds in only 4 regions of California: the central and southern Sierra; the coastal cliffs and mountains of San Mateo, Santa Cruz, and Monterey counties; the San Gabriel, San Bernardino, and San Jacinto mountains of southern California; and a limited area in the Cascade Range (Remsen 1978). In the Forests, known nesting areas include Santa Anita Canyon and Wolfskill Canyon in the San Gabriel Mountains, Mill Creek Canyon in the San Bernardino Mountains, and Tahquitz Creek in the San Jacinto Mountains (Stephenson and Calcarone 1999).	The inaccessibility of nest sites makes it nearly invulnerable to most disturbances. Rock-climbing in the vicinity of nest sites seems to be the only likely menace. The spray-soaked rocks of most nest sites make them unattractive for climbers, but some of the waterfall nest sites dry out during summer (Remsen 1978).
YELLOW WARBLER *Dendroica petechia brewsteri* **CA: SSC**	The most widely distributed North American wood warbler, usually found in riparian deciduous habitats in the summer, with cottonwoods, sycamores, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland. Breeds in riparian woodlands in coastal and desert lowlands, montane chaparral, and open ponderosa pine and mixed conifer habitats with substantial amounts of brush. Once a common summer resident in riparian areas throughout California but today populations are seriously reduced and even extirpated in some areas (Remsen 1978, Zeiner et al. 1990b, Small 1994). In the Forests, a summer resident at low elevations (Stephenson and Calcarone 1999).	Destruction of riparian habitat has contributed to declines, but the absence of this species from many areas of suitable habitat and its susceptibility to cowbird parasitism indicate that the expansion of the brown-headed cowbird may be the key factor. The replacement of native shrubs by exotic *Arundo* has reduced nesting and foraging habitat for this species (Remsen 1978, Zeiner et al. 1990b).

YELLOW-BREASTED CHAT *Icteria virens* **CA: SSC**	Once a fairly common summer resident in riparian woodland throughout California, but has declined dramatically, especially in southern California (Remsen 1978). In the Forests, a summer resident in low-elevation foothill canyons (Stephenson and Calcarone 1999).	Destruction of riparian woodlands has certainly played a role, but the bird's absence from some areas that still have intact habitat suggests the possibility of cowbird parasitism. Also negatively impacted by *Arundo* (Remsen 1978).
MAMMALS		
WESTERN RED BAT *Lasiurus blossvillii* **FED: S** **CA: SSC**	Occurs in riparian and wooded habitats. Roosting observed in caves, but the western red bat generally roosts alone in tree foliage or shrubs, often along edge habitat adjacent to streams or open fields. Occurs throughout California up to 3,000 feet, excluding desert habitat (Bolster 1998). Found in the Forests near the upper Salinas River (LPNF), Sugarloaf Meadows, Big Bear Dam (SBNF), Laguna Meadow and Lost Valley (CNF; Stephenson and Calcarone 1999).	Possible negative effects of controlled burns and pesticide use are of concern. Controlled burns may impact the bat as it roosts in leaf litter during cool weather (Bolster 1998, Stephenson and Calcarone 1999).

OBJECTIVES

Fauna

Immediately preserve all remaining intact habitats of sensitive fish within the Forests.

Complete a comprehensive survey of populations of sensitive native fish in the Forests within 5 years of the adoption of this plan. The survey shall include the identification of all existing and potential habitat for arroyo chub, Santa Ana speckled dace, Santa Ana sucker, and partially armored three-spine stickleback, as well as density and reproduction data.

Rehabilitate degraded potential habitats for sensitive fish. Such measures include but are not limited to:

- Removing dams and water diversions to secure adequate amounts of water for fish survival
- Eliminating domestic livestock grazing, roads causing excessive sedimentation, and timber harvest
- Ensuring continuous streamflow in cases where upstream water controls cannot be removed
- Improving water quality
- Restoring native riparian vegetation
- Conducting ongoing, aggressive efforts to remove non-native fish species
- Establishing refuges for sensitive fish in which all human activity (with the exception of biological monitoring) will be prohibited

Re-introduce native sensitive fish into existing, historically occupied suitable habitat within 5 years after the comprehensive survey is completed, and into potential habitat within 5 years after rehabilitation is completed.

Immediately preserve habitat critical to the survival of the foothill yellow-legged frog. This habitat shall be identified in part by the presence of riffle areas in streams with a substrate of cobble-sized or larger rocks.

Protection of sensitive native fish in the Forests shall take precedence over management of streams for other purposes, including maintenance of introduced trout fisheries, water diversions, and recreation.

Eliminate roads, domestic livestock grazing, and other impacts in habitat critical to the survival of the foothill yellow-legged frog.

Implement aggressive removal of Arundo donax infestations in habitat suitable for Cooper's hawks and yellow-breasted

chats (see section 10.0, *Invasive Species*).

Identify black swift nest sites vulnerable to human disturbance and prohibit rock climbing in the vicinity of these sites.

Conduct research on the effects of controlled burns on western red bats.

Flora

Determine the population trend and vulnerability on Forest Service lands for *Boykinia rotundifolia, Muhlenbergia californica, Scutellaria bolanderi* ssp. *Austromontanum,* and *Thelypteris puberula* var. *sonorensis*.

Determine the population trend for *Lilium humboldtii* ssp. *ocellatum*.

Monitor at least every 5 years all populations of each of the above plant species.

Initiate botanical surveys in areas of potential habitat for these species to determine presence on Forest Service lands.

Complete a feasibility study for introduction of sensitive plants to suitable habitat or re-introduction into historic locations. Implementation of an introduction/re-introduction program will augment the species, decreasing the need for listing under the Endangered Species Act in the future.

Secure water rights to maintain the hydrology of the riparian system if necessary.

Initiate weed control of exotic species that directly and indirectly compete with sensitive plant species in general riparian habitats.

Place interpretive signs at appropriate sites adjacent to general riparian habitats, as an educational opportunity.

STANDARDS

The Forest Service shall ensure that water releases do not create excess flow and shear conditions during the time interval that egg masses and the more fragile younger larval stages of foothill yellow-legged frogs are present.

The Forest Service shall limit public access to riparian habitats that harbor significant populations of two-striped garter snakes if such access is likely to adversely affect the species.

The Forest Service shall prohibit the take of Cooper's hawk nestlings for falconry, and Cooper's hawks in the possession of falconers shall be banded by the Department of Fish and Game.

VALLEY-FOOTHILL OAK WOODLAND, SAVANNA, AND GRASSLAND HABITAT

Species/Status	Habitat Description	Threats
BIRDS		
LONG-EARED OWL *Asio otus* **CA: SSC**	Inhabits dense riparian and live oak thickets near meadow edges or open spaces, and nearby woodland and forest habitats. Requires riparian or other thickets with small, densely canopied trees for nesting and roosting (Remsen 1978, Zeiner et al. 1990b, Small 1994). Rare in the Forests. Potential breeding areas are located on the desert side of the Castaic Ranges, in the upper Cuyama Valley, and along the immediate coast in San Luis Obispo and southern Monterey counties (Stephenson and Calcarone 1999).	Destruction of lowland riparian woodland and live oak groves has played a role in declines, but the absence of this species from existing riparian areas and its disappearance from many areas before the habitat was destroyed indicates that other factors are involved. Road kills by cars may have an impact, and conspicuous nests make them vulnerable to shooting and harassment (Remsen 1978, Zeiner et al. 1990b).

OBJECTIVES

Fauna

Immediately preserve lowland riparian habitat in the Forests that is suitable for the long-eared owl.

Flora

Determine the population trend and vulnerability on Forest Service lands for *Pentachaeta exilis* ssp. *aeolica* and for *Sibaropsis hammittii.*

Determine the vulnerability on Forest Service lands for *Calycadenia villosa*.

Monitor at least every 5 years all populations of each of the above plant species.

Initiate botanical surveys in areas of potential habitat for these species to determine presence on Forest Service lands.

Complete a feasibility study for introduction of sensitive plant species to suitable habitat or re-introduction into historic locations. Implementation of an introduction/re-introduction program will augment the species, decreasing the need for listing under the Endangered Species Act in the future.

Implement appropriate fire regimes to benefit the health of the habitat and sensitive plant species.

Initiate weed control of exotic species that directly and indirectly compete with sensitive plant species in foothill woodland, savanna, and/or grassland habitats. Because grasslands were made up of native wildflowers and bunchgrasses prior to European arrival, an emphasis should be placed on managing for native species, not exotic annual grass species.

Place interpretive signs at appropriate sites adjacent to the foothill woodland, savanna, and/or grassland habitats, as an educational opportunity.

STANDARDS

The Forest Service shall prevent harassment to all long-eared owl nests by the public; if necessary, the Forest Service shall prohibit public access to known nest sites.

The Forest Service shall implement guidelines for federally listed species that occur in foothill woodland, savanna, and/or grassland habitats.

SCRUB AND CHAPARRAL HABITAT

Species/Status	Habitat Description	Threats
INVERTEBRATES		
HERMES COPPER BUTTERFLY *Lycaena hermes* **FED: SC**	Restricted to mixed chaparral and coastal sage scrub where its larval host plant, redberry (*Rhamnus crocia*), occurs. Adults frequently obtain nectar from the flat-topped buckwheat (*Eriogonum fasciculatum*). Eggs appear to be sensitive to dessication, which could partly explain its restricted range. Due to diapause on the plant, it is very sensitive to fire, but may recolonize quickly if there are neighboring populations or plants that are not burned during fires (Pratt, pers. comm.). Occurs in western San Diego County and a small area of northwestern Baja California, Mexico. In the Forests, extends inland to Viejas Grade, Guatay, and Pine Valley on the CNF (Stephenson and Calcarone 1999).	The greatest threat is improper fire management, with development a close second. May not need as large an area as other butterflies since small patches of Rhamnus can support it. Non-native ants could have a negative impact, as Argentine ants are voracious feeders upon larvae, particularly in areas of high densities that occur following development and heavy watering of non-native plants in yards (G. Pratt, pers. comm.).

REPTILES		
COAST HORNED LIZARD *Phrynosoma coronatum* **FED: S** **CA: SSC**	There are 2 subspecies that overlap in northern Los Angeles and Ventura counties, and the range of the California horned lizard (*P. c. frontale)* continues north (Stephenson and Calcarone 1999). *P.c. frontale* occurs in several habitat types, including areas with an exposed gravelly-sandy substrate, with scattered shrubs (e.g. California buckwheat), clearings in riparian woodlands, dry chamise chaparral, and annual grassland with scattered perennial seepweed or saltbush. Prefers sandy loam areas and alkali flats dominated by iodine bush. Historically abundant in relict lake sand dunes and old alluvial fans bordering the San Joaquin Valley. Often uses small mammal burrows, or burrows into loose soils under surface objects during periods of inactivity or hibernation. Originally had a patchy distribution from Shasta County southward along the edges of the Sacramento Valley into much of the South Coast Ranges, San Joaquin Valley, and Sierra Nevada foothills to northern Los Angeles, Santa Barbara and Ventura counties, California. Disjunct populations occur in Santa Barbara and San Luis Obispo counties (Zeiner et al. 1988, Jennings and Hayes 1994). In the Forests, the California horned lizard occurs on both the coastal and San Joaquin sides of the mountains. *P. c. frontale* intergrades with the San Diego horned lizard (*P. c. blainvillii*) in southern Kern County and much of northern Santa Barbara, Ventura, and Los Angeles counties (Stephenson and Calcarone 1999). The San Diego horned lizard occurs in a wide variety of habitats including coastal sage, annual grassland, chaparral, oak woodland, riparian woodland, and coniferous forest. The key habitat elements are loose, fine sandy soils; an abundance of native ants or other insects; and open areas with limited overstory for basking, and low but relatively dense shrubs for refuge. Historically most abundant in riparian and coastal sage habitats on the old alluvial fans of the southern California coastal plain. Historically distributed from the Transverse Ranges in Kern, Los Angeles, Santa Barbara, and Ventura counties south throughout the Peninsular Ranges of southern California into Baja California, Mexico (Zeiner et al. 1988, Jennings and Hayes 1994). Occurs on all 4 National Forests, up to 7,000 feet in Tahquitz Meadow. It is most common on the coastal slope but also occurs on the desert side of the mountains.	*P. c. frontale* has disappeared from about 35% of its range in central and northern California, and extant populations are becoming increasingly fragmented with continued development. In the Central Valley, the conversion of relict lake sand dunes and alluvial fans to agriculture, and other development such as pipelines, canals, and roads, has resulted in the species' disappearance from many areas. Because the California horned lizard is probably long-lived, individuals may be observed for some years along the fringes of agricultural developments, but disappear after several generations if the edge habitat is altered, or its food resources are reduced by pesticides or habitat takeover by Argentine ants (see below). Negative effects of human disturbance such as domestic cats have eliminated horned lizards within a mile from a cat's home base. *P. c. blainvillii* has disappeared from about 45% of its range in southern California; few populations are extant on the coastal plain. Exploited by the pet trade and biological supply companies before commercial collecting was banned in 1981. Commercial exploitation and extensive habitat loss from agriculture, flood control, and urbanization are the main reasons for its decline. Surviving populations inhabit suboptimal upland sites in the Forests. Also impacted by fires, ORVs, domestic livestock grazing, and various types of development. Argentine ants build nests in disturbed soils (such as around building foundations, roads, and landfills) and expand into adjacent areas, eliminating native ant colonies (Jennings and Hayes 1994).

ORANGE-THROATED WHIPTAIL *Cnemidophorus hyperythrus* **FED: SC** **CA: SSC**	Occurs on hillsides, washes, and sandy mesas in coastal sage scrub and chaparral, reaching peak densities on floodplains and streamside terraces. Prefers relatively open shrub habitats and is most commonly seen along the edges of sandy openings, dirt trails, or washes. Range extends from Orange and southern San Bernardino counties into Baja California, Mexico (Zeiner et al. 1988, Jennings and Hayes 1994). In the Forests, occurs at low elevations on the coastal side of the San Diego ranges (along the upper San Diego River), the Santa Ana Mountains, and in Bautista Canyon in the San Jacinto Mountains (Stephenson and Calcarone 1999).	Availability of suitable habitat remains a large factor determining future populations. Most of the viable habitat is located in floodplains and stream terraces, which are the most developed areas in southern California (Jennings and Hayes 1994).
COASTAL ROSY BOA *Lichanura trivirgata roseofusca* **FED: S**	Widely but patchily distributed, it occurs in rocky coastal sage and chaparral-covered hillsides, canyons, and deserts. Attracted to permanent or intermittent streams but does not require permanent water. Often found in canyons and washes in the mountains. Found south of Los Angeles, from the coast to the Mojave and Colorado deserts, but does not extend to extreme eastern California or to the Salton Sea. In coastal areas, can be found in rocky chaparral-covered hillsides and canyons. In the desert, occurs on scrub flats with good cover (Zeiner et al. 1988). In the Forests, found in the foothills of the San Gabriel and San Bernardino mountains, on all Forests except the LPNF (Stephenson and Calcarone 1999).	High market value in the pet trade, and illegal collection is thought to be a significant problem (Zeiner et al. 1988, Stephenson and Calcarone 1999).
COAST PATCH-NOSED SNAKE *Salvadora hexalepis virgultea* **FED: SC** **CA: SSC**	A subspecies of the western patch-nosed snake, which can be found in coastal chaparral, desert scrub, washes, sandy flats, and rocky areas. Associated with brushy or shrubby vegetation, such as chaparral. Appears to require at least a low shrub component of minimum density. Range extends from San Luis Obispo County southward on the coastal side of the mountains into Baja California, Mexico (Zeiner et al. 1988, Jennings and Hayes 1994). In the Forests, widespread from sea level to 7,000 feet, but usually found below 5,000 feet (Stephenson and Calcarone 1999).	Extensive conversion of chaparral to grassland for domestic livestock and, later, for fire control, has impacted this snake. Large foothill tracts of shrub-dominated vegetation on the coastal slope have been destroyed by urbanization and agriculture. It is estimated that at least 20% of the suitable habitat has been destroyed, but that number could be much higher (Jennings and Hayes 1994).

BIRDS		
COASTAL CACTUS WREN *Campylorhynchus brunneicapillus cousei* **FED: S** **CA: SSC**	Both coastal and interior populations occur in California, historically connected through the San Gorgonio Pass in Riverside County. The Checklist of North American Birds recognizes all California populations as *Campylorhynchus brunneicapillus couesi*. Coastal population is unique in that it occurs exclusively within coastal sage scrub, with patches of cholla and tall (> 3 ft) prickly pear cacti (*Opuntia* spp.) for nesting. Supplements its insect diet in winter by feeding on the cactus fruit. Coastal populations occur from southern Ventura County, southeast to the Baldwin Hills and the Palos Verdes Peninsula in Los Angeles County, and east along the southern slopes of the San Gabriel and San Bernardino mountains from the northern San Fernando Valley in Los Angeles County to Mentone in San Bernardino County. Populations also extend south along the coastal slopes and interior valleys west of the Peninsular ranges in Riverside, Orange, and San Diego counties to northwestern Baja California, Mexico (Remsen 1978, Garrett and Dunn 1981, Zeiner et al. 1990b, Rea and Weaver 1990, Small 1994, Solik and Szijj 1999, CPIF 2000c). In the Forests, occurs only in the ANF. There are no known locations on the CNF but they have been seen nearby, and they potentially occur on the SBNF (Stephenson and Calcarone 1999).	Habitat loss, degradation, and fragmentation are the most critical management issues. Human disturbance to nests and habitat have impacted the wren, as nesting can occur close to roads and human development. Other factors affecting distribution are predation by native fauna and feral cats, rats, and other exotic species invasion. Wildfire may also harm cactus wrens more than other coastal sage scrub residents, because large cactus can take many years to recover after an intense burn. Isolation of coastal populations due to urban fragmentation may be promoting loss of genetic variation within these smaller populations and could compromise long-term meta-population viability (Remsen 1978, Zeiner et al. 1990b, Solik and Szijj 1999, CPIF 2000c).
RUFOUS-CROWNED SPARROW *Aimophila ruficeps canescens* **FED: SC** **CA: SSC**	Year-round resident of arid, sunny, often rocky slopes vegetated with grasses and scattered low shrubs. Typically favors areas that are in the vicinity of rock outcrops; occasionally found on the desert side of the mountains, especially the northern end of the San Jacinto Mountains and in southern San Diego County (Remsen 1978, Garrett and Dunn 1981, Zeiner et al. 1990a, Small 1994, CPIF 2000c). Has been observed in chaparral and scrub oak; generally avoids dense chaparral and woodlands. Optimal habitat: sparse, rather low brush on grassy, hilly slopes interspersed with boulders. Range coincides with extensive stands of coastal sage scrub; extends further into the foothills than the cactus wren and California gnatcatcher. Prefers more open shrublands; may benefit from higher fire frequency than other birds in similar habitat. Occurs from Santa Barbara County south to northwestern Baja California, Mexico, at low elevations on the coastal side of the mountains. Found on all Forests (Stephenson and Calcarone 1999).	May be declining due to loss and degradation of coastal sage scrub habitat. Cowbird parasitism of this species is also a problem (Remsen 1978, Zeiner et al. 1990b, CPIF 2000c).

MAMMALS		
SAN DIEGO POCKET MOUSE *Chaetodipus fallax* **FED: SC CA: SSC**	Occupies habitats from sparse, low, desert shrublands on the desert side of the mountains (*C. f. pallidus*) to dense, high, coastal sage scrub vegetation on the coastal side (*C. f. fallax*). On the desert side, occurs in pinyon-juniper woodlands, desert scrub, rocky slopes, and agave-ocotillo habitat, correlated with the presence of yucca. Tend to concentrate activities around shrubs. The *C. f. fallax* subspecies occurs from the eastern San Gabriel Mountains to near San Onofre along the coast, southwards into northern Baja California, Mexico (Wilson and Ruff 1999). In the Forests, occurs on all except the LPNF (Stephenson and Calcarone 1999).	Both subspecies occur on the Forests. *C. f. fallax* occurs on the coastal side of the mountains, and may be vulnerable to destruction of coastal sage scrub habitat due to urbanization (Stephenson and Calcarone 1999).

OBJECTIVES

Fauna

Preserve all remaining coastal sage scrub habitat in the National Forests. Degraded habitat shall be restored to the maximum extent practicable. Scrub that has been converted to grasslands shall be prioritized for rehabilitation. Other measures to protect the cactus wren and the rufous-crowned sparrow shall include but not be limited to:

- Creating habitat buffers around existing protected areas
- Identifying ongoing research on the ecology of the birds, and coordinating research efforts whenever possible
- Promoting sound urban habitat conservation practices among the public through education (e.g. discourage cactus removal by homeowners at the urban/rural interface, and modify current city/county weed abatement and fire suppression programs to limit the unnecessary destruction of cactus and coastal sage scrub habitats)

Prioritize land acquisition of scrub and chaparral habitat occurring within or adjacent to the Forests, particularly coastal sage scrub, washes, stream terraces, and floodplains.

Attempt to halt the spread of exotic Argentine and red fire ants into the Forests, and to eliminate any existing populations.

Protect suitable habitat for coastal cactus wrens (e.g. stands of coastal sage scrub with large prickly-pear cactus) from wildfire to the maximum extent practicable.

Conduct studies to determine the optimal timing and intensity of prescribed fire to promote the type of open scrub habitats required by the rufous-crowned sparrow.

Manage for primary carnivores, including mountain lions, bobcats, and coyotes, that control populations of mesopredators such as feral cats, raccoons, opossums, striped skunks, and gray foxes. Due to the low stature of the vegetation, the nesting and foraging by shrubland birds occurs relatively close to the ground, making them vulnerable to these mesopredators.

Flora

Determine trends in population for *Arctostaphylos edmundsii, Chorizanthe parryi* var. *parryi,* and *Lepidium virginicum* var. *robinsonii.*

Determine the vulnerability on Forest Service lands for *Lepidium virginicum* var. *robinsonii*.

Monitor at least every 5 years all populations of each of the above plant species.

Initiate botanical surveys in areas of potential habitat for these species to determine presence on Forest Service lands.

Complete a feasibility study for introduction to suitable habitat or re-introduction into historic locations. Implementation of an introduction/re-introduction program will augment the species, decreasing the need for listing under the Endangered Species Act in the future.

Implement appropriate fire regimes to benefit the health of the habitat and sensitive species.

Initiate weed control of exotic species that directly and indirectly compete with sensitive plant species in scrub and chaparral habitats.

STANDARDS

The Forest Service shall prohibit ORV use and domestic livestock grazing in suitable habitat for the coast horned lizard and the coast patch-nosed snake.

The Forest Service shall implement guidelines for federally listed plant species that occur in scrub and chaparral habitats.

MIXED HARDWOOD AND CONIFER HABITAT

Species/Status	Habitat Description	Threats
INVERTEBRATES		
SAN GABRIEL MTS. ELFIN BUTTERFLY *Incisalia mossii hidakupa* **FED: SC**	Found primarily on steep, north-facing slopes. Larval host plant is a stonecrop (*Sedum spathulifolim*) that is limited in extent. Known from only 6 locations in the San Gabriel and San Bernardino Mountains, including the San Antonio Canyon watershed, the Big Tujunga watershed, and in the Santa Ana watershed in the SBNF and the ANF (Stephenson and Calcarone 1999).	The major threat is over-collecting and destruction of host plants by butterfly collectors (Stephenson and Calcarone 1999).
AMPHIBIANS		
YELLOW-BLOTCHED SALAMANDER *Ensatina eschscholtzii croceater* **FED: S** **CA: SSC**	Occurs from California black oak, blue oak, and gray pine open woodlands to Jeffrey pine, ponderosa pine, and white fir open forest. Found in canyons amongst litter and debris from canyon live oaks, and extends onto slopes with California scrub oaks and deerbrush. Woody debris may be a key habitat component. Range is restricted to Kern and Ventura counties, in the Tehachapi Mountains, and extends into the Forests near Mount Pinos, Frazier Mountain, and Alamo Mountain (Jennings and Hayes 1994, Stephenson and Calcarone 1999).	Current and proposed developments in the Tehachapi Mountains threaten a significant portion of the range. The Tejon Ranch Company, a significant landowner in the range of the salamander, has conducted extensive oak woodcutting operations over the past decade, and opened up various areas of the ranch for hunting, camping, agriculture, mining, and potential investment. Existing and planned development in these areas have focused largely on oak woodlands, perhaps the most important habitat. In the Forests, over-collecting of standing trees and downed logs in oak-conifer forests may adversely impact the species (Jennings and Hayes 1994).
LARGE-BLOTCHED SALAMANDER *Ensatina eschscholtzii klauberi* **FED: S** **CA: SSC**	Occurs in a range of habitats, including canyon live oak and Coulter pine woodlands, yellow pine and incense cedar coniferous forests to California scrub oak, toyon, and buckwheat shrublands. The species favors coast live and black oak; woody debris—including oak logs and leaf litter—has been identified as a key habitat component for other species of Ensatina. The range is discontinuous from the San Jacinto Mountains to Cottonwood Creek, San Diego County. In the Forests, occurs on the CNF and the SBNF (Jennings and Hayes 1994, Stephenson and Calcarone 1999).	Intensive development of sandstone/woodland associations on steep slopes in montane Riverside and San Diego counties threatens this salamander, including improved pasture, drip-irrigated orchards, and luxury homes. Potential impacts from mining exist in the Crystal Creek area of the San Bernardino Mountains. May not be vulnerable to most current land use activities in the Forests (Jennings and Hayes 1994).

SAN GABRIEL MT. SLENDER SALAMANDER *Batrachoseps gabrieli* **FED: S**	Occurs in mixed hardwood-*conifer forests near water and is associated with rocky talus slopes. Generally found under large rocks, rotting logs, downed tree limbs, and bark in mesic lower-montane forests such as bigcone Douglas-fir/canyon live oak. This recently described species is known only from the eastern San Gabriel Mountains, at Pine Flats near Crystal Lake and Rockbound Canyon in the upper San Gabriel River, in San Antonio Canyon, and the south, middle, and north forks of Lytle Creek – all within the ANF and SBNF (Jennings and Hayes 1994, Stephenson and Calcarone 1999).	Very little is known about the distribution, abundance, and ecology of this species. May not be vulnerable to most current land use activities in the Forests, as its apparent niche under rocks, logs, and duff is not particularly threatened (Stephenson and Calcarone 1999).
BIRDS		
PURPLE MARTIN *Progne subis* **CA: SSC**	Nests colonially in cavities of large trees in oak or riparian woodlands and low-elevation coniferous forests. Nests are often found in a tall, old, isolated tree or snag in open forest or woodland, near a body of water (Garrett and Dunn 1981, Stephenson and Calcarone 1999). The purple martin was once a fairly common breeder in all the coast ranges of the state and in the Sierra Nevada. In the Forests, it historically occurred in all major mountain ranges, but has disappeared from the San Gabriel Mountains and Palomar Mountain. May still occur in the LPNF on Big Pine and San Rafael Mountains, Nojoqui Falls County Park, and the Alisal Ranch in the Santa Ynez Valley. Lake Hemet and Garner Valley are historic breeding sites in the San Jacinto Mountains (Stephenson and Calcarone 1999).	Introduced starlings have been observed ousting purple martins from nest cavities at a number of localities, and competition for nesting sites with starlings is likely to be at least partly responsible for the decline. Removal of dead trees (snags) has eliminated nesting sites in several areas (Remsen 1978, Garrett and Dunn 1981, Stephenson and Calcarone 1999).

OBJECTIVES

Fauna

Maintain sufficient amounts of oak logs, leaf litter, downed tree limbs, and other woody debris in suitable habitat for the yellow-blotched, large-blotched, and San Gabriel Mt. slender salamanders, as determined by the best available research on habitat requirements for the species.

Rehabilitate potential nest sites for purple martin. Such measures include but are not limited to:

- Experimenting with methods for starling control at nest sites
- Retaining large, old trees and snags (see section 24.0, *Timber Harvest*)
- Erecting nest boxes in areas where purple martins still nest (artificial nest boxes have been utilized by martins in Oregon)

STANDARDS

The Forest Service shall prohibit all mining activities in suitable habitat for the large-blotched salamander.

MONTANE CONIFER FOREST HABITAT

Species/Status	Habitat Description	Threats
INVERTEBRATES		
ANDREW'S MARBLE BUTTERFLY *Euchloe hyantis andrewsi* **FED: SC**	Found in pine and mixed conifer forests. Larval host plants are *Streptanthus bernardinus* and *Arabis holboellii*. Range is restricted to the San Bernardino Mountains near Lake Arrowhead and Big Bear Lake, and along the crest and north slope (Murphy 1990).	No obvious threats have yet been identified.
REPTILES		
SOUTHERN SAGEBRUSH LIZARD *Sceloporus graciosus vandenburgianus* **FED: SC**	Inhabits mixed-conifer forest, black oak woodlands, montane chaparral, and pinyon-juniper woodlands. Tends to prefer open sunny habitats. Patchily distributed; occurs at high elevations. Extends from near Mount Pinos south into Baja California, Mexico. In the Forests, it has been found at Big Bear Lake in the San Bernardino Mountains, the James Reserve in the San Jacinto Mountains, in the San Gabriel Mountains, and in San Diego County (Zeiner et al. 1988, Jennings and Hayes 1994, Stephenson and Calcarone 1999).	No obvious threats to the southern sagebrush lizard have been specifically identified, other than the fact that population distribution is limited and disjunct (Stephenson and Calcarone 1999).
SAN BERNARDINO MOUNTAIN KINGSNAKE *Lampropeltis zonata parvirubra* **FED: S CA: SSC**	Occurs in the San Jacinto, San Bernardino, and San Gabriel mountains, in well-illuminated canyons with rocky outcrops or rocky talus in association with bigcone spruce (*Pseudotsuga macrocarpa*), various canyon chaparral species at lower elevations, and with black oak, incense-cedar, Jeffrey pine, and ponderosa pine at higher elevations. Rocky outcrops or talus likely provide hibernation, oviposition, and refuge sites as well as the food resources for this lizard-eating snake (see *L. z. pulchra* account; Zeiner et al. 1988, Jennings and Hayes 1994, Stephenson and Calcarone 1999). In the Forests, this subspecies is found in the San Jacinto, San Bernardino, and San Gabriel mountains (Stephenson and Calcarone 1999).	This species is highly prized among collectors, despite regulations limiting collecting and laws preventing the sale of native reptiles in the state. Black market trade continues with high demand (especially in Europe) because collectors want examples of each of the various color morphs known from southern California (e.g. the "San Gabriel phase", the "San Jacinto phase", etc.). Sharply increased public use levels of the ANF (San Gabriel Mountains) and SBNF (San Bernardino Mountains and Mount San Jacinto) over the past 25 years have increased collecting pressure (Jennings and Hayes 1994).

SAN DIEGO MOUNTAIN KINGSNAKE *Lampropeltis zonata pulchra* **FED: S** **CA: SSC**	Inhabits coniferous forests, chaparral, riparian zones, wet meadows, and woodlands. Most common in the vicinity of rocks or boulders near streams or lake shores, and rotting logs. In interior mountain ranges, occurs primarily in associations of ponderosa, Jeffrey and Coulter pine, and black oak; infrequently found below coniferous forest associations. Occurs below the edge of mixed oak-*coniferous forest in riparian woodlands, usually in canyon bottoms that have western sycamore, Fremont's cottonwood, coast live oak, willows, wild rose, and blackberries. May be found in narrow riparian woodlands in association with chaparral and coastal sage vegetation types. Rocks or rocky outcrops are an important element of its habitat because they provide suitable refuge sites, harbor necessary food resources, and provide overwintering sites. The San Diego subspecies occurs in the mountains of San Diego County, including Laguna, Cuyamaca, Volcan, Hot Springs, and Palomar, as well as the Santa Ana and Santa Monica mountains (Zeiner et al. 1988, Jennings and Hayes 1994, Stephenson and Calcarone 1999).	Highly prized among collectors despite prohibitions on collecting or selling it in California. Individuals in possession by their owners before the prohibition was implemented are legal. The destruction of local habitat, dismantling outcrops, and shredding of logs and stumps, especially in San Diego County, may also be a reason for decline. Rock-chipping for the kingsnake as well as for selected lizards was documented over 15 years ago, and continues to be a problem in certain local areas, despite the fact that altering habitat in this way is prohibited under current regulations by both State and Federal land management and resource agencies. Illegal fuelwood harvesting also adds to the problem of habitat alteration (Jennings and Hayes 1994).
BIRDS		
SHARP-SHINNED HAWK *Accipiter striatus* **CA: SSC**	Nests in coniferous forests within riparian areas or on north-facing slopes. Nest stands are dense patches of small trees, and are cool, moist, well- shaded, near water, and with little ground cover, near open areas. During winter and the migration period, this species occurs in nearly all habitats, avoiding alpine, open prairie, bare desert, grassland, and marshland. For breeding, prefers ponderosa pine, black oak, mixed conifer, and Jeffrey pine, and especially riparian deciduous habitats. Critical foraging habitat includes north-facing slopes with perches for plucking prey (Remsen 1978, Zeiner et al. 1990b, Johnsgard 1990, Small 1994). Breeding population greatly reduced from former levels, but data is lacking. In the Forests, occurs regularly in winter and as a migrant. Nesting has been recorded only in the northern Santa Lucia, San Gabriel, San Bernardino and San Jacinto mountains, but it is not known how regularly (Stephenson and Calcarone 1999).	The use of DDT following World War I led to declines in populations. Forest management practices producing monoculture forest are also implicated in declines. The total population breeding within California is very small, and thus vulnerable to disturbance at nest sites and impacts from falconry (Remsen 1978, Stephenson and Calcarone 1999).

NORTHERN GOSHAWK *Accipiter gentiles* **FED: S** **CA: SSC**	Occurs in ponderosa and Jeffrey pine, mixed conifer, white fir, and lodgepole pine habitats. Nest sites are generally in dense stands of large trees, with higher canopy cover and more open understories than the surrounding forest. Large snags and downed logs appear to be important habitat elements because they are correlated with small to medium-sized birds and mammals that are the primary prey of the goshawk (Reynolds et al. 1992, Stephenson and Calcarone 1999). An uncommon permanent resident in the mountains of California in the Sierra south as far as Tulare County, and in the northern Coast Range south as far as Mendocino County. There are summer reports from the San Jacinto Mountains (Tahquitz Valley, Willow Creek, Skink Cabbage, Humber Park, and Lake Fulmor), the San Bernardino Mountains (Big Bear, Arrowbear, and Fish Creek), and Mount Abel and Mount Pinos in the southern Coast Range. There is no data on population trends in California, but this species is reported infrequently, and the total population breeding within California is probably quite small and vulnerable (Remsen 1978, Garret and Dunn 1981, Stephenson and Calcarone 1999).	Since most of the habitat of this species is within public lands such as National Forests and National Parks, there is comparatively little threat in the way of habitat destruction, but falconry, logging, and stand-replacement fire are potential threats (Remsen 1978, Stephenson and Calcarone 1999).
VIRGINIA'S WARBLER *Vermivora virginiae* *Ca: SSC*	Breeding habitat consists of brushy areas within arid coniferous forests, including mountain mahogany, manzanita, and serviceberry. Rare and local summer resident along the Nevada border. Only a few scattered breeding localities are known: Wyman Canyon, White Mountains, Inyo County; east side of Monitor Pass, Mono County; and Clark Mountain, San Bernardino County. Recently expanded its breeding range into the San Bernardino (Arrastre Creek and the South Fork of the Santa Ana River) and San Gabriel Mountains (Blue Ridge) in the Forests (Stephenson and Calcarone 1999).	Habitat destruction (unlikely except by forest fire) is a potential threat (Stephenson and Calcarone 1999).

MAMMALS		
LONG-EARED MYOTIS BAT *Myotis evotis* **FED: SC**	Prefers coniferous vegetation, but occurs as low as pinyon-juniper forests and sagebrush steppe in the western United States and riparian desert scrub in Baja California, Mexico. Found in areas containing deciduous trees where streams or reservoirs are present. Presence of broken rock outcroppings and snags for roosts is probably more important in determining habitat suitability than actual type or species of vegetation. For day roosts, it uses sink holes, crevices, caves, slabs of bark, under rocks, hollow trees, abandoned mines, buildings, and railroad trestles (Wilson and Ruff 1999). In the Forests, occurs along Indian Creek and Pine Springs (LPNF), Dorr Canyon Spring, Islip Saddle, and Big Rock campground (ANF), Arrastre Creek, Holcomb Valley, Alpine Canyon, and Coon Creek (SBNF), and the Laguna and Cuyamaca mountains (CNF) (Stephenson and Calcarone 1999).	Presumably the major threat is destruction of roosting, maternity, and hibernacula sites in abandoned mines, caves, and trees. Stand-replacement fire in the bat's coniferous forest habitat has also been identified as a threat (Stephenson and Calcarone 1999, Wilson and Ruff 1999).
FRINGED MYOTIS BAT *Myotis thysanodes* **FED: SC**	A resident of oak, dry pine, mixed conifer, and pinyon-juniper forests and the desert scrub of the Southwest. Roost sites include caves, mines, rock crevices, cliff faces, trees, and buildings, but hibernation has only been documented in buildings and mines (Barbour and Davis 1969, Stephenson and Calcarone 1999, Wilson and Ruff 1999). In the Forests, recorded on Frazier Mountain and Pine Springs (LPNF), Buckhorn and Big Rock campgrounds (ANF), Arrastre Creek (SBNF), and Laguna Mountain (CNF) all above 4,600 feet (Stephenson and Calcarone 1999).	The major threat is disturbance to roost, nursery, and hibernacula sites in caves, abandoned mines, and trees. Stand-replacement fire of conifer forests and pinyon-juniper forests is also a threat (Stephenson and Calcarone 1999).
LONG-LEGGED MYOTIS BAT *Myotis volans* **FED: SC**	Occupies mountainous or rugged areas of coniferous forests and sometimes oak or riparian woodlands and desert areas. Roosts in large ponderosa pine snags, crevices in cliffs, cracks in the ground, caves, and abandoned buildings (Wilson and Ruff 1999). In the Forests, found on Frazier Mountain and Chief Peak (LPNF), Dorr Canyon Spring and Buckhorn and Big Rock campgrounds (ANF), Big Bear Lake Dam and Holcomb, Deep, and Arrastre creeks (SBNF), and Laguna Mountain and Lost Valley (CNF).	Again, the major threat is disturbance to roost, nursery, and hibernacula sites (Stephenson and Calcarone 1999).

MT. PINOS LODGEPOLE CHIPMUNK *Tamias speciosus callipeplus* **FED: S**	Occurs only in the high-elevation subalpine and alpine habitats around Mount Pinos and Mount Abel (LPNF; Stephenson and Calcarone 1999). Found in open-canopy forests with an understory of shrubs, particularly in lodgepole pine forests but also white fir, Jeffrey pine, and mixed conifer. Shrubs include chinquapin or manzanita (Williams 1986, Zeiner et al. 1990a). Eats seeds and fungi, and nests in holes in dead snags and stumps (Wilson and Ruff 1999).	Limited distribution and habitat makes this subspecies vulnerable to habitat alteration. Stand-replacement fire could be a threat (Stephenson and Calcarone 1999).
SAN BERNARDINO FLYING SQUIRREL *Glaucomys sabrinus californicus* **FED: S** **CA: SSC**	A major prey species for the California spotted owl, known from mid- to high-elevation coniferous forest, and apparently does not occur in lower-montane bigcone Douglas-fir/canyon live oak forests. Generally found in denser, mature, coniferous forests, especially white fir, near riparian areas. Uses cavities in large trees, snags, and logs for cover (Zeiner et al. 1990a, Stephenson et al. 1999). In the Forests, occurs in the San Bernardino Mountains, and historically in the San Jacinto Mountains though no recent sightings have been reported there (Stephenson and Calcarone 1999).	This species' apparent extirpation from the San Jacinto Mountains and limited distribution in high-elevation forests has concerned managers about their vulnerability in the San Bernardino Mountains. Little is known about movements, population dynamics, and threats. May benefit from fire suppression and resulting high white fir densities in the short term, but may be susceptible to large fires (Stephenson and Calcarone 1999).
SAN BERNARDINO WHITE-EARED POCKET MOUSE *Perognathus alticola alticola* **FED: S** **CA: SSC**	This species is the rarest of the pocket mice, occurring as isolated, relict populations at a few scattered localities along the desert slopes of the Transverse and San Bernardino ranges. *P. a. alticola* was last found in 1934 near Little Bear Lake and may be extinct. Had been found on the dry floor of open pine forest among bracken ferns (Wilson and Ruff 1999). The species may also occur in sagebrush, pinyon-juniper, and open pine forests on the north side of the San Bernardino and maybe San Gabriel mountains (Stephenson and Calcarone 1999).	Little data is available on this subspecies.

OBJECTIVES

Fauna

Conduct annual systematic monitoring to ensure that prohibitions against kingsnake habitat alteration are enforced and alteration of habitat is minimized. The Forest Service shall implement a program of public education to make prohibitions effective.

Protect riparian-deciduous forests as habitat for the sharp-shinned hawk, Known nest sites shall be protected from disturbance to the maximum extent practicable.

Flora

Determine the population trend and vulnerability on Forest Service lands for the following alpine and subalpine species: *Erigeron breweri* var. *jacinteus, Heuchera hirsutissima, Monardella cinerea, Podistera nevadensis, Viola pinetorum* ssp.

grisea, Eriogonum kennedyi var. *alpigenum, Eriogonum microthecum* var. *johnstonii, Eriogonum umbellatum* var. *minus, Heuchera abramsii, Hulsea vestita* ssp. *pygmaea, Leptodactylon jaegeri, Oreonana vestita,* and *Potentilla rimicola.*

Initiate botanical surveys in areas of potential habitat for these species to determine presence on Forest Service lands.

Initiate weed control of exotic species that directly and indirectly compete with sensitive plant species in subalpine/alpine habitats.

Place interpretive signs at appropriate sites adjacent to the subalpine/alpine habitats, as an educational opportunity.

The Forest Service shall determine the population trend and vulnerability on Forest Service lands for the following montane conifer species: *Antennaria marginata, Astragalus bicristus, Astragalus lentiginosus* var. *antonius, Castilleja montigena, Eriophyllum lanatum* var. *obovatum, Galium jepsonii, Heuchera elegans, Hulsea vestita* ssp. *callicarpha, Lupinus excubitus* var. *johnstonii, Oxytheca caryophylloides, Castilleja gleasonii, Galium angustifolium* ssp. *jacinticum, Heuchera parishii, Horkelia wilderae, Ivesia callida, Linanthus concinnus, Machaeranthera canescens* var. *ziegleri, Mimulus clevelandii, Oxytheca parishii* var. *cienegensis, Phlox dolichantha, Piperia leptopetala, Sedum niveum, Senecio ionophyllus,* and *Sidalcea hickmanii* var. *parishii.*

The Forest Service shall monitor the above plant species by the following matrix based on year:

	HIGH VULNERABILITY	**MEDIUM VULNERABILITY**	**LOW VULNERABILITY**
Declining	Annually	Bi-annually	Every 3 years
Stable	Bi-annually	Every 4 years	Every 5 years
Increasing	Every 3 years	Every 5 years	Every 10 years

Note: for annual species, monitoring frequency will be performed in years with appropriate environmental conditions for species detection.

STANDARDS

The Forest Service shall prohibit the alteration of habitat (rock-chipping and removal of wood) for San Diego and San Bernardino mountain kingsnakes. Regulations against habitat alteration shall be strictly enforced with criminal penalties.

The Forest Service shall identify abandoned mines and caves that are used by long-legged, fringed, and long-eared myotis bats for roosting and hibernacula, and protect such sites from human disturbance by gating off entrances and protecting roost buildings and other structures from vandalism.

For pre-project plant surveys follow BLM's Handbook on Special Status Plant Management (1996).

MONTEREY COAST HABITAT

Species/Status	Habitat Description	Threats
MAMMALS		
MONTEREY DUSKY-FOOTED WOODRAT *Neotoma fuscipes luciana* **FED: SC CA: SSC**	Little data exist on this subspecies of *N. fuscipes*. Dusky-footed woodrats are found in dense chaparral, oak, and riparian woodland, and in mixed conifer alliances with a well-developed understory. In central coastal areas, the species appears to prefer closed woods on drier sites with a high percentage of live oaks, and a mixed shrub understory (Williams et al. 1992). In the Forests, the species is common in the northern Santa Lucia Range, but it is unknown whether it is this subspecies (Stephenson and Calcarone 1999).	Fire, shrub removal, timber harvest, and other human disturbances generally reduce the suitability of woodrat habitat (Williams et al. 1992).

OBJECTIVES

Fauna

Conduct appropriate fuels management in chaparral and oak habitat for the Monterey dusky-footed woodrat (see section 5.0, *Vegetation Management*).

Flora

Determine trends in population for *Galium californicum* ssp. *luciense* and *Perideridia gairdneri* ssp. *gairdneri.*

Monitor species with declining population trends and low vulnerability on Forest Service lands at least every 3 years.

Monitor species with stable population trends and low vulnerability on Forest Service lands at least every 5 years.

Initiate botanical surveys in areas of potential habitat for these species to determine presence on Forest Service lands.

Complete a feasibility study for introduction to suitable habitat or re-introduction into historic locations. Implementation of a successful introduction/re-introduction program will augment the species, decreasing the need for listing under the Endangered Species Act in the future.

Protect hydrology of the Monterey coastal habitats, to maintain the sensitive species that occur there.

Initiate weed control of exotic species that directly and indirectly compete with sensitive plant species in Monterey coastal habitats.

Place interpretive signs at appropriate sites adjacent to the Monterey coastal habitats, as an educational opportunity.

DESERT MONTANE

Species/Status	Habitat Description	Threats
INVERTEBRATES		
DESERT MONKEY GRASSHOPPER *Psychomastix pysylla deserticola* **FED: SC**	Endemic to the lower desert-side slopes of the San Bernardino Mountains. Little data exist on habitat, but this species is described as occurring in arid environments; chamise may be a possible food source (Stephenson and Calcarone 1999).	No threats have yet been identified.
SAN EMIGDIO BLUE BUTTERFLY *Plebulina emigdionis* **FED: SC**	Closely associated with saltbush in alkali sink areas (Murphy 1990) but distribution is more localized than the host plant. Perhaps an obligatory mutualistic relationship between 1 or more ant species (Stephenson and Calcarone 1999). Found along the Mojave River, but isolated colonies occur in the Forests from Bouquet and Mint canyons near Castaic, in canyons along the north side of the San Gabriel Mountains near the edge of the desert, and in arid areas south of Mount Abel near San Emigdio Mesa (Stephenson and Calcarone 1999).	Urbanization has caused declines along the Mojave River.
BIRDS		
GRAY VIREO *Vireo vicinior* **CA: SSC**	In the San Jacinto Mountains and San Diego ranges, found in dense, mature chaparral dominated by chamise or redshank (Unitt 1984); also found on brushy slopes in pinyon-juniper woodlands and in the San Gabriel and San Bernardino Mountains. Once a locally common summer resident on the desert slopes of the mountain ranges of southern California. Currently occurs near Valyermo in the San Gabriel Mountains, Rose Mine, and Cactus Flats in the San Bernardino Mountains, and Pinyon Flats in the San Jacinto Mountains. Occurs in arid shrublands between Palomar and Hot Springs mountains, and on the southern slope of the Laguna Mountains from Pine Valley Creek southeast to La Posta Creek (Stephenson and Calcarone 1999).	In most cases, habitat destruction is not a factor. Since vireos are highly susceptible to cowbird parasitism, perhaps this is another of the small passerines being decimated by cowbirds (Remsen 1978, Stephenson and Calcarone 1999).

HEPATIC TANAGER *Piranga falva* **CA: SSC**	Restricted to arid montane habitats; known to occur only in the San Bernardino Mountains, including upper Arrastre Creek and Round Valley, both east of Baldwin Lake. Breeding habitat consists of mature pinyon pine woodland with a mix of taller conifers such as white fir or Jeffrey pine. May also occur in pine and deciduous oak woodlands on arid slopes (Garret and Dunn 1981, Stephenson and Calcarone 1999)	Habitat destruction of white fir-*pinyon areas on the desert peaks is unlikely, except by forest fires. Habitat destruction and human disturbance are still potential threats in some areas; target shooters, ORV users, and general picnickers can impact the very shy, wary species (Remsen 1978).
MAMMALS		
TEHACHAPI POCKET MOUSE *Perognathus alticola inexpectatus* **FED: S** **CA: SSC**	Endemic to the Tehachapi Mountains and the western Transverse Ranges, but habitat is not well defined. Found in a fallow grain field where desert shrubs and grasses dominate nearby hills. Also collected on grassy flats among scattered yellow pine trees, in arid annual grassland, desert shrub communities, and pinyon pine woodland. In view of the scarcity of specimens and the general inability to find them, their populations must be small, scattered, and vulnerable to changes in habitat quality (Williams 1986). Known from a few scattered locales in the Tehachapi Pass on the northeast, to the area of Mt. Pinos on the southwest (Pinyon Pines, Cuddy Valley, and Chuchupate Campground), and around Elizabeth, Hughes, and Quail Lakes on the southeast. Populations may intergrade with populations of *P. parvus xanthonotus* in the Tehachapi Mountains in the vicinity of Walker Pass and adjacent canyons. Habitat for pocket mice appears to be nearly continuous along the desert slopes of the southern Sierra Nevada, Tehachapi Mountains, San Gabriel Mountains, and San Bernardino Mountains (Williams 1986, Stephenson and Calcarone 1999).	Very little data are known.
SAN DIEGO DESERT WOODRAT *Neotoma lepida intermedia* **FED: SC** **CA: SSC**	Prefers rocky outcrops, cliffs, and slopes in coastal sage scrub and chaparral habitats. In coastal sage scrub communities, they are known to associate with the prickly pear (*Opuntia occidentalis*). Woodrats have been shown to have a minimum requirement of dense shrub cover to persist in a habitat. Foraging and breeding habitat for the woodrat is the same.	Primarily threatened by habitat loss and fragmentation due to urban and agricultural development within the coastal sage scrub habitat. Development, the use of herbicides for vegetation control, and cattle grazing threaten most of the known occurrences (Stephenson and Calcarone 1999).

OBJECTIVES

Fauna

Preserve desert peak white fir groves, and manage them to protect the hepatic tanager.

Flora

Determine trends in population and vulnerability on Forest Service lands for *Canbya candida, Chorizanthe xanti* var. *leucotheca, Cordylanthus eremicus* ssp. *eremicus, Linanthus floribundus* ssp. *hallii, Muilla coronata, Stylocline masonii,* and *Viola aurea.*

The Forest Service shall determine the trends in population for *Arabis dispar, Astragalus lentiginosus* var. *sierrae, Astragalus leucolobus, Castilleja plagiotoma, Caulanthus simulans, Delphinium inopinum, Dudleya abramsii* ssp. *affinis, Marina orcuttii* var. *orcuttii, Opuntia basilaris* var. *brachyclada, Swertia neglecta,* and *Syntrichopappus lemmonii*.

Determine the vulnerability on Forest Service lands for *Eriogonum foliosum.*

Monitor the above plant species by the following matrix based on year:

POPULATION TREND	HIGH	MEDIUM	LOW
Declining	Annually	Bi-annually	Every 3 years
Stable	Bi-annually	Every 4 years	Every 5 years
Increasing	Every 3 years	Every 5 years	Every 10 years

Note: for annual species, monitoring frequency will be performed in years with appropriate environmental conditions for species detection.

Initiate botanical surveys in areas of potential habitat for these species to determine presence on Forest Service lands.

Complete a feasibility study for introduction to suitable habitat or re-introduction into historic locations. Implementation of a successful introduction/re-introduction program will augment the species, decreasing the need for listing under the Endangered Species Act in the future.

Implement appropriate fire regimes to benefit the health of the habitat and sensitive species. Fire will be suppressed in the pinyon-juniper communities. Control burns in chaparral will not be implemented with greater frequency than 50 years in a specific area. Wildfires will be suppressed in areas where fire has occurred in the previous 50 years (Hanes 1990). These timeframes allow for full succession of the chaparral community to occur, renewing the seed bank and decreasing fuel loads that cause catastrophic fires.

Initiate weed control of exotic species that directly and indirectly compete with sensitive plant species in desert montane habitats.

Place interpretive signs at appropriate sites adjacent to the desert montane habitats, as an educational opportunity.

STANDARDS

The Forest Service shall restrict human access (e.g. prohibit overnight camping and use of firearms) in areas where the hepatic tanager is known to occur and breed.

For pre-project plant surveys follow BLM's Handbook on Special Status Plant Management (1996).

GABBRO HABITAT

Species/Status	Habitat Description	Threats
INVERTEBRATES		
THORNE'S HAIRSTREAK BUTTERFLY *Mitoura thornei* **FED: SC**	The larval host plant is the Tecate cypress (*Cupressus forbesii*). The Tecate cypress grows in alkaline, clay soils derived from gabbroic (i.e. coarse-grained igneous) rock. The butterfly is known only from the area of Otay Mountain near the Mexican border in southwestern San Diego County. It apparently does not occur in the Forests, but has the potential to occur on the CNF (Stephenson and Calcarone 1999).	The biggest threat to this species is overly frequent fire, which could affect the Tecate cypress (see section 5.0, *Vegetation Management;* Stephenson and Calcarone 1999).

OBJECTIVES

Fauna

Focus fire management in Tecate cypress groves on maintaining natural fire regimes to protect the Thorne's hairstreak butterfly (see section 5.0, *Vegetation Management*).

Flora

Determine the trends in population for *Arctostaphylos otayensis* and *Brodiaea filifolia.*

Determine the vulnerability on Forest Service lands for *Nolina interrata.*

Monitor the above species by the following matrix based on year:

	HIGH VULNERABILITY	MEDIUM VULNERABILITY	LOW VULNERABILITY
Declining	Annually	Bi-annually	Every 3 years
Stable	Bi-annually	Every 4 years	Every 5 years
Increasing	Every 3 years	Every 5 years	Every 10 years

Note: for annual species, monitoring frequency will be performed in years with appropriate environmental conditions for species detection.

Initiate botanical surveys in areas of potential habitat for these species to determine presence on Forest Service lands.

The Forest Service shall complete a feasibility study for introduction to suitable habitat or re-introduction into historic locations. Implementation of a successful introduction/re-introduction program will augment the species, decreasing the need for listing under the Endangered Species Act in the future.

Implement appropriate fire regimes to benefit the health of the habitat and sensitive species.

Initiate weed control of exotic species that directly and indirectly compete with sensitive plant species in gabbro habitats.

Place interpretive signs at appropriate sites adjacent to the gabbro soil habitats, as an educational opportunity.

STANDARDS

The Forest Service shall implement guidelines for federally listed species that occur on gabbro soils.

For pre-project plant surveys follow BLM's Handbook on Special Status Plant Management (1996).

The Forest Service shall initiate mineral withdrawal on gabbro soils that support or have potential to support sensitive plant species.

LAKE HABITAT

Species/Status	Habitat Description	Threats
BIRDS		
OSPREY *Pandion haliaetus* **CA: SSC**	Occurs on offshore islands, seacoast, coastal lagoons, large bays, estuaries, freshwater lakes and reservoirs, and large rivers. Strictly associated with large, fish-bearing waters and occurs in ponderosa pine through mixed-conifer habitats. Breeding habitats require 3 components: fish that move slowly near the water surface; an ice-free season long enough to permit reproduction; and elevated nest sites. Prefers nest sites that are dead, or open-topped live trees located beside or in the water; sometimes rock outcrops or cliffs are used as well. Range extends the length of California, and the bird is typically a winter visitor or transient where it is observed in Los Angeles County. In the Forests, nesting has been observed at Lake Casitas near Ventura, and Lake San Antonio in Monterey County (Johnsgard 1990, Stephenson and Calcarone 1999).	Has vanished as a nesting species almost completely from southern California, including the Channel Islands. Human disturbance or destruction of nests and declining fishery stocks, as well as contamination by persistent pesticides (e.g. DDT), have contributed to the decline of populations. Removal of nesting trees, degradation of river and lake water quality, boating on nesting lakes, and shooting may all be partly responsible for declines. Southern California populations had disappeared long before the pesticide era (Remsen 1978).

OBJECTIVES

Fauna

Preserve habitat critical to the survival of the osprey in southern California, and other measures shall be adopted to protect the raptor. Such measures shall include but are not limited to:

- Protecting all nesting trees, many of which are dead and thus susceptible to tree removal operations
- Preserving potential suitable nesting trees and other nesting sites
- Restricting boating during breeding season on lakes fished by ospreys
- Providing artificially constructed nesting sites to help restore osprey populations

LOW-ELEVATION VALLEY FLOOR HABITAT

Species/Status	Habitat Description	Threats
AMPHIBIANS		
WESTERN SPADEFOOT TOAD *Spea hammondii* **FED: SC** **CA: SSC**	Primarily a lowland species, inhabiting open chaparral, foothills, grasslands, and occasionally woodlands. Abundant in areas with crumbly soil. Commonly this includes washes, alluvial fans, playas, or even alkali flats. Open habitats with short grass and sandy or gravelly substrates are preferred and facilitate the construction of burrows. Often occupies burrows made by California ground squirrels, remaining holed up in the burrow during dry periods. Soil characteristics of burrow refuge sites have not been studied, but if they are similar to those of other *Spea* species, the soil may become fairly compact and hard during summer aestivation. For breeding, the Western spadefoot toad requires temporary rainpools with water temperatures between 48º F and 86º F that last 3 weeks in order to metamorphose successfully. Rainpools in which western spadefoots successfully reproduce and metamorphose lack fishes, bullfrogs, and crayfishes. Most restricted distribution of all members of the genus. Endemic to the Californias and ranges mostly along the coastal regions, with some extension into the Central Valley and bordering foothills, from the vicinity of Redding, Shasta County, southward into northwestern Baja California, Mexico. In California, the known range of *S. hammondii* is entirely west of the Sierran-desert range axis (Zeiner et al. 1988, Jennings and Hayes 1994).	Currently extinct throughout much of southern California, presumably because of the loss of ephemeral breeding sites. Non-native species such as the bullfrog and the mosquitofish are known to prey on adults and tadpoles. Continued placement of mosquitofish by mosquito abatement programs in vernal pools threatens some populations. Current data indicate that in southern California (from the Santa Clara River Valley, Los Angeles and Ventura counties, southward), > 80% of habitat once occupied has been developed or converted to uses that are incompatible with successful reproduction and recruitment. In many areas of the Central Valley, remaining suitable rainpool or vernal pool habitat, concentrated on valley terraces along the edges of the Valley Floor, has been disappearing in a fragmented fashion, which may present a significant threat to its metapopulation structure. Rainpool habitats that harbor *S. hammondii* are protected in small preserves, under the jurisdiction of The Nature Conservancy (e.g. Santa Rosa Plateau, Riverside County; Pixley Vernal Pools Preserve, Tulare County; Jennings and Hayes 1994).
BIRDS		
BURROWING OWL *Athene cunicularia hypogaeae* **FED: SC** **CA: SSC**	Prefers dry, open, treeless shortgrass plains, often in areas with little or no vegetation, which are usually associated with burrowing mammals and rodents. Can also be found on golf courses, at airports, in cemeteries, in vacant residential lots, and along shoulders of roadways (Small 1994). Occurs primarily in agricultural and grassland areas of interior and coastal valleys, and in fewer numbers on bluffs along the immediate coast of California, but are resident on the Channel Islands. Burrowing owls from more northerly areas occasionally migrate into southern and coastal regions of Southern California during the winter.	Conversion of grasslands and pasturelands to agriculture, and destruction of ground squirrel colonies have been the main factors causing population decline. Bio-accumulation of poisons applied to ground squirrel colonies has probably also taken a toll. Propensity for nesting in roadside banks also makes them particularly vulnerable to roadside shooting, roadkill, road maintenance operations, and general harassment (Remsen 1978).

LOGGERHEAD SHRIKE *Lanius ludovicianus* **FED: SC** **CA: SSC**	Resident and winter visitor in lowlands and foothills throughout California. Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Fairly common resident year round in grasslands, fields, and agricultural areas. Woodlands habitat includes oaks, oak-*conifer woods, pinyon-*juniper associations, Joshua tree woodland, parks, and suburban "woodland." Also chaparral, coastal sage scrub, brushlands, sagebrush, and other brushy vegetation of cool, arid areas. Highest densities occur in open-canopied valley foothill hardwood, valley foothill hardwood-*conifer, valley foothill riparian, pinyon-*juniper, juniper, desert riparian, and Joshua tree habitats. Found rarely in heavily urbanized areas, but is found in open cropland. Occasionally uses edges of denser habitats. Perch sites are important to the ecology of this species. Traditional forms of agriculture using hedgerows probably provided excellent habitat; today, roadside areas containing barbed wire fences, power lines, or telephone poles are preferred. Large range extending from the southern portion of Canada to the southern reaches of Mexico. Occurs in high concentrations throughout areas that have < 12 inches of snow a year: the Southeast, areas of the West along the lower Colorado River, and the San Joaquin valley of California. Resident in interior central and southern portions, as well as Channel Islands. In April through September, present in northeast California to Owens Valley (Remsen 1978, Stesphenson and Calcarone 1999).	Relatively indiscriminate in their foraging habits; prey density does not seem likely to affect their distribution patterns, but does affect abundance within a given area. Availability of suitable territories may be limiting. Virtually nonexistent in dense chaparral or forests and requires open areas with suitable perches (Remsen 1978).

MAMMALS		
LOS ANGELES POCKET MOUSE *Perognathus longimembris brevinasus* **FED: S CA: SSC**	Subspecies of the little pocket mouse, which is distributed throughout southern California deserts. Distributed within the Los Angeles basin. Nocturnal; tends to hibernate below ground when temperatures drop and/or food availability decreases (Zeiner et al. 1990a). Prefers open ground with fine sandy soils. Geographic range is restricted to lower-elevation grasslands and coastal sage associations in the Los Angeles Basin, from approximately Burbank and San Fernando on the northwest, to San Bernardino on the northeast, and Cabazon, Hemet, and Aguanga on the east and southeast. Geographic limits on the southwest are not clear, but probably somewhere near the Hollywood Hills (Stephenson and Calcarone 1999).	Populations have greatly declined due to severe and continuing loss of suitable habitat. Urbanization and cultivation of the majority of the land within the interior valleys of the Los Angeles Basin have made a large percentage of this species' historic range uninhabitable (Zeiner et al. 1990a).
SAN DIEGO BLACK-TAILED JACKRABBIT *Lepus californicus bennettii* **FED: SC CA: SSC**	Found on a narrow strip along the southern coast of California and southward about 200 miles, along the west coast of the Baja peninsula (Wilson and Ruff 1999). Occurs only on the coastal side of the southern California mountains, in grasslands or sparse coastal scrub. In the Forests, reported from Santa Ysabel and the Laguna and Cuyamaca mountains (Stephenson and Calcarone 1999).	Most of the historic habitat has been developed or converted to agriculture (Stephenson and Calcarone 1999).

OBJECTIVES

Fauna

Preserve all remaining rainpool, vernal pool, and upland critical habitat for the western spadefoot toad.

Prioritize the acquisition of land adjacent to the Forests to protect the Los Angeles pocket mouse. These habitats include coastal sage scrub.

STANDARDS

The Forest Service shall prohibit disturbance at and around nesting burrows of burrowing owls. Ground squirrel colonies supporting burrowing owls shall be protected and monitored as critical wildlife areas.

DESERT FLOOR HABITAT

Species/Status	Habitat Description	Threats
BIRDS		
BENDIRE'S THRASHER *Toxostoma bendirei* **CA: SSC**	Very local spring and summer resident and breeder in flat areas of desert succulent shrub and Joshua tree habitats in the Mojave Desert area. Occurs primarily in San Bernardino County, along the eastern and northern base of the San Bernardino Mountains. Forages on the desert floor with scattered clumps of cactus, yucca, and thorny scrub. Nests in cholla, yucca, paloverde, thorny shrubs, or small trees. Migrants appear in California in February. Most leave breeding grounds by August, although fall and winter records are occasionally reported (England and Laudenslayer 1989).	Potentially serious threats include harvesting of Joshua tree and other yuccas for soap products, grazing by domestic livestock, urbanization, and ORV activity within its limited breeding range (Remsen 1978, Stephenson and Calcarone 1999).
LECONTE'S THRASHER *Toxostoma lecontei* **CA: SSC**	Widespread but rare permanent resident in the western and southern San Joaquin Valley, upper Kern River Basin, Owens Valley, Mojave Desert, and Colorado Desert. Known to occur in Joshua tree woodlands in the Mojave Desert and arid desert scrub in the Carrizo Plain (Garrett and Dunn 1981). Inhabits very sparse desert scrub, especially around small washes. Densities even in optimum habitat are 5 pairs or less per square mile — an extremely low density for any passerine bird. Many areas with seemingly suitable habitat lack this species (Remsen 1978); Stephenson and Calcarone (1999) note that it is unlikely to occur in the Forests.	Although it inhabits some of the most inhospitable regions in California, most of its habitat is also preferred racing grounds for ORV enthusiasts. Not only is this species rare and local, but exceptionally wary of human beings. The impact of even a single motorcycle race through a desert wash (preferred nest sites are in large shrubs along washes) on a breeding pair may be considerable. The remnant San Joaquin Valley and Owens Valley populations are threatened by agricultural development (Remsen 1978).
SUMMER TANAGER *Piranga rubra* **CA: SSC**	Nests in desert riparian groves dominated by mature Fremont cottonwoods. In the Forests, may nest in Fremont cottonwood groves along the northern base of the San Gabriel Mountains, the Mojave River at Mojave Narrows Regional Park, Whitewater Canyon along the base of the San Bernardino Mountains, and the lower reaches of Palm and Andreas canyons on the desert side of the San Jacinto Mountains (Stephenson and Calcarone 1999).	Destruction of cottonwood habitat, particularly along the Colorado River, is the major cause of the decline. Suitable breeding habitat for this species must include some tall trees, preferably continuous cottonwood riparian woodland (Stephenson and Calcarone 1999).

MAMMALS		
CALIFORNIA LEAF-NOSED BAT *Macrotus californicus* **FED: S** **CA: SSC**	Found in lowland desert associations. Habitats occupied include desert riparian, desert wash, desert scrub, desert succulent shrub, alkali desert scrub, and palm oasis (Williams 1986). Roost in rocky, rugged terrain, and appear to be limited to areas with suitable day roosts. Day roosts usually are in deep mine tunnels or caves, and occasionally in buildings or bridges. The roost must provide shelter from heat and aridity (i.e., high ceilings and sufficient space for flight). Night roosts may be in buildings, mines, bridges, rock shelters, or other sites with overhead protection. Gregarious, roosts in groups of up to 500; they forage over nearby flats and washes. Occurs from southern Nevada, southern California, and western Arizona southward through Baja California Sur and Sonora, Mexico. In California, occupies low-lying desert areas of southern California, including the coastal basins. In California, distributed from Riverside, Imperial, San Diego, and San Bernardino counties south to the Mexican border (Zeiner et al. 1990a). Historical populations extirpated from the coastal basins, from Los Angeles to San Diego. Low-lying desert populations have declined. In the forests, observed in the Arrastre Creek area of the San Bernardino Mountains, and the desert side of the San Jacinto Mountains (Stephenson and Calcarone 1999).	Loss of foraging habitat in the coastal basins is a principal factor in the decline of those populations. California leaf-nosed bat is also sensitive to roost disturbance. They no longer occur in coastal regions, and most current records are from mountain ranges bordering the Colorado River. Possible threats to their roosting sites are human disturbance and residential commercial development (Williams 1986).

OBJECTIVES

Fauna

Immediately retire all grazing allotments that include critical habitat of the Bendire's thrasher, and habitat shall be restored (see section 25.0, *Domestic Livestock Grazing*).

Preserve critical cottonwood riparian woodland habitat for the summer tanager, and shall restore areas where it has been degraded.

Preserve and protect California leaf-nosed bat foraging sites from human alteration and disturbance.

STANDARDS

The Forest Service shall prohibit ORV use in areas supporting the LeConte's thrasher and the Bendire's thrasher, especially in desert washes used for breeding. Potential habitat shall also be protected from ORV use.

The Forest Service shall identify roosting sites of California leaf-nosed bats in the Forests, and human disturbance in and nearby those sites shall be prohibited. Entrances to tunnels shall be sealed off to prevent access by humans, but shall permit entry by bats (leaf-nosed bats must be able to enter by flying).

HABITAT GENERALIST

Species/Status	Habitat Description	Threats
REPTILES		
CALIFORNIA LEGLESS LIZARD *Anniella pulchra* **FED: S** **CA: SSC**	Occurs along the Pacific slope of the coastal mountains, primarily in dune areas with sandy or loose loamy soils with leaf litter under the vegetation of beaches, riparian zones, chaparral, coastal sage scrub, alluvial fans, pine-*oak woodland, sycamores, cottonwoods, or oaks that grow on stream terraces (Jennings and Hayes 1994). Favors stabilized dunes with bush lupine, mock heather, mock aster, and other native coastal shrubs. Occurs in desert scrub at western edge of the Mojave Desert. Found under or in close vicinity of surface objects such as logs, rocks, old boards, and compacted debris of woodrat nests; may be tied to decomposing granite soils. Rocky soils or areas disturbed by agriculture, sand mining, or other human uses apparently lack legless lizards (Jennings and Hayes 1994). Species is known to occur in the coastal ranges from San Francisco to northwest Baja California, including the floor of the San Joaquin Valley, the west slope of the southern Sierra, the Tehachapi Mountains, and the mountains of southern California below 6,000 feet in elevation. In the Forests, it probably occurs on all the mountains except the San Bernardinos (Stephenson and Calcarone 1999).	Fossorial existence in substrates with a high sand fraction renders this lizard vulnerable in urbanized, agricultural, or other areas where a loose substrate has been removed or radically altered (i.e., the substrate severely disturbed by plowing or bulldozing). Probably disappeared from about 20% of its known historic range. Factors in decline include habitat fragmentation, livestock grazing, ORV activities, sand mining, beach erosion, breakwaters, and excessive recreational use of coastal dunes. The introduction of exotic plant species such as ice plants, Marram grass, veldt grass, and eucalyptus trees is likely to alter the substrate, increase the salt concentration in the soil, and decrease the arthropod food base. Susceptible to pesticide. Feral house cats in parks and coastal areas may contribute to reducing populations. Development, flood control measures, habitat isolation, mining, and livestock grazing threaten 8 of the known occurrences (Jennings and Hayes 1994).
CORONADO SKINK *Eumeces skiltonianus interparietalis* **FED: SC** **CA: SSC**	Occurs in coastal sage, chaparral, oak woodlands, pinyon-*juniper, and riparian woodlands to pine forests, but is often restricted to more mesic pockets that consist of open riparian or subriparian margins. Significant variation exists in the nature of the mesic habitats used (e.g. fog-bound islands). Inhabits coastal plain and Peninsular Ranges west of the deserts from San Gorgonio Pass (Riverside County) southward to San Quentin (Baja California), Mexico. Isolated populations occur on Santa Catalina, Los Coronados, and Todos Santos islands off the coast of southern California and Baja California. Ranges from near Banning in Riverside County south to the Mexican border.	Although this species occurs in a number of vegetative associations, a large portion of southern California with suitable habitat has undergone land use changes incompatible with its survival. Large areas of habitat have been urbanized or converted into orchard crops. Much of the physical habitat structure remains in many planted steep-slope avocado orchards; the absence of skinks in such habitats suggests that something besides habitat structure may exclude this species. Pesticide or herbicide use in orchards and on other agricultural crops may adversely affect this species. Human use of surface and underground water resources dessicated the more mesic pockets within various plant associations.

SAN BERNARDINO RINGNECK SNAKE *Diadophis punctatus modestus* **FED: S**	Subspecies of the ringneck snake; habitat range is widespread in California. This species is only absent from large portions of the Central Valley, high mountains and desert, except in the Providence Mountains in San Bernardino County, and those regions east of the Sierra-Cascade crest. Restricted to mountains or moist woodlands and watercourses, but absent from the desert slope in arid areas. Common in open, relatively rocky areas within valley-foothill, mixed chaparral, and annual grass habitats. Found under bark, beneath and inside rotting logs, and under stones and boards, and restricts its movements to areas of surface litter or herbaceous vegetation, avoiding movement through open or barren areas (Jennings and Hayes 1994). In the Forests, has been documented in Miller Canyon in the San Gabriel Mountains, Mill Creek, the upper Santa Ana River in the San Bernardino Mountains, and in Trabuco Canyon in Orange County; potentially within the Santa Ana Mountains (Stephenson and Calcarone 1999).	Occurs in mesic microhabitats in otherwise arid, upland vegetation types, and therefore may be sensitive to changes in these habitat types. Stephenson and Calcarone (1999) note that the snake does not seem to be particularly vulnerable to existing activities on public lands.
SAN DIEGO RINGNECK SNAKE *Diadophis punctatus similes* **FED: S**	Occurs from Orange County east into Riverside County, south through San Diego County and into northern Mexico. Confined to mountains and watercourses; associated with moist woodlands, grassland, chaparral, mixed-conifer alliances, and riparian areas in southern California. Diurnal; may be found under cover objects during the day (Zeiner et al. 1988). Found in coastal areas, with smaller numbers from inland valleys and foothills; few in the mountains (Stephenson and Calcarone 1999). In the Forests, has been documented in Hall Canyon, Apple Canyon, Hurkey Creek, Idyllwild, Dark Canyon, Vista Grande Fire Station, Strawberry Canyon, Pine Valley, Laguna Mountain, Cuyamaca Lake, Boulder Creek, Pine Hills, Santa Ysabel, Warner Springs, Witch Creek, Wynola, and the south side of Palomar Mountain (Stephenson and Calcarone 1999).	Similar to the San Bernardino ringneck snake, this subspecies occurs in mesic microhabitats in otherwise arid, upland vegetation types, and therefore may be sensitive to changes in these habitat types. Stephenson and Calcarone (1999) note that the snake does not seem to be particularly vulnerable to existing activities on public lands.
BIRDS		
GOLDEN EAGLE *Aquila chrysaetos* **CA: SSC**	Inhabits mountainous terrain, valleys, and plains in the western U.S. from Alaska to Mexico, hunting over open country (grasslands, oak savannas, and open shrublands) for small mammals, snakes, carrion, and birds. Nests in cliffs or in trees (NGS 1999). Uncommon, but widely distributed throughout the Forests, especially in foothill, lower montane, and desert-montane habitats.	A decline has been observed in the San Diego County population, particularly in the coastal foothills. Good nesting habitat on public lands, but declining foraging habitat in the lower-elevation private lands. Recreational activity near cliff nests may cause eagles to abandon nests (Stephenson and Calcarone 1999).

PRAIRIE FALCON *Falco mexicanus* **CA: SSC**	Prefers open terrain including sagebrush, desert, desert grassland, grassland, savanna, and rangeland habitats. Requires cliffs, promontories, earthen mounds, and other similar nest sites adjacent to open country. Not found in the northern coastal fog belt or along the coastline. Ranges from southern Canada, south through California and eastern Mexico; east to Texas and Nebraska. An uncommon permanent resident and migrant, the prairie falcon ranges from the southeastern deserts northwest along the inner Coast Ranges and Sierra Nevada (Garrett and Dunn 1981, Johnsgard 1990, Zeiner et al. 1990b). In the Forests, uncommon but widely distributed (Stephenson and Calcarone 1999).	Historically, robbing of eyries by falconers has taken its toll, especially near population centers. Shooting has also been a common cause of mortality, especially for juveniles. Urban development on suitable habitat for foraging has been a problem. Increased recreational activity around nest cliffs, such as rock climbing, can cause birds to abandon their nests (Remsen 1978, Stephenson and Calcarone 1999).
MAMMALS		
WESTERN SMALL-FOOTED MYOTIS BAT *Myotis ciliolabrum* **FED: SC**	Occurs primarily in pinyon-*juniper woodlands as well as deserts, chaparral, riparian areas, and coniferous forests. Utilizes a variety of roost types in caves, mines, and human structures. Found in all 4 Forests, mostly in montane conifer forests and desert montane habitats (Stephenson and Calcarone 1999).	As with all bat species, identification and protection of maternity colony sites are important (Stephenson and Calcarone 1999).
SPOTTED BAT *Euderma maculatum* **FED: SC** **CA: SSC**	Distributed from central Mexico north to southern Montana, east into Texas, and west to California (Jameson and Peeters 1986). Found in a small number of localities, mostly in foothill, mountain, and desert regions (Zeiner et al. 1990a). Habitats range from arid deserts and grasslands through mixed-conifer forests. Prefers roosting in rock crevices, with cliffs providing optional roosting habitat; occasionally found in caves and buildings (Zeiner et al. 1990a). In the Forests, found on Palomar Mountain (Stephenson and Calcarone 1999).	Little information is available at this time. These bats are difficult to locate because of their crevice roosting habits (Zeiner et al. 1990a). May not be vulnerable to land use activities due to the habit of roosting in cliffs (Stephenson and Calcarone 1999).

PALLID BAT *Antrozous pallidus* **FED: S** **CA: SSC**	Range extends throughout most of the western U.S. from Mexico to British Columbia (Barbour and Davis 1969). Occurs in low elevations in California in grasslands, shrublands, woodlands, and forests on both coastal and desert sides of the mountains (Stephenson and Calcarone 1999). Resident in most of its range. Most common in open, dry habitats with rocky outcrops, cliffs, and crevices for roosting (Zeiner et al. 1990a). Also roosts in tree hollows (large conifer snags, basal hollows, and bole cavities), mines, caves, and several man-made structures. In the Forests, pallid bats occur on the LPNF and the ANF (Stephenson and Calcarone 1999).	Declining primarily due to loss of habitat, roost sites, food, and indirect and direct killing. Although once widespread throughout California, roost sites have shown a significant decline near urban and suburban areas. Very sensitive to disturbance of roosting sites. May abandon roost for a number of years. Loss of food availability has resulted from increased used of pesticides (Barbour and Davis 1969).
WESTERN MASTIFF BAT *Eumops perotis californicus* **FED: SC** **CA: SSC**	Resident at low elevations in the coastal basins of southern California. Occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban interface. Appears to favor rugged, rocky areas where suitable crevices are available for day-roosts, located in large downward-facing cracks in exfoliating slabs of granite or sandstone, high up on cliffs. Frequently roosts in hollow trees, tunnels, and tall buildings, with sheltering spaces similar to those described above. Roosts alone or in small colonies, usually of fewer than 100 bats. Commonly share roosts with other large bats, such as *Eptesicus fuscus*, *Antrozous pallidus*, and *Tadarida brasiliensis*. Distribution includes southern portion of North America, West Indies, and South America. Uncommon resident in southeastern San Joaquin Valley and Coastal Ranges from Monterey County southward, from the coast eastward to the Colorado Desert (Zeiner et al. 1990a). Found in all 4 Forests (Stephenson and Calcarone 1999).	Appears to be widespread in the Forests, but abundance in not known. Cliff and rock habitats provide important roost habitats, so activities threatening these areas should be discouraged (Stephenson and Calcarone 1999).

OBJECTIVES

Fauna

Identify and preserve mesic microhabitats in otherwise arid, upland vegetative communities for the San Bernardino and San Diego ringneck snakes.

Enhance coastal beach habitat for legless lizards, and conduct habitat restoration projects to minimize impacts to existing legless lizard populations and other sympatric taxa.

Determine the effects of removing exotic vegetation and restoring native plant communities in coastal dune habitats harboring legless lizards.

The Forest Service shall ensure adequate numbers of conifer and oak snags and decadent trees throughout the Forests as roost sites for pallid bats.

Flora

Determine the population trend and vulnerability on Forest Service lands for *Androsace elongata* ssp. *acuta, Calystegia peironsii, Galium angustifolia* ssp. *gabrielense, Galium grande, Hulsea vestita* ssp. *gabrielensis, Hulsea vestita* ssp. *parryi, Phacelia exilis,* and *Phacelia mohavensis.*

Determine the population trend for *Fritillaria.*

STANDARDS

The Forest Service shall prohibit draining of surface and ground water in suitable habitat for the Coronado skink.

The Forest Service shall prohibit rock-climbing and ORV activity in the vicinity of active prairie falcon and golden eagle nest sites during the breeding season.

The Forest Service shall prohibit rock-climbing in the vicinity of cliff and rock roost sites of spotted and Western mastiff bats.

ISSUE STATEMENT

The invasion of exotic plant and wildlife species in both aquatic and terrestrial habitats has substantially degraded and disrupted natural communities. Introduced species have disrupted the ecological integrity of entire watersheds, which has had profound effects on native species that are adapted to and dependent upon these natural communities. As these communities become invaded and dominated by non-native species they become less able to support native species. In 1995, Dudley and Collins (in Stephenson and Calcarone 1999) conducted a statewide analysis of non-indigenous species, and concluded that the South Coast Bioregion has more non-native species than any other ecoregion in California.

Since European settlement in California, more than 1,000 exotic plant species have become naturalized. In fact, non-native plant species now represent more than 15% of California's flora (Hickman 1993). Non-native species can cause both ecological and economic damage; the California Exotic Pest Plant Council (Lovich et al. 1996) has developed a list of the 76 most damaging invaders in the state (in Stephenson and Calcarone 2000). As defined in Forest Service Manual 2080.5, noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage (i.e., invasive), poisonous, toxic, parasitic, or a carrier or host of serious insects or serious disease. Exotic plants out-compete native plants, reduce the quality of forage and cover for wildlife, and hybridize with native species, which can sometimes cause plant sterility. Non-native plants can also disrupt natural processes, such as fire, by increasing frequency and intensity (Randall et al. 1998, D'Antonio and Haubensak 1998, Stephenson and Calcarone 1999; see section 2.0, *Fire Management*).

Exotics are a significant concern for terrestrial plant communities, but non-native wildlife species are particularly prevalent in riparian and aquatic habitats. Invasive exotic species are typically present in disturbed and degraded habitat. These non-indigenous species outcompete, prey upon, and harm native species; in fact, exotic aquatic predators are the primary contributor to the declines of native amphibians. Numerous non-native animals occur in southern California (Table 10-1, *Non-native Animals of the South Coast Ecoregion*). Exotic wildlife species of particular concern in the Forests include bullfrog, African clawed frog, predatory warm-water fish, German brown trout, crayfish, mosquitofish, brown-headed cowbird, European starling, Argentine ants, and red imported fire ants (Stephenson and Calcarone 1999).

Activities that exacerbate the spread of non-native species include domestic livestock grazing, fire suppression, development, equestrian use, and roads. The establishment of aggressive weedy species (e.g. sweet clover, alfalfa, dandelions, cheatgrass, non-native grains, other grasses, etc.), brought in by horse manure, hooves, and feed, is a particular problem for certain listed plants. Streams changed by dams and diversions undermine the survival of native plants and wildlife species and can promote the spread of non-native species. Other natural processes that have been changed by human activity, such as fire return intervals (Quigley et al. 1997b,Vitousek 1986) have also promoted the spread of non-native plants.

TABLE 10-1

NON-NATIVE ANIMALS OF THE SOUTH COAST ECOREGION
(ADAPTED FROM STEPHENSON AND CALCARONE 1999)

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	THREAT LEVEL
INVERTEBRATES			
Mollusca	*Potamocorbula amurensis*	Asian clam	1
Arthropoda	*Apis mellifera scutellata*	Africanized honey-bee	4
	Apis mellifera ssp.	European honey-bee	3
	Forficula auricularia	European earwig	3
	Linepithema humile	Argentine ant	2
	Solenopsis invicta	red imported fire ant	4

	Procambarus clarkii	Louisiana crayfish	2
REPTILES AND AMPHIBIANS			
Chelydridae	*Chelydra serpentina*	snapping turtle	4
Emydidae	*Chrysemys picta, C. scripta*	red-eared slider, painted turtle	4
Ranidae	*Rana catesbeiana*	bullfrog	1
Pipidae	*Xenopus laevis*	African clawed frog	1
FISH			
Centrarchidae	*Lepomis spp.*	green sunfish, bluegill, pumpkinseed	1
	Micropterus spp.	largemouth and smallmouth bass	1
Cyprinidae	*Carrasius auratus*	goldfish	2
	Cyprinella lutrensis	red shiner	1
	Cyprinus carpio	carp	2
	Pimephales promelas	fathead minnow	2
Ictaluridae	*Ameiurus (Ictalurus) melas*	black bullhead	1
	Ictalurus punctatus	channel catfish	3
Percichthyidae	*Morone saxitilis*	striped bass	1,3
Poeciliidae	*Gambusia affinis*	mosquitofish	1
Salmonidae	*Oncorhynchus mykiss*	rainbow trout (stocked pops.)	1,3
	Salmo trutta	German brown trout	1
MAMMALS			
Castoridae	*Castor canadensis*	beaver	1,3
Didelphidae	*Didelphus virginiana*	opossum	3,4
Equidae	*Equus cabullus*	feral horse	2
	Equus asinus	feral burro	2
Muridae	*Rattus rattus, R. norvehicus*	black rat, Norway rat	1
Suidae	*Sus scrofa*	European boar, feral pig	1
Canidae	*Vulpes fulva*	red fox	1
Felidae	*Felis domesticus*	feral cats	2
BIRDS			
Ardeidae	*Bubulcus ibis*	cattle egret	3
Cracidae	*Melegris gallopavo*	wild turkey	4
Icteridae	*Molothrus ater*	brown-headed cowbird	1
Sturnidae	*Sternus vulgararis*	European starling	1

THREAT LEVEL CATEGORIES:

1 = Serious, documented threat to native species and ecosystems

2 = Moderate threat to native species and ecosystems

3 = Benign, low risk

4 = Potential threat, but impacts not well documented

The challenge to eradicating these invasive plant and animal species is that they are inherently aggressive and difficult to manage, as evidenced by their successful proliferation. The best strategy for non-native species control is prevention. Preventing the introduction of invasive species will help protect ecosystem values and eliminate future costs of containment and eradication. Experts agree that prevention of new infestations is the best method to protect the integrity of our remaining ecosystems. In the Forests where invasive species have already prevailed, it is important to have an active invasive species management program, especially in habitats where management can capitalize on the fact that the infestation has been relatively minimal.

AREA DESCRIPTION

Invasive non-native plants and animals are present throughout the Forests. Table 10-2 provides information on the known distribution of 5 especially challenging invasive species, including the warm-water fish, bullfrog, African clawed frog, Arundo, and tamarisk. The table also illustrates the sheer pervasiveness of the invasive species problem.

TABLE 10-2

WATERSHEDS WITH KNOWN PROBLEMATIC NON-NATIVE SPECIES

PRIMARY (OR SECONDARY) WATERSHED	WARM-WATER FISH	BULLFROG	AFRICAN CLAWED FROG	ARUNDO DONAX	
LOS PADRES NATIONAL FOREST					
Lower Carmel	X	X			
Little Sur River					
San Antonio River	X	X			
Nacimiento River	X				
San Carpoforo Creek	X	X	X		
Arroyo de los Chinos	X	X	X		
Arroyo de la Cruz	X	X	X		
Arroyo Laguna	X	X	X		
Arroyo del Puerto	X	X	X		
Broken Bridge Creek	X	X	X		
Little Pico Creek	X	X	X		
Pico Creek	X	X	X		
Arroyo del Padre Juan	X	X	X		
San Simeon Creek	X	X	X		
Santa Rosa Creek	X	X	X		
Green Valley Creek	X	X	X		
Ellysly Creek	X	X	X		
Villa Creek	X	X	X		

Cayucos Creek	X	X	X		
Little Cayucos Creek	X	X	X		
Willow Creek	X	X	X		
Old Creek	X	X	X		
Toro Creek	X	X	X		
San Luis Obispo Creek	X				
Lower Cuyama River	X				
Alamo Creek	X				
Upper Cuyama River	X				
Sisquoc River	X				X
Little Santa Ynez	X	X		X	X
Middle Santa Ynez	X	X		X	X
Santa Cruz Creek	X				
Upper Santa Ynez	X	X			
Mono Creek	X				
Indian Creek	X				
Ventura River	X				
Matilija Creek	X				
Lower Santa Clara River	X				
Lower Sespe Creek	X	X			
Middle Sespe Creek	X	X			
Lower Piru Creek	X	X			
Upper Piru Creek	X	X		X	
ANGELES NATIONAL FOREST					
Upper Santa Clara	X	X	X	X	
Castaic Creek					X
Fish Canyon					X
Elizabeth Lake Canyon			X		
San Francisquito Canyon			X	X	X
Bouquet Canyon				X	
Amargosa Creek			X		
Little Rock Creek	X				
Los Angeles River	X				
Pacoima Creek	X	X		X	
Lower Big Tujunga Creek		X		X	
Lower San Gabriel River	X	X	X	X	X
Upper San Gabriel River	X	X		X	
Lower West Fork	X				
North Fork San Gabriel River	X	X		X	
San Dimas Creek	X	X		X	
Big Dalton Canyon	X				

SAN BERNARDINO NATIONAL FOREST					
Santa Ana River			X		
Little Santa Ana	X	X	X	X	X
San Antonio Canyon				X	
Cajon Wash				X	X
East Twin Creek				X	
Waterman Canyon				X	
Strawberry Creek				X	
West Fork Mojave		X			
Deep Creek		X			
Bautista Creek					X
South Fork San Jacinto	X				X
CLEVELAND NATIONAL FOREST					
Aliso Canyon			X	X	
San Juan Creek	X	X	X	X	X
Trabuco Creek	X				
San Mateo Creek	X	X		X	X
Devil's Canyon	X	X			
Christianitos/Talega Creeks		X			
Tenaja Creek	X	X			
Santa Margarita River	X	X	X	X	X
Del Luz Creek	X	X		X	X
Murrieta Creek	X	X		X	X
Lower Temecula Creek	X	X		X	X
Upper Temecula Creek	X	X			
Lower San Luis Rey River	X	X		X	
Middle San Luis Rey River	X	X			
Pauma Creek		X			
Pala Creek		X			
Upper San Luis Rey River	X	X			
Headwaters San Luis Rey	X	X			
West Fork San Luis Rey	X	X			
San Dieguito River	X	X			
Lower Santa Ysabel	X	X		X	
Temescal Creek		X			
Upper Santa Ysabel	X	X			
Lower San Diego River	X	X			
San Vicente Creek		X			
Upper San Diego	X	X			X
Cedar Creek	X				X
Boulder Creek	X	X			
Lower Sweetwater	X	X	X	X	X

Upper Sweetwater	X	X		X	X
Otay River	X	X			
Dulzura Creek		X			
Tijuana River	X	X			
Lower Cottonwood	X	X			X
Lower Pine Valley Creek	X	X			
Upper Pine Valley Creek	X				
Laguna Meadow					X
Upper Cottonwood	X	X			
Cottonwood Creek	X	X			X
Morena Creek	X				

DESIRED CONDITION

Invasive species management is integrated into all Forest management activities. Relationships between specific species of concern and specific exotics are identified and guide the implementation of aggressive invasive species management to protect vulnerable native species.

There are no new populations of invasive species; existing populations are contained and, where possible and deemed ecologically necessary, eradicated.

Employees, users of National Forest lands, adjacent landowners, and state agencies are aware of and informed about invasive species concerns. As a result, inadvertent introductions of undesirable non-native species through authorized activities are prevented.

Clear criteria have been developed and implemented for aggressive invasive species control efforts. Inventorying and monitoring are used to prevent the introduction and spread of non-native species, and to ensure the continued success of restoration and eradication efforts.

OBJECTIVES

Use existing data to ascertain spread of non-native species; identify and address information gaps in order to determine the "big picture" of invasive species spread and repercussions. Use the best available science to identify and implement effective strategies to eliminate invasions of the most pernicious and damaging non-native species.

Based on mapping and data-gathering, focus eradication efforts on the most damaging non-native species and follow up with restoration, monitoring, and preventive efforts to ensure that control efforts result in the restored health of ecological communities and the prevention of future introductions.

Work with local, state, and federal agencies to prevent future introductions of non-native species through stocking, recreational use, Special Use Permits, and all other activities and decisions that could promote additional invasions.

Educate the public, Forest Service staff, and other governmental agencies to prevent any additional introductions and to increase public awareness of the nature and severity of this management problem.

Manage all planning and activities that have the potential to establish or exacerbate populations of non-native species to identify, control, and prevent non-native species invasions and proliferation.

Research

Determine the conditions and activities that favor the presence or introduction of invasive species. Conduct an analysis of the conditions and activities that prevent, minimize, or reverse the introduction, establishment, spread, and re-invasion of specific non-native plant and wildlife species. Incorporate the findings of this analysis into all planning activities, including livestock grazing permits and annual operating plans (see section 25.0, *Domestic Livestock Grazing*).

Within 2 years, conduct a comprehensive literature review on the latest research findings regarding applications of

exotic control and ecosystem management. Annually update this review to ensure that the best available science and management strategies are being used and that the information is assembled in a searchable database for ongoing use.

Inventory, Control, and Monitoring

Identify breeding sites (e.g. stock ponds, reservoirs) of introduced fish and aquatic predators (e.g. bullfrog, African clawed frog) to develop priorities for eradication and control efforts. Utilize the most environmentally sound methods for eradication and control.

Within 5 years, map all uninfested areas and develop an invasive species management plan that protects them from infestation. Areas to be given high priority for protection include old forests, roadless areas, riparian areas, high fire-risk areas, and sensitive or listed species habitat.

Increase reproductive success of listed and sensitive riparian birds by managing brown-headed cowbird parasitism through the implementation of a comprehensive trapping program to pursue long-term landscape objectives for cowbird reduction. Exterminate adult and juvenile cowbirds using the most humane method (USFWS 2001b).

Take an interdisciplinary approach to invasive species management plans and actions to prevent, contain, and control non-native plant and wildlife species in coordination with other resource management activities to achieve optimum management goals and objectives. Methods include education; preventive measures; cultural, physical, or mechanical methods; biological control agents; and general land management practices (such as manipulation of livestock or wildlife grazing strategies) that accomplish vegetation management objectives (Forest Service Manual 2080.5). Alternatives to pesticides and herbicides including prevention, manual removal, and Integrated Pest Management (IPM) practices will be researched and employed.

In selecting weed management methods, choose the method that poses the least risk of damage to surrounding organisms and ecosystems, while accomplishing weed management goals.

Use the following criteria when setting priorities for the control of non-native species in all TES habitat: rate of spread of the species; invasions found within occupied and potential habitat for TES species, or within special management areas such as Research Natural Areas, Special Interest Areas, Wilderness, Wild and Scenic Rivers, roadless areas, Riparian Conservation Areas, and Habitat Linkages; and high probability of successful treatment to contain and control non-natives (USFWS 2000).

Complete an invasive species risk assessment in accordance with Forest Service Manual 2081.03 for all projects and activities that have a moderate to high risk of introducing or spreading invasive species. All ground-disturbing activities, including but not limited to timber harvest, livestock grazing, road and trail construction and management, prescribed fire, restoration activities, and commercial packstock operations shall be considered as having a moderate to high risk for the purposes of this standard.

Prepare a report each year describing the progress of their invasive species management program, documenting the number of project analyses including invasive species surveys, risk analyses, and the resulting prevention and mitigation strategies. The Forest Service will then provide explanations for project analyses that did not include invasive species surveys or risk analyses, and for any failure to implement management strategies.

Cooperative and Integrated Management

Cooperate with state agencies, local landowners, weed control districts and boards, and other federal agencies in the management and control of invasive species. Cooperate with local and state agencies to discourage the introduction of, and to promote the removal of, non-native species on lands within and adjacent to Forest Service lands. Develop cooperative partnerships with counties or other agencies.

The Forest Service shall coordinate with CDFG to eliminate stocking of non-native fish into natural habitats including mosquitofish, for example (USFWS 2000b,c). If reservoirs are stocked with non-native fish for recreational use, install barriers to ensure that these non-native predators do not move up or downstream of the reservoir. Monitor these areas regularly to ensure that barriers are effective.

Within 3 years, review facilities, roads, and trails, and perform an analysis to determine which roads and trails may be moved or closed to protect high-priority uninfested areas. Where facilities, roads, and trails pose a high risk to priority uninfested areas but cannot be moved or closed, other management measures shall be taken to prevent infestation. See

section 22.0, *Roads*.

Education

Develop and implement a region-wide invasive plant and wildlife species management training course for Forest and District-level employees within 2 years. Require the participation of at least one representative from range management, recreation management, education, law enforcement, and transportation systems from each Forest annually.

Within 1 year, develop partnerships with CDFG, counties and others to develop information, education materials, and programs emphasizing the detrimental effects of the introduction of undesirable non-native species, and enlist the help of the public to prevent, identify, and eradicate such introductions.

Develop and implement an active public education program, focused on invasive plant and wildlife species management that includes contact with a variety of Forest users. A variety of tools, such as brochures, programs, hikes, eradication and restoration projects coordinated with community groups, and website information should be incorporated in the invasive species awareness program.

Within 2 years, offer noxious weed and invasive species identification sheets, reporting forms, and depositories to visitors in all visitor centers and at trailheads.

Meet with user groups including ORV groups, packstock operators, hiking groups, birding groups, Native American groups, native plant groups, timber companies, and ranchers to educate the public on the threats posed by non-native plant and wildlife species, and to develop strategies for minimizing the spread of invasive species through their activities in the Forests.

Where public demand to introduce an exotic species arises, coordinate with CDFG, USFWS, and other appropriate groups and agencies to educate the public regarding the hazards of non-native species invasion, and to prevent such introductions.

Other Activities

Identify and implement mitigation measures for projects that may contribute to the spread of existing or new populations of invasive species. These measures shall be designed to substantially reduce and, where possible, eliminate the risk of existing invasive species populations spreading, lessening the risk of introducing new non-native species.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding invasive species management contained in other sections of this alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

Inventory, Control, and Monitoring

The Forest Service shall, within 2 years, evaluate and map the current distribution and potential for spread of invasive plant and wildlife species during ecosystem analysis at the watershed scale, using Geographical Information Systems (GIS).

Each Forest shall maintain an annually updated inventory of invasive plant and wildlife species in accordance with Forest Service Manual 2083.

The Forest Service shall, prior to implementing any invasive species eradication or control project, conduct pre-project presence absence surveys for sensitive and listed species to prevent adverse effects (USFS 1998).

The Forest Service shall conduct all exotic removal operations in late summer and fall, when it is less likely that there will be sensitive life-stages of TES and mis-identification of native species as exotic species targeted for removal (USFS 1998).

Cooperative and Integrated Management

The Forest Service shall include provisions in contracts and permits for use of Forest Service lands and resources to prevent the introduction and spread of invasive plant and wildlife species in TES key habitats. See section 21.0,

Special Use Permits.

Pending development of a weed-free forage (forage with no non-native plant species) certification program by the State of California, the Forest Service shall make every effort to use forage free of non-native plant species for all erosion control and restoration activities in National Forests. When a weed-free forage program has been created in California, the Forest Service shall require certified weed-free forage for all uses on National Forests as directed in Forest Service Manual 2081.03 (2).

The Forest Service shall, for introduced game species, prohibit any additional introductions; for existing populations, monitor and manage to prevent any harmful impacts to or competition with native wildlife.

Other Activities

If the spread of invasive species in association with ground-disturbing activities, such as livestock grazing, becomes unmanageable then the Forest Service shall halt such ground-disturbing activities.

For all project areas that involve any degree of ground disturbance, the Forest Service shall annually survey for invasive species during project planning, and/or NEPA analysis and subsequent implementation. Survey results will be reported in NEPA documents, along with district and Forest-based invasive plant and wildlife species risk analyses and control plans. This information will also dictate measures to eradicate existing invasions, and to prevent future invasions.

Forests shall require measures to prevent the spread of weeds during activities that require permits and plans, such as livestock grazing, wilderness camping, and timber harvest. Measures shall include but should not be limited to:

- Equipment cleaning
- Prohibitions against movement of equipment, packstock, or livestock directly from infested areas to uninfested areas without cleaning, purging, or other measures to prevent weed spread
- Use of weed-free hay and straw for erosion control, mulch, revegetation, forage, and other uses

Contract and permit compliance shall require: identifying washing station locations, and cleaning and inspecting construction and maintenance equipment prior to use in areas where TES species occur, and before moving to new locations outside the southern California Forests. This includes equipment used or owned by the Forest Service, contractors, special use permittees, and cooperating agencies. Such measures are to be implemented in occupied and modeled habitats for the arroyo toad, California red-legged frog, mountain yellow-legged frog, southwestern willow flycatcher, and least Bell's vireo. Consider such measures in occupied and modeled habitat for all other TES species (USFWS 2001).

For all projects, use mulch, road-bed, and topsoil materials that will not introduce invasive non-native species throughout the Forests. Consider in modeled habitats for all TES species (USFWS 2001).

In restoration programs, introduce seed from locally collected species only. Native species restoration includes soil communities — re-inoculate cryptobiotic crusts with native biological materials. See Section 6.0, *Soils Management*.

Section 11.0

WILDERNESS AREAS

ISSUE STATEMENT

The National Wilderness Preservation System (NWPS) includes almost 105 million acres; of these, approximately 35 million acres are National Forest Service lands. Wilderness Areas make up only 4.5% of the land area of the United States. The Wilderness Act of 1964 defines Wilderness as "a place where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean an area of undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions, and which: (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, archeological, or other features of scientific, educational, scenic, or historical value."

Published for review in May 2000, the Forest Service Roadless Area Conservation Draft Environmental Impact Statement identified a total of 1,051,000 acres of Inventoried Roadless Areas on the Forests, the vast majority of which is eligible for inclusion in the NWPS (see section 13.0, *Roadless Areas*).

Roadless areas are becoming scarce in the lower 48 states, particularly in southern California. The Sierra Club and California Wilderness Coalition have compiled the Citizens' Wilderness Inventory, and have developed a Wilderness Proposal for California that is currently being reviewed by members of Congress (see Appendix B, *Proposed Wilderness Areas and Additions*). Potential Wilderness Areas and Wilderness Additions identified under their proposal have been included as part of this Alternative. Ultimately, the enlargement of existing Wilderness and the designation of additional Wilderness Areas are key to ensuring the ecological integrity of already designated Wilderness.

In a region with such an extensive road network, areas still meeting the Wilderness criteria should definitely be granted such status. Permanent legislative protection as Wilderness for the remaining roadless areas on the 4 Forests offers the single most enduring land management prescription for preserving ecosystem processes and biodiversity in this global hotspot. Due to cumulative degradation and loss of habitat throughout the ecoregion, all remaining roadless areas are critical to maintaining native species viability and biodiversity. Wilderness is the cornerstone of protecting biodiversity. Whether designated or proposed, these areas function as biological strongholds and places of refuge for many species, from wide-ranging large carnivores down to tiny invertebrates. Conservation biologists emphasize the importance of large, cohesive, undeveloped roadless areas in protecting biodiversity and ecosystem processes. Essentially, Wilderness Areas form the backbone of any viable wildlands network.

Roadless areas not yet designated as Wilderness have served as protective buffers between lands affected by other resource management activities; they have also served as wildlife movement corridors, providing connectivity between existing Wilderness Areas. Maintaining these areas as roadless and designating them as either Wilderness or Habitat Linkages will help sustain existing wilderness values (see sections 13.0, *Roadless Areas,* and 14.0, *Habitat Linkages*).

Existing and proposed Wilderness Areas are also valuable for watershed protection, scientific and educational uses, and primitive recreational opportunities. The headwaters for many of the region's municipal water sources originate in Wilderness or roadless areas, which is a fundamental reason why grazing should be prohibited in Wilderness Areas. Wilderness provides the highest quality primitive recreation opportunities for hiking, backpacking, horsepacking, hunting, fishing, and backcountry skiing. See sections 1.0, *Watershed Management,* and 19.0, *Recreation*.

AREA DESCRIPTION

The Forests cover an area of approximately 3,512,000 acres. Wilderness Areas currently encompass 1,112,704 acres, over half of which is in the LPNF (Table 11-1). Of the 664,000 acres that make up the ANF, only 76,697 acres are currently designated as Wilderness. On the SBNF, 137,119 acres of the 662,000 acres that comprise the Forest are currently protected as Wilderness. Of the 425,000 acres that make up the CNF, only 76,968 acres have been granted designation as Wilderness. LPNF has the most designated Wilderness, covering 821,920 acres of the 1,761,000-acre forest.

TABLE 11-1

EXISTING WILDERNESS AREAS ON THE FOUR FORESTS

FOREST	WILDERNESS AREA	ACRES
Angeles National Forest	Sheep Mountain	40,969
	San Gabriel	35,728
San Bernardino National Forest	Sheep Mountain	1,807
	Big Horn Mountain	12,000
	Cucamonga	12,720
	San Gorgonio	58,583
	San Jacinto	15,369
	San Jacinto	17,268
	Santa Rosa	19,372
Cleveland National Forest	San Mateo Canyon	40,494
	Agua Tibia	15,904
	Pine Creek	13,397
	Hauser	7,173
Los Padres National Forest	Ventana	165,734
	Ventana	38,142
	Silver Peak	14,318
	Santa Lucia	21,400
	Machesna Mountain	18,582
	Garcia Mountain	14,798
	San Rafael	190,074
	Chumash	38,195
	Dick Smith	71,299
	Sespe	219,779
	Matilija	29,599
TOTAL WILDERNESS *ACREAGE*		**1,112,704**

The Forest Service was the lead agency on the Roadless Area Conservation Draft Environmental Impact Statement that was published for review in May of 2000. This document identifies 1,051,000 acres of Roadless Areas on the Forests of which the vast majority is suitable for Wilderness designation, over half of which presently allow road construction under existing Forest Service Resource Management Plans. Table 11-2, *Inventoried Roadless Area Acreage*, provides more detailed information on these areas.

TABLE 11-2

INVENTORIED ROADLESS AREA ACREAGE

(USDA FOREST SERVICE 2000)

FOREST NAME	TOTAL AREA OF FOREST SERVICE LAND	TOTAL	TOTAL	…THAT DO NOT ALLOW ROAD CONSTRUCTION & RECONSTRUCTION	…THAT EXISTING FOREST PLANS RECOMMEND AS WILDERNESS	…THAT ALLOW ROAD CONSTRUCTION AND RECONSTRUCTION
ANF	664,000	80,000	155,000	76,000	0	80,000
CNF	425,000	68,000	88,000	71,000	0	17,000
LPNF	1,761,000	849,000	636,000	172,000	0	464,000
SBNF	662,000	114,000	172,000	53,000	0	120,000
TOTAL ACRES	**3,512,000**	**1,111,000**	**1,051,000**	**372,000**	**0**	**681,000**

** Designated areas include Wilderness, Wilderness Study Areas, Wild and Scenic Rivers, or other special designations.*

DESIRED CONDITION

All proposed Wilderness Areas and Wilderness Additions have been recommended to Congress as additions to the National Wilderness Preservation System (NWPS). Wilderness areas make up a significant portion of the Forests and have been connected through designated Habitat Linkages. All community types present on the Forests are fully represented in Wilderness, and natural processes are operating freely to ensure proper ecosystem function. TES species and other indigenous species are present at functionally significant levels, and invasive exotic species have been eradicated or controlled. Native species that had been extirpated are again thriving.

Existing and newly designated Wilderness Areas are managed in accordance with the 1964 Wilderness Act, specifically with no permanent roads, no use of motorized/mechanized equipment (including bicycles and hang gliders), no commercial logging, and no new mining claims. In addition, grazing allotments have been re-evaluated. The newly adopted direction for wilderness has moved management towards the more pristine end of the administrative scale, increasing the acreage managed as pristine and primitive.

Human use is managed to protect the ecological integrity of the area, while providing traditional wilderness recreational activities (hiking, backpacking, horsepacking, canoeing, river running), scientific study and research conducted under wilderness principles, and recreational hunting and fishing that does not degrade the integrity of the area. The Forest Service has instituted specific standards for campsite condition, campsite density, crowding, dogs, recreational stock use, noxious weed control, and prescribed natural fire in order to maintain and improve wilderness recreation opportunities and ecosystem function.

Humans who enter the Wilderness will find a primitive and powerful experience, and will leave civilization behind to meet the wilderness on its own terms; risk is inherent in wilderness.

OBJECTIVES

Examine the potential for wilderness designation as an opportunity to recover and enhance native species and ecosystems, and re-introduce extirpated wildlife.

Allow natural processes, such as fires and floods, to resume their role in the ecosystem without human interference, except when a danger is posed to human life and safety outside of wilderness.

Allow natural conditions including downed trees, earth movements, and fire scars to remain, except to maintain system trails to conditions that meet minimum standards.

Eliminate or control non-native vegetation to the maximum extent feasible.

Ensure connectivity amongst Wilderness Areas and other Roadless Areas to facilitate animal movement and other essential ecological processes

Protect the experience of solitude within Wilderness.

Identify and implement key road closures to prevent intrusion by mechanical vehicles into existing and potential Wilderness Areas.

Develop both Wilderness and Fire Management Plans for all Wilderness Areas within 2 years of the adoption of this plan.

Develop and implement quantitative water quality monitoring in Wilderness Areas.

Control and, where feasible, remove exotic species (including non-native game fish).

Direct management activities towards ecosystems only to re-introduce historic native species, monitor and minimize human impacts, restore human-caused impacts to natural conditions, control human-caused fire, and maintain system trails to minimum standards.

Provide information to wilderness users about the opportunities for solitude, discovery, and challenge inherent in the wilderness experience.

Provide visitor information sites or kiosks, located outside of wilderness, for wilderness interpretation and information. Convey information to visitors at these sites regarding "Leave No Trace" camping practices and wilderness ethics, including allowed and prohibited activities.

Instruct wilderness users in "Leave No Trace" camping practices and provide no developed campsites. Encourage wilderness visitors to use pressurized gas stoves. Allow small cooking fires and campfires only in areas where the Forest Service has determined through impact studies that effects on soil and vegetation are acceptable.

Implement construction and maintenance practices for trails that are consistent with objectives for wilderness resource and ecosystem function.

Regularly monitor impacts of human use within wilderness to protect the character of the resource and restore impacted areas to natural conditions. Use only the minimum necessary tools and least intrusive methods and actions that will achieve the desired outcome.

Restore topsoil in firelines constructed by bulldozers in wilderness. Rehabilitate firelines or fire-impacted areas where erosion would create gullying or other hazardous conditions; use only sterile hybrids or native species, preferably from locally-collected seed sources.

Where management activities for fire pre-suppression are authorized by the legislation creating the Wilderness, design, construct and landscape fuelbreaks individually to blend into the natural terrain as completely as possible.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding Wilderness Areas contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall prohibit non-native fish planting in Wilderness Areas.

The Forest Service shall, consistent with the Wilderness Act, exclude all vehicles, motorized and non-motorized, and exclude motorized tools and equipment, except in emergency, unless justified by a Minimum Tool Analysis.

The Forest Service shall re-evaluate domestic livestock grazing leases and permanently retire all vacant allotments within existing or proposed Wilderness Areas (see section 25.0, *Domestic Livestock Grazing*).

The Forest Service shall not develop new system trails and access points unless there is a demonstrated need.

The Forest Service shall require wilderness users to locate their campsites a minimum of 200 feet away from springs, streams, meadows, lakes, and other sensitive areas where practicable.

The Forest Service shall continue to implement a pack-it-in/pack-it-out program for wilderness users.

The Forest Service shall prohibit recreational target shooting within wilderness.

WILD AND SCENIC RIVERS

ISSUE STATEMENT

The National Wild & Scenic Rivers Act (Public Law 90-542; 16 U.S.C. 1271-1287) is the nation's primary river conservation law. Enacted in 1968, the Act was specifically intended by Congress to complement the existing policy of developing rivers for their water supply, power, and other benefits, with a new policy of protecting the free-flowing character and outstanding values of other rivers. The Act concluded that selected rivers and streams should be preserved in a free-flowing condition for the benefit and enjoyment of present and future generations. Since 1968, many rivers and streams have been added to the National Wild & Scenic Rivers System, including 16 rivers (and many forks and tributaries) in California, totaling more than 1,900 miles. The 16 components of the National Wild & Scenic Rivers System in California include the Smith (and its forks and tributaries), Klamath, Scott, Salmon (and its forks), Trinity (and its forks), New, Eel (and its forks), Van Duzen, Middle Fork Feather, American (two separate forks), Tuolumne, Kings, Kern (and its forks), Big Sur, Sisquoc, and Sespe.

The Wild & Scenic Rivers Act seeks to maintain a river's free-flowing character, protect and enhance outstanding natural and cultural values, and provide for public use consistent with this mandate. Designation prohibits federal approval or funding for new dams and diversions on designated river segments, and requires that designated rivers flowing through federal public lands be managed to protect and enhance their free-flowing natural character. Where private lands are involved, the federal management agency works with local governments and property owners to develop protective measures, but the Act grants no additional federal authority over private property or local land use.

Rivers are primarily added to the National System by an Act of Congress, often in response to a study and recommendation submitted by a federal land management agency. To be considered for federal protection, a river must be free-flowing and contain one or more outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other values (including botanical, ecological, hydrological, paleontological, and scientific).

The Study Process

The Act directs federal land management agencies such as the Forest Service to identify, study, and recommend rivers and streams to Congress for potential inclusion in the Wild and Scenic Rivers System. Forest Service planning regulations direct the agency to conduct such studies as part of its land and resources planning process, which results in the development of forest plans that guide the management of each Forest. In addition, the agency may conduct Wild & Scenic studies separate from the forest planning process.

The first step of the Wild & Scenic study requires determination of whether a river or stream is eligible for federal protection. Rivers are eligible if they are free-flowing and possess one or more outstanding values. The Act defines a river as "a flowing body of water or estuary, or a section, portion, or tributary thereof, including rivers, streams, creeks, runs, kills, rills, and small lakes." A river or stream is considered free-flowing if its flows are sufficient to maintain outstanding values. Rivers with flows modified by dams or diversions, small creeks or streams, or even seasonally flowing streams, may be considered free-flowing as long as the flows sustain or complement outstanding values. Outstanding values may include scenic, recreational, historical, cultural, fish, wildlife, ecological, botanical, geological, hydrological, and others. Outstanding values must be river-related; unique, rare, or exemplary with a comparative region; be located generally within 1/4 mile of the rivers; contribute substantially to the functioning of the river ecosystem; or owe their location to the existence or presence of the river.

Once a river is determined eligible, the agency segments and classifies the stream as wild, scenic, or recreational based on the level of existing development. River area or corridor boundaries for rivers and streams under study encompass 1/4 mile on each side of the river measured from the ordinary high-water mark. The corridor boundary for designated rivers encompasses an average of 320 acres per mile as measured from the ordinary high-water mark. Boundary widths for designated rivers may vary within the 320 acre/mile standard in order to address land ownership patterns, adjacent resources and natural values, viewsheds, and other concerns. Agency guidelines also require interim protection of the free-flowing character, outstanding values, and classification for all eligible rivers.

Rivers and streams in the bioregion have undergone extensive development and degradation by dams, reservoirs,

modification of flows from large and small diversions, channelization, reduction of sediment transport capabilities, vegetation removal, road and other construction on river banks, water pollution, and introduction of non-native species. Consequently, few rivers and streams in the bioregion remain free-flowing (within the definition of the Act) or possess outstanding values. Continued development threatens the few remaining natural streams with potential degradation.

The final step of the study process is the determination of suitability and an agency recommendation. Suitability requires consideration of existing and reasonably foreseeable potential land uses, values foreclosed or diminished, if not protected public and agency interest in designation, land ownership status, management needs and costs, and alternative management. A river found suitable is recommended to Congress for designation. Interim protection of suitable rivers continues until Congress acts on the recommendation. Rivers not recommended by the agency are no longer subject to interim protection. Suitability decisions are considered a major federal decision – it is therefore desirable for the agency to utilize the forest plan EIS process to complete the suitability study and make recommendations to Congress.

AREA DESCRIPTION

The Los Padres National Forest is located in portions of two of California's ten bioregions – the South Central Coast and South Coast. The Angeles, San Bernardino, and Cleveland National Forests are located in the South Coast bioregion. The South Coast bioregion is completely un-represented in the National Wild & Scenic Rivers System. Three streams on the LPNF within the Central Coast bioregion are components of the National Wild & Scenic Rivers System – the Big Sur River, Sisquoc River, and Sespe Creek. Rivers recommended for designation are listed in Appendix C.

DESIRED CONDITION

Included in the System are rivers and streams on the National Forest lands in the South Central Coast and South Coast bioregions that meet the requirements of the Act. These rivers are managed to protect and enhance their free-flowing character and outstanding natural and cultural values. Rivers and streams with critical aquatic, wetland, and riparian habitat for sensitive, threatened, and endangered species, as well as outstanding recreational, scenic, cultural, historical, water quality, and other natural values are protected and enhanced. These protected rivers and streams contribute to the overall biodiversity, ecological health, and sustainable economy of the region.

The public lands along each segment are managed to protect and enhance the free-flowing character, outstanding values, and water quality for which the river was designated. Management of multiple outstanding values is balanced. Potential management conflicts between the protection and enhancement of 2 different outstanding values (e.g. intensive recreation and endangered species/critical habitat) shall be resolved in favor of the value that would face irreversible loss or degradation if the other value were to be protected or enhanced. Where wild rivers and wilderness overlap, management will be consistent with both designations.

OBJECTIVES

Include rivers and streams in bioregions that are currently un- or under-represented in the National Wild & Scenic Rivers System.

Federal hydroelectric licenses for new dams and diversions are prohibited on designated rivers.

No federal agency may permit or otherwise assist any water resource project on a designated river that would have a direct and adverse effect on the values for which the river was designated.

Water resource projects located upstream, downstream, or on tributaries of a suitable designated river must not invade the eligible designated river area or unreasonably diminish its scenic, recreational, fish, and wildlife values. Water resource projects are defined as any federally assisted project or activity (generally but not always located or occurring instream) that may affect the free-flowing character of the river.

Manage free-flowing rivers and streams for their recreational and interpretive values, while ensuring the protection and enhancement of other outstanding natural and cultural values that may be susceptible to degradation due to overuse and lack of management.

Interim protections for eligible rivers and streams for which studies have been completed are pursuant to section 5(d) of the Act and section 1909.12 in the Forest Service Handbook, particularly section 8.14 (if eligibility study is completed,

"the forest plan must provide for protection of the river area until a decision is made as to the future use of the river and adjacent lands") and section 8.2 (outlining management standards for wild, scenic, and recreational rivers and explicitly including interim management of study rivers).

After finishing eligibility studies, provide interim protection to eligible rivers and streams so that those waters are not degraded to the point where they are no longer eligible for Wild and Scenic protection (e.g. a dam is built) or that their classification is "downgraded" (e.g. a road is built along an eligible wild segment so that it is now only an eligible scenic or recreational segment).

Upon designation by Congress, complete and implement a comprehensive management plan for each designated river and stream within 1 year after the designation, to guide management activities and ensure the protection of free-flowing character and outstanding values.

Encourage fee title acquisition or purchase of scenic easements on private lands within the river area to ensure protection of outstanding values, provide public right of way, and increase management efficiency. Acquisition will be primarily through willing seller or exchange. Condemnation of fee title or scenic easements will be used only as a last resort to prevent unacceptable impacts on an eligible or designated river.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding Wild and Scenic Rivers contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall ensure the protection of at least 30 free-flowing streams and outstanding river-based values in a region that has undergone extensive water resource development and degradation of river values.

Classification

River areas shall be classified as Wild, Scenic, or Recreational based on the level of existing development, and managed accordingly. Management of the public lands in these river areas shall ensure the maintenance of the existing Wild, Scenic, or Recreational classification. Activities that diminish existing classification on public lands are prohibited. Regardless of classification, management shall protect and enhance the outstanding values of the designated river.

- Wild river areas are free of impoundments, generally inaccessible except by trail, with watersheds or shorelines essentially primitive, having unpolluted waters. Motorized travel is prohibited, except for public safety emergencies. Discrete roads or motorized trails that end at the boundary of the area are permitted. Wild river areas are withdrawn from new mineral entry, and existing mining is permitted subject to valid existing rights. Road construction, logging, and extensive mechanical manipulation of vegetation within the river area are prohibited. The visual quality objective for Wild river areas is Preservation or Retention. The visual quality objective for areas outside of Wild river areas, but visible from within, is Partial Retention. The recreational opportunity spectrum classification for Wild river areas is Primitive, or Semi-Primitive Non-Motorized.
- Scenic river areas are free of impoundments, having shorelines or watersheds largely primitive and shorelines largely undeveloped, but accessible in places by roads (i.e., roads may cross but generally not parallel the river). Motorized travel may be permitted, subject to area-specific prescriptions. Mining and other uses are subject to valid existing rights and maintenance of visual quality along the shoreline. Water quality should meet, or be able to meet, federal standards. The visual quality objective for Scenic river areas is Retention along the shoreline and generally throughout the river area, but Partial Retention is permitted in portions of the river area not directly visible from the river. The recreational opportunity spectrum classification is Semi-Primitive Non-Motorized or Semi-Primitive Motorized. Bridge crossings may be Roaded Natural.
- Recreational river areas are readily accessible by road or railroad, may have some development along the shoreline, and may have some small existing diversion dams or structures. Motorized travel is permitted, subject to area-specific prescriptions. Mining and all other uses are subject to valid existing rights. Water quality should meet, or be able to meet, federal standards. The visual quality objective is Partial Retention. The recreational opportunity spectrum classification is Roaded Natural.

ISSUE STATEMENT

Roadless area conservation is an important component of any sustainable forest management plan. The extensive literature on the importance of intact natural habitats makes a strong case for the potential role of roadless areas as refugia for native biodiversity and as areas critical to forest integrity and function (Strittholt and Dellasala 2001). Even more extensive is the body of evidence showing the negative ecological impacts of roads in forested ecosystems (Lyon 1984, Costick 1996, Kattelmann 1996, Kattelmann and Embury 1996, Reed et al. 1996, Spellerberg 1998, Noss 1999). Many of the remaining roadless areas encompass important high-quality habitat. Recent studies emphasize the importance of unroaded areas greater than 1,000 acres as strongholds for the production of fish and other aquatic and terrestrial species, as well as sources of high-quality water (Henjum et al. 1994, Rhodes et al. 1994b). In addition, Strittholt and Dellasala (2001) showed that even small (e.g. 405-acre) roadless areas may contain more species of concern than would be expected from land area alone, and capture habitat types that are not found in Wilderness or larger roadless areas. Large and small roadless areas also contribute to connectivity of the ecosystem. As stated in a 1997 letter to President Clinton from 169 scientists, "[t]here is a growing consensus among academic and agency scientists that existing roadless areas—irrespective of size—contribute substantially to maintaining biodiversity and ecological integrity on the national forests."

The above studies illustrate the ecological benefits derived from roadless areas. Given that greater than 10,128 miles of roads, including fire breaks and tractor lines (LPNF = 2,528 miles; ANF = 1,895 miles; CNF = 1,776 miles; SBNF = 3,929 miles) currently exist in the Forests, the remaining roadless lands possess critical ecological values. Protecting roadless areas of all sizes will create an unbroken network of wildlands in the South Coast ecoregion that will protect native species and habitats, and provide magnificent backcountry recreational opportunities.

In an effort to identify these essential roadless areas, the California Wilderness Coalition coordinated the Wildlands 2000 campaign. This statewide Citizens' Wilderness Inventory sought to determine the extent of wilderness caliber lands remaining on our public lands. On the Forests, the Citizen's Wilderness Inventory determined that there are approximately 881,365 acres of remaining wilderness quality lands (Henson et al. 2001). The RARE II inventory conducted by the Forest Service in 1980 identifies many of these roadless areas – however, many of the units identified by the Citizen's Inventory, or portions of these units, are not recognized by the RARE II inventory. Additionally, much of the roadless acreage that existed in 1980 was not protected and has since been lost to development or other impairing impacts. In the four forests alone, close to 165,000 acres were lost to development in this twenty-year period (Spitler et al. 1998).

An index of existing roadless areas inventoried on the Forests that qualify for wilderness designation, as identified in the Citizen's Wilderness Inventory, is located in Appendix D.

AREA DESCRIPTION

Roadless areas occur throughout all the Forests. See Table 11-2 and Figure 13-1 for roadless area inventories.

DESIRED CONDITION

Lands classified as roadless have increased in total acreage and distribution across the Forests, spanning the full range of native habitats. Wildlands designated as Wilderness, Wilderness Study Areas, Riparian Conservation Areas, other special interest areas, and Habitat Linkages form a network—unbroken by roads and ORV trails—connecting the Forests and other protected areas. Once-rare species and their habitats are again thriving in the wildlands network (see section 14.0, *Habitat Linkages*).

OBJECTIVES

Complete a comprehensive inventory of the Forests and the National Forest road system to identify roadless areas greater than 1,000 acres within 3 years.

Inventory and protect all roadless areas identified by the 1980 RARE II inventory and by the 2001 Citizen's

Inventory.

Extend roadless protection to areas down to 1,000 acres that are contiguous to congressionally designated Wilderness, Wilderness Study Areas, Riparian Conservation Areas, other special interest areas, or federally administered components of the National Wild and Scenic Rivers System that are classified as "Wild" (see section 12.0, *Wild and Scenic Rivers*).

Identify and protect undeveloped roadless lands of 1,000 acres or greater for their ecological benefits and wildland characteristics.

Complete a comprehensive, ground-based inventory of land areas of all sizes that lack roads within 3 years of the adoption of this plan. Evaluate each of these roadless areas according to the following criteria:

- Past human disturbance, including motorized recreation and livestock
- Presence of late-successional old-growth forest conditions
- Presence of sensitive plant communities
- Presence of species of concern and their habitat
- Presence of wild, free-flowing rivers
- Proximity to other roadless areas or protected lands regardless of size

To the maximum extent practicable, manage all undeveloped roadless lands, regardless of size, as roadless reserves. Prohibit road construction, ORV use, mining, and other development in these areas.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding roadless areas contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

To the extent permitted by 36 CFR 294, the Forest Service shall manage all roadless lands of 1,000 acres or greater to fully maintain their roadless and pristine character. Other than for scientifically justifiable restoration purposes, undergrowth reduction and road construction shall be prohibited in these areas. ORV use, mining, and other development shall be prohibited in these areas to the maximum extent practicable. Damage from past human disturbance including but not limited to soil erosion and invasion of exotic species due to ORVs and domestic livestock shall be remediated to restore natural conditions (i.e., Potential Natural Community). Prescribed burning may be permitted at frequencies and intensities identified as suitable for each vegetative community and consistent with TES species and watershed analyses.

In the interim and until an evaluation of individual roadless lands between 1,000 acres and 5,000 acres has been completed, all roadless lands greater than 1,000 acres, and any undeveloped roadless lands regardless of size shall be managed to fully maintain their existing roadless character by the Forest Service. Road construction, ORV use, mining, and other development shall be prohibited in these areas.

HABITAT LINKAGES

ISSUE STATEMENT

The Forests are located in California's most populated area, and in an area of extraordinary biological diversity—the California Floristic Province, identified as one of 25 hotspots of biological diversity on Earth (Myers 2001). Hotspots are places of exceptional species richness coupled with an exceptional risk of species extinction. The South Coast Ecoregion, in which 3 of the Forests and a portion of the fourth are found, has the dubious distinction of being the most threatened hotspot of biodiversity in the U.S., with more than 200 species of plants and 200 species of animals considered threatened or sensitive by government agencies and conservation groups (Hunter 1999). The most serious threats to biological diversity in this region are habitat loss and fragmentation. Habitat fragmentation alters ecosystem functions such as top-down regulation by large predators, gene flow, natural patterns and mechanisms of pollination, seed-dispersal, natural competitive relationships among species, resistance to invasion of alien species, and prehistoric patterns of energy flow and nutrient cycling. Past management efforts focused on single species instead of ecosystem function have proven to be very costly, and of limited success. There must be a new emphasis on conserving and connecting large wildland areas and their core habitat so that large-scale ecosystem processes can operate unfettered.

The remaining large wildlands form an archipelago of natural open space thrust into one of the world's largest metropolitan areas. These wild areas are naturally connected; indeed, they are fundamentally one ecological system. It is only very recent, intensive, and unsustainable activities that threaten to sever this natural connection. If such a severance is allowed to proceed, the biological, ecological, educational, recreational, and spiritual impacts will be substantial. The value of these lands for biodiversity conservation, environmental education, outdoor recreation, and scenic beauty is immense.

In November 2000, some 200 land managers and conservation ecologists participated in a conference entitled "Missing Linkages: Restoring Connectivity to the California Landscape." The participants identified 232 linkages statewide, including 60 critical linkages for the South Coast Ecoregion, and 20 for the Central Coast Ecoregion (Penrod et al. 2000). The Forests span these 2 ecoregions. A number of these linkages qualified as *landscape linkages* in that they provide the only connection between pairs of large protected wildland areas; some are critically important in terms of the large size of wildlands served by the linkage. A number of these landscape linkages are directly associated with Forest Service lands, providing intra- and inter-forest connectivity between and among the Forests, and between ecoregions (Central Coast, Sierra Nevada, Mojave and Sonoran Deserts).

Conservation biologists concur that the best way to manage for connectivity is to ensure permeability across a wide connective swath of habitat rather than a hard-line corridor (Simberloff et al. 1992). However, delineated corridors are the only viable option for connectivity in this densely populated and rapidly growing area (Beier 1993). There are probably only 10 to 20 more years to acquire and protect these landscape linkages. The value of National Forest lands, state and regional parks, and private reserves in these areas reaches in the billions of dollars. A relatively modest investment in connective habitats can ensure the integrity of these sites. Quite simply, if we do not quickly preserve this coarse-scale wildland network as the backbone of a regional conservation strategy, there will be no rich biological core for smaller wildlands to connect *to*. The biological integrity of several thousand square miles of the very best southern California wildlands would be jeopardized if these linkages were lost.

AREA DESCRIPTION

National Forest Service lands are the most significant core habitat areas left in southern California. Because they are not currently protected as part of a regional reserve network, the ecological integrity of these lands in perpetuity may be in question (Stephenson and Calcarone 1999). Habitat linkages between the Forests must be protected and restored, and linkages must also be secured between Forest Service lands and other publicly and privately conserved lands in lower elevations to allow for seasonal migration between the mid- and higher-elevation Forests and these sites. In addition, there are wide swaths of habitat that currently link existing and proposed specially designated areas—Wilderness, Research Natural Areas (RNAs), Special Interest Areas (SIAs) within the Forests—that are not afforded any special protection. The following landscape linkages are directly related to the Forests; they must be secured to ensure the ecological integrity of the lands in perpetuity (Figure 14-1, *Habitat Linkages*).

*Sierra Madre Mountains-*San Gabriel Mountains* (South Coast Missing Linkages Map ID# 26, Solelad Canyon-*Mint Canyon). This linkage connects the Sierra Madre Mountains in the LPNF to the San Gabriel Mountains in the ANF. The key species identified as indicative of connectivity for this linkage were mountain lion, bobcat, coyote, southwestern willow flycatcher, unarmored three-spined stickleback, and western spadefoot toad. Urbanization and roads are severe threats to connectivity function, with the primary impediment being Highway 14; as such this linkage was identified as a connectivity choke-point. The primary habitat types in the linkage are coastal sage scrub, chaparral, oak woodland, and riparian. In fact, the Santa Clara River was identified as the primary feature facilitating animal movement in the linkage.

*San Gabriel Mountains-*San Bernardino Mountains* (South Coast Missing Linkages Map ID# 32, Cajon Pass). This linkage connects the San Gabriel Mountains in the ANF with the San Bernardino Mountains in the SBNF. Species targeted as connectivity indicators for this linkage included mountain lion, black bear, bobcat, mule deer, badger, reptiles, and rodents. This linkage was identified as a connectivity choke-point and a landscape linkage, largely due to the high degree of threat to connectivity because of freeway and railway expansion, a proposal for a bullet train to Las Vegas, and urbanization. Currently, the primary barriers to movement are Interstate 15, Highway 138, and Route 66. The underpass under Cleghorn Canyon bridge is the most direct and largest; however, the mouth of the canyon, on the west side of the freeway, is at risk; there are 7 or more additional large culverts or underpasses which are also important to maintain. The primary habitat types in the linkage are chaparral, valley foothill riparian, and alluvial fan sage scrub.

*San Bernardino Mountains-*San Jacinto Mountains* (South Coast Missing Linkages Map ID# 42, San Gorgonio Pass). This linkage connects the San Bernardino Mountains to the San Jacinto Mountains, both of which are part of the SBNF. It was also identified as a coastal-to-desert link, a critical connection where species intergrade along a genetic continuum. A secondary linkage was identified connecting the San Bernardino Mountains near Oak Glen to the Redlands Badlands and ultimately to the San Jacinto/Lake Perris Core Reserve along Singleton Road. Key species identified for this linkage included mountain lion, badger, bobcat, black bear, reptiles, and rodents including kangaroo rats. This linkage was identified as a connectivity choke-point and a landscape linkage; it is threatened by urbanization, gravel mining, residential development, and potential "improvements" to Interstate 10. San Gorgonio Creek was identified as the principal feature facilitating plant and animal passage, while Interstate 10 and sand and gravel mines in the stream bottom were identified as the primary impediments. The primary large non-private landowners in the vicinity are the Forest Service, State Parks, the County of Riverside, and the Cahuilla Indians. The dominant vegetation types in the linkage are valley foothill riparian, desert riparian, alluvial fan sage scrub, desert scrub, mesquite catclaw, and chaparral.

*Santa Ana Mountains-*Palomar Ranges* (South Coast Missing Linkages Map ID#s 12, 12, 56, Pechanga Corridor). This linkage connects the Santa Ana Mountains to the Palomar Ranges, both of which include portions of CNF. This linkage was recognized as a landscape linkage connecting 2 significant habitat blocks and a connectivity choke-point, mainly because Interstate 15 is the primary impediment. Species targeted as connectivity indicators included mountain lion, bobcat, badger, and deer. Contiguous habitat coverage and underpasses/bridges under I-15 facilitate movement, but restoration is needed to restore functional connectivity. The principal restoration necessities are conversion of agricultural lands to the historical chaparral and riparian vegetation, vegetated over/underpasses, and fencing along the freeway to prevent road kill. The primary large landowners in the vicinity are the Forest Service, Bureau of Land Management, The Nature Conservancy, and San Diego State University. Expanding urbanization, rural development, and agriculture threaten the integrity of these already conserved lands. Numerous studies have been conducted which document the importance of this linkage. In addition, 2 Habitat Connectivity Workshops co-sponsored by the San Diego State University Field Stations Program, The Nature Conservancy, and South Coast Wildlands Project have taken place: one on Biological Perspectives, the other on Conservation Design. Another workshop, on Conservation Delivery, is scheduled for the summer of 2002.

*Palomar Ranges-*San Jacinto Mountains* (South Coast Missing Linkages Map ID# 57, Wilson Creek). This landscape linkage connects the Palomar Ranges in the CNF to the San Jacinto Mountains in the SBNF. This linkage was recognized as providing habitat connectivity for mountain lion, bobcat, coastal California gnatcatcher, quino checkerspot butterfly, and raptors. The primary impediment to wildlife passage is State Route 79, while the existing feature that facilitates movement is contiguous habitat coverage, including riparian corridors. The primary habitat types in the linkage include chaparral, coastal sage scrub, and riparian. This linkage lies within the subregional planning area of the Western Riverside County Multi Species Habitat Conservation Plan (MSHCP). Studies have been conducted towards the development of a Wilson Creek Conservation Bank, though the project has not been implemented.

*Cuyamaca Mountain-*Palomar Mountain* (South Coast Missing Linkages Map ID# 9, Cuyamaca-Palomar). This linkage connects the CNF. This linkage was identified as a landscape linkage for mountain lion, cougar, deer, Stephen's kangaroo rat, and migratory birds. No specific barriers were identified, but agriculture, grazing, rural residential development, and roads were recognized as threats. Continual habitat coverage facilitates movement; the major habitat types in the linkage are grassland, riparian, and oak woodland. The large landowners in the vicinity of the linkage include the Forest Service, Vista Irrigation District, and Cauzza, Mesa Grande Indian Reservation.

*Eastern Sierra Madre Mountains-*Western Sierra Madre Mountains* (South Coast Missing Linkages Map ID#25, Castaic I-5 Undercrossing). This linkage connects the Eastern Sierra Madre Mountains to the Western Sierra Madre Mountains, in the LPNF. The primary impediments to animal movement are Highway 126 and Interstate 5, though there are crossings under the freeway and riparian corridors that facilitate animal movement. This linkage was identified as a connectivity choke-point at the Missing Linkages Conference, but because of the size of the core areas being connected it is essentially a landscape linkage. However, because urbanization was identified as a threat, there is potential for the linkage to become a choke-point in the very near future.

*Sierra Madre-*Tehachapi-*Sierra Nevada* (Sierra Nevada Missing Linkages Map ID#10, Southern Sierra Checkerboard). This landscape linkage connects the South Coast Ecoregion to the Sierra Nevada Ecoregion, via the Tehachapi Mountains, which is critical to secure so the southern forests don't become isolated in the future. This linkage was identified as providing connectivity for key species such as mountain lion, bobcat, deer, and black bear. The primary impediment to movement here is Highway 58, while a fairly contiguous mosaic of chaparral, hardwood forest, and coniferous forest habitats facilitates movement. This linkage is threatened by habitat fragmentation from urbanization and road-building. The major challenge is getting large mammals, such as the Tule elk, from LPNF and the Wind Wolves Preserve to the Sierra Nevada. The major landowner is Tejon Ranch, which covers 277,000 acres; major public funds will be needed to accomplish an acquisition of this size.

Santa Lucia Ranges North (Central Coast Missing Linkages Map ID# 5, Los Padres Connector-*Hearst Castle). This linkage connects portions of the LPNF in the northern part of the Santa Lucia Ranges; it was identified as a landscape linkage connecting 2 major protected core areas. Species targeted as connectivity indicators included mountain lion, black bear, spotted owl, and California red-legged frog. The primary barriers identified included gaps in habitat cover, and Highways 41 and 46, while fairly contiguous habitat and riparian corridors were acknowledged as facilitating movement. Habitat types within the linkage include grassland, oak woodland, and riparian. The linkage was recognized as being highly threatened by development and exotic invasion. The major landowners in the vicinity of the linkage include State Parks and the Hearst Corporation.

Santa Lucia Ranges South (Central Coast Missing Linkages Map ID# 6, Cuesta Grade North). This linkage connects portions of the Los Padres National Forest in the southern part of the Santa Lucia Ranges; it was also identified as a landscape linkage. The key species recognized as connectivity indicators for this linkage included mountain lion, bobcat, gray fox, black bear, and deer. The primary impediments to wildlife movement are Highway 101 and Southern Pacific Railway at the Cuesta Grade crossing; numerous road kill records of mountain lion and black bear have been documented. The dominant vegetation type in the linkage is mixed chaparral with scattered conifers; contiguous habitat coverage facilitates movement. The primary landowner is the Forest Service, with a CalTrans right-of-way at Highway 101.

*San Bernardino-*Little San Bernardino Mountains* (Mojave and Sonoran Deserts Missing Linkages Map ID#8, Morongo Valley). This linkage connects the San Bernardino Mountains (SBNF) in the South Coast Ecoregion to the Little San Bernardino Mountains, which are part of Joshua Tree National Park, in the Mojave and Sonoran Deserts Ecoregion, via the Morongo Valley. Dominated by creosote bush scrub, this linkage was identified as providing habitat connectivity for indicator species such as Peninsular bighorn sheep, mule deer, and large predators. The most significant barrier to wildlife movement is State Route 62, while urbanization threatens to create additional impediments.

DESIRED CONDITION

A system of natural and restored open spaces forms a comprehensive interconnected system of natural space. Forest Service lands are the backbone of a regional conservation strategy for a large-scale wildlands network for the ecoregion. Within the Forests, habitat linkages have been identified and protected to ensure connectivity between specially designated areas (Wilderness, RNAs, SIAs). Large carnivores and keystone species have been used as a planning tool to identify critical linkages and to conserve a broad range of ecosystem processes. The network of wildlands is able to preserve

populations of vulnerable species such as wide-ranging mammals, rare species, and habitat specialists. It also maintains biological and ecological processes such as mutualism and competition, predator-prey interactions, gene flow, plant dispersal mechanisms, vegetational succession patterns, and pathways of energy flow and nutrient cycling resembling conditions of the last several millennia.

OBJECTIVES

Provide intra- and inter-forest habitat connectivity at the province level to ensure the ecological integrity of Forest Service lands in perpetuity.

Provide habitat connectivity between Forest Service lands and other protected open space such as state parks and state, regional, and private reserves.

Develop collaborative partnerships with other pertinent state and federal agencies and organizations working on habitat connectivity issues associated with Forest Service lands, such as the South Coast Missing Linkages Project.

Determine linkage use by target species from all taxonomic groups, including Management Indicator/Focal Species.

Attend Habitat Connectivity Workshops on Biological Perspectives, Conservation Design, and Delivery to provide critical input and data to the South Coast Missing Linkages Project.

Develop maps of vegetation, infrastructure, undeveloped parcels, and land-use zoning in linkage areas.

Work with regional scientific experts to develop monitoring protocols for connectivity indicator species.

Monitor linkages to document movement of target species for all taxonomic groups; methods for monitoring include track beds, remote-sensored cameras, counters, radio tracking, mark-recapture studies, pitfall traps, small mammals traps (Sherman live traps), etc.

Monitor movement of focal/management indicator species both within and between Forest Service lands (see section 7.0, *Management Indicator/Focal Species*).

Develop spatially-explicit descriptions of impediments to and opportunities for animal movement through linkage areas.

Identify and implement solutions to wildlife movement barriers by applying for grants to retrofit over and under crossings, and by involving CalTrans in a coherent way.

Determine how the linkage is incorporated in existing conservation measures (e.g., NCCPs and HCPs) and work with state and federal agencies to ensure that Forest Service lands are incorporated into planning efforts.

Identify Forest Service lands that might contribute to the establishment of connectivity, including those that might otherwise have been determined to be surplus because they are discontinuous from the main Forest area.

Work with other agencies and organizations with conservation investments (e.g. state parks, private reserves, NCCP lands) in close proximity to Forest Service lands. These investors may be potential partners in acquisition efforts, or in developing conservation easements in the linkages.

Conduct parcel-scale analyses on connectivity zones. Determine landowner receptivity to conservation in connectivity zones (conservation easements, acquisition, fee title agreements, etc.). See section 17.0, *Land Protection Opportunities*.

Identify needs and opportunities for restoration. Develop and implement restoration projects in connectivity zones.

With respect to the San Gabriel Mountains-*San Bernardino Mountains linkage (South Coast Missing Linkages Map ID# 32, Cajon Pass), coordinate closely with CalTrans, Federal Highway Administration, San Bernardino Planning Department, San Bernardino Flood Control, San Bernardino County Museum, San Bernardino County Parks, and railroad companies to ensure that linkages are maintained, restored, or installed with infrastructure upgrades.

The bridge at Cleghorn Canyon is the most direct and largest connection between the San Gabriel Mountains and the San Bernardino Mountains, but the mouth of the canyon is privately owned. The Forest Service should determine landowner receptivity to conservation and work to protect and if necessary restore this connection.

Private land in Crowder Canyon (Highway 138) is a critical inholding affecting north-south movement from the San

Gabriel Mountains to the San Bernardino Mountains. The Forest Service should determine landowner receptivity to conservation and work to protect and if necessary restore this connection.

Continue exotic species control projects (Arundo removal) to maintain connectivity function for an array of taxonomic groups.

Coordinate with CalTrans on the expansion of Highway 138 currently being undertaken to incorporate movement corridors between the San Gabriel Mountains and San Bernardino Mountains into the project.

Coordinate with the Department of Fish and Game, the California Department of Parks and Recreation, City of Banning, Riverside County, Riverside County Flood Control District, CalTrans, Morongo Indian Tribe, the local Audubon Chapter, and The Wildlands Conservancy to protect and restore functional connectivity between the San Bernardino Mountains and San Jacinto Mountains.

Coordinate with the Natural Community Conservation Plan Managers of the Riverside MSHCP and Coachella Valley MSHCP to ensure that connections between the San Bernardino Mountains and San Jacinto Mountains are incorporated into the plan.

Coordinate with the BLM, CDFG, Santa Margarita Ecological Reserve, The Nature Conservancy, and the Fallbrook Land Conservancy to identify potential acquisition priorities in the linkage connecting the Santa Ana Mountains to the Palomar Ranges.

Coordinate with the Natural Community Conservation Plan Managers for the Western Riverside MSHCP and North San Diego County MSHCP to ensure that the connections between the Santa Ana Mountains and the Palomar Ranges are incorporated into the plans.

Coordinate with the County, Coastal Commission, Greenspace, and The Nature Conservancy to ensure that the Santa Lucia Ranges north linkage is protected and restored.

Conduct studies to identify habitat linkages required for less vagile species, such as amphibians, including necessary information on minimum width, length, and vegetative structure of the linkage (Lambeck 1997).

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding Habitat Linkages contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall identify, designate, and protect habitat linkages between reserves within the Forests to connect existing and proposed specially designated areas (Wilderness, RNAs, SIAs). Develop land use management policies and programs within these connections to ensure that connectivity function is maintained.

The Forest Service shall collect and analyze road kill data, and work with the California Department of Fish and Game, CalTrans, and County Animal Care and Control Stations.

RESEARCH NATURAL AREAS

ISSUE STATEMENT

Research Natural Areas (RNAs) are part of a nationwide network established to protect land in perpetuity as living, learning centers for ecological research and ecosystem restoration. RNAs should include broad representation of the ecological diversity and processes that occur in the Forests.

RNA designation requires only the stroke of a Regional Forester's pen; it does not preclude Congressionally-mandated protection such as Wilderness. In fact, some Wilderness areas currently contain RNAs. As defined in section 4063.02, the objectives of establishing Research Natural Areas are to:

- Preserve a wide spectrum of pristine representative areas that typify important forest, shrubland, grassland, alpine, aquatic, geological, and similar natural situations that have special or unique characteristics of scientific interest and importance that, in combination, form a national network of ecological areas for research, education, and maintenance of biological diversity
- Preserve and maintain genetic diversity
- Protect against serious environmental disruptions
- Serve as reference areas for the study of natural community succession
- Provide onsite and extension educational facilities for academic institutions
- Serve as baseline areas for measuring long-term ecological changes
- Serve as control areas for comparing results from manipulative research
- Monitor effects of resource management techniques and practices

RNAs may also be established to illustrate an ecological process, such as fire and its beneficial effect on community regeneration. This significantly benefits research and conservation and publicly promotes current scientific knowledge. All RNAs must have ecologically viable boundaries. They must be large enough to support the species and/or processes for which they were set aside. RNAs should also be designed as part of a network of protected areas (Wilderness, SIAs, etc.) to ensure that plants and animals can adapt to changes in the face of impending climatic change.

The Forest Service only identified 4 criteria in the *Notice of Intent* for evaluating potential RNAs:

- Quality: how well does the site represent the targeted ecosystem type or biological diversity elements?
- Condition: has the site been degraded or altered from natural or optimal conditions?
- Viability: what is the likely long-term survival for the ecosystem and its biological diversity elements?
- Defensibility: can the ecosystem and biological diversity elements be protected from extrinsic human factors over the long term?

RNAs are an investment in ecological knowledge that the present generation gives to future generations.

AREA DESCRIPTION

There are currently only 14 established RNAs on the Forests, encompassing 14,460 acres (Table 15-1, *Established Research Natural Areas*).

TABLE 15-1

ESTABLISHED RESEARCH NATURAL AREAS

FOREST	RNA NAME	ACRES	MAJOR ECOSYSTEM TYPES AND FEATURES
Angeles	Falls Canyon	1,165	Bigcone Douglas-fir, Canyon live oak
	Fern Canyon	1,460	Chamise chaparral, Canyon live oak
Cleveland	Agua Tibia	480	Bigcone Douglas-fir, Madrone
	King Creek	1,002	Cuyamaca cypress, Gabbro endemics
	Organ Valley	560	Engelmann oak, Gabbro endemics
Los Padres	American Canyon	1,500	Coulter pine-chaparral, Riparian
	Black Butte	540	Knobcone pine, Chaparral
	Cone Peak Gradient	2,787	Santa Lucia fir, Mixed evergreen, Coast live oak
	San Emigdio Mesa	1,200	California juniper, *P. monophylla, Q. turbinella ssp.*
San Bernardino	Cahuilla Mountain	929	Coulter pine, Ca black oak
	Fisherman's Camp	431	Coulter pine, Mixed conifer
	Hall Canyon	667	Mixed conifer, adjacent to James Reserve
	Horse Meadow	946	White fir, Subalpine forest
	Millard Canyon	793	*Q. wislizennii,* Bigcone Douglas-fir

This Alternative recommends designation of 23 additional RNAs that represent the broad sweep of ecosystems representative of the 4 Forests. These areas are summarized in Table 15-2. Please see Figure 15-1, *Existing and Proposed RNAs and SIAs*.

TABLE 15-2

PROPOSED RESEARCH NATURAL AREAS

FOREST	RNA	SIZE (AC.)	MAJOR ECOSYSTEM TYPE AND FEATURES
ANF	Arroyo Seco		
	Condor Peak		
	Falls Canyon Expansion		
	Fish Canyon		
	Liebre Mountain		
	Mount Pacifico		
CNF	Guatay*	1,352	Tecate cypress
	San Diego River*	5,114	Coastal sage scrub
	Viejas Mountain*	3,158	Chamise chaparral
LPNF	Big Pine Mountain*	3,258	Sierra Nevada mixed conifer / Santa Lucia fir / Canyon live oak
	Sawmill Mountain*	? not mapped	Jeffrey pine
	Ventana Cones*	2,220	Oak
	Wagon Caves*	107	Valley oak woodland
SBNF	Bluff Lake		
	Broom Flat*	417	Single-leaf pinyon, Pinyon-juniper
	Cleghorn*	1,662	Southern sycamore &alder riparian woodland, White alder
	Merriman Meadow		Metcalf Meadow

* Denotes formally proposed RNAs

DESIRED CONDITION

The appropriate Regional Forester has designated all RNAs proposed under this Alternative. RNAs have been established to ensure ecosystem and natural process representation on the Forests. RNAs make up a significant portion of the Forests and have been connected to other protected areas (Wilderness, SIAs, etc.) through designated Habitat Linkages (see section 14.0, *Habitat Linkages*). RNAs have been designed as part of a network of protected areas to allow for ecological processes and dynamic, continually evolving landscapes. Lands surrounding RNAs have been designated as primitive non-motorized areas to serve as buffers for these natural outdoor laboratories.

RNAs provide abundant research and educational opportunities for elementary, high school and college students, ranging from an outdoor classroom experience to in-depth projects conducted by graduate students. TES species and other indigenous species are present at functionally significant levels. Research and restoration projects eradicate or control invasive exotic species. The Forest Service is using the RNAs as control areas with which to compare management techniques being applied elsewhere.

OBJECTIVES

Protect RNAs against activities that directly or indirectly modify ecological processes. The prime consideration in managing RNAs is maintenance of natural conditions and natural processes.

Set standards for non-manipulative research activities and encourage such use.

The station director shall assess each proposal for research within the RNA for its potential impact on listed, sensitive, and management indicator species and their habitats; proposals may be accepted, modified, or disallowed.

Surveys should be conducted during the appropriate time of year for federally and state-listed species in RNAs with potential habitat. Surveys should be conducted using the appropriate established protocols.

Establish long-term photo documentation points and produce a reference document for use in a range of research projects.

Conduct field observations to identify unfavorable conditions including cutting or opening of trails, vandalism of temporary or permanent plots, and construction of water diversions or other devices by the public.

Encourage research projects that eradicate or control exotic plant and animal life.

Encourage research on pathological conditions to gather information on baseline conditions. Gather information on previous entomological and disease surveys and consolidate them in District files for future reference.

Document the results of monitoring efforts and produce an annual report to be kept at the Regional Forester's office for reference in subsequent research projects.

Develop a GIS database for each RNA to track information generated through research projects.

Cooperative agreements with agencies, academic institutions, and organizations will facilitate research and management actions.

Identify, within 2 years, at least 1 RNA per Forest for each vegetative community. The boundaries of each RNA should be established based on biological realities, and should encompass entire watersheds, to the maximum extent practicable.

Conduct the required environmental assessments for new RNAs within 5 years, and generate the final establishment record for each RNA identified.

Sustain and safeguard the natural resource values for which the RNA was established, with particular emphasis on the preservation of the target element or process.

Ensure the preservation of biodiversity of the RNA, particularly listed, sensitive, or rare species and their habitat.

Establish RNAs to examine research questions on ecosystem processes, including responses of resource elements to climate patterns.

Collect adequate data to document baseline conditions of the RNA and produce analytically based assessments of changes in the ecological status of target vegetation types and other sensitive species.

Assess the effectiveness of various vegetation management treatments, including exotic plant eradication techniques, prescribed fires, etc.

Identify factors that affect the protection of RNAs' targeted communities and natural processes, and responsively manage those factors.

The Forest Service shall consult with organizations or agencies that are stakeholders in the management of the RNA in order to identify additional research questions and management direction.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding Research Natural Areas contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall establish specific, meaningful RNA protections that are implemented, monitored, and enforced.

The Forest Service shall permit no ground-disturbing activities in RNAs that would negatively affect TES species

The Forest Service shall prohibit any form of recreational use if it threatens or interferes with the objectives or purposes for which the RNA was established. Implement seasonal closures as needed to protect TES species. Discourage hiking, camping, picnicking, hunting, fishing, and biking within the RNA through signing of the area boundary in strategic

locations. Signs should list permitted or prohibited uses on the RNA and identify its boundaries.

The Forest Service shall prohibit collecting unless being conducted under an approved research project; do not permit logging or wood-gathering activities.

The Forest Service shall prohibit roads, trails, fences, or signs on an established RNA unless they contribute to the objectives or to the protection of the area, such as boundary fencing to exclude livestock or excessive human use.

The Regional Forester will request withdrawal of the RNA from mineral entry through the U.S. Bureau of Land Management.

All illegal water structures will be removed.

Law enforcement officers will survey drainages for illegal cultivation.

SPECIAL INTEREST AREAS

ISSUE STATEMENT

Special Interest Areas (SIAs) are designated to protect unique resource values. Typically, they have been selected based on botanical, zoological, geological, cultural, paleontological, or scenic values, but they may also be designated to protect and manage threatened, endangered, and/or sensitive species, or other elements of biological diversity.

SIA designation doesn't preclude Congressionally mandated protection such as Wilderness. In fact, some Wilderness areas currently contain SIAs. SIAs are managed to maintain the special interest values for which they were designated, while providing appropriate public education and recreational opportunities. However, whether an SIA is established or proposed, they are recognized in Forest plans as special management zones and managed as such. SIA prescriptions are the same as for Primitive Areas and Wilderness (FSM 2322, USDA 1990).

Throughout the 4 Forests there are areas with extraordinary botanical, zoological, scientific, geological, cultural, and scenic values, or other special interests that deserve special recognition and management. Federal agencies, such as the Forest Service, are mandated to preserve important historic, cultural, and natural aspects of our national heritage under the Environmental Policy Act of 1970. Yet only 15 areas are currently recognized as SIAs on all 4 of the southern California National Forests, with the majority being designated for their unique botanical resources. Province-wide, only 2 SIAs have been designated for geological resources, and only one SIA each has been designated for zoological, cultural, and scenic resources.

The Forest Service has the ability to designate or propose designation of SIAs under the authority granted in 36 CFR 294.1. Regional Foresters have the authority to establish areas of 160 acres or less under 36 CFR 294.1b; they may delegate this authority to Forest Supervisors (USDA 1990). Areas that exceed 160 acres require approval of the Secretary. The Chief has given Regional Foresters the authority to establish SIAs less than 100,000 acres in size, while areas over 100,000 acres require the Chief to notify the appropriate House and Senate Committees and forward any proposals. Classification reports covering SIAs between 5,000 and100,000 acres must be sent to the Washington Office for informational purposes, after they have been approved (USDA 1990). The time is ripe for the identification and designation of additional SIAs through the land and resource management plan revisions.

Forest Service lands make up the majority of core habitat in this rapidly urbanizing ecoregion. Thus, the Forest Service has the responsibility to educate forest visitors on the regional and global significance of this biodiversity hotspot. Because SIAs have such extraordinary characteristics, they are ideal places to use as outreach tools involving interpretive displays and educational programs. Educational opportunities abound, from the role of natural processes such as fire in wildland systems, to physical geography lessons on mountain building, to historical accounts of man's role in the ecosystem. The prospects are endless. Heightening public awareness of the unique resources of SIAs will bolster support for conservation and evoke an appreciation for the rich natural heritage of the bioregion.

AREA DESCRIPTION

Province-wide, only 15 areas have been designated as SIAs, covering 30,269 acres (Table 16-1). The majority of these areas were designated as SIAs for their unique botanical resources. Only 2 SIAs have been designated for their geological resources, and very surprisingly, only one SIA each has been designated for zoological, cultural, and scenic resources.

TABLE 16-1

EXISTING SPECIAL INTEREST AREAS

FOREST	SIA NAME	SIA TYPE	ACREAGE
Los Padres	Alder Creek	Botanical	23
	Lion Den	Botanical	81
	Southern Redwood	Botanical	17
	Cuesta Ridge	Botanical	1,304
	Sierra Madre	Cultural	5,790
	Quatal Canyon	Geological	469
	Mt. Pinos Summit	Botanical	453
	Dry Lakes	Botanical	406
Angeles	Mt. Baden-Powell	Botanical	252
	Mt. San Antonio	Botanical	164
	Devil's Punchbowl	Geological	1,264
San Bernardino	Baldwin Lake Holcomb Valley	Botanical	12,700
	Black Mountain	Scenic	6,948
Cleveland	West Fork San Luis Rey	Zoological	218
	Guatay Mountain	Botanical	180

This Alternative recommends designation of 23 additional SIAs, covering 164,199 acres. These proposed SIAs represent unique botanical, zoological, ecological, cultural, and geological resource values of the 4 Forests. These areas are summarized in Table 16-2. Please see Figure 15-1, which depicts all existing and proposed RNAs and SIAs.

TABLE 16-2

PROPOSED SPECIAL INTEREST AREAS

FOREST	SIA NAME	SIA TYPE	ACREAGE
Los Padres	**Big Sur Management Area		89,707
	Wagon Caves	Cultural	99
Angeles	**Liebre Mountain	Botanical	9,798
	Aliso-Arrastre	Cultural	16,065

San Bernardino	**Arrastre Creek above 2N02	Botanical, Zoological	1,425
	* Bear Creek	Botanical, Zoological, Scenic	2,597
	Cajon Pass	Geological, Zoological, Cultural	7,028
	**Coxey Creek	Zoological, Scenic	3,048
	**Deep Creek	Zoological, Cultural, Scenic	5,884
	* Fish Creek Meadows		718
	**Garner Valley	Botanical, Zoological	2,465
	**Green Canyon		910
	**Holcomb Creek	Botanical, Zoological, Scenic	6,973
	Cactus Flat		910
	**Santa Ana River – Upper	Zoological, Cultural, Scenic	6,436
	* San Jacinto River	Zoological, Cultural, Scenic	1,225
	Siberia Creek Trail Camp		2,090
	**Sugarloaf Meadow		2,873
	**May Van Canyon		1,364
	* Wild Horse Meadows		1,119
Cleveland	Fileree Flat	Botanical	452
	**Pine Mountain	Botanical	273
	**Chiquito Springs	Botanical	740

** denotes areas totally within existing or proposed Wilderness Areas and/or Wild and Scenic Rivers*

***denotes areas partially within existing or proposed Wilderness Areas and/or Wild and Scenic Rivers*

DESIRED CONDITION

A comprehensive province-wide inventory has been conducted to evaluate potential areas for inclusion as SIAs. As a result, the full spectrum of SIA designations—including botanical, zoological, ecological, cultural, historic, prehistoric, geologic, and scenic—has been established on all 4 Forests.

Management strategies and monitoring protocols have been developed for each SIA to ensure the protection of the unique values for which the SIA was established. Natural and anthropogenic elements of SIAs are maintained or enhanced when appropriate, but natural processes prevail.

The Forest Service has developed educational and interpretive information on the exceptional values of each SIA to provide to Forest visitors. Forest visitors depart with a new appreciation for the rich natural heritage of the bioregion and an awareness of the precious natural and cultural resources that are present in the 4 Forests.

OBJECTIVES

Inventory and Establishment

Conduct a province-wide inventory of all areas potentially suitable for inclusion as SIAs, including sites encompassing

botanical, zoological, ecological, geological, cultural, archaeological, and scenic values. Elicit input from regional experts in the appropriate field of study. For each suitable area, complete the necessary assessments and establish records for formal designation. Complete within 3 years of adoption of this plan.

Conduct baseline assessments of all potential SIAs, including information regarding the geology and geomorphic setting; vegetation sub-series and seral stage distribution; listed, sensitive, and rare wildlife, plants, and plant communities; ecological processes; fire history and regimes; historic and cultural resources; recreation; transportation and access; minerals management; and land adjustment and uses. Complete within 5 years of adoption of this plan.

Work with academic institutions and graduate students to complete baseline assessments.

In addition to SIA designation, evaluate areas with historic, architectural, or archaeological values to determine their significance for nomination for inclusion on the National Register of Historic Places (FSM 2363.2). If of national significance, consider proposals to the National Park Service regarding inclusion in theme studies for the National Historic Landmark Program (Forest Service 2363.1,USDA 1990).

Management and Monitoring

Develop and implement management and monitoring strategies for each SIA, with particular emphasis on the unique features for which the SIA was established.

Develop and provide recreational, educational, and interpretive information and opportunities, as appropriate, for each SIA.

Manage for the full complement of species and plant communities and the unique features for which the SIA was designated, as well as the natural processes that support these elements.

Develop and implement a monitoring strategy for a suite of species to serve as a baseline for future analyses in each SIA within 2 years of establishment of an SIA.

Work with academic institutions to study the needs of rare plant and wildlife species in each SIA.

Work with academic institutions to conduct a fire history study on a landscape level and incorporate this information into a prescribed burn program.

If prescribed burns are determined to be appropriate for an SIA, inform and educate adjacent landowners on the value of prescribed fire for protection of property and ecological benefits.

Develop and implement a monitoring strategy to ensure that the unique features of SIAs are not impacted by any human activities.

Acquire fee ownership of private lands within SIAs.

Work with user groups to establish peer pressure programs that encourage appropriate use of SIAs.

Recreation, Education, and Outreach

Promote public use, education, interpretation, and enjoyment of special interest values of each SIA, when such activities do not harm the values for which the SIA was designated.

Promote SIAs to target segments of the public that are interested in the particular values of an SIA. SIAs that are readily accessible with interpretation opportunities should have a higher level of promotion, while isolated SIAs with few facilities should receive minimal promotion.

Provide multi-lingual informational brochures on the natural, cultural, and historical features of each SIA.

Provide recreational opportunities for visitors that are consistent with the values for which the area was designated.

Work with groups such as the California Native Plant Society, Sierra Club, etc., to conduct educational and recreational activities in the SIAs to heighten the awareness of SIAs.

Provide docents to interpret features of the area, where appropriate.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding Special Interest Areas contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

Inventory and Establishment

The Forest Service shall update the National Forest Recreation Survey to include areas identified in the province-wide inventory with special significance for recreational, scientific, cultural, or educational use; store this information in the Recreation Information Management System (USDA 1990).

The Forest Service shall ensure that SIA boundaries are selected so as to be easily recognized, readily enforced, and inclusive of all values to be protected. The general instructions on boundaries for Wilderness (FSM 2320) are applicable, except as to the degree of isolation required.

The Forest Service shall supervise the size allotment of an SIA, which should, at a minimum, be 160 acres, due to the ease with which a Forest Supervisor may designate such areas. This may be an appropriate size for cultural, historic, or archaeological SIAs. However, as biological and ecological processes operate over a much more extensive area, SIAs designated for these reasons should ideally encompass full watersheds.

The Forest Service shall prepare establishment records for all proposed SIAs; complete within 2 years of concluding baseline assessments.

Management and Monitoring

The Forest Service shall develop Special Interest Management Strategies within 3 years of adoption of this plan. These strategies will identify the botanical, ecological, geological, and/or cultural attributes, threats, resource conflicts, restoration needs, access development, recreation opportunities, and monitoring elements for each SIA.

The Forest Service shall, in accordance with the National Environmental Policy Act (NEPA), notify adjacent landowners of any proposed management action within an SIA that has the potential to affect their property.

The Forest Service shall perform a road inventory within each SIA to identify problem areas, and shall decommission or repair roads having drainage problems. Close roads (seasonal or permanent) as appropriate to protect values for which SIAs were designated.

The Forest Service shall survey along roads or other disturbed settings within and adjacent to SIAs for the presence of invasive exotic species; eradicate where identified (see section 10.0, *Invasive Species Management*).

The Forest Service shall prohibit mining in SIAs and eliminate impacts of potential mining on the resource values of SIAs (see section 27.0, *Minerals Management*).

The Forest Service shall prohibit livestock grazing on SIAs (see section 25.0, *Domestic Livestock Grazing*).

The Forest Service shall prohibit ORVs within SIAs.

The Forest Service shall prohibit collecting in SIAs and direct special use permits for collecting away from these areas.

The Forest Service shall patrol for unauthorized use of SIAs (e.g. trespass, marijuana production, rock collecting).

Recreation, Education, and Outreach

The Forest Service shall provide information panels welcoming visitors to the SIA, when access allows. To be included: a map, guidelines for use of the area, a description of the unique features, and a list of recreational opportunities such as trails or self-guided tours.

LAND PROTECTION OPPORTUNITIES

ISSUE STATEMENT

The 4 Forests comprise the majority of core habitat in the ecoregion; they are also the most heavily used public lands in the nation, providing recreational open space for the more than 20 million people within a day's drive of the Forests. As the region's population continues to expand, habitat continues to disappear. Between the years of 1996 and 2000, 28,000 acres were claimed by urbanization in Riverside and San Bernardino counties alone, much of this at the wildland-urban interface (*L.A. Times* 2001). The land base is the underlying foundation of all other cumulative values of the National Forests. Integrating and consolidating the land base to the fullest extent possible must be elevated to the highest of management priorities in order to ensure optimum survival of these forests.

The Land and Water Conservation Fund (LWCF) is designed to help consolidate national forests for protection of recreational open space, watershed integrity, and wildlife habitat, especially for listed and sensitive species. Between 1965 and 2001, the majority of federal acquisition spending in the state has been directed to National Forests in Northern California, by a margin of $516 million to $67 million; this translates to $45 per capita in the North versus $3 per capita in the South. Increased funds from the LWCF are urgently needed in this part of the state to help protect valuable habitat in this biodiversity hotspot, and to expand recreational opportunities in America's most popular public lands.

Urbanization is hindering wildlife movement between large core areas of habitat, including Forest Service lands. Scientists have long known that isolated reserves lose species over time. Plants and animals need room to move, for dispersal and seasonal movement, foraging, and to find mates. While the 4 Forests are comparatively vast in terms of acreage, they are only part of a much larger ecological landscape. Each Forest should enlarge its land acquisition program to include a greater emphasis on perimeter lands outside existing Forest boundaries. To ensure the survival of countless species that are dependent on the Forests for their habitat, the Forest Service should work with adjacent land management agencies, scientists, and conservation groups to biologically connect the 4 Forests as part of an integrated regional network of wildlands. In addition to inholdings, undeveloped perimeter parcels contiguous with Forest Service lands present prime opportunities for the agencies and conservation groups to create a connected system of wildlands for the South Coast Ecoregion.

Habitat is also being displaced by ever-expanding communities within the boundaries of the Forests. Lands are too often sold for habitat-destroying development rather than protected to buffer Forest Service lands and prevent urban sprawl within the boundaries of the Forests. In addition, Special Use Permits (SUPs) (e.g. utility corridors) are granted that degrade and fragment habitat. Once the lands have been degraded, the Forest Service may be more inclined to dispose of these lands that have lost their natural values. Watersheds that are only partially included within National Forest boundaries should be high acquisition priorities, unless adjacent areas are already managed with the forest's integrity in mind. Otherwise, upstream decisions may erode many of the values for which the Forests were established.

There is a serious biological need for accelerated and large-scale habitat acquisition efforts, to stave off extinctions and avert the listing of additional species in the future. Native ecosystems within the Forests are affected by activities on private lands. By acquiring key lands, developing conservation easements, or securing rights-of-way, the Forest Service will improve its ability to protect biological resources and/or meet key objectives in resource management programs. Lands that support habitat for endangered, threatened, or sensitive species are a top priority.

Land exchanges should be avoided unless all other methods of land acquisition have been exhausted. Divestment may be considered in cases where land is isolated from the main body of the National Forest, as long as it isn't functioning as a wildlife movement corridor, and opportunities exist to transfer the land into other more appropriate conservation ownership. Direct purchase of priority acquisition sites as a primary land adjustment method should take precedent over land exchanges, which should only be implemented when divested public lands are placed in other forms of conservation ownership.

Because the urbanizing pressures in southern California are especially great, the threat of habitat fragmentation and gradual loss of public benefits on the Forests is unprecedented. Already the percentage of interior urban development found within the Forests (particularly the SBNF and CNF) significantly exceeds other public lands and has seriously compromised their recreational and resource value. Land acquisition and better Forest consolidation are vital require-

ments for the future viability of these landscapes.

AREA DESCRIPTION

Opportunities for land protection occur throughout and between the Forests.

DESIRED CONDITION

Because forest land acquisition issues are especially critical and urgent in southern California, exceptional measures are taken during the next decade to guarantee that these National Forests located in the most heavily used region in the nation can continue to successfully fulfill their mission of "caring for the land and serving people."

The Pacific Southwest Regional Office of the Forest Service has increased the administrative and real estate processing capabilities of the South Zone Lands Team, which is charged with implementing the acquisition needs of 4 National Forests in southern California. This team is fully staffed and provided with the financial resources necessary to successfully carry out multiple land transactions on each individual Forest annually.

To ensure that the South Zone Team is assigned the most optimum projects, each individual Forest has a fully staffed real estate division, which consists of one full-time Forest-wide Lands Officer aided by a full-time assistant. Each of these positions is held by a qualified person fully trained in the complexities of Forest Service real estate management and transactions. These positions, in particular, are not to be relegated to part-time duties or doubled up with overlapping assignments from other divisions (e.g. Recreation, Fire, or Resources). The urgency of critical land acquisition is afforded full-time and undivided attention. In addition, each separate Ranger District, where private inholdings and significant perimeter lands are located, has a full-time land specialist assigned to the acquisitions needs and priorities of that particular district of the Forest.

New policies and priorities are adopted whereby the Forest Service works with regional scientists and organizations to identify key landscape linkages beyond the existing boundaries, connecting the 4 Forests and other large protected areas. The Forest Service cosponsors and participates in a series of Habitat Connectivity Workshops focused on landscape-level connectivity in the ecoregion—one on Biological Perspectives, the other on Conservation Design. Using the information gathered at the workshops, the Forest Service acquisitions division actively works with other appropriate local, state, and federal agencies and organizations to purchase key parcels. A system of connected and flourishing wildlands is established, and the Forest Service works to ensure the persistence of countless species.

Both outside and within Forest Service boundaries, adjustments in land ownership achieve biological and ecological resource protection objectives and serve public interest needs. Undeveloped parcels within and contiguous with Forest Service land are targeted for purchase to protect ecosystem processes and functions. Large chunks of habitat have been protected for listed and sensitive species, as well as for Management Indicator Species (MIS) (see section 7.0). Parcels in key watersheds are acquired to ensure the protection of public water resources. Rights-of-way have been purchased for public access. The Forest Service continues to be actively involved in city, county, and state planning efforts (e.g. Natural Community Conservation Plans, Multi Species Conservation Plans, General Plan Revisions) to ensure that Forest Service interests (e.g. TES species and habitats, water quality and diversions, rights-of-way, and recreational access) are promoted.

OBJECTIVES

Insofar as each Forest has extensive records and data about land acquisition needs, this information should be consolidated and expanded under a strong land management division and given renewed emphasis as a top priority. New opportunities are available to coordinate with local land conservancy groups and to benefit from major acquisition strategies such as a southern California-wide national forest LWCF campaign.

Consolidate ownership to protect biological resources, particularly federally listed TES species and their habitats.

Secure connections both within and among the 4 Forests to facilitate plant and animal movement and other essential flows (e.g. nutrients, floods) across the landscape.

Prepare an inventory of key watershed and wildlife areas that exist on private lands within and adjacent to the 4 Forests. Examine the relative value of both private and public ownership of these key areas as a means to achieve habitat integrity

and biological connectivity for the native flora and fauna.

Prepare an inventory of public/private land ownership in order to identify potential for consolidation of public ownership in key watershed and wildlife areas.

Review and update established criteria and ranking for priority acquisitions of parcels in light of bioregional and ecological information.

Identify and purchase lands identified as necessary for the recovery of TES species, or state-listed or sensitive species. Avoid land adjustments that could undermine recovery for TES species.

Identify and purchase lands adjoining Forest Service lands that are suitable for development that would adversely affect the management and recovery of TES species and their habitat.

Identify and purchase land identified as habitat movement corridors both within and among the 4 Forests.

Identify and purchase lands within or adjacent to designated or proposed Wilderness Areas or other areas designated by Congress.

Identify and acquire lands adjacent to expanding communities to buffer existing Forest Service lands from edge effects, such as exotic invasion.

Identify and purchase key parcels in riparian areas and/or lands associated with wetlands, flood plains, rivers, lakes, and associated riparian ecosystems. Prioritize watersheds with TES species.

Identify and purchase lands where resource protection could be enhanced through National Forest ownership (i.e., land within watersheds occupied by TES species).

Identify and purchase key lands or rights-of-way needed to meet specific resource management objectives, such as outdoor recreation purposes and open space values.

Work with local land trusts and conservancies to identify and develop conservation easements on lands not currently for sale but important to the biological integrity of Forest Service lands.

STANDARDS

The Forest Service shall locate all new rights-of-way outside riparian/aquatic zones and relocate all existing rights-of-way that are currently in riparian habitat. Prioritize by presence of TES species.

The Forest Service shall require replacement of lost riparian habitat at a 3:1 ratio where rights-of-way have impacted riparian habitat. Monitor restoration projects for plant cover, density, diversity, and use by target species of different taxonomic groups—birds and invertebrates, in particular.

The Forest Service shall keep a current GIS database with information such as land ownership adjustments and acquisitions, rights-of-way, landline location, and easements. Annually provide an updated GIS layer to Greeninfo Network for inclusion into their protected lands database for the ecoregion.

The Forest Service shall give prompt and careful consideration to any offer from a willing seller and actively pursue all parcels with willing sellers.

Section 18.0

CULTURAL HERITAGE

ISSUE STATEMENT

The Forests are rich in prehistoric, historic, and Native American cultural resources. However, the extent and significance of these resources remain somewhat of a mystery. In LPNF alone, there are an estimated 20,000 cultural sites, but only 1,200 have been inventoried and only 3% of the Forest has actually been field surveyed.

An estimated 300,000 Native Americans, speaking more than 100 languages, lived in California when the Spanish began moving into the region in 1769. Numerous tribes have lived in what is now California for the past several thousand years. Communities often clustered in local coastal canyons, plains, and inland valleys with abundant food and water (W.A. Selby, undated material). Native Americans have lived within the Forest environment of southern California for thousands of years. The way they related to and lived off the resources of the land formed the basis for their societies. For Native Americans, the relationship with the land was paramount, and its significance was reflected in the rules and laws determining social organization, spiritual beliefs, and the allocation of physical resources. Common to the various tribes or nations was the principle of stewardship of the Earth, with attendant responsibilities and obligations governing individuals, the family, and the collective.

Native Americans have an important and integral role in Forest policy development, planning, and management. Forest management, therefore, must recognize and make provision for tribal rights and responsibilities, and respect the values and traditions of Native Americans regarding the Forests for their livelihood, community, and cultural identity.

In addition to Native American resources, there are cultural resources that indicate Hispanic settlement throughout the region and more recent historic artifacts of homesteading and early recreational use and management activities in the Forest.

Knowledge of the history and archeological past of the Forests helps both Forest employees and visitors understand, appreciate, and pursue knowledge about the rich cultural heritage of southern California.

AREA DESCRIPTION

Applies to all Forest areas.

DESIRED CONDITION

Native American sites and resources are identified within the 4 Forests in a manner and to the degree that Native American religious meanings and uses are not compromised. Cultural resources are protected in their native, wild, and natural settings. This includes the site's visual, audible, and atmospheric surrounding environment. Culturally significant sites will take precedence over resource-consumptive activities, as mandated by the National Historic Preservation Act (NHPA). Ongoing traditional Native American uses of Native American sites and cultural traditions on the Forests will be accommodated.

Tribal leaders or representatives will become equal partners with Forest management in ecosystem restoration, fire planning, and Tribal land access rights plans.

The manner in which traditional knowledge can contribute to sustainable forest management and the resulting guidelines are incorporated into forest research, management practices, planning, and training.

OBJECTIVES

Develop a Cultural Resource Protection Plan based on desired future conditions, the American Religious Protection Act, and NHPA incorporates heritage and tribal knowledge of the Forests, and includes representatives from the Native

American communities.

Monitor and attain goals, objectives, standards, and guidelines for Native American sites that incorporate heritage and tribal knowledge of the Forests, and includes representatives from the Native American communities.

Promote a forest vision that reflects the shared beliefs, values, and aspirations of Native Americans with regard to the forest, while respecting regional and ecological diversity, incorporates Native American heritage and knowledge of the Forests.

Gear the nature of visitation to Native American sites first and foremost to protection of the sites and their meaning to Native Americans rather than to the convenience or perception of the visitors.

Each alternative prepared in proposals for activities that may interfere with the native, wild, and natural setting of cultural resources, or result in the degradation of such a site or resource, will be accompanied by a finding of the alternative's potential to protect or degrade the sites, and to comply with provisions of the Cultural Resources Protection Plan.

Forest visitors should not be directed to Native American sites or resources. Do not provide trails, roads, developments, or on-site interpretive structures. Use natural barriers, such as native vegetation, for protection of sites.

A Native American site will not be isolated from its surrounding environment. Tribal representatives, through contracted work, will provide guidance on what constitutes such isolation, based on traditional uses of and relationships to such sites.

Protect significant non-Native American (e.g. European American) historic sites and maintain them in their historic settings for public education about human presence and impacts to the extent that education is consistent with protection.

Begin implementing processes for Native American involvement in forest policy development, taking into account initiatives already started and areas where coordination of new efforts is needed.

Develop a Native American forest vision that reflects the shared beliefs, values, and aspirations of Native peoples with regard to the forest, while respecting regional and ecological diversity.

Identify means by which traditional knowledge can contribute to sustainable forest management, and by developing guidelines for defining this knowledge, incorporate it into forest research, management practices, planning, and training.

Improve understanding between Native Americans, other users of the Forests, and Forest Service employees in regard to historical issues of Native American and Treaty rights, traditional forest values, and modern Native American aspirations and needs, through means such as regional forums, media articles, resource materials, and seminars to sensitize forest sector managers, workers, and students (see section 20.0, *Environmental Education*).

Through contracted work with appropriate tribal representatives, within 2 years prepare standards and guidelines for accommodations of traditional Native American uses of Native sites and cultural resources within the Forests. The public version of this report will omit any references to specific sites that would place such sites at risk of damage.

Within 5 years, restore and retain the natural setting of non-Native American historic sites.

Within 5 years, provide for multi-cultural public education about the historic significance of sites to the extent that education is consistent with protection of the site and its natural setting (see section 20.0, *Environmental Education*).

Within 5 years, implement the Heritage Protection System.

Protect historically significant sites as mandated by law.

Make educational materials, classes, and training available to Forest visitors on Native historical stewardship of the Forests. Tribal leaders/elders from Forest reservations will be contacted and issued an invitation to develop educational material and to participate in both training and teaching classes (see section 20.0, *Environmental Education*).

Teach the history of the Native American communities of the Forests to all Forest employees who interface with the public, and such education will be encouraged for all Forest employees and management (see section 20.0, *Environmental Education*).

Coordinate with Native American individuals or groups to promote non-conflicting harvest locations with TES species or habitats.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding cultural heritage contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall complete a cultural resource inventory of the Forests.

The Forest Service shall coordinate the data-gathering and reporting activities already carried out by various agencies relevant to Native American participation in forest management.

The Forest Service shall, within 1 year, contact Tribal leaders/elders from Forest-area reservations and issue an invitation to become involved with sustainable use and ecological restoration Forest management planning committees.

The Forest Service shall, within 1 year, assign representatives to establish and promote partnerships with Forest Tribal reservations.

The Forest Service shall, within 2 years, write a new Cultural Resource Protection Plan based on desired future conditions, the American Religious Protection Act, and the National Historic Preservation Act. This will include an enforcement plan to protect and monitor cultural resources.

ISSUE STATEMENT

The Forests currently provide access to the natural world for a rapidly growing urban population. National Forests provide a wide range of recreational opportunities, from nature-based, dispersed recreation in undeveloped and wildland settings, to high-density recreation in developed sites. The public interacts with the Forests through recreational activities that include but are not limited to camping, picnicking, driving, hiking, sightseeing, wildlife viewing, hunting, fishing, target shooting, off-road vehicle (ORV) use, horseback riding, mountain bike riding, skiing, and mountain climbing. However, recreational use, especially when improperly managed, can jeopardize and even destroy the natural values for which the Forests were protected.

With southern California's growing population and anticipated increases in recreational use of the Forests, it is critical that the Forest Service advance a forward-thinking strategy for recreation management. Recreational use takes place throughout the Forests, but the majority of recreational use tends to be concentrated in relatively few populated areas, usually at sites with developed facilities by a road. Management conflicts arise when high-use and/or high-impact recreational activities occur in sensitive, threatened, and/or endangered species habitats, and/or in sensitive ecological communities, such as riparian zones. As a prime example, off-road motorized recreation in some areas can adversely impact ecological integrity in the Forests. Recreation should be managed so that biological diversity and ecosystem processes are protected. While recreational use of the Forest is an essential use, the activities of any user group, whether hikers, bikers, equestrian, or ORVers, should not be allowed at the expense of the Forests' ecological health. There are ways to provide for recreational opportunities while protecting vulnerable habitats from destructive impacts, including seasonal closures and restrictions on access in more fragile areas.

Since the mid-1980s, the Forest Service has used a classification system known as the Recreation Opportunity Spectrum (ROS) to describe the variety of recreational opportunities and designate where those uses should occur. Under the ROS, the Forest Service inventories and maps different types of recreational settings in the Forests, ranging along a scale from least developed (facilities, etc.) and most pristine and remote to most developed and least remote. The ROS is meant to help land managers delegate what activities are appropriate in which areas based on resource and management criteria, and to distribute recreation in a way that protects habitat for TES species. Forest Service personnel may utilize these ROS maps, but most Forest visitors are not familiar with these designations. Fortunately, with the advances in Geographical Information System (GIS) technology, the Forest Service can and should generate much more detailed, user-friendly recreational maps for public use.

Using GIS technology, existing ROS classifications can be analyzed in relation to listed and sensitive species and communities to determine where resource conflicts exist. For example, peninsular bighorn sheep (*Ovis canadensis cremnobates*) must have little if any human intrusion into their lambing areas. Such habitat must be managed as Primitive. Other species such as the mountain yellow-legged frog (*Rana muscosa*) may need protection of their riparian habitat. This habitat is best protected as Primitive or Semi-Primitive Non-Motorized, so that motorized vehicles are not crossing and disturbing their territory. One of the simplest, most effective ways to protect habitat is to retain all the remaining roadless areas in the Forests (see section 13.0, *Roadless Areas*).

AREA DESCRIPTION

Dispersed and developed recreational opportunities abound on the 4 Forests; there are more than 2,000 miles of trails, 10 ski areas (5 SBNF, 5 ANF) covering more than over 4,000 acres, some 4,200 developed recreation sites, and 5 ORV open areas (Figure 19-1, *Recreational Opportunities on the Four Forests*). Table 20-1, *Classes, Settings, and Opportunity Descriptions,* describes the general attributes for each ROS category. Table 20-2, *Existing Acreage for each ROS Classification,* provides a detailed breakdown of the areas for each ROS category.

TABLE 19-1

CLASSES, SETTINGS, AND OPPORTUNITY DESCRIPTIONS

(BASED ON US FOREST SERVICE WASATCH-CACHE NF LRMP)

ROS CLASSIFICATION	DESCRIPTION OF RECREATION OPPORTUNITY	
	SETTING	DESCRIPTIONS
PRIMITIVE	*Access*	Travel by foot, snowshoes, cross-country skis, or horse. Non-motorized trails, no mechanized travel.
	Physical	Landscape shaped by natural ecological processes. Wilderness Areas, Potential Wilderness Areas, and Roadless Areas. Largely unmodified by man, with the exception of trails that provide access to these largely pristine natural areas.
	Managerial	Management provides for optimal resource protection and minimizes the structuring and guidance of recreational use. Controls exist, though they are not evident.
	Social	High probability of solitude, self-reliance, challenge and risk; there is little evidence of people and one may experience nature intimately.
	Activities/Facilities	Activities may include backpacking, hiking, camping, cross-country skiing, snow-shoeing, fishing, hunting, horseback riding, wildlife viewing, nature study; no developed recreational facilities are provided, Leave No Trace principles are applied. All signs are constructed of materials that blend in with the natural surroundings.
SEMI-PRIMITIVE NON-MOTORIZED	*Access*	Travel by foot, snowshoes, cross-county skis, bike, or horse. Non-motorized trails.
	Physical	Characterized by a natural environment with little or no evidence of roads.
	Managerial	Subtle on-site controls and regulations may be present but are the minimum needed to meet identified needs of user safety.
	Social	High probability of solitude, self-reliance, high to moderate challenge and risk. Interaction between users is low, but there is often evidence of other users.
	Activities/Facilities	Appropriate activities include: hiking, viewing scenery, cross-country skiing, snow-shoeing, camping, horseback riding, nature study, swimming, water play, hunting, fishing, general information, and bicycling.

SEMI-PRIMITIVE MOTORIZED	*Access*	Low-standard or infrequently used roads, or trails used for motorized and non-motorized use.
	Physical	Characterized by a predominantly natural environment with evidence of trails and roads. Subtle modifications may exist but they are not obvious to most visitors.
	Managerial	Emphasis on resource protection and user safety. On-site controls and regulations that effectively prevent resource damage by vehicle use and provide for user safety may be present.
	Social	Moderate probability of experiencing challenge, risk, and the opportunity to apply outdoor skills. In areas somewhat influenced by motorized uses, evidence of other users may be relatively high.
	Activities/Facilities	Appropriate activities include camping, ORV touring, picnicking, nature study, hang gliding, snow play, swimming and water play, hiking, hunting, cross-country skiing, horseback riding, fishing, bicycling. Facilities may include observation sites, interpretive sites, day-use areas, and campgrounds.
ROADED NATURAL	*Access*	Accessible by all-weather travel routes. Separate facilities may be provided for day-use and overnight activities.
	Physical	The area is characterized by an environment that is predominantly natural-appearing with strong evidence of roads or highways. Alterations are visually subordinate when observed from sensitive travel routes or use areas.
	Managerial	Management emphasis is on providing a variety of developed and general Forest recreation opportunities, user convenience and safety, and resource protection. On-site controls and regulations are present for user convenience and security and for resource protection.
	Social	Opportunities exist for both social interaction and moderate isolation from human sights and sounds. Interaction between users is low to moderate on trails and away from roads, and moderate to high on roads and in developed facilities. Evidence of other users is apparent.
	Activities/Facilities	Appropriate activities may include camping, snow play, ORV, bus touring, picnicking, visitor information, hang gliding, fishing, cross-country skiing, hiking, hunting, swimming, bicycling, nature study, and horseback riding. Facilities may include observation sites, organizational camps, recreation residences, swimming sites, interpretive sites, winter sports sites, family and group picnic grounds, and campgrounds.

RURAL	*Access*	High-standard paved roads provide access to the area.
	Physical	Characterized by a substantially modified natural environment where human sights and sounds are readily evident. The natural landscape has been evidently modified for specific recreation activities.
	Managerial	Numerous regulatory controls and resource protection measures may be evident in areas of high-density use. Site operation and maintenance will provide for user safety, security, and convenience.
	Social	Opportunities for social interactions and experience in a setting where wildlife challenges, risk, and the testing of outdoor skills are generally unimportant. Interaction between users is moderate to high.
	Activities/Facilities	Activities include fishing, hunting, camping, biking, automobile or motorcycle touring, ORV use, hang gliding, bicycling, snow play, swimming, bus touring, horseback riding, recreation residence use, sports-games, nature study, cross-country skiing, Facilities may include: group and family picnic grounds, campgrounds, observation sites, parks, playgrounds, recreation residence sites, winter sports sites, and interpretive/information sites.

TABLE 19-2

EXISTING ACREAGE FOR EACH ROS CLASSIFICATION ON ALL FORESTS

(BASED ON GIS DATA PROVIDED BY THE U.S. FOREST SERVICE)

ROS CLASS	ANF	SBNF	CNF	LPNF	TOTAL ACREAGE
Primitive	34,001	117,822		583,575	735,398
Semi-Primitive Non-Motorized	176,316	162,753	153,496	414,289	906,854
Semi-Primitive Motorized	96,686	58,933	107,297	428,034	690,949
Roaded Natural	255,169	285,723	245,584	514,374	1,300,850
Rural	128,518	33,120	54,494	21,510	237,643
Unclassified	10,286	147,223	15,667	7,320	180,496

DESIRED CONDITION

The rustic character and wildlands atmosphere that define the Forests are protected and restored and are accessible to the public through a variety of means. The Forest Service provides diverse outdoor recreational opportunities, while protecting and restoring the rich natural and cultural heritage of the Forests. Access and facilities are compatible with the natural features and attributes of the Forests, and facilities are monitored and maintained to avoid damage to the ecological systems in which they occur.

Ecologically damaging human activity has been concentrated in some areas and reduced or eliminated in others, thereby minimizing disturbance to nest and roost sites, dens, fawning and lambing areas, and other important wildlife habitats and plant communities. Recreational activities are conducted in such a manner as to not defeat the long-term goals of protection and recovery of native species and the ecosystems on which they depend. Environmental education experiences

and opportunities via sustainable and balanced recreational use of the Forests are readily available to all Forest users and reflect the cultural diversity of those users. All recreational activities and decision-making processes strive to minimize and isolate adverse impacts.

OBJECTIVES

Assess the current recreational uses of the Forests for impacts on TES species. Minimize negative impacts to TES species resulting from inappropriate recreational uses.

Overarching Recreational Objectives

Within 1 year, establish a baseline inventory of existing legal launches, roads, trails, trailheads, facilities, and any illegal developments. This inventory will be updated annually to identify unauthorized launches, roads, trails, trailheads, or facilities. Use this inventory to eliminate these unauthorized uses.

Within 2 years, complete a study that identifies alternative means and routes of transportation to and from high-use recreational destinations, and identify alternative, sustainable transportation strategies, including public shuttles and vehicle quotas.

Identify appropriate recreational carrying capacities using standard methodologies, to protect both Forest resources and the visitor experience. In TES species habitat, low-density and low-intensity recreational uses will be allowed to the degree that those species and their habitat are protected.

Encourage and educate Forest users to keep their dogs on leash at all times to reduce occurrences of wildlife harassment, and to protect the dog and other Forest visitors.

For any existing or future recreational activities not covered by this section, institute regulations and management practices that promote resource protection and human safety, using these objectives and standards as guidelines for designing the objectives and standards for those other activities.

Ensure that the Forests are accessible and responsive to a diversity of cultures, and encourage appropriate recreational enjoyment of the Forests. Promote access to recreational sites for lower-income Forest visitors through enhanced public transportation opportunities.

Encourage recreational use in approved areas through multi-language interpretive signs and educational materials, and multi-lingual interpretive Forest Service guides (see section 20.0, *Environmental Education*).

Recreational Opportunity Spectrum

Identify appropriate ROS management zones by conducting extensive GIS analyses (i.e., recreational activities in relation to occurrences of TES species and their habitat) and use that information to promote higher-impact recreational uses in less sensitive areas that are better able to withstand such use.

Listed and Sensitive Species and Habitats

Within 1 year, analyze current recreational activities in relation to known locations of listed, sensitive, and Management Indicator Species (MIS) / focal species and their habitats to identify existing and potential adverse impacts. Eliminate overuse and overcrowding in those habitat areas by closing areas where biological resources are at risk, monitoring and enforcing permanent or seasonal closures, directing users towards more resilient areas, and educating users on the incompatibility of certain recreational activities.

Monitoring

Develop and implement an annual monitoring protocol for each MIS to determine ecosystem health in relation to recreational activities. If the resulting data indicate that MIS are declining or otherwise harmed by the use of specific roads and/or tourist facilities, implement immediate remedial actions. Issue annual findings of compatibility of motorized access and facilities, and assemble and update a database that informs ongoing management and provides important information for future planning efforts (see section 7.0, *Management Indicator/Focal Species*).

Gather information on the impacts of recreation to the Forests' natural and cultural resources and carefully monitor

the effectiveness of mitigation measures both in terms of actually controlling recreational use and preventing harm to targeted species and communities.

Trails

Implement an educational program through use of signs, printed materials, and multi-lingual Forest Rangers to provide information on: (1) low-impact behavioral practices (not cutting switchbacks, avoiding breaking down water bars, using care not to dislodge rocks, wheeled vehicles not riding side slopes, not traveling outside the tread of the trail), and (2) practices of etiquette (wheeled vehicles giving way to hikers, hikers giving way to equestrians, wheeled vehicles not startling hikers and equestrians).

Implement trail grade criteria to minimize soil compaction on trails (see section 6.0, *Soils Management*).

Equestrian

Conduct studies to evaluate potential impacts (e.g. trail degradation, soil erosion and compaction, water quality, and sedimentation in riparian areas) from equestrian use of trails to prioritize trail maintenance and enhancement projects, as well as restoration projects, and to identify trails that need to be rerouted and/or seasonally closed for resource protection.

Develop and distribute informational pamphlets that encourage equestrian users of the Forest to carry out excrement, in order to deter the spread of invasive plant species.

Pending development of a weed-free forage (forage with no non-native plant species) certification program by the State of California, make every effort to use forage free of non-native plant species for all erosion control, restoration, and livestock and packstock activities in National Forests.

Party size of outfitted or guided groups will be limited to a quota of people and stock that adequately protects natural resources. This quota is to be re-evaluated bi-annually, to ensure that it promotes the protection and recovery of native flora and fauna. More sensitive regions in the Forests are evaluated for site-specific group size restrictions that may be smaller than the general group size (see section 21.0, *Special Use Permits*)

Mountain Bikes

Conduct studies to evaluate potential impacts (e.g. trail degradation, soil erosion and compaction, water quality, and sedimentation in riparian areas) from mountain biking use to prioritize trail maintenance and enhancement projects, as well as restoration projects, and to identify trails that need to be rerouted for resource protection.

Within 2 years, examine all system trails for suitability for use by bicyclists. Review for safety of and conflicts with other users all trails on which bicycles are allowed. Review for safety of other users all trails that do not meet the following criteria: minimum sight distance of +/- 85 feet for trail grades of 5-10% at blind turns; minimum sight distance of +/- 50 feet for trail grades of 10-15% at blind turns; minimum sight distance of +/- 25 feet for trail grades over 15% at blind curves.

Annually monitor and assess class II trails to identify and prioritize trail maintenance, enhancement projects, and restoration projects, and to identify trails that need to be rerouted for resource protection.

Develop, implement and enforce safety standards, including speed limits, for bicyclists to reduce conflicts with other users on class II trails for the safety of all Forest visitors.

Analyze the potential impacts of all proposed bicycle group activities (enduro rides, races, etc.) to determine appropriate areas for these activities and to limit the number of users (see section 21.0, *Special Use Permits*).

Motorized Recreation

Complete a comprehensive, ground-based inventory of all roads and ORV trails in the Forests within 2 years after the adoption of this plan. Include system and non-system roads with improved or unimproved surfaces, and routes wide enough to allow passage of a motorized vehicle, including ORVs (see section 22.0, *Roads*).

To the maximum extent practicable, manage all undeveloped roadless lands, regardless of size, as roadless reserves.

Develop and implement a region-wide Road Removal and Restoration (RRR) strategy (described in detail in sections 22.0, *Roads,* and 13.0, *Roadless Areas*) to identify specific roads and ORV trails for removal. The RRR strategywill be

finished within 3 years after the completion of necessary inventories, analyses, and strategies, and shall include:

- Specific ORV trails to be obliterated
- Adequate funding for obliteration and restoration of ORV trails
- Feasible and timely deadlines for obliteration and restoration of ORV trails
- Protocol for re-vegetation, including use of native plant species only

Criteria used to designate trails for off-road motorized vehicle use will include the potential for resource damage, unacceptable soil or water quality damage, TES habitat, conflict with other users, contribution to wildlife harassment, unacceptable safety hazards, and the ability to control use on the trail and enforce trespass prohibitions. ORV trails must be designed to minimize any damage to soil, plants, wildlife, and ecosystem processes.

Conduct annual surveys to determine noise, air, and water pollution levels as they relate to boating and jetskiing activities to develop appropriate restrictions.

Within 1 year, identify and eliminate motorized recreational use in areas where it is incompatible (e.g. riparian areas, meadows). Motorized recreation includes but is not limited to all-terrain vehicles, off-road vehicles, motorbikes, 4x4s, snowmobiles, and motorized watercraft.

Identify user conflicts with respect to motorized versus non-motorized uses; significant recreation user conflicts shall default to non-motorized uses.

Translate the fire danger of ORVs into use restrictions, including trail closures and re-routings in areas with dangerous fuel loads during high fire season.

Forest Service law enforcement officials will ensure that speed limits are adhered to in order to ensure the safety of all Forest Service visitors, and to prevent resource conflicts.

River-based Recreation

Work with local non-governmental organizations to develop and conduct on-the-ground, multi-lingual outreach and educational programs to river-based recreational users on the sensitivity of riparian habitat and how to lessen their impacts, and to instill the leave no trace ethic (see section 20.0, *Environmental Education*).

Outfitters and Guides

Party size of outfitted or guided groups will be limited to a quota of people and stock that adequately protects natural resources. This quota is to be re-evaluated bi-annually, to ensure that it promotes the protection and recovery of native flora and fauna. More sensitive regions in the Forests are evaluated for site-specific group size restrictions that may be smaller than the general group size (see section 21.0, *Special Use Permits*).

Require outfitters and guides to obtain training on the identification and ecology of native and non-native species, and appropriate actions for the protection of these resources, to inform their group management and education.

Provide simple noxious weed and invasive species handbooks and forms to outfitters and guides to report changes in the location or presence of noxious weeds or invasive species along their outfitting and guiding routes. As a condition of their permit, the permittee will complete and submit forms for each month in which their services are provided (see section 10.0, *Invasive Species Management*).

Require outfitters and guides to obtain training in heritage resource protection and the significance and sensitivity of Native American sites (see section 20.0, *Environmental Education,* and section 18.0, *Cultural Heritage*).

Campgrounds

Assess the capacity of campgrounds and designated campsites to serve visitation needs and determine whether the development of additional sites is required to protect sensitive resources from unregulated car camping.

Post educational signs and conduct outreach to campground users to “leave no trace”.

Implement campground noise standards to reduce conflicts between Forest visitors, and to reduce adverse impacts to noise-sensitive native wildlife.

Backcountry Camping

Institute all necessary restrictions to protect TES species and watersheds through appropriate backcountry use including: camping at least 200 feet from the nearest water source; no fires below 10,000 feet or whatever is in keeping with fulfilling the objectives and standards of Vegetative Community Management and Fire Management; and no camping in TES species sites where it could adversely affect those species.

Climbing

Within 3 years, identify popular climbing spots and map high-use areas along with sensitive biological and cultural resources; where resource conflicts exist, implement measures to eliminate impacts.

Protect the primitive solitude of climbing, and restrict use through permitted quotas if necessary to perpetuate resource protection and the quality of the visitor experience.

Within 1 year, develop and distribute outreach materials that inform climbers to leave no trace; advocate the use of camming devices as opposed to permanent bolts, and the use of colored chalk and slings that match the rock. Restrict chalk use in areas where it becomes a visual impact.

Close areas on permanent and seasonal bases, as necessary, to protect wilderness values and/or the habitat and reproductive success of TES species.

Manage use, through quotas or permits if necessary, to prevent social trailing and the trampling of area microhabitats.

The Forest Service, may, at their discretion, close areas to climbing on a permanent or seasonal basis to protect the quality of the visitor experience, promote human safety, or promote the recovery of TES species.

Boating

Inventory and evaluate existing boat launches and relocate launches where they are posing a threat to sensitive watershed, botanic, and wildlife resources.

Winter/Snow-based Recreation

Conduct detailed studies on all water diversions related to ski areas to identify adverse impacts to native aquatic species and habitats. Where resource conflicts exist, the Forest Service shall work with the permit holder to develop and implement mitigation measures (see section 1.0, *Watershed Management*).

For snowmobile use, apply all relevant aforementioned objectives under motorized recreation.

For snowplay, monitor existing public use and distribution and where necessary, encourage dispersed activities to ensure human safety and resource protection.

Fishing

Monitor fish stocking, ensuring that non-native fish stocking will only be permitted in areas that are non-contiguous with other aquatic or riparian habitats and the chance of spread to such habitats is zero. Stocking will not be permitted in systems that are hydrologically connected or where there is a realistic probability of spread into any other aquatic systems.

Native fish restoration is based on the best available science and confined to areas where the existing population is not able to perpetuate itself through natural reproduction. Fish restoration is limited to release of conservation hatchery stocks genetically, morphologically, and behaviorally indistinguishable from wild native species.

Coordinate with California Department of Fish and Game (CDFG) with respect to their fish stocking activities to ensure that no fish (sport fish or mosquito fish) are being introduced to areas that support habitat for listed or sensitive aquatic species (native fish, amphibians, etc.). Please see Section 10.0, *Invasive Species*, for more detailed information on this topic.

Promote fishing opportunities away from sensitive habitat areas.

Hunting and Target Shooting

Reduce conflicts between hunting and target shooting and sensitive resources.

Trapping

Allow trapping only under pre-approved circumstances, such as for the purposes of permitted research or for the removal of non-native species.

Recreational Mining

Within 2 years, identify and map areas impacted by recreational mining activities, in order to develop, prioritize, and implement restoration plans.

Within 1 year, develop and distribute informational pamphlets on the biological and ecological impacts associated with recreational and industrial mining activities to educate Forest visitors on the impacts associated with the multiple-use concept.

Commercial Concessionaires

Educate commercial concessionaires about negative impacts to sensitive resources, and methods of reducing impacts.

Recreational Residences

Identify and map all leased recreational residences, as well as determine and track the length of leases.

Identify recreational residences that qualify for historical or cultural land use designations and protections.

Develop and distribute information to educate users of recreational residences on the sensitivity of forest resources, including materials on Best Management Practices (BMPs) for "living in the mountains" (light pollution and the effects of light on nocturnal species, attracting large carnivores with domestic pet food or livestock, etc.).

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding recreation contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

Recreational Opportunity Spectrum

The Forest Service shall designate all existing and potential Wilderness Areas and Roadless Areas over 1,000 acres in size as Primitive under the ROS (see section 11.0, *Wilderness Areas,* and section 13.0, *Roadless Areas*).

Listed and Sensitive Species and Habitats

The Forest Service shall maintain or develop GIS layers for each listed and sensitive plant and wildlife species that include key, occupied, and modeled habitat. Conduct GIS analyses that compare the occurrence of listed, sensitive, and management indicator species and their habitat in relation to recreational activities. Regulate and where necessary eliminate or relocate recreational activities, roads, and trails that are incompatible with the protection and recovery of listed native species (see section 8.0, *Listed Species*).

Monitoring

The Forest Service shall, within 3 years, develop and implement a comprehensive monitoring plan that will annually document the compatibility or incompatibility of each major type of recreational activity with the Forests' protection and restoration of watersheds, vegetative communities, and TES species and habitat. An annual report will document adverse impacts and identify remedial actions.

Trails

To minimize user conflicts, the Forest Service shall, within 1 year, classify all trails according to the following authorized use classes: (I) hiking and equestrian use only; (II) all non-motorized permitted uses (e.g. hiking, equestrian, and bicycling);

and (III) all permitted uses (e.g. hiking, equestrian, bicycling, and ORV). Delineate these classes on the Forest Service map distributed to the public.

The Forest Service shall implement the NEPA process for any trail or portion thereof proposed to be converted from one class to another.

The Forest Service shall, within 2 years, examine all Forest lands for unauthorized trails. Annually survey, update records, and close all non-system trails found. To the maximum extent practicable, restore habitat to natural condition.

The Forest Service shall implement trail construction practices that will meet but not exceed width, grade, and clearance standards applicable to the particular use class of the trail. For trails constructed based on earlier standards, reroute and reconfigure such trails where necessary for public safety and resource protection. When designing trails, emphasize trail and habitat connectivity.

The Forest Service shall, for trails open to class II and III uses, construct turnouts according to the following schedule: trails with average grades of 5-10% shall have turn-outs every +/- 1,000 feet; trails with sustained grades of 10-15% shall have turn-outs every +/- 500 feet; trails with sustained grades over 15% shall have turn-outs every +/- 250 feet.

The Forest Service shall, for trails open to class II uses, implement the following standards: trails with average of 5-10% grade shall have a water control device approximately every 150-300 feet; trails with average grades of 10-15% shall have a water control device approximately every 60-150 feet; trails with average grades of 15% shall have a water control device approximately every 30-60 feet.

To comply with the National Historic Preservation Act, the Forest Service shall implement the following criteria for trails in all Forests: on all trails within 100 feet of sensitive areas and with slopes of 0-20%, survey zones of 50 feet will be established (all distances measured from center line); on all trails within 1/4 mile of known cultural resources and with 20-30% slope, survey zone will be 20 feet; on all trails within 1/8 mile of known cultural resources and 30% slope, survey zone will be 10 feet.

Equestrian

When a weed-free forage program has been created in California, the Forest Service shall require certified weed-free forage for all uses on National Forests as directed in Forest Service Manual 2081.03 (2).

Mountain Bikes

The Forest Service shall monitor and enforce all permanent or seasonally closed trails to ensure that resource protection objectives are met. All trails not posted as open shall be considered closed. Use natural barriers to prevent new offshoots of trails.

Motorized Recreation

Within 3 years, analyze all existing trails utilized by motorized recreational users to determine if trails are designated or non-system trails (see section 22.0, *Roads*). Close all non-system trails and restore habitat to pre-disturbed condition. Trails and routes in poor condition should be closed and repaired.

To the extent permitted by 36 CFR 294, the Forest Service shall manage all roadless lands of 1,000 acres or greater to fully maintain their roadless and pristine character. ORV use shall be prohibited in these areas. Damage from past ORV use, including but not limited to soil erosion and invasion of exotic species, shall be rectified in an appropriate manner.

Only street-legal vehicles shall be allowed on all Forest Service roads. ORVs must be transported to trails designated specifically for ORV use. Off-road motorized recreation shall be permitted only on designated ORV trails.

In order to minimize motorized tresspass into wilderness, no ORV trails shall be designated leading up to a wilderness boundary.

No ORV trails shall be designated by the Forest Service in riparian areas and TES habitat.

The Forest Service shall manage existing ORV areas to the standards in the Forest Service Manual in order to minimize erosion and sediment into aquatic systems.

The Forest Service shall strictly enforce prohibitions on motorized trespass in the Forests, and violations shall receive such penalties as fines, and impounding and forfeiture of ORVs.

The Forest Service shall limit motorized access to developed recreational facilities to primary use roads.

The Forest Service shall, within 3 years, develop and implement a permit system for motorized recreational users, including but not limited to all-terrain vehicles, off-road vehicles, motorbikes, 4x4s, snowmobiles, and motorized watercraft. Motorized recreational users will be required to obtain a permit, which will be accompanied by information on regulations and responsible Forest use. The permit system will also assist the Forests in determining the extent of motorized recreational use and facilitate enforcement of motorized recreation policies and regulations.

The Forest Service shall coordinate with the State OHV Commission to develop and implement a permit system that requires each ORV to be equipped with a tread cleat that imprints the permit number of the vehicle in readable size to enforce resource protection goals of ecosystem restoration and recovery.

The Forest Service shall close trails to motorized vehicles, if the trails are near homes disturbed by ORV noise, dust, gas fumes, and other pollution.

River-based Recreation

The Forest Service shall identify and map high-density riparian-based recreational activities in relation to TES species and their habitat, including occupied and potential habitat. Permanently or seasonally close areas to protect TES species and enforce closures.

Campgrounds

The Forest Service shall identify and map campgrounds in relation to key, occupied, and modeled habitat for listed, sensitive, and management indicator species. The Forest Service shall implement permanent or seasonal closures to ensure that biological resource protection goals are met.

Backcountry Camping

The Forest Service shall annually survey more popular camping areas (and monitor annually for incremental change), and where overuse is apparent and/or is undermining protection of the area's natural and cultural resources, develop designated, regulated camping sites in less sensitive areas and provide backcountry latrines. Where camping impacts are spreading, revegetate satellite camping sites and install natural barriers.

Climbing

In wilderness, no new fixed anchors may be installed unless they are necessary to prevent a risk to life or are a replacement for existing, unsafe fixed anchors.

The Forest Service shall prohibit crack-cleaning or other disturbances of vegetation where a climb is facilitated at the expense of the natural resources.

The Forest Service shall prohibit motorized drills in wilderness.

Boating

The Forest Service shall map all reservoirs and identify areas where boating is allowed.

Prohibit jet skis and all two-stroke motors on all reservoirs and natural lakes.

Forest Service law enforcement officials shall ensure that speed limits are adhered to in order to ensure the safety of all Forest visitors, and to prevent resource conflicts.

The Forest Service shall seasonally close areas to boating and other activities during the occupancy season of bald eagle, or other listed species, where these activities have the potential to conflict with nesting or reproductive behaviors.

Winter/Snow-based Recreation

The Forest Service shall map existing ski areas, in relation to TES species and sensitive natural communities, and determine usage at each site. Where resource conflicts exist, implement immediate remedial actions. No expansions

and no new ski areas are permitted. New water withdrawals and increases in water withdrawals shall be prohibited.

Hunting and Target Shooting

The Forest Service shall map designated hunting and target shooting areas in relation to TES species, sensitive natural communities, and existing or proposed wilderness areas to identify potential impacts to sensitive resources (TES species and their habitat); where resource conflicts exist, establish scientifically based buffer areas and no-shooting zones on both permanent and seasonal bases.

The Forest Service shall require the disposal of lead bullets in all designated target shooting areas to protect wildlife and ecosystem health until lead is phased out on the Forests (see Listed Species section 8.54, *California Condor*, and section 8.55, *Bald Eagle*).

The Forest Service shall continue its Forest Order on Target Shooting in response to fire safety issues in SBNF, which closes the SBNF to target shooting except for selected sites, which can be effectively managed for resource protection and the safety of Forest visitors. The Forest Service shall implement similar Forest Orders on the other three Forests where necessary.

Trapping

To the maximum extent practicable, the Forest Service shall prohibit trapping of all wild animals except for permitted instances for the purposes of approved research or removal of non-native species, where it has been determined to be the most effective and humane method of control.

Recreational Mining

The Forest Service shall, within 2 years, develop and implement a permit system for all recreational mining activities with guidelines to ensure resource protection (see section 27.0, *Minerals Management*).

Commercial Concessionaires

The Forest Service shall identify and map all commercial concessionaires in relation to habitat for listed, sensitive, and management indicator species to identify existing or potential impacts on sensitive biological resources. In addition, Forest Service personnel shall research lease information and analyze the possibility of seasonal or permanent closures near sensitive species and/or habitats (see section 21.0, *Special Use Permits*).

Recreational Residences

The Forest Service shall not issue more permits to construct, substantially reconstruct, or enlarge recreational residences. Under no circumstances shall title to land occupied by a recreational residence be conveyed to the permittee by sale or exchange unless property is an island surrounded by private property.

The Forest Service shall map recreational residences in relation to habitat for TES or management indicator species to identify potential conflicts with species protection. Where structures are not historically unique and/or present existing or potential conflicts with protection of unique and/or sensitive natural resources, including TES species that cannot be mitigated, those structures shall be inventoried and removed.

The Forest Service shall map recreational residences in relation to rivers and streams to identify water quality issues (e.g. faulty septic systems). If such conflicts cannot be eliminated or mitigated the lease shall not be renewed.

ENVIRONMENTAL EDUCATION

ISSUE STATEMENT

As the population of southern California continues to grow, so will use of the Forests, and accordingly, so must the need for public education on how to best enjoy and protect these public lands. As the region's demographics shift, the Forest Service must respond with educational programs that make the Forests accessible, logistically and culturally, to a diverse public. In order for continuing generations of Californians to enjoy the Forests without harming their ecological health, the Forest Service must educate the visiting public, students, and Forest staff.

There is a variety of strategies that the Forest Service can and should pursue to maximize the potential of these Forests to provide substantive and wide-ranging educational programs, including:

- Expanded partnerships;
- Targeted programs for youth (K-12);
- Promotion of environmental careers;
- Educating the adult public to promote environmental literacy; and
- Educating across international boundaries.

The Forest Service is well positioned to educate the public about the environment. Its research sites, resources, and on-the-ground experience of more than 30,000 Forest Service managers, scientists, and technicians, combined with the fact that the Forests are one of the planet's most ecologically rich areas, make it a particularly appropriate location for effective environmental education.

Environmental education is inherently a cooperative endeavor, requiring educators and resource specialists to work together on material development, delivery systems, and hands-on educational activities. Partnerships between the Forest Service and educational organizations, educators, and federal, state, and local agencies should play a key role in maximizing the Forests' potential to deliver environmental education to the public. Through such partnerships, environmental education materials and activities reach a much larger, more diverse audience than simply those individuals who visit the Forest. Not only does this increase the reach of important conservation messages, but it allows the Forest Service to leverage its financial investment in environmental education, often to the point of 3 to 4 dollars for every dollar invested by the Forest Service. In some states, 20 dollars has been leveraged for each dollar spent by the Forest Service (Forest Service Educ. Report).

AREA DESCRIPTION

Environmental education applies to all 4 Forests.

DESIRED CONDITION

Forest Service education connects Forest visitors to the land by providing visitors with the tools they need to make informed decisions and take action related to sustaining natural and cultural resources. The public is equipped with the knowledge to understand natural resource issues and the skills to participate meaningfully in relevant discussion and debate. Forest Service education helps people develop the critical thinking skills and the knowledge they need to understand the complexities of ecological issues. The programs available are broad-based in approach, content, and scope.

The primary, overarching theme of Forest Service education is to develop a public awareness of the interrelationships among natural systems, people, and the land that leads to the development of an appreciation of the Forests as a biodiversity hotspot worthy of protection. Education programs are designed to reach 3 key audiences: youth/students; regional urban communities; and the general public. Emphasis of delivery is on teachers, youth leaders, and community organizers to expand the network of environmental education providers. Delivery is also through special events such as Earth Day, school- or forest-based conservation education programs, electronic media including websites and CDs, teacher and youth workshops and camps, and adult-focused environmental education programs.

Interpretive materials are available in a variety of formats and languages that teach the public about conservation biology and their opportunity to interact with the Forests in a way that protects the Forests' ecological integrity (see section 19.0, *Recreation*).

OBJECTIVES

Education and Outreach

Consistently deliver specific educational messages, prioritizing target areas and audiences where public education is needed to protect resources that are actively being degraded by human overuse or mismanagement. Identify and encourage the development of conservation education products, tools, and techniques that communicate the respective messages to target audiences.

Build the infrastructure necessary (facilities, staffing, and educational materials) to effectively deliver environmental education to target audiences.

Provide training that equips employees, volunteers, and partners to participate in the delivery of quality educational experiences. This training is to be provided to educational staff as well as other Forest staff who have contact with the public and/or engage in work that has the potential to impact Forest resources.

Within 2 years, meet or exceed the North American Association for Environmental Education's (NAAEE) set of guidelines for environmental education: Excellence in Environmental Education Guidelines for Learning (K-12).

Continue to foster and expand inter-agency programs and partnerships, such as Hands on the Land (a coalition of the BLM, NPS, USFWS, Natural Resources Conservation Service (NRCS), EPA and the National Environmental Education and Training Foundation (NEETF), to maximize Forest resources and establish stronger links between students and the land.

Foster and continue partnerships with educational organizations including Project Learning Tree, Boy Scouts, Girl Scouts, Project Wild, and Project Wet. Work with partners to develop or modify training curricula, and accurately address conservation issues. Emphasize workshops that "train the trainers," increasing the overall contribution and reach of the training effort.

Review the program and effectiveness of the Hispanic Natural Resources Career Camp (conducted by the Rocky Mountain Research Station at the Frasier Experimental Forest) and consider duplication at appropriate sites in the Forests.

Develop internship programs that would use volunteers from colleges and universities to expand the Forests' monitoring capacity while providing participants with an intensive educational field experience.

Establish visitor centers, kiosks, and other permanent facilities, sited at the most heavily used areas and entrances, to implement education and outreach programs.

Establish visitor centers and incorporate educational materials into pre-existing, appropriate sites near urban areas to provide hands-on, place-based educational opportunities to urban youth and house teacher training workshops. Visitor centers should include interpretive programs, exhibits, and audio-visual presentations that illustrate the diverse values of the Forests and the many opportunities for year-round recreation.

Develop cooperative, community-based environmental research and education programs (like Urban Tree House) These programs shall be characterized by structures placed in urban greenspaces, around which activities take place where the goal is to help urban youth and adults learn about natural resources and environmental concepts.

Develop outreach and education programs specifically geared to residents of different ethnic groups/communities. Interpretive materials should be available in several languages.

Emphasize "Leave No Trace" programs, a cooperative effort of the Forest Service, BLM, NPS, and USFWS. Promote the idea of resource protection via minimizing the impacts of recreational use through educated user behavior and practice. Provide consistent messages and quality materials for both managers and the public in a proactive manner, focusing on preventing degradation rather than repairing impacts.

Establish programs like Passport in Time (sponsored by the Recreation, Heritage, and Wilderness Resources program), where volunteers are trained and mobilized to provide the public with opportunities to share in the thrill of discovery

through archeological and historic research. Forest Service archeologists and historians guide volunteers in activities ranging from archeological excavation to historic building restoration.

Utilize interpretive sites, self-guided nature walks, wayside exhibits, and kiosks to focus visitor attention on the geological and cultural and natural history of the area.

Offer the following environmental education classes: Effects of ORV use on dirt roads and trails on air and water quality, both in the Forest and in the Valley; reuse and recycle; environmental stewardship and pollution prevention; ecosystems; ecology; endangered species; global warming; habitats; watersheds; acid rain; fire management; drinking water and water pollution; "leave no trace" training; how grazing contributes to invasive plants and soil erosion; water depletion; and soil degradation.

Develop outreach and education programs on fire management and invasive species specifically geared to residents at the wildland-urban interface.

Broadcast Public Service Announcements (PSAs) through local TV and radio outlets regarding priority conservation and public use issues. Special emphasis will be given to fire ecology, and the effects of cars and industry on air pollution in the Forests.

Deliver resource-specific conservation education programs that are national in scope, resource-specific, long-term, and sponsored by specific Forest Service programs. Such programs promote resource protection by minimizing the impacts of recreational use through educated user behavior and practice. Interagency programs provide consistent messages and materials for both managers and the public in a proactive manner, focusing on preventing resource degradation rather than repairing impacts, while enhancing visitor enjoyment.

Interpretive Materials and Facilities

Pilot and evaluate environmental education materials on a bi-annual basis. Examples include curriculum development, coordination of curricula with national and state standards, translating science for popular consumption, producing or supporting educational journals or newsletters, posters, brochures, handouts, books, videos, CDs, websites, and other packages of educational materials (especially for teachers).

Maintain or establish a multi-lingual interpretive trail in every District.

Design and provide a map to visitors that indicates where recreational opportunities are sited, with guidelines on use and restrictions.

Encourage safe and enjoyable resource use and protection by placing information and interpretation at appropriate locations throughout the recreation area and nearby communities. Visitors with differing levels of interest and understanding should be able to easily find the area's natural and cultural features, visitor facilities, activities, and services.

Place visitor contact facilities strategically at several locations within the recreation area to detail significant stories and provide information and directions to sites and activities.

Monitoring and Adaptive Management

Within 1 year, develop and implement public surveys/questionnaires to be distributed to a random sampling of Forest users, ascertaining the level of understanding, gaps, and interest areas in the visiting public. The results of these surveys/questionnaires will be used to improve Forest Service public education.

Improve staff education on distinct ethnic user groups of the Forests and their cultural differences, needs, and expectations as directed by results received on user surveys/questionnaires.

Within 2 years, determine demographics of recreational activities and users of each of the 4 Forests. Use of these data will help determine more specifically where and what kind of educational outreach is lacking.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding environmental education contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service environmental education programs for K-12 shall be designed to coordinate with the State Board of Education's Content Standards for California Public Schools [http://www.cde.ca.gov\board\board.html] as this will encourage California public school teachers to incorporate environmental education resources into their classroom curriculum.

The Forest Service shall tailor environmental education programs to regional school curricula. Forest Service staff and regional educators will jointly develop teaching and training materials and courses for school-based programs.

The Forest Service shall, within 3 years, establish signs at all trailheads and campgrounds with multi-lingual information and guidelines on safe use and information, including "leave no trace" strategies, invasive species concerns and control measures, endangered and threatened species, and respect for other users.

The Forest Service shall, within 3 years, establish multi-language signs along approved motorized routes with information on "leave no trace" strategies, invasive species concerns and control measures, endangered and threatened wildlife, and respect for other users. Signs will also instruct users on safety requirements, including staying on established approved routes, obeying speed limits, and the impacts of motorized vehicle emissions on global warming and habitat degradation (see section 19.0, *Recreation*).

Section 21.0

SPECIAL USE PERMITS

ISSUE STATEMENT

Numerous activities occur in the Forests pursuant to special use permits (SUPs). Activities requiring SUPs range from activities that occur over a single weekend with little or no environmental effect, to the construction and installation of permanent structures with significant, often adverse impacts. Special use permits can be for private, municipal, non-profit, or commercial activities. While the Forests are the appropriate setting for many activities requiring a special use permit, all too often the Forest Service prioritizes special use permits for commercial activities at the expense of forest resources.

Like all other activities in the Forests, special use permits must be consistent with all applicable environmental laws and regulations. However, numerous special use permits for ongoing activities on the Forests were issued without any environmental review; or in many cases, the environmental situation has changed, requiring a re-evaluation of the ecological impacts of the permits. Many permits include conditions requiring monitoring and/or mitigation. Unfortunately, the Forest Service lacks any system to monitor compliance with the terms of special use permits, much less the environmental impacts of these permits.

The Forest Service needs to improve its management of special use permits to bring the system into compliance with the law and reduce the negative impacts of these permits in the Forests.

AREA DESCRIPTION

Special use permits impact all areas of the Forests.

DESIRED CONDITION

The Forest Service manages the issuance and renewal of special use permits so that adverse environmental effects are minimized. New special use permits are issued only when they are determined to have negligible adverse impacts on Forest resources. The Forest Service has a system to monitor the status and impacts of all special use permits and to take prompt action to suspend or modify any permit when necessary to protect Forest resources.

OBJECTIVES

Manage the issuance and renewal of special use permits such that adverse environmental effects are minimized.

Issue new special use permits only when they are determined to have negligible adverse impacts on Forest resources.

Develop and implement a system to monitor the status and impacts of all special use permits and to take prompt action to suspend or modify any permit when necessary to protect Forest resources.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding Special Use Permits contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall not issue any SUP unless sufficient funding is ensured to fully mitigate any foreseeable adverse ecological impacts of the permitted activity.

The Forest Service shall issue special use permits for commercial activities only where no private land is available to accomplish the same purpose.

The Forest Service shall, to the maximum extent allowed by law, charge fair market value for any resources commercially extracted from the Forest pursuant to a special use permit.

The Forest Service shall, to the maximum extent allowed by law, charge fair market value for any commercial activity authorized pursuant to a special use permit.

The Forest Service shall, to the maximum extent allowed by law, recover the actual cost of administration and management for all commercial activities subject to a special use permit.

There will be no new special use permits will be issued for landfills.

No special use permits will be issued by the Forest Service for telecommunication sites outside the footprint of already authorized telecommunications.

No special use permits will be issued by the Forest Service for pipelines, power lines, fiber optics cables, or other utilities outside existing utility corridors.

No new special use permits will be issued by the Forest Service if the impacts of issuance conflict with the Recovery Plan for any ESA-listed species.

No new special use permits will be issued by the Forest Service if the impacts of issuance would likely result in significant adverse impacts to any TES species.

No special use permits will be issued or renewed if the permit conflicts with any Forest Plan objective or standard.

The Forest Service shall, within 6 months of Forest Plan adoption, complete an inventory of all special use permits active in the Forests.

The Forest Service shall, within 9 months of Forest Plan adoption, complete an analysis of each special use permit to determine whether the permittee has complied with all terms and conditions associated with permit. If a permittee is not in compliance with the terms and conditions of the permit, the Forest Service shall within 30 days contact the permittee and require the permittee to come into compliance immediately. If within 30 day of notification of non-compliance with the permit terms and conditions, the permittee has not complied with the permit, the Forest Service shall revoke the permit.

ISSUE STATEMENT

Improved management of road systems in the Forests is long overdue. Roads have been identified as the greatest negative impact on forested ecosystems (Jacobs 1995). Roads cause pollution, sedimentation, erosion, alteration of watershed hydrology, water quality degradation, long-term loss of soil and forest productivity, invasion by non-native species, and loss and fragmentation of wildlife habitat (Lyon 1984, Costick 1996, Kattelmann 1996, Kattelmann and Embury 1996, Reed et al. 1996, Spellerberg 1998, Noss 1999).

Roads are a major source of habitat fragmentation, which has been cited as one of the greatest threats to biodiversity (Noss 1983, Harris 1984, Wilcox and Murphy 1985, Wilcove et al. 1986, Noss 1987, Noss and Cooperrider 1994). Roads also impact wildlife by killing animals during and after construction, causing noise pollution, and changing wildlife behavior (Lyon 1984, Noss and Cooperrider 1994). For example, roads on stream terraces or that cross streams can cause significant mortality to slow-moving animals such as arroyo (*Bufo californicus*) and spadefoot (*Spea hammondii*) toads (Stephenson and Calcarone 1999). Vehicles on roads that cross through or near breeding pools for arroyo toads also kill eggs and juveniles (Stephenson and Calcarone 1999). Some animal species simply will not cross a road, essentially dividing the population in half (Noss 1999). An extensive network of roads will expose vulnerable species to inbreeding and genetic drift (Lande 1993), potentially resulting in extinction of the local population (Lynch and Lande 1998).

In the long term, roads and associated fragmentation can make areas uninhabitable for some species. Interior habitats converted by roads into edge habitats will experience small-scale changes, including greater water evaporation, higher temperatures, increased sunlight, and decreased available soil moisture (Reed et al. 1996). As a result, species that are adapted to interior habitat are often unable to persist in roaded areas.

Roads also result in destructive erosion and flooding. Numerous studies show that even well-maintained roads contribute to increased surface runoff and flooding (King and Tennyson 1984, Jacobs 1995, Jones and Grant 1996) and have been identified as the main cause of soil erosion and sedimentation into streams (Coats and Miller 1981, Reid and Dunne 1984, Engstrom et al. 1991, Fahey and Coker 1992, Eaglin and Hubert 1993, Harr and Nichols 1993, Jacobs 1995, Elliot et al. 1996, Lee et al. 1998). From 1968 to 1983, the rate of landslides in the North Fork Nooksack River watershed in northwest Washington was 110 times greater in roaded than undisturbed forest, and 6 times greater than the rate in logged areas (Harr and Nichols 1993).

In streams, fewer pools and increased sediment from roads degrade habitat quality for many aquatic species (Bjorn and Reiser 1991, McIntosh et al. 1994, deMaynadie and Hunter 1995, Lee et al. 1998), often resulting in changes in fish and other communities (Welch et al. 1977, Lyon 1984, Eaglin and Hubert 1993). In a study of 28 streams in the Medicine Bow National Forest in Wyoming, higher road culvert density was associated with higher sedimentation and fewer trout (Eaglin and Hubert 1993). A survey of 33 small streams in western New Brunswick reported that streams in clearcut watersheds had 17% fewer trout, over 200% more sculpins, and 26% fewer bottom-dwelling organisms than streams in uncut watersheds, and damage was attributed to logging road crossings (Welch et al. 1977). Excessive sedimentation not only negatively affects the local habitat, but degrades downstream conditions for aquatic species and drinking water for wildlife and humans alike. Culverts at road crossings are not typically constructed to allow fish passage. As a result, culverts at stream crossings can fragment fish populations, increasing the risk of extirpation from habitat damage.

While negative impacts to watersheds are positively correlated with road density, road system evaluations indicate that the worst problems are often associated with major and repeated failures of specific roads. These problem roads are often located on unstable terrain. Inadequate maintenance can also result in road failure and delivery of excessive sediment to streams. Finally, wet-weather heavy hauling on native surfaced, rocked, or graveled roads has been shown to result in high levels of sediment delivery to streams (Reid and Dunne 1984).

Roads adversely impact ecosystems by facilitating invasion by non-native species. Exotic plant species introduced by vehicle tires have invaded and successfully displaced native species in many habitats of western North America (Tyser and Worley 1992, Clampitt 1993, Appleby 1998). In the Forests, highly invasive and problematic weeds such as spotted knapweed (*Centaurea maculosa*), star thistle (*C. solstitialis*), Andean pampas grass (*Cortaderia jubata*), Arundo (*Arundo donax*), and several species of broom have spread along roadsides (Stephenson and Calcarone 1999).

Finally, roads indirectly affect ecosystems by providing access to humans, resulting in hunting and mortality of wildlife (legal and illegal), rare plant and animal collection, snag removal for firewood, human-ignited fires, illegal waste disposal, and increased development (Noss and Cooperrider 1994). For example, in his testimony to Congress, resource economist Dr. Peter A. Morton documented that 90% of forest fires are caused by humans, and over 50% of those fires are started along roads.

Roads provide access to the Forests for recreation, resource utilization, and public safety. While some roads can provide social benefits, the Forest Service must develop criteria to assess the impacts of roads on the bioregion that consider the ecological impacts separately from the economic benefits provided by roads.

AREA DESCRIPTION

Roads exist throughout the Forests. See Figure 22-1 for locations of roads.

DESIRED CONDITION

The roads system in the Forests, between the Forests, and among other protected lands in the ecoregion is designed to facilitate and adequately maintain wildlife dispersal, migration, and other essential ecological flows across the landscape. Remaining roads are well designed and maintained, not positioned on unstable terrain, and located mostly along urban areas to allow for appropriate fire management and recreational access.

Soil erosion, watershed hydrology alteration, water pollution, and invasion of exotic species as well as fragmentation of plant and wildlife habitat resulting from roads have been reduced through the obliteration and ecological restoration of roads that threatened aquatic or terrestrial ecosystems. In addition, all non-system and redundant roads have been obliterated and ecologically restored, thereby reducing further degradation of plant and wildlife habitat.

Human activity has been concentrated in some areas and reduced or eliminated in others, thereby minimizing disturbance to nest and roost sites, dens, burrows, fawning and lambing areas, and other important wildlife habitats.

Continued monitoring of remaining roads is conducted, annual reports on road conditions are published, and adaptive management is practiced to eliminate or minimize negative ecological impacts.

OBJECTIVES

Reduce road density and conserve roadless areas of all sizes as a means to minimize the fragmentation of habitat from roads and the human disturbance related to roads.

Conduct a regional survey of existing roads and ORV trails in the Forests within 3 years of plan adoption, and develop a comprehensive region-wide strategy for Road Removal and Restoration (RRR) to determine roads and trails appropriate for obliteration and ecological restoration.

Use the roads inventory, along with Watershed Management standards (section 1.0), a regional invasive species analysis, Wilderness and Wilderness additions data, and TES surveys (as described in other sections of the Alternative) as the basis for the Road Removal and Restoration (RRR) strategy, to identify specific roads and ORV trails for removal. The RRR strategy shall be finished within 3 years after the completion of the inventories, analyses, and strategies described above and shall include:

- Scientifically based region-wide and watershed-specific road density standards for wildlife and fisheries, with explicit standards for road-sensitive species where such information is known (e.g. <2 mi per mi2 in mule deer and mountain lion habitat), and with road density reduction targets where species-specific information is not available
- Specific roads and ORV trails to be obliterated
- Adequate funding for obliteration and restoration of roads and ORV trails
- Feasible and timely deadlines for obliteration and restoration of roads and ORV trails, including an annual target for road obliteration within each Forest
- Protocol for re-vegetation, including use of native plant species only

The RRR strategy shall identify roads subject to removal as follows:

- Roads within and adjacent to aquatic areas, riparian zones, coastal sage scrub, and other sensitive, ecologically

significant habitats

- Roads occurring within habitat for TES species and management indicator species that are sensitive to the direct and cumulative effects of roads
- Roads in watersheds that feed into habitat for TES species and management indicator species that are sensitive to the direct and cumulative effects of roads
- Roads with the potential to deliver high levels of sediment to streams
- Roads in watersheds with existing sedimentation or peakflow flooding problems
- Roads in watersheds with significant hydrologic problems, areas prone to mass failure, or other hazards
- Roads with stream crossings that cannot currently convey flow and sediment association with a 100-year flood event
- Roads bisecting adjacent roadless areas, regardless of their size
- Roads surrounding designated Wilderness Areas
- Roads identified as currently or potentially contributing to the invasion of exotic species
- Roads leading into high fire-risk areas (as identified in section 2.0, *Fire Management*)
- Roads in watersheds with already high road densities (>2 mi per mi2)

The roads inventorywill identify collector and arterial roads that will remain open that are causing high levels of stream damage. These roads should be prioritized for relocation to less damaging areas or redesigned to correct the problem as much as feasible. Relocation or redesign efforts shall be aggressively scheduled and implemented.

Obliterate and ecologically restore (i.e., re-vegetate with locally harvested native plant species) those roads that pose a risk to aquatic ecosystems or to any ecosystem threatened by invasive exotic species. Reduce road density in general, upgrade poorly designed roads, and maintain all roads to standards prescribed in the Forest Service Manual (see section 1.0, *Watershed Management*).

Close and eventually obliterate all roads that are not actively maintained or that cannot be brought up to maintenance standards.

Re-vegetate all roads that have been obliterated with locally harvested, native plant species.

Monitor all remaining roads and ORV trails on an annual basis and obliterate roads that are found to cause unacceptable negative ecological impacts.

Supervise an annual volunteer-implemented survey of closed roads in order to document signs of motorized use of closed roads. Use the annual survey documentation to develop an action plan for dealing with closure failures.

STANDARDS

Roads Assessment

The Forest Service shall complete a comprehensive, ground-based inventory of all roads and ORV trails in the 4 Forests within 3 years after the adoption of this plan. Include system and non-system roads with improved or unimproved surfaces, and routes wide enough to allow passage of a motorized vehicle, including an ORV. This inventory should be ocnducted in conjunction with the vegetation map described in section 5.0, *Vegetation Management*.

The Forest Service shall determine road density at the watershed scale as part of the inventory.

The Forest Service shall include identification of the following on all road segments:

- Maintenance condition on all roads, and maintenance needed to bring those segments into compliance with the Forest Service Manual
- Ability of all culverts and stream crossings to convey the 100-year flood and their effects on fish passage and sedimentation
- Extent of all road segments within unstable areas and/or erosive soils or terrain
- Roads within and adjacent to aquatic areas, riparian zones, and other sensitive, ecologically significant habitats
- Roads occurring within habitat for TES species and management indicator species that are sensitive to the direct and

cumulative effects of roads

- Roads in watersheds that feed into habitat for TES species and management indicator species that are sensitive to the direct and cumulative effects of roads
- Roads with the potential to deliver high levels of sediment to streams (as identified in section 1.0, *Watershed Management*)
- Roads in watersheds with existing sedimentation or peakflow flooding problems
- Roads in watersheds with significant hydrologic problems, areas prone to mass failure, or other hazards
- Roads bisecting adjacent roadless areas, regardless of their size
- Roads surrounding designated Wilderness Areas
- Roads currently or potentially contributing to the invasion of exotic species
- Roads leading into high fire-risk areas
- Roads in watersheds with already high road densities (>2 mi per mi2)
- Non-system roads

The following roads are specifically recommended for closure within 2 years of the adoption of this plan:

- Indians Arroyo Seco road on the Monterey Ranger District of the Los Padres National Forest.
- 3N16 from Big Pine Flat to Holcomb Creek on the Mountaintop Ranger District of the San Bernardino National Forest. The road has created a canyon that continues to erode and lacks a way to get water off without a huge amount of sediment being delivered to Holcomb Creek and eventually Deep Creek.
- 3N93 4-wheel drive route on the Mountaintop Ranger District of the San Bernardino National Forest parallels Holcomb Creek and needs to be relocated and redesigned to avoid adverse effects on Holcomb Creek. There is a severe hill climb right above the creek.
- 3N97 Mountaintop Ranger District of the San Bernardino National Forest runs through a meadow above Ironwood Group Camp and adversely impacts the meadow and is redundant. Group camp is right on the edge of the meadow and should be relocated.
- Roads around Wildhorse Meadow in the Mountaintop Ranger District of the San Bernardino National Forest shall be obliterated and any camping shall be adjacent to 2N93. Several roads encircle the meadow and are seriously impacting the value of the meadow.

Other than for scientifically justifiable restoration purposes, construction of new roads and landings shall be prohibited. Present roads will not be widened. If roads are resurfaced, that resurfacing will keep them at the same general class and maintenance level. No previously closed roads will be reopened. Exceptions shall be confined to circumstances where limited new road construction is needed to attain the goals outlined in section 1.0, *Watershed Management,* and section 2.0, *Fire Management;* or for the management of TES species; or to comply with other Roads standards. Any new road or landing construction must be scientifically defensible and subject to public scrutiny via NEPA and CEQA processes.

Maintenance and Monitoring

Existing roads shall be maintained to the standards in the Forest Service Manual in order to reduce erosion and sediment into aquatic systems.

All native surface roads that remain open shall be rocked or graveled within 2 years.

Quantitative annual road-impact monitoring surveys shall be developed and implemented in the Forests within 3 years of the completion of the roads inventory, commensurate with the completion of the RRR strategy, and annual reports shall be published thereafter. Impacts to be monitored shall include, but not be limited to, blockage of aquatic species movement; invasion of exotic weeds; water drainage and sedimentation; and timber theft (i.e., fuelwood cutting). Identified maintenance needs should be implemented within 2 years of identification of a problem during initial surveying or annual monitoring.

All roads that cannot be annually surveyed for maintenance needs shall be closed and abandoned until such monitoring can be instigated. Roads that cannot have culverts and other stream crossing problems addressed within 5 years of identification of a problem during initial surveys or annual monitoring shall be closed, abandoned, and prioritized for

obliteration. Roads that cannot have maintenance needs fully implemented within 2 years after survey shall also be closed, abandoned, and prioritized for obliteration.

Any roads with stream crossings that cannot currently sustain a 100-year flood event, and roads with crossings where culverts have failed in the past 10 years, shall be identified and prioritized for removal, improvement, or relocation. Any roads remaining open that cross natural year-round water bodies (streams, ponds, lakes, etc.) and cannot be relocated shall be bridged or fitted with open-arch culverts with natural bottoms to provide for aquatic species movement and maintain water quality. All roads that cannot have such crossings replaced within 5 years should be closed, abandoned, and prioritized for obliteration.

Heavy hauling during any wet periods year-round on roads with native rock and gravel surfaces shall be prohibited. Heavy hauling shall be permitted only on paved roads during the wet season or wet periods.

Cleaning of contract and fire vehicles shall be required prior to entry into National Forest roads to ensure that no exotic plant seeds are transmitted.

TRANSPORTATION, UTILITY, AND TELECOMMUNICATIONS CORRIDOR

ISSUE STATEMENT

As the southern California population rapidly expands, so too does the demand for infrastructure to support that development. As private lands become more scarce and expensive, local governments and developers look to the Forests to accommodate this additional infrastructure. The Forest Service is facing increasing requests for cellular communication sites, electrical transmission lines, water conveyances, and other linear utility corridors across lands that do not currently have permits for such uses. This type of development undermines the ability of the Forest Service to protect the irreplaceable values of the Forests and provide an escape from the crowding of urban development.

These towers, roads, power lines, and associated developments are not solely an aesthetic blight; they are also a vector for invasions of non-native species (see section 10.0, *Invasive Species*) and a direct threat to native plant and wildlife habitat (see section 14.0, *Habitat Linkages,* and section 5.0, *Vegetation Management*).

Transportation corridors are also a severe threat to biodiversity, as roads not only fragment habitat, but bring with them all of the problems discussed in section 22.0, *Roads*, and section 14.0, *Habitat Linkages.* A number of proposed transportation routes have been put forth by various entities that would fragment habitat and degrade the Forests' ecological integrity. In fact, Riverside County has proposed several alternatives for a transportation corridor that would bisect the Santa Ana Mountains in the Cleveland National Forest to connect Riverside and Orange County. Mountain lions have already suffered in the Santa Ana Mountains in the Cleveland National Forest, where traffic is the leading cause of death to that population; in fact, 33% of radio-tagged individuals were killed on roads (Beier 1995, see section 7.1, *Mountain Lion*). In addition, the Transportation Corridor Agency, a private company, has proposed yet another toll road in south Orange County that would block wildlife and plants that need to move between the Forests and other surrounding public and privately conserved lands, such as San Onofre State Park, and Caspers Wilderness Park. The proposed toll road would destroy designated critical habitat for a number of listed species (southern steelhead, California gnatcatcher, arroyo toad, etc.), and run through the largest undeveloped coastal habitat in the bioregion.

Utility lines and telecommunications corridors disturb and modify landscapes and habitat, which in turn facilitates the establishment of non-native species (Stephenson and Calcarone 1999). Powerline rights-of-way in southern California have been documented as points-of-entry for several exotic species, including black mustard (*Brassica nigra*) and ripgut brome (*Bromus diandrus*; D'Antonio and Haubensak 1998).

Utility lines and telecommunication corridors are also a threat to migrating and resident birds. California condors, eagles, waterfowl, and neotropical migrants have been killed in collisions with power lines, communication towers, and other tall structures. (DEIS for Oil and Gas Leasing, Los Padres National Forest).

DESIRED CONDITIONS

No new utility, transportation, and telecommunication corridors are established. Habitat restoration in existing corridors is a priority.

Infrastructure uses, including utilities, roads, pipelines, and communications which serve no Forest Service management objective are viewed as the least resource value of any other resource for which the Forest Service has responsibility either as lead or responsible agency. Infrastructure uses are considered only when suitable private land is not available and such use does not conflict with management objectives. Technically feasible alternatives are required if they reduce impacts to other forest resources.

Minimizing edge effects is the goal of transportation, utility, and telecommunication corridor management, especially when those effects increase predation, exotic species invasion, degradation of habitat, or otherwise undermine the protection of TES species.

Controlling the spread of invasive plants and animals is emphasized in any transportation, utility, and telecommunication corridor redesign and maintenance.

OBJECTIVES

Do not plan, authorize, or allow rerouting of utility, transportation, and telecommunication corridors and facilities.

Proposals for new transportation, utility and telecommunication corridors will not be authorized without exhaustive alternative route analysis and review of alternative transportation strategies and/or use of non-Forest Service lands.

Road access to utility and telecommunication corridors and facilities shall not be permitted in Special Interest Areas (SIAs), Research Natural Areas (RNAs), Resource Conservation Areas (RCAs), Wilderness, and Wild and Scenic rivers.

Develop a Communication Site Management Plan for every site, including a consultation with USFWS. Each plan shall provide effective protections for natural and cultural resources, TES species, interference, health and safety issues, and shall comply with other applicable regulations and laws.

A program to prevent soil erosion shall be accompanied by imprinting techniques for live vegetation restoration. Live planting will be from local seed sources and will be ¼ mile from the right-of-way. Topsoil shall be salvaged after soil has been disturbed.

Encourage underground transmission and communication lines to eliminate visual intrusions.

Existing transportation, utility, and telecommunication corridors shall be evaluated for their impact on the spread of non-native species. Existing exotic species populations shall be eradicated or controlled, and their spread shall be minimized.

Within 1 year, begin annual monitoring of existing transportation, utility, and telecommunication corridors for exotic invasive species, and institute a program for the removal/control of those species (see section 10.0, *Invasive Species*).

Reduce the effective width of utility and telecommunication corridors. Create small lobes or peninsulas of shrubby vegetation extending from the forest edge into the aforementioned corridors, to reduce the effects of habitat fragmentation and to facilitate animal movement.

Feather the edges of power line corridors to minimize edge effects while restoring and maintaining interior habitat for locally sensitive species.

Identify strategies to overcome wildlife movement barriers resulting from existing transportation corridors by collaborating with the California Department of Transportation (CalTrans).

Offer stewardship awards to individuals, departments, or interdisciplinary teams for effectively incorporating biodiversity management goals into transportation projects.

Conduct special training workshops to help staff understand the importance of managing ecosystems and avoiding and countering the adverse impacts of transportation corridors.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding transportation, utility, and telecommunication corridors contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

No new utility, transportation, or telecommunication corridors shall be established by the Forest Service. Use existing rights-of-way and development footprints and consolidate existing occupancy.

The Forest Service shall deny proposals for new transportation, utility, and telecommunication corridors.

The Forest Service shall not approve the construction of new facilities, expansions, or modifications of existing telecommunication facilities outside the existing development footprint (including buildings, towers, security fencing, and related modifications of communication sites) .

The Forest Service shall, for permit issuance or re-issuance, require new or re-constructed telephone lines and power lines of 35 KV or less to be buried unless: burial is not feasible due to geologic hazards or unfavorable conditions; greater harm would result to TES species; or an environmental assessment shows undergrounding to be otherwise detrimental to natural and cultural resources.

The Forest Service shall, within 3 years, require installation of anti-perching devices on all power lines and communica-

tion sites and incorporate other raptor-safe guidelines for all existing, reconstructed, and re-permitted transmission and distribution power lines, towers, and other transmission facilities.

The Forest Service shall collect and analyze road kill data, and work with CalTrans and County Animal Care and Control Stations (see section 14.0, *Habitat Linkages*).

The Forest Service shall, within 1 year, require utility companies to pay market value to the Forest Service for use of the land as a utility corridor (see section 21.0, *Special Use Permits*).

The Forest Service shall, within 1 year, limit grading of the transportation corridor to the backfilled trenches.

ISSUE STATEMENT

Forested lands in southern California prior to intensive logging were composed mainly of forests dominated by either ponderosa pine (*Pinus ponderosa*) or bigcone Douglas-fir (*Pseudotsuga macrocarpa*) at low elevation, with white fir (*Abies concolor*) as a major component above 6,000 feet and lodgepole pine (*P. contorta*) present above 8,500 feet (McKelvey and Johnston 1992). Most of the land base suitable for commercial timber harvest in southern California was, and still is, in the San Bernardino National Forest. Intensive timber harvest occurred in the San Bernardino Mountains as early as 1865 (Leiperg 1899, R. Minnich, UC-Riverside, pers. comm.), and continued until the early 1990s (McKelvey and Johnston 1992). From 1947 to 1990, 362.3 million board feet were harvested from San Bernardino and Los Angeles counties (California Department of Forestry and Fire Protection 1947-78, California State Board of Equalization 1979-90). Some of that came from the San Gabriel Mountains in the Angeles National Forest, but most was from the more densely forested San Bernardino Mountains. Logging mainly consisted of even-age management (e.g. clearcutting, shelterwood, and seed tree removal) where possible, with some selective cutting in less accessible areas (B. La Haye, pers. comm.). Such intensive logging, combined with effective fire suppression policies, significantly altered forest structure in these areas (Minnich et al. 1995, McKelvey and Johnston 1992). Minnich (1995) found that the average diameter of trees in the San Bernardino Mountains shifted from > 26 inches (ranging from 12 to 36 inches) in 1932, to smaller than 12 inches in 1992 (primarily 4 to 12 inches, with a few trees from 12 to 24 inches). In addition, tree density increased by 79% within that same time period. Past timber harvest substantially reduced the number of large trees, with ponderosa and Jeffrey pines (*P. jeffreyi*) suffering the greatest reductions (Stephenson and Calcarone 1999). These trees are also the most fire-resistant. In addition, timber harvest and fire suppression may have increased the dominance of white fir, and domestic livestock grazing in some areas may have contributed to overstocked forests by lowering the density of grasses that would compete with tree seedlings and reducing the herbaceous understory that facilitates ground fires (Archer and Smiens 1991).

For the past decade, small timber harvest programs involving mostly single-tree or group-selection methods have been the predominant forest management direction on the southern California forests (Stephenson and Calcarone 1999). These programs have focused on purported "forest health" issues (insect and disease outbreaks, understory thinning, and fuels reduction), administering individual permits to accommodate local demand for fuelwood, and identifying and removing hazard trees (Stephenson and Calcarone 1999). Salvage logging to remove trees killed by wildfire or bark beetles has also been conducted (Stephenson and Calcarone 1999). Activities include marking of trees, site preparation, harvesting of green and standing dead trees, thinning of stands, skid trail development, tree planting, cone collection, and grubbing of grass and brush around planted trees (Biological Opinion). Each Forest's personal-use fuelwood program is slightly different, but typically, members of the public can purchase permits for cutting up to 5 cords of wood from downed logs or marked standing dead trees in designated areas. In some Forests, permits are awarded through a lottery process.

In recent years, the concept of "forest health" as accepted by the timber industry, federal agencies, and politicians has become increasingly controversial. The term has been narrowly used to describe the health of some aspect of trees. However, within an ecological context, forest health includes consideration of the integrity of the whole forest ecosystem: soils; water; biological diversity including fish and wildlife populations; forest processes including succession, and organic and inorganic cycles; and the ability of the forest to resist or recover from dramatic changes. Consequently, the appropriateness of thinning and salvage logging has come under increasing scientific and public scrutiny. While both thinning and removal of dead and dying trees may provide some limited economic benefits, and possibly some limited ecological benefits, they are also likely to degrade forest ecosystem integrity by damaging soils and removing key wildlife habitat components. The potential ecological benefits of salvage are speculative, while the negative effects of salvage on forest resources are definite and persistent. For these reasons, silvicultural treatments aimed at addressing forest health are likely to have persistent ecological costs that outweigh any potential benefits.

If properly implemented as undergrowth reduction, thinning may have some ecological benefits (USFS and BLM 1997a, Franklin et al. 2000). However, large-scale thinning operations that tear up ground-cover plants, remove large trees that shade the understory, and leave behind flammable slash may actually cause stands to become more dried-out in summer weather and more prone to fire than before (Sierra Club and The Lands Council 1994). The Sierra Nevada Ecosystem

Project report to Congress (1996) stated that "timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any other recent human activity." In addition, any increase in access on newly constructed or reconstructed logging roads heightens the risk that human-caused wildfires will be ignited. Assessments by agencies (USFS and BLM 1997a) and pre-eminent forest ecologists (Franklin et al. 2000) stress that thinning and other fuel reduction efforts should not be conducted in roadless areas. Other areas that should be excluded from large-scale thinning are old-growth stands, Riparian Conservation Areas (RCAs), and areas with fragile soils or steep slopes.

However, in some cases a need may exist to conduct non-commercial light-touch hand thinning of shrubs and small-diameter trees (i.e., < 12 inches diameter breast height) in some overstocked stands. The intention is to introduce fire back into the system and allow it to shape the forests of the future. Data from Californian mixed-conifer forests in unmanaged fire regimes (e.g. Baja California, Mexico) and from vegetation surveys 60 years ago in the San Bernardino Mountains, show that forests generally contained an average of 20 to 80 trees > 5 inches diameter per acre, with the majority being > 26 inches diameter breast height (Minnich et al. 1994, Minnich 1995, Minnich 2000). However, modern southern California mixed-conifer forests have experienced more than a century of selective logging and fire suppression, resulting in increased stand densities of trees > 5 inches, increases in white fir and incense cedar, and an overall reduction in average diameter at breast height (Minnich et al. 1994). Fewer large trees are distributed across the landscape; therefore, retaining trees > 12 inches during thinning operations may be critical for recruitment of future large trees.

Salvage logging often is a full-scale, commercial operation that can inflict the same degree of damage to soil, water, vegetation, and wildlife as any other equivalent logging operation. However, it does so during a time period when forest resources are highly susceptible to incremental damage, causing significantly increased adverse effects on forest and watershed resources. Salvage logging can decrease plant regeneration, by mechanical soil and plant damage and change in microclimate, and is likely to have unanticipated consequences concerning microhabitat for species such as soil microbes (Beschta et al. 1995). Sexton (1998) documented that salvage logging significantly hampered post-fire regeneration in ponderosa pine stands. Heavy equipment further disturbs and compacts soils already depleted by fire, and removes trees and logs that would otherwise shelter wildlife and new growth, trap moisture, stabilize slopes, and restore nutrients to the soil (Sierra Club and the Lands Council 1994). Removal of wood reduces downed wood that ultimately provides a source of organic matter vital to soil productivity and topsoil formation. The combined effects of soil impacts and tree removal from salvage logging constitute greater and more persistent impacts on soils than even intense wildfire (USFS and BLM, 1997b). These impacts are of concern in these Forests due to relatively thin topsoils, slow rates of topsoil formation, and low levels of organic matter (J. Rhodes, Center for Biological Diversity, pers. comm.).

Fuelwood programs may seem innocuous but can have a detrimental effect on wildlife and forest ecosystems. Stephenson and Calcarone (1999) note that large snags and large downed logs that are reachable by roads in the Forests can be "difficult to retain because of unauthorized cutting." They add that "snag retention requirements in existing Forest Plans are adequate but enforcement is difficult in popular woodcutting areas." Hazard tree removal, authorized under the Federal Highway Safety Act, also reduces the number of large trees and snags, and often occurs along remote logging roads where very little danger to the public exists. Whether by unauthorized fuelwood collection or by hazard tree logging, the removal of large-diameter trees, snags, and downed logs can adversely impact cavity nesters and other snag-dependent species (Thomas et al. 1979).

AREA DESCRIPTION

Timber harvest operations occur throughout the Forests.

DESIRED CONDITION

Sufficiently large blocks of land (greater than 1,000 acres) have been restored via undergrowth reduction and fire to pre-logging forest structure and function, to maintain wildlife dispersal and migration, and to allow natural disturbance processes such as fire to continue to shape the landscape. All forested areas include large trees, snags, and downed logs that are well distributed throughout the landscape. Fragmentation of wildlife habitat has been reduced through the obliteration of roads and the net reduction in total road density. The level of harmful human activity has decreased or been eliminated in many areas, thereby reducing the disturbance to nest and roost sites, dens, and fawning habitat.

High-quality mature and old-growth forest occurs in large reserves that are well distributed across the landscape and connected through a series of habitat linkages. Where appropriate for the biophysical conditions, multi-storied canopies exist that represent the full natural complement of tree species and ages. Large, old, decadent trees are well represented throughout the landscape. Small openings in the forest are dispersed among stands of large mature trees, with herbaceous and shrub species that are within the Potential Natural Community of the site. The forest floor contains large woody material in various stages of decay with sufficient needle and leaf cast to enhance soil productivity. The herbaceous and shrub layer is varied, depending on the nature of the overstory. Controlled and natural fire of low to moderate intensity at periodic intervals limits the excessive build-up of small woody material and the intrusion of shade-tolerant tree species. Severe crown fires are infrequent and limited in size.

Commercial timber harvest is excluded on all public lands unless activities demonstrably enhance and restore high-quality forest conditions to those areas. Some undergrowth lessening to reduce hazardous fuel loads occurs in a 200-foot fire protection zone around houses, and in areas appropriate for light, non-commercial operations. No roads are built or reconstructed to accommodate undergrowth reduction.

OBJECTIVES

End the commercial logging program on the 4 Forests to eliminate economic incentives for inappropriate timber harvest.

Restore forested lands degraded by past timber harvesting by obliterating roads after undergrowth reduction, and re-introducing natural disturbances such as fire.

Allow undergrowth reduction in a 200-foot fire protection zone around houses, and only where appropriate for restoring and protecting high-quality forest habitat, water quality, and soil integrity, and moving towards Potential Natural Communities in each vegetative community.

Ensure that high-quality forest conditions are maintained throughout the landscape, including but not limited to multi-storied canopies, large-diameter trees, appropriate composition of tree species, healthy riparian conditions, and snags and large downed woody debris of all sizes and in all stages of decay.

Increase the number of Forest Service personnel dedicated to monitoring and preventing timber theft to numbers needed.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding timber harvest contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

Vegetation Management

No commercial logging shall occur on National Forest lands. All undergrowth reduction shall be conducted by the Forest Service or non-profit organizations, and must be compatible with continued ecosystem restoration, long-term ecosystem health, continued progress towards Potential Natural Community of each vegetative community, and conservation of the forest ecosystem in terms of soil integrity, vegetation, hydrology and water quality, and native wildlife. Undergrowth reduction shall also be used in conjunction with prescribed burning.

Other than for scientifically justifiable restoration purpose, no road construction and reconstruction shall occur in conjunction with undergrowth reduction and other vegetation management activities.

Other than for scientifically justifiable restoration purposes, the Forest Service shall prohibit timber harvest (undergrowth reduction) in roadless areas of all sizes and within RCAs or within 300 ft as measured from the outer edge of the 100-year floodplain in all streams (perennial or not), whichever is larger. Watershed analysis must present compelling scientific and logical reasons supporting the alleged benefit of land-disturbing restoration activities proposed (see section 1.0, *Watershed Management* and section 13.0*, Roadless Areas*).

Undergrowth reduction shall be discouraged or used cautiously and conducted with a "light touch" (i.e., hand thinning and no heavy equipment) in sensitive areas where it can impact recovery of aquatic resources or can increase existing

levels of degradation. Such areas include:

- Steep slopes (> 20%)
- Fragile and erosive soils
- Burned areas (i.e., areas with litter destruction)
- Watersheds with habitat for at-risk aquatic biota
- Watersheds with already-high levels of logging and/or roads (i.e., if road density > 2 mi per mi2)
- Watersheds with existing sedimentation problems, erosive sites, or any site where accelerated erosion is possible

Riparian Conservation Areas and harvest buffers shall be determined using methods described in the Watershed Appendix.

Heavy machinery shall be prohibited for log yarding, due to adverse impacts on soil resources (see section 6.0, *Soils Management*).

Any ground-based timber harvest with heavy machinery shall be specifically prohibited in burned areas.

Undergrowth reduction shall be used only when it can be shown to benefit forest ecosystem integrity, soils, water, fish, and wildlife. In areas suitable for undergrowth reduction, the following elements shall be retained:

- All trees and snags > 12 inches diameter at breast height (DBH).
- At least 5 live trees 6-12 inches DBH per acre.
- A minimum density of 40 live trees/acre or maintain a basal area 75-150 square feet/acre.
- At least 4-6 snags per acre > 14 inches DBH.
- At least 6 downed logs of all age and decay classes per acre, with a minimum log size > 12 inches DBH and 20 feet long, for species dependent on dead and downed logs. If at least 6 logs do not naturally occur, then 6 of the largest trees shall be left on the ground during harvest.
- At least 9 downed logs of all age and decay classes per acre in southern rubber boa habitat (see section 8.0, *Listed Species*).

All slash must be removed from the site by the Forest Service.

Post-Fire Management

Building of new roads or reconstructing existing roads in the burned landscape shall be prohibited.

Active reseeding and replanting post-fire shall be conducted only under limited conditions. These conditions include replanting of native shrubs along roads in burned areas to prevent vehicle trespass, and replanting of native trees when natural seed sources have been destroyed. Replanting shall be conducted using locally grown native stock in the same species composition as occurs naturally on the site.

Structural post-fire restoration involving installation of hard structures such as sediment traps, fish habitat alterations, bank stabilization, weirs, rocks, check dams, and gabions shall be prohibited. Some light post-fire structures may be used for soil stabilization, including weed-free hay bales and small holes.

Hazard Tree Removal

"Hazard" tree removal shall occur only within designated campground areas, or at such distance from a paved road that does not exceed the height of the tree. All trees designated as "hazard" that are greater than 12 inches diameter shall be left on site after cutting to contribute to large downed woody debris.

Only dead trees leaning > 10% towards a paved road or into a designated campground shall be considered "hazard" trees.

For any hazard removal of a tree > 12 inches diameter, an Environmental Assessment shall be conducted, and the public shall be provided the opportunity to comment on the removal. Cumulative effects shall be considered.

The dead and down personal fuelwood program shall be replaced, within 1 year of the adoption of this plan, with the sale of green and dead wood from undergrowth reduction projects designed to restore pre-fire suppression conditions. This wood shall be taken off site and made available for purchase by the public through a permitting process (see section

2.0, *Fire Management*).

Monitoring Timber Theft

Prohibitions on timber theft shall be strictly enforced, with such penalties as fines, forfeiture of vehicles, repossession of stolen timber, and criminal charges.

DOMESTIC LIVESTOCK GRAZING

ISSUE STATEMENT

A century or more of grazing by domestic livestock has significantly harmed native plants, wildlife, and habitats in the West (Platts 1991, USDI 1994). Domestic livestock grazing causes: 1) severe damage to riparian systems (see Belsky et al. 1999), 2) the decline of sensitive species and habitats (see Horning 1994, Ohmart 1996), and 3) the spread of exotic invasive species (Rothstein et al. 1980, Belsky and Gelbard 2000).

Riparian and Aquatic Impacts

Damage to riparian areas is well documented. Free-ranging cattle strongly prefer riparian areas due to the availability of water, shade, and increased forage. Cattle spend 5 to 30 times as much time in these cool, productive zones relative to other areas (Roath and Krueger 1982, Skovlin 1984, Clary and Medin 1990). Cattle prefer to browse young willow and cottonwood shoots, eventually eliminating these important woody species from streamside locations (Kauffman et al. 1983, Kovalchik 1987, Loft et al. 1987, Case and Kauffman 1997). Grazing in riparian areas can jeopardize fish and wildlife species (Kauffman and Krueger 1984, Knapp and Matthews 1996), alter stream morphology and hydrology, increase soil erosion, and degrade and even contaminate water quality (Atwill 1996; also see references in Belsky et al. 1999 and Chaney et al. 1990).

Upland Impacts

Upland ecosystems are harmed by domestic livestock grazing, which can damage riparian systems in the same watershed. A review of all quantitative comparisons of grazed and ungrazed sites in the arid West found that soil erosion was 80% higher, vegetative biomass 24% lower, microbial soil crusts 45% lower, and rodent species diversity lower on grazed than on ungrazed control sites (Jones 2000). Domestic livestock compact soils, which reduces infiltration and retention of rainfall in a watershed. Conversely, soil compaction increases rates of surface flow and erosion, resulting in watershed flashiness, stream sedimentation, lowered water tables, and degradation of perennial into ephemeral streams (reviewed in Belsky et al 1999).

Oak Woodland Impacts

Domestic livestock trample and graze hardwood species, including oaks (Pavlik et al. 1991). Oak woodlands – particularly blue oak stands – are seriously declining throughout California (Borchert et al. 1989). Historical "cut and graze" policies to provide more range for livestock have reduced and even eliminated oak stands, discouraging their re-establishment (Borchert et al. 1993, Standiford et al. 1997, Swiecki et al. 1997).

Threatened and Endangered Species

Domestic livestock grazing has directly killed sensitive plant and wildlife species (Stephenson and Calcarone 1999) and is the fifth most widespread cause of species endangerment in California (Flather et al. 1994, 1998, Horning 1994). Domestic livestock grazing is a significant factor in the decline of 76 listed and candidate fish and wildlife species, and likely to be a factor in the decline of another 270 listed and candidate fauna. Of these 76, 61 are riparian-dependant or riparian-associated species, such as the least Bell's vireo (*Vireo bellii pusillus*), the Southwestern willow flycatcher (*Empidonax raillii extimus*), the California red-legged frog (*Rana aurora draytonii*), and the arroyo southwestern toad (*Bufo californicus;* Taylor 1986, Stephenson and Calcarone 1999). Domestic livestock grazing also seriously threatens upland species such as the California gnatcatcher (*Polioptila californica*) and the Peninsular bighorn sheep (*Ovis canadensis cremnobates*; Stephenson and Calcarone 1999). Domestic livestock also negatively impact mule deer (Odocoileus hemionus), a management indicator species (see section 7.0, Management Indicator/Focal Species). A series of experimental studies in the Sierra Nevada demonstrated that heavy cattle stocking rates are likely to negatively impact habitat selection, space use, and feeding patterns and food availability of mule deer, as deer are forced to search for alternative food sources (e.g. willow versus preferred herbaceous species) over a significantly larger area than normal (Loft et al. 1987, Kie et al. 1991, Loft et al. 1991, Loft et al. 1993; also see section 7.2, Mule Deer).

Invasive Species

Domestic livestock encourage the spread of non-native invasive species (Stephenson and Calcarone 1999) through transport in their feces, hair, and feet. Non-native plant species invasion relative to domestic livestock grazing also occurs through associated soil disturbance, selective grazing of native species, and altering ecosystem processes like fire and nutrient cycling (Rickard 1985, Lacey 1987, Archer and Smeins 1991, Hobbs and Huenneke 1992, Young 1994, Dwire et al. 1999, Olson 1999, Rosentreter 1999, Belsky and Gelbard 2000). The spread of invasive animal species is also associated with domestic livestock grazing. The brood-parasitic brown-headed cowbird (*Molothrus ater*), which has caused profound declines in songbird populations, reaches its highest densities near areas where domestic livestock are concentrated (Stephenson and Calcarone 1999). Most current grazing management plans treat exotic species problems with reactive recommendations: washing vehicles; using weed-free livestock feed; and trapping cowbirds rather than eliminating domestic livestock (Belsky and Gelbard 2000, Stephenson and Calcarone 1999). However, continued grazing will only perpetuate and exacerbate the spread of invasive species and prevent community recovery.

AREA DESCRIPTION

According to recent data from the Forest Service, 140 active grazing allotments occur in the 4 Forests, occupying a total of 767,784 acres. Most grazing allotments are located on the LPNF (see Figure 25-1). Active allotments occupy 0.6% of the ANF, 9% of the SBNF, 20% of the CNF, and 28% of the LPNF.

DESIRED CONDITION

Aquatic, riparian, meadow, and upland ecosystems are no longer degraded by domestic livestock, and vegetative communities throughout the Forests have reached their Potential Natural Community. Exotic invasive plant and animal species that are introduced or spread by domestic livestock have been eliminated from the Forests.

Ecosystems in the Forests are not degraded by domestic livestock grazing, and they are healthy and properly functioning. Water is clean, of appropriate temperature, and flows throughout the year where appropriate. Grazing does not occur in sensitive species habitat adversely impacted by grazing.

OBJECTIVES

Restore natural conditions of aquatic, riparian, meadow, and upland ecosystems to where they are no longer degraded by domestic livestock. Such conditions should include natural functioning of processes that are not significantly different from pristine natural systems, such as nutrient cycling, water quality maintenance, and biological diversity preservation.

Prevent the spread of invasive exotic plant and animal species caused by domestic livestock, contain existing exotic species populations, and eradicate or control them to the maximum extent possible.

Conduct studies of all current active grazing allotments, permanently retire unsuitable areas from grazing, reformulate allotment boundaries, and conduct NEPA analyses to develop allotment-specific grazing management plans (utilization, stocking rate, season of use, etc.) that are compatible with continued ecosystem restoration, long-term ecosystem health, continued progress towards Potential Natural Community, and conservation of the Forest ecosystem in terms of soil, vegetation, hydrology, and native wildlife.

Design and implement a coordinated ecosystem-wide grazing program, shown by empirical study to cause no statistically significant reduction of ecosystem functions, and that meets riparian conservation strategy goals, utilizes adaptive management to facilitate desired ecosystem conditions, includes inventories and annual monitoring of grazing allotments to determine whether ecosystems are achieving desired outcomes, and adjusts grazing to achieve desired conditions in a timely manner.

Investigate the feasibility of a pilot study for a buyout program to be implemented as follows: If the holder of a grazing permit or lease, only for an allotment that has been determined to be suitable for domestic livestock grazing, chooses to relinquish the grazing preference that runs with their base property back to the federal government, the individual National Forest will recommend that the Department of Agriculture compensate the permittee at a determined cost per animal unit month. The allotment shall then be permanently retired from domestic livestock grazing by the provisions

for automatic plan amendments as noted above. Determine candidate leaseholders for this pilot study within 1 year. Any permittee, if they desire, can retire their allotment in this manner without a plan amendment.

Identify representative ungrazed vegetation reference plots in appropriate areas to demonstrate the Potential Natural Community. Data on potential ungrazed ecological structure and species composition may also be gathered from similar plant communities in National Parks or other protected areas, by consulting key researchers, and by inspecting historical records from the last century.

Conduct long-term monitoring to determine whether the implemented grazing systems and stocking levels are significantly impairing progress towards Potential Natural Communities, vis a vis no grazing. In a replicated research study, at the end of 5 years and 10 years, randomly-chosen grazed plots and matched ungrazed reference plots will be compared with respect to the following variables:

- Soil loss rates
- Soil bulk density
- Native vegetation composition and abundance
- Rodent, insect, reptile, amphibian, and bird species composition, abundance, and diversity

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding domestic livestock grazing contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall immediately retire all vacant allotments (see Figure 25-1).

The Forest Service shall immediately retire the Wellman allotment due to historical and ongoing conflicts with Peninsular bighorn sheep recovery.

The Forest Service shall prohibit livestock facilities (e.g. corrals, pack stations, salting areas, and feedlots) that attract and provide foraging habitat for brown-headed cowbirds.

The Forest Service shall ensure that domestic livestock grazing does not degrade wilderness values.

Pre-NEPA Grazing Assessment

A comprehensive region-wide survey of all allotments currently grazed by domestic livestock shall be conducted within 3 years of the adoption of this plan. This survey should include assessments of the following factors:

- Riparian health and affected stream and aquatic habitat conditions, as described in section 1.0, *Watershed Management*
- Soil conditions, including compaction and estimated soil loss caused by grazing
- Presence and rate of spread of invasive exotic plants and animals
- Habitat functionality for native fish and wildlife
- Condition of the ecosystem relative to Potential Natural Communities
- History of permittee and agency compliance with Land Management Plan Standards
- Presence of TES species that are adversely impacted by domestic livestock
- An analysis of the economic and environmental consequences of term permit grazing and the alternative uses foregone, in part or as a whole, such as hunting, fishing, birding, and recreation
- Costs analyses including costs of resource degradation of an area from domestic livestock (e.g. any reductions in the quality and/or quantity of water flowing from a watershed), monitoring, facilities maintenance, applicable administrative overhead, restoration projects, etc. The cost analysis shall also include disclosure of the costs of obtaining equivalent forage on private grazing lands – if costs are greater than benefits
- Determination as to whether a particular area is inappropriate for domestic livestock grazing (i.e., National Forest Management Act)

The Forest Service shall utilize the above survey data to determine the suitability of each allotment for domestic livestock

grazing, as well as for NEPA review (described below). Results of the survey shall be published within 1 year of survey completion. The Forest Service shall explain in the survey results precisely how it has determined that a given area is or is not suitable for grazing. Justification is to be based on: rational and objective consideration of alternative uses foregone; comprehensive estimation of all tangible and intangible environmental and economic costs and benefits and relative values of uses; and showing how resources are "utilized in the combination that will best meet the present and future needs of the American people" (Multiple Use Sustained Yield Act). All areas that meet the ecological conditions described in the following Grazing Suitability Criteria Standards (but not limited to those areas) shall be permanently retired from domestic livestock grazing.

In any allotment for which the above analysis is not completed within 3 years, domestic livestock grazing shall be suspended until such analysis is completed.

Grazing Suitability Criteria

Wild and Scenic River corridors, Riparian Conservation Areas, and Research Natural Areas and Special Interest Areas (unless determined otherwise) shall be designated as unsuitable for domestic livestock grazing.

The following areas Forest-wide shall be designated as unsuitable for domestic livestock grazing, permanently retired from domestic livestock grazing, and shall be physically excluded from access by domestic livestock:

- Riparian Conservation Areas (section 1.0, *Watershed Management*)
- Areas with greater than 20% slope
- Areas containing soils with moderate to high erosion hazard
- Areas where grazing has caused significant loss of topsoil and/or A-horizon coverage is not continuous
- Areas with significant soil rilling, gullying, and stream incisement
- Areas with less than 30% perennial grass cover
- Areas receiving less than 12 inches of rainfall annually, as determined by historic and recent records on precipitation
- Areas at risk of invasion by exotic species that are transmitted or exacerbated by domestic livestock
- Areas with suitable or critical habitat for TES species that are known to be adversely impacted by domestic livestock grazing (see sections 7.0, *Focal Species,* 8.0, *Listed Species,* and 9.0, *Sensitive Species*)
- Areas within 400 meters of a spring, seep, vernal pool, or wet montane meadow (i.e., meadows that have soils that remain saturated with water throughout the year)
- Seasonally saturated meadows with non-cohesive soils that lack deep-rooted woody vegetation
- Dry meadows in early seral status with greater than 10% of the meadow with bare soil and active erosion
- Watersheds that drain into sensitive aquatic habitats that are negatively impacted by domestic livestock grazing
- Recently (within past 10 years) burned areas
- All exposed archeological sites
- Chaparral and coastal sage scrub habitats that are vulnerable to type conversion to exotic grasses (see section 5.0, *Vegetation Management*)
- Oak habitats in which the viability of the advanced regeneration cohort is found to be at risk from domestic livestock grazing
- Other areas to be determined by the Forest Service

A determination that an area is unsuitable for domestic livestock grazing will constitute a decision to permanently end and exclude domestic livestock grazing use from this area. Any existing permit to graze a particular allotment notwithstanding, if any portion of the allotment is determined to be unsuitable, the entire allotment shall be managed to ensure that livestock are eliminated from unsuitable areas, including eliminating livestock from the entire allotment if necessary. The Forest Service shall immediately advise permittees currently using the area of the decision to remove domestic livestock grazing use from the area.

Domestic livestock use shall be eliminated in an area within 3 months of the determination that the area is unsuitable for domestic livestock grazing.

Allotment boundaries shall be modified to totally exclude unsuitable areas. New allotment boundaries may be created to consolidate areas that are suitable for domestic livestock grazing. Fencing shall be prohibited if such fencing is determined to cause significant negative impacts on wildlife. If negative impacts on wildlife will occur, the entire allotment shall be vacated in lieu of fencing.

All areas that have been degraded by domestic livestock and designated as unsuitable for grazing shall be ecologically restored starting within 3 years of the designation, and continuing indefinitely until Potential Natural Community has been reached. Restoration options include, but are not limited to:

- Eradication of exotic plant species (see section 10.0, *Invasive Species*), and re-vegetation with local native plants
- Intensive trapping of cowbirds

Allotment-specific NEPA Analyses

All allotments not retired as unsuitable and that are out of NEPA compliance shall be prioritized for NEPA review to determine grazing systems that promote satisfactory progress towards achieving Potential Natural Community. All allotments shall be brought into NEPA compliance within 2 years of the completion of the region-wide survey.

All NEPA analyses shall be conducted by an interdisciplinary team of trained specialists in range management, botany, ecology, soil science, fisheries, hydrology, wildlife, and other appropriate disciplines.

All allotment-specific NEPA analyses shall assess, at a minimum, the following elements:

- Habitat condition assessment for TES and Focal Species, including current survey data for focal, sensitive, and rare species for the entire allotment
- Identification of any non-TES or non-focal native wildlife and plant species whose habitat and diet needs may not be protected adequately by grass cover, water quality, and riparian health standards
- Watershed evaluation for adjacent meadows or other upland areas outside of Riparian Conservation Areas (e.g. assess sediment delivery with respect to in-channel trends and measures for aquatic biota, bare ground coverage, compacted soils, rills, gullies, headcuts, hummocks, etc., compared with ungrazed reference sites, or existing conditions determined via monitoring)
- Rangeland Health analyses (i.e., average available palatable forage per acre)
- Grazing system compatibility with Watershed Management goals and assessments (section 1.0, *Watershed Management*)
- Grazing system compatibility with need to promote movement towards Potential Natural Communities (i.e., late seral vegetation, phenological native plant requirements, and wildlife) so as to achieve no significant departure from Potential Natural Community 10 years after the implementation of this plan
- Weed risk analysis (as required by the Forest Service Manual (FSM) § 2080)
- Staffing analysis comparing available staff with monitoring, mitigation, and enforcement workload for the given allotment, and disclosing the feasibility of implementing these measures
- Rational objective decision-making process, with commitment to choose the optimal alternative based on an established decision protocol such as the "alternative uses foregone" ideal: under National Forest Management Act (NFMA) (36 Code of Federal Regulations (CFR) § 219.3), suitability is defined as "the appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone."

Allotment-specific management plans (i.e., Record of Decision) resulting from NEPA analysis shall include:

- Quantitative and qualitative description of Desired Future Condition with respect to Potential Natural Community as measured by ungrazed reference sites
- Utilization limits, including browse limits, based on scientific data that establish that the limits are compatible with wildlife needs
- Stocking rates and rest rotational prescriptions that are compatible with focal species habitat management standards and vegetative community management standards (e.g. mule deer, blue oak; see sections 5.0, *Vegetation Management,* and 7.0, *Focal Species*)
- Prohibition on supplemental feeding, including salt and alfalfa blocks

- Biologically based season of use determination
- Modified boundaries delineated by fencing or other physical barriers to exclude unsuitable areas
- Mandate to confine domestic livestock for 36 or more hours prior to entry into Forest Service lands. Inspection for and removal of weed propagules from animals shall be required
- Domestic livestock shall not be moved from infested to uninfested areas when viable seed is present in the infested areas, particularly when it is present on stems
- Mandatory weed control requirements such as use of weed-free forage and equipment, and vehicle washing
- Monitoring plan with timelines
- Adaptive management plan, including timeframes, specifying what actions will be taken if standards are not met

Management plans for dry meadows suitable for domestic livestock grazing shall include bi-ennial resting periods, short seasons (10 days maximum), and limited stocking densities.

For areas determined to be suitable for domestic livestock grazing, management plans shall include browse limits of at least 6-inch stubble height for herbaceous species, and 20% maximum annual utilization on new growth on highly palatable upland woody browse species (Loft et al. 1987, Clary and Webster 1989, Elmore and Kauffman 1994).

All Forests shall ensure, within 3 years after the adoption of this plan and commensurate with the region-wide grazing assessment, that their Forest-wide grazing management direction includes the following elements:

- Consistency with Forest Service Manual direction (FSM § 2211.6)
- Quantitative monitoring and reporting program, with timelines
- Quantitative and qualitative ecological indicators, to be used for long-term monitoring and for ecological health standards as described below
- Utilization limits that vary depending on plant community type and range condition as required by FSM § 2211.6. These must include browse limits of at least 6-inch stubble height for herbaceous species, and < 20% for woody species
- Minimum bare soil area of < 3%
- Sediment delivery limits
- Quantitative wildlife habitat quality standards

The evaluation shall include public review and input of Standards and Guidelines.

Monitoring

If an allotment is out of NEPA compliance and NEPA analysis for an allotment-specific management plan has not been conducted within 2 years of the completion of the region-wide survey, domestic livestock grazing shall be suspended on that allotment until such NEPA analysis has been conducted, a management plan has been developed, and monitoring is in place.

Allotments shall be monitored every year before, during, and after the grazing season. Allotment-specific monitoring plans shall be science-based, quantitative, conducted by the Forest Service, and include the following affected attributes and standards with which permittees must comply:

- Soils: soil surface aggregate stability and depth to common roots should be equivalent to undisturbed sites, and bare soil should cover less than 3% of each allotment
- Plant community demography: percent cover, proportion of native species, distribution of seral stages, and age classes should vary from undisturbed sites by no more than 10%; native indicator species that reflect ecosystem health should be used to compare condition of grazed site with undisturbed sites; non-native species that invade following disturbance should not occur; advanced regeneration cohort of oak species should not be declining as compared to undisturbed sites
- TES and rare species (those not adversely impacted by grazing): each individual species should meet standards for abundance, area covered by populations, recruitment, and vigor, and standards should provide for the recovery of these species
- Water quality: temperature, sediment, nutrient (N and P), and fecal coliform limits shall meet standards put forth

by the Regional Water Quality Control Board Basin Management Plans

- Compliance with on- and off-dates, forage utilization, and stocking levels

Permittees shall be responsible for meeting annual domestic livestock management requirements as specified in the allotment management plan and annual operating instructions. The Forest Service shall be responsible for the collection and accuracy of all monitoring data and for meeting ecological standards.

All monitoring results produced by the Forest Service shall be available for public and permittee review upon demand.

The Forest Service shall produce a statewide monitoring report that will indicate which allotments were monitored for annual use or long-term trend, and which were not; whether monitoring was performed using ocular estimates or quantitative measurement; what, if any, violations of standards or guidelines were observed; and what, if any, enforcement action was taken. This report shall be available to the public in PDF format and posted on the Forest Service website.

Adaptive Management

Non-compliance with on/off-dates, stocking, or forage utilization shall result in grazing suspension or cancellation in whole or part on the allotment.

If monitoring during the grazing season indicates that any of the standards outlined in the allotment-specific management plan are not being met, then grazing management shall be immediately modified to reduce impacts by domestic livestock. Domestic livestock removal, stocking rate reductions, shortened grazing seasons, lowering of allowable utilization levels, and use of rest-rotation grazing management systems are applicable to achieve the standards.

If at any time and for any reason monitoring for any indicator cannot be conducted, then grazing shall be suspended on the allotment until such time that monitoring can be conducted.

If monitoring indicates that long-term ecosystem health standards are not being met, ecological condition status is determined to be moving in a downward trend, or there is evidence that grazing impacts are causing an unsatisfactory condition such as invasion of exotic weeds, then grazing shall be suspended until such time that the standards can be met.

If new data become available indicating that a native species of plant or animal is determined to be (or found likely to be) adversely impacted by domestic livestock grazing, then grazing shall be permanently retired in all suitable habitat for that plant or animal within 1 year.

OIL AND GAS DRILLING

ISSUE STATEMENT

Oil and gas drilling activities can result in sprawling landscape destruction, air and water pollution, habitat loss, fire hazards, hazardous waste, noise pollution, aesthetic degradation, and harm to threatened and endangered plant and animal species. Current and proposed oil and gas drilling activities could harm as many as 20 federally endangered and threatened species and dozens more species that are candidates for listing, sensitive, or of special concern. Oil and gas drilling activities, due to their destructive impacts, preclude many other Forest purposes, such as the protection of regional fish and wildlife, recreation, public access, and safeguarding air and water quality.

The Los Padres National Forest currently produces 700,000 barrels of oil per year under 22 leases covering 14,618 acres. The majority of the oil is produced at a field near Fillmore. Existing operations have already resulted in substantial degradation. Nonetheless, the Forest Service is now considering opening up additional lands to oil and gas drilling activities, including 5 roadless areas that have been historically off-limits to such activities. The remaining cache of oil beneath the Forest is estimated to be approximately 90 million barrels BOE (barrels of oil equivalent). This represents only 1% of the oil and only 6/100 of 1% of the gas thought to underlie the Federal lands in the United States, including Alaska—only 5 days of our nation's oil supply.

Seventy-four percent of the 140,000-acre area estimated to have high potential for occurrence of oil and gas (HOGPA) is within Inventoried Roadless Areas (IRAs). Ninety-three percent of one of the most important HOGPAs, the South Cuyama, lies within IRAs. Congress is currently considering the possibility of protecting these IRAs as federal wilderness. Leasing activities in these areas will sabotage that future protection. These areas currently provide recreational opportunities, essential habitat for a host of vulnerable plants and animals, a scenic backdrop for visitors (the largest single recreational use in the Forest is "viewing scenery," and other environmental protection benefits (see section 13.0, *Roadless Areas*).

The areas being considered for oil and gas development also contain a wide variety of Native American archeological sites, including permanent villages and temporary habitation sites, cemeteries, rock art, and places of religious significance. Much of the area is unexplored archeologically, creating the need for careful baseline surveys prior to any development. Because of the area's intermediate position between California's central coast and central valley cultural zones and the lack of previous surveys, it is very possible that unique and unexpected site types could be damaged and lost to current and proposed oil and gas development.

One of the insidious and destructive problems resulting from oil and gas development is the proliferation of roads and associated infrastructure. While each additional road may seem insignificant, the overall effect of a large network of roads is ecologically devastating. Historically, the cumulative effects and long-term consequences of roads have not been adequately analyzed in oil and gas leases (see section 22.0, *Roads*).

Given the significant degradation caused by oil and gas drilling and its inherent conflict with many other public uses, including recreation and resource protection, no additional leasing should be permitted in Los Padres National Forest. There should also be a rigorous examination of the impacts of existing leases and activities. It is critically important that the Forest Service thoroughly review the "big picture" of the environmental and cultural impacts of oil and gas leasing in a Forest-wide document prior to evaluating which lands may be appropriate for continued leasing. This analysis must take place after the Southern California Conservation Strategy is completed, providing the appropriate Forest-wide context for analyzing current and future oil and gas activities. This type of systematic analysis is crucial. Once a lease is granted, the lease stipulations the government can use at this point are notoriously ineffective at preventing environmental damage, and the Forest Service is legally obligated to allow development.

AREA DESCRIPTION

There are 22 existing leases covering 14,618 acres, with 90% of the oil and gas extracted coming from the Sespe Oil Field. Most lease areas do not have wells, and oil is pumped from adjacent private land. According to current lease maps, they are sited at Sespe Oil Field, South Cuyama, Bates Canyon, Deer Park Canyon, and Sulphur Springs. (USFS 2001b)

All lands within Los Padres National Forest that have not been withdrawn from mineral entry by Congress are now being analyzed and considered for additional oil and gas leasing under one or more alternative leasing scenarios in a recently issued Draft Environmental Impact Statement (USFS 2001b). The only areas currently withdrawn from leasing and therefore not under consideration are designated Wilderness areas, the Santa Ynez watershed, and the Big Sur coastal zone.

DESIRED CONDITION

No new Forest Service lands are designated suitable for oil and gas leasing. Stringent requirements are identified to govern existing operations.

The measurable and uncounted benefits of protecting roadless areas and sensitive natural and cultural resources are clearly weighed against the costs of permitting continued oil exploration and drilling. This formula is used to determine restrictions and prohibitions on existing oil and gas drilling activities in order to protect the Forest's natural and cultural resources.

Current and future oil and gas exploration and development are precluded where it conflicts with the management, protection, and recovery of cultural resources, TES species, watersheds, roadless areas, and forest health.

For all oil- and gas-related activities, all potentially affected sites are thoroughly surveyed for cultural and archeological resources, and any exploration or drilling is contingent upon the implementation of mitigations that will prevent harm and/or loss to significant resources. Existing operations are surveyed, and continuing activity is conditional upon the implementation of mitigations that will prevent harm and/or loss to significant resources. The appropriate tribes are consulted in regard to tribally related cultural resource management issues.

There is continual monitoring and evaluation of oil and gas activities, and restrictions and prohibitions are instituted to ensure protection of the Forests' natural and cultural resources.

OBJECTIVES

Assess current oil and gas activities for their impacts on sensitive resources.

Planning

Develop, in conjunction with the BLM, a reasonable foreseeable development (RFD) scenario, based upon currently known geologic strata, past activity, and future demand. Development of the RFD scenario is based on a determination of an accurate picture of the number and location of wells in the Forest. This document is made available to the public and is submitted for peer review. The RFD assessment is completed within a year, circulated for public and independent review, and re-examined annually with updated information on geologic strata, past activity, and future demand. The most current RFD is incorporated into all NEPA oil- and gas-related documents. If at any point, the Forest Service expands or permits a continuation of drilling beyond what is contained in the RFD, the NEPA analysis must be redone accordingly, including a new public review.

Address any "drainage" of federal minerals by non-federal development through administrative resolutions such as Compensatory Royalty Agreements. The federal agencies should use all legal authorities to oppose irresponsible development that causes undue and unnecessary degradation to resources. The proper resolution of any drainage case that may occur must be addressed in the current NEPA process. Unresolved and future drainage cases must include subsequent "tiered" NEPA processes at a site-specific level to ensure that fully informed and open decisions are made on how the federal land managers will address specific drainage issues.

General Operations

Identify activities that conflict with the management of protection and recovery of TES species, watersheds, and forest health. Complete that analysis within 2 years, and shut down all destructive activities within a year after the analysis.

Relocate wells and transportation corridor alignments to prevent disturbances to sensitive areas of high wildlife value or critical habitat and/or recreational value, including wetlands and riparian areas. This also applies to areas with high erosion potential, highly saline soils, rugged topography, and/or poor reclamation potential (e.g. steep slopes, eroded lands, floodplains, unstable soils).

Provide training twice a year on wildlife and plant protection requirements. Harassment of wildlife is prohibited, and all employees are trained in invasive weed identification to actively control identified infestations.

Evaluate the roads that have been established for oil and gas drilling activities within 2 years for redundancy or conflicts with resource protection goals. Roads that are not essential or that undermine resource protection goals are immediately closed and actively rehabilitated within 1 year of having been identified as non-essential. No new roads are established (see section 22.0, *Roads*).

Manage all areas disturbed during exploration, including roads and pads, as temporary disturbances and restore to their natural condition at the end of use.

Use existing roads and locate facilities on existing well pads to prevent any additional surface and/or visual degradation. Existing roads that are not required for routine operation and maintenance of producing wells and ancillary facilities, and disturbed areas associated with permanently blocked and abandoned wells, will be permanently blocked, recontoured, reclaimed, and revegetated.

Cultural

Thoroughly survey all sites that could be potentially impacted by oil and gas exploration and activities for cultural and archeological resources. Any exploration or drilling is contingent upon the implementation of mitigations that will prevent harm and/or significant loss to resources.

Elicit information from federal, state, and tribal officials concerning the potential effects of any action resulting from the proposed activity on traditional cultural properties, including areas of traditional use and areas of religious or cultural importance to tribes. Work crews are educated on the sensitivity of cultural resources, mandated protections, and their responsibilities to avoid disturbance to sites and report any discoveries during any activity.

Watershed

Develop a comprehensive water management plan that takes into account specific conditions of watersheds, surface waters, groundwater, aquifers, and geological formations involved. This plan must address all potential coal bed methane development in a watershed area, regardless of surface and mineral ownership.

Reclamation

Minimize long-term visual impacts through design and active mitigation/rehabilitation of impacted sites.

Monitoring

Monitor for downwind and downstream activities, collect baseline information, and monitor for any changes.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding oil and gas drilling contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

Planning

The Forest Service shall, for existing leases, monitor compliance with 36 CFR 228.102(d) by examining the potential impacts of oil and gas leasing on TESCP, critical habitat, seasonal ranges, watershed, biological linkage integrity, and scenic and recreational values. The analysis must be thorough and precede any leasing decisions. Confine it to areas where there has been an expressed interest in leasing or where potential for oil and gas occurrence is high.

The Forest Service shall exercise the discretionary no lease authority granted by the 1987 Federal Onshore Oil and Gas Leasing Reform Act (FOOGLRA), which mandates that the Forest Service identify those areas that will be "closed to leasing…through exercise of management direction"—36 CFR 228.102(c)(1)(iii). Closures will be implemented wherever necessary to fulfill the objectives and standards of this Alternative.

The Forest Service shall apply no surface occupancy leasing (NSO) stipulations to protect other significant scenic,

environmental, and recreational features in areas otherwise available for leasing.

There will be no waivers, exemptions, or modifications (WEMs) that relax protections in NSO stipulations. WEMs will only be granted after review that includes full public involvement.

Restrictions to leases include but are not limited to: placement of well-sites to avoid sensitive areas, restrictions on the time of year when activity is allowed, and NSO stipulations.

NSO restrictions are not used as a substitute for no-lease decisions. NSO stipulations should not be applied to roadless areas, as surface disturbance around the perimeter of the core areas will cause an edge effect, disrupting and fragmenting the core area and linkage corridors.

Stipulations established at the planning level will not be removed without a NEPA revision that includes a public process.

Leasing stipulations and applications for permits to drill (APDs) must specify the most protective BMPs and apply them to each well. The Best Available Technology that minimizes environmental impacts must be used at each well site.

The oil potential must be separated from the gas potential in all environmental impact analyses and documents. If non-conventional sources are under consideration, the Forest Service must precede such action by updating the Long-Range Management Plan (LRMP) and including a public process.

The field plan developed for each producing formation when development wells are first drilled is accompanied by a full EIS that indicates the general locations of wells along with the cumulative impacts of the drilling program.

General Operations

The Forest Service shall implement all Best Management Practices (BMPs) and strategies outlined in the EPA Sector Notebook, "Profile of the Oil and Gas Extraction Industry" (at http://es.epa.gov/oeca/sector/index.html#oilgasex, Publication number EPA/310-R-99-006.

The Forest Service shall shut-in any wells found to be directly associated with a threat to public health, safety, or environmental protection pending the completion of an investigation, which will be used as the basis for determining appropriate remedial action.

Any wells shut-in due to a potential threat to public health, safety, or the Forest's natural or cultural resources will remain shut-in pending an investigation. If the investigation determines that the threat cannot be remedied by mitigation, the offending well shall be plugged, reclaimed, and monitored. If investigation reveals that mitigation measures may be used to eliminate the threat, the shut-in shall remain in effect until mitigation and monitoring measures are adopted after full notice and public hearing.

The Forest Service shall withdraw the following areas from oil and gas leasing: existing and proposed Wilderness/Roadless Areas/Wild and Scenic rivers, backcountry recreation areas, Linkages, Research Natural Areas, Special Interest Areas, scenic byways, and key, occupied, and modeled TES habitat.

The Forest Service shall require annual raptor surveys to determine the status of known nests and verify presence of additional nests within the project area. Cost for surveys and preparation of an annual report of the findings of the survey would be the obligation of the operator.

The use of insecticides, herbicides, fungicides, rodenticides, or other similar substances shall be prohibited.

Construction areas and access roads shall be kept litter-free.

All power lines shall be built to prevent electrocution of people and wildlife.

The operator must provide a trash pit or trash cage, and trash must be collected weekly and contained during the operation. All garbage, trash, flagging lath, and palatable refuse (e.g. food scraps, automotive coolant), etc., shall be removed from the area and hauled to an authorized dump site.

Compressors and compressor stations shall be sited to avoid sensitive surface resources and potential conflicts with other uses. Electric compressors and other Best Available Control Technology shall be used.

Soil loss will be minimized by restricting the removal of vegetation; the leveling of work areas; and the location of wells on slopes that require cuts-and-fills for well pad construction.

Drill sites, two-track access routes, and pipeline routes are prohibited in areas of highly erosive soils.

Fences along service roads will be prohibited in order to prevent barriers to the movement of wildlife. Existing fences will be redesigned to permit wildlife passage and prevent entanglement.

All employees and contractors must clean equipment before bringing it to the project vicinity to prevent the introduction and spread of invasive weeds.

Operators shall be held responsible for suppression costs for any fires caused by an operator's oil and gas operations. No burning of debris is permitted.

The operator shall enforce strict adherence to speed limits by its employees and contractors while working on the project.

Any proposed ground disturbance will prompt surveys for federally listed threatened and endangered species and species of concern before the project is permitted. Projects that may destroy or modify habitat for any TES species shall undergo consultation with U.S. Fish and Wildlife Service (USFWS) prior to approval and will be permitted only if there are legitimate restrictions that prevent any destruction or modification. Drilling is prohibited in critical nesting habitat and winter range for all TES species to prevent any harmful disturbance.

Roads to leasing areas are only open to gas production personnel during the production period to both minimize disturbance and prevent development of a tradition of public use.

New roads in inventoried and uninventoried roadless areas are prohibited.

Each access road corridor will be the same corridor used for gas and water pipelines and electrical cables. Gathering lines, water lines, high-pressure gas lines, and underground electrical cables shall also be located along existing road rights-of-way.

Signs and locked gates are established to restrict use of roads to leasing areas and to close roads that have been identified for closure and rehabilitation.

Cultural

The Forest Service shall complete all requirements of the Native American Graves and Repatriation Act of 1990 and the American Indian Religious Freedom Act of 1978 within 2 years of plan adoption. The results of these surveys and tribal consultations are used to establish appropriate restrictions, prohibitions, and closures to protect sensitive, unique, and irreplaceable cultural and archeological resources.

All drilling windows, or areas of potential effect (APE), which have not been inventoried for cultural resources must be inventoried prior to approval of or continuation of any activity, and a publicly available report will be submitted to the Forest Service prior to any drilling approval or activity. The APE is defined as any area that may be subject to direct or indirect impacts to cultural resources by elements of the development project. The zone of the APE would vary in size in accordance with the projected levels of sensitivity for cultural resources at the location of any development. In low-sensitivity areas, the APE would be defined as the area subject to direct impacts through surface disturbance. In areas of medium sensitivity, the APE would be expanded to account for potential direct impacts: intensive inventory would occur on all well pads plus an additional 10 acres surrounding each pad; a 150-foot corridor centered on roads, flow lines, and other facilities would be inventoried as the APE. In high-sensitivity areas, the APE would include the well pad and 10 acres surrounding the well location; and the APE for roads, flow lines, and other facilities would be the area of direct ground disturbance and a 300-foot zone on all sides of the facility.

If a cultural property is encountered during surveys, construction, or operation of the facilities, or if a previously planned undertaking would affect a known historic property in an unanticipated manner, all work that might adversely affect the property shall cease until qualified archeologists evaluate the significance of the property and the potential harm from the development. The archeologist will consult with the SHPO (State Historic Preservation Office) on both a determination of eligibility and the expected impacts from the proposed activity. If the site is determined eligible the operator shall avoid the site and comply with all applicable laws.

Watershed

The Forest Service shall conduct a watershed-level analysis of the potentially impacted region and resources from current

oil and gas activities and facilities (see section 1.0, *Watershed Management*). All watershed analyses are completed within 3 years and used as a tool for deciding how to regulate and/or prohibit proposed or continued oil and gas drilling activity to prevent damage, such as erosion and sedimentation, to watershed health, including groundwater and surface water resources.

Existing culverts on lease will be replaced by the operator and Forest Service if water flow exceeds culvert capacity. New culverts and/or low-water crossings will need to be sized considering total flows. Operators shall work collaboratively and with surface owners in the same drainage to replace downstream undersized culverts that would be affected by their operations.

Local springs will be identified and construction will be prohibited in those areas.

Soaps, detergents, and other non-degradable foreign substances shall not be used for washing in streams or rivers. No oil lubricants, engine coolants, or toxic substances may be drained onto the ground surface. Pads must be designed so that any oil, lubricants, etc., would drain into a collective system.

Construction shall not occur on frozen or saturated soils, or when watershed damage is likely.

Water bars shall be constructed on road grades or slopes to prevent erosion. Spacing of water bars is tailored to the slope and soil type. Water bars or other means of diverting flows off sloping pipeline rights-of-way will be constructed to control and eliminate increased runoff and erosion.

To protect existing wetlands and riparian areas, there should be no water discharge including stormwater within or near existing wetlands and riparian areas, and no disturbance within all delineated and recognized wetlands.

Fences and power line corridors are prohibited in wetlands and riparian corridors.

All surface disturbance is prohibited within 330 feet of the centerline or within the 100-year recurrence interval floodplain of perennial streams.

No surface disturbance is permitted within 660 feet of springs, irrespective of the volume of its current flow. Vibroseis, drilling, and blasting are all prohibited within 1/2 mile of any spring or water well.

Wells shall be cased and cemented from top to bottom to prevent water migration up the well bore.

Reclamation

All restoration, reclamation, and environmental mitigations are paid for by a bond posted prior to exploration and/or drilling. All current and proposed oil and gas activities shall be preceded by the development of a reclamation plan that is accompanied by a fully funded bond.

Uneconomic and depleted wells shall be plugged and abandoned, and the disturbance reclaimed and revegetated to pre-project conditions within 1 month of closure.

Timely recontouring and revegetation are required for all disturbed areas within 3 months of ceased operations to prevent runoff that could cause increased sediment concentrations in surface waters.

All ground-disturbed areas from oil and gas drilling activities are reclaimed within 6 months of ceased operations and/or use. This includes full reclamation and revegetation of roads, drilling activities, and associated infrastructure.

Roads will be designed to be consistent with ROS classes. The range of recreation experiences will be protected by appropriate mitigation (e.g. semi-primitive non-motorized area roads will be closed to public motorized vehicles).

Reclamation begins immediately after closures and/or cessation of use of any site. Reclamation and final closure will re-establish the pre-project conditions in the disturbance areas.

After well plugging and abandonment, roads constructed by the operator shall be closed and obliterated and reclaimed in accordance within section 22.0, *Roads*.

Actions for restoration include the following: mechanical loosening or roughening of the soil where compacted; fertilization or soil amendment; seeding to proper depth with desirable species; mulching to retain soil moisture; transplanting containerized native and locally collected seeds to speed the establishment of slow-growing species; eradication of invasive weeds; and fencing to exclude livestock to permit re-establishment of native vegetation.

Sufficient topsoil to facilitate re-vegetation shall be segregated from subsoils during all construction operations and will be returned to the surface upon completion of operations. Topsoil stockpiles shall be re-vegetated to prevent erosion and maintain soil microflora and microfauna. Stockpiled soil would be spread evenly over the recontoured area.

Reclamation must produce a natural appearance and must be consistent with site conditions, local standards, and projected uses, as identified by the landowner and appropriate local, state, and federal agencies.

All pits must be reclaimed to the natural condition of the regional area.

Reclamation will include, as appropriate, recontouring, establishment of desirable perennial vegetation, stabilization, and erosion control of all disturbed areas. Additional measures shall include topsoil conservation, temporary fencing, mulching, and invasive weed eradication to ensure long-term vegetative stabilization of all disturbed areas.

Temporary erosion control measures such as mulch, jute netting, or other appropriate methods shall be used on unstable soils, steep slopes, and wetland areas to prevent erosion and sedimentation until vegetation becomes established.

Abandonment of pipelines and flow lines and subsequent reclamation shall require fill replacement in the original cuts, reducing and grading cut-and-fill slopes to conform to the adjacent terrain, replacement of surface soil material, water barring, and revegetation.

Long-term visual impacts will be prevented through the design of permanent structures to harmonize with the surrounding landscape, recontouring and re-vegetating disturbed areas no longer needed for operations, and by reshaping straight edges of clearings resulting from roads, pipelines, well pads, and compression facilities to create irregular or indistinct edges.

To the maximum extent practicable, buried power lines to each well shall be used to reduce the linear element in the landscape, unless this creates ground disturbance that could undermine protection of the watershed and/or TES species.

Monitoring

Where suitable wells do not exist for monitoring, operators are required to obtain access, permit, drill, and properly complete wells (including PVC casing, stainless steel screen where appropriate, sand pack where appropriate, logging, and cementing) where necessary, in relation to their projects. In addition, operators would provide and install necessary support facilities (shelter and fence) and would be responsible for the cost of the monitoring equipment.

Data on quantity and quality of produced water discharges shall be required. Upon acquisition of monitoring data, the data are to be furnished and published in a commonly accessible format on a website.

Periodic/monthly sampling of water quality shall be done at all discharge points, including stormwater discharge and other locations.

Surface water monitoring sites shall be established in order to collect information related to surface water characteristics, flow regimes, substrates, and aquatic habitats.

Three techniques shall be in place to detect leaks: material balance; pressure maintenance through its computerized automation system (in the event of a pressure drop, the well is shut-in immediately); and an annual survey of pipelines with leak detection equipment. In the event of a pipeline leak, the exact location is detected by either gas detection equipment or visible traces of water. The appropriate part of the field shall be shut-in and the pipeline shall be shut down until fully repaired and any leaks or spills are fully cleaned up.

The operator will use a remote monitoring system that would limit the number of routine maintenance visits to wells.

ISSUE STATEMENT

Unpatented mining claims occur throughout the Forests, excepting large portions of the San Gabriel Mountains. Mining operations and activities occurring on the southern California Forests include prospecting and miscellaneous small mining operations ranging to very large limestone mines. Mineral deposits are categorized as locatable, leasable, saleable mineral, or mineral materials. Locatable minerals such as gold and certain limestone deposits are governed by the 1872 Mining Law, which gives owners of valid, unpatented claims the right to extract minerals, subject to applicable regulations. Leasable minerals include oil, gas, geothermal, and certain other minerals. Mineral materials (common-variety minerals) such as sand, gravel, and common clay can be sold by the Forest Service to meet public needs.

There is a significant concentration of limestone mining in the northeastern San Bernardino Mountains, where several large companies are extracting high-grade and cement-grade limestone, resulting in several open pits and quarries. There are smaller limestone mines in the northern San Rafael Mountains and Santa Lucia Range near Little Sur. In the Forests' larger streams, suction dredging has been permitted by the California Department of Fish and Game, as the agency identifies which streams are open to this activity. Suction dredging involves the use of gas-powered, high-pressure water pumps to suck up water and sediment that is then filtered for gold, resulting in waste piles of sediment. Suction dredging equipment can introduce gas and other petroleum-based substances into the water body. Sand and gravel mining operations occur in foothill drainages with well-developed alluvial deposits. There is also future potential for open-pit gold-mining operations, and oil and gas leasing in Los Padres National Forest.

Mining impacts, which can harm species, habitat, and entire ecological systems such as watersheds, fall loosely into 3 categories:

- Site-specific direct impacts of the mining operation(s)
- Impacts on water and air quality
- Impacts due to infrastructure (roads, pipelines, power lines) used to support mining activity, including habitat loss and fragmentation, non-native species invasions, release of pollutants, and increased motorized access resulting in increased recreational use

All forms of mining activity from simple prospecting with pan and shovel to the use of sluice boxes and suction dredges can harm aquatic species (USFWS, Biological Opinion, 2001), from directly harming species and their habitat to creating altered habitat that promotes the presence of harmful non-native species. For example, suction dredging can create deeper pools, which provide habitat to non-native predatory species such as sunfish and bullfrogs. Surface and groundwater quality can be degraded. Mining can also diminish water quantity through the direct use of water in the mining process. Mining impairs air quality through the generation of fugitive dust from roads, pipeline corridors, and other infrastructure disturbances, as well as from fugitive dust generated directly from mining activities such as blasting and crushing. Both riparian and terrestrial habitats can be damaged and destroyed by various mining activities.

Mining activities that occur on or near TES habitat and populations are particularly problematic. For example, there is an entire community of endemic, rare plants on carbonate deposits in the San Bernardino Mountains. Aquatic and riparian species particularly suffer from in-stream mining operations.

The Forest Service has the discretion to deny proposed hard rock mining operations on public land based on a mine's adverse impacts to environmental or cultural resources (Flynn and Parsons 2001). The Forest Service must deny any operation that cannot ensure compliance with the basic environmental laws and standards. The Forest Service authority to regulate mining operations is governed by the Organic Administration Act of 1897 (Organic Act), which authorizes the agency to promulgate rules and regulations for the National Forests "to regulate their occupancy and use and to preserve the forests thereon from destruction" (Flynn and Parsons 2002).

While the Forest Service intends to review existing and proposed mining operations on a case-by-case basis, those evaluations need to be completely consistent with the following conditions, objectives, and standards.

AREA DESCRIPTION

Mining claims are scattered throughout the Forests, with the notable exception of large parts of the San Gabriel Mountains. The primary area of mining activity is in the northeastern San Bernardino Mountains, where several large companies are extracting limestone. Smaller limestone operations exist at the north end of the San Rafael Mountains and in the Santa Lucia Ranges near Little Sur. Suction dredging currently occurs on some of the larger streams in the Forests.

DESIRED CONDITION

Mining activities are regulated, and site-specific conservation strategies are developed to prevent any direct loss of habitat and species or impairment to the recovery of TES species and sensitive habitat types.

TES habitat and specially designated areas are withdrawn from mineral activity to prevent detrimental mining-related impacts, including existing and proposed Wilderness, existing and proposed Wild and Scenic rivers, research natural areas (RNAs), and special interest areas (SIAs).

All minerals and energy operations are preceded by an approved plan of operations, approved reclamation plan, and approved and submitted reclamation bond. Reclamation standards include restoration guidelines, monitoring protocols, success criteria (based on success in resource protection and restoration), and reporting standards and bonded accordingly. Bonds will be equal to the amount needed to achieve successful ecological restoration, including full habitat restoration for TES species, to meet established success criteria. The bond is posted in full before any mining occurs.

Current mining operations are evaluated and monitored for environmental impacts, including water drawdown and water quality impairment and impacts to TES species. If there are existing or anticipated adverse impacts, mining activities are restricted to the extent necessary to prevent those impacts.

All lands disturbed by minerals operations are reclaimed and successfully restored. Safety and health hazards are eliminated or mitigated, and water quality standards are achieved.

Reclamation requirements include backfilling all pits, placing waste rocks that contain potentially hazardous materials above groundwater level, and capping backfilled pits with overburden. In addition to compliance with the Surface Mining and Reclamation Act, the Forest Service exerts its authority to mandate additional requirements, such as recontouring and successful habitat restoration. Priority for restoration is given to riparian and TES habitat restoration. Reclamation of disturbed lands achieves the planned uses of the management area.

The Forest Service exercises its regulatory authority over suction dredging and places all requirements for locatable mineral activities on suction dredging as well as other forms of mining in streams.

OBJECTIVES

Where operations will likely, through ground disturbance or otherwise, result in impacts to TES species or other sensitive Forest resources (e.g. water, soils), a plan of operations as well as reclamation and bonds for all mineral operations are required.

Plans of operation in TES habitat will include timing and/or no surface occupancy stipulations, including closures during breeding seasons if necessary. Such plans and bonds must address the costs of removing facilities, equipment, and materials; recontouring of disturbed areas to pre-mining topography; isolation, neutralization, or removal of toxic or potentially toxic materials; salvage and replacement of unpolluted topsoil; and seedbed preparation and re-vegetation to meet management objectives.

Maintain withdrawals for the period of time needed to promote the recovery of TES species and key habitats.

Prohibit mining and timber harvest on fragile sites so soils are protected and forest regeneration is ensured (Rhodes 1995).

Deny any mining proposed on invalid claims or unclaimed lands except in instances of initial exploration. If claims are found to be invalid, apply for withdrawal of area.

All plans of operations must include a hazardous waste plan.

Incorporate costs for full mitigation (including seasonal closures and operational restrictions) and reclamation (including

successful habitat restoration) when conducting bond assessments.

The Forest plan must not be changed to accommodate mining development at the site-specific level.

Map all current mineral claims/permits/leases in the Forests and use as a basis for managing/regulating current and proposed mining operations. Within 2 years, identify, on a site-by-site basis, any potential conflicts between various mining operations and the Forests' protection of Forest resources and values, and prohibit such activities accordingly.

Conduct ongoing field surveys as needed. If adverse impacts are detected, implement remedial actions within the following 2 years.

Review the current operating and reclamation plans for all mining operations that may have a negative impact on all TES species or habitats. Within 3 years, regulate ongoing mining activities that have the potential to affect TES species to prevent impacts to these species.

All mining operations are situated to avoid disturbance of natural waterways, rare or imperiled habitat or species, wildlife corridors or high-use areas, and other biological resources.

Within 3 years, identify and map areas impacted by recreational mining activities, in order to develop, prioritize, and implement restoration plans.

Within 1 year, develop and distribute informational pamphlets on the biological and ecological impacts associated with recreational and industrial mining activities to educate Forest visitors on the impacts associated with the multiple-use concept.

Hire inspectors for each Forest to conduct the monitoring described above and survey for unregulated suction dredging activities.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding minerals management contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall utilize the Sensitivity Classification System (presence of listed species) to help identify which mining areas on the Forests need management action first (USFWS 1998a).

Do not approve mining in plant communities on carbonate substrates on Forest lands (see section 5.0, *Vegetation Management*).

The Forest Service shall require mine operators to design the placement of mine tailings, soil and overburden, wastes and sanitary waste facilities outside TES species habitats and riparian areas.

The Forest Service shall remove surface occupancy for existing leasable and mineral operations. Locate structures, support facilities, and roads outside riparian areas.

Panning, sluicing, and dredging activities, when and where approved, will be restricted to portions of the stream bottom and stream bank in which there is naturally flowing water. No high banking will be allowed. No disturbance of rooted or embedded woody plants (trees and shrubs), whether alive or dead, will be allowed. Excavation or digging shall be performed by hand tools or suction dredges no larger than 4 inches. Materials too large to be moved by hand will not be disturbed.

All existing and proposed suction dredging operations shall require a plan of operations and Forest Service approval. At a minimum, all mining operations must comply with 228 regulations.

The Forest Service shall not permit hydraulic or cyanide heap leach mining.

The Forest Service shall prohibit the placement of mine tailings, soil and overburden, similar materials or wastes, and sanitary waste facilities in riparian zones. Prohibit the use of hazardous materials within riparian areas and TES habitat. Monitor facilities and mining residue in or adjacent to riparian zones and TES habitats to ensure that discharges are not causing detrimental effects. When detrimental situations are identified, stop mining operations until situation is rectified.

For existing leasable mineral operations, the Forest Service shall prohibit surface occupancy within riparian zones where contracts and leases do not already exist.

For locatable minerals, only mining operations covered by valid rights under the 1872 Mining Law can even be considered for possible approval.

The Forest Service shall not issue permits or authorizations for noncommercial collection of rocks and minerals.

The Forest Service shall revise and update plans of operation for ongoing mineral activities in TES habitats bi-ennially with an analysis of environmental impacts and appropriate mitigation measures, including activity restrictions.

The Forest Service shall assess TES species or habitat present and modify all plans of operation (POOs) to avoid detrimental impacts within 3 years.

The Forest Service shall require a validity claim review when any plan is submitted, and review all affected mining claims for validity within 1 year of the plan's submission.

Administrative withdrawals will be applied for (to the BLM) to promote the recovery of TES species and habitats. All special designations (listed in desired conditions) and TES habitats are withdrawn from mineral entry. Apply for withdrawal in 2 years and finalize within following 2 years.

The Forest Service shall coordinate with the California Department of Fish and Game to undesignate all riparian areas on Forest Service lands from suction dredging within 1 year.

All processing operations and soil, overburden, and waste rock storage areas are located to avoid site-specific damage to TES species and sensitive habitats.

The Forest Service shall, within 2 years, develop and implement a permit system for all recreational mining activities with guidelines to ensure resource protection.

Monitoring

There shall be regular and consistent monitoring at each mining operation for compliance with all rules and regulations governing mining in the Forests.

Monitoring shall, at the very least, consist of monitoring compliance with regulations, the approved plan of operations, and with state and federal law. In addition there shall be monitoring of the on-site effects of suction dredging and associated activities on key physical and biological conditions and the off-site effects of dredging on downstream conditions.

Monitoring shall include the collection of baseline data on past and present impacts of all types of mining, including collateral impacts such as access to mining claims, and cumulative impacts from roads, logging, water withdrawals, and fire. Systematic field investigations of each mining claim shall be used to establish baseline conditions for monitoring future impacts and to correct activities that are clearly harmful and/or illegal.

Use monitoring results to modify operations as needed to come into compliance with stated objectives, standards, and guidelines in this and all other relevant sections of this Alternative.

Each mine site shall be inspected for any soils or waters contaminated with petroleum products, solid waste contamination, high banking, and assurance that the miner has the required permits and is in full compliance.

Section 28.0

MONITORING AND ADAPTIVE MANAGEMENT

ISSUE STATEMENT

Adaptive management is one of the most abused concepts in current natural resource management. In theory, adaptive management provides managers with the flexibility to adapt otherwise rigid standards to the site-specific needs of a given site. Additionally, adaptive management allows for projects to go forward even when the environmental effects are uncertain or impossible to ascertain; the manager is to monitor the effects of the project and if the monitoring data show unanticipated adverse effects, the project will be modified or suspended so as to address the effects.

In reality adaptive management rarely works. First and foremost, adaptive management requires good monitoring data. In all too many cases, "intentions" to carry out monitoring or further research fall by the wayside, and are either never implemented or are discontinued prematurely. Significant adverse effects from a project then can occur, but absent proper monitoring there are usually insufficient data to trigger a change in management practices.

Additionally, managers often embrace adaptive management as a method to avoid having to actually make any difficult or unpopular decisions; rather than actually implementing any meaningful standards and guidelines, managers often state that if adverse effects are detected in the future they will take appropriate measures to address them at that time. Again, since required monitoring is often never actually carried out, absent citizen oversight, the manager will never detect the adverse impacts and will therefore never take any action to improve the situation.

Another problem with adaptive management as implemented by the Forest Service is that it is often used as a one-way ratchet. A plan may contain good standards and guidelines but allows for their waiver if site-specific analysis shows that different standards are more appropriate. This exception often swallows the rule and allows, after cursory analysis, for any meaningful standards in a planning document to be ignored on the basis that they are not appropriate for a given situation. The more "appropriate" standards then applied to a project are almost always weaker than the fallback standards. So while adaptive management allows standards to be relaxed or waived altogether, rarely does it result in more actual on-the-ground protection for the natural resources of the Forests.

Any adaptive management paradigm used by the Forest Service should be tiered to monitoring and research that actually occurs, rather than monitoring and research that the agency simply hopes will occur. If required monitoring does not occur, then the related action should be suspended until and unless such monitoring is actually conducted, and such monitoring shows that there are no significant adverse effects from the action. Adaptive management properly applied should lead only to more protective management, not, as has historically been the case with the Forest Service, to the abdication of decision making and the relaxation of environmental protection.

AREA DESCRIPTION

Monitoring and Adaptive Management issues occur in all areas of the Forests.

DESIRED CONDITION

The Forest Service employs adaptive management in such a manner that on-the-ground environmental protection increases over time rather than decreases. The Forest Service actually carries out all the monitoring and research activities contemplated by the Forest Plan and all other Forest Service decision documents. Projects with the potential to cause significant adverse environmental impacts do not occur in the absence of a rigorous and enforceable monitoring regime.

OBJECTIVES

Employ adaptive management in such a manner that on-the-ground environmental protection increases over time rather than decreases.

All the monitoring and research activities contemplated by the Forest Plan and all other Forest Service decision documents are completed in a timely manner.

Projects with the potential to cause significant adverse environmental impacts do not occur in the absence of a rigorous and enforceable monitoring regime.

Within 1 year of adoption of the Forest Plan, establish a system to monitor all activities conducted, authorized, permitted, or approved by the Forest Service to determine the short- and long-term environmental effects of those actions.

Establish and maintain long-term research and monitoring plots on appropriate locations throughout the Forests to study and document the effects of global warming.

In consultation and in conjunction with other state and federal agencies and independent experts, conduct an analysis of the projected impacts of global warming on the resources of the Forests. Complete within 4 years of the adoption of the Forest Plan.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding adaptive management contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall monitor provisions of the Forest Plan. All other Forest Service decision documents issued pursuant to the Forest Plan shall be mandatory and cannot be waived absent an amendment of the Forest Plan.

All other Forest Service decision documents shall contain definite dates by which monitoring must be initiated and by which monitoring reports must be completed.

For any activity conducted, authorized, permitted, or approved by the Forest Service, the Forest Service shall require monitoring commensurate in duration and scope to the duration and scope of the activity.

For any activity conducted, authorized, permitted, or approved by the Forest Service that will likely result in the ground disturbance of more than 1 acre, the Forest Service shall require monitoring that analyzes the activity site and surrounding area both prior to and after the ground-disturbing activity. Such monitoring shall continue, on at least an annual basis, until the site is fully restored. In cases where on-site restoration is impossible, such monitoring shall continue for at least 5 years.

If for any reason the monitoring required for a given project or activity is not initiated, completed, or carried out on the schedule or in the manner specified by the Forest Plan or other relevant decision document, the Forest Service shall immediately suspend that activity if there is any foreseeable chance that significant adverse environmental effects may be occurring. Such activity or project shall remain suspended until such time as the required monitoring is completed.

The Forest Service shall not, in employing any adaptive management regime, in any instance waive the requirements of any standard otherwise specified by the Forest Plan or other relevant decision document.

The Forest Service shall, in any analysis conducted by the Forest Service, include an analysis of the contribution of the activity or project to global warming, as well as of the projected impacts of global warming on the Forest resources, affected by the activity or project, including but not limited to water, flora, and fauna.

ISSUE STATEMENT

Proper management of the Forests requires adequate funding. All too often necessary resource protection activities do not occur because the agency lacks sufficient funding to carry them out. Inadequate funding is a result of both intrinsic and extrinsic factors. On a fundamental level, the Forests are not adequately funded by Congress. While to some degree this is beyond the control of the Forest Service, the agency needs to better advocate to ensure that the Forests receive sufficient funding from Congress. Regardless of the cause, inadequate appropriations from Congress do not excuse the Forest Service's failure to wisely spend the limited resources available to it. Numerous commercial activities occur in the Forests that cost the Forest Service far more to administer than the agency receives in return (e.g. grazing, logging, special use permits). Wise management of the Forests requires the agency to prioritize resource protection and visitor safety over commercial use and the permitting of resource-damaging activities to the maximum extent allowed by law.

AREA DESCRIPTION

Funding issues impact all areas of the Forests.

DESIRED CONDITION

The Forest Service has sufficient funding to carry out all required resource management activities. No resource-damaging activities occur unless sufficient funding exists to fully restore and mitigate the impacts of those activities. Resource protection and public safety are prioritized over commercial activities and special use permits in funding allocations.

OBJECTIVES

Seek sufficient funding from Congress to fully implement all resource protection activities required by Forest Plan.

Seek sufficient funding to acquire all available private land inholdings within the Forest.

Prioritize resource protection activities in funding allocation decisions.

To the maximum extent allowed by law, charge fair market value for any resources commercially extracted from the Forest.

To the maximum extent allowed by law, recover the actual cost of administration and management for all commercial activities permitted in the Forest.

STANDARDS

The standards in this section shall be interpreted to supplement, not replace, any standards regarding funding contained in other sections of this Alternative. If the standards in this section differ from the standards in another section, the more environmentally protective standards shall apply.

The Forest Service shall not authorize any project unless sufficient funding is ensured to fully mitigate any foreseeable adverse ecological impacts of the project.

The Forest Service shall, to the maximum extent allowed by law, charge fair market value for any resources commercially extracted from the Forest.

The Forest Service shall, to the maximum extent allowed by law, recover the actual cost of administration and management for all commercial activities permitted in the Forest.

WATERSHED ANALYSIS FRAMEWORK

THE WATERSHED ANALYSIS PROCESS

The following seven steps were adapted from the *Federal Guide to Watershed Analysis* (version 2.2) and Doppelt et al. (1996). Watershed analysis is used to increase protection measures at the watershed level and to refine more site-specific protection measures. In no instance, however, can it be used to downgrade existing protections.

1. Characterize the Watershed. The watershed context is used to identify the primary ecosystem elements needing detailed analysis in subsequent steps.

Determine the appropriate size of the watershed to be evaluated. The analysis area may be composed of several sub-watersheds. Adjust the boundaries of the analysis area to include roadless areas and Riparian Conservation Areas (RCAs) that span more than one watershed.

Identify the dominant physical, biological, and human processes or features of the watershed that affect ecosystem functions or conditions. At a minimum these shall include identifying existing erosion processes and factors that are contributing to present erosion; identifying features of the local hydrologic system, including the potential contribution small streams and drainages may make to sediment loading; identifying patterns of disturbance related to insect infestations, pathogens, and fire; conducting spatial analysis of patterns of vegetation, including mapping of forest by seral stage and identification of wet meadows and riparian areas; documentation of stream channel characteristics; assessment of water quality, including assessment of turbidity, stream temperature, and presence of pollutants; identification of species and their habitats within the watershed; and human uses.

Establish the relationship between these ecosystem elements and those occurring in the river basin or province.

Identify land allocations, Forest Plan objectives, and regulatory constraints that influence resource management in the watershed.

2. Identify Issues. Focus the analysis on the key elements of the ecosystem that are relevant to the management objectives in the Regional Guide and Forest Plan and the resource conditions within the watershed.

At a minimum, include the following issues in all watershed analyses. Issues should be added to this list as necessary to reflect the features that characterize the watershed.

ROAD DENSITY (SEE SECTION 22.0, ROADS)

What is the road density?

How does road density vary across the watershed?

What is the effect of road density on wildlife habitat and aquatic health?

How does the placement of specific roads affect wildlife habitat and aquatic health?

Identify any roadless areas larger than 1,000 acres within the watershed.

What ecological or other values do the roadless areas provide to the watershed? Identify the roads that are no longer used or needed to maintain forest resources. Inventory the location and size of all landings.

RIPARIAN AND AQUATIC HEALTH

Do sediment loads exceed the levels likely to be encountered in the same stream type in an undisturbed setting?

Estimate sediment delivery from all anthropogenic sources.

Do channel conditions provide habitat qualities likely to be found in the same stream type in an undisturbed setting?

(At a minimum channel conditions analysis should include: fine sediment levels in key aquatic habitats, water temperature, pool frequency and volume, width/depth ratio, and bank stability.)

Are the levels of canopy cover, litter, and woody debris at levels that would be encountered for the vegetation type in

an undisturbed setting?

Does this watershed include habitat for TES species?

For high-elevation meadows, what is the condition of the willows and is there sufficient suitable habitat for will ow flycatcher?

What plant and animal, including macroinvertebrate, species utilize the riparian area and how far do they range from the drainage?

What is the source of future woody debris for the drainage? How far does the floodplain extend from the drainage? What is the extent of the canopy cover that moderates climate along the drainage?

Map areas with steep slopes and erodible soils along with roads, grazing, mining, landings, logging, oil and gas drilling areas.

HABITAT LINKAGES

Is a habitat linkage included within this watershed? If so, identify the existing condition of the linkage, including vegetative condition; complete an assessment of habitat elements and statement of existing disturbance regime (for example, patterns of fire, flooding, drought, and insect infestation); include an evaluation of roads as barriers to movement and vectors of human disturbance

Identify habitat suitability for mesocarnivores throughout the watershed. Specifically, analysis should address the following: relative fragmentation of habitat; the spatial distribution of canopy closure within the watershed; spatial configuration of suitable habitat within the watershed; relative quality of habitat surrounding designated use areas; the spatial relationship between habitat suitable for dispersal, foraging, and denning, and the presence or absence of meso-carnivores within the area.

BIODIVERSITY

Are there endemic or rare species in the watershed?

Are there species on the Forest Sensitive Species List in this watershed?

Does this watershed occur within the historic range of locally extirpated species?

FIRE AND FUELS

Identify areas of concentrated human use, such as the urban/wildlands interface and high-use campgrounds, that may require increased fuels treatment.

Identify areas that would be good ecological candidates for the reintroduction of fire.

Identify other areas where the accumulation of fuels (dead and live) exceeds levels expected for the biophysical conditions of the site.

NOXIOUS WEEDS

What is the extent and distribution of noxious weeds in the watershed?

What was the likely source of the introduced species?

Where are the weed-free areas in the watershed?

What is the potential for spread of noxious weeds from adjacent watersheds?

3. Describe the Current Conditions. Assemble detailed information relevant to the issues and key questions identified in the preceding analysis in step 2 that documents the current range, distribution, and condition of the ecosystem elements in the watershed. Collect baseline information where relevant and up-to-date information is absent. Utilize spatial analysis to characterize the extent of important ecosystem elements and to assist in evaluating the relationship among these elements.

Inventory of current conditions should include:

- the extent and distribution of all land-disturbing activities (mining, logging, landings, grazing, roads, ORV trails, water withdrawals, etc.)
- the effects of the above should be quantitatively analyzed for effects on soil (productivity, compaction, soil loss, extent of the activities on erosive/unstable soils), sediment delivery, vegetation, peakflows, low flows, and channel conditions including: water quality, bank stability, fine sediment levels, width/depth ratio, turbidity, water temperature, and effects on native aquatic biota)

4. Describe Historic Conditions. Describe how ecological conditions have changed over time as a result of human influence and natural disturbances. Analysis should be specific to the watershed itself, and should not merely be a recitation of general forest conditions throughout southern California National Forests.

5. Establish Watershed Management Objectives. Establish watershed management objectives, including aquatic conservation objectives, that characterize the condition of watershed processes and elements in a reasonably functioning, productive system. These objectives shall reflect the potential natural vegetation and natural dynamics of the watershed. It is anticipated that objectives will differ among watersheds as reflected by the variability in vegetation, climate, and geography within the southern California region. However, as stated earlier, watershed objectives shall meet or surpass the general objectives and standards outlined throughout this Plan.

The watershed management and aquatic conservation objectives provide refinement to the objectives in the Regional Guide and Forest Plan. These watershed-specific objectives shall be consistent with and incorporate objectives from the Regional Guide and Forest Plan.

Identify areas where long- and short-term objectives conflict, and indicate how such conflicts might be avoided.

6. Synthesize and Interpret Information. Compare and contrast existing and historic conditions of specific ecosystem elements.

Discuss the factors that have contributed to the differences, similarities, or trends observed between current and historic conditions.

Identify the problems within the watershed that historically may have or currently are preventing attainment of the watershed management objectives identified above and the more general objectives in the Regional Guide. Identified problems may include but are not limited to: habitat simplification; loss of biodiversity; presence of exotic and non-native species; increased sedimentation and water temperature; altered hydrologic regime; alteration of disturbance regime.

7. Management Recommendations. The purpose of this step is to bring the results of the previous steps to conclusion by developing management recommendations that are responsive to watershed processes identified in the analysis. The goal is to identify measures that best protect the remaining high-quality areas, prevent further degradation of any area, and over time restore the overall ecological condition and function of the watershed to meet the objectives specified in Step 5 and the objectives in the Regional Guide and Forest Plan.

Include a prioritized set of passive and active protection, restoration, and monitoring actions intended to reduce threats to existing conditions and recover ecological processes and structure in this section. At a minimum, management recommendations must include the following restoration measures:

Identification of roads to be repaired, removed, or relocated.

Identification of roadless areas to be protected; it is assumed that there will be no entry into roadless areas greater than 1,000 acres in size.

Identification of areas that would benefit from prescribed fire and/or undergrowth reduction.

Identification of additional sensitive areas and the special management needed in these areas, including habitat for endemic, rare, threatened, or endangered species and the presence of sensitive soils or unstable slopes.

Identification of practices to reduce the impact of introduced plant species and area to be protected from new introductions.

RIPARIAN BUFFER AREA ASSESSMENT

Effects of land use disturbance are reduced by keeping such activities at a distance from the aquatic system and by maintaining a buffer area capable of absorbing disturbance. The likelihood of disturbance to a stream from most land uses increases as a function of proximity to a stream, the steepness of surrounding hillsides, and the erodibility of soils. These relationships, as in many risk factors, are probably multiplicative, and therefore a doubling of the slope has more than twice the risk of disturbance to the stream (i.e., an exponential change). Current practice for designing buffer systems based on risk relies on classification of the aquatic system (as mentioned above) and creating three and four categories of slope. As a consequence, a fixed width is chosen even though conditions on the land and requirements of the community would suggest a variable width. We propose a more direct system for estimating a variable width buffer based on the community and energy area in combination with slope and other measurable risk factors.

For example, let us assume that a stream is in the mixed-conifer zone. The determination of hillside slope can be made from topographic maps or from GIS. The SNEP GIS team has prepared a program that will calculate slope at 30 m increments along a stream channel. At each point, slope from five successive 30 m segments out from a channel are computed from the 30 m Digital Elevation Model. Slopes are then weighted 5,4,3,2,1 from closest to farthest away and divided by five to produce a weighted average slope over the 150 m (slopes closest to the stream have the greatest effect on the average). Let's also assume the stream has a community area defined by species as 110 ft (33.5 m) and an energy area that is 150 ft (46m). Thus, a minimum region with maintenance of forest structure and minimal land disturbance is 150 ft. for these two areas. This distance is then multiplied by the base of natural logs (e) raised to a power equal to 1+slope (in decimal form). If, for example, the slope were 25%, the equation is

Buffer width (ft) = 150 * e(1+0.25)\

giving a value of 524 ft (160 m). If the average slope were 50%, the buffer would be 672 ft (205 m). In the first case, an additional 374 ft (114 m) of buffer would be needed. Soil erodibility, also available from soil maps and GIS, can be incorporated as the detachability value (Costick 1996) and the exponent would be expanded to 1+slope+detachability-slope x detachability. For example, if detachability were 0.03, the equation is

Buffer width (ft) = 150 * e(1+0.25+0.30-0.075)

giving a value of 656 ft (200 m). Extreme cases, when slope and detachability are both high, would result in even larger buffer zones and as slope and detachability approach zero, buffer zones would become smaller—exactly the outcome that common sense would indicate is appropriate. This additional area beyond 150 ft would not have the same land use restrictions as the community and energy areas. Its purpose is to highlight a region in which probability of disturbance may affect these areas and the aquatic system. Silvicultural procedures should minimize soil disturbance and in general retain sufficient forest structure to ameliorate microclimate change within the community area and minimize abrupt transition from upslope to the community area. By describing a "probability of disturbance" region, responsibility is placed on managers for designing practices that have higher standards and are more carefully matched to conditions where mistakes will matter more.

Current information and computer-aided analytic methods are sufficient for layout of such a buffer system for many regions of the Southern California National Forests. Refinements in scale of Digital Elevation Models from 30 m to 10 m are underway, and soil mapping continues to expand and be incorporated into GIS layers. Most forest and land managers today could determine first approximations based on habitat requirements, energy inputs, and hillside slope calculations to produce a logical, ecologically based riparian management-protection system along the lines we have described. It would lead to better protection of riparian-dependent organisms as well as energy linkages between the land-water systems, and also can assist managers in tailoring land-use activities to regions of greater need than is presently the case.

PROPOSED WILDERNESS AREAS AND ADDITIONS

The California Wild Heritage Campaign is building support for Wilderness and Wild and Scenic Protection for California's remaining public wild places. The campaign represents over 200 member groups, including businesses, faith and civic organizations, and local environment protection groups that have joined the Sierra Club, Friends of the River, California Wilderness Coalition, and The Wilderness Society to carry out the campaign's mission. This mission to protect the nation's wildlands began over a century ago.

The following information sheets are the product of volunteers throughout Southern California who worked to identify potential wilderness and Wild and Scenic rivers. Volunteers mapped areas and photographed and identified the wonderful wilderness characteristics that California wildlands possess.

APPENDIX B, ACREAGES FOR RECOMMENDED WILDERNESS AREAS AND ADDITIONS

Area Name	Acreage	Area Name	Acreage
LOS PADRES NF		Dick Smith Wilderness Adds. (cont.)	
Ventana Wilderness Additions		Bear	1,500
Black Rock	FS 125		
BLM 625	Matilija Wilderness Additions		
Little Sur	1,225	Diablo	20,993
Anastasia Canyon	1,125	Juncal	10,935
Chews Ridge	1,200	White Ledge	15,968
Coast Ridge	1,750	Dry Lakes	11,000
Arroyo Canyon	3,650	Sespe Wilderness Additions	
Bear Canyon	14,750	Fishbowls	1,200
San Antonio	3,100	Thorn	3,800
Chaulk	6,200	Stonehouse	4,500
Willow Creek	8,900	Sheep Creek	
San Carpoforo	7,850	Boulder Creek	2,500
Black Mountain	10,000	Chorro Grande	2,500
Mashesna Wilderness Additions		Beaver	1,800
Queen Bee	2,413		
Soto Canyon	3,550	Antimony - 4 Units	
Los Pelados	4,800	San Emigdio	13,216
Garcia Wilderness Additions		Antimony	4,352
Trout Creek	1,760	Pleito	4,992
Garcia Mountain	1,792	Tecuya	11,008

		Chumash Wilderness Additions	
San Rafael Wilderness Additions		Badlands Quatal	7,488
Moon Canyon	14,000	Badlands Apache	12,448
Fox Mountain	53,000	Badlands N.W.	700
Santa Cruz	19,000	Chumash S.W. / Longs Canyon	2,560
Indian Creek Buckhorn	14,374	Wagon Wheel Springs	5,472
Dick Smith Wilderness Additions		Abel / Cerro Noroeste	1,152
Cuyama	21,000	Chumash N.E.	1,088
Mono Creek	27,807		
ANGELES NF		SAN BERNARDINO NF (cont.)	
Castaic - 4 Units		South Fork	9,460
Salt Creek	11,700	Cahuilla	7,000
Fish Canyon	26,400	Area Name	Acreage
Tule	10,042	CLEVELAND NF	
Red Mountain	8,600	Ladd - 2 Units	4,500
Santa Clarita	4,200	Coldwater	7,500
Magic Mountain	12,080	San Mateo Canyon Wilderness Add	
Condor	16,745	Morrell	1,500
Pleasant View	26,000	Cucta Valley	12,000
West Fork	4,000	Barker Valley	8,000
Silver Mountain / Roberts Canyon Vicinity	9,472	Caliente	5,900
Area Name	Acreage	San Diego River Gorge	5,700
SAN BERNARDINO NF		Cedar Creek	4,000
Cucamonga Addition	13,620	Eagle Peak	6,800
Sheep Mountain Addition	2,400	“No Name”	5,200
Sugarloaf	9,760	Sill Hill	5,200
San Gorgonio Addition	7,500	Hauser Wilderness Addition	
San Jacinto Addition	22,060	South Hauser	4,600

At the beginning of the 21st century, the protection of our state’s wild places is more critical than ever before. A report published by the California Wilderness Coalition in August ’01 said it all. In the past two decades California lost 700,000 acres of wilderness, an area the size of Yosemite National Park. At the present rate, the young of today will live to see the last wilderness destroyed.

The report, "California's Last Wild Places," comes at a time when visits to our Southern California forests are among the heaviest in the nation, and expected to grow as our population grows. What is critically important for forest managers and visitors to understand is that these are the very places that provide drinking water for Southern California cities, places that produce and filter our air, places that give visitors an opportunity for solitude and peace in an ever faster and smaller world. We cannot let our activities degrade the forests that our communities depend upon, and our children will want to visit.

California's remaining wild places are the foundation of our society. They establish and support the vast ecological web we depend on. California's wild places are home to the animals we love to observe: the California condor in flight, soaring golden eagles, and the bighorn sheep climbing near vertical rockscapes.

The goal of this document is to guide forest management in a direction that will protect our wild places today and for future generations. Visit a wild place today, you will be thankful you did. Let us act to keep the forest wild forever. The attached maps show recommended wilderness areas and additions. The boundaries are based upon the best known information as of September, 2002. Boundaries are subject to adjustment. Questions regarding boundaries should be directed to the contact listed or the California Wild Heritage Campaign (www.californiawild.org). Maps are not produced at consistent scales but at scale that will help the viewer identify known landmarks for reference. The Center for Biological Diversity assisted in developing the final maps.

RECOMMENDED WILD AND SCENIC RIVERS

CLEVELAND NATIONAL FOREST

RIVER: San Luis Rey River – Main Stem

TOTAL LENGTH: 4 miles from Henshaw dam to National Forest boundary

SEGMENT(S)/MILES/CLASSIFICATION:

1. Henshaw dam to National Forest boundary/4 miles/Recreational

VALUES:

Wildlife/Ecological – Riparian habitat supports the largest southwestern willow flycatcher population (FE) in the Southern California National Forests.

RIVER: San Luis Rey River – West Fork

TOTAL LENGTH: 6 miles from source to National Forest boundary

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to National Forest boundary/6 miles/Wild

VALUES:

Wildlife, Fish, & Ecological – Significant populations of arroyo toad (FE), pond turtle (S), and arroyo chub (S).

RIVER: Pine Valley Creek

TOTAL LENGTH: 28 miles from source to Barrett Reservoir

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to Pine Creek Wilderness boundary/12 miles/Recreational
2. Wilderness boundary to Barrett Reservoir/6 miles/Wild

VALUES:

Hydrological – One of the longest free-flowing, low-elevation streams in the Southern California National Forests.

Ecological – High-quality riparian habitat supporting numerous TES species.

Wildlife – Largest arroyo toad (FE) population on the Cleveland NF; one of the largest pond turtle (S) populations in the Southern California National Forests; significant population of least Bell's vireo (FE); historical red-legged frog (FT) habitat.

Botanical – Poa atropurpurea (FE).

Recreation: Diverse recreational opportunities, high level of use.

RIVER: Noble Canyon & Lake of the Woods Creek

TOTAL LENGTH: 6 miles from source to Pine Valley Creek

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source in Laguna Meadows to Pine Valley Creek confluence/6 miles/Scenic

VALUES:

Botanical – Poa atropurpurea (FE)

Wildlife – California spotted owls (FC)

Recreation – Noble Canyon National Recreation Trail

Historical – Significant gold mining history

RIVER: Cottonwood Creek

TOTAL LENGTH: 13 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to Lake Morena County Park/9 miles/Recreational
2. Lake Morena County Park to Barrett Reservoir/4 miles/Wild

VALUES:

Ecological – High-quality riparian habitat supporting numerous TES species.

Wildlife – Significant populations of arroyo toad (FE), pond turtle (S), and least Bell's vireo (FE), historical red-legged frog habitat (FT).

Scenic & Recreational – Schad describes Cottonwood Creek Falls as "one of many secret beauty spots tucked away in Southern California's mountainous folds." Brown describes Cottonwood Creek Falls as "a gorgeous freefall…"

RIVER: Upper San Diego River

TOTAL LENGTH: 11 miles from source to Capitan Reservation boundary

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to 1/4 mile upstream of Cedar Creek/10 miles/Wild
2. 1/4 mile upstream of Cedar Creek to Capitan Grande Reservation boundary/1 mile/Scenic

VALUES:

Scenic & Recreational – Spectacular waterfalls in a remote setting, outstanding opportunities for primitive and trail-less recreation.

Ecological – High-quality riparian habitat supporting numerous TES species.

Wildlife – Arroyo toad (FE), pond turtle (S), coastal rosy boa (S), horned lizard (S), orange throated whiptail (SC), two-striped garter snake (S), historical red-legged frog habitat (FT).

RIVER: Cedar Creek

TOTAL LENGTH: 6.5 miles from Inaja Reservation boundary to San Diego River SEGMENT(S)/MILES/CLASSIFICATION:

1. Inaja Reservation boundary to 1/8 mile upstream of Cedar Ck road crossing/4 miles/Wild
2. 1/8 mile upstream of Cedar Ck road crossing to 1/8 mile downstream of road crossing/25 miles/Scenic
3. 1/8 mile downstream of Cedar Ck road to 1/8 mile upstream of road 13S06/2 miles/Wild
4. 1/8 mile upstream of road 13S06 to San Diego River confluence/25 miles/Scenic

VALUES:

Scenic & Recreational: Cedar Creek Falls is one of the most-visited waterfalls in San Diego County. Schad considers the falls to be "one of the most attractive and accessible" in the region. Doll describes the falls as "a place of startling beauty…"

Wildlife: Arroyo toad (FE), southwest pond turtle (S), Coast Range newt (S).

RIVER: Boulder Creek

TOTAL LENGTH: 9 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Cuyamaca State Park boundary to 1/4 mile upstream of Road 13S08/4 miles/Wild
2. 1/4 mile upstream of Road 13S08 to western private property boundary in Sec. 9/1.5 miles/Scenic

3. Private property boundary in Sec. 9 to Capitan Grande Reservation boundary/3.5 miles/Wild

VALUES:

Wildlife – Southwest pond turtle (S), Coast Range newt (S)

Recreational & Scenic – Popular dayhike destination to view Three Sisters Falls--a triple set of waterfalls. Brown notes that the "Three Sisters creates an impressive display of white water on smooth granite."

RIVER: San Mateo Creek

TOTAL LENGTH: 27 miles from source to Pacific Ocean

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to San Mateo Wilderness boundary/12 miles/Wild
2. Wilderness boundary to Pacific Ocean/15 miles/Recreational (note: includes Camp Pendleton and State Park lands)

VALUES:

Hydrological & Ecological – The most pristine free-flowing river south of the Santa Monica Mountains

Scenic & Recreational – Scenic canyon, waterfalls, extensive wilderness trail system in upper segment. Schad considers Tenaja Falls to be "the most interesting feature in the San Mateo Canyon Wilderness." Stienstra and Brown describe Tenaja Falls as "magnificent when flowing full."

Fish – Southernmost known population of southern steelhead (FE).

Wildlife – Significant populations of arroyo toad (FE), pond turtle (S), Coast Range newt (S), historical red-legged frog habitat (FT).

Botanical – Significant population of Dudleya viscida (S), Broadia ea orcuttii (S).

RIVER: San Juan Creek

TOTAL LENGTH: 7 miles from confluence of Morrell/Long canyons to National Forest boundary

SEGMENT(S)/MILES/CLASSIFICATION:

1. Confluence of Morrell/Long canyons to National Forest boundary/7 miles/Recreational

VALUES:

Wildlife & Ecological – Significant arroyo toad (FE) population, historical red-legged frog habitat (FT).

Fish – Potential reintroduction habitat for southern steelhead (FE).

Wildlife – Coast Range newt (S).

Botanical – Significant population of Dudleya viscida (S).

Recreational – Heavy day-use recreation associated with Hwy 74, popular San Juan loop trail. Brown describes San Juan Falls as "one of the many fine features of the San Juan Loop Trail…"

RIVER: Trabuco Canyon

TOTAL LENGTH: 5.5 miles from source to National Forest boundary

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to road 6S13 end/2.5 miles/Wild
2. Road 6S13 end to National Forest boudnary/3 miles/Recreational

VALUES:

Fish – Possible reintroduction habitat for southern steelhead (FE).

Recreational – Diverse recreation opportunities in a primitive setting. Schad considers the canyon to be "one of the more varied and interesting hikes" in Southern California, on the trail to popular Holy Jim Falls. Brown describes the falls

as being set in a “terrific little grotto.”

Wildlife – Arroyo toad (FE), historical habitat for California red-legged frog (FT), southwestern pond turtle (S), Coast Range newt (S).

Historical – Significant mining history, site of the killing of California’s last wild grizzly bear in 1908. According to Stienstra and Brown, Holy Jim Falls was named after “Cussin’ Jim” Smith, a colorful homesteader and beekeeper who lived in Trabuco Canyon in the 1890s.

SAN BERNARDINO NATIONAL FOREST

RIVER: San Jacinto River – North Fork (including Black & Fuller Mill Creeks)

TOTAL LENGTH: 12 miles from source to South Fork confluence

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to State Park boundary/2/Wild
2. State Park boundary to 1/8 mile downstream of Hwy 243/2 miles/Scenic
3. 1/8 mile downstream of Hwy 243 to water diversion in Sec. 7/7 miles/Wild
4. Water diversion in Sec. 7 to South Fork confluence/1 mile/Recreational
5. Source of Black Creek to North Fork confluence/2 miles/Scenic
6. Source of Fuller Mill Creek to North Fork confluence/3 miles/Scenic

VALUES:

Ecological – High-quality mixed conifer/bigcone Douglas fir forest habitat.

Wildlife – One of the last remaining mountain yellow frog populations (FC) in Southern California; southernmost population of southern rubber boa (S), California spotted owl (FC).

Recreation – Upper segment has numerous popular trails, including the Pacific Crest Trail. Robinson describes the upper North Trail as “no better place to explore the riparian delights of the San Jacintos…”

Historical – Historic Webster Trail (2E16), named after local cattle rancher characterized in Helen Hunt Jackson’s 1884 novel, Ramona.

RIVER: Palm Canyon

TOTAL LENGTH: 10 miles from Hwy 74 to National Forest boundary

SEGMENT(S)/MILES/CLASSIFICATION:

1. Hwy 74 to National Forest boundary/10 miles/Wild

VALUES:

Ecological – Rare palm oasis.

Wildlife – Habitat for Peninsular bighorn sheep (FE).

Recreational – Popular hiking trail.

RIVER: Bautista Creek

TOTAL LENGTH: 13 miles from its source to the National Forest boundary

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to National Forest boundary/13 miles/Recreational

VALUES:

Ecological – High-quality low-elevation riparian habitat supporting diverse species

Wildlife – Swainson’s thrush, yellow-breasted chat, greenest tiger beetle (SC), historical arroyo toad (FE) habitat.

Scenic & Recreational – Scenic waterfalls, springs, and desert canyon. Robinson describes the Palm Canyon trail as offering "spectacular canyon scenery" and a "rich and varied desert flora."

RIVER: Deep Creek

TOTAL LENGTH: 25.5 miles from source to high-water limit of Mojave flood control dam

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to Running Springs/4 miles/Recreational
2. Running Springs to 1/4 mile upstream of T-6 road crossing/6.5 miles/Wild
3. 1/8 mile upstream of T-6 road crossing to 1/8 mile downstream/.25 miles/Scenic
4. 1/8 mile downstream of T-6 road to 1/8 mile upstream of OHV Trail 2W01/2.75 miles/Wild
5. 1/8 mile upstream of Trail 2W01 to 1/8 mile downstream of Trail 2W01/.25 miles/Scenic
6. 1/8 mile downstream of Trail 2W01 to high-water limit of Mojave flood control dam/10 miles/Wild

VALUES:

Scenic – Rugged and highly scenic canyon. Robinson describes it as cutting "an impressive swath through the north-slope country of the San Bernardinos." Stienstra and Brown note that "Deep Creek has many personalities."

Recreational – Route of the Pacific Crest Trail, popular hot springs, popular backcountry fishing stream. According to Doll, "Deep Creek is a hall of champions. It's easily the best swimming river in the State of California."

Fish – Mojave chub (FE) population in lower segment, State-designated Wild Trout Stream.

Ecological – High-quality aquatic and riparian habitat and mountain/desert transition zone supporting diverse species.

Wildlife – Significant population of arroyo toad (FE), historical red-legged frog (FT) habitat, San Bernardino flying squirrel (S), Northern goshawk (S).

RIVER: Holcomb Creek

TOTAL LENGTH: 20.5 miles from its source in Holcomb Valley to Deep Creek

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to 1/8 mile downstream of Road 3N16/15 miles/Recreational
2. 1/8 mile downstream of Road 3N16 to Deep Creek/5.5 miles/Wild

VALUES:

Wildlife – Flammulated owl (S), San Bernardino flying squirrel (S).

Ecological – Upper segment in Holcomb Valley is located in a region that supports the largest concentration of endemic plants in California.

Botanical – C4Recreational – Lower segment is the route of the Pacific Crest Trail. Robinson describes it as "the longest hike in the western half of the San Bernardinos" with opportunity for solitude that is "quite an experience in this generally overused part of the range."

RIVER: Santa Ana River

TOTAL LENGTH: 17.25 miles from source to confluence with Bear Creek

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to Filaree Flat/13.5 miles/Recreational
2. Filaree Flat to Bear Creek confluence/3.75 miles/Wild

VALUES:

Recreational – Popular recreation area supporting a wide variety of uses, including developed campgrounds, organized youth camps, hiking trails, and the Rim of the World Scenic Byway (Hwy 38). According to Robinson, the Santa Ana headwaters as viewed from the Heart Bar Creek trail "are a delight to behold."

Ecological – Flows through a region that supports the largest expanse of conifer forest in Southern California, providing key habitat for several forest-dependent species.

Wildlife – Significant California spotted owl (FC) population, San Bernardino flying squirrel (S), southern rubber boa (CT), flammulated owl (S), Northern goshawk (S).

RIVER: South Fork Santa Ana River

TOTAL LENGTH: 3 miles from source to Santa Ana River

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to San Gorgonio Wilderness boundary/2.25 miles/Wild
2. Wilderness boundary to Santa Ana River/1.75 miles/Recreational

VALUES:

Recreational – Major trail route into the San Gorgonio Wilderness.

Ecological – Flows through a region that supports the largest expanse of conifer forest in Southern California, providing key habitat for several forest-dependent species.

Wildlife – Significant California spotted owl (FC) population, San Bernardino flying squirrel (S), southern rubber boa (CT), flammulated owl (S).

RIVER: Bear Creek

TOTAL LENGTH: 9 miles from Big Bear dam to Santa Ana River confluence

SEGMENT(S)/MILES/CLASSIFICATION:

1. 1/4 mile downstream of Big Bear dam to Santa Ana River confluence/9 miles/Wild

VALUES:

Wildlife – California spotted owl (FC), San Bernardino flying squirrel (S).

Recreational – State-designated Wild Trout Stream, providing outstanding opportunities for backcountry fishing, Camp Creek National Recreation Trail. Robinson describes the destination of Bear Creek as "Here, smack in the middle of the overused San Bernardinos, nature reveals her quiet, pristine best."

RIVER: Whitewater River (including North, Middle, South, & East Forks)

TOTAL LENGTH: 28.5 miles from the sources of the South, East, Middle, and North Forks to the San Gorgonio Wilderness boundary

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source of the South Fork to 1/8 mile upstream of Road 2S01 crossing/1 mile/Wild
2. 1/8 mile upstream of Road 2S01 to 1/8 mile downstream of Road 2S01/.25 mile/Recreational
3. 1/8 mile downstream of Road 2S01 to Middle Fork confluence/7 miles/Wild
4. Source of the East Fork to 1/8 mile upstream of Road 2S01/2 miles/Wild
5. 1/8 mile upstream of Road 2S01 to 1/8 mile downstream of Road 2S01/.25 miles/Recreational
6. 1/8 mile downstream of Road 2S01 to South Fork confluence/1 mile/Wild
7. Source of the Middle Fork to North Fork confluence/5 miles/Wild
8. Source of the North Fork to Middle Fork confluence/4 miles/Wild
9. North/Middle Forks confluence to San Gorgonio Wilderness boundary in Sec. 15 T2S R3E (includes 6 miles of BLM land)/8 miles/Wild

VALUES:

Scenic – The river canyons provide spectacular views of the surrounding mountains and desert.

Recreational – Route of the Pacific Crest Trail. Robinson describes the Raywood Flat trail to Silverwood Falls as "superb,

particularly in the springtime."

Hydrological – One of the most remote, unroaded watersheds in Southern California.

Wildlife – Arroyo toad (FE).

Historical – Raywood Flat sawmill and flume (circa 1870s).

RIVER: Lytle Creek (including North, Middle, & South Forks)

TOTAL LENGTH: 23.5 miles from the sources of the North Fork, Middle Fork, and South Forks to the Lytle Creek Ranger Station.

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source of the North Fork to the Lytle Creek Ranger Station/12 miles/Recreational
2. Source of the Middle Fork to 6W01 trailhead/4.25 miles/Wild
3. Middle Fork from trailhead to North Fork confluence/3 miles/Scenic
4. Source of the South Fork to 1/8 mile upstream of Middle Fork confluence/3.75 miles/Wild
5. South Fork from 1/4 mile upstream of confluence to the Middle Fork confluence/.25 miles/Recreational

VALUES:

Scenic & Recreational – Diverse landscape and vegetation provides outstanding scenery; scenic Bonita Falls adjacent to the South Fork Lytle Creek; heavily used developed and primitive recreation area with use focused along the creeks.

Wildlife – Important habitat for Nelson's bighorn sheep, San Gabriel slender salamander (S), historical habitat for California red-legged frog (FT).

ANGELES NATIONAL FOREST

RIVER: Upper San Gabriel River (including West Fork, North Fork, & East Fork)

TOTAL LENGTH: 34.5 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. West Fork – Source to powerline in Sec. 22/5 miles/Scenic
2. West Fork – Powerline to Cogswell reservoir/2 miles/Wild
3. West Fork – Cogswell dam to San Gabriel reservoir/6.5 miles/Recreational
4. North Fork – Source to West Fork confluence/6.5 miles/Recreational
5. East Fork – Source to Heaton Flat/10 miles/Wild
6. East Fork – Heaton Flat to San Gabriel reservoir/4.5 miles/Recreational

VALUES:

Fish – Refugia for imperiled native fish, including unarmored three-spined stickleback (FE), Santa Ana sucker (FT), Santa Ana speckled dace (S), arroyo chub (S). Wildlife – Mountain yellow-legged frog (S) populations inupper watershed, large pond turtle (S) population, Coast Range newt (S), historical California red-legged frog habitat (FT).

Ecological – Combination and diversity of fish and wildlife habitat values. Recreational – Popular and intensively used dispersed and developed recreation area with numerous public and private campgrounds and picnic areas. The lower West Fork is managed for its wild trout fishery, upper West Fork is the route of the Gabrieleno National Recreation Trail, and lower West Fork is the route of the West Fork National Recreation Trail. Schad considers the East Fork to be "one of the liveliest and most remote streams in the San Gabriels." According to Doll, "The Narrows is the deepest gorge in Southern California."

RIVER: Little Rock Creek & Cooper Canyon

TOTAL LENGTH: 14.5 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to Road 5N04/6 miles/Wild
2. Road 5N04 to Little Rock reservoir/7 miles/Recreational
3. Source of Cooper Canyon to Little Rock Creek confluence/1.5 miles/Wild

VALUES:

Ecological – Upper segment has high level of ecological integrity, high-quality riparian habitat. Wildlife – Substantial arroyo toad (FE) and mountain yellow-legged frog (S) populations.

Recreational – Rare southern California class IV-V whitewater kayak stream; Pacific Crest Trail follows upper segment. Schad considers Cooper Canyon Falls to be "one of the best unheralded attractions of the San Gabriel Mountains…"

Scenic – Cooper Canyon Falls, rugged canyon transitioning from mountains to desert.

RIVER: Big Tujunga Creek, Fox Creek, Trail Canyon

TOTAL LENGTH: 41 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Big Tujunga Creek – Source to Big Tujunga reservoir/12 miles/Recreational
2. Big Tujunga Creek – Big Tujunga dam to National Forest boundary/9 miles/Recreational
3. Fox Creek – Sources of the main stem and West Fork to Tujunga reservoir/10 miles/Wild
4. Trail Canyon – Source to Big Tujunga Creek/10 miles

VALUES:

Fish – Lower Big Tujunga Creek supports significant populations of unarmored three-spined stickleback (FE, CE), Santa Ana sucker (FT), arroyo chub (S), historical habitat for Santa Ana speckled dace (S).

Wildlife – Existing and potential habitat for arroyo toad (FE), historical habitat for California red-legged frog (FT), southwestern pond turtle (S).

Botanical – Known populations of the rare ocellated Humboldt lily (Lilium humboldtii ssp. Ocellatum) found in riparian habitat along Big Tujunga and Trail creeks.

Recreational – Big Tujunga Creek is a popular and intensively used recreation area with several picnic areas, one developed and one undeveloped campground. Fox Creek is trail-less and offers a true opportunity for primitive recreation. Trail Canyon is a popular hiking route to view waterfalls.

Scenic – Trail Canyon Falls. Stienstra and Brown describe that falls as "so beautiful in winter and early spring that it can take your breath away."

RIVER: Arroyo Seco Creek

TOTAL LENGTH: 10.5 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Sources (including Bear and Little Bear Canyons) to 1/8 mile upstream of debris dam in section 19/7.5 miles/Wild
2. 1/8 mile downstream of debris dam to Gould Mesa Picnic Area/1.5 miles/Wild
3. Gould Mesa Picnic Area to National Forest boundary/1.5 miles/Recreational

VALUES:

Wildlife – Arroyo toad (FE), historical habitat for California red-legged frog (FT) and southwestern pondturtle (S).

Recreational – Route of the Gabrieleno National Recreational Trail. Schad considers the canyon to be a "scenic treasure" with "astounding…sylvan glens and sparkling brook…" Stienstra and Brown note that "The Gabrieleno National Recreation Trail is your ticket to visiting the waterslides, mini-cascades, and pools of spectacular Bear Canyon."

Scenic – Switzer Falls.

Historical – Switzer Camp historic resort site used by Hollywood stars in the 1920s.

RIVER: Big Santa Anita Canyon

TOTAL LENGTH: 9.5 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to Santa Anita reservoir/3.5 miles/Recreational
2. Source of the North Fork to main stem confluence/1.5 miles/Wild
3. Source of the East Fork to main stem confluence/2.25 miles/Wild
4. Souce of Winter Creek to main stem confluence/2.25 miles/Scenic

VALUES:

Recreational – Route of Gabrieleno National Recreation Trail. Popular dayhiking destination.

Scenic – Sturtevant Falls, described by Brown as "the crown jewel of Big Santa Anita Canyon." Brown further describes the canyon as "a lush, almost magical gulch just a handful of miles from the Pasadena Freeway."

RIVER: San Francisquito Canyon

TOTAL LENGTH: 12 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to National Forest boundary/12 miles/Recreational

VALUES:

Fish – Significant habitat for unarmored three-spine stickleback (FE), Santa Ana sucker (FT).

Ecological – High-quality low-elevation riparian habitat. Wildlife – Southwestern willow flycatcher (FT) and other riparian species, including Swainson's thrush, yellow-breasted chat, California red-legged frog (FT). Botanical: Ferberis nevinii (FE). Historical: Site of William Mulholland's Saint Francis dam disaster in 1928.

RIVER: Elizabeth Lake Canyon

TOTAL LENGTH: 10 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Confluence with Hiatt Canyon to Castaic reservoir/10 miles/Recreational

VALUES:

Ecological – High-quality low-elevation riparian habitat.

Wildlife – Arroyo toad (FE), historical populations of foothill yellow-legged frog (S), high-quality riparian habitat supports several riparian-dependent species, including Swainson's thrush, yellow-breasted chat, historical populations of Tehachapi white-eared mouse (S).

LOS PADRES NATIONAL FOREST

RIVER: Piru Creek

TOTAL LENGTH: 56.5 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. North Fork source to private property in S4 T6N R24W/9 miles/Wild
2. Private property to South Fork confluence/1 mile/Scenic
3. South Fork source to Thorn Meadows/3.5 miles/Wild
4. Thorn Meadows to North Fork confluence/1 mile/Scenic
5. NF/SF confluence to 1/8 mile downstream of Road 18N01 crossing/15 miles/Scenic
6. 1/8 mile downstream of Road 18N01 crossing to 1/8 mile upstream of Castaic Mine/3 miles/Wild

7. 1/8 mile downstream of Castaic Mine to Pyramid reservoir/6 miles/Scenic
8. 1/8 mile downstream of Pyramid dam to Osito Canyon/3 miles/Recreational
9. Osito Canyon to Sespe Wilderness boundary/11 miles/Wild
10. Wilderness boundary to Piru reservoir/2 miles/Scenic

VALUES:

Wildlife – Important riparian and aquatic habitat supporting large arroyo toad (FE) and southwest pond turtle (S) populations, as well as California red-legged frog (FT).

Fish – Santa Ana sucker (FT), historical habitat for southern steelhead (FE).

Botanical – Known population of the rare ocellated Humboldt lily (Lilium humboldtii ssp. Ocellatum) along the South Fork in the Thorn Meadows area.

Scenic – Variety class A.

Recreational – Diverse recreational opportunities close to urban population, documented in various guidebooks, including the popular Fishbowls swimming holes in upper segment, rugged trail-less lower canyon.

Historical/Cultural – High density of sites, some of which are on or eligible for the National Register; established traditional cultural use by Native Americans.

Geological – Unique geological features, as well as textbook examples.

Ecological – Important ecological community, unique assemblage of species.

Spiritual – Landscape that evokes emotion, sense of history, and wonder of the universe.

RIVER: Upper Sespe Creek

TOTAL LENGTH: 20 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to private property in S10 T6N R24W/1.5 miles/Scenic
2. Property boundary to Hartman Ranch boundary in S14 T6N R24W/2miles/Wild
3. Hartman Ranch to 1/8 mile downstream of Beaver Campground/14.5 miles/Recreational
4. 1/8 mile downstream of Beaver Campground to Rock Creek confluence/2/Scenic

VALUES:

Wildlife – High-quality riparian and aquatic habitat, supporting important populations of arroyo toad (FE), California red-legged frog (FT), southwestern pond turtle (S).

Fish – Important population of southern steelhead (FE).

Botanical – Potential habitat for the rare ocellated Humboldt lily (Lilium humboldtii ssp. Ocellatum).

Scenic – Dramatic and scenic gorge along Hwy 33, with highly scenic sandstone formations.

Recreational – Diverse recreational opportunities adjacent to urban area, easy recreational access for hikers, campers, picnickers, and rock climbers along Hwy 33.

Historical/Cultural – Sites potentially eligible for the National Register.

Geological – Combination of unique geological features.

Ecological – Rare free-flowing stream supporting a unique assemblage of species and unusual ecological community.

RIVER: Santa Paula Creek

TOTAL LENGTH: 13 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. East Fork source to confluence with Santa Paula Creek/3 miles/Wild

2. Source to private property boundary in S10 T4N R21W/8 miles/Wild
3. Private property boundary to National Forest boundary/2 miles/Scenic

VALUES:

Wildlife – Southwestern pond turtle (S), upper segment supports an incredible diversity of large mammals, including mountain lion, bear, and coyote.

Fish – Historical habitat for southern steelhead (FE).

Scenic – Variety class A, scenic waterfalls.

Recreational – Diverse and high-quality recreational opportunities close to urban area. Brown considers Santa Paula Creek to provide some of the best swimming holes and waterfalls in California, describing it as one of the few "high-quality, easy backpacking trips…brief in length…" in the region.

Historical/Cultural – Historic sites 50 years or older.

Ecological – Pristine and important ecological community supporting a diverse species assemblage.

Spiritual – Landscape that evokes emotion--uplifting or awe-inspiring.

RIVER: Matilija Creek

TOTAL LENGTH: 16 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. North Fork source to confluence with Matilija Creek/7 miles/Wild
2. Source of the main stem to confluence with Old Man Canyon/7 miles/Wild
3. Old Man Canyon to Murrieta Canyon/2 miles/Scenic

VALUES:

Wildlife – Arroyo toad (FE), California red-legged frog (FT).

Fish – Historical habitat for southern steelhead (FE).

Scenic – Variety class A, scenic waterfalls and creek pools.

Recreational – Diverse recreational opportunities close to urban area, exceptional interpretive opportunities. According to Doll, "If you've only got one day in the Ventura County backcountry, spend it here."

Historical/Cultural – Connectedness of cultural sites, established traditional use by Native Americans.

Geological – Unique geological value associated with a combination of features.

Ecological – Unusual ecological community.

RIVER: Santa Ynez River

TOTAL LENGTH: 25 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to Jameson reservoir/3 miles/Scenic
2. .5 miles downstream of Juncal dam to Gibraltar reservoir/10 miles/Scenic
3. 5 miles downstream of Gibraltar dam to 1/4 mile upstream of road 5N18/2 miles/Scenic
4. 1/4 mile upstream of road 5N18 to National Forest boundary/10 miles/Recreational

VALUES:

Wildlife – High-quality riparian habitat supports the largest population of least Bell's vireo (FE) on Southern California National Forests (combined with lower Mono and Indian Creeks), as well as arroyo toad (FE), California red-legged frog (FT), southwestern pond turtle (S).

Scenic – Variety class A.

Recreational – Diverse recreational opportunities with special attractions to urban and local residents, considered the longest stretch of free-flowing river with public access in southern California, popular developed recreation area with several campgrounds and picnic areas, trailheads for the Aliso National Recreation Trail and other trails.

Historical/Cultural – Sites that are on or eligible for the National Register, established traditional cultural use by Native Americans.

Geological – Unique geologic features and classic textbook examples.

Ecological – Important and unusual ecological community.

RIVER: Mono Creek

TOTAL LENGTH: 24 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to 1/8 mile upstream of road 7N05/5 miles/Wild
2. 1/8 mile upstream of road 7N05 to 1/8 mile downstream of unnamed tributary confluence in S34 T7N R25W/2 miles/Scenic
3. 1/8 mile downstream of unnamed tributary confluence to Ogilvy Ranch property boundary/14 miles/Wild
4. Ogilvy Ranch property boundary to Mono debris dam high-water mark/3 miles/Scenic

VALUES:

Wildlife – High-quality riparian habitat supports the largest population of least Bell's vireo (FE) on Southern California National Forests (combined with Santa Ynez River and lower Indian Creek), highly significant population of arroyo toad (FE), California red-legged frog (FT), southwestern pond turtle (S).

Scenic – Variety class A.

Recreational – Opportunities for exceptional and high-quality diverse recreation with special attraction to urban and local residents, remote trail-less upper canyon offering truly primitive recreation.

Ecological – Important and pristine ecological community.

Spiritual – Landscape scale that creates feelings of significance/insignificance.

RIVER: Indian Creek

TOTAL LENGTH: 19.25 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to 1/8 mile upstream of road 9N11/.5 miles/Wild
2. 1/8 mile upstream of road 9N11 to 1/4 mile downstream of road 9N11/.75 miles/Scenic
3. 1/4 mile downstream of road 9N11 to Buckhorn Creek confluence/10 miles/Wild
4. Buckhorn Creek confluence to 1/8 mile downstream of road 6N24/.5 miles/Scenic
5. 1/8 mile downstream of road 6N24 to Mono debris dam high-water mark/3 miles/Wild

VALUES:

Wildlife – High-quality riparian habitat supports the largest population of least Bell's vireo (FE) on Southern California National Forests (combined with Santa Ynez River and lower Mono Creek), arroyo toad (FE), California red-legged frog (FT), highly significant population of southwestern pond turtle (S).

Scenic – Variety class A.

Recreational – Opportunities for exceptional and high-quality diverse recreation with special attraction to urban and local residents, popular trail route into the Dick Smith Wilderness, exceptional interpretive opportunities.

Ecological – Pristine ecological community.

Spiritual – Landscape that evokes emotion, presence of history, wonder of the universe, and feelings of significance/insignificance.

RIVER: Santa Cruz Creek

TOTAL LENGTH:19.5 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. West Fork source to East Fork confluence/7 miles/Wild
2. East Fork source to West Fork confluence/8 miles/Wild
3. WF/EF confluence to 1/8 mile upstream of Santa Cruz campground/1 mile/Wild
4. 1/8 mile upstream of Santa Cruz campground to Black Canyon/.5 miles/Scenic
5. Black Canyon to National Forest boundary/3 miles/Wild

VALUES:

Wildlife – California red-legged frog (FT), highly significant population of southwestern pond turtle (S).

Scenic – Variety class A.

Recreational – Exceptional and high-quality diverse recreational opportunities close to urban and regional populations, exceptional interpretive opportunities.

Ecological – Pristine ecological community.

Spiritual – Landscape that is uplifting or inspiring, creates a sense of history and wonder of the universe.

RIVER: South Fork Sisquoc River

TOTAL LENGTH: 4 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to confluence with the Sisquoc River/4 miles/Wild

VALUES:

Wildlife – High-quality habitat and reintroduction site for the California condor (FE), probable habitat for arroyo toad (FE), California red-legged frog (FT), and southwestern pond turtle (S).

Scenic – Variety class A.

Recreational – Provides diverse and high-quality recreational opportunities.

Ecological – Pristine ecological community.

Spiritual – Landscape that evokes emotion, uplifting or awe-inspiring, offers feeling of significance/insignificance.

RIVER: Manzana Creek

TOTAL LENGTH: 15

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to 1/4 mile upstream of Nira Campground/ 8.5 miles/Wild
2. 1/4 mile upstream of Nira Campground to 1/4 mile downstream of campground/.5 miles/Scenic
3. 1/4 mile downstream of Nira Campground to private property boundary in S1 T8N R30W/4 miles/Wild
4. Private property boundary in S1 to Sisquoc River confluence/2 miles/Scenic

VALUES:

Wildlife – Highly significant populations of California red-legged frog (FT) and southwestern pond turtle (S).

Scenic – Variety class A.

Recreational – Exceptional, high-quality, and diverse recreational opportunities, including angling. Stienstra and Brown note that Manzana Creek is popular with anglers.

Spiritual – Evokes emotion, sense of history, wonder of the universe.

RIVER: La Brea Creek

TOTAL LENGTH: 28 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. North Fork source to 1/8 mile upstream of Smith Canyon confluence/7 miles/Wild
2. Smith Canyon to confluence with South Fork/8 miles/Recreational
3. South Fork source to Wilderness boundary/10.5 miles/Wild
4. Wilderness boundary to North Fork confluence/2 miles/Recreational
5. NF/SF confluence to National Forest boundary/.5 miles/Recreational

VALUES:

Wildlife – California red-legged frog (FT), southwestern pond turtle (S).

RIVER: Lopez Creek

TOTAL LENGTH: 11 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source to Wilderness boundary/6 miles/Wild
2. Wilderness boundary to confluence with Big Falls Canyon/2 miles/Scenic
3. Big Falls Canyon to Lopez reservoir/3 miles/Recreational

VALUES:

Scenic – Variety class A.

Recreational – Diverse high-quality recreation featured in various publications, with a special attraction to urban populations; popular trail route in the Santa Lucia Wilderness.

Geological – Feature, phenomenon, or process unique to area.

Wildlife – California red-legged frog (FT), California spotted owl (FC), Coast Range newt (S), several species of sensitive riparian birds.

Ecological – High-quality riparian and aquatic habitat, with important ecological community.

RIVER: Arroyo Seco River

TOTAL LENGTH: 18 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Headwaters to Ventana Wilderness boundary in Sec. 7/2.5 miles/Wild
2. Ventana Wilderness boundary to Ventana Wilderness boundary in Sec. 1/2 miles/Recreational
3. Ventana Wilderness boundary in Sec. 1 to Tassajara Creek confluence/8.5 miles/Wild
4. Tassajara Creek confluence to Rocky Creek confluence/2.5 miles/Scenic
5. Rocky Creek confluence to National Forest boundary/2.5 miles/Recreational

VALUES:

Fish – South Central Coast steelhead (FT).

Wildlife – Southwest pond turtle (S), genetically unique regional population and unique assemblage of species.

Botanical – Endemic groves of Santa Lucia fir.

Scenic – Variety class A, scenic rocky gorge with numerous cascades and pools.

Recreational – Diverse high-quality recreation including swimming, camping, youth camps, and class III-IV kayak run, competitive events, popular trailheads into Ventana Wilderness, exceptional interpretive opportunities, regional and urban attraction. Schaffer describes the upper Arroyo Seco River trail as “a very pleasing one…”

Geological – Unique feature, phenomenon, process.

Cultural/Historical – Cultural site on National Register, historic resources 50 or more years old.

Spiritual – Landscape that evokes emotion, uplifting or inspiring, generates feelings of significance or insignificance.

RIVER: Tassajara Creek

TOTAL LENGTH: 10.5 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source in Ventana Wilderness to Tassajara Hot Springs private property boundary/6 miles/Wild
2. Tassajara Hot Springs private property/.5 miles/Recreational
3. Tassajara Hot Springs property boundary to Arroyo Seco River confluence/4 miles/Wild

VALUES:

Fish – South Central Coast steelhead (FT).

Recreational – High-quality regional recreation opportunity, exceptional interpretive opportunities.

Historical – Special event or use site.

Spiritual – Landscape that evokes emotion, is uplifting or inspiring, presence of history, wonder of universe.

RIVER: Willow Creek

TOTAL LENGTH: 11.25 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source of the North Fork in Sec. 10 to unnamed tributary confluence in sec. 27/3 miles/Wild
2. Source of unnamed tributary in Sec. 24 to North Fork confluence/3 miles/Wild
3. North Fork/Unnamed tributary confluence to 1/4 mile upstream of Highway 1 crossing/2 miles
4. Highway 1 to Pacific Ocean/.25 miles/Recreational
5. Source of South Fork to main stem confluence/3 miles/Scenic

VALUES:

Fish – Central Coast steelhead (FT).

Wildlife – Smith's blue butterfly (FE), California spotted owl (FT), Foothill yellow-legged frog (S), Coast Range newt (S).

Botanical – La Graciosa thistle (Cirsium loncholepis) (CT, FCE).

Hydrological – Undeveloped, nearly pristine coastal watershed.

RIVER: Carmel River

TOTAL LENGTH: 12.5 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source of main stem to Ventana Wilderness boundary/6.5 miles/Wild
2. Source of Miller Fork to main stem confluence/6 miles/Wild

VALUES:

Wildlife – Southwest pond turtle (S), Coast Range newt (S), unique assemblage of species.

Fish – Possible landlocked population of South Central Coast steelhead (FT).

Botanical – Endemic groves of Santa Lucia fir.

Scenic – Variety class A.

Recreational – Exceptional high-quality diverse recreation, mentioned in guidebooks, exceptional interpretive opportunities.

Geological – Unique feature, phenomenon, process.

Cultural/Historical – Potential National Register quality cultural site, historic sites 50 years or older.

Spiritual – Landscape that is uplifting or inspiring.

RIVER: Little Sur River

TOTAL LENGTH: 19.25 miles

SEGMENT(S)/MILES/CLASSIFICATION:

1. Source of the North Fork to Pico Blanco Boy Scout Camp property boundary/6 miles/Wild
2. Camp property boundary to confluence with unnamed tributary in sec. 25/.75 miles/Recreational
3. Unnamed tributary confluence in sec. 25 to .25 mile upstream of South Fork confluence/2 miles/Scenic
4. Source of the South Fork to National Forest boundary at the southwest corner of sec. 35/7 miles/Wild
5. National Forest boundary to North Fork confluence/1.5 miles/Recreational
6. North/South Fork confluence to Pacific Ocean/2 miles/Recreational

VALUES:

Fish – South Central Coast steelhead (FT).

Wildlife – California red-legged frog (FT), California spotted owl (FC), southwest pond turtle (S), California tiger salamander (S), Coast Range newt (S), disjunct population of Pacific giant salamander, nesting and foraging habitat for several raptor species such as peregrine falcon (FT), prairie falcon (S), golden eagle (S), and osprey (S), potential nesting habitat at the Little Sur River mouth for Western snowy plover (FT), potential nesting habitat for marbled murrelet (FT).

Botanical – Endemic groves of Santa Lucia fir, southernmost stands of coastal redwood.

Ecological – Combination of important and diverse ecological communities.

Scenic – Variety class A, scenic redwood forest, white mountain top of Pico Blanco. Schaffer describes the Little Sur "as a verdant, linear oasis…shaded by redwoods, bay trees, and tanbark oaks…"

Recreational – Exceptional high-quality diverse recreation, mentioned in guide books; regional recreational opportunity.

Geological – Pico Blanco Mountain has a unique high-grade limestone deposit.

Cultural – Potential National Register quality sites

CITIZENS' WILDERNESS INVENTORY

provided by California Wilderness Coalition

ANGELES NATIONAL FOREST

Unit Name	Acres
Condor Peak	**17,873**
Magic Mountain	**10,500**
Pacifico	**24,000**
Pleasant View	**27,131**
Redrock Mountain (Fish Canyon)*	**34,869**
Rim of the Valley	**4,100**
Salt Creek*	**10,867**
San Francisquito (Red Mountain)*	**7,998**
Sheep Mountain Additions	**19,161**
Silver Mountain	**10,236**
Strawberry Peak	**9,063**
Tule*	**9,917**
Forest Total	**185,715**

**Part of the Castaic Mountains complex*

CLEVELAND NATIONAL FOREST

Unit Name	Acres
Agua Tibia Additions	**26,356**
Barker Valley	**8,000**
Caliente	**6,643**
Cedar Creek	**3,478**
Coldwater	**8,747**
Cutca Valley	**12,000**
Eagle Peak	**16,367**
Hauser Mountain	**5,000**
Ladd	**5,402**
Morrell	**7,600**
No Name	**5,900**
San Diego River Gorge	**8,000**
Sill Hill	**5,296**
Trabuco	**27,160**
Forest Total	**145,949**

LOS PADRES NATIONAL FOREST

Unit Name	Acres
Anastasia Canyon/Ventana Addition	1,827
Antimony	41,330
Arroyo Seco Corridor/Ventana Addition	3,639
Bear Canyon/Ventana Addition	16,482
Chalk Peak/Ventana Addition	7,095
Chews Ridge/Ventana Addition	1,364
Chumash Additions	54,734
Coast Ridge/Ventana Addition	2,273
Condor Point	21,427
Dick Smith Additions	40,725
Fox Mountain	53,030
Garcia Additions	7,415
Little Sur/Ventana Addition	1,358
Machesna Mountain Additions	10,507
Matilija Additions	70,073
Moon Canyon	14,011
Queen Bee/Machesna Mountain Addition	2,413
San Antonio/Ventana Addition	2,196
San Carpoforo/Silver Peak Addition	7,900
Sespe Additions	66,479
Silver Peak Addition	291
Skinner Ridge/Ventana Addition	1,778
Willow Creek/Silver Peak Addition	8,909
Forest Total	**420,774**

SAN BERNADINO NATIONAL FOREST

Unit Name	Acres
Cahuilla Mountain	7,131
City Creek	10,009
Crystal Creek	7,472
Cucamonga Additions	12,884
Deep Creek	22,600
Mill Peak	8,900
Rouse	13,700
San Gorgonio Additions	9,546
San Jacinto Additions	18,536
South Fork	8,895
Sugarloaf	9,254
Forest Total	**128,927**

Total Roadless Area acreage on all four Southern California National Forests 881,365

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