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*Author(s):* Charles D. Hathcock, Leslie A. Hansen, and David C. Keller



Cover photo: Composite photos of various sensitive animal and plant species within and around Los Alamos National Laboratory.

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## Introduction

This Best Management Practices Source Document will enhance the stewardship for sensitive species at Los Alamos National Laboratory (LANL). Federally-protected species are already managed at LANL under the Biological Resources Management Plan, the Habitat Management Plan, and Migratory Bird Best Management Practices Document. There is a gap in management for species not protected by the *Endangered Species Act* (ESA) or the *Migratory Bird Treaty Act* (MBTA). This plan addresses species protected on state and local levels.

The species considered in this plan are identified by federal or state agencies or non-government organizations under one or more of six different categories. LANL biological resources subject matter experts (SMEs) selected these seven categories because of their applicability to species in this area and requirements for evaluation of project impacts on some of these categories of species under the *National Environmental Policy Act*.

The categories are:

- proposed species (United States Fish and Wildlife Service [USFWS]),
- federal candidate (USFWS),
- federal species of concern (USFWS),
- New Mexico endangered (New Mexico Department of Game and Fish [NMDGF]),
- New Mexico threatened (NMDGF),
- New Mexico sensitive (informal) (NMDGF), and
- critically imperiled in New Mexico (S1) (Natural Heritage New Mexico).

Proposed species are those candidate species that were found to warrant listing as either threatened or endangered and were officially proposed as such in a *Federal Register* notice after the completion of a status review and consideration of other protective conservation measures. Public comment is always sought on a proposal to list species under the ESA.

Federal candidate species are plants and animals for which the USFWS has sufficient information on their biological status to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher-priority listing activities. Candidate species receive no statutory protection under the ESA; however, the USFWS encourages the formation of partnerships to conserve these species because they are by definition species that may warrant future protection under the ESA.

Federal species of concern refers to species that the USFWS considers might be in need of conservation action. This may range from a need for periodic monitoring of populations and threats to the species and its habitat, to the necessity for listing as threatened or endangered. Such species receive no legal protection and use of the term “federal species of concern” does not necessarily imply that a species will eventually be proposed for listing.

New Mexico endangered is defined in the *Wildlife Conservation Act* [17-2-37 to 17-2-46 NMSA (New Mexico Statutes Annotated) 1978]: "ENDANGERED SPECIES" "formerly

called 'Group 1'" means any species of fish or wildlife whose prospects of survival or recruitment within the state are in jeopardy due to any of the following factors: 1) the present or threatened destruction, modification, or curtailment of its habitat; 2) overutilization for scientific, commercial, or sporting purposes; 3) the effect of disease or predation; 4) other natural or human-made factors affecting its prospects of survival or recruitment within the state; or 5) any combination of the foregoing factors.

New Mexico threatened is defined in the Wildlife Conservation Act [17-2-37 to 17-2-46 NMSA 1978]: "THREATENED SPECIES" "formerly called 'Group 2'" means any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range in New Mexico; the term may also include any species of fish and wildlife appearing on the United States list of endangered native and foreign fish and wildlife as set forth in Section 4 of the ESA as threatened species, provided that the commission adopts the list in whole or in part.

New Mexico sensitive (informal) is designated by the NMDGF. This designation is for taxa that, in the opinion of a qualified NMDGF biologist, deserve special consideration in management and planning, but are not listed threatened or endangered by the State of New Mexico. These may include taxa that are listed threatened, endangered or sensitive by other agencies; taxa with limited protection; and taxa without any legal protection. The intent of this category is to alert land managers to the need for caution in management where these taxa may be affected. Where the NMDGF lacks in-house expertise, the opinion of a recognized authority for the taxa is used.

Critically imperiled (S1) status is designated by Natural Heritage New Mexico. These species are critically imperiled in the state because of extreme rarity or because of some factor(s) making them especially vulnerable to extirpation. Typically there are five or fewer geographic occurrences of the species or very few remaining individuals. The status is based on the estimated number of extant occurrences of the element and other factors such as trends, threats, and abundance.

The Bald Eagle receives specific protections under the *Bald Eagle Protection Act of 1940*. This law provides for the protection of the Bald Eagle (the national emblem) and the Golden Eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures.

## **Sensitive Species Best Management Practices Document**

This document was prepared by LANL biological resources SMEs as a site-wide mitigation plan to reduce risks to species protected under state statutes or otherwise identified as needing special conservation action. The best management practices in this plan will assist in making recommendations for project activities at LANL and will provide mitigation measures for the reduction of risks to sensitive species. By avoiding or minimizing the impact of activities on sensitive species populations and otherwise implementing the terms of this document, LANL can reduce or eliminate the biological significance of any potential violation of state statutes, as well as the possibility of enforcement action.

## Risks to Sensitive Species at LANL

At LANL, the most significant risk to sensitive species is the loss, alteration, or fragmentation of their habitat. Since the sensitive species encompass a wide variety of taxa, and they occur in different habitat types at LANL, best management practices are developed for each species.

Table 1 lists all sensitive species at LANL. This table is periodically updated and can be found on the LANL biological resources' webpage:

<http://int.lanl.gov/environment/bio/controls/index.shtml>.

**Table 1. Sensitive Species Occurring or Potentially Occurring at LANL**

Scientific Name	Common Name	Protected Status <sup>1</sup>	Potential to Occur <sup>2</sup>
<i>Gila pandora</i>	Rio Grande Chub	NMS	Moderate
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	NMT, FSOC	High
<i>Falco peregrinus tundrius</i>	Arctic Peregrine Falcon	NMT, FSOC	Moderate
<i>Haliaeetus leucocephalus</i>	Bald Eagle	NMT, S1	High
<i>Cynanthus latirostris magicus</i>	Broad-billed Hummingbird	NMT	Low
<i>Accipiter gentilis</i>	Northern Goshawk	NMS, FSOC	High
<i>Coccyzus americanus occidentalis</i>	Yellow-billed Cuckoo (western population)	PT, NMS	High
<i>Lanius ludovicianus</i>	Loggerhead Shrike	NMS	High
<i>Vireo vicinior</i>	Gray Vireo	NMT	Moderate
<i>Amazilia violiceps</i>	Violet-crowned Hummingbird	NMT	Low
<i>Myotis ciliolabrum melanorhinus</i>	Western Small-footed Myotis Bat	NMS	High
<i>Myotis volans interior</i>	Long-legged Myotis Bat	NMS	High
<i>Euderma maculatum</i>	Spotted Bat	NMT	High
<i>Corynorhinus townsendii pallescens</i>	Pale Townsend's Big-eared Bat	NMS, FSOC	High
<i>Nyctinomops macrotis</i>	Big Free-tailed Bat	NMS	High
<i>Bassariscus astutus</i>	Ringtail	NMS	High
<i>Vulpes vulpes</i>	Red Fox	NMS	Moderate
<i>Ochotona princeps nigrescens</i>	Goat Peak Pika	NMS, FSOC	Low
<i>Zapus hudsonius luteus</i>	New Mexico Meadow Jumping Mouse	PE, NME,	Moderate
<i>Lilium philadelphicum var. andinum</i>	Wood Lily	NME	High
<i>Cypripedium calceolus var. pubescens</i>	Greater Yellow Lady's Slipper	NME	Moderate
<i>Speyeria nokomis nitocris</i>	New Mexico (Mountain) Silverspot Butterfly	FSOC	Moderate

<sup>1</sup> PE = Proposed Endangered; PT = Proposed Threatened; C = Federal Candidate Species; NMS = New Mexico Sensitive Taxa (informal); S1 = Heritage New Mexico: Critically Imperiled in New Mexico; NMT = New Mexico Threatened; NME = New Mexico Endangered; FSOC = Federal Species of Concern.

<sup>2</sup> Low = No known habitat exists on LANL; Moderate = Habitat exists, although the species has not been recorded recently; High = Habitat exists and the species is recorded to occur at LANL.

## **Best Management Practices**

The species that have a high probability of occurrence at LANL have best management practices associated with them to assist project managers in avoiding impacts. Best management practices for each species are listed below.

### ***Yellow-billed Cuckoo***

- Avoid disturbing riparian and wetland vegetation along the Rio Grande and the lower reaches in canyons along the river.

### ***American Peregrine Falcon***

- Avoid disturbing cliff structure in the canyons between 01 March and 15 May or have a biological resources SMEs survey the cliffs for peregrine nests.

### ***Bald Eagle***

- In the Bald Eagle core habitat area along LANL's eastern boundary with the Rio Grande, comply with the suggested practices adopted by the electrical industry (APLIC 2006) for new power lines. Priority should be given to poles likely to be used by raptors or other birds with a high electrocution risk.
  - (A) A minimum of 60-in. [1.5-m] (48-in. [1.2-m] vertical and 60-in. [1.5-m] diagonal) spacing between electrically conductive points on the power line through spacing in new construction or shielding (e.g., phase-to-phase or phase-to-ground);
  - (B) The use of covered/insulated coverings over bare conductors at structures.
- Retrofit old power poles identified as problems. Suggested Practices states that "95 percent of all eagle electrocutions could be eliminated by correcting 2 percent of all the poles." Fabricated products are available to retrofit poles to make them unattractive for perching or to provide insulation to prevent phase-to-phase and phase-to-ground contact by birds.
- Do not remove large ponderosa pines in the drainages along the Rio Grande as they are used as roosting trees by wintering Bald Eagles.

### ***Other Avian Species***

- Avoid killing nesting birds by avoiding habitat alterations during the nesting season between 01 June and 31 July.
- If habitat alterations are going to take place between June 01 and July 31, have a biological resources SME survey the area for bird nests before beginning the project.
- Avoid removing large standing dead ponderosa pine trees unless they are a hazard tree.

### ***Bat Species***

- Avoid disturbing ponded areas or intact wetlands in the summer months.
- Avoid disturbing cliff structure in canyons in the summer months.
- Avoid removing standing dead trees in the summer months.

### ***Ringtail***

- Avoid disturbing riparian habitat.

### ***Wood Lily***

- Do not perform any ground-disturbing work until surveys take place during the summer months in canyon bottoms that contain perennial water (along LANL's western boundary).

## Species Descriptions

Descriptions of all sensitive species identified as potentially occurring at LANL are listed below.

### ***Rio Grande Chub***



Photo Credit: Unknown

Common Name: Rio Grande chub

Scientific Name: *Gila pandora*

Distribution: The native range of the Rio Grande chub is thought to have included most streams in the Rio Grande and Pecos River basins (Sublette et al. 1990) and the San Luis Closed Basin (Zuckerman and Bergersen 1986, Zuckerman and Langlois 1990). This species has likely been extirpated from the mainstream Rio Grande and now is found only in tributary streams (Bestgen et al. 2003).

Habitat Associations: The Rio Grande chub is able to inhabit both riverine and lacustrine habitats (Zuckerman and Langlois 1990). It has been known to thrive at elevations up to 3,470 m (11,370 ft; Kerr Lake) (Zuckerman and Langlois 1990). It is usually found in pools with overhanging banks and brush (Rinne 1995). Platania (1991) found the Rio Grande chub to be part of a guild preferring cool, fast-flowing reaches with gravel or cobble substrate. Bestgen et al. (2003) found that substrate particle size, stream width, and presence of brown trout were important variables that explained the presence of Rio Grande chub in the Rio Grande Basin, Colorado.

National-level Conservation Status: None

State-level Conservation Status: New Mexico Sensitive

LANL Status: Possibly occurs in the Rio Grande along LANL's eastern boundary. No known surveys have been completed.

### **Habitat Model for the Rio Grande Chub**

None are available.

## **Yellow-billed Cuckoo**

Common Name: Yellow-billed Cuckoo (western population)

Scientific Name: *Coccyzus americanus occidentalis*

Distribution: Breeds from southeastern Canada southward to Mexico and the Caribbean, westward to the Great Plains, and in scattered localities across the West.

Habitat Associations: Open woodlands with clearings and dense scrubby vegetation, often along water. Yellow-billed Cuckoos observed in New Mexico have been found in areas dominated by salt cedar (*Tamarix aphylla*) and breeding populations have been documented along the Pecos and Rio Grande Rivers. (NM Avian Conservation Partners 2011; Sogge et al. 2008) Numerous studies have documented a large area habitat requirement, ranging from 3 ha to 99 ha (New Mexican Avian Conservation Partners 2011). The Yellow-billed Cuckoo may require habitat similar to that of species documented along the Sacramento River, 300 m in length and 100 m in width (Gaines 1974) or upwards of 10 ha of contiguous riparian woodland for nesting (Wiggins 2005) and nesting incidences may be linked to the presence and abundance of cicada populations in dense cottonwood stands (Johnson et al. 2007).



Photo Credit: Unknown

National-level Conservation Status: MBTA, Federal Proposed Threatened Species

State-level Conservation Status: New Mexico Sensitive

LANL Status: The Yellow-billed Cuckoo has been documented on the Rio Grande near the LANL's eastern boundary, although it is not reported in Travis (1992). It likely occurs along the Rio Grande near LANL, but biological resources SMEs have determined that sufficient habitat (large tracts of largely undisturbed riparian woodland) does not exist on LANL property to support a Yellow-billed Cuckoo population. Breeding bird surveys have found this species in Los Alamos County in the fall.

### **Habitat Model for the Yellow-billed Cuckoo**

None are Available

## **American Peregrine Falcon**



Photo Credit: Unknown

Common Name: American Peregrine Falcon

Scientific Name: *Falco peregrinus anatum*

Distribution: The American Peregrine Falcon is the most common peregrine in the contiguous United States (the lower 48 states) and southern Canada and is also called the American Peregrine. Occupancy by any peregrine was 83% statewide within New Mexico, and remained below the recovery goal of 85% in every region except the Colorado Plateau (Johnson and Williams III 2006).

Habitat Associations: The American Peregrine Falcon is known to inhabit terrestrial, terrestrial inland aquatic and coastal habitats.

National-level Conservation Status: Federal species of concern, Migratory Bird Treaty Act

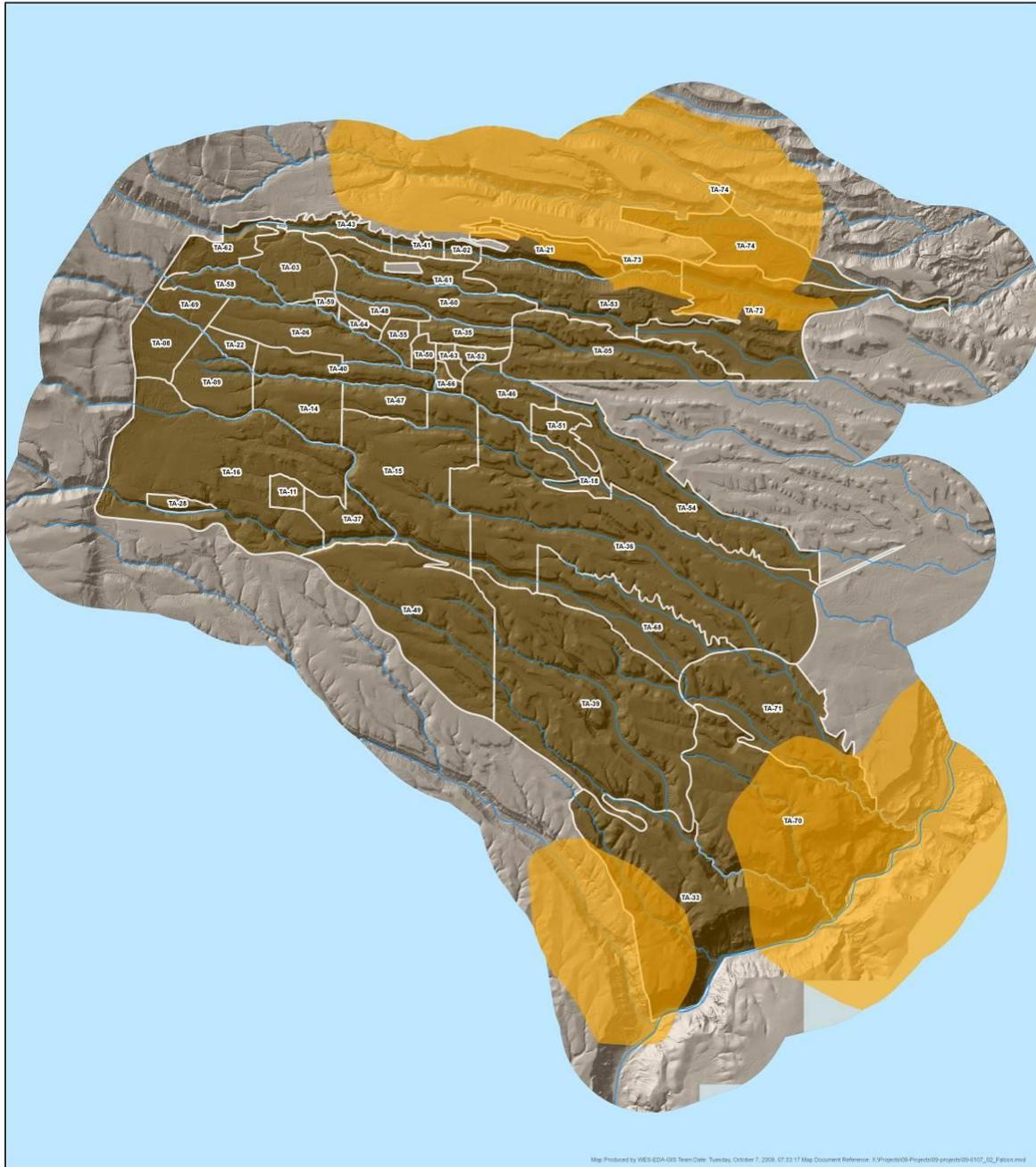
State-level Conservation Status: New Mexico Threatened

LANL Status: No confirmed breeding was documented in Travis (1992), although the species has been documented in Los Alamos County (D. Ponton, pers. comm. 2013).

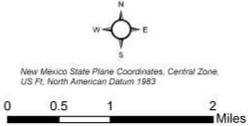
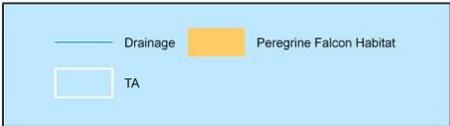
### **Habitat Model for the American Peregrine Falcon**

Habitat requirements were modeled using GIS and predicted habitat has been mapped (Figure 2). The model was based on mapping performed for the Habitat Management Plan (LANL 1998). The model identifies cliff structures at LANL that have supported peregrines in the past or that could be used as nesting habitat in the future.

# Peregrine Falcon Habitat Within and Near LANL



Map Produced by WES-EDA/GIS Team Date: Tuesday, October 7, 2008, 07:33:17 Map Document Reference: X:\Projects\08-Projects\08-0107\_02\_Falcon.mxd



This map was created for work processes associated with the Sensitive Species Management Plan. All other uses for this map should be confirmed with LANL ENV-EAQ.

DATA SOURCES:  
 1) Technical Area Boundaries: Los Alamos National Laboratory, Site Planning and Project Initiation Group, Infrastructure Planning Office, September 2007; as published 04 December 2008.  
 2) WQH Drainage\_arc: Los Alamos National Laboratory, ENV Water Quality and Hydrology Group, 1:24,000 Scale Date: 03 June 2003.  
 3) Peregrine Falcon, Los Alamos National Laboratory, ENV Ecology and Air Quality, October 1998, LALP-98-112

Figure 2. Modeled potential American Peregrine Falcon habitat at LANL.

## ***Arctic Peregrine Falcon***



Photo Credit: Unknown

Common Name: Arctic Peregrine Falcon

Scientific Name: *Falco peregrinus tundrius*

Distribution: The Arctic Peregrine Falcon is also called "tundrius" because it refers to the terrain of the far north—the tundra.

Habitat Associations: The Arctic Peregrine Falcon is known to inhabit terrestrial, terrestrial inland aquatic and coastal habitats (Hubbard 1978).

National-level Conservation Status: Federal Species of Concern, MBTA

State-level Conservation Status: New Mexico Threatened

LANL Status: No confirmed breeding has been documented in Los Alamos County, although the species may migrate through the area.

### **Habitat Model for the Arctic Peregrine Falcon**

None are available; however, if the species did migrate through the area it would utilize the same habitat modeled for the American peregrine falcon.

## **Bald Eagle**

Common Name: Bald Eagle

Scientific Name: *Haliaeetus leucocephalus*

Distribution: The Bald Eagle breeds near water from Alaska throughout Canada and in scattered localities in nearly all of the United States. There is also a small number in Mexico. They winter in coastal Alaska and Canada and throughout the lower 48 states.

Habitat Associations: The Bald Eagle is found only in North America, generally in coastal areas or near large inland lakes and rivers that have abundant fish and shores with large trees.

National-level Conservation Status: Bald Eagle Protection Act, MBTA

State-level Conservation Status: New Mexico Threatened

LANL Status: The Bald Eagle is commonly seen along the Rio Grande on LANL's eastern boundary during the winter months, although it is not reported in Travis (1992). The entire LANL site is considered potential wintering habitat for the species.

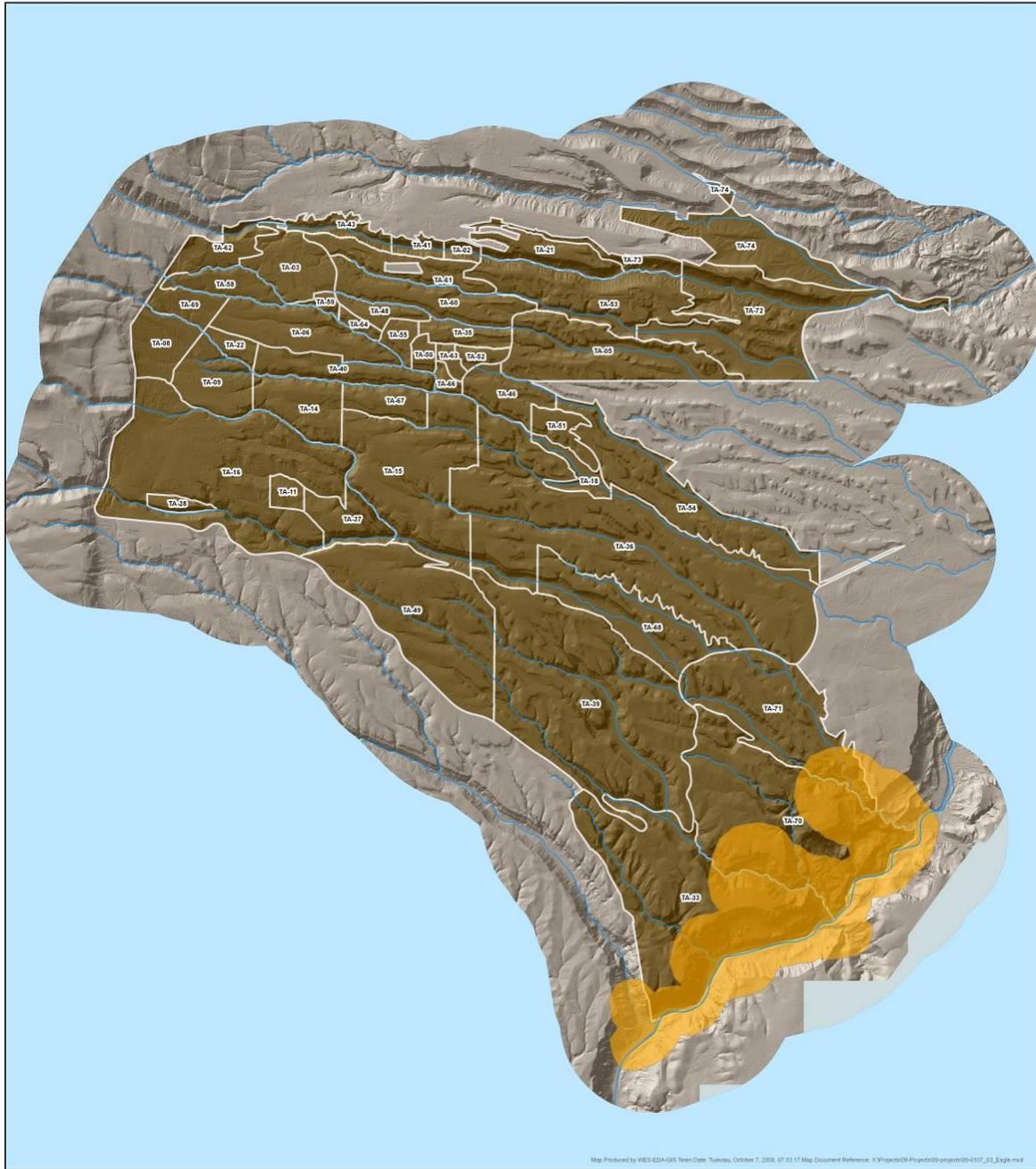
### **Habitat Model for the Bald Eagle**

Habitat requirements were modeled using GIS and predicted habitat has been mapped (Figure 3). The model was based on mapping performed for the Habitat Management Plan (LANL 1998). The model is centered on large roost trees along the Rio Grande on LANL's eastern boundary that have previously supported Bald Eagles.

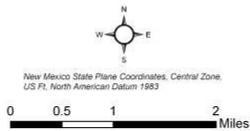


Photo Credit: USFWS

# Bald Eagle Wintering Habitat Within and Near LANL



Map Produced by WES-EDA/GIS Team Date: Tuesday, October 7, 2008, 07:33:17 Map Document Reference: X:\Projects\08-Projects\08-0107\_03\_Eagle.mxd



This map was created for work processes associated with the Sensitive Species Management Plan. All other uses for this map should be confirmed with LANL ENV-EAQ.

DATA SOURCES:  
1) Technical Area Boundaries: Los Alamos National Laboratory, Site Planning and Project Initiation Group, Infrastructure Planning Office, September 2007; as published 04 December 2008.  
2) WQH Drainage\_arc: Los Alamos National Laboratory, ENV Water Quality and Hydrology Group, 1:24,000 Scale Date: 03 June 2005.  
3) Bald Eagle: Los Alamos National Laboratory, ENV Ecology and Air Quality, October 1998, LALP-98-112.

Figure 3. Modeled potential Bald Eagle habitat at LANL.

## **Broad-Billed Hummingbird**



Photo Credit: Unknown

Common Name: Broad-billed Hummingbird

Scientific Name: *Cynanthus latirostris magicus*

Distribution: The Broad-billed Hummingbird is found from southern Arizona and southwestern New Mexico southward throughout most of Mexico to Chiapas. In New Mexico this species summers regularly in Guadalupe Canyon (Hidalgo County), which is its main habitat area in the state. Birds have been reported on occasion near Los Alamos and Bandelier National Monument, Las Vegas, Truth or Consequences, Las Cruces, and Carlsbad Caverns National Park.

Habitat Associations: In the United States, this hummingbird is found in riparian woodlands at low to moderate elevations. In Guadalupe Canyon, these woodlands are characterized by cottonwoods, sycamores, white oaks, and hackberries.

National-level Conservation Status: MBTA

State-level Conservation Status: New Mexico Threatened

LANL Status: There are historical reports of this species in Los Alamos County. It was not listed in Travis (1992).

### **Habitat Model for the Broad-billed Hummingbird**

None are available.

## **Northern Goshawk**



Photo Credit: Unknown

Common Name: Northern Goshawk

Scientific Name: *Accipiter gentiles*

Distribution: Breeds from Alaska throughout most of Canada to New England, the northern Great Lakes region, and the Rockies, Cascades, and Sierra Nevada. Also breeds in the Mexican highlands and throughout much of northern Europe and Asia as far south as Iran in mountainous areas.

Habitat Associations: Various forest types especially mature forest.

National-level Conservation Status: Federal Species of Concern, MBTA

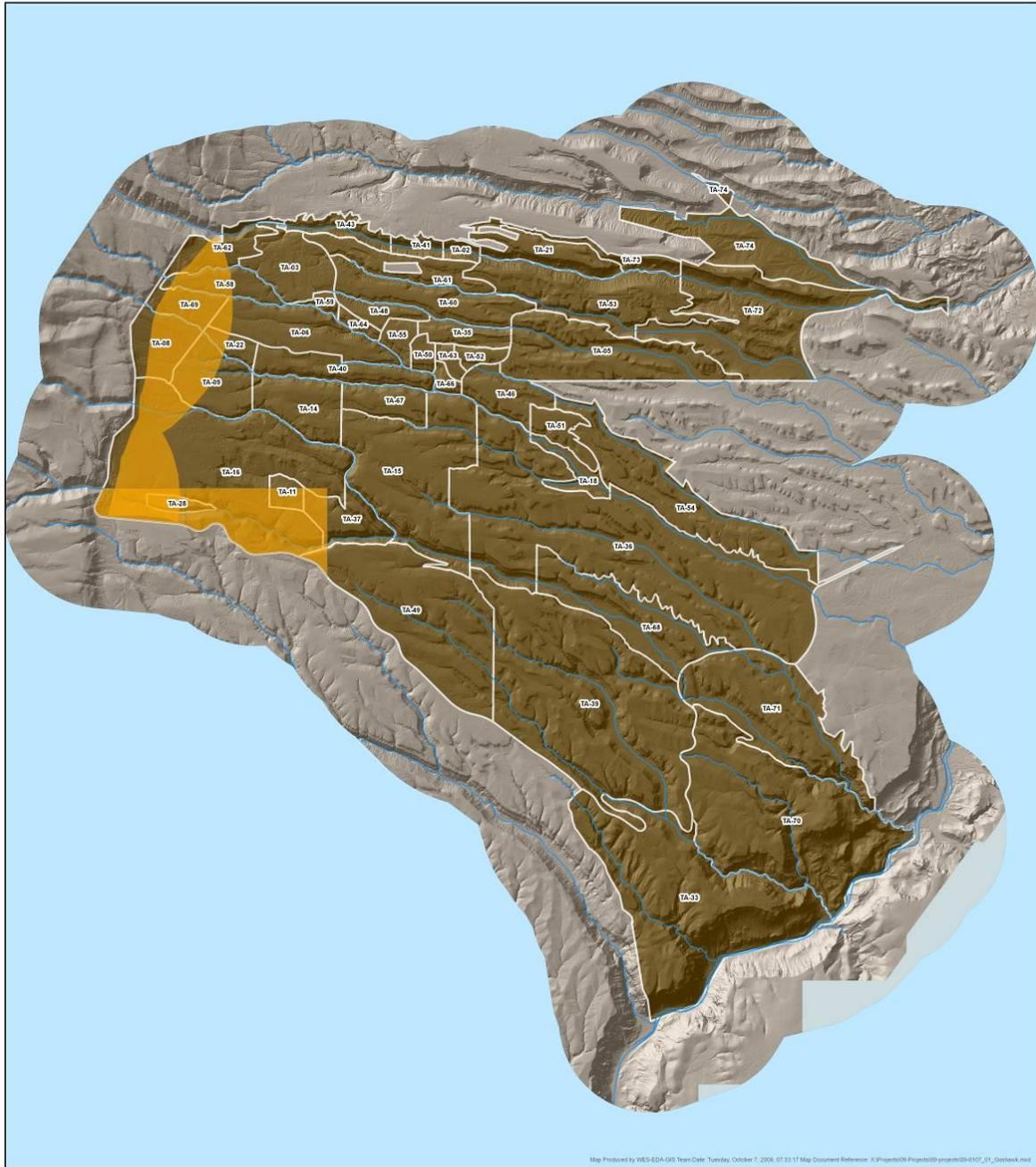
State-level Conservation Status: New Mexico Sensitive

LANL Status: Travis (1992) lists the northern goshawk as breeding in Los Alamos County and potentially breeding on LANL property in Water Canyon.

### **Habitat Model for the Northern Goshawk**

Habitat requirements were modeled using GIS and predicted habitat has been mapped (Figure 4). The model was based on mapping performed for the Habitat Management Plan (LANL 1998) on research by Pat Kennedy. The habitat is based on formerly active nesting sites along the western boundary of the Laboratory.

# Northern Goshawk Habitat Within and Near LANL



Map Produced by WES-EDA/GIS Team Date: Tuesday, October 7, 2009, 07:33:17 Map Document Reference: X:\Projects\09-Projects\09-0107\_01\_Goshawk.mxd

Drainage
  Goshawk Habitat

TA

New Mexico State Plane Coordinates, Central Zone,  
 US Ft. North American Datum 1983

0    0.5    1    2  
 Miles

This map was created for work processes associated with the Sensitive Species Management Plan. All other uses for this map should be confirmed with LANL ENV-EAQ.

DATA SOURCES:  
 1) Technical Area Boundaries: Los Alamos National Laboratory, Site Planning and Project Initiation Group, Infrastructure Planning Office, September 2007, as published 04 December 2008.  
 2) WQH Drainage\_arc: Los Alamos National Laboratory, ENV Water Quality and Hydrology Group, 1:24,000 Scale Data, 03 June 2005.  
 3) Northern Goshawk: Los Alamos National Laboratory, ENV Ecology and Air Quality, September 2009. (Developed from Travis, J.R. 1992. Atlas of the Breeding Birds of Los Alamos County, New Mexico. Pajarito Ornithological Survey, Los Alamos National Laboratory report LA-12208 and Series O-1, and P.L. Kennedy, 1994. 1994 Northern goshawk inventory on portions of Los Alamos National Laboratory, Los Alamos, NM. LA-6165-95-2.)

Figure 4. Modeled potential Northern Goshawk habitat at LANL.

## **Loggerhead Shrike**



Photo Credit: Unknown

Common Name: Loggerhead Shrike

Scientific Name: *Lanius ludovicianus*

Distribution: Summer Range: Breeds from central prairie provinces and the Canadian border southward to Florida and southern Mexico. Winter Range: Winters from very southern Oregon, southern Kansas, Tennessee, and Virginia southward to southern Mexico.

Habitat Associations: This species uses a variety of habitats from woodlands to grasslands.

National-level Conservation Status: MBTA

State-level Conservation Status: New Mexico Sensitive

LANL Status: The Loggerhead Shrike has been documented in Los Alamos County, although it is not reported in Travis (1992).

### **Habitat Model for the Loggerhead Shrike**

None are available.

## **Gray Vireo**

Common Name: Gray Vireo

Scientific Name: *Vireo vicinior*

Distribution: Breeds locally from southern California (north to Inyo County), southern Nevada, southern Utah, western and southeastern Colorado, and northwestern and central New Mexico south to northwestern Baja California, central and southeastern



Photo Credit: Jack Binch

Arizona, southern New Mexico, western Texas (east to Kinney, Colorado, and Kerr counties), and northwestern Coahuila (Sierra del Carmen). Winters locally in central and southern Baja California, southwestern Arizona (rarely), Sonora (including Tiburón and San Esteban islands), and (rarely) western Texas (Big Bend region) (Barlow et al. 1999).

Habitat Associations: Dry oak-juniper and piñon-juniper woodlands, dry chaparral, and thorn scrub; in migration and winter, also desert and arid scrub.

National-level Conservation Status: MBTA

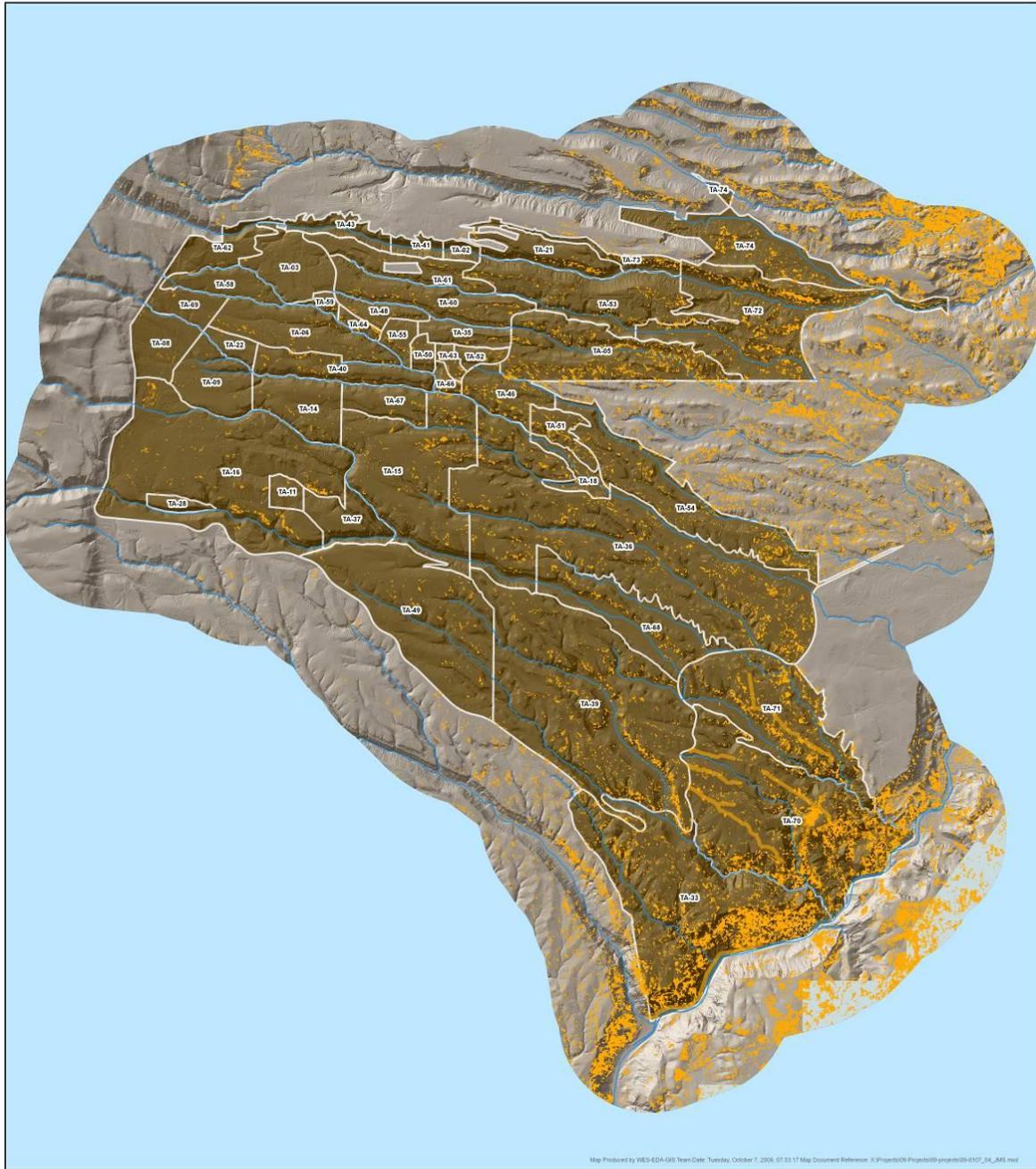
State-level Conservation Status: New Mexico Threatened

LANL Status: Not listed in Travis (1992); documented in Los Alamos County by the New Mexico Breeding Bird Atlas (Breeding Bird Atlas Explorer 2006). Presence/absence surveys began in 2007 along the eastern flanks of LANL, and to date no Gray Vireos have been documented on LANL.

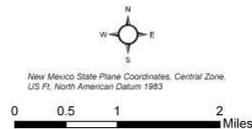
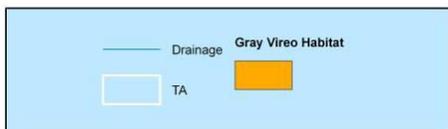
### **Habitat Model for the Gray Vireo**

Habitat requirements were modeled using GIS and predicted habitat has been mapped (Figure 5). The model was based on piñon/juniper land cover categories in McKown et al. 2003. Following the Las Conchas Fire, Gray Vireo habitat along the northeastern LANL boundary was likely reduced in suitability.

# Gray Vireo Habitat Within and Near LANL



Map Produced by WES-EDA/CS Team Date: Tuesday, October 7, 2009, 07:33:17 Map Document Reference: X:\Projects\09-Projects\09-0107\_04\_843.mxd



This map was created for work processes associated with the Sensitive Species Management Plan. All other uses for this map should be confirmed with LANL ENV-EAQ.

DATA SOURCES:  
 1) Technical Area Boundaries: Los Alamos National Laboratory, Site Planning and Project Initiation Group, Infrastructure Planning Office, September 2007, as published 04 December 2008.  
 2) WCH Drainage\_arc: Los Alamos National Laboratory, ENV Water Quality and Hydrology Group, 1:24,000 Scale Date: 03 June 2003.  
 3) Gray Vireo: Los Alamos National Laboratory, ENV Ecology and Air Quality, April 2008.

Figure 5. Modeled potential Gray Vireo habitat at LANL.

## ***Violet-crowned Hummingbird***



Photo: Mark L. Watson

Photo Credit: bison-m.org

Common Name: Violet-crowned Hummingbird

Scientific Name: *Amazilia violiceps*

Distribution: The species occurs from southeastern Arizona and extreme southwestern New Mexico southward through Mexico to Chiapas. In New Mexico, this hummingbird summers regularly in Guadalupe Canyon (Hidalgo Co.), which is the key habitat area in the state for the species (Baltosser et al. 1985). In addition, a vagrant was documented in Water Canyon, in the Magdalena Mts. (Socorro Co.), in 1981 (NMDGF 1988). It has been documented in Los Alamos County during the summers.

Habitat Associations: The array of habitats used by this hummingbird in Mexico is quite varied, but in the United States the species is found primarily in riparian woodlands at low to moderate elevations

(Baltosser et al. 1985). In Guadalupe Canyon, these woodlands are characterized by Fremont cottonwood (*Populus fremontii*), Arizona sycamore (*Platanus wrightii*), Arizona white oak (*Quercus arizonica*), and netleaf hackberry (*Celtis reticulata*). Nests found in Guadalupe Canyon have all been in Arizona sycamore trees and have been 4–13 m above the ground (Zimmerman and Levy 1960; Baltosser 1980, 1983). Violet-crowned hummingbirds inhabit riparian woodlands at lower (2800–5500 ft) elevations. This hummingbird prefers Sonoran desert scrub with open to dense vegetation of shrubs, low trees, and succulents dominated by paloverde (*Cercidium microphyllum*), prickly pear (*Opuntia* spp.), and giant saguaro (*Cereus giganteus*).

National-level Conservation Status: MBTA

State-level Conservation Status: New Mexico Threatened

LANL Status: No known occurrences at LANL.

### **Habitat Model for the Violet-crowned Hummingbird**

None are available.

## ***Western small-footed Myotis Bat***



Photo Credit: Unknown

Common Name: Western Small-footed Myotis Bat

Scientific Name: *Myotis ciliolabrum melanorhinus*

Distribution: The western small-footed bat is found from southern British Columbia, Alberta, Saskatchewan, to the southwestern United States (Harvey et al. 1999).

Habitat Associations: *Myotis ciliolabrum melanorhinus* shows little geographic variability in New Mexico. The center of distribution of this species seems to be in the ponderosa pine zone, although the animals occur as low as desert and as high as the lower edges of the spruce-fir zone. Of 34 specimens in the Museum of Southwestern Biology, 24% are from grassland (including riparian associations within grassland), 12% are from woodland and encinal, and 64% are from the yellow pine zone and its associates (Findley et al. 1975).

National-level Conservation Status: None

State-level Conservation Status: New Mexico Sensitive

LANL Status: This species has been documented in the area (Bogan et al. 1998).

### **Habitat Model for All Bat Species**

No model is available because they could occur in almost all of our undeveloped environments and are most likely to forage near water sources.

## ***Long-legged Bat***

Common Name: Long-legged Bat

Scientific Name: *Myotis volans interior*

Distribution: Long-legged bats are found from southern Alaska and western Canada southward into northern Mexico (Harvey et al. 1999).

Habitat Associations: The majority of specimens of this bat have been taken in the ponderosa pine zone or above, although some have come from grassland, as at Albuquerque and Glenwood. It may be that these animals from lower stations are migrants; however, one from Glenwood was pregnant. Specimens have been shot or taken in mist nets set over water holes. Davis and Barbour (1970) found a maternity colony in an abandoned building near Eagle Nest in Colfax County (Findley et al. 1975).

National-level Conservation Status: None

State-level Conservation Status: New Mexico Sensitive

LANL Status: This species has been documented in the area (Bogan et al. 1998).

### **Habitat Model for All Bat Species**

No model is available because they could occur in almost all of our undeveloped environments, and are most likely to forage near water sources.



Photo Credit: Unknown

## **Spotted Bat**

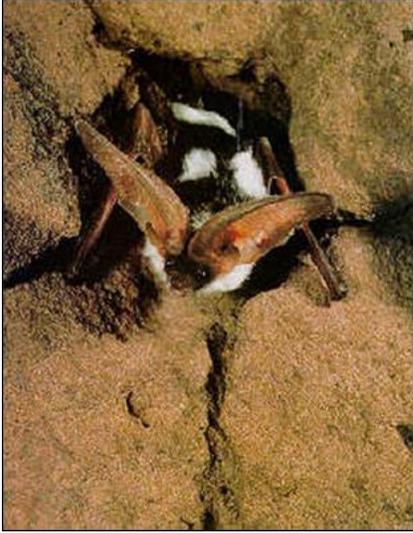


Photo Credit: Unknown

Common Name: Spotted Bat

Scientific Name: *Euderma maculatum*

Distribution: The spotted bat is found from south-central British Columbia to southern Mexico (Harvey et al. 1999).

Habitat Associations: The Spotted bat has been captured in ponderosa pines in montane forests, piñon-juniper woodlands, and open semi-desert shrublands. Rocky cliffs are necessary to provide suitable cracks and crevices for roosting, as is access to water. The species shows apparent seasonal change in habitat, occupying ponderosa pine woodlands in the reproductive season and lower elevations at other times of the year (Fitzgerald et al. 1994).

National-level Conservation Status: None

State-level Conservation Status: New Mexico Threatened

LANL Status: This species has been documented in the area (Bogan et al. 1998).

### **Habitat Model for All Bat Species**

No model is available because they could occur in almost all of our undeveloped environments, and are most likely to forage near water sources.

## **Townsend's Pale Big-eared Bat**



Photo Credit: C. Schwalbe

Common Name: Townsend's Pale Big-eared Bat

Scientific Name: *Corynorhinus townsendii pallescens*

Distribution: Townsend's big-eared bats are found throughout western Canada and the western United States to southern Mexico; a few isolated populations exist in the eastern United States (Harvey et al. 1999).

Habitat Associations: Townsend's big-eared bat is a western species occupying semi-desert shrublands, piñon-juniper woodlands, and open montane forests. Where the species does occur on the Great Plains, it is restricted to deciduous woodland near suitable caves and rocky outcrops. It is frequently associated with caves and abandoned mines for day roosts and hibernacula but will also use abandoned buildings and crevices on rock cliffs for refuge. Townsend's big-eared bats are relatively sedentary. They do not move long distances from hibernacula to summer roosts nor do they move or forage far from their day roosts (Fitzgerald et al. 1994).

National-level Conservation Status: Federal Species of Concern

State-level Conservation Status: New Mexico Sensitive

LANL Status: This species has been documented in the area (Bogan et al. 1998).

### **Habitat Model for All Bat Species**

No model is available because they could occur in almost all of our undeveloped environments, and are most likely to forage near water sources.

## ***Big Free-tailed Bat***

Common Name: Big Free-tailed Bat

Scientific Name: *Nyctinomops macrotis*

Distribution: Big free-tailed bats are found in the southwestern United States, the Caribbean, and Central America throughout northern South America (Harvey et al. 1999).

Habitat Associations: Big free-tailed bats have been found in a variety of habitats in Arizona; ponderosa pine, piñon-juniper, Douglas-fir, and Sonoran desert scrub (Hoffmeister 1986).

National-level Conservation Status: None

State-level Conservation Status: New Mexico Sensitive

LANL Status: This species has been documented in the area (Bogan et al. 1998).

### **Habitat Model for All Bat Species**

No model is available because they could occur in almost all of our undeveloped environments, and are most likely to forage near water sources.



Photo Credit: Unknown

## ***Ringtail***



Photo Credit: Mick Greenbank of the TA-55 Imaging Lab (IRM-RMMSO).

Common Name: Ringtail

Scientific Name: *Bassariscus astutus*

Distribution: The ringtail is fairly common over all of the Upper Sonoran part of New Mexico except the open plains and valleys; although it extends beyond the upper limits of the Upper Sonoran Zone. It inhabits cliffs and canyons and does not stray far from these haunts on which it depends for protection and hunting ground. There are a few reports of them in the northern part of the state, although nowhere in great numbers (Bailey 1931).

Habitat Associations: Seldom far from a perennial water source, ringtails inhabit talus cliffs, rocky canyons, chaparral, scrub oak, piñon-juniper, riparian woodlands, and occasionally evergreen forests (Zelveloff and Collett 1988).

National-level Conservation Status: None

State-level Conservation Status: New Mexico Sensitive

LANL Status: The species was documented at Technical Area (TA) 33 in 2005 and trapped and photographed at TA-55. Ringtails are routinely trapped and relocated by LANL pest control under LANL's state permit.

### **Habitat Model for the Ringtail**

None are available.

## **Red Fox**

Common Name: Red Fox

Scientific Name: *Vulpes vulpes*

Distribution: Findley et al. (1975) considered red fox in New Mexico a montane species occurring in the northern mountainous regions.

Habitat Associations: Primary habitat types include subalpine coniferous forest, mixed coniferous forest, coniferous and mixed woodlands, Great Basin desert scrub, Chihuahuan desert scrub, desert grassland, and urban/farm/water (Thompson et al. 1992).



Photo Credit: Unknown

National-level Conservation Status: None

State-level Conservation Status: New Mexico Sensitive

LANL Status: Habitat exists, although the species has not been documented at LANL.

### **Habitat Model for the Red Fox**

None are available.

## **Goat Peak Pika**

No picture available.

Common Name: Goat Peak Pika

Scientific Name: *Ochotona princeps nigrescens*

Distribution: Goat Peak pikas occur commonly within the Jemez Mountains of New Mexico on patches of large talus slopes on higher peaks, small rocky areas at the head of Frijoles Canyon, older talus slopes of Cerro Grande, and exposed ski slopes of Pajarito Mountain (Swickard et al. 1972; Hafner, pers. obs.). Areas most heavily populated by pikas are the Tschicoma Mountain and eastern rim of the Valles Caldera, Rabbit Mountain, Redondo Peak, and Cerros del Abrigo (Biggs 1996).

Habitat Associations: Goat Peak pikas occupy virtually every patch of appropriate talus in the Jemez Mountains down to 2,640 m (8,800 ft) (Swickard et al. 1972).

National-level Conservation Status: Federal Species of Concern

State-level Conservation Status: New Mexico Sensitive

LANL Status: No habitat exists at LANL, although the species has been documented near LANL lands at the Pajarito Ski Hill.

### **Habitat Model for the Goat Peak Pika**

None are available.

## ***New Mexico Meadow Jumping Mouse***



Photo Credit: Jennifer K. Frey

Common Name: New Mexico Meadow Jumping Mouse

Scientific Name: *Zapus hudsonius luteus*

Distribution: The species occurs from Alaska to Labrador, southward to British Columbia, the southwestern United States, Oklahoma, Alabama, and Georgia; the subspecies *Z. h. luteus* is endemic to New Mexico and Arizona (Hafner et al. 1981, NMDGF 1988).

Habitat Associations: In both the Jemez Mountains and the Rio Grande Valley of New Mexico, Morrison (1985, 1988) and Frey (2007) found that preferred habitat for the meadow jumping mouse contained permanent streams, moderate to high soil moisture, and dense and diverse streamside vegetation consisting of grasses, sedges, and forbs.

National-level Conservation Status: Federal Proposed Endangered Species

State-level Conservation Status: New Mexico Endangered

LANL Status: Habitat exists at LANL, although the species has not been documented. It has been documented in the Jemez Mountains and along the Rio Grande (Frey 2007), so it may occur at LANL. Habitat evaluations at LANL occurred in 2009 by NMDGF biologists and presence/absence surveys are recommended by biological resources SMEs in upper Sandia Canyon near the wetlands (Hathcock 2009).

### **Habitat Model for the New Mexico Meadow Jumping Mouse**

None are available.

## **Wood Lily**

Common Name: Wood Lily

Scientific Name: *Lilium philadelphicum* L. var. *andinum* (Nutt.) Ker-Gawl.

Distribution: The wood lily is the widest ranging of the true lilies. Rather common in high meadows of the mountain west and some intact tall-grass prairies of the Great Plains and adjacent cornbelt, it is decidedly rare to the east in lower midwestern prairies of the United States and in the southern Appalachians, where it is protected by several states.

Habitat Associations: Riparian, ponderosa pine, mixed conifer, spruce/fir. The wood lily can be found in canyons above 2,285 m (7,500 ft) and usually occurs in areas of old-growth conifers.

National-level Conservation Status: None

State-level Conservation Status: New Mexico Endangered

LANL Status: Habitat exists at LANL, although the species has not been documented. The presence of the wood lily has been documented on Los Alamos County, Bandelier National Monument, and Santa Fe National Forest lands (Foxx et al. 1998).

### **Habitat Model for the Wood Lily**

The habitat requirements were modeled using GIS and predicted habitat has been mapped (Figure 6). The model was based on perennial streams in the western portions of LANL.



Photo Credit: Unknown

# Wood Lily Habitat Within and Near LANL

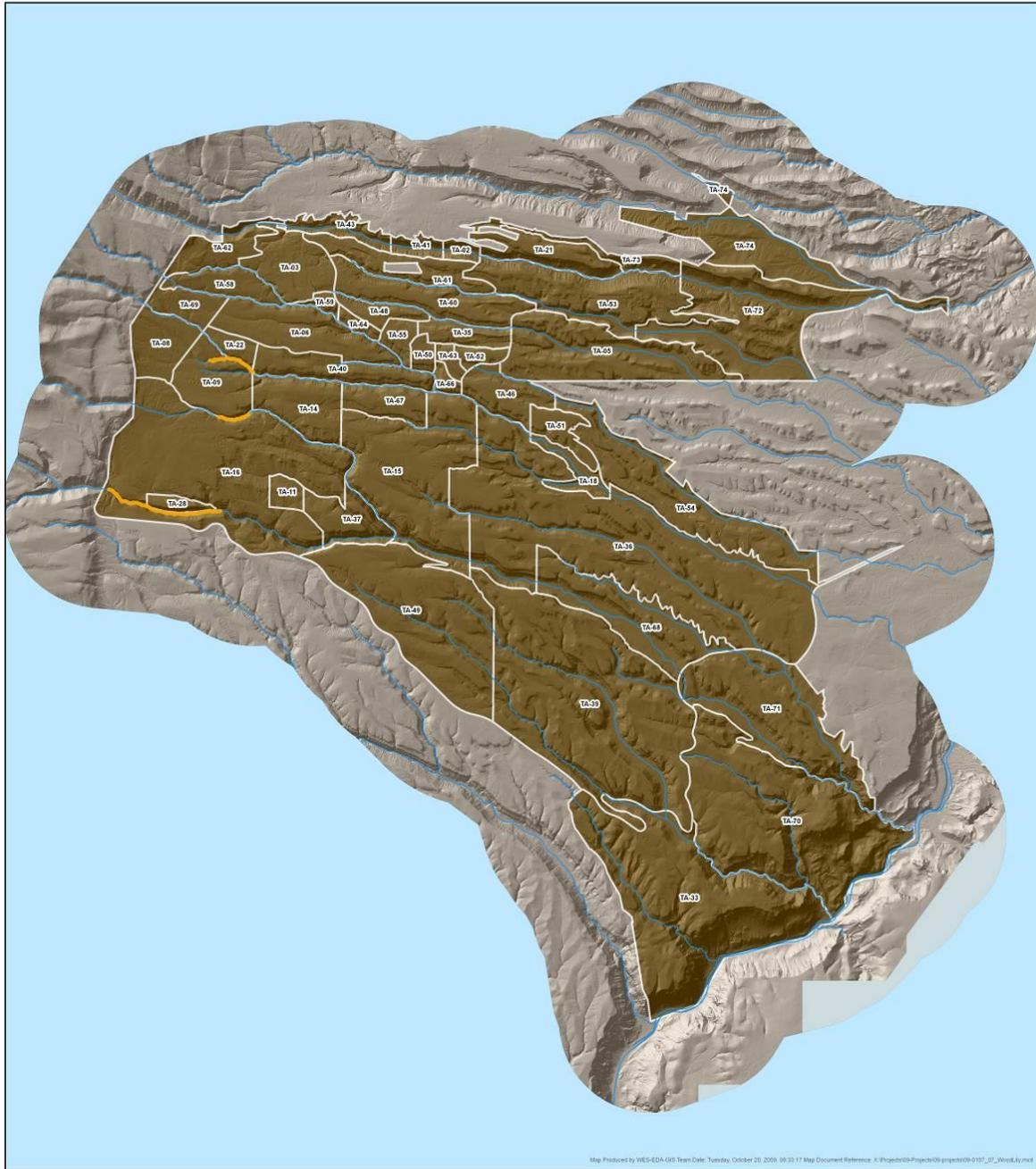


Figure 6. Modeled potential Wood Lily habitat at LANL.

## **Greater Yellow Lady's Slipper**



Photo Credit: G.A. Cooper

Common Name: Greater Yellow Lady's Slipper

Scientific Name: *Cypripedium parviflorum* Salisb. var. *pubescens* (Willd.) Knight

Distribution: Throughout much of North America.

Habitat Associations: Flowering April through August. Mesic deciduous and coniferous forest, openings, thickets, prairies, meadows, fens.

National-level Conservation Status: None

State-level Conservation Status: New Mexico Endangered

LANL Status: Habitat exists at LANL, although the species has not been documented. The presence of the greater yellow lady's slipper has been documented on Los Alamos County, Bandelier National Monument, and Santa Fe National Forest lands (Foxx et al. 1998).

### **Habitat Model for the Greater Yellow Lady's Slipper**

None are available.

## ***New Mexico Silverspot Butterfly***

No photo available.

Common Name: New Mexico Silverspot Butterfly, or Mountain Silverspot Butterfly.

Scientific Name: *Speyeria nokomis nitocris*

Distribution: Arizona, New Mexico, and Colorado (AZGFD 2002)

Habitat Associations: Alpine meadows (AZGFD 2002)

National-level Conservation Status: Federal Species of Concern

State-level Conservation Status: None

LANL Status: Habitat exists, although the species has not been documented at LANL.

### **Habitat Model for the New Mexico Meadow Silverspot Butterfly**

None are available.

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