LA-UR-11-02582

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| *Title:* | **Threatened and Endangered Species Habitat Management Plan for Los Alamos National Laboratory** |
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| *Intended for:* | Reference purposes |

# Threatened and Endangered Species Habitat Management Plan for Los Alamos National Laboratory

**Environmental Protection Division**
**Resources Management Team**

**Updated April 2011**

# Contents

## LIST OF ACRONYMS

| | |
|---|---|
| AEI | Area of Environmental Interest |
| BA | Biological Assessment |
| BSL-3 | Biosafety Level 3 |
| COPCs | chemicals of potential concern |
| DARHT | Dual-Axis Radiographic Hydrodynamic Test (Facility) |
| DOE | U.S. Department of Energy |
| ESA | Endangered Species Act of 1973 |
| GIS | geographic information system |
| HMP | Threatened and Endangered Species Habitat Management Plan |
| HVAC | heating, ventilation, and air conditioning |
| LANL | Los Alamos National Laboratory |
| LASO | Los Alamos Site Office |
| NEPA | National Environmental Policy Act |
| PR-ID | Permits and Requirements Identification |
| SME | subject-matter expert |
| USFWS | U.S. Fish and Wildlife Service |

# I. THREATENED AND ENDANGERED SPECIES HABITAT MANAGEMENT PLAN GENERAL OVERVIEW

## 1.0 INTRODUCTION

Los Alamos National Laboratory's (LANL) Threatened and Endangered Species Habitat Management Plan (HMP) was prepared to fulfill a commitment made in the U.S. Department of Energy's (DOE) Final Environmental Impact Statement for the Dual-Axis Radiographic Hydrodynamic Test Facility Mitigation Action Plan (USDOE 1996). The HMP received concurrence from the U.S. Fish and Wildlife Service (USFWS) in 1999 (USFWS consultation numbers 2-22-98-I-336 and 2-22-95-I-108). In this 2011 update, we have retained the management guidelines from the 1999 HMP for listed species. We have also 1) updated some descriptive information, 2) included habitat boundary changes that received USFWS concurrence in 2005 (USFWS consultation number 22420-2006-I-0010), and 3) removed species that are no longer federally listed as threatened or endangered.

## 2.0 ROLE OF SITE PLANS IN THE HMP

The purpose of the HMP is to provide a management strategy for the protection of threatened and endangered species and their habitats on LANL property. The HMP consists of site plans for federally listed threatened or endangered species with a moderate or high probability of occurring at LANL. The following federally listed threatened or endangered species currently have site plans at LANL: Mexican spotted owl (*Strix occidentalis lucida*) and southwestern willow flycatcher (*Empidonax trailii extimus*). Site plans provide guidance to ensure that LANL operations do not adversely affect threatened or endangered species or their habitats.

## 3.0 DESCRIPTION OF AREAS OF ENVIRONMENTAL INTEREST

Suitable habitats for federally listed threatened and endangered species have been designated as Areas of Environmental Interest (AEIs). AEIs are the geographical units at LANL that are managed for the protection of listed species and consist of core habitat areas and buffer areas.

Site plans identify restrictions on activities within the AEIs. Allowable activities are activities that the USFWS has reviewed and has provided concurrence that these activities are not likely to adversely affect federally listed species. Activities discussed in site plans include day-to-day disturbance activities, such as access into an AEI, and long-term impacts, such as habitat alteration in the AEI.

### 3.1 DEFINITION AND ROLE OF DEVELOPED AREAS IN AEI MANAGEMENT

***Summary:*** Habitat alteration is not restricted in developed areas unless it impacts undeveloped core areas of an AEI (e.g., noise and light impacts on a core area). Current ongoing disturbance activities are not restricted in developed areas. Disturbance activities not currently ongoing are restricted when impacts occur to undeveloped core areas of an AEI that are occupied by a threatened or endangered species.

Developed areas include all building structures, paved roads, improved gravel roads, paved and unpaved parking lots, and firing sites. The extent of developed areas in each AEI was determined using two methods. First, LANL geographic information system (GIS) analysts placed a 15-m border around all buildings and parking lots. For paved and improved gravel roads, the developed area was defined as the area to a roadside fence, if one exists within 9 m of the road, or 4.5 m (15 ft) on each side of the road, if there is no fence within 9 m. If an area of highly fragmented habitat was enclosed by roads, a security fence, or connected buildings, that area was also classified as developed. Developed areas at firing sites were defined as a circle with a 91.4-m radius from the most centrally located firing pad. Second, LANL GIS analysts overlaid scanned orthophotos onto a map of the Los Alamos area and digitized all areas that appeared developed. These two information sources were overlaid and combined, so that areas that were classified as developed by either method were considered developed in final maps and analyses. Some areas were confirmed by ground surveys, such as the firing sites. Developed areas are contained in the HMP GIS database.

Developed areas are located in the core and/or buffer of some AEIs. However, developed areas do not constitute suitable habitat for federally listed species. Current ongoing activities in developed areas constitute a baseline condition for the AEIs and are not restricted. New activities including further development within already existing developed areas are not restricted unless they impact undeveloped portions of an AEI core. For example, if light or noise from a new office building in a developed area were to raise levels in an undeveloped core area, those light and noise levels would be subject to the guidelines on habitat alterations. If a proposed action within a developed area does not meet site plan guidelines, it must be individually reviewed for compliance with the Endangered Species Act of 1973 (ESA).

Building a new structure or clearing land within a previously designated developed area in an AEI core does not add to the size of the developed area. New structures in core areas will not be given any developed-area border unless they are individually reviewed for ESA compliance.

Development occurring in the developed area in an AEI buffer can be given a 15-m developed-area border at the discretion of the project leader or facility manager. To expand the size of a developed area in a buffer based on new developments, please contact a biological resources subject-matter expert (SME) (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

## 3.2 GENERAL DESCRIPTION OF BUFFER AREAS AND ALLOWABLE BUFFER AREA DEVELOPMENT

***Summary:*** Limited future development is allowed in the currently undeveloped DOE-controlled buffer area under the guidelines of this HMP as long as it does not alter habitat in the undeveloped AEI core (including light and noise guidelines). Development beyond the cap established for each AEI, or greater than 2 ha (5 ac) in size, including the developed-area border, requires independent review for ESA compliance. New development projects in AEI buffer areas must be reported to biological resources SMEs for tracking (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

The purpose of buffer areas is to protect core areas from undue disturbance or habitat degradation. The current levels of development in buffer and core areas represent baseline

conditions for this HMP. No further development is allowed in the core area under the guidelines of this HMP. A limited amount of development is allowed in buffer areas. Under the guidelines of this HMP, individual development projects are limited to 2 ha (5 ac) in size, including a 15-m developed-area border around structures and a 4.5-m (15-ft) developed-area border around paved and improved gravel roads. Projects greater than 2 ha (5 ac) in area require individual review for ESA compliance (see exceptions for fuels management activities and utility corridor maintenance). New development projects in AEI buffer areas must be reported to biological resources SMEs for tracking (http://int.lanl.gov/environment/bio/lanl_only/support.shtml). Descriptions of each of the AEIs give the total area in each buffer available for development.

### 3.3 EMERGENCY ACTIONS

***Summary:*** Contact DOE and LANL biological resources SMEs as soon as possible.

If safety and/or property is immediately threatened by something occurring within an AEI (for example, wildfire, water line breakage, etc.) managers may activate emergency actions. Contact a LANL biological resources SME (http://int.lanl.gov/environment/bio/lanl_only/support.shtml), the Environmental Stewardship Group (1-505-665-8855), or the DOE Los Alamos Site Office (LASO) (1-505-667-6819) as soon as possible. If the emergency occurs outside of regular business hours, contact the Emergency Management Office (1-505-667-6211). This office will then communicate with the appropriate LANL and LASO personnel.

## 4.0 IMPLEMENTATION OF SITE PLANS

### 4.1 ROLES AND RESPONSIBILITIES

***Summary:*** LANL's facility managers and operational staff are responsible for ensuring that activities are reviewed for compliance with all applicable site plans. Figure 1 presents a flowchart illustrating the process for utilizing site plans. If activities follow approved guidance, there is no requirement for additional ESA regulatory compliance. However, additional National Environmental Policy Act (NEPA), cultural resources, wetlands, or other regulatory compliance actions may be required.

If an activity or project occurs outside of all LANL AEIs and will not impact habitat within an AEI, it does not have to be reviewed for ESA compliance, unless it is a large project. Projects that are larger than 2 ha (5 ac) or cost more than $5 million require an individual ESA compliance review, even if they are not located within an AEI.

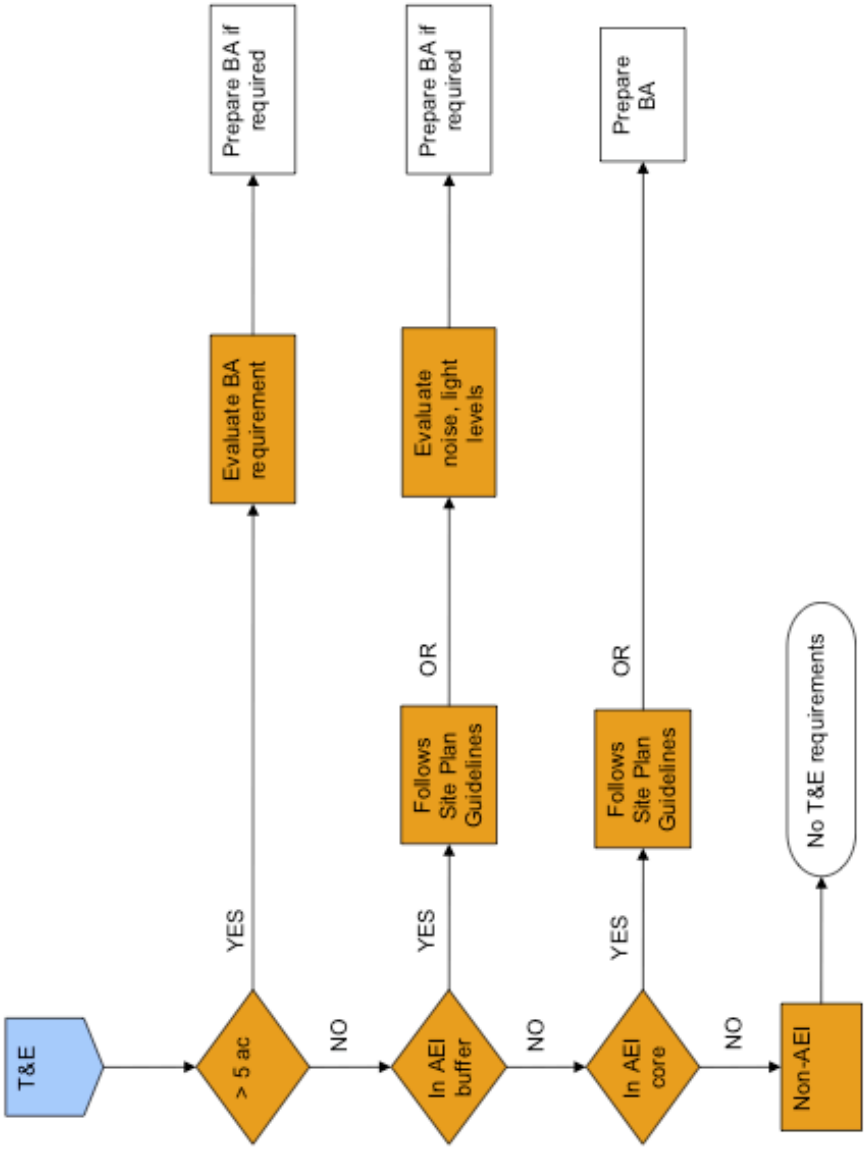


**Figure 1. Process flowchart for determining site plan requirements.**

LANL's facility managers are responsible for determining if operations within their geographic and/or programmatic area of responsibility comply with the guidelines in these site plans. Submission of a Permits and Requirements Identification (PR-ID) for a new or modified project is required under PD400 (LANL 2009) and allows managers to identify the requirements within their project area. Deployed environmental professionals and core SMEs are available to support managers. If activities follow site plan guidelines, the activity does not require any additional ESA regulatory compliance action. However, NEPA, cultural resources, wetlands, or other regulatory compliance actions are not addressed in site plans and additional compliance actions may be required. It is the responsibility of the project leader or facility management staff to ensure that all requirements are satisfied. If you have questions, contact biological, cultural, or NEPA SMEs (links to contact information can be found at http://int.lanl.gov/environment/index.shtml?1 under the "Assistance" tab).

A single facility may have one or more AEIs within its boundary and the AEIs may be for different species. Some AEIs overlap. In areas where overlap occurs, project managers must follow the guidelines for AEIs of all involved species.

### 4.2 IF AN ACTIVITY DOES NOT MEET SITE PLAN GUIDELINES

***Summary:*** Activities or projects that do not meet all applicable site plan guidelines must be evaluated individually for compliance with the ESA.

If a project reviewer determines that an activity or project cannot meet the guidelines in applicable site plans, biological resources SMEs evaluate that activity individually for compliance with the ESA. Results of the evaluation of potential impacts allow biological resources SMEs to make recommendations to the LASO biological resources program manager regarding the need for USFWS consultation. An evaluation may result in 1) a LASO determination that there is no possibility of adverse effects and the activity can proceed, 2) a LASO suggestion for modifications of the action to avoid adverse effects so that it can proceed, or 3) a LASO decision to prepare a Biological Assessment (BA) for the activity and submit it to the USFWS for concurrence. Fieldwork and preparation of a BA can take up to six months with an additional two months or more for LASO and USFWS concurrence.

### 4.3 DISSEMINATION OF INFORMATION

Although information about threatened or endangered species is not classified, it is considered sensitive information. It is in the best interests of threatened and endangered species to restrict specific knowledge about their locations. Locations of threatened or endangered species habitats are not considered sensitive.

## 5.0 CHANGES IN THE HMP SINCE IMPLEMENTION

The HMP received concurrence from USFWS and was first implemented in 1999. Since that time, both the peregrine falcon (*Falco peregrinus*) and the bald eagle (*Haliaeetus leucocephalus*) have been delisted. Site plans for those species have been removed from LANL's HMP. Both species are protected at LANL under the Migratory Bird Treaty Act, and the bald eagle is also protected under the Bald and Golden Eagle Protection Act.

The black-footed ferret (*Mustela nigripes*) is federally listed as endangered. However, no sightings of black-footed ferrets have been reported in Los Alamos County for at least the last 50 years. In addition, no large prairie dog towns, which are prime habitat for black-footed ferrets, have been observed on LANL lands. Thus, there is no site plan for this species.

In 2005, USFWS concurred with DOE's proposal for new Mexican spotted owl habitat boundaries based on a revised analysis of Mexican spotted owl habitat quality within LANL property (USFWS consultation #22420-2006-I-0010).

## 6.0 DATA MANAGEMENT

The data used in the implementation of the HMP is stored in a GIS database at LANL.

The literature cited in this document, including electronic copies of unpublished reports, is maintained in an EndNotes X4 database at LANL.

# II. AREA OF ENVIRONMENTAL INTEREST
# SITE PLAN FOR THE MEXICAN SPOTTED OWL

## 1.0 SPECIES DESCRIPTION—MEXICAN SPOTTED OWL

### 1.1 STATUS

In 1993, the USFWS determined the Mexican spotted owl to be a threatened species under the authority of the ESA, as amended (58 FR 14248). In 1995, the USFWS released its final recovery plan for the spotted owl (USFWS 1995). The USFWS most recently designated critical habitat for Mexican spotted owl in 2004 (69 FR 53181).

### 1.2 GENERAL BIOLOGY

The Mexican spotted owl is found in northern Arizona, southeastern Utah, and southwestern Colorado south through New Mexico, west Texas, and into Mexico. It is the only subspecies of spotted owl recognized in New Mexico (USFWS 1995).

The Mexican spotted owl generally inhabits mixed conifer and ponderosa pine (*Pinus ponderosa*)-Gambel oak (*Quercus gambelli*) forests in mountains and canyons. High canopy closure, high stand diversity, multilayered canopy resulting from an uneven-aged stand, large, mature trees, downed logs, snags, and stand decadence as indicated by the presence of mistletoe are characteristic of Mexican spotted owl habitat. Some spotted owls have been found in second-growth forests (i.e., younger forests that have been logged); however, these areas were found to contain characteristics typical of old-growth forests. Mexican spotted owls in the Jemez Mountains seem to prefer cliff faces in canyons for their nest sites (Johnson and Johnson 1985, T. Johnson, personal communication). The recovery plan for the Mexican spotted owl recommends that mixed conifer and pine-oak woodland types on slopes greater than 40 percent be protected for the conservation of this owl.

A mated pair of adult spotted owls may use the same home range and general nesting areas throughout their lives. A pair of owls requires approximately 800 ha of suitable nesting and foraging habitat to ensure reproductive success. Incubation is carried out by the female. The incubation period is approximately 30 days, and most eggs hatch by the end of May. Most owlets fledge in June, 34 to 36 days after hatching (USFWS 1995). The owlets are "semi-independent" by late August or early September, although juvenile begging calls have been heard as late as September 30. Young are fully independent by early October. The nonbreeding season runs from September 1 through February 28. Although seasonal movements vary among owls, most adults remain within their summer home ranges throughout the year.

The diet of the Mexican spotted owl consists primarily of small rodents and rabbits with lesser amounts of reptiles, birds, and insects. A majority of the prey consumed by the Mexican spotted owl during the nesting season probably comes from a relatively small area surrounding the nest site. Ganey and Balda (1994) found core areas of individuals (i.e., where owls spent 60 percent of their time) averaged 134 ha, and core areas for pairs averaged 160 ha. High-use areas tended

to correspond to steep slopes. The relative abundance of prey types in Mexican spotted owl pellets collected at LANL are listed in Table A-1 in the Appendix.

### 1.3 THREATS

The Mexican spotted owl was listed as threatened because of destruction and modification of habitat caused by timber harvest and fires, increased predation on owls associated with habitat fragmentation, and a lack of adequate protective regulations.

## 2.0 IMPACT OF HUMAN ACTIVITIES

### 2.1 INTRODUCTION

The primary threats to Mexican spotted owl on LANL property are 1) impacts on habitat quality from LANL operations and 2) disturbance of nesting spotted owls. This section provides a review and summary of scientific knowledge of the effects of various types of human activities on Mexican spotted owl and provides an overview of the current levels of activities at LANL.

### 2.2 IMPACTS ON HABITAT QUALITY

#### 2.2.1 Development

The type of habitats used by Mexican spotted owls, late seral stage forests with large trees, are usually not found in large quantities near developed areas or near areas that have had recent agricultural or forest product extraction land uses. Therefore, Mexican spotted owls are generally not found near developments. Whether it is the development itself or a lack of suitable habitat that discourages colonization of these areas by Mexican spotted owls is unknown.

Areas of LANL vary from remote undeveloped areas to heavily developed and/or industrialized facilities. Most LANL facilities are situated atop mesas, primarily in the northern and western portion of the Laboratory. LANL is bounded by developed residential, industrial, and retail areas along its northern boundary (the town of Los Alamos) and by residential and retail development along a portion of its eastern boundary (the town of White Rock). Three major paved roads traverse LANL from northeast to southwest. Sandia, Pajarito, and Los Alamos canyons have paved roads within AEIs, and several AEIs have dirt roads along at least a portion of the canyon bottom. AEIs containing paved or dirt roads in the canyon bottoms have not been occupied at LANL (Hathcock et al. 2010).

#### 2.2.2 Contaminants

There is no specific information on the impact of contaminants on Mexican spotted owl, although experience with other raptor species suggests that exposure to polychlorinated biphenyls, DDT and its derivatives, and other organophosphate or organochlorine pesticides would probably be harmful (Cain 1988). Exposure to other contaminants could also be harmful (Cain 1988).

LANL completed three ecological risk assessments that included the Mexican spotted owl between 1997 and 2009. The ecological risk assessment process involves using computer modeling to assess potential effects to animals from chemicals of potential concern (COPCs) that have been detected in the environment. All of the following ecological risk assessments concluded that, on average, no appreciable impact is expected to Mexican spotted owls from COPCs:

- Gallegos, A., G. Gonzales, K. Bennett, and L. Pratt. 1997. Preliminary Risk Assessment of the Mexican Spotted Owl under a Spatially-weighted Foraging Regime at the Los Alamos National Laboratory. LANL report LA-13259-MS.

- Gonzales, G., R. Ryti, P. Newell, A. Gallegos, and S. Sherwood. 2004. Modeled Ecological Risk to the Deer Mouse, Mexican Spotted Owl, and Western Bluebird at the Los Alamos National Laboratory using ECORSK.7. LANL report LA-14118.

- Gonzales, G., P. Gallegos, A. Gallegos, and K. Bennett. 2009. Site-wide Application of ECORSK.9 at the Los Alamos National Laboratory. LANL report LA-UR-09-02833.

### 2.2.3 Disturbance

#### *2.2.3.1 Pedestrians and Vehicles*

Based on work with other raptors, LANL biologists assume that Mexican spotted owls would probably be disturbed by the approach of either pedestrians or vehicles. At an equal distance, pedestrians are frequently more disturbing to raptors than vehicles (Grubb & King 1991). Brown and Stevens (1997) reported that during surveys in Grand Canyon National Park, 22 times more bald eagles were found in canyon reaches with low human recreational use compared to reaches with moderate to high human recreational use. Human activity 100 m from bald eagle nests in Alaska caused clear and consistent changes in behavior of breeding eagles (Steidl & Anthony 2000).

Swarthout and Steidl (2001) found that both juvenile and adult roosting Mexican spotted owls were unlikely to alter their behavior in the presence of a single hiker at distances greater than 55 m. Swarthout and Steidl (2003) concluded that cumulative effects of high levels of short-duration recreational hiking near Mexican spotted owl nests may be detrimental.

Many canyon bottoms and mesa tops at LANL have dirt roads traversing them. Most of these roads are gated. However, these roads are accessible to LANL employees and some of them are accessible to the public on foot or by bike or horseback. LANL SMEs have found that AEIs are occupied less often if there is recreational access into a canyon (Hathcock et al. 2010).

#### *2.2.3.2 Aircraft*

Ground-based disturbances appear to impact raptor reproductive success more than aerial disturbances (Grubb & King 1991). Grubb and Bowerman (1997) concluded that a categorical exclusion of aircraft within 600 m of bald eagle nest sites would limit bald eagle response frequency to 19 percent.

Delaney et al. (1999) found for Mexican spotted owls that chainsaws consistently elicited higher response rates than helicopters at similar distances. Owl flush rates did not differ between nesting and non-nesting seasons. No owls flushed when noise stimuli (helicopter or chainsaws) were at distances greater than 105 m. Distance was generally a better predictor of spotted owl response to helicopter overflights than sound level.

LANL is restricted airspace, and planes infrequently fly less than 2000 ft above ground level. The County of Los Alamos operates an airport along the northern edge of LANL. The airport is located on the southern rim of Pueblo Canyon. Currently, there are no scheduled commercial flights from the airport, although that is subject to change. Most flights approach and depart to the east of the airport, over the Rio Grande.

*2.2.3.3 Explosives*

There is no specific information on the reaction of Mexican spotted owls to explosives detonation currently available. Explosive blasts set off 120 to 140 m from active prairie falcon (*Falco mexicanus*) nests caused perched prairie falcons to flush from perches 79 percent of the time, and, in 26 percent of the cases, caused incubating prairie falcons to flush from nests. Measured sound levels at aerie entrances during blasts ranged from 129 to 141 dB (Holthuijzen et al. 1990). Explosives blasting for dam construction 560 to 1000 m from active prairie falcon nests caused a change in behavior 26 percent of the time, and birds flushed in 17 percent of all cases. No incubating birds flushed (Holthuijzen et al. 1990). Brown et al. (1999) found little activity change in roosting or nesting bald eagles and no population-level impacts from weapons detonations at the Aberdeen Proving Ground. Holthuijzen et al. (1990) found that a 167-g charge of Kinestik produced noise levels between 138 and 141 dB at 100 m, and that a 500-g charge of TNT produced noise levels between 144 and 146 dB at 100 m. A 20-kg charge of TNT produced noise levels that measured 163 dB at 100 m (Paakkonen 1991).

Measurements of noise levels during explosives testing (quantities of high explosives ranged from 4.5 to 67.5 kg of TNT during six shots) were conducted at three locations at LANL. Noise levels increased during the test from a background level of 31 dB(A)[1] to a range between 64 and 71 dB(A) during shots at a distance of 1.8 km. At a distance of 4.3 km, noise levels rose from a background range of 35 to 64 dB(A) to a range of 60 to 63 dB(A) (Vigil 1995). At a distance of 6.7 km, noise levels rose from a background range of 38 to 51 dB(A) to a range of 60 to 71 dB(A) (Burns 1995). LANL SMEs estimated that the noise from a shot at the Dual-Axis Radiographic Hydrodynamic Test (DARHT) facility would be 150 dB(A) at the source and 80 dB(A) at 400 m (Keller & Risberg 1995). LANL SMEs found that Mexican spotted owl AEIs located within the explosives testing buffer area were occupied more frequently than AEIs in other locations (Hathcock et al. 2010).

[1] Sound can be measured as decibels (dB), C-weighted dB [dB(C)], or A-weighted dB [dB(A)]. The dB(A) measurement best resembles the response of the human ear by filtering out lower and higher frequency sound not normally heard by the human ear.

*2.2.3.4 Other Sources of Noise*

Major noise-producing activities at LANL include automobile and truck traffic and noise associated with office buildings, construction activities, a live-fire range, and explosives testing. In addition, there is noise associated with aircraft traffic at the Los Alamos County airport. Construction and maintenance activities involved with operations at LANL are fairly common. In addition, implementation of the 2005 Consent Order has resulted in an increased frequency of drilling groundwater monitoring wells (NMED 2005). Planned fuels management operations use chainsaws, chippers, and other noise-generating equipment.

LANL SMEs conducted a study of noise levels in canyons and found that the primary sources of noise exceeding 55 dB(A) were cars and trucks. Readings taken near flowing water were up to 11 dB(A) higher than readings taken elsewhere. The average dB(A) in canyons near paved roads ranged from 41 to 62, with maximum values ranging from 62 to 74. Away from paved roads 1.6 km or more, average dB(A) in canyons ranged from 37 to 50, with all but one average beneath 45. Maximum dB(A) away from paved roads ranged from 38 to 76 [76 dB(A) was measured during a thunder clap] (Huchton et al. 1997).

Noise measurements were conducted by LANL staff at the Los Alamos County airport and in Bayo and Pueblo canyons, including the Los Alamos County Sewage Treatment Facility, in December 1997. Sound levels near the airport runway during the maximum use time (06:30 to 07:30 AM) had background values averaging 54 dB(A). Noise during plane arrivals ranged from 47 to 63 dB(A). No measurements were collected during plane take-off. Sound measurements conducted in the bottoms of Pueblo and Bayo canyons ranged from 37 to 40 dB(A) in most areas of the canyon. At the sewage treatment facility parking lot during a working day, the average dB(A) during a three-minute period was 46 (range 45 to 49). At the intersection of the road going into Pueblo Canyon with State Road 502, the average dB(A) during a three-minute period was 60 (range 41 to 70).

LANL staff conducted sound measurements at successive distances from an industrial area near a canyon rim, into the canyon, and to the opposite rim, using a C-weighted decibel scale (Keller & Foxx 1997). Measurements of noise levels using the C-weighted decibel scale are greater than if measured using A-weighted decibels. The average background noise on the mesa was 65.8 dB(C) [with a range of 43–81 dB(C)]. The average background noise in the canyon bottom was 62.3 dB(C) [with a range of 54–78 dB(C)]. The average background noise at the bottom of the north-facing slope was 53.8 dB(C) [with a range of 48–64 dB(C)]. Measurements were taken mid-day.

LANL staff measured sound levels from various pieces of construction equipment used at project sites at LANL over 5-minute intervals at distances of 20 to 100 ft (Knight & Vrooman 1999). Average values ranged from 58.5 dB(A) to 80.9 dB(A). Peak values ranged from 75.7 to 155.4 dB(A). Additional data were collected by other LANL operators on specific pieces of construction equipment and on the Security Computer Complex construction site fence perimeter at TA-3 before and during construction (Knight & Vrooman 1999). The average noise levels before construction began was 56.6 dB(A), and the average during construction was 82.1 dB(A).

LANL staff conducted a series of sound measurements at LANL to investigate background noise levels around AEIs (Vrooman et al. 2000). Background noise levels were significantly higher in daytime than in nighttime. AEIs with greater than 10 percent developed area in their buffers had significantly higher levels of background noise than undeveloped AEIs. Mean background sound levels were 51.3 dB(A) in developed AEIs and 39.6 dB(A) in undeveloped AEIs. The LANL biological resources project review process uses the individual AEI background measurements from Vrooman et al. (2000) to screen project activities for increases more than 6 dB(A) above background.

LANL staff took sound level measurements of heavy equipment use associated with concrete recycling on Sigma Mesa at LANL in 2004 (Hansen 2004). At this location, background noise levels at two different locations were 55.2 and 58.8 dB(A). Operation of a dump truck hauling and dumping concrete increased noise levels above background by a mean of 22.7 dB(A) at 30 m and 2.4 dB(A) at 80 m. Additional sound level measurements were taken in the same general area on Sigma Mesa in 2005 as part of a BA for the operation of an asphalt batch plant (Hansen 2005). Measurements were taken on the north rim of Mortandad Canyon (south of the asphalt batch plant at distances of ~100 to 400 ft), at the bottom of Mortandad Canyon (~600 to 800 ft from the asphalt batch plant), and on the south rim of Mortandad Canyon (~1000 ft from the asphalt batch plant). Background noise levels at the various locations ranged from 41.1 to 48.7 dB(A). The only locations with increases greater than 3 dB(A) during operation of the asphalt batch plant were the locations on the north rim of Mortandad Canyon, within 400 ft of the asphalt batch plant. Noise from the operation of the asphalt batch plant was not detected in the bottom of Mortandad Canyon or on the south rim.

LANL staff took sound level measurements around the LANL Biosafety Level 3 (BSL-3) Laboratory with the heating, ventilation, and air conditioning (HVAC) system on and with it off (Hansen 2009). The area to the north of the BSL-3 is developed, and the area to the south is not. Background noise levels north of the facility ranged from 53.6 to 57.6 dB(A). Background noise levels south of the facility ranged from 41.6 to 49.7 dB(A). Noise from the HVAC system was detected at 25 m from the facility on both sides, but was not detected at 81 m on the north side, or at 107 m on the south side.

Overall, these studies appear to show that areas adjacent to or within developed areas or paved roads are likely to have daytime average background noise levels between 45 and 63 dB(A). More undisturbed areas are likely to have average background noise levels between 37 and 50 dB(A).

*2.2.3.5 Artificially Produced Light*

There is no information on the effects of artificially produced light on Mexican spotted owls available. Under the Los Alamos County Code, commercial site development plans are reviewed to ensure that lighting serves the intended use of the site while minimizing adverse impacts to adjacent residential property (Section 16-276). Section 16-276 of the County Code includes light source measurement limitations by zoning district. The code allows off-site light to be 0.5 ftc in residential areas. By comparison, full moonlight measures 0.1 ftc, and a crescent moon was measured at 0.01 ftc. Table A-2 in the Appendix presents preliminary light measurements in ftc.

Preliminary surveys were conducted for light levels within Los Alamos Canyon at the Omega Reactor (Keller & Foxx 1997). The Omega Reactor was brightly lit for purposes of security; therefore, total light intensity was greater than the average street lighting. Measurements were conducted at a light pole with an open parking lot at the reactor as the source. Trees did not obscure the area. Using the relationship of light intensity reducing as a square of the distance, calculations using the field data indicated that at 30 m from the source the light levels would be equivalent or nearly equivalent to full moonlight.

## 3.0 AEI GENERAL DESCRIPTION FOR MEXICAN SPOTTED OWL

### 3.1 DESCRIPTION OF A MEXICAN SPOTTED OWL AEI

An AEI consists of two areas—a core and a buffer. The core of the habitat is defined as suitable canyon habitat from rim to rim and 100 m out from the top of the canyon rim. The buffer area is 400 m wide extending outward from the edge of the core area. Although adult Mexican spotted owls may be found within their home range anytime throughout the year, the primary threat from disturbance to the owls is during the breeding season when owl pairs are tied to their nest sites. Therefore, management of disturbance in Mexican spotted owl AEIs is concentrated on the breeding season.

### 3.2 METHOD FOR IDENTIFYING A MEXICAN SPOTTED OWL AEI

The original location of each Mexican spotted owl AEI was identified using a habitat model developed by Johnson (1998) that classified nesting and roosting habitat for Mexican spotted owls using topographic characteristics and vegetative diversity. LANL biologists compared the results from the Johnson (1998) model to a different model identifying slopes > 40 percent in mixed conifer and ponderosa pine cover types at LANL. Areas identified from the Johnson (1998) model application to LANL that were over five contiguous 30- by 30-m pixels in size, were above 1980 m in elevation, and that had mixed conifer or ponderosa pine forest cover, were considered suitable Mexican spotted owl habitat. Where suitable habitat was identified, AEI core area boundaries were established to include the canyons and 100 m outward from the canyon rims.

A new Mexican spotted owl habitat model was developed and refined for application on LANL following the Cerro Grande fire (Hathcock & Haarmann 2008). This model incorporates finer-scale vegetation characteristics into the Mexican spotted owl habitat quality assessment. This model was used to redelineate the boundaries of the Mexican spotted owl AEIs at LANL in 2005 following wildfire, drought, and a regional bark beetle outbreak (USFWS consultation number 22420-2006-I-0010).

The new core boundaries were delineated with an area approximately 0.4 km (0.25 mi) from the edge of the nearest good habitat, up and down canyon. Core boundaries were established along readily recognizable geologic features or anthropogenic features in the terrain wherever possible to facilitate the ease of identification of core boundaries when in the field.

### 3.3 LOCATION AND NUMBER OF MEXICAN SPOTTED OWL AEIs

There are currently five Mexican spotted owl AEIs on LANL, each encompassing one or more canyons. In general, the AEI cores are centered in canyons on the western side of LANL. The canyons with AEIs are Cañon de Valle, Water, Pajarito, Los Alamos, Sandia, Mortandad, and Three-Mile. AEI boundaries are maintained in the LANL biological resources program GIS database.

## 4.0 AEI MANAGEMENT

### 4.1 OVERVIEW

This AEI management section provides guidelines for LANL operations to reduce or eliminate the threats to Mexican spotted owls from 1) habitat alterations that reduce habitat quality and 2) disturbance of breeding or potentially breeding owls. Habitat alterations are considered for all AEIs and for both core and buffer areas. Activities causing disturbance—hereafter referred to as "disturbance activities"—to owls are considered only for occupied AEIs and only for impacts on core areas. Developed areas (see Part I, Section 3.1) that have ongoing baseline levels of activities and are not suitable habitat for Mexican spotted owls have different restrictions than undeveloped core or buffer areas. Therefore, the location of the disturbance activity within the AEI, the occupancy status of the AEI, and the type of activity all affect whether or not the activity is allowable. Remember, AEIs for different species may overlap, and an activity must meet the guidelines of all applicable site plans to be allowable. Protective measures are described as management practices that should be followed when working in AEIs.

### 4.2 DEFINITION AND ROLE OF OCCUPANCY IN AEI MANAGEMENT

***Summary:*** The occupancy status of an AEI affects what disturbance activities are allowable in different areas (core, buffer, developed) of the AEI. All Mexican spotted owl AEIs are considered occupied during March 1 through August 31 or until surveys show the AEI to be unoccupied. See the Activity Table (Section 4.5.2) for restrictions on occupied undeveloped core and buffer areas, and see the developed area section (Part I, Section 3.1) for restrictions on developed areas.

Occupancy simply refers to whether or not an AEI is occupied during a species' period of sensitivity. For Mexican spotted owls, LANL is primarily concerned with protecting the owls from disturbance during the breeding season. Because individuals may colonize suitable habitat, all Mexican spotted owl AEIs are treated as though they are occupied from March 1 through August 31 or until surveys show an AEI to be unoccupied. Spotted owl surveys are conducted from late March through June. In general, surveys in areas with ongoing or proposed projects are completed by May 15. If a nest is located during surveys, then the AEI can be treated as unoccupied except for the area within a 400-m radius of the nest site. Because spotted owls are not as sensitive to disturbance during the non-breeding season, Mexican spotted owl AEIs are treated as unoccupied from September 1 to February 28.

The occupancy status of an AEI affects what activities are allowable in the AEI. Although activities causing habitat alterations are restricted in all AEIs, disturbance activities are restricted

only in occupied AEIs. The Activity Table (Section 4.5.2) provides dates and levels of allowable disturbance activities within occupied Mexican spotted owl AEIs under the guidelines of this site plan. Contact a biological resources SME to find out the current occupancy status of an AEI (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

## 4.3 INTRODUCTION TO AEI MANAGEMENT GUIDELINES

***Summary:*** The habitat alterations section and the activities section give the guidelines for habitat alteration and disturbance activities, respectively, for Mexican spotted owl AEIs. The flow chart (see Figure 1) provides a quick reference to determine what, if any, guidelines need to be consulted for a specific activity. Protective measures give management practices that should be applied when working or considering work in AEIs. Biological resources SMEs are available to answer questions and provide advice (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

Sections 4.4 and 4.5 provide the guidelines for habitat alterations and allowable activities in AEI core and buffer areas. The flow chart (see Figure 1) provides a quick reference that should be used to determine whether a project or activity will affect an AEI and what sections of the site plan need to be consulted. The section on habitat alterations (Section 4.4) describes what and where habitat alterations are allowed under the guidelines of this site plan. The section and table on allowable activities (Section 4.5) describe what, when, and where disturbance activities are allowed in occupied AEIs under the guidelines of this site plan. If an activity does not meet the restrictions given in the guidelines, the activity must be individually reviewed for ESA compliance. This site plan only provides guidelines for Mexican spotted owl AEIs. If an activity is desired in an area with overlapping AEIs, all applicable site plans must be consulted. AEI maps show the location of all AEIs in an area. The section on protective measures (Section 4.6) describes management practices that should be applied when working or considering work in an AEI. Biological resources SMEs are available to answer questions and provide advice (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

## 4.4 DEFINITION OF AND RESTRICTIONS ON HABITAT ALTERATIONS

### 4.4.1 Definition of Habitat Alterations

Habitat alteration includes any action that alters over the long-term the soil structure, vegetative components necessary to the species, prey quality and quantity, water quality, hydrology, or noise or light levels in undeveloped areas of an AEI. Long-term means the alteration lasts for more than one year. For physical disturbances, in general, any activity that can be accomplished by one person with a hand tool is generally not considered habitat alteration; any activity that requires mechanized equipment on a landscape is habitat alteration. An actual activity may take place outside of the AEI and will be considered habitat alteration if consequences of the activity have effects inside the AEI core.

The habitat components most important to Mexican spotted owls include vegetative structure, food quality and quantity, and disturbance levels, including noise and light. The forest structure within a canyon designated as a Mexican spotted owl AEI is important because it provides roost sites and a suitable habitat for nesting and foraging. Trees along the canyon rim are used for

foraging and territorial calling, and they shelter the canyon interior from light and noise disturbances.

A long-term change in light or noise levels within the undeveloped core of an AEI is considered to be a habitat alteration if it increases average noise levels by ≥6 dB(A) during any portion of the 24-hour day, or it increases average light levels by ≥0.05 ftc at night. Changes in noise and light levels are measured at the core area boundary if the source is outside the core area, or at 10 m from the source if the source is in the undeveloped core area. Impacts of changes in developed areas on undeveloped cores are measured at the developed area boundary if it is within a core, or at the core area boundary if the developed area is outside of the core.

### 4.4.2 Fuels Management Practices to Reduce Wildfire Risk

The recovery plan for Mexican spotted owl lists stand-replacing wildfires as a primary threat to spotted owl habitat and encourages land managers to reduce fuel levels and abate fire risks in ways compatible with spotted owl presence on the landscape (USFWS 1995). Within undeveloped core areas, on slopes >40 percent, in the bottoms of steep canyons, and within 30 m of a canyon rim, thinning of trees <22.4 cm diameter at breast height, treatment of fuels, and prescribed and natural prescribed fires are allowed. Exceptions allowing trees >22.4 cm to be thinned within 30 m of buildings are granted to protect facilities (see below). Large logs (>30 cm midpoint diameter) and snags should be retained. Thinning within core areas not meeting the characteristics listed above and in buffer areas may include trees of any size to achieve a 7.6-m spacing between tree crowns. However, clearcutting is not allowed in undeveloped core areas.

For health and safety reasons, any trees within 30 m of buildings, but outside a developed area, may be thinned to achieve a 7.6-m spacing between crowns. Habitat alterations including thinning are not restricted in developed areas. However, LANL biologists encourage the retention of trees and snags along canyon rims if the rim is in a developed area. Because of the extreme fire danger associated with firing sites and the potential impact of a fire on Mexican spotted owl habitat, firing sites and burn areas are treated separately for the purposes of fuels management. Trees within 380 m of firing sites and burn areas in both core and buffer areas may be thinned to a 15-m spacing between trees everywhere except on slopes >40 percent or in the bottoms of steep canyons. Any tree over 22.4 cm diameter at breast height within 380 m of a firing site may be delimbed to a height of 1.8 m to help prevent crown fires.

In historically occupied core areas, fuels treatment may not exceed 10 percent of the undeveloped core area and is not allowed within 400 m of nesting areas. In occupied core areas, forest management activities must take place during the nonbreeding season (September 1 to February 28) (USFWS 1995). Fuels management activities that are allowable in core areas have to be reported for either core or buffer areas.

### 4.4.3 Utility Corridors

Habitat alterations such as cutting down trees that threaten power lines are allowed within 8 m of either side of an existing utility line in all areas of an AEI (Trujillo & Racinez 1995). New utility lines and utility lines requiring clearance of a right-of-way greater than 16 m total must be

individually reviewed for ESA compliance. Disturbance activities must follow the guidelines given in the Activities Table for occupied AEIs.

### 4.4.4 Restrictions on Habitat Alterations

***Summary:*** Habitat alterations other than fuels management practices and utility corridor maintenance are not allowed in undeveloped core areas. Habitat alterations in buffer areas are restricted to 2 ha per project, with a maximum cap on development in the buffer for each AEI. Habitat alterations other than fuels management and utility corridor maintenance must be reported to biological resources SMEs for tracking (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

Habitat alterations other than the fuels management practices and utility corridor maintenance described above are not allowed in undeveloped core areas under the guidelines of this site plan. If a project or activity is planned that would alter habitat in an undeveloped core area, it must be individually evaluated for ESA compliance. Habitat alterations in undeveloped buffer areas other than the fuels management activities and utility corridor maintenance described above are restricted to 2 ha in area per project and are subject to other restrictions including light and noise effects in the core (see Section 2.2.3). Projects in the buffer over 2 ha in size will require individual ESA compliance review.

Habitat alterations in a buffer area other than the fuels management and utility corridor maintenance described above must be reported to LANL's biological resources SMEs for tracking (http://int.lanl.gov/environment/bio/lanl_only/support.shtml). There is a cumulative maximum area that can be developed in each AEI's buffer. Once that cumulative area is reached, all habitat alterations in a buffer will require individual ESA reviews for compliance.

## 4.5 DEFINITION OF AND RESTRICTIONS ON DISTURBANCE ACTIVITIES

### 4.5.1 Definitions of Disturbance Activities

LANL biologists considered six categories of activities that might cause disturbance in an AEI. Most of the categories were first identified in the document "Peregrine Falcon Habitat Management in the National Forests of New Mexico," prepared for the United States Forest Service (Johnson 1994). LANL biologists added explosives detonation, other light production, and other noise production to provide the most comprehensive list of activities possible, thereby reducing the need for individual review of activities for ESA compliance. The categories of activities are people, vehicles, aircraft, other light production, other noise production, and explosives detonation. LANL biologists have defined low, medium, and high levels of impact for these activities except for explosives detonation. Activity levels for explosives detonation have been designed to follow the guidelines agreed upon by LANL, DOE, and USFWS in the DARHT BA (Keller & Risberg 1995). Restrictions on explosives detonation are described in the definition of the activity, but are not included in the Activity Table. These six categories of activities are restricted only in AEIs that are classified as occupied.

People—includes any entry of people into an AEI on foot.

- Low impact is the presence of three or fewer people per project and duration of one day or less during a breeding season.

- Medium impact is the exceedance of either the number of people or the duration criteria.

- High impact is the exceedance of both the number of people and the duration criteria.

Vehicles—includes the entry of any two-axle highway vehicle, all-terrain vehicle, or motorized machinery into an AEI by any route other than a paved road or an improved gravel road.

- Low impact is the presence of two or fewer vehicles per project and duration of one day or less during a breeding season.

- Medium impact is the exceedance of either the number of vehicles or the duration criteria.

- High impact is the exceedance of both the number of vehicles and the duration criteria.

Aircraft—includes the operation of any aircraft below an elevation of 600 m (2000 ft) above the highest ground level in the local vicinity.

- Low impact is the presence of one single-engine airplane and the duration of one day or less during a breeding season.

- Medium impact is the exceedance of either the number of aircraft or the duration criteria.

- High impact is the exceedance of both the number of aircraft and the duration criteria.

Any use of helicopters, jet airplanes, and propeller airplanes with two or more engines is classified as medium impact or above, depending on duration.

Other Light Production—includes any activity not previously listed that causes additional light to occur in an AEI core area. For example, plans for construction of a new building at the edge of a developed area may call for lighting at night to facilitate nighttime work that impacts an undeveloped core area.

- Low impact is the increase of light intensity by ≤0.05 ftc and a duration of one night or less per project per breeding season.

- Medium impact is the exceedance of either the intensity or duration criteria.

- High impact is the exceedance of both the intensity and duration criteria.

Measurements for increases in light are taken at the AEI core area boundary closest to the light source if the source is outside the core and at 10 m from the source if the source is inside the core. Light measurements for developed areas are taken at the edge of the developed area if the

developed area is within an AEI core or at the closest core boundary if the developed area is outside of an AEI core.

Other Noise Production–includes any activity not previously listed except for explosives detonation that causes additional noise to occur in an AEI. For example, operation of machinery creates noise.

- Low impact is increasing noise levels in an AEI core by 6 dB(A) or less for one day or less per project per breeding season.
- Medium impact is the exceedance of either the level or the duration criteria.
- High impact is the exceedance of both the level and the duration criteria.

Measurements for increases in noise are taken at the AEI core boundary closest to the noise source if the source is outside the core and at 10 m from the source if the source is inside the core. Noise measurements for developed areas are taken at the edge of the developed area if the developed area is within an AEI core or at the closest core boundary if the developed area is outside of an AEI core.

Explosives Detonation—includes the use of high explosives for any purpose. LANL biologists did not define low, medium, and high levels of this activity because of the difficulty of determining levels for a shot before actually doing the shot. For the purpose of explosives detonation near Mexican spotted owl AEIs, occupied habitat is defined as the area within 400 m of the current year's nest/roost sites or the previous year's nest site if a current site has not been identified. No explosives detonation will take place within 400 m of nest/roost sites in occupied habitat between March 1 and August 31. Explosives detonation at night at sites within 400 to 800 m of a nest site in occupied habitat is restricted to once a month from March 1 and August 31. There are no restrictions on daytime explosives testing between 400 and 800 m. There are no restrictions between September 1 and February 28 or in unoccupied habitat. Explosives detonation adjacent to AEIs that have not previously been recorded by LANL as occupied will have no restrictions unless surveys detect Mexican spotted owls. Explosives tests not allowed under the guidelines of this site plan must be individually reviewed for ESA compliance before they are allowed to go forward.

### 4.5.2 Activity Table

The dates shown in the Activity Table (Table 1) are the dates between which the activity in the row is restricted under the guidelines of this site plan. All AEIs are considered occupied from March 1 to August 31 or until surveys show an AEI to be unoccupied. If owls are detected, AEIs are considered occupied until August 31 within 400 m of the nest site. Consult the biological resources SMEs to find out occupancy status of AEIs and what locations are within 400 m of nest sites (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

**Table 1. Restrictions on Activities in Undeveloped Occupied Mexican Spotted Owl AEIs**

| | | Core | Buffer |
|---|---|---|---|
| *People* | | | |
| | Low | No Restrictions* | No Restrictions |
| | Medium | Mar 1 to Aug 31 | No Restrictions |
| | High | Mar 1 to Aug 31 | No Restrictions |
| *Vehicles* | | | |
| | Low | No Restrictions | No Restrictions |
| | Medium | Mar 1 to Aug 31 | No Restrictions |
| | High | Mar 1 to Aug 31 | No Restrictions |
| *Aircraft* | | | |
| | Low | Mar 1 to Aug 31 | No Restrictions |
| | Medium | Mar 1 to Aug 31 | Mar 1 to May 15 |
| | High | Mar 1 to Aug 31 | Mar 1 to Aug 31 |
| *Other Light Production* | | | |
| | Low | Mar 1 to Aug 31 | No Restrictions** |
| | Medium | Mar 1 to Aug 31 | No Restrictions** |
| | High | Mar 1 to Aug 31 | No Restrictions** |
| *Other Noise Production* | | | |
| | Low | Mar 1 to Aug 31 | No Restrictions** |
| | Medium | Mar 1 to Aug 31 | No Restrictions** |
| | High | Mar 1 to Aug 31 | No Restrictions** |
| *Explosives Detonation* See text (Section 4.5.1) | | | |

*Entry is restricted in core areas that are occupied within 400 m of the nest site from March 1 to August 31. If the current nest has not been located, entry is restricted within 400 m of the previous year's nest site.
**Noise or light production in the buffer is restricted if the activity would violate core area restrictions on noise or light.

## 4.6. PROTECTIVE MEASURES

***Summary:*** This section provides a list of management practices to apply in Mexican spotted owl AEIs.

- Timing of projects must take into account that projects in core areas or that violate restrictions for occupied buffer areas must stop on February 28 each year until occupancy status of the AEI is determined.

- Every reasonable effort should be made to reduce the noise from explosives testing within 800 m of occupied habitat. Methods to reduce noise could include contained shots, noise shields in the direction of AEI cores, etc. For night shots, every reasonable effort should be made to limit the amount of light directed into AEI core areas.

- Put signs on dirt roads and trails leading into AEIs labeling them as restricted access areas and providing a number to contact for access restrictions.

- Keep disturbance and noise to a minimum.

- Avoid unnecessary disturbance to vegetation (e.g., excessive parking areas or equipment storage areas, off-road travel, materials storage areas, crossing of streams or washes).

- Avoid removal of vegetation along drainage systems and stream channels.

- Avoid all vegetation removals not absolutely necessary.

- Appropriate erosion and runoff controls should be employed to reduce soil loss. The controls must be put in place and periodically checked throughout the life of projects.

- All exposed soils must be revegetated as soon as feasible after construction to minimize erosion.

- In the Los Alamos Canyon AEI, development should be focused away from undeveloped areas on the western end of the AEI.

## 5.0 LEVELS OF DEVELOPMENT IN AEI CORE AND BUFFERS

### 5.1 ALLOWABLE HABITAT ALTERATION IN THE BUFFER AREAS

The following quantifications of development and guidance for allowable habitat alteration in buffer areas were published and consulted on in the 1999 version of the HMP. Most AEIs changed in dimensions during the 2005 redelination of the habitats, and many have experienced additional development. Development in buffer habitat was not addressed during the 2005 consultation. Many projects were reviewed and received USFWS concurrence between 1999 and 2011.

LANL staff have provided the current development status for each of the AEIs at the end of each paragraph.

*Cañon de Valle*—In 1999, 16.3 ha (2.9 percent) of the core was developed and 52.2 ha (6.8 percent) of the DOE-controlled buffer was developed. The recommendations for this AEI were that only an additional 25.30 ha of this AEI buffer be developed. The 1999 HMP stated that once this ceiling is reached or a large-scale project is proposed in the buffer, additional consultation with USFWS would be required. By 2011, 28 ha of the core and 84 ha of the buffer had been developed.

*Pajarito*—In 1999, there were 6.7 ha (5.5 percent) of the core developed and 75.05 ha (16.7 percent) developed in the buffer. LANL biologists recommended only an additional 35.0 ha of the buffer be developed before additional USFWS consultations take place. The 1999 HMP stated that once the cap is reached or a single large-scale project is proposed, additional consultation would be required. By 2011, 27 ha of the core and 89 ha of the buffer had been developed.

*Los Alamos*—In 1999, there were 77.06 ha of the core developed and 167.23 ha developed in the buffer. For this AEI, LANL biologists recommended only an additional 28.6 ha (5.9 percent) of the DOE-owned buffer be developed before additional USFWS consultations take place.

Because this AEI is so heavily developed, additional development was restricted to a few selected areas within the buffer. Development outside of these areas requires individual review for ESA compliance. By 2011, 94 ha of the core and 181 ha of the buffer had been developed.

*Sandia-Mortandad*—In 1999, 98.4 ha of this AEI on DOE lands were developed, including 29.0 ha (10.7 percent) of the core and 75.1 ha (16.7 percent) of the buffer. For this AEI, LANL biologists recommended only an additional 38.1 ha of the buffer be developed before additional USFWS consultations take place. Once this cap is reached or a single large-scale project is proposed, additional consultation will be required. By 2011, 45 ha of the core and 83 ha of the buffer had been developed.

*Three Mile*—In 1999, 25.3 ha of this AEI on DOE lands were developed, including 3.8 ha (2.8 percent) of the core and 21.5 ha (7.3 percent) of the buffer. For this AEI, LANL biologists recommended only 64.3 ha additional area of buffer be developed before additional USFWS consultations take place. Once this ceiling is reached or a single large-scale project is proposed, additional consultation will be required. By 2011, 12 ha of the core and 37 ha of the buffer had been developed.

# III. AREA OF ENVIRONMENTAL INTEREST SITE PLAN FOR THE SOUTHWESTERN WILLOW FLYCATCHER

## 1.0 SPECIES DESCRIPTION—SOUTHWESTERN WILLOW FLYCATCHER

### 1.1 STATUS

In 1995, the USFWS designated the southwestern subspecies of the willow flycatcher (*Empidonax traillii extimus*) as a federally endangered species (60 FR 10693). The USFWS most recently designated critical habitat for the southwestern willow flycatcher in 2005 (70 FR 60885). The most recent recovery plan was published for southwestern willow flycatcher in 2002 (USFWS 2002).

### 1.2 GENERAL BIOLOGY

The southwestern willow flycatcher is one of four subspecies of the willow flycatcher. The historic range of the southwestern willow flycatcher included Arizona, California, Colorado, New Mexico, Texas, Utah, and Mexico. Currently, this flycatcher breeds in riparian habitats from southern California to Arizona and New Mexico, plus southern Colorado, Utah, Nevada, and far western Texas. In winter it is found in southern Mexico, Central America, and northern South America (USFWS 2002).

Willow flycatchers are present in New Mexico from early May through mid-September and breed from late May through late July (Finch & Kelly 1999; USFWS 2002; Yong & Finch 1997). The flycatcher's nesting cycle is approximately 28 days. Three or four eggs are laid at one-day intervals, and incubation begins when the clutch is complete. The female incubates eggs for approximately 12 days, and the young fledge about 13 days after hatching. Southwestern willow flycatchers typically raise one brood per year (USFWS 2002). Because arrival dates vary, northbound migrant willow flycatchers (of all subspecies) pass through areas where southwestern willow flycatchers have already begun nesting. Similarly, southbound migrants (of all subspecies) in late July and August may occur where southwestern willow flycatchers are still breeding. Therefore, it is only during a short period of the breeding season (approximately June 15 through July 20) that one can assume that a willow flycatcher seen within southwestern willow flycatcher range is probably of that subspecies (USFWS 2002).

The southwestern willow flycatcher only nests along rivers, streams, and other wetlands. It is found in close association with dense stands of willows (*Salix* spp.), arrowweed (*Pluchea* spp.), buttonbush (*Cephalanthus* spp.), tamarisk (*Tamarix* spp.), Russian olive (*Eleagnus angustifolia*), and other riparian vegetation, often with a scattered overstory of cottonwood (*Populus* spp.) (USFWS 2002). The size of vegetation patches or habitat mosaics used by southwestern willow flycatchers varies considerably and ranges from as small as 0.8 ha to several hundred hectares (Hatten & Paradzick 2003). The southwestern willow flycatcher nests in thickets of trees and shrubs approximately 2 to 15 m tall, with a high percentage of canopy cover and dense foliage from 0 to 4 m above ground. Regardless of the plant species composition or height, occupied sites always have dense vegetation in the patch interior (Allison et al. 2003; USFWS 2002).

The southwestern willow flycatcher is an insectivore. It forages within and occasionally above dense riparian vegetation, taking insects on the wing and gleaning them from foliage. The flycatcher's prey includes flies, bees, wasps, ants, beetles, moths, butterflies, grasshoppers, crickets, dragonflies, damselflies, and spiders (Durst et al. 2008; Wiesenborn & Heydon 2007).

### 1.3 THREATS

The current population of southwestern willow flycatchers in the United States is estimated at between 900 and 1300 pairs (USFWS 2002). The distribution of breeding groups is highly fragmented, with groups often separated by considerable distances. This subspecies has suffered declines attributed to extensive loss of its cottonwood-willow habitat and to poor productivity resulting from brood parasitism by brown-headed cowbirds (*Molothrus ater*) (USFWS 2002).

## 2.0 IMPACT OF HUMAN ACTIVITIES

### 2.1 INTRODUCTION

The primary threats to the southwestern willow flycatcher on LANL property are 1) impacts on habitat quality from LANL operations and 2) disturbance of nesting flycatchers. This section includes a review and summary of the known effects of various types of human activities to the southwestern willow flycatcher and an overview of the current levels of activities at LANL within species habitat.

### 2.2 IMPACTS ON HABITAT QUALITY

#### 2.2.1 Development

Throughout the Southwest, riparian habitats are rare and tend to be small and separated by vast expanses of arid lands. The southwestern willow flycatcher has experienced extensive loss and modification of its habitat resulting from urban and agricultural development, water diversion and impoundment, channelization of waterways, livestock grazing, off-road vehicle and other recreational uses, and hydrological changes resulting from these and other land uses (USFWS 2002). River and stream impoundments, groundwater pumping, and overuse of riparian areas have altered as much as 90 percent of the flycatcher's habitat (USFWS 2002). Loss of cottonwood-willow riparian forests has had widespread impact on the distribution and abundance of bird species associated with that forest. Development itself may be tolerated if the habitat is left intact. Southwestern willow flycatchers do nest near roads, bridges, and railroad tracks (D.A. Leal, personal communication, 1998).

Because watercourses at LANL tend to be intermittent to ephemeral, riparian habitat is uncommon. There has been extensive degradation of the riparian zone along the Rio Grande caused by cattle grazing and flood control operations of Cochiti Lake. There are other riparian/wetland areas on LANL associated with canyon bottoms, the most significant one being Pajarito wetlands in the lower end of Pajarito Canyon. A major paved road traverses the wetlands area in Pajarito Canyon.

### 2.2.2 Contaminants

There is no specific information on the impact of contaminants on southwestern willow flycatcher.

#### *2.2.2.1 Ecorisk Assessment*

LANL completed two ecological risk assessments that included the southwestern willow flycatcher between 1997 and 2009. The ecological risk assessment process involves using computer modeling to assess potential effects to animals from COPCs that have been detected in the environment. The following ecological risk assessments concluded that, in general, there is a small potential for effects to southwestern willow flycatcher from COPCs:

- Gonzales, G., A. Gallegos, M. Mullen, K. Bennett, and T. Foxx. 1998. Preliminary Risk Assessment of the Southwestern Willow Flycatcher at the Los Alamos National Laboratory. LANL report LA-13508-MS.

- Gonzales, G., P. Gallegos, A. Gallegos, and K. Bennett. 2009. Site-wide Application of ECORSK.9 at the Los Alamos National Laboratory. LANL report LA-UR-09-02833.

An ecotoxicological risk assessment for southwestern willow flycatcher, centered on Pajarito wetlands, found that between 7 and 16 percent of 100 hypothetical nest sites examined had hazard indices >1.0 and <10.0, depending on the foraging scenario (Gonzales et al. 1998). This indicates a small potential for impacts from contaminants. The primary contaminants driving the risk scenario were pentachlorophenol, aluminum, radium-226, calcium, and thorium-228. Aluminum, radium, and thorium are naturally occurring substances in northern New Mexico.

### 2.2.3 Disturbance

#### *2.2.3.1 Pedestrians and Vehicles*

There is no specific information on the reactions of southwestern willow flycatchers to pedestrians and vehicles available. The recovery plan for the southwestern willow flycatcher recommends providing protected areas, reducing unpredictable activities, providing visual barriers, and reducing noise disturbance (USFWS 2002).

#### *2.2.3.2 Aircraft*

There is no specific information on the reaction of southwestern willow flycatchers to aircraft available.

LANL lies within restricted airspace and planes infrequently fly less than 2000 ft above ground level. The County of Los Alamos operates an airport along the northern edge of LANL. The airport is located on the southern rim of Pueblo Canyon. Currently, there are no scheduled commercial flights from the airport, although that is subject to change. Most flights approach and depart to the east of the airport, over the Rio Grande.

2.2.3.3 *Explosives*

There is no specific information on the reaction of southwestern willow flycatchers to explosives detonation available. The southwestern willow flycatcher AEI is not located close to any explosives testing sites.

*2.2.3.4 Other Sources of Noise*

LANL biologists do not have good information on the effects of noise, including machinery operation, on southwestern willow flycatchers. However, southwestern willow flycatchers do nest near roads, bridges, and railroad tracks (D.A. Leal, personal communication, 1998) and are probably not as sensitive to disturbance as some other threatened or endangered species (USFWS 2002). For a description of noise levels at LANL, see Part I, Section 2.2.3.

*2.2.3.5 Artificially Produced Light*

There is no information on the effects of artificially produced light on southwestern willow flycatcher available. Under the Los Alamos County Code, commercial site development plans are reviewed to ensure that lighting serves the intended use of the site while minimizing adverse impacts to adjacent residential property (Section 16-276). Section 16-276 of the County Code includes light source measurement limitations by zoning district. The code allows off-site light to be 0.5 ftc in residential areas. By comparison, full moonlight measures 0.1 ftc, and a crescent moon was measured at 0.01 ftc.

Preliminary surveys were conducted for light levels within Los Alamos Canyon at the Omega Reactor (Keller & Foxx 1997). The Omega Reactor was brightly lit for purposes of security; therefore, total light intensity was greater than the average street lighting. Measurements were collected at a light pole with an open parking lot at the reactor as the source. Trees did not obscure the area. Using the relationship of light intensity reducing as a square of the distance, calculations using the field data indicated that at 30 m from the source the light levels would be equivalent or nearly equivalent to full moonlight. Table A-3 in the Appendix presents preliminary light measurements in ftc.

## 3.0 AEI GENERAL DESCRIPTION FOR SOUTHWESTERN WILLOW FLYCATCHER

### 3.1 DESCRIPTION OF THE SOUTHWESTERN WILLOW FLYCATCHER AEI

The AEI consists of two types of areas—core and buffer. Core areas represent wetland areas with suitable vegetation for nesting, primarily dense willows. The buffer area is the area within 100 m of core areas. The Southwestern Willow Flycatcher AEI on LANL consists of two separate core areas. For purposes of this site plan, both core areas and associated buffers are considered one AEI unit.

### 3.2 METHOD FOR IDENTIFYING THE SOUTHWESTERN WILLOW FLYCATCHER AEI

The core areas were defined by the presence of riparian habitat and suitable wetland vegetation. These areas were identified in 1994 during a survey of wetlands at LANL, mapped using a

global positioning system receiver (K. Bennett and T. Foxx, personal communication), and confirmed by ground surveys in 1998 (S. Koch, personal communication). Wetlands without stands of dense willows at least 2 m tall and 30 m wide were removed from the AEI. The buffer area is the area within 100 m of the core areas.

### 3.3 LOCATION OF THE SOUTHWESTERN WILLOW FLYCATCHER AEI

LANL has one AEI for southwestern willow flycatcher. It is composed of two core areas with associated buffers. The AEI core areas are located in the bottom of Pajarito Canyon, on the eastern side of LANL adjacent to Pajarito Road and State Road 4. The boundaries of the southwestern willow flycatcher AEI are maintained in the biological resources program GIS database at LANL.

## 4.0 AEI MANAGEMENT

### 4.1 OVERVIEW

This AEI management section provides guidelines for LANL operations to reduce or eliminate the threats to southwestern willow flycatcher from 1) habitat alterations that reduce habitat quality and 2) disturbance of breeding or potentially breeding flycatchers. Habitat alterations are considered for all AEIs and for both core and buffer areas. Activities causing disturbance (hereafter referred to as "disturbance activities") to flycatchers are considered only for occupied AEIs and only for impacts on core areas. Developed areas (see Part I, Section 2.3) with ongoing baseline levels of activities and are not suitable habitat for southwestern willow flycatchers have different restrictions than undeveloped core or buffer areas. Therefore, the location of the disturbance activity within the AEI, the occupancy status of the AEI, and the type of activity all affect whether or not the activity is allowable. Remember, AEIs for different species may overlap, and an activity must meet the guidelines of all applicable site plans to be allowable. Protective measures are described as management practices that should be followed when working in AEIs.

### 4.2 DEFINITION AND ROLE OF OCCUPANCY IN AEI MANAGEMENT

***Summary:*** The occupancy status of an AEI affects what disturbance activities are allowable in different areas (core, buffer, developed) of the AEI. The Southwestern Willow Flycatcher AEI is considered occupied during May 15 through September 15 or until the surveys show the AEI to be unoccupied. See the Activity Table (Table 2) for restrictions on occupied undeveloped core and buffer areas, and see the developed area section (Part I, Section 2.3) for restrictions on developed areas.

Occupancy simply refers to whether or not an AEI is occupied during a species' period of sensitivity. For southwestern willow flycatchers, LANL biologists are primarily concerned with protecting the birds from disturbance during the breeding season. Because individuals may colonize suitable habitat, the Southwestern Willow Flycatcher AEI is treated as though it is occupied from May 15 through September 15 or until surveys show an AEI to be unoccupied. Southwestern willow flycatcher surveys are conducted during May, June, and July. In general, surveys in areas with ongoing or proposed projects are completed by June 15. Because

southwestern willow flycatchers migrate south for the winter, the AEI is treated as unoccupied from September 16 to May 14.

The occupancy status of an AEI affects what activities are allowable in the AEI. Although activities causing habitat alterations are always restricted, disturbance activities are restricted only in occupied AEIs. Table 2 provides dates and levels of disturbance activities allowable in the occupied Southwestern Willow Flycatcher AEI under the guidelines of this site plan. The dates in Table 2 indicate the time period during which the activity is restricted. Contact a biological resources SME to find out the current occupancy status of an AEI (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

## 4.3 INTRODUCTION TO AEI MANAGEMENT GUIDELINES

***Summary:*** The habitat alterations section (Section 4.4) and the activities section (Section 4.5) give the guidelines for habitat alteration and disturbance activities, respectively, for the Southwestern Willow Flycatcher AEI. The flow chart (see Figure 1) provides a quick reference to determine what, if any, guidelines need to be consulted for a specific activity. Protective measures give management practices that should be applied when working or considering work in AEIs. Biological resources SMEs are available to answer questions and provide advice (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

Sections 4.4 and 4.5 provide the guidelines for habitat alterations and allowable activities in AEI core and buffer areas. The flow chart (see Figure 1) provides a quick reference that should be used to determine whether a project or activity will affect an AEI and what sections of the site plan need to be consulted. The section on habitat alterations (Section 4.4) describes what and where habitat alterations are allowed under the guidelines of this site plan. The section and table on allowable activities (Section 4.5 and Table 2) describe what, when, and where disturbance activities are allowed in occupied AEIs under the guidelines of this site plan. If an activity does not meet the restrictions given in the guidelines, the activity must be individually reviewed for ESA compliance. This site plan only provides guidelines for the Southwestern Willow Flycatcher AEI. If an activity is desired in an area with overlapping AEIs, all applicable site plans must be consulted. The section on protective measures (Section 4.6) describes management practices that should be applied when working or considering work in an AEI. Biological resources SMEs are available to help interpret site plans and answer questions (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

## 4.4 DEFINITION OF AND RESTRICTIONS ON HABITAT ALTERATIONS

### 4.4.1 Definition of Habitat Alterations

Habitat alteration includes any action that alters over the long-term the soil structure, vegetative components necessary to the species, prey quality and quantity, water quality, hydrology, or noise or light levels in undeveloped areas of an AEI. Long-term means the alteration lasts for more than one year. Habitat alteration includes any activity that removes vegetative components important to the southwestern willow flycatcher (primarily trees and shrubs). An actual activity may take place outside of the AEI and will be considered habitat alteration if consequences of the activity have effects inside the AEI core.

The habitat components most important to flycatchers include vegetative structure, food quality and quantity, and disturbance levels, including noise and light. The thickets of certain trees and shrubs along wetlands are important because they provide roost sites and a suitable habitat for nesting and foraging.

A long-term change in light or noise levels within the undeveloped core of an AEI is considered to be a habitat alteration if it increases average noise levels by ≥6 dB(A) during any portion of the 24-hour day, or it increases average light levels by ≥0.05 ftc at night. Changes in noise and light levels are measured at the core area boundary if the source is outside the core area, or at 10 m from the source if the source is in the undeveloped core area. Impacts of changes in developed areas on undeveloped cores are measured at the developed area boundary if it is within a core, or at the core area boundary if the developed area is outside of the core.

### 4.4.2 Fuels Management Practices to Reduce Wildfire Risk

Thinning within undeveloped buffer areas may include trees of any size to achieve a 7.6-m spacing between tree crowns. However, clearcutting is not allowed in undeveloped buffer areas. No fuels management practices are allowed in core areas. Habitat alterations including thinning are not restricted in developed areas. All fuels management activities in developed and buffer areas must follow the guidelines in the Activity Table (Table 2) if the AEI is occupied.

### 4.4.3 Utility Corridors

Habitat alterations such as cutting down trees that threaten power lines are allowed within 8 m of either side of an existing utility line in all areas of an AEI (Trujillo & Racinez 1995). New utility lines and utility lines requiring clearance of a right-of-way greater than 16 m total must be individually reviewed for ESA compliance. Disturbance activities must follow the guidelines given in the Activities Table for occupied AEIs.

### 4.4.4 Restrictions on Habitat Alterations

***Summary:*** Habitat alteration other than utility corridor maintenance is not allowed in undeveloped core areas. Habitat alteration in buffers is limited. Habitat alteration must be reported to a biological resources SME for tracking (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

Habitat alterations other than the utility corridor maintenance described above are not allowed in undeveloped core areas under the guidelines of this site plan. If a project or activity is planned that would alter habitat in an undeveloped core area, it must be individually evaluated for ESA compliance. Habitat alterations in a buffer area other than fuels management activities or utility corridor maintenance must be reported to a biological resources SME for tracking (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

## 4.5 DEFINITION OF AND RESTRICTIONS ON DISTURBANCE ACTIVITIES

### 4.5.1 Definition of Disturbance Activities

LANL biologists considered five categories of activities that might cause disturbance in an AEI. Most of the categories were first identified in the document "Peregrine Falcon Habitat Management in the National Forests of New Mexico" prepared for the U.S. Forest Service (Johnson 1994). Other light production and other noise production were included to provide the most comprehensive list of activities possible, reducing the need for individual review of activities for ESA compliance. The categories of activities are people, vehicles, aircraft, other light production, and other noise production. The impact of explosives detonation on this species is not considered here because there are no explosives testing sites within 2 km of potential nesting habitat. Low, medium, and high levels of impact for these activities are considered here. The following categories of activities are restricted only in AEIs that are classified as occupied.

People—includes any entry of people into an AEI on foot.

- Low impact is the presence of three or fewer people per project and duration of one day or less during a breeding season.
- Medium impact is the exceedance of either the number of people or the duration criteria.
- High impact is the exceedance of both the number of people and the duration criteria.

Vehicles—includes the entry of any two-axle highway vehicle, all-terrain vehicle, or motorized machinery into an AEI by any route other than a paved road or an improved gravel road.

- Low impact is the presence of two or fewer vehicles per project and duration of one day or less during a breeding season.
- Medium impact is the exceedance of either the number of vehicles or the duration criteria.
- High impact is the exceedance of both the number of vehicles and the duration criteria.

Aircraft—includes the operation of any aircraft below an elevation of 600 m (2000 ft) above the highest ground level in the local vicinity.

- Low impact is the presence of one single-engine airplane and duration of one day or less during a breeding season.
- Medium impact is the exceedance of either the number of aircraft or the duration criteria.
- High impact is the exceedance of both the number of aircraft and the duration criteria.

Any use of helicopters, jet airplanes, and propeller airplanes with two or more engines is classified as medium impact or above, depending on duration.

Other Light Production includes any activity not previously listed that causes additional light to occur in an AEI core area (e.g., plans for construction of a new building at the edge of a developed area may call for lighting at night to facilitate nighttime work that impacts an undeveloped core area).

- Low impact is the increase of light intensity by up to 0.05 ftc and a duration of one night or less per project per breeding season.
- Medium impact is the exceedance of either the intensity or duration criteria.
- High impact is the exceedance of both the intensity and duration criteria.

Measurements for increases in light are taken at the AEI core area boundary closest to the light source if the source is outside the core, and at 10 m from the source if the source is inside the core. Light measurements for developed areas are taken at the edge of the developed area if the developed area is within an AEI core, or at the closest core boundary if the developed area is outside of an AEI core.

Other Noise Production–includes any activity not previously listed except for explosives detonation that causes additional noise to occur in an AEI. For example, operation of machinery causes noise.

- Low impact is increasing noise levels in an AEI core by 6 dB(A) or less for one day or less per project per breeding season.
- Medium impact is the exceedance of either the level or the duration criteria.
- High impact is the exceedance of both the level and the duration criteria.

Measurements for increases in noise are taken at the AEI core boundary closest to the noise source if the source is outside the core, and at 10 m (33 ft) from the source if the source is inside the core. Noise measurements for developed areas are taken at the edge of the developed area if the developed area is within an AEI core, or at the closest core boundary if the developed area is outside of an AEI core.

### 4.5.2 Activity Table

Disturbance activities are of concern only when southwestern willow flycatchers occupy an AEI. The AEI is always considered occupied between May 15 and September 15, or until surveys show the AEI to be unoccupied. The Southwestern Willow Flycatcher AEI is always considered unoccupied between September 16 and May 14, when flycatchers have migrated for the winter. For occupancy status of an AEI after completion of surveys, contact a biological resources SME (http://int.lanl.gov/environment/bio/lanl_only/support.shtml).

**Table 2. Restrictions on Activities in Undeveloped Occupied Southwestern Willow Flycatcher AEI**

| | | Core | Buffer |
|---|---|---|---|
| ***Restrictions on Occupied Habitat*** | | | |
| *People* | | | |
| | Low | No Restriction | No Restriction |
| | Medium | May 15 to Aug 15 | No Restriction |
| | High | May 15 to Sept 15 | No Restriction |
| *Vehicles* | | | |
| | Low | May 15 to Sept 15 | No Restriction |
| | Medium | May 15 to Sept 15 | No Restriction |
| | High | May 15 to Sept 15 | No Restriction |
| *Aircraft* | | | |
| | Low | No Restriction | No Restriction |
| | Medium | May 15 to Aug 15 | May 15 to Aug. 15 |
| | High | May 15 to Sept 15 | May 15 to Sep. 15 |
| *Other Light/noise Production* | | | |
| | Low | May 15 to Sept 15 | No Restriction* |
| | Medium | May 15 to Sept 15 | No Restriction* |
| | High | May 15 to Sept 15 | No Restriction* |

*Noise or light production in the buffer is restricted if the activity would violate core area restriction on noise or light.

## 4.6 PROTECTIVE MEASURES

***Summary:*** This section provides a list of management practices to apply in the AEI.

- No wetland vegetation will be removed outside of developed areas.
- Appropriate erosion and runoff controls should be employed to reduce soil loss.
- Avoid unnecessary disturbance to vegetation (e.g., excessive parking areas or equipment storage areas, off-road travel, materials storage areas, crossing of streams or washes).
- Avoid removal of vegetation along drainage systems and stream channels.
- Avoid all vegetation removals not absolutely necessary.
- Appropriate erosion controls must be put in place and periodically checked throughout the life of any projects.
- All exposed soils must be revegetated as soon as feasible after disturbance to minimize erosion.

# 5.0 SOUTHWESTERN WILLOW FLYCATCHER AEI DESCRIPTION

## 5.1 PAJARITO CANYON SOUTHWESTERN WILLOW FLYCATCHER AEI

### 5.1.1 Allowable Habitat Alteration in the Buffer Area

Since the purpose of the buffer area is to help maintain the core area as suitable willow flycatcher habitat, habitat alteration in the buffer area will be extremely limited. There are two areas in which restrictions on habitat alteration are relaxed.

1. The mesa top of Mesita del Buey. This mesa top can be developed as long as restrictions on impacts to the core area are met.

2. Pajarito Road within the AEI. Mowing of upland vegetation is allowed up to 4.5 m from Pajarito Road, or to the fence, if the fence is within nine meters. Vegetation must cover the roadsides to prevent sediment runoff, so mowed plants should be at least 5 cm high. LANL biologists encourage the growth of willow throughout the AEI—even the area along Pajarito Road—to enhance habitat. If, within this area, it is absolutely necessary to remove new willow growth (i.e., to improve visibility for human safety), LANL biologists recommend that only willows at or above the level of the roadway surface be mowed.

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# APPENDIX

**Table A-1. The percentage of each food type found in Mexican spotted owl food remains at LANL.**

| Species | Relative Abundance |
|---|---|
| *Neotoma* spp. | 26.22 |
| *Peromyscus* spp. | 10.22 |
| *Microtus* spp | 4.44 |
| Gophers | 4.89 |
| Bats | 5.78 |
| Chipmunks | 0.89 |
| Rabbits | 12.89 |
| Shrews | 1.33 |
| Small Mammal | 1.33 |
| Medium Mammal | 1.78 |
| Medium Bird | 8.00 |
| Small Bird | 4.89 |
| Nocturnal Birds | 0.89 |
| Reptiles | 4.89 |
| Arthropods | 11.56 |

**Table A-2. Preliminary light measurements in ftc for Mexican spotted owl site plan**

| | | Distance from Source | | | |
|---|---|---|---|---|---|
| | Source (street light) | 5 m | 10 m | 15 m | 20 m |
| ftc | 3.70 | 2.28 | 1.20 | 0.62 | 0.32 |

**Table A-3. Preliminary light measurements in ftc for southwestern willow flycatcher site plan**

| | | Distance from Source | | | |
|---|---|---|---|---|---|
| | Source (street light) | 5 m | 10 m | 15 m | 20 m |
| ftc | 3.70 | 2.28 | 1.20 | 0.62 | 0.32 |


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