

# Threatened and Endangered Species Habitat Management Plan Overview



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## **Contributing Personnel**

M. Diana Webb, Group Leader, Ecology Group  
Teralene S. Foxx, Project Manager  
John D. Huchton, Acting Deputy Group Leader, Ecology Group  
Carey M. Bare, Environmental Planner  
Leslie A. Hansen, Wildlife Biologist  
Timothy K. Haarmann, Ecologist  
Kathryn D. Bennett, Ecologist, Geographic Information System Specialist  
David C. Keller, Ornithologist  
Steven W. Koch, Ecologist  
H. Todd Haagenstad, Ecologist  
Gilbert J. Gonzales, Ecologist  
Anthony F. Gallegos, Radioecologist  
James R. Biggs, Wildlife Biologist  
Mary A. Mullen, Bio Statistician  
Randy G. Balice, Plant Ecologist  
New Mexico Natural Heritage Program, University of New Mexico  
Biological Research Division of the United States Geologic Survey  
Earth Data Analysis Center, University of New Mexico  
Biology Department, University of New Mexico  
Science Applications International Corporation  
Terrell H. Johnson, Consulting Ornithologist  
Hector A. Hinojosa, Editing  
L. Kim Nguyen Gunderson, Graphic Design and Layout  
Guadalupe D. Archuleta, Printing Coordinator

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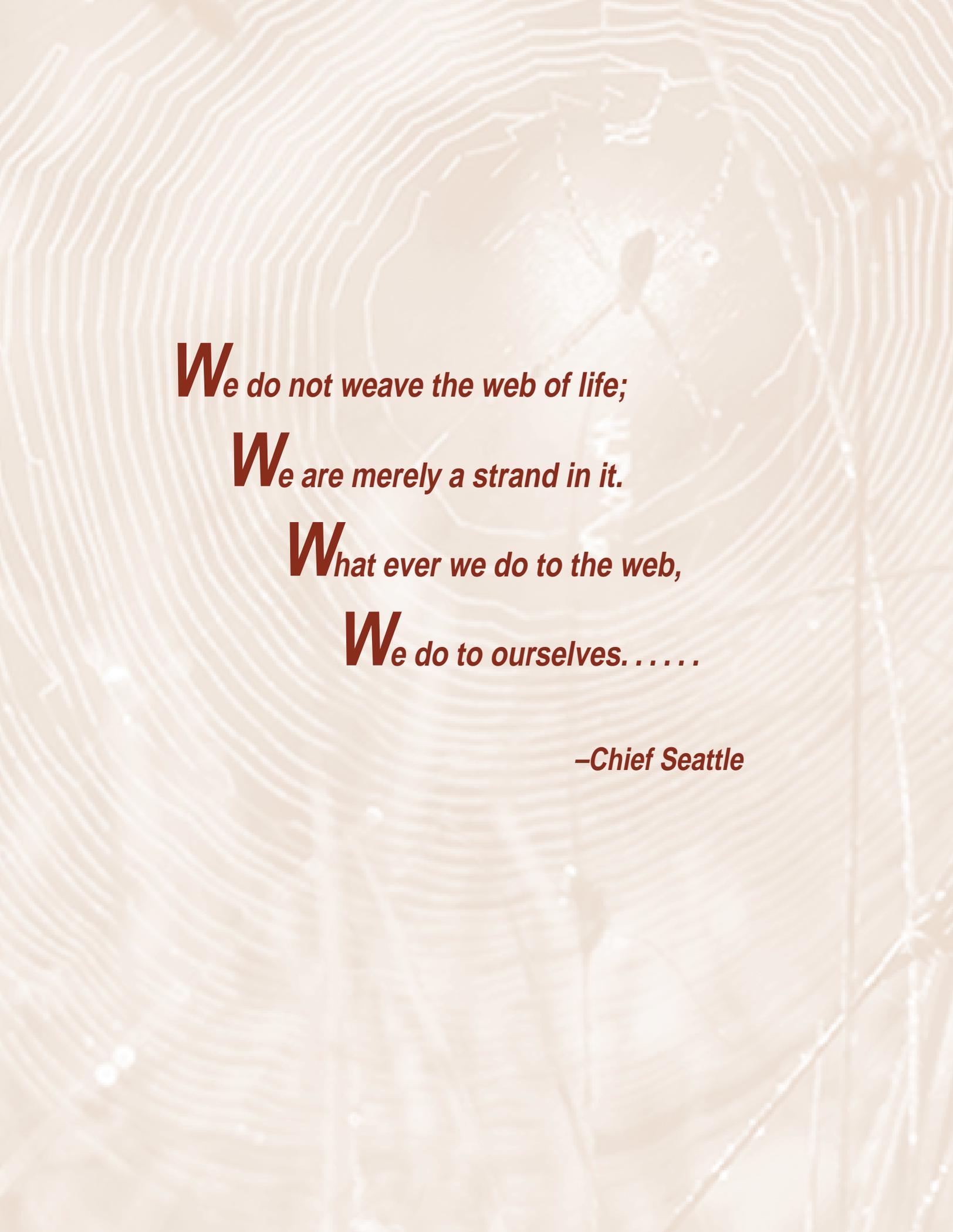


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***We do not weave the web of life;***

***We are merely a strand in it.***

***What ever we do to the web,***

***We do to ourselves. . . . .***

***–Chief Seattle***



## Introduction

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The relative isolation and undisturbed natural setting of much of Los Alamos National Laboratory (LANL) make this facility ideally suited for its defense-related mission. These factors, combined with limited public access, also have resulted in the preservation of habitat that can sustain a number of species receiving federal protection under the Endangered Species Act (ESA). The Threatened and Endangered Species Habitat Management Plan (HMP) at LANL—which covers all of the lands within LANL's boundaries—was developed over a three-year period with the dual intent of providing protection for threatened or endangered species that may reside on or use LANL property as well as facilitating the implementation of the Department of Energy's (DOE) mission at LANL. The procedures and strategies outlined in the HMP provide the basis for the sound management of these species while allowing LANL's programs to proceed in an efficient and cost-effective manner.



This document provides an overview of the HMP, including

- Regulatory requirements and reviews that led to its development;
- Existing conditions at LANL that gave rise to the need for an HMP;
- Goals, objectives, and implementing strategies;
- HMP components;
- A summary of roles and responsibilities of key organizations involved in implementing the HMP;
- Long-term activities required to implement the HMP;
- Methods for modifying the HMP; and
- Methods for tracking the success of the plan and for implementing corrective actions where needed.

Section 3 of the ESA defines

- endangered species as any species which is in danger of extinction throughout all or a significant portion of its range,
- threatened species as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, and
- candidate species as species that are being investigated for listing.



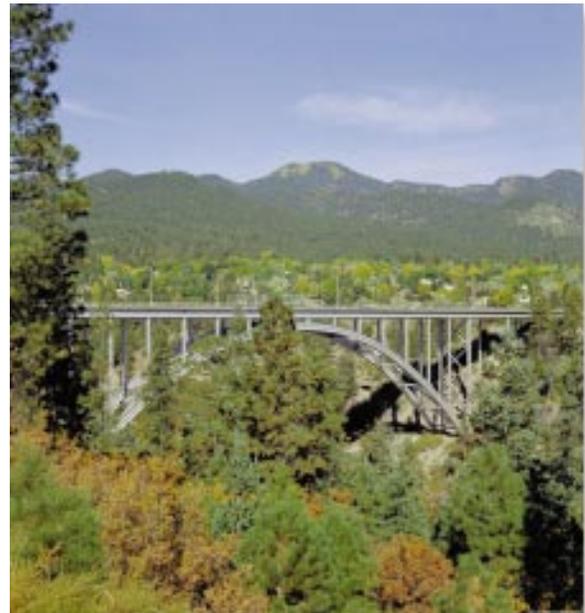
## Why Develop the Habitat Management Plan?

In the past, natural resources at LANL were not managed actively. Decisions regarding the locations for new development and upgrades to existing development were based on engineering and programmatic criteria on a project-by-project basis. The perimeter areas and other undeveloped areas were designated simply as unmanaged buffers. In recent years, however, LANL managers have become increasingly aware of the need for proactive management of the natural environments under their jurisdiction. This approach stems not only from an appreciation of the role that diverse natural environments and biota play in enhancing the quality of life for both LANL employees and nearby residents, but also from federal laws and regulations requiring that specific natural resources at LANL be managed to meet certain objectives and criteria. The primary federal environmental laws and regulations that affect activities at LANL are described in the accompanying tables.

The two federal acts that have the most direct bearing on the development of the HMP are the National Environmental Policy Act (NEPA) and the ESA. In accordance with NEPA requirements, DOE published a final Environmental Impact Statement (EIS) on LANL's Dual Axis Radiographic Hydrodynamic Test (DARHT) facility in August of 1995 (DOE/AOO-LAAO 1995). The final EIS identified and discussed measures that would mitigate potential adverse effects resulting from the various alternatives evaluated in the draft EIS. Among these measures was the commitment of DOE to develop a habitat management plan for all threatened and endangered species occurring at LANL. The plan would be used

to determine long-range mitigation actions to protect the habitat of these species. The EIS contained additional mitigation measures for protecting the nesting habitat of the Mexican spotted owl and other selected species; it also recommended the collection of baseline data to document the presence of contaminants that could adversely affect these species.

DOE issued a Record of Decision (ROD) on the DARHT project on October 10, 1995, which was published in the Federal Register on October 16, 1995 (60 FR 53588). The ROD commits DOE to the implementation of the mitigation measures described above and added that the habitat management plan must be completed within three years from the date of the ROD and updated as necessary. Each of the measures is restated in the mitigation action plan prepared for the DARHT project (DOE/AOO-LAAO 1996).

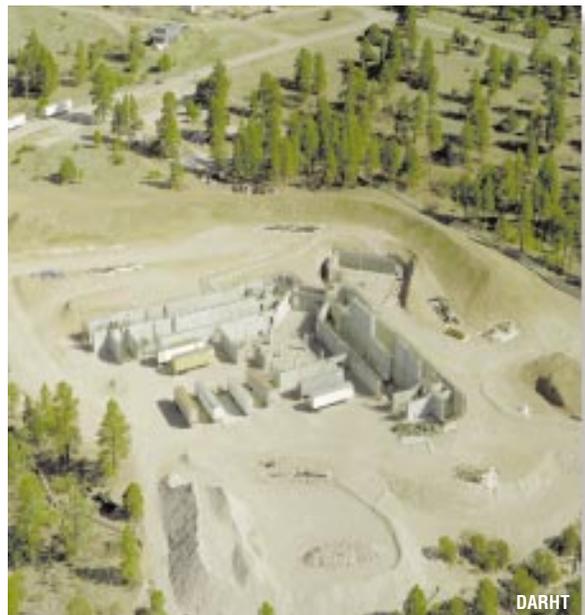
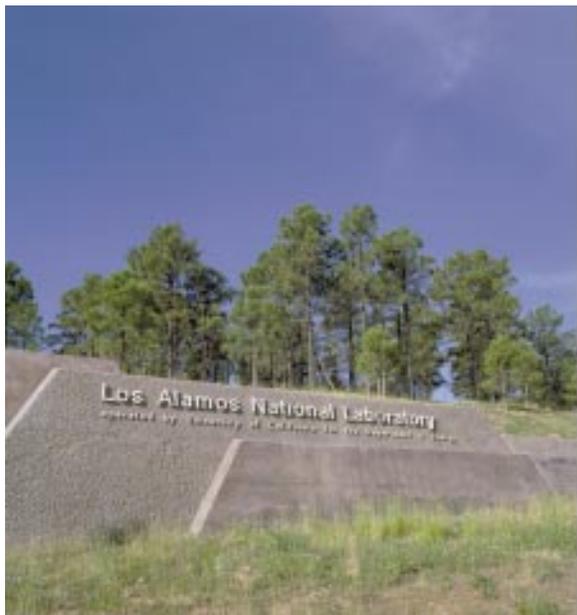


This HMP was prepared to fulfill the requirements of the ROD. The mitigation measures for threatened and endangered species are included in the HMP as part of the Area of Environmental Interest (AEI) Site Plans and Monitoring Plans, which are described in subsequent sections.

The HMP also complies with the provisions of the ESA. It fulfills the requirements that federal agencies carry out programs for the conservation of threatened and endangered species and ensure that their actions are not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of habitat determined to be critical to the species. It has the added advantage of streamlining the review process for new projects by identifying actions that can occur without triggering the need for a Biological Assessment. Before the existence of

the HMP, all LANL projects and activities were reviewed individually for compliance with the ESA. For actions that are outside of the range of activities addressed in this HMP, DOE, in consultation with LANL contractor biologists will follow established procedures for determining whether a Biological Assessment is required.

The policies associated with the National Environmental Research Park (NERP) at LANL also serve as a source of guidance for the HMP. LANL was established as a NERP in 1976 by the DOE, with the goal of contributing to the understanding of how humans can best live in balance with nature, while enjoying the benefits of technology. This is accomplished by an integrated scientific approach for evaluation of the environmental significance of stressors to the environment and the mitigation of possible effects from these stressors.



## Summary of General Federal Environmental Laws Governing LANL

Federal Law	What It Does
Resource Conservation and Recovery Act (RCRA) and its Hazardous and Solid Waste Amendments	Regulates hazardous waste from generation to disposal and mandates reduction in the amount of hazardous waste produced.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)	Establishes requirements for environmental restoration and outlines appropriate responses to hazardous substance releases to the environment.
Toxic Substances Control Act (TSCA)	Regulates the use, storage, handling, and disposal of polychlorinated biphenyls (PCBs).
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)	Regulates the manufacture, handling, application, and disposal of pesticides.
Clean Air Act	Regulates both radioactive and nonradioactive air emissions.
Clean Water Act	Protects the chemical, physical, and biological integrity of the nation's waters and requires permits that establish specific criteria for effluent discharges.
Safe Drinking Water Act	Requires routine water sample monitoring to determine the levels of microbiological organisms, organic and inorganic chemicals, and radioactivity in drinking water.
National Environmental Policy Act (NEPA)	Requires federal agencies to consider the environmental impact of their activities—including the impact on cultural resources; endangered, threatened, or sensitive species; and floodplains or wetlands—before deciding to proceed with those activities.

## Summary of Federal Laws and Executive Orders Regulating Biological Resources at LANL

Federal Law/Executive Order	What It Does
Endangered Species Act (ESA)	Protects proposed and listed threatened or endangered species. Section 7 of the ESA directs federal agencies, such as the DOE, to use their authorities to carry out programs for the conservation of endangered and threatened species. Specifically, federal agencies must ensure that their actions are not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of habitat determined by the Secretary of the Interior to be critical to the species. Formal consultation with the U.S. Fish and Wildlife Service (USFWS) is required for federal projects and all other projects that require federal permits where such actions could directly or indirectly affect any proposed or listed species. As part of consultation, Biological Assessments used to determine if agency actions may affect a listed or proposed species are submitted to the USFWS. The ESA also prohibits the importing, exporting, or taking of threatened or endangered species, their possession or sale, or the violation of any regulation pertaining to them. Civil and criminal penalties may be levied for violating these prohibitions or any other provision of the ESA.
Migratory Bird Treaty Act	Protects all migratory birds by limiting the transportation, importation, killing, or possession of those birds.
Executive Order 11990, Protection of Wetlands	Requires that governmental agencies, in carrying out their responsibilities, provide leadership and take actions to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.
Executive Order 11988, Floodplain Management	Requires that governmental agencies, in carrying out their responsibilities, provide leadership and take action to restore and preserve the natural and beneficial values served by floodplains.
Fish and Wildlife Coordination Act	Requires consultation with the USFWS and the state agency responsible for fish and wildlife management whenever a federal project would impound, divert, or otherwise control or modify a body of water.
Fish and Wildlife Conservation Act	Promotes state programs to conserve, restore, and benefit non-game fish and wildlife and their habitat.
Bald Eagle and Golden Eagle Protection Act	Addresses the protection of bald and golden eagles with criminal penalties for their disturbance.



# Existing Conditions at Los Alamos National Laboratory

## Location and Surrounding Land Uses

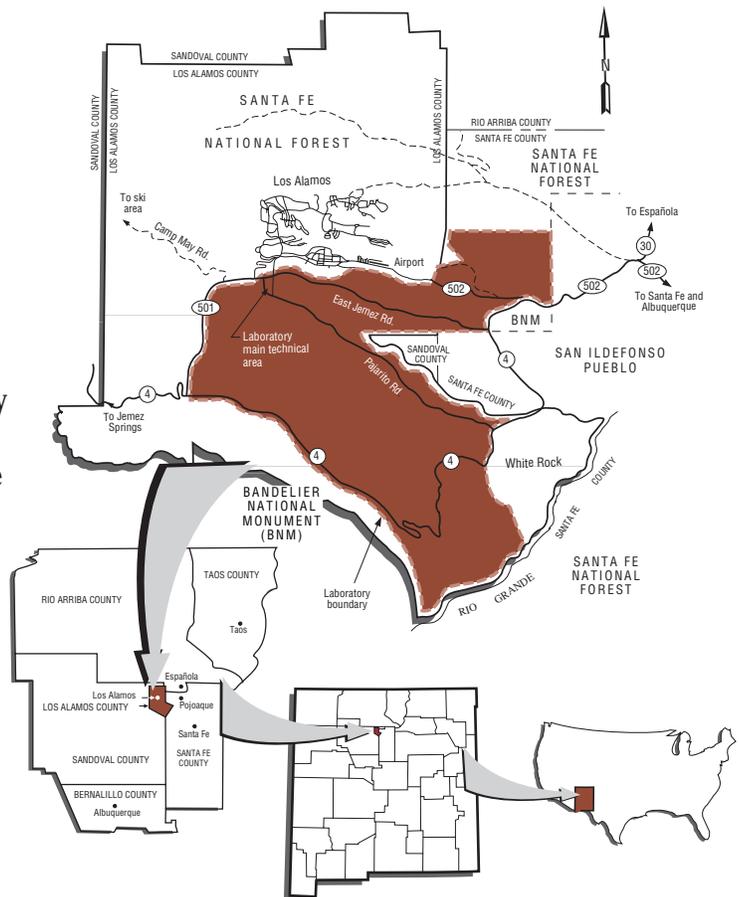
LANL is located on the eastern slopes of the Jemez Mountains, approximately 80 miles north of Albuquerque and 25 miles northwest of Santa Fe. Much of the area surrounding LANL is under the jurisdiction of Los Alamos County, although a substantial area to the north and west is under the management of the U.S. Forest Service. LANL is bordered on the east by the Pueblo of San Ildefonso and on the south by Bandelier National Monument. Two populated areas, Los Alamos townsite and White Rock townsite, are adjacent to LANL on the north and southeast, respectively. Most of the land surrounding the facility is undeveloped, although some ranching and light farming occurs. In recent years, land management agencies have developed increasingly effective mechanisms for interagency coordination and collaboration in order to facilitate managing the large tracts of undeveloped land surrounding LANL.

## Historical Background

LANL has been in existence since 1943. Administered by the DOE with the University of California serving as the management and operations contractor, its primary missions are to conduct nuclear weapons research and development for the DOE and to reduce nuclear danger. Before 1943, much of the area that is now developed with LANL facilities was homesteaded or logged, and the tendency to develop facilities in previously cleared areas generally has persisted to the present. As a result, LANL consists of a mosaic of developed land and undeveloped land with a variety of naturally occurring plant communities.

## General Environmental Setting

A wide variety of natural environments are found within the 43 square miles that comprise LANL. The facility contains three major vegetational zones (juniper savanna, piñon-juniper woodland, and ponderosa pine forest) in addition to several types of localized or unique habitats, such as wetlands and cliffs. The higher mountains to the west of LANL are vegetated primarily by mixed conifer forests and spruce-fir forests. These diverse habitats provide food and shelter for a wide variety of animal species, as well as opportunities for a variety of recreational activities.



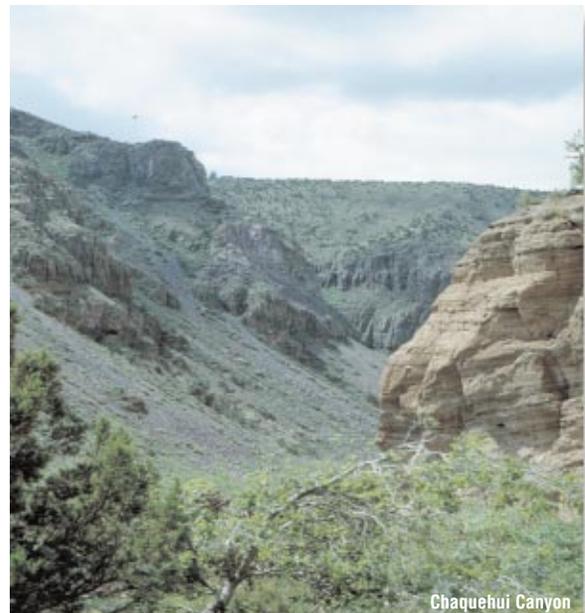
LANL's varied topography is one of the reasons for its diverse habitats. The facility ranges in elevation from approximately 5350 ft at the bottom of White Rock Canyon—where flows the Rio Grande—to 7820 feet at its western border, which also marks the western limit of the Pajarito Plateau.

The local climatic conditions also are strongly influenced by the steep elevation change from the Rio Grande to the peaks of the Jemez Mountains. At the lowest elevations in White Rock Canyon, the climate is arid continental. Throughout the rest of the region, the climate is temperate, semiarid continental. There is a corresponding shift in air temperature and moisture content, from warm and dry at the lower elevations to relatively cool and moist in the mountains. The Los Alamos region, along with much of New Mexico and Arizona, receives much of its annual precipitation during the summer months. During the winter months in the Los Alamos region, most of the precipitation is snow.

Although the regional increase in elevation from the Rio Grande westward to the crest of the Jemez Mountains is a major reason for LANL's environmental diversity, it is not the only reason. For example, localized topographic features are complex. White Rock Canyon is a rugged chasm that is approximately one mile wide and extends to a depth of nearly 900 feet. Additionally, the surface of the Pajarito Plateau is dissected into narrow mesas by a series of east-west trending canyons. To the west of the plateau, these canyons continue to the higher elevations of the Jemez Mountains.

Surface water in the Los Alamos region consists primarily of one river, the Rio Grande, and several intermittent streams. Perennial springs supply base flow into the upper reaches of some canyons, but the volume is insufficient, in the face of evaporation and infiltration, to maintain surface flow across LANL to the Rio Grande. In some drainages, increased stream runoff from thunderstorms and snowmelt reaches the Rio Grande several times a year. Additionally, the flow levels within segments of some intermittent streams are augmented by treated discharge from sanitary sewage and industrial waste treatment facilities.

Ground water in the Los Alamos region is stratified as (1) alluvial water, (2) perched water, and (3) water contained in a deeper, main aquifer. The latter provides the major source of water for domestic and industrial uses in the Los Alamos region. The main aquifer is also the source of permanently flowing springs that emanate near the Rio Grande in White Rock Canyon.





## Threatened and Endangered Species

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Three types of species are addressed under the ESA: those that are proposed for listing, those that are listed as threatened, and those that are listed as endangered. No proposed species are known to occur in Los Alamos County. Habitat exists for two threatened species, the bald eagle and Mexican spotted owl, as well as for two endangered species, the American

peregrine falcon and southwestern willow flycatcher. The habitat requirements for occupancy by the endangered black-footed ferret, Arctic peregrine falcon, and whooping crane are not completely met at LANL, but these species will be monitored because they could potentially occur on the property. The following species are addressed under the HMP.

Species	Status
Mexican Spotted Owl ( <i>Strix occidentalis lucida</i> )	Threatened
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	Threatened
Southwestern Willow Flycatcher ( <i>Empidonax traillii extimus</i> )	Endangered
Whooping Crane ( <i>Grus americana</i> )	Endangered (Experimental)
American Peregrine Falcon ( <i>Falco peregrinus anatum</i> )	Endangered
Arctic Peregrine Falcon ( <i>Falco peregrinus tundrius</i> )	Endangered (Similarity of Appearance)
Black-Footed Ferret ( <i>Mustela nigripes</i> )	Endangered

### **Mexican spotted owl (*Strix occidentalis lucida*)**

The Mexican spotted owl can be found in most of the mountain ranges of New Mexico and Arizona and in portions of Colorado, Utah, Texas, and northern Mexico. Spotted owls occupy mixed conifer forests or ponderosa pine forests that are intermixed with firs and oaks. Home ranges for a pair of nesting owls vary from approximately 1000 ac in canyon habitats, to 2800 ac in mixed conifer forests, and 3800 ac in pine-oak forests.

In the LANL region, the Mexican spotted owl is a year-round resident of forested areas. The owls nest in canyons vegetated by mixed conifer forests. Nesting usually begins in late March or early April (Travis 1992). The owls forage in adjacent areas that are vegetated by a variety of community types, including open grasslands, ponderosa pine forests, and piñon-juniper woodlands. Most individual owls and pairs of owls remain in their summer territory throughout the year; however, some individuals move to lower elevations during winter months, and about 10 percent travel as far as 35 miles from the nesting area.

The reproductive success of Mexican spotted owls that nest in the LANL region has been good to excellent. One pair of owls on LANL property has fledged two chicks per year for the last four years. Successful nests also have been maintained in Los Alamos County, at Bandelier National Monument, and elsewhere in the Jemez Mountains (Bennett 1995).



**Bald eagle**  
*(Haliaeetus leucocephalus)*



In New Mexico, the bald eagle is primarily a winter inhabitant in the San Juan, upper Rio Grande, Pecos, Canadian, San Francisco, Chama, Gila, and Estancia valleys (Hubbard 1985). On average, about 430 eagles per year winter in these areas, and up to 100 individuals may gather at a single communal roosting site. Bald eagles also occur sporadically in New Mexico during the summer months.

In the LANL region, bald eagles roost throughout much of White Rock Canyon from November until late March or mid-April. Since 1979, these wintering populations have doubled in size and have extended their occupancy from the Cochiti Lake area upriver to include most of the Rio Grande in White Rock Canyon. In particular, they have been commonly observed at roost sites near Water and Chaquehui Canyons (Keller et al. 1996).

The historic range of the bald eagle extended across much of North America; eagles are usually found near water where they can find fish, their favorite food (Clark and Wheeler 1987). Both the range and population of bald eagles have declined drastically in recent decades, however. The primary cause for the decline is the ingestion of prey containing DDT and other persistent pesticides, which results in thinning of the eggshells and consequent reproductive failure. Habitat modification, reduction in prey availability, and hunting may have been contributing factors to this decline. Some populations have recovered in recent years.

**American peregrine falcon**  
**(*Falco peregrinus anatum*)**

Historically, the American peregrine falcon nested over much of North America, between the Arctic tundra and north-central Mexico, and wintered as far south as the Caribbean and South America. Populations declined drastically because of increased use of DDT and other pesticides, and this species continues only in scattered areas across its historic range. With the elimination of DDT in the 1970s, however, breeding populations of peregrine falcons have largely stabilized and even increased in some areas. In New Mexico, peregrine falcons are rare to uncommon residents of montane areas from May to late August. During migration and the winter, they may be present throughout the state.

The breeding territories of peregrine falcons center on cliffs that are in wooded or forested regions. All of Los Alamos County is within the foraging range of identified suitable nesting habitat. Peregrines range widely during foraging. They take virtually all of their prey on the wing, typically after a swoop or dive from above. Prey consists almost entirely of birds, most typically jays, woodpeckers, swifts, mourning doves, and pigeons.

Several peregrine falcon nesting areas are located in the LANL region. Production at these nesting sites has been similar to the state as a whole. One nesting area has been occupied each year since 1994, and at least four young were fledged during this period.

In 1998, the USFWS has proposed the delisting of the Peregrine Falcon.

**Arctic peregrine falcon**  
**(*Falco peregrinus tundrius*)**

The Arctic peregrine falcon breeds in the Arctic tundra and inhabits coastlines and mountains from Florida to South America in winter. In New Mexico it is considered a rare migrant, having been verified only in the Roswell area. It is slightly smaller and paler than the American peregrine falcon, although the two are difficult to distinguish except on close examination. Because of the similarity in appearance between these two subspecies, the Arctic peregrine falcon has been granted protection as an endangered species under the ESA.



**Southwestern willow flycatcher (*Empidonax traillii extimus*)**



The southwestern willow flycatcher breeds in riparian habitats from southern California to Arizona and New Mexico, extending northward to southern Utah and Nevada. It may also be found in southwest Colorado and western Texas. The songbird is found in the United States from May until September. It winters in southern Mexico, Central America, and northern South America.

During migration, southwestern willow flycatchers occur throughout their range. However, to complete their breeding cycle, from May until September, they require riparian habitats. These are characterized by

dense stands of willows, tamarisk, buttonbush, and other riparian shrubs with open canopies of cottonwoods. The USFWS has identified habitat that is critical for the survival of the southwestern willow flycatcher, but the closest example of this critical habitat is restricted to the Gila and San Francisco rivers in southwest New Mexico.

The breeding populations of southwestern willow flycatchers have been reduced by the loss of their preferred riparian habitats and by nest parasitism. Census data collected since the late 1980s indicate that only 300 to 500 breeding pairs remain. Many nesting groups have continued to decline, and some groups have had all of their nests parasitized by cowbirds. The breeding success of this species is also reduced by excessive cattle grazing and other physical disturbances to their riparian habitats. The breeding population in New Mexico is estimated to be about 100 pairs, and overall numbers have declined throughout much of the Rio Grande Valley. Seventy-five percent of these pairs occur in one localized area.

In the Los Alamos region, southwestern willow flycatchers have been observed in Bandelier National Monument, but there has been no indication that they have successfully nested there. The nearest known nest site is along the Rio Grande near Española, upstream from LANL. Willow flycatchers occasionally have been observed in White Rock Canyon, and one sighting of a migrating individual occurred on LANL property in the wetlands of Pajarito Canyon.

### **Black-footed ferret (*Mustela nigripes*)**

The black-footed ferret was once widely distributed between Saskatchewan, Canada and Arizona, New Mexico, and Texas, where it lived in close association with prairie dog colonies (Findley 1987). It is now considered to be the rarest mammal in North America, and the only known populations were introduced into Wyoming, Montana, and South Dakota (Finch 1992). In New Mexico, if any animals survive, they would most likely occur in the northwestern part of the state. The most recent reliable sightings come from Valencia, McKinley, Los Alamos, and Curry counties (Hubbard et al. 1979). However, the last confirmed sighting was in 1934.

Little is known about the habits, home ranges, and other behavior patterns of black-footed ferrets (Findley 1987). Apparently, they are permanent residents of prairie dog towns where they feed primarily on prairie dogs and ground squirrels. They may also feed on other small to medium-sized mammals. Within the LANL region, the nearest prairie dog colony is in the vicinity of Española and Pojoaque.



### **Whooping crane (*Grus americana*)**

This species once was fairly widespread in North America, but the population declined to 21 birds in 1941 (Lewis 1995). Since that time, the population has increased to 153 individuals. Excessive hunting and conversion of prairie wetlands to croplands contributed to the decline of this species (Finch 1992).

A population was established in 1975 with sandhill cranes as foster parents at Grays Lake National Wildlife Refuge in Idaho (Hubbard 1985). Both cranes migrate together to the Rio Grande Valley in southern New Mexico. The whooping crane population had a maximum of 35 birds (Lewis 1995), but since pairing and reproduction among the whooping cranes never occurred, the experimental population dwindled to three individuals in 1997.

During fall and spring migration, the whooping cranes follow the Rio Grande through northern and central New Mexico. The cranes roost on sandbars along the way, including those in White Rock Canyon and the upper sections of Cochiti Reservoir. This is the only known time period when whooping cranes might occur on or near LANL.





## Potential Sources of Disturbance

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A number of activities at LANL have the potential to adversely impact threatened and endangered species. Many of the industrial processes used at LANL have involved hazardous and radioactive materials. During World War II and for a while thereafter, some of these materials were disposed of on LANL property or were otherwise released into the environment. More than 2500 potential release sites have been identified at the facility, ranging in size from several square feet or smaller to several acres. These sites include



past disposal sites as well as areas where accidental spills of hazardous materials have been reported and areas suspected of past disposal or association with potentially hazardous materials. Congress has enacted a variety of laws and regulations to protect the environment since the 1970s. In accordance with this legislation, LANL has conducted surveys to determine the presence of hazardous and radioactive wastes and has begun to remediate sites where such materials are found to exist. Many sites still remain, however.

Hazardous and radioactive materials may disturb or reduce the population viability of threatened and endangered species; however, these are not the only potential sources of disturbance at LANL. Habitat destruction or fragmentation resulting from soil erosion, forest fires, fire management practices, or the development of new facilities and infrastructure can also have an adverse effect on the well-being of plants and animals, as can light and noise resulting from construction activities or laboratory operations.

The HMP specifically addresses these potential sources of disturbance to threatened and endangered species. It contains specific measures—described below under Components of the Habitat Management Plan—that address impacts from hazardous and radioactive materials through the monitoring of contaminants in biota and through ecological risk models and determinations. It also describes allowable activities that can be conducted in environmentally sensitive areas without adversely impacting the species considered in this HMP.



## Goals and Objectives of the Habitat Management Plan

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Goals and objectives were defined in the early stages of HMP preparation in order to give clear direction to plan development. In addition, specific strategies for implementing these goals and objectives were developed. These are outlined below.

### Goal 1

Develop a comprehensive management plan that protects undeveloped portions of LANL that are suitable or potentially suitable habitat for threatened and endangered species, while allowing current operations to continue and future development to occur with a minimum of project or operational delays or additional costs related to protecting species or their habitats.

- **Objective:** Provide facility and project managers with a process that enables them to plan operations and facilities effectively, while minimizing impacts to threatened and endangered species.

*Strategy:* Develop an application for planning and review of proposed projects, operations, or facilities for both short- and long-term planning timeframes.

- **Objective:** Minimize project costs and delays by reducing the need to engage in the USFWS consultation process on new projects.

*Strategy:* Develop a strategy to consult with the USFWS on groupings of activities commonly conducted, so that individual agency consultations on individual projects will be reduced.

*Strategy:* Develop strategies to help facility planners and managers avoid or mitigate activities that may affect threatened and endangered species.

### Goal 2

Facilitate DOE compliance with the ESA and related federal regulations by protecting and aiding in the recovery of threatened and endangered species.

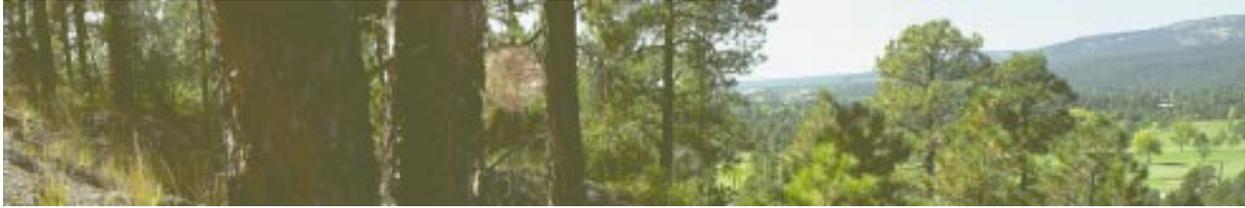
- **Objective:** By October 10, 1998, fulfill the requirements of the DAHRT facility mitigation action plan that are related to completion of the HMP.

*Strategy:* Milestones will be developed and an annual review conducted so that the planning activities remain on schedule and results are reviewed and found acceptable.

- **Objective:** Develop tools for more timely, accurate, and defensible assessments of impacts and cumulative effects and aid in species recovery in compliance with Section 7 of the ESA.

*Strategy:* Develop a land cover map so that habitats of species can be delineated and essential elements of those habitats protected.

*Strategy:* Review approaches taken by other DOE and Department of Defense facilities that may be applicable at LANL.



*Strategy.* Develop tools, such as survey methods and habitat evaluation models, to understand where and how threatened or endangered species are found on LANL.

*Strategy.* Obtain training to understand the full extent of ESA Section 7 requirements.

### Goal 3

Promote good environmental stewardship by monitoring and managing threatened and endangered species and their habitats using sound scientific principles.

- **Objective:** Develop monitoring plans, conduct surveys, and collect data on threatened and endangered species.

*Strategy.* Personnel will become certified in accepted protocols for specific species, obtain federal permits, and conduct appropriate surveys on an annual basis. Use the expertise both within LANL and within New Mexico for species that are threatened or endangered.

*Strategy.* Report the status of habitat occupancy to appropriate organizations within and outside of DOE, including University of California management and USFWS.

- **Objective:** Develop and maintain a system for effective data management and analysis that is timely, accurate, and easy to use.

*Strategy.* Centralize all previously collected and new data into a geographic information system (GIS) where it can be easily accessed for the purposes of mapping, displaying, and analyzing. This includes data on threatened or endangered species, as well as species that may be prey or part of the food chain for a threatened or endangered species.

*Strategy.* Develop protocols to maintain the data management system so that it is timely, accurate, and easy to use.

*Strategy.* Develop consistent standards for nomenclature, data entry, and data storage.

- **Objective:** Develop and implement management plans for species and their habitats.

*Strategy.* Prepare monitoring plans that will establish the breeding and rearing seasons and population levels of species, as well as methods for long-term monitoring and management.



## Components of the Habitat Management Plan

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The HMP consists of two components in addition to this overview document: Area of Environmental Interest (AEI) Site Plans and Monitoring Plans. The AEI Site Plans establish species-specific restrictions and criteria for planning and implementing projects and activities at LANL. The Monitoring Plans provide the technical basis for conducting the species-specific research and activities necessary for maintaining the HMP's technical viability. The Monitoring Plans also provide the technical basis and justification for future studies associated with the HMP. These elements are tightly integrated to ensure that the short- and long-term implementation of the plan is functional, effective, and accurate. Each component is described below.

### **Area of Environmental Interest Site Plans** ***What Are AEIs?***

AEIs are areas within LANL that are being managed and protected because of their significance to biological or other resources. Habitats of threatened and endangered species that occur or may occur at LANL are designated as AEIs. In general, a threatened and endangered species AEI consists of a core area that contains important breeding or wintering habitat for a specific species and a buffer area around the core area. The buffer protects the area from disturbances that would degrade the value of the core area to the species. The exact form and size of an AEI differs from species to species.

### ***How Were the AEIs Defined?***

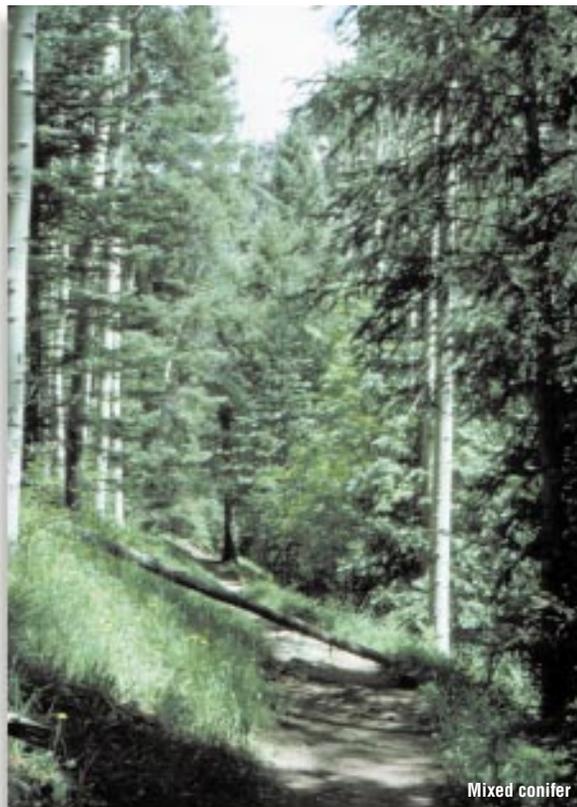
The core AEIs are defined geographically based on habitat requirements of the threatened and endangered species. Core zones of potential (suitable) habitat were defined after a multi-step process that included a literature review, development of a land cover map, species surveys, data and technical reviews from regional species experts, guidance from state and federal regulatory agencies, and modeling habitat components to define the most suitable habitat.

The literature review was considered essential to understanding the habitat requirements of threatened and endangered species. A systematic search is conducted to find published data that can be used to help determine which habitat components are important to these species. Knowledge of the land cover types is fundamental to determining areas of habitat suitability. A basic land cover map for LANL identifying areas of dominant vegetation was therefore developed using satellite imagery. The satellite image was classified into eight land cover types. Land cover types used by the threatened and endangered species can then be mapped to develop a very general habitat suitability map.

The general habitat suitability map and information from regional and LANL species experts were used to identify areas to survey for the presence of threatened and endangered species or to measure additional habitat components for the currently identified threatened and endangered species. Information from these surveys fed back into the general habitat suitability map, refining areas of potential habitat. For peregrine falcon,

regional species experts had already identified the habitats, and interagency agreements were in place for the management of those habitats. In these situations, the habitats were directly incorporated into the threatened and endangered species habitat suitability map. Similar steps would be taken for newly listed species in the future.

For some species, habitat components could be mapped on a regional basis, and species models were used to identify areas of high habitat suitability. For example, a topographical model coupled with land cover data was used to identify areas of suitable habitat for Mexican spotted owls (Johnson 1996). Areas of high suitability were incorporated into the habitat suitability map.

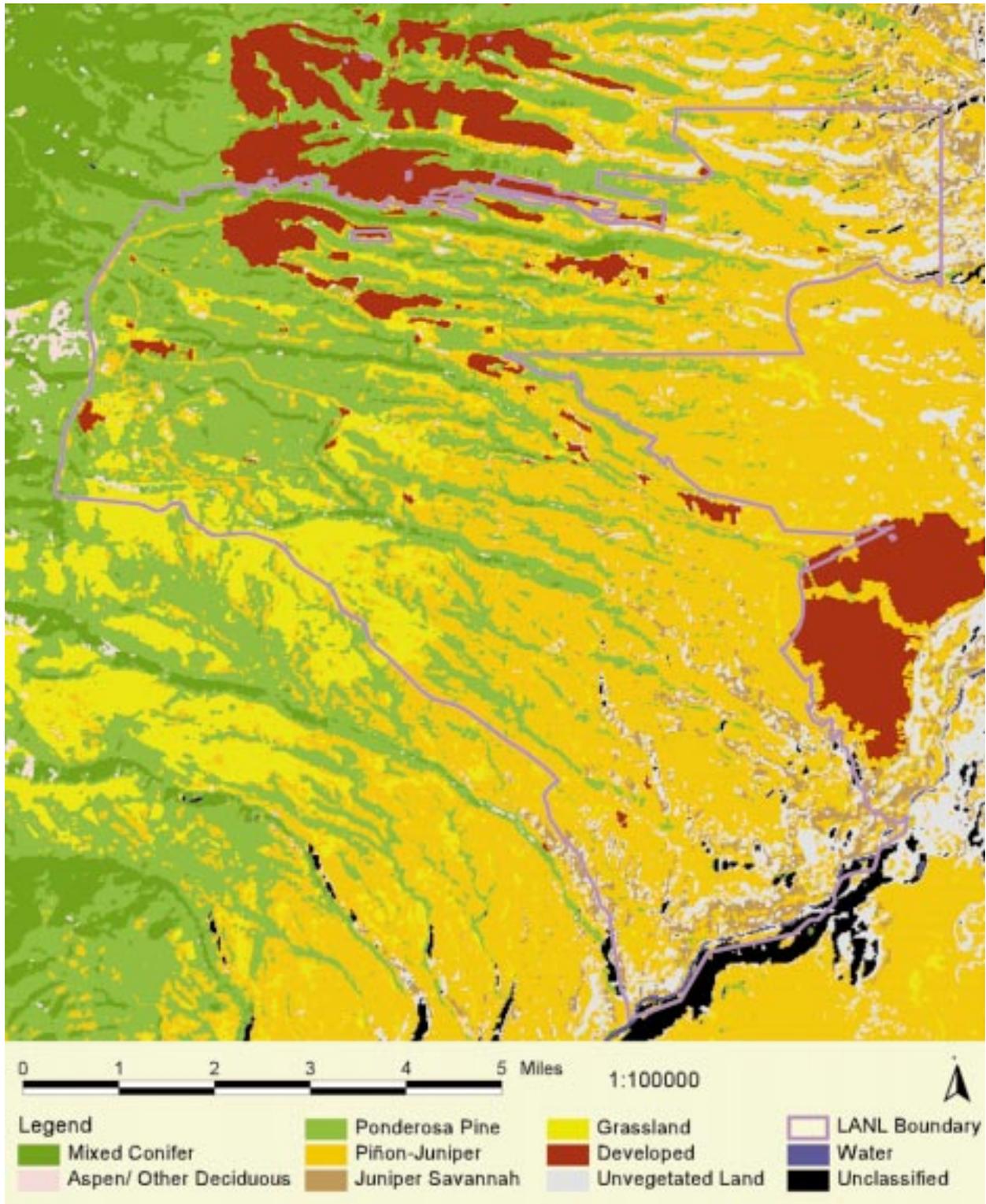


From the habitat suitability map, core areas were drawn to reflect highly suitable areas for each species. Buffer zones were established around each core zone based on regulatory guidance and literature information on species' reactions to disturbance.

AEI Site Plans are intended to be living documents, and additional species-specific information on habitat requirements, the impact of human activities, or listing status can lead to changes in what are considered acceptable activities. The AEI boundaries will be reviewed periodically to reflect current understanding of the species in question. Occupancy will be determined on a yearly basis for all listed species living within the defined LANL site. AEIs will be developed for any newly listed species. Most changes will require review and concurrence by the USFWS before they can be incorporated into an AEI Site Plan. Activities that do not fall within the parameters of a Site Plan generally may be undertaken following preparation of a Biological Assessment and formal or informal consultation with USFWS. Biological Assessments will be submitted by DOE to USFWS and require that the latter concur that the activity will not adversely affect a listed species or its habitat before the activity can go forward. Field research and preparation of a Biological Assessment can take up to about six months with an additional two months or so for DOE and USFWS review for actions that will not result in any adverse effects to the habitat or individuals of the species. Additional requirements, possibly taking up to five more months, would be necessary for actions that might result in adverse effects.

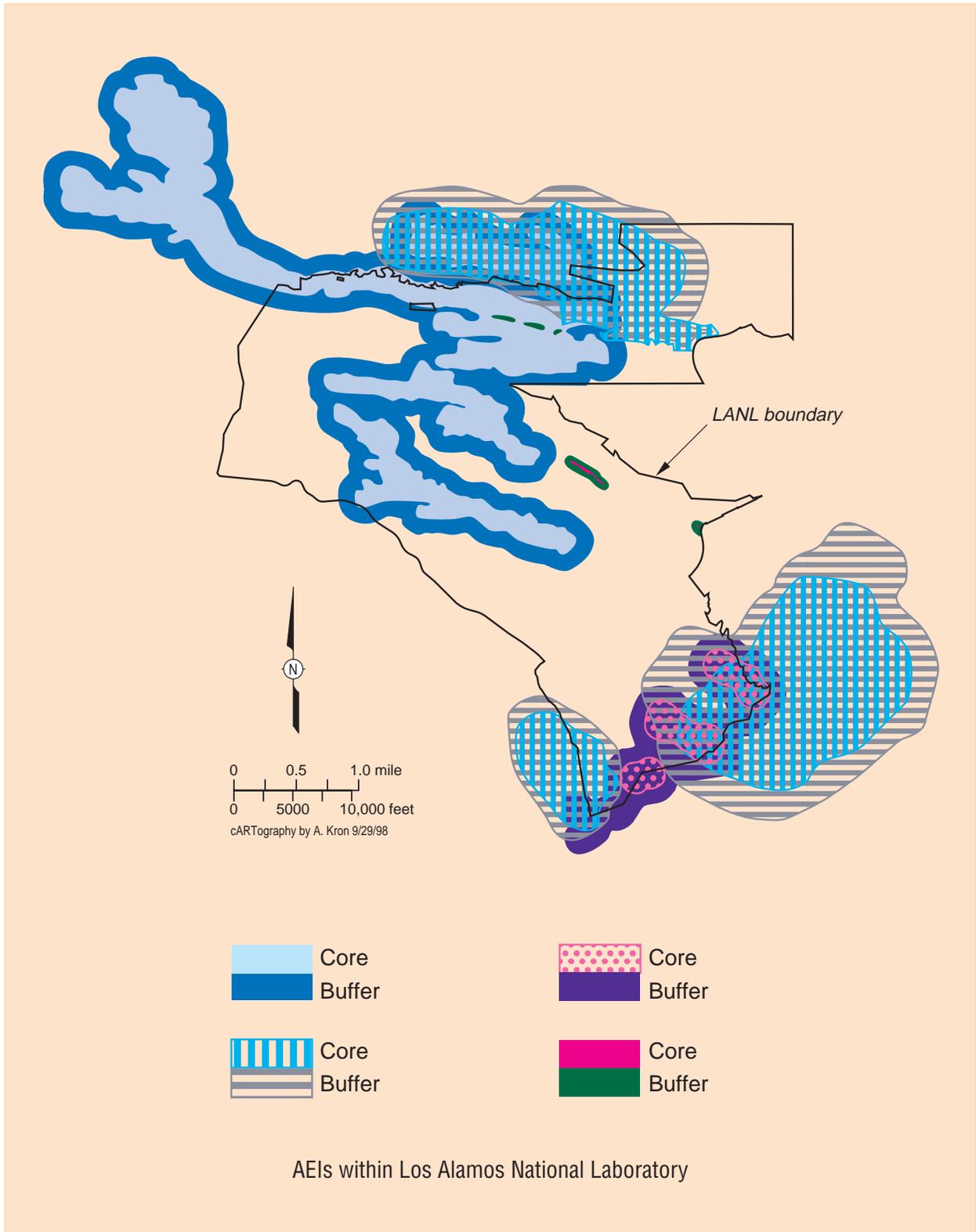


# Land Cover Map





# Areas of Environmental Interest



### **What is an AEI Site Plan?**

An AEI Site Plan contains descriptions of an individual species, the AEI(s) for that species, and current impacts in the AEI. It also includes management plans that describe allowable activities within core and buffer areas. Collectively, the AEI Site Plans provide the basis for day-to-day HMP implementation.



In general, any activity that would detrimentally alter the habitat in an AEI or would cause unacceptable disturbances to the species inhabiting the AEI is not allowed under the AEI Site Plan. Buffer areas are managed to prevent degradation of the value of the core area to the species. Any activity that does not fall within the parameters that are established in an AEI Site Plan has to be considered in a Biological Assessment and given concurrence by USFWS before the activity can go forward.

### **Species Considered in AEI Site Plans**

Site Plans and AEIs have been developed only for federally listed threatened and endangered species with suitable habitat within LANL boundaries, as follows.

<b>Species with AEIs on or near LANL</b>	<b>Number of AEIs</b>
<b>Peregrine Falcon</b> <i>(Falco peregrinus anatum)</i>	<b>4</b>
<b>Mexican Spotted Owl</b> <i>(Strix occidentalis lucida)</i>	<b>6</b>
<b>Southwestern Willow Flycatcher</b> <i>(Empidonax traillii extimus)</i>	<b>1</b>
<b>Bald Eagle</b> <i>(Haliaeetus leucocephalus)</i>	<b>1</b>

### ***Site Plan Guidelines***

Other than the identification of suitable habitat for a species, the core of a Site Plan is the definition of acceptable parameters for activities and habitat alteration within the AEI. Six categories of activities that might cause disturbance in an AEI are addressed in the Site Plans. The list is intended to be as comprehensive as possible, thereby reducing the need for individual review of activities for ESA compliance. The categories of activities are

- People (includes any entry of people into an AEI on foot).
- Vehicles (includes the entry of any ordinary two-axle highway vehicle into an AEI by any route other than a paved road or an improved gravel road).
- Aircraft (includes the operation of aircraft below an elevation of 2000 ft above the highest ground level in the local vicinity).
- Other Light Production (includes any activity not previously listed that causes additional light to occur in an AEI core area).
- Other Noise Production (includes any activity not previously listed, except for explosives testing, that causes additional noise to occur in an AEI).
- Explosives Detonation (includes the use of high explosives for any purpose).

Low, medium, and high levels of impact are defined for each of these activities, except for explosives detonation. Activity levels for explosives detonation were designed to follow the guidelines agreed upon by the DOE, LANL staff, and the USFWS in the DAHRT

Facility Biological Assessment. The six categories of activities are restricted only in AEIs that are classified as occupied by the species.

The Site Plans identify parameters for these categories of activities to ensure no adverse effect to individuals of a species inhabiting an AEI and/or the quality of the habitat within the AEI. Some activities may be allowed with no restrictions; others may be allowed during certain seasons only. The acceptable activities were formulated by LANL biologists based on previous recommendations for the management of certain species developed by the USFWS (in recovery plans, for example), scientific literature concerning the species, and, where necessary, best biological opinions. The direction included in the Site Plans is designed to ensure that day-to-day Laboratory operations do not adversely impact threatened and endangered species.

### ***Site Plan Implementation***

DOE Los Alamos Area Office, LANL's Ecology Group of the Environment, Safety, and Health (ESH) Division, Facility Managers, Facility Management Unit ESH-Deployed Teams, and line organizations are the key organizations responsible for implementing the Site Plans. Only persons with a "need to know" will receive the plans, which are considered controlled documents. Facility Managers, with the assistance of their staff, are responsible for determining if operations within their Facility Management Unit comply with the guidelines in the Site Plans. This is initiated through the ESH-Identification process, which is an internal

review that identifies any environmental concerns associated with a project. The ESH-Deployed Teams may assist the Facility Managers with this process. Once the process has been initiated, the Ecology Group provides technical guidance by conducting the necessary impact evaluations and regulatory compliance actions at the direction of the DOE.

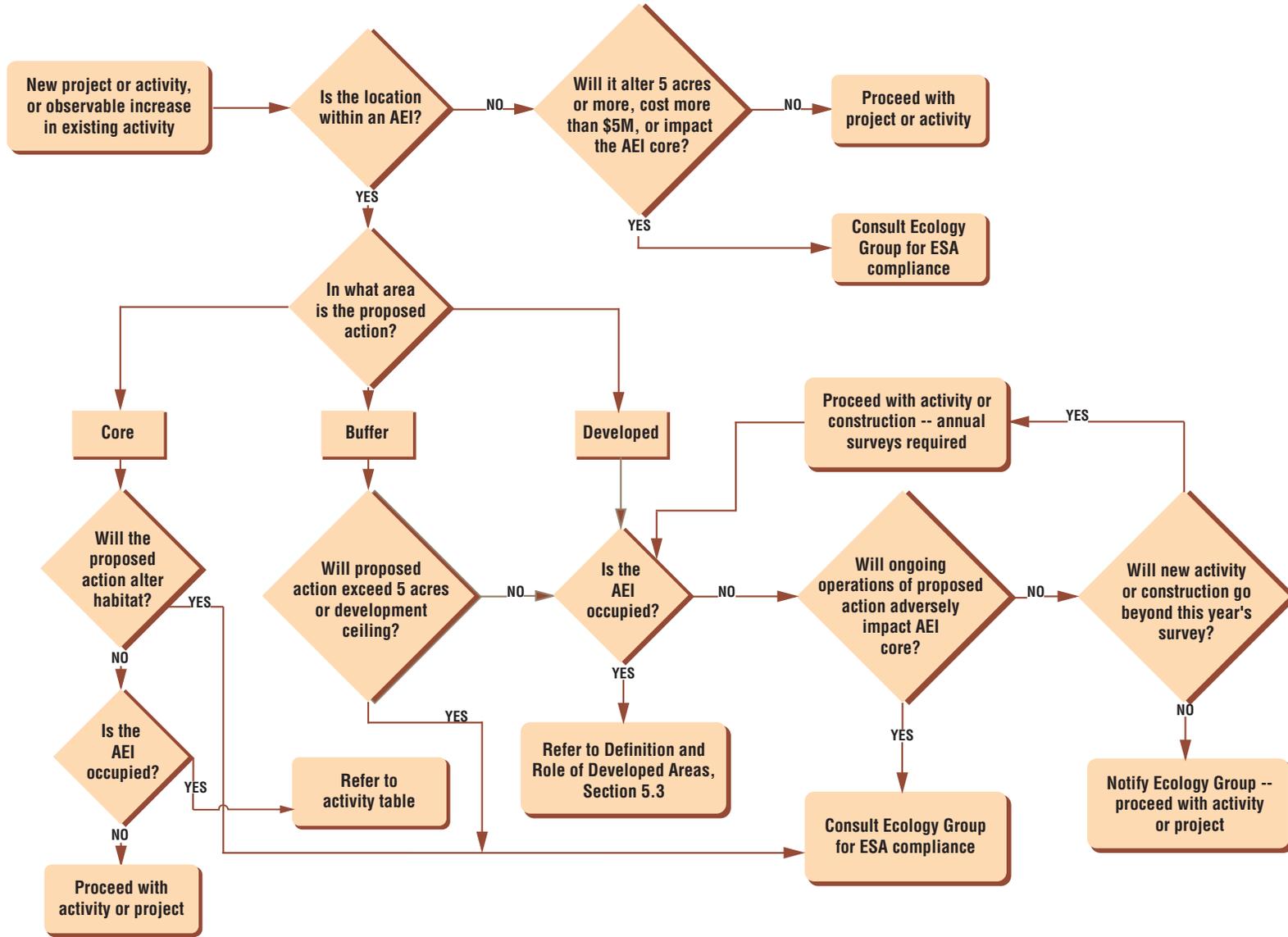
Each Site Plan provides a process flow diagram used to evaluate projects and activities. If the proposed action is within the scope of allowable activities as defined in the activity table provided in each Site Plan, the project or activity may proceed. However, if the activity is outside of the range of activities described in the Site Plan, the Ecology Group is consulted

for further technical guidance. Existing operational procedures will be used to determine whether the action requires preparation of a Biological Assessment.

Each Site Plan describes the locations of AEIs and guidelines for a different species; thus, all of the plans need to be consulted to evaluate the compliance status of an activity. If an activity follows all guidelines, no additional ESA regulatory compliance action is required before going forward. Other regulatory compliance actions may still be required under NEPA, however, or to address impacts to cultural resources, wetlands, or other resources. It is the responsibility of the project leader or Facility Management staff to ensure that all requirements are satisfied.



### Project/Activity Review Process



## **Monitoring Plans**

### ***What is the Purpose of Monitoring Plans?***

Monitoring Plans have been developed for each federally listed species that may occur in the Los Alamos area, and they describe the methodology used to determine if these species are present on LANL. For species that are present, Monitoring Plans may be designed to estimate reproduction, abundance, and/or distribution of the species at LANL. Monitoring Plans

1. Allow implementation of Site Plans for federally listed species. Guidelines for allowable activities differ for occupied and unoccupied habitats, and annual monitoring provides the greatest possible flexibility in conducting Laboratory operations, while ensuring adequate protection of the species.
2. Allow evaluation of the effectiveness of the HMP.
3. Will allow DOE to comply with proposed changes in the ESA, which include requiring federal agencies to report on the status of threatened, endangered, and candidate species on their property every five years.



### ***Which Species are Covered by Monitoring Plans?***

The following is a list of species for which Monitoring Plans have been developed.

- American peregrine falcon
- Arctic peregrine falcon
- Mexican spotted owl
- Whooping crane
- Bald eagle
- Southwestern willow flycatcher
- Black-footed ferret

### ***What are Monitoring Plans?***

Monitoring Plans generally consist of the following elements: a species description; monitoring justification, purpose, and objectives; existing monitoring protocols and proposed studies; species analysis and reporting protocol; and a list of technical references. The species description element provides background on a species' technical status, seasonal activities, behavior, and feeding characteristics. The monitoring justification, purpose, and objectives element establishes the reasons for species-specific monitoring activities and ranks the individual activities in terms of importance. The monitoring protocol and proposed studies element describes monitoring methodologies and presents a list of existing and proposed monitoring activities. Priorities for implementing each activity are identified; those activities considered less critical will proceed as funds are available. Finally, the species analysis and reporting element formalizes the protocol for notifying USFWS concerning monitoring activity field survey results. This element also establishes the protocol for HMP database management.

As with the AEI Site Plans, Monitoring Plans may be revised as new information becomes available. Monitoring Plans will be developed for any newly listed species in accordance with established protocols and in coordination with new AEI Site Plans. Personnel conducting surveys and research will be trained in those protocols.

Additionally, monitoring protocols for species not federally listed have been developed to standardize monitoring efforts at LANL. Sources of information for these protocols may include methods developed by other federal or state agencies, such as the US Forest Service or the US Geological Survey Biological Resources Division, protocols developed for similar species, scientific literature concerning the species, and experience with the species at LANL. Changes in monitoring plans for species not federally listed do not require consultation with the USFWS.

### ***Levels of Monitoring***

Most Monitoring Plans call for annual monitoring of a species. However, depending on the status of a species, its likelihood of occurring at LANL, and potential monitoring methods, some plans may call for monitoring at different intervals, monitoring of habitat only, or simply tracking the species' status. Nine levels of monitoring have been identified that may be applied individually or in combination.

1. Status Tracking—Maintaining up-to-date information on the federal status of a species through coordination with the USFWS.
2. Habitat Analysis and Models—Using habitat models and other available information to identify potential habitat at LANL.
3. Presence/Absence Surveys—Conducting field surveys to determine presence or absence of the species on LANL property. The Monitoring Plans identify the resources required, including personnel, equipment, training, and permits. Analysis and reporting requirements are specified, as well.
4. Reproduction Surveys—Conducting field surveys to (a) determine the breeding status of a given species, (b) collect productivity and breeding biology information, and (c) describe habitat characteristics and habitat use patterns. Required resources are the same as for Presence/Absence Surveys.
5. Contaminant Studies—Conducting field research to estimate contaminant loads and levels in prey species or in the species itself on LANL property.
6. Ecorisk—Developing models to estimate the toxicological risk to species inhabiting LANL property.
7. Prey Base—Conducting field research to estimate prey density and/or distribution at LANL.
8. Individual Tracking—Marking, tagging, and tracking of individuals.

9. Regional Studies—Initiating or participating in studies of the species at the regional level, with the goal of gaining more information about the species to make better management decisions. Any data collected will be shared with the USFWS.

### ***Monitoring Plan Implementation***

For federally listed species, the USFWS in cooperation with other agencies develops standardized monitoring protocols. The person conducting the monitoring must possess an ESA section 10(a)(1)(A) endangered species subpermit from the USFWS. Formal training in the standardized survey method may be required before the subpermit is granted.

The University of California's LANL Ecology Group is responsible for determining species' occupancy in suitable habitat and notifying the DOE and USFWS. Like the AEI Site Plans, the Monitoring Plans are controlled and will be issued only to persons who have a need to know and are trained by the Ecology Group or the DOE. The DOE Los Alamos Area Office is responsible for notifying the USFWS of occupancy of suitable habitat.

The schedule and milestones for individual monitoring activities are included in each Monitoring Plan. They take into consideration available resources, as well as technical and regulatory drivers. The final schedules and milestones are formalized in a work package agreement that is presented in each Monitoring Plan and is also submitted to the appropriate LANL organization with a request for funding.

The costs of implementing Monitoring Plan activities are evaluated yearly through a formal project management cost evaluation and estimate process. This process includes a detailed assessment of the scope and schedule for each of the selected activities, as well as the personnel and equipment needed to complete each activity. It also includes a funding source assessment provided by an authorized budget analyst. When the cost evaluation process is completed, a formal work package agreement containing the scope, schedule, and cost for each of the monitoring activities is submitted to the appropriate LANL organization with a request for funding.





## Summary of Roles and Responsibilities

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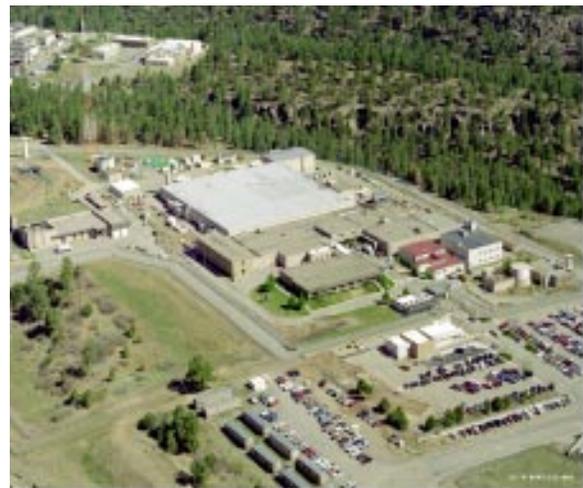
Many organizations were involved in the development of the HMP and will continue to play an active role in ensuring that it responds to changes in the scope of activities occurring at LANL, changes in the regulatory environment, and new information regarding biological resources. Other organizations will have the primary responsibility for implementing the HMP on a day-to-day basis. The following is a summary of the roles and responsibilities of the key organizations involved.

### Roles and Responsibilities

- **USFWS**  
In accordance with the provisions of the ESA, USFWS will consult with DOE on the scope and proposed implementation of the HMP and will provide a letter of concurrence with the HMP.
- **DOE**  
DOE has administrative control of LANL and has developed the regulatory and technical components of the HMP with the Ecology Group and in consultation with the USFWS. The DOE will be responsible for ensuring the HMP is implemented and modified in the future, as needed.
- **University of California**  
The University of California manages and operates LANL under contract for the DOE.
- **Environment, Safety, and Health (ESH) Division**  
This is the division-level line organization responsible for providing guidance and support for implementing all applicable federal, state, and local regulatory requirements specific to the protection of human health and the environment.
- **Ecology Group**  
The Ecology Group developed the regulatory and technical components of the HMP with DOE and will maintain the AEI Site Plan and Monitoring Plan elements, such as species-specific information, habitat delineation and classification maps, species protection criteria, and species/habitat assessment protocols as directed by DOE. The group will conduct species-specific surveys, habitat evaluations, and habitat and species impact assessments, as required. The group will train LANL staff on the use of AEI Site Plans and Monitoring Plans and will review project consistency with the Site Plan activity tables. When a project is found to be outside the range of the activity table, they determine whether a Biological Assessment is needed in consultation with DOE. All HMP implementation requirements will be formally documented by the Ecology Group in specific Laboratory Implementation Requirements (LIRs). The group will also be responsible for implementing necessary changes to the HMP in the future as directed by DOE.



- **Facilities Engineering (FE) Division**  
The FE Division is the division-level line organization responsible for implementing the LANL-wide Facility Management System. FE Division supports Facility Managers (FMs) and other personnel to implement this system in a safe, reliable, and environmentally responsible manner.
- **Facility Managers**  
FMs are responsible for operating LANL facilities in a safe, reliable, and environmentally responsible manner. The FMs are responsible for ensuring the day-to-day implementation of the HMP as an integral part of LANL's LIRs and the Integrated Safety Management program.
- **ESH-Deployed Teams**  
The ESH-Deployed Teams are composed of environmental generalists that review projects and activities for FMs. They provide the first level of screening and will assist the Ecology Group with project review.



- **Line Organizations**  
Line organizations are responsible for following the Laboratory LIRs for management of projects and activities under their control. The HMP components include requirements that will be in the LIR.

Implementing the HMP is a dynamic, ongoing process. The following is a summary of major elements that will require long-term commitments from LANL staff, including funding work packages, in order to facilitate the HMP's success as a planning tool.



## Long-Term Activities Required to Implement the HMP

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### Training

To maintain the highest degree of accuracy and efficiency, organizations and individuals involved in the daily implementation of the HMP must acquire and maintain proper training. The training associated with the AEI Site Plans is targeted for individuals within the Ecology Group, FM staff, ESH-Deployed Teams, and others who are responsible for reviewing project consistency with the activity tables. Specialized training is also provided for individuals within the Ecology Group who conduct technical evaluations (e.g., species-specific surveys, AEI habitat evaluations, habitat and species impact assessments) as part of implementing the AEI Site Plans and Monitoring Plans. This training is intended for individual specialists who are involved in decision making and detailed technical analyses. The training requirements will be formalized and documented as part of the LIR for management of LANL projects and activities related to biological resources.

### Data Management

Data management is required to ensure the viability of the HMP. This includes tracking project reviews and the status of species, and updating maps and AEI boundaries. It also includes periodic checks of the accuracy of land cover maps, analysis of data for prey species, and data storage. Presently, biological data are stored in a GIS database that allows display, query, analysis, and modeling of biological data. This system must be maintained and updated to provide accurate point-in-time assessments.

### Project Review Tools

The AEI concept must be integrated with the ESH-Identification process and other internal tracking project-management tools. Further development of GIS and Web-based management tools is necessary to facilitate this integration.

### Monitoring

Monitoring of species' status and presence/absence is fundamental to the success of the HMP. Although monitoring activities are prioritized on a critical-to-least-critical basis, proactive management will include implementing those activities classified as less than critical. If surveys are not completed in accordance with the schedules and milestones included in the Monitoring Plans, the value of the HMP will be diminished.

### Revision and Updating

AEI Site Plans and Monitoring Plans are controlled documents that will require periodic revision and updating. This may be necessary as a result of listing and delisting of species, changes in survey protocols, and changes in requirements under the ESA.

### Monitoring of Disturbances to Threatened and Endangered Species

The impacts of noise, light, and contaminants to threatened and endangered species must be studied on an ongoing basis to enhance the HMP's usefulness and effectiveness as a planning tool.

## Reporting Requirements

Implementation of the Monitoring Plans requires reporting of findings of presence/absence surveys and occupancy of species to the USFWS.

## Habitat Improvement and Recovery

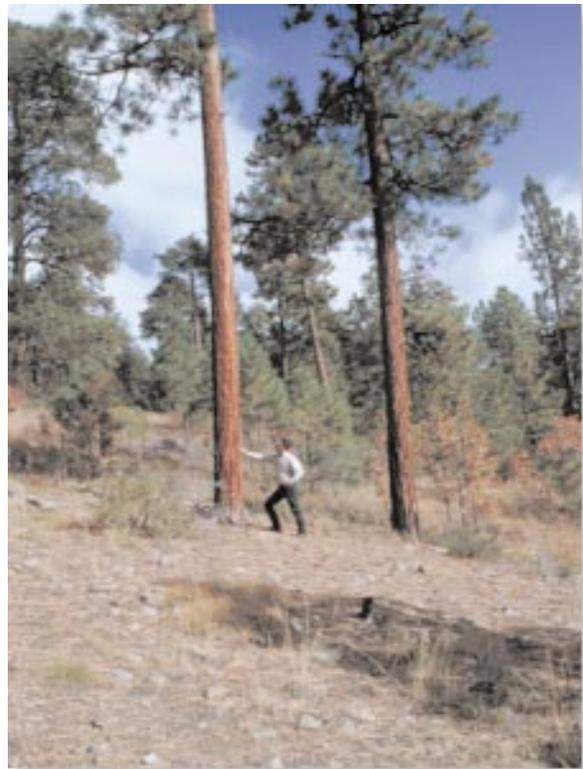
Each AEI Site Plan outlines actions that can protect and improve habitat for a specific species. Activities outlined under species recovery plans developed by USFWS should be considered as a means of improving habitat. They also should be considered when planning other activities, such as fire management, wetland management, and forest management.

## Regional Coordination

Each Monitoring Plan outlines the opportunities for regional studies of specific species, which will allow for better management of the AEIs. DOE and LANL staff will cooperate with the East Jemez Resource Council, a coordinating body for regional natural and cultural resource management, nearby pueblos, Bandelier National Monument, the U.S. Forest Service, and other key agencies to ensure that the HMP is integrated with the management plans for surrounding areas and that cumulative impacts from actions in these areas are addressed.

## Metrics Tracking

This HMP describes social, management, and ecological metrics that will be used on an ongoing basis to measure the plan's success.





## Changes to the Habitat Management Plan

Federal requirements under the ESA may vary as the law is changed and as individual species are listed or delisted. For these reasons, the HMP includes a mechanism for incorporating necessary technical and regulatory changes. Changes in how the HMP is implemented may result from both internal and external factors. The internal factors may include the following:

- changes in the data gathered from AEI Site Plans or Monitoring Plans regarding species presence, location, or habitat;
- changes in the prioritization scheme for individual AEI Site Plans or Monitoring Plan activities; and
- changes in the technical approach to conducting AEI Site Plans and Monitoring Plan activities.
- changes in DOE and LANL missions, facility operating procedures, or organizational structure; and

The external factors may include the following:

- changes in the ESA;
- changes in the USFWS implementation of the ESA and associated procedures and protocols;
- listing and delisting of species or declaration a species is extinct.

The HMP will be modified as necessary based on an assessment of these and other relevant factors. In addition, the HMP will be reviewed for technical and regulatory accuracy every five years. Following these assessments, the contents of the AEI Site Plans and Monitoring Plans will be revised as necessary. The Ecology Group will submit recommended changes to DOE, who will seek USFWS concurrence on the revisions through informal consultation. In some cases, depending on the scope and extent of changes, the USFWS may initiate formal consultation with DOE and LANL staff. All changes will be tracked in the metrics and performance measures of the HMP.





## Metrics and Corrective Actions

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A critical component of measuring the success of the HMP is the development and tracking of key metrics. These metrics will allow the DOE and the Ecology Group to assess whether the HMP's goals and objectives have been met and specifically to:

- accurately gauge the ecological success of the HMP;
- measure the level of support that the HMP provides to the overall mission of the DOE at LANL; and
- assess the integration of the HMP into the environmental planning process at LANL.

Of utmost importance is the careful selection of metrics that accurately gauge the success of the HMP. Metrics have been developed for three key areas—social, management, and ecological—and the appropriate corrective actions will be implemented in these areas when deemed necessary.

### **Social, Management, and Ecological Metrics**

Several critical individual metrics were developed for each key area to most accurately assess success of each key area as a whole. These were selected in order to capture the key area using the fewest, but most accurate, metrics. Below is a list of metrics that will be used.

### **Social**

- Measure the institutional and public approval level of the HMP through an annual survey.
- Track the total number of threatened and endangered species-related cooperative efforts with external agencies (e.g., East Jemez Resource Council, Native American Pueblos, U.S. Forest Service, Bandelier National Monument).

### **Management**

- Estimate the temporal and economic savings the HMP provides to the Los Alamos National Laboratory related to the development of new projects, operations of existing facilities, maintenance, and similar activities, based on a formula that includes such factors as avoidance of delay, decrease in consultations, and decreased cost related to the Biological Assessment process for ESA Section 7 consultation.

### **Ecological**

- Track development (roads, buildings, etc.) in any threatened and endangered species buffer zones.
- Track the preservation and protection of all core areas.
- Assess the distribution and reproductive success of all threatened and endangered species within LANL boundaries.

## Social Metrics

*“Measure the institutional and public approval level of the HMP through an annual survey.”*

Measuring the institutional and public approval level of the HMP will be accomplished by conducting a professional, well organized, annual survey to be distributed to select groups internal and external to DOE and the University of California. The HMP will not function at an optimal level without institutional and public approval.

*“Track the total number of threatened and endangered species-related cooperative efforts with external agencies (e.g., East Jemez Resource Council, Native American Pueblos, U.S. Forest Service, Bandelier National Monument).”*

An excellent gauge of the integration of the HMP with outside agencies and an assessment of the contributions the HMP provides to those external agencies, will be the total number of cooperative efforts with these agencies. The HMP will need to be highly integrated with external resource management plans if it is to be a success.

## Management Metrics

*“Estimate the temporal and economic savings the HMP provides to LANL related to the development of new projects, operations of existing facilities, maintenance, and similar activities, based on a formula that includes such factors as avoidance of delay, decrease in consultations, and decreased cost of Biological Assessment process.”*

If the HMP is to be successful in the key area of management, it must provide DOE with temporal and economic savings. Through proactive and organized planning, the HMP will orchestrate the integration of biological concerns with project- and maintenance-related concerns. If followed closely, the HMP guidelines will result in both temporal and economic savings. The success of the HMP will be judged by a simple algorithm aimed at calculating total savings.

## Ecological Metrics

*“Track the development in any threatened and endangered species buffer zones.”*

A critical component in measuring the HMP's ecological success will be tracking the development of the designated threatened and endangered species buffer zones. These buffer zones were carefully designated using the best scientific knowledge concerning potential impacts to the species. Using GIS, the DOE and the Ecology Group will track all buffer zone development to assure the designated development ceiling is not surpassed.

*“Track the preservation and protection of all core areas.”*

Like the buffer zones, the core areas were carefully and logically designated using best scientific knowledge. The AEI Site Plans outline specific activities that are allowed in the core areas. Again, using a tracking system, the DOE and the Ecology Group will ensure that all recommended activities are being carefully followed, which will assure protection of the species.

*“Assess the distribution and reproductive success of all threatened and endangered species within LANL boundaries.”*

A critical element of the HMP is the actual protection of species. Protection of species includes the maintenance of a suitable habitat; this, in turn, promotes successful reproduction and increased distribution of the species. If the species at LANL are experiencing ecologically successful levels of reproduction and distribution, the HMP will be successful.

### **Feedback Loop and Corrective Actions**

Metrics will be used to measure the success levels of the HMP. When the metrics indicate that the HMP is not successful at meeting the desired expectations as a management tool, corrective actions will be undertaken, including but not limited to the following:

1. Updating AEI Site Plans and the designated AEIs.
2. Updating Monitoring Plans.
3. Integrating the HMP with LANL projects earlier in the process.
4. Increasing training for individuals working with the HMP, including the ESH-Deployed Teams.
5. Consulting with USFWS to make changes or additions to the HMP, such as adding new species or AEIs.
6. Increasing the cooperative efforts with outside agencies.

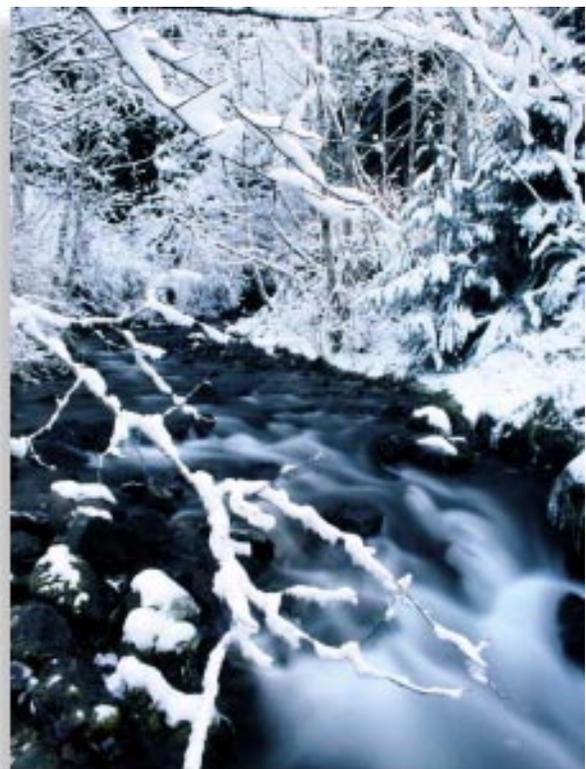




## Conclusion

This HMP has been prepared in the spirit of DOE's goal of using "thoughtful planning to sustain the natural systems for which we are stewards." The plan is comprehensive, providing for the protection of threatened and endangered species while allowing the maximum flexibility for LANL operations. By taking a proactive approach to resource management, it prevents problems rather than trying to solve them after they have already occurred.

The HMP will be a dynamic, evolving document. It continually will be assessed to assure it is being used according to the original goals and objectives of those who developed it. By using the metrics described above, the DOE and LANL staff will be able to measure the success of the HMP, and if needed, take corrective actions to mitigate the problems. Because the HMP can improve over time, it has the potential to accomplish not only the original goals and objectives, but to go beyond that which was originally anticipated.





## Literature Cited

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- Bennett, K. 1995. Endangered and threatened species potentially occurring in Los Alamos and Guaje Canyons. Pages 277–283 in *Ecological baseline studies in Los Alamos and Guaje Canyons, County of Los Alamos, New Mexico* (compiled by T.S. Foxx). LA-13065-MS, Los Alamos National Laboratory, Los Alamos, New Mexico.
- Clark, W.S. and B.K. Wheeler. 1987. *A field guide to hawks of North America*. Houghton Mifflin Company, New York, New York.
- DOE/AOO-LAAO. 1995. Dual Axis Radiographic Hydrodynamic Test Facility, final environmental impact statement. DOE/EIS-0228, Department of Energy, Albuquerque Operations Office and the Los Alamos Area Office, Albuquerque, New Mexico.
- DOE/AOO-LAAO. 1996. Dual Axis Radiographic Hydrodynamic Test Facility, final environmental impact statement, mitigation action plan. DOE/EIS-0228, Department of Energy, Albuquerque Operations Office and the Los Alamos Area Office, Albuquerque, New Mexico.
- Finch, D.M. 1992. Threatened, endangered, and vulnerable species of terrestrial vertebrates in the Rocky Mountain Region. USDA Forest Service general technical report RM-215, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.
- Findley, J.S. 1987. *The natural history of New Mexican mammals*. University of New Mexico Press, Albuquerque, New Mexico.
- Hubbard, J.P. 1985. *Handbook of species endangered in New Mexico*. New Mexico Department of Game and Fish, Santa Fe, New Mexico.
- Hubbard, J.P., M.C. Conway, H. Campbell, G. Schmitt, and M.D. Hatch. 1979. *Handbook of species endangered in New Mexico*. New Mexico Department of Game and Fish, Santa Fe, New Mexico.
- Johnson, T. H. 1996. Topographical model of potential spotted owl habitat in northern New Mexico Prepared for Santa Fe National Forest, PO 43-8379-5-0391, and Los Alamos National Laboratory, Agreement Number C-5379.
- Keller, D.C., T.H. Johnson, S.W. Koch, E. Nelson, T.K. Haarmann, J.A.R. Ladyman, M. Altenbach, N. Monteith, M. A. Bogan, T.J. O'Shea, and T.S. Foxx 1997. Annual monitoring report on the status of threatened, endangered, and sensitive species at Los Alamos National Laboratory. LA-UR-97-4615. Los Alamos National Laboratory, Los Alamos, New Mexico.
- Keller, D.C., J.R. Biggs, and T.H. Johnson. 1996. Threatened and endangered species surveys and habitat management at Los Alamos National Laboratory. LA-UR-96-3444. Los Alamos National Laboratory, Los Alamos, New Mexico.
- Lewis, J., USFWS, Albuquerque, NM, Personal Communication (1995).
- Travis, J.R. 1992. *Atlas of the breeding birds of Los Alamos County, New Mexico*. LA-12206. Los Alamos National Laboratory. Los Alamos, New Mexico.

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Editing: Hector A. Hinojosa

Photography credits:

Teralene S. Foxx

David C. Keller

Carolyn and Tom Jervis

D. Robert Franz

New Mexico Department of Game and Fish

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