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Title: **Sensitive Species Best Management Practices Source Document (Updated November 2011)**

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Los Alamos
NATIONAL LABORATORY
EST. 1943

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

Contents

Introduction

This Best Management Practices Document will enhance the stewardship for sensitive species at Los Alamos National Laboratory (LANL). Federally protected species are already managed at LANL with the Biological Resources Management Plan and the subtier 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 (MTBA). This plan addresses species protected on state or 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. These six categories were selected for consideration by LANL biologists due to 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 federal candidate (United States Fish and Wildlife Service [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).

Federal candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats 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 USFWS judges 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 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, and 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 Department lacks in-house expertise, the opinion of a recognized authority for the taxa will be 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

The Sensitive Species Best Management Practices Document for LANL was prepared by biological resources subject matter experts at LANL 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

For LANL lands, the most significant risks to sensitive species are the loss, alteration, or fragmentation of their habitat. Since the sensitive species encompasses a wide variety of taxa, and they occur in different habitat types at LANL, best management practices will be developed for each species.

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

http://int.lanl.gov/environment/bio/lanl_only/support.shtml?4

Table 1. Sensitive Species Occurring or Potentially Occurring at LANL

Scientific Name	Common Name	Protected Status[1]	Potential to Occur[2]
Gila pandora	Rio Grande Chub	NMS	Moderate
Plethodon neomexicanus	Jemez Mountains Salamander	NME, C	High
Falco peregrinus anatum	American Peregrine Falcon	NMT, FSOC	High
Falco peregrinus tundrius	Arctic Peregrine Falcon	NMT, FSOC	Moderate
Haliaeetus leucocephalus	Bald Eagle	NMT, S1	High
Cynanthus latirostris magicus	Broad-billed Hummingbird	NMT	Low
Accipiter gentilis	Northern Goshawk	NMS, FSOC	High
Coccyzus americanus	Yellow-billed Cuckoo	C, NMS	Moderate
Lanius ludovicianus	Loggerhead Shrike	NMS	High
Vireo vicinior	Gray Vireo	NMT	Moderate
Myotis ciliolabrum melanorhinus	Western Small-footed Myotis Bat	NMS	High
Myotis volans interior	Long-legged Bat	NMS	High
Euderma maculatum	Spotted Bat	NMT	High
Corynorhinus townsendii pallescens	Townsend's Pale Big-eared Bat	NMS, FSOC	High
Nyctinomops macrotis	Big Free-tailed Bat	NMS	High
Bassariscus astutus	Ringtail	NMS	High
Vulpes vulpes	Red Fox	NMS	Moderate
Cynomys gunnisoni	Gunnison's Prairie Dog	C, NMS	Low
Ochotona princeps nigrescens	Goat Peak Pika	NMS, FSOC	Low
Zapus hudsonius luteus	New Mexico Meadow Jumping Mouse	NME, C	Moderate
Lilium philadelphicum var. *andinum*	Wood Lily	NME	High
Cypripedium calceolus var. *pubescens*	Greater Yellow Lady's Slipper	NME	Moderate
Speyeria Nokomis nitocris	New Mexico Silverspot Butterfly	FSOC	Moderate

[1] C = Federal Candidate Species; NMS = New Mexico Sensitive Taxa (informal); S1 = Natural Heritage New Mexico: Critically Imperiled in New Mexico; NMT = New Mexico Threatened; NME = New Mexico Endangered; FSOC = Federal Species of Concern. [2] Low = No known habitat exists on LANL; Moderate = Habitat exists, though 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.

Jemez Mountains Salamander

- Avoid removing trees on north-facing slopes along the LANL western boundary.
- If thinning activities do take place, ensure that the canopy cover is not reduced below 80%.
- This habitat should be protected where possible from disturbance activities including the following: new structures, new roads, improving roads, use of heavy equipment (compacting soil), or any activity that would desiccate or fragment the habitat including prescribed burning or removal of vegetation.

American Peregrine Falcon

- Avoid disturbing cliff structure in the canyons between 01 March and 15 May without having a biological resources subject matter experts survey the cliffs for peregrine nests.

Bald Eagle

- In the Bald Eagle core habitat area along LANL's eastern boundary with the Rio Grande, new power lines should comply with the suggested practices adopted by the electrical industry (APLIC 2006). Priority should be given to poles likely to be used by raptors or other birds that have 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 that are 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. The Bird Electrocution Mitigation Website (http://bems.edmlink.com, last accessed 09/29/09) has online programs to assist in finding products to retrofit specific types of power poles.
- 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

- To avoid killing nesting birds, avoid 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 subject matter expert survey the area for bird nests before beginning the project.
- Avoid removing large standing dead ponderosa pine trees.

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

- Surveys should take place before any ground-disturbing work occurs 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 follow.

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 is likely extirpated from the mainstream Rio Grande and now is found only in tributary streams (Bestgen et al. 2003).

Habitat Associations: This species 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

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

Habitat Model for the Rio Grande Chub
None are available.

Jemez Mountains Salamander

Photo Credit: Charles Hathcock

Common Name: Jemez Mountains Salamander

Scientific Name: *Plethodon neomexicanus*

Distribution: The current range for *P. neomexicanus* is the Jemez Mountains in northern New Mexico in Los Alamos, Rio Arriba, and Sandoval counties.

Habitat Associations: *P. neomexicanus* salamanders predominantly occur in mixed-conifer forest at an elevation between 2,200 and 2,900 m (7,260 and 9,570 ft), consisting mainly of Douglas fir, blue spruce, Engelmann spruce, white fir, limber pine, and aspen (Degenhardt et al. 1996). The microhabitat is characterized by high-humidity soils that contain deep, igneous, subsurface rock (NMEST 2000). Present in its habitat year-round, this subterranean species spends much of its life underground, but can be found at the surface when conditions are warm and wet—approximately July through September.

National-level Conservation Status: Federal Species of Concern

State-level Conservation Status: New Mexico Endangered

Los Alamos National Laboratory Status: *P. neomexicanus* salamanders have been documented at two locations at LANL. Surveys were conducted in 1982–1985 and 2007-2009. The species was documented in Los Alamos Canyon, 0.5 miles east of the Los Alamos Canyon Bridge (Romotnik 1986) and west of the bridge (Hathcock 2008).

In 2010, the Jemez Mountains salamander was reviewed for federal protection. It was determined to be warranted for protection but precluded at this time by higher priority

species. The Las Conchas Wildfire, started on June 29, 2011, could potentially expedite the listing process. The burned more than 150,000 acres, predominantly in the Santa Fe National Forest, which contains 90% of the habitat for the Jemez Mountains salamander.

Habitat Model for the Jemez Mountains Salamander

Habitat requirements were modeled using GIS and predicted habitat has been mapped (Figure 1). The following habitat requirements were modeled:

o Elevation: Greater than 2,100 meters (6,930 feet)
o Slope: Greater than 20 degrees
o Aspect: North-facing +/-20 degrees
o Land cover: Mixed conifer and/or bare rock (talus) (McKown et al. 2003)
o Land use: Undeveloped

A total area of 230.95 acres (93.46 ha) was identified as potential habitat. Surveys are conducted annually during the rainy season to verify these potential sites.

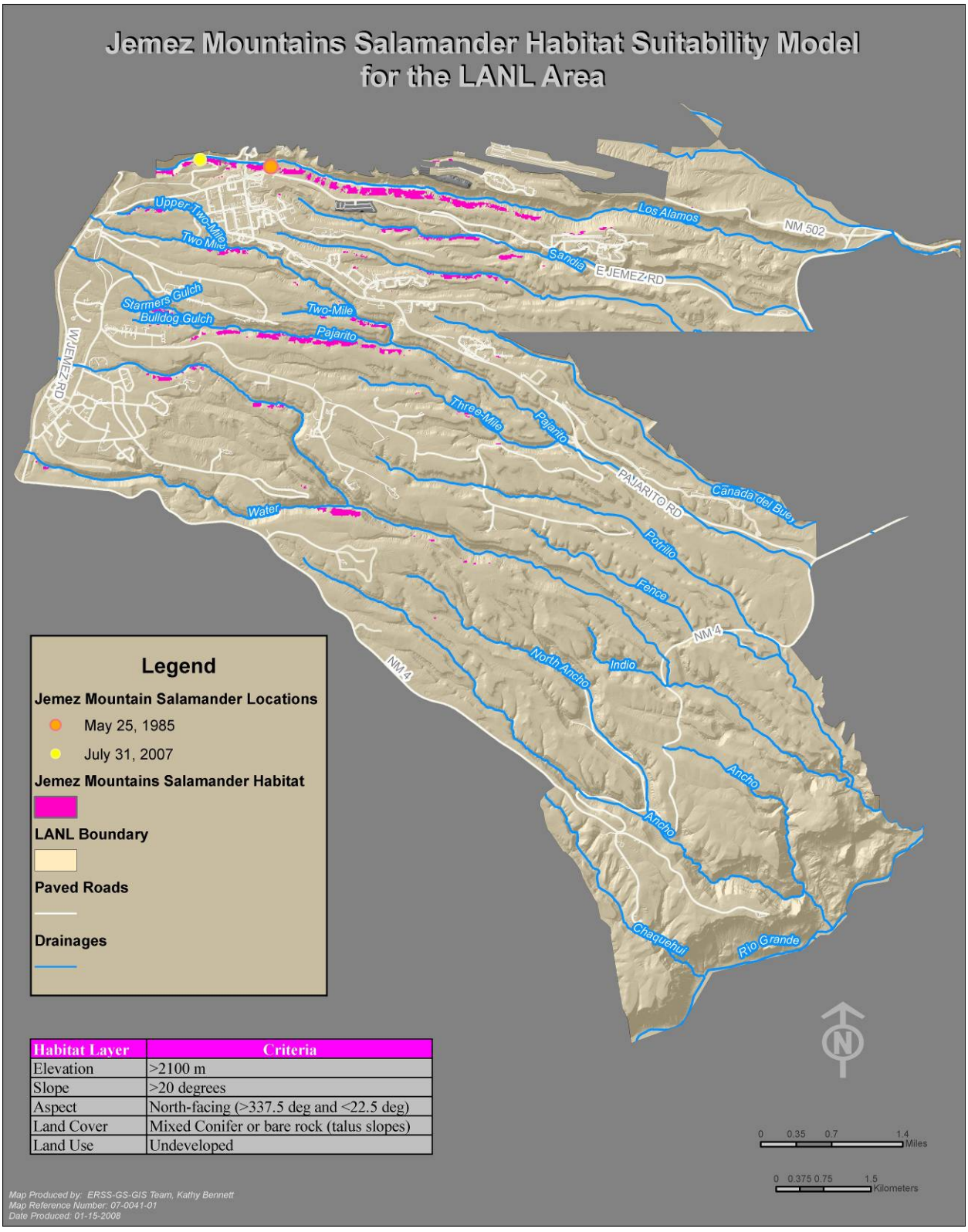

Figure 1. Modeled potential Jemez Mountains salamander habitat and salamander locations at LANL.

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

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

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.

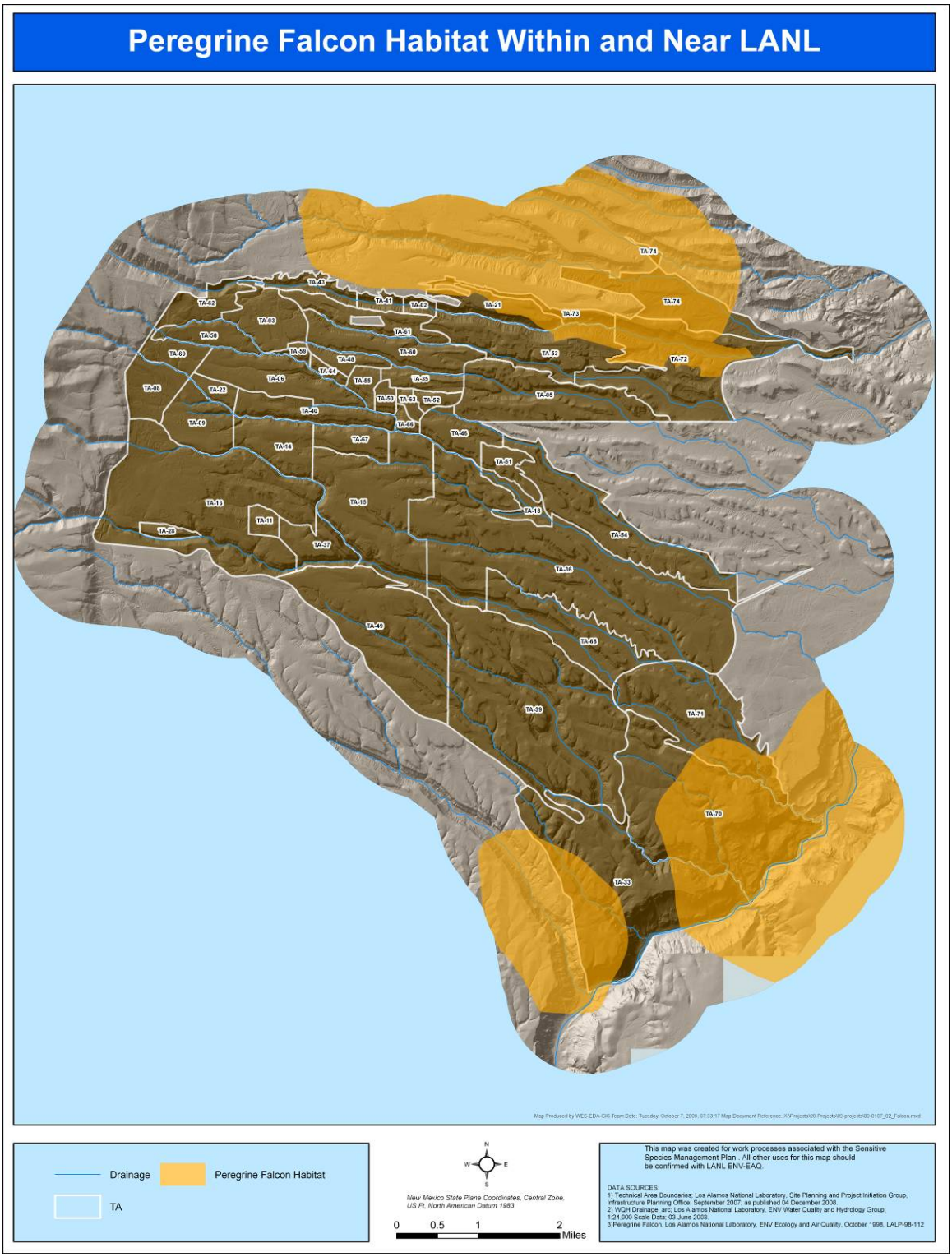

Figure 2. Modeled potential Peregrine Falcon habitat at LANL.

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.

National-level Conservation Status: Federal Species of Concern, Migratory Bird Treaty Act

State-level Conservation Status: New Mexico Threatened

Los Alamos National Laboratory Status: No confirmed breeding has been documented in Los Alamos County, though 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

Photo Credit: USFWS

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, Migratory Bird Treaty Act

State-level Conservation Status: New Mexico Threatened

Los Alamos National Laboratory Status: The Bald Eagle is commonly seen along the Rio Grande, on LANL's eastern boundary during the winter months, though 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 supported Bald Eagles in the past.

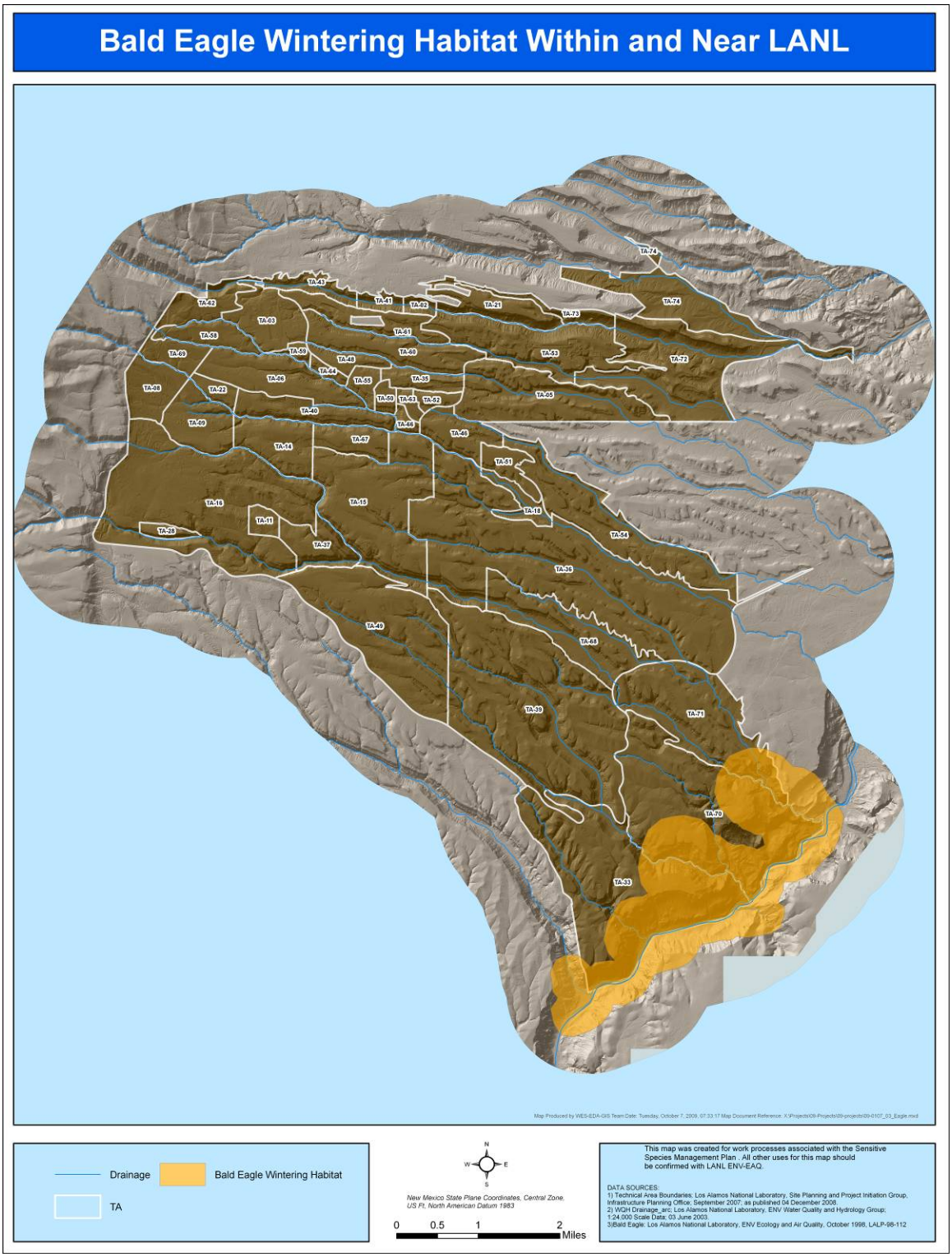

Figure 3. Modeled potential Bald Eagle habitat at LANL.

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: Migratory Bird Treaty Act

State-level Conservation Status: New Mexico Threatened

Los Alamos National Laboratory 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: Migratory Bird Treaty Act, Federal Species of Concern

State-level Conservation Status: New Mexico Sensitive

Los Alamos National Laboratory 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.

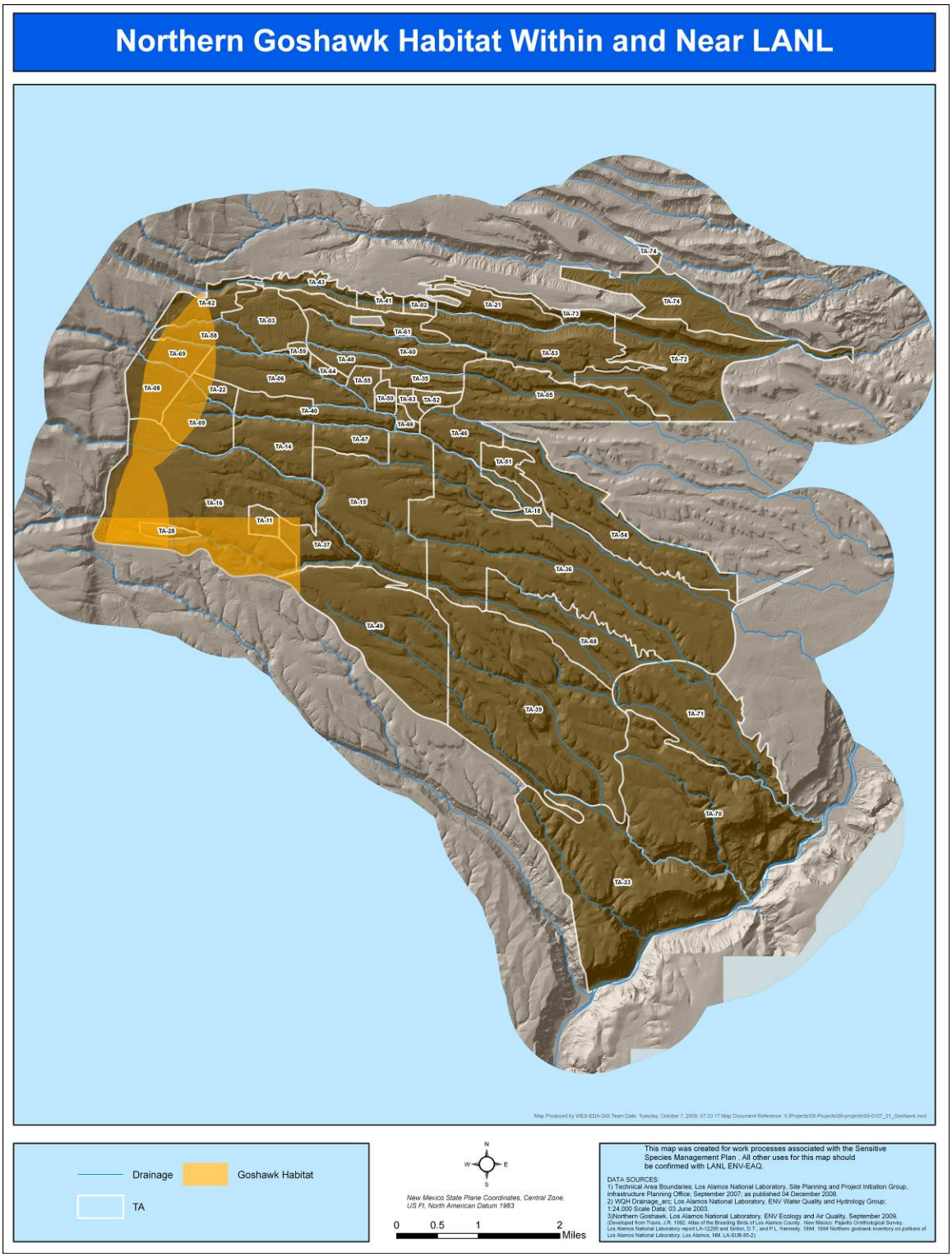

Figure 4. Modeled potential Northern Goshawk habitat at LANL.

Yellow-billed Cuckoo

Photo Credit: Unknown

Common Name: Yellow-billed Cuckoo

Scientific Name: *Coccyzus americanus*

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

Habitat Associations: Open woodlands with clearings and dense scrubby vegetation, often along water. Species observed in New Mexico have been found in areas dominated by salt cedar and tamarisk 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 the large area habitat requirement, ranging from 3 ha to 99 ha (NM Avian Conservation Partners 2011). It 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).

National-level Conservation Status: Migratory Bird Treaty Act, Federal Candidate Species

State-level Conservation Status: New Mexico Sensitive

Los Alamos National Laboratory Status: The Yellow-billed Cuckoo has been documented on the Rio Grande near the LANL's eastern boundary, though it is not reported in Travis (1992). It likely occurs along the Rio Grande, but LANL biologists

have determined that no sufficient habitat (large tracts of largely undisturbed riparian woodland) exists on LANL property with which to support a Yellow-billed Cuckoo population.

Habitat Model for the Yellow-billed Cuckoo
None are Available

Loggerhead Shrike

Photo Credit: Unknown

Common Name: Loggerhead Shrike

Scientific Name: *Lanius ludovicianus*

Distribution: Summer Range: Breeds from central prairie provinces and 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: Migratory Bird Treaty Act

State-level Conservation Status: New Mexico Sensitive

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

Habitat Model for the Loggerhead Shrike
None are available.

Gray Vireo

Photo Credit: Jack Binch

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 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: Migratory Bird Treaty Act

State-level Conservation Status: New Mexico Threatened
Los Alamos National Laboratory 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.

Figure 5. Modeled potential Gray Vireo habitat at LANL.

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

Los Alamos National Laboratory 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

Photo Credit: Unknown

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

Los Alamos National Laboratory 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.

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 animal has been captured in ponderosa pine of montane forests, piñon-juniper woodlands, and open semidesert shrublands. Rocky cliffs are necessary to provide suitable cracks and crevices for roosting, as is access to water. The animals show 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

Los Alamos National Laboratory 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, 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 semidesert 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

Los Alamos National Laboratory 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

Photo Credit: Unknown

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 taken in a variety of habitats in Arizona; ponderosa pine, piñon-juniper, Douglas-fir, and Sonoran desertscrub (Hoffmeister 1986).

National-level Conservation Status: None

State-level Conservation Status: New Mexico Sensitive

Los Alamos National Laboratory 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.

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 fewer 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, chapparal, scrub oak, piñon-juniper, riparian woodlands, and occasionally evergreen forests (Zeveloff and Collett 1988).

National-level Conservation Status: None

State-level Conservation Status: New Mexico Sensitive

Los Alamos National Laboratory Status: The species was documented at Technical Area 33 in 2005 and trapped and photographed at TA-55 in 1998 (C. Hathcock, pers. comm.). There are several anecdotal reports of other sightings around Los Alamos County (L. Hansen, pers. comm.).

Habitat Model for the Ringtail
None are available.

Red Fox

Photo Credit: Unknown

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).

National-level Conservation Status: None

State-level Conservation Status: New Mexico Sensitive

Los Alamos National Laboratory Status: Habitat exists, though the species has not been documented at LANL.

Habitat Model for the Red Fox
None are available.

Gunnison's Prairie Dog

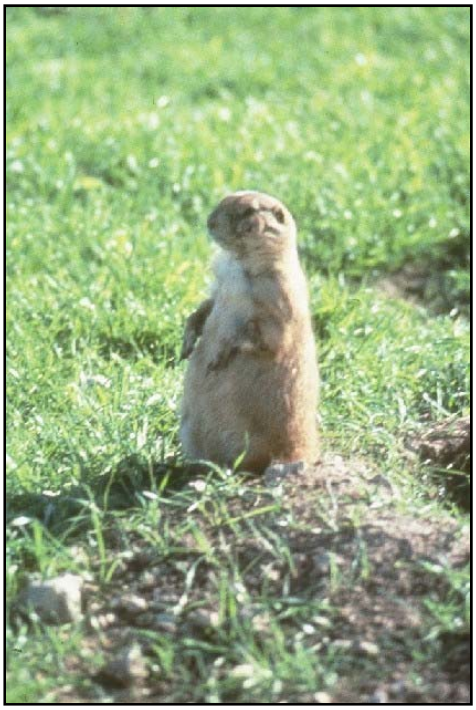

Photo Credit: fws.gov

Common Name: Gunnison's Prairie Dog

Scientific Name: *Cynomys Gunnisoni*

Distribution: One of five prairie dog species occurring in North America and is native to New Mexico. Its populations occur in the four corners area of Arizona, Utah, Colorado and New Mexico. Populations warranted for protection under the ESA occur in central and south-central Colorado and north-central New Mexico, in the San Juan, Jemez, and Sange de Cristo mountains.

Habitat Associations: Prairie dogs live in shortgrass and midgrass prairies and grass-shrub habitats (Finch 1992) in northern and western parts of the state where the black-tailed prairie dog does not occur. They can occur in low valleys below mesas dominated by dens sagebrush but also are common in parks and meadows in the montane forests up to at least 10,000 feet. (Findley 1975)

National-level Conservation Status: Federal Candidate Species

State-level Conservation Status: New Mexico Sensitive

Los Alamos National Laboratory Status: No known habitat exists at LANL.

Habitat Model for the Gunnison's Prairie Dog
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 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

Los Alamos National Laboratory Status: No habitat exists at LANL, though 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, 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 Species of Concern

State-level Conservation Status: New Mexico Endangered

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

Habitat Model for the New Mexico Meadow Jumping Mouse
None are available.

Wood Lily

Photo Credit: Unknown

Common Name: Wood Lily

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

Distribution: The wood lily is the widest ranging of our 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

Los Alamos National Laboratory Status: 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 Lilly

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.

Figure 6. Modeled potential Wood Lilly 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

Los Alamos National Laboratory Status: 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

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

Los Alamos National Laboratory Status: Habitat exists, though the species has not been documented at LANL.

Habitat Model for the New Mexico Meadow Silverspot Butterfly

None are available.

Future Work

Habitat modeling and mapping will be revised when more detailed habitat requirements become available. This will allow conservation efforts to be focused on the appropriate habitat. Annual presence / absence surveys should be continued for the Jemez Mountains salamander and gray vireo, and they should be initiated for the American peregrine falcon, northern goshawk, yellow-billed cuckoo, and New Mexico meadow jumping mouse.

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