

LA-UR-17-30912

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Title: Status of Federally Listed Threatened and Endangered Species at Los Alamos National Laboratory

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Intended for: Report
Environmental Regulatory Document

Issued: 2017-12-04

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December 2017

Status of Federally Listed Threatened and Endangered Species at Los Alamos National Laboratory

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ACRONYMS

AEI	area of environmental interest
Bd	Batrachochytrium dendrobatidis
DOE	U.S. Department of Energy
GPS	Global Positioning System
HMP	Threatened and Endangered Species Habitat Management Plan
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
NNSA	National Nuclear Security Administration

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INTRODUCTION

Los Alamos National Security, LLC (LANS) biologists at Los Alamos National Laboratory (LANL) conduct surveys annually for three species protected under the Endangered Species Act. These surveys follow the required survey protocols for each species and were performed by permitted biologists. This 2017 biennial report details survey results and other actions related to endangered species management at LANL.

HABITAT MANAGEMENT PLAN

Compliance with the Endangered Species Act at LANL is achieved through the implementation of the LANL Threatened and Endangered Species Habitat Management Plan (HMP; LANL 2017a). This plan is a formal agreement between the U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA) and the U.S. Fish and Wildlife Service for the management of endangered species and their habitats at LANL. Actions and activities approved in the HMP were reviewed by the U.S. Fish and Wildlife Service and do not require further consultations. Projects that cannot follow the HMP requirements must go through separate section 7 consultations. The controls for Endangered Species Act compliance are incorporated into an internal project review process through which all LANL projects are reviewed for environmental compliance (LANL 2017b).

COMPLIANCE ACTIONS

Since the last version of this report in 2015 (LANL 2015), three biological assessments were completed for actions not covered in the HMP. The DOE/NNSA consulted with the U.S. Fish and Wildlife Service on the excavation of trenches on U.S. Forest Service property west of LANL by LANS geologists (LANL 2016; 02ENNM00-2016-F-0528). The goal of this project is to update the probabilistic seismic hazard index of the Pajarito fault system around LANL. The U.S. Fish and Wildlife Service concurred with LANS biologists that the project may affect, but was not likely to adversely affect the Mexican Spotted Owl, but would likely adversely affect the Jemez Mountains Salamander. The U.S. Fish and Wildlife Service provided a formal biological opinion on May 1, 2017. As of November 2017, this action has not yet been completed due to permit acquisition delays within the U.S. Forest Service.

The DOE/NNSA consulted with the U.S. Fish and Wildlife Service on the continued operation and expansion of the water monitoring programs at LANL (LANL 2017c; 02ENNM00-2017-I-0254). The U.S. Fish and Wildlife Service concurred with LANS biologists that the project may affect, but was not likely to adversely affect, the Mexican Spotted Owl and the Jemez Mountains Salamander.

The DOE/NNSA also consulted with the U.S. Fish and Wildlife Service on the redelineation of Mexican Spotted Owl habitat in Water Canyon and the construction of a new facility in developed core habitat in Pajarito Canyon (LANL 2017d; Consultation # 02ENNM00-2017-I-0255). The U.S. Fish and Wildlife Service concurred with LANS biologists that the project may affect, but was not likely to adversely affect, the Mexican Spotted Owl.

MITIGATION ACTIONS

As part of the aforementioned consultations, mitigation actions were required. Projects were completed in several areas in Mortandad and Los Alamos canyons to enhance and protect habitat for federally listed species.

Approximately 150 native plants were planted in the Mexican Spotted Owl core area within Mortandad Canyon to promote vegetative cover. Four areas were selected for restoration where an increase in canopy cover and plant diversity would benefit the owl.

A boundary fence was installed east and west of the Los Alamos County Ice rink, a county inholding in Los Alamos Canyon. The fences will prevent future encroachment into DOE land identified as core habitat for the Jemez Mountains Salamander under the HMP.

The required mitigation for the trenching project has not yet been implemented because the project has not yet started.

SPECIES INTRODUCTION

The LANL HMP includes federally protected species under the Endangered Species Act that occur on or near LANL property. The HMP requires surveys to be conducted either annually or as needed depending on the species.

Mexican Spotted Owl

General Biology

Mexican Spotted Owls (*Strix occidentalis lucida*) are one of only a few owls in the United States with dark eyes. Features include a pale gray-chestnut brown color with white and brown spots on the abdomen, back, and head; the tails are brown with thin white bands; and the ears lack tufts. Young owls less than five months old have a downy appearance. Females are larger than males (USFWS 2012a).

The Mexican Spotted Owl is found in northern Arizona, southeastern Utah, southwestern Colorado, New Mexico, west Texas, and into Mexico. It is the only subspecies of Spotted Owl recognized in New Mexico (USFWS 2012a). The Mexican Spotted Owl generally inhabits mixed conifer and ponderosa pine (*Pinus ponderosa* Douglas) and Gambel oak (*Quercus gambelii* Nutt.) forests in mountains and canyons. Characteristics of Mexican Spotted Owl

habitat include high canopy closure, high stand diversity, multi-layered canopy resulting from an uneven-aged stand, large mature trees, downed logs, snags, and stand decadence, as indicated by the presence of mistletoe (*Phoradendron* Nutt.). 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. No Spotted Owls were found in forests less than 36 years of age (USFWS 2012a). Mexican Spotted Owls in the Jemez Mountains seem to prefer cliff faces in canyons for their nest sites (Johnson and Johnson 1985). The young leave the nest at 32 to 36 days old to perch on surrounding branches, and can fly short distances at 40 to 45 days. Survival rate for the young is low. 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 (USFWS 2012a). Although seasonal movements vary among owls, adults commonly remain within their summer home ranges throughout the year.

Under the HMP, Mexican Spotted Owl habitat was modeled at LANL based on a combination of topographical features and macro-level vegetation classifications. Areas defined as suitable Mexican Spotted Owl habitat were delineated into areas of environmental interest (AEIs) during the development of the HMP in 1998. However, LANS biologists developed a Mexican Spotted Owl habitat model that incorporates a finer scale of vegetation characteristics into the current model (Hathcock and Haarmann 2008). A version of this model was used to redelineate the AEIs at LANL and the proposed changes received concurrence from the U.S. Fish and Wildlife Service in 2005 (LANL 2005). The current Mexican Spotted Owl AEI inventory consists of five AEIs spanning seven canyons at LANL.

Conservation History and Current Status

On December 30, 1982, a U.S. Fish and Wildlife Service status review of vertebrate taxa led to the consideration of adding the Mexican or “Southern” Spotted Owl to the Endangered Species Act list of threatened or endangered species (USFWS 1982). On November 3, 1991, the U.S. Fish and Wildlife Service proposed listing the Mexican Spotted Owl as a threatened species under the Endangered Species Act (USFWS 1991). The Mexican Spotted Owl was listed as a threatened species under the Endangered Species Act on March 16, 1993 (USFWS 1993). Critical habitat was established on August 31, 2004 (USFWS 2004). The first recovery plan for the Mexican Spotted Owl was approved in 1995 (USFWS 1995a). The plan was updated in 2012 (USFWS 2012a).

Survey Methods

There are three primary calling techniques that can be used to survey for the Mexican Spotted Owl. The choice of calling technique is based on the best way to cover all suitable habitats. The three calling methods are point, continuous, and leapfrog technique. LANS biologists use the point method survey technique.

In the point method survey technique, an electronic recording of an owl call is played using a FOXPRO® Game Caller at a fixed point. The observer spends at least 15 minutes at a point and

alternates between playing the recording of the owl and listening for a response. In canyon habitat, surveyors spend a minimum of 20 minutes at each station. The primary four-note location call of the Mexican Spotted Owl is the major call played during surveys. Points are approximately 0.5 mi (0.8 km) apart and cover all suitable habitats.

Surveys are conducted annually in all Mexican Spotted Owl AEI core areas on LANL property. Four surveys are conducted in each AEI between April 1 and August 31 of any given year unless a Mexican Spotted Owl is found. No more than one survey is conducted in March of any given year. A minimum of two surveys are completed before July 1 of any given year. Surveys are at least five days apart. Surveys are initiated either before sunrise or the two hours after sunset. Field surveys are not conducted during existing or predicted wind >15 mph (>24.1 km) or during stormy weather. Surveys are not conducted when there are access problems due to snow or poor road conditions.

History of Results

Surveys for Mexican Spotted Owls have been conducted on LANL property since 1994. In 1995 a pair of Mexican Spotted Owls and their nest was located in Cañon de Valle. The nesting territory was occupied from 1995 through 2011, and young have fledged in multiple years. In 2004, 2005, and 2006, a territory in Mortandad Canyon was occupied by at least one Mexican Spotted Owl. This area was re-occupied in 2013 and continues to be occupied to date with a pair of owls. In 2007, LANS biologists located a pair of Mexican Spotted Owls and their nest in Three-mile Canyon. This site has been occupied each year since and young have fledged in multiple years. A history of the Mexican Spotted Owl survey results since surveys began in 1994 is detailed in Table 1.

Table 1. Mexican Spotted Owl Survey Results at LANL

Year	Cañon de Valle	Water Canyon	Three-mile Canyon	Pajarito Canyon	Mortandad Canyon	Sandia Canyon	Los Alamos Canyon
1993	—	—	—	N	—	—	—
1994	—	—	—	—	—	—	N
1995	P+(2)	N	N	N	—	—	N
1996	P+(2)	N	N	N	—	—	N
1997	P	N	—	—	—	—	N
1998	P+(2)	N	—	—	N	N	N
1999	P+(2)	N	N	N	N	N	N
2000	P	N	N	N	N	N	N
2001	P	N	N	N	N	N	N
2002	P	N	N	N	N	N	N
2003	P	N	N	N	N	N	N
2004	P	N	N	N	P*	N	N

Year	Cañon de Valle	Water Canyon	Three-mile Canyon	Pajarito Canyon	Mortandad Canyon	Sandia Canyon	Los Alamos Canyon
2005	P+(3)	N	N	N	P*	N	N
2006	P	N	N	N	P*	N	N
2007	P	N	P+(3)	N	N	N	N
2008	P	N	P	N	N	N	N
2009	P+(2)	N	P+(1)	N	N	N	N
2010	P	N	P	N	N	N	N
2011	P	N	P	N	N	N	N
2012	N	N	P+(1)	N	N	N	N
2013	N	N	P+	N	P+	N	N
2014	N	N	P	N	P	N	N
2015	N	N	P+(4)	N	P+(3)	N	N
2016	N	N	P	N	P+(2)	N	N
2017	N	N	P+(2)	N	P	N	N

— = No data; N = Negative survey; P = Positive survey; + = Breeding confirmed (# of young seen); * = A single owl;

LANS biologists started conducting surveys within Acid Canyon (a canyon within the township of Los Alamos) after hearing reports that local bird enthusiasts were observing Spotted Owls in that canyon. Surveys conducted in 2016 and 2017 determined that the Mexican Spotted Owls in Acid Canyon were not breeding; the owls were thought to possibly be siblings. One Mexican Spotted Owl was found dead in nearby Pueblo Canyon in 2017; most likely the result of depredation by a Great-horned Owl. The dead owl was transferred to the U.S. Fish and Wildlife Service’s species lead, Shaula Hedwall, in September 2017. Surveys will be conducted in 2018 to assess the continued use of these canyons by dispersing owls.

Jemez Mountains Salamander

General Biology

The Jemez Mountains Salamander (*Plethodon neomexicanus*) is one of two species of plethodontid (lungless) salamanders endemic to New Mexico. The species can be found in the Jemez Mountains in north-central New Mexico in Los Alamos, Rio Arriba, and Sandoval counties (Stebbins and Riemer 1950). The Jemez Mountains Salamander occurs predominantly at elevations between 6,988 to 11,254 ft (2,130 to 3,430 m) in mixed-conifer forest, consisting primarily of Douglas fir (*Pseudotsuga menziesii* Mirb.), blue spruce (*Picea pungens* Engelm.), Engelmann spruce (*Picea Engelmannii* Parry), white fir (*Abies concolor* Gord.), limber pine (*Pinus flexilis* E. James), ponderosa pine, Rocky Mountain maple (*Acer glabrum* Torr.), and aspen (*Populus tremuloides* Michx.; Degenhardt et al. 1996). Although pure stands of ponderosa pine may not be considered ideal habitat, the species has occasionally been found in this habitat.

The species has also occasionally been found in spruce-fir and aspen stands, and high-elevation meadows.

The Jemez Mountains Salamander spends most of its life underground but can be found at the surface when conditions are warm and wet, typically from July through September; but occasional salamander observations have been made in May, June, and October (USFWS 2013a). When on the surface, the species usually is found under decaying logs, rocks, bark or moss mats, or inside decaying logs or stumps. The salamander is strictly terrestrial and does not use standing surface water for any life stage. Respiration occurs through the skin, which requires a moist microclimate for gas exchange. The Jemez Mountains Salamander is uniformly grayish dark brown above (dorsal side), with occasional gold stippling and sooty gray below (ventral side). The salamander is slender and elongate, and it possesses foot webbing and a reduced fifth toe. The average Jemez Mountains Salamander is approximately 3.2 in. (82 mm) total length; eats invertebrates including ants, mites, and beetles; and is thought to lay its eggs underground (USFWS 2013b).

Conservation History and Current Status

The Jemez Mountains Salamander was listed in New Mexico as endangered under the Wildlife Conservation Act of New Mexico in 2006 (NMDGF 2006). In September 2012, the U.S. Fish and Wildlife Service proposed the Jemez Mountains Salamander as endangered under the Endangered Species Act (USFWS 2012b). The final listing of the Jemez Mountains Salamander as endangered under the Endangered Species Act was issued September 10, 2013 (USFWS 2013c). On November 20, 2013, the U.S. Fish and Wildlife Service issued the designation of critical habitat for the Jemez Mountains Salamander (USFWS 2013b).

Survey Methods

The survey techniques for the Jemez Mountains Salamander were developed jointly between the New Mexico Department of Game and Fish and the U.S. Fish and Wildlife Service. Federal and state permits are required prior to conducting surveys. The Jemez Mountains Salamander Visual Encounter Surveys consist of three-person hour surveys or until first detection of the species. A moisture assessment of the survey area is required prior to all surveys in order to determine if conditions are suitable for salamander surface activity. Current weather, soil moisture, soil pH, and soil temperature data are collected before the salamander survey begins. Once conditions are determined to be suitable for a salamander survey, the three-person hour survey begins. One individual is the center point and lead for the survey and responsible for tracking time; the remaining surveyors are spaced approximately 30 ft apart in a line. Global Positioning System (GPS) coordinates for the initial survey point, midpoint, and conclusion of the area surveyed are collected. While surveying within a new area for salamanders, the surveyors always leave one log intact for each log destroyed and only destroy 50 percent of any log in order to minimize habitat disturbance. If a salamander is found, it is immediately placed into a plastic bag with a small amount of water. Morphological measurements and microhabitat data (cover object type and size, soil temperature, soil pH, and current weather conditions) are recorded. All salamanders are swabbed on their ventral side for disease sampling. GPS coordinates are

collected at the salamander location and the survey is complete. The New Mexico Department of Game and Fish and U.S. Fish and Wildlife Service recommend repeat salamander surveys should be conducted at least twice within a survey season. During repeat salamander surveys, the surveyors leave two logs intact for each log destroyed and only destroy 50 percent of any log in order to minimize habitat disturbance. To prevent inadvertent movement of disease or parasitic organisms among sites, field equipment and boots are cleaned and disinfected following the disinfection protocols provided by the U.S. Fish and Wildlife Service.

History of Results

Prior to being listed as endangered under the Endangered Species Act in 2013, there were two documented Jemez Mountains Salamander locations at LANL. Surveys were conducted in 1985 and began again in 2007. The salamander was documented in Los Alamos Canyon, east of the Omega Bridge by Romotnik (1986) and west of the bridge by Hathcock (LANL 2008). In 2014, Jemez Mountains Salamander surveys were conducted in Los Alamos Canyon, Cañon de Valle, and around the Fenton Hill facility; no salamanders were detected. In 2015, Jemez Mountains Salamander surveys were conducted in Los Alamos Canyon, Two-mile Canyon, and around the Fenton Hill facility; two salamanders were found in Los Alamos Canyon. A history of Jemez Mountains Salamander survey results are detailed in Table 2.

Table 2. Jemez Mountains Salamander Survey Results at LANL

Year	Los Alamos Canyon	Pajarito Canyon	Two-mile Canyon	Canon de Valle	Fenton Hill
1985	P	—	N	N	N
2008	P	—	—	—	—
2009	—	—	—	—	—
2010	—	—	N	—	—
2011	—	—	—	—	—
2012	—	—	—	—	N
2013	—	—	—	—	N
2014	N	—	—	N	—
2015	P	N	N	—	N
2016	—	—	—	—	—
2017	—	—	—	—	—

P = Positive survey; — = No survey; N = Negative survey

Surveys were conducted within the footprint of the paleoseismic trenching investigation on U.S. Forest Service lands to the west of LANL, during 2016 and 2017. One salamander was found within a planned access route for the project in 2016. Due to logistical and cost concerns, this

route was later dropped from consideration. No salamanders were found during surveys in these areas in 2017.

Disease

One of the factors in the federal listing (USFWS 2013a) was risk to the Jemez Mountains Salamander from disease. The amphibian pathogenic fungus *Batrachochytrium dendrobatidis* (Bd) was found in a Jemez Mountains Salamander in 2003 (Cummer et al. 2005) on the east side of the species' range and again in another salamander in 2010 on the west side of the species' range (USFWS 2013a). LANS biologists have proactively been monitoring for Bd since 2007. In 2010, 2015, and 2016, a total of four Jemez Mountains Salamander found on or near LANL were swabbed for Bd and test results from Pisces Molecular, LLC laboratory were negative. An additional swab from 2017 has not yet been analyzed. Various other amphibians have been swabbed since 2007 and all were negative for Bd. In a separate study in 2015, 10 larval stage (neotenic adult and juvenile) Tiger Salamanders (*Ambystoma tigrinum*) were collected from the Milagro Pond at Technical Area 57. They were anesthetized and euthanized. Swab samples were taken on the outer dermis and also on all mouth parts to examine whether larval stage Tiger Salamanders had enough keratin in their outer dermis to be able to detect Bd compared with keratinized mouth parts. All 20 swabs were negative for Bd; more study is needed. Tissue samples were also collected from all 10 Tiger Salamanders and were tested for ranavirus, another amphibian pathogen; these were also negative.

Southwestern Willow Flycatcher

General Biology

The Southwestern Willow Flycatcher (*Empidonax traillii extimus*) is a small migratory bird about 6 in. (15 cm) long with gray-green back and wings, white throat, gray-olive breast, and pale-yellow belly. It also has two obvious pale wing-bars, but lacks the conspicuous pale eye-ring of many similar *Empidonax* species. While perched, the Southwestern Willow Flycatcher characteristically flicks its tail slightly upward. It is best identified by vocalizations. The primary song, consisting of *fitz-bew*, can be interspersed with *britt* notes (USFWS 2002). The Southwestern Willow Flycatcher is found in close association with dense stands of willows (*Salix* L.), arrowweed (*Pluchea* spp.), buttonbush (*Cephalanthus occidentalis* L.), tamarisk (*Tamarix* L.), Russian olive (*Elaeagnus angustifolia* L.), and other riparian vegetation, often with a scattered overstory of cottonwood (*Populus* L.; USFWS 2002). The size of vegetation patches or habitat mosaics used by Southwestern Willow Flycatchers varies considerably and ranges from as small as 2 ac (0.8 ha) to several hundred acres. The Southwestern Willow Flycatcher nests in thickets of trees and shrubs approximately 6.5 to 50 ft (2 to 15 m) tall, with a high percentage of canopy cover and dense foliage from 0 to 13 ft (0 to 4 m) above ground. Regardless of the plant species composition or height, occupied sites always have dense vegetation in the patch interior (Sogge et al. 2010).

Conservation History and Current Status

The Southwestern Willow Flycatcher was given a status review and possible listing as an endangered or threatened species on September 1, 1992 (USFWS 1992). It was proposed due to serious population declines, historical and present habitat destruction, and inadequate regulatory protections. It was given full protection under the Endangered Species Act as endangered on February 27, 1995 (USFWS 1995b). It also received revisions to critical habitat on January 3, 2013 (USFWS 2013c). The Southwestern Willow Flycatcher is known to have breeding territories in all states of its historical range, except Texas. However, its continued existence is in jeopardy due to continued riparian habitat reduction, degradation, and elimination caused by land and water management actions associated with agricultural and urban development. Other threats include predation, cowbird (*Molothrus* spp.) brood parasitism, and naturally occurring fires and floods that have become more frequent and intense as a result of the proliferation of exotic vegetation and degraded watersheds (USFWS 2002).

Survey Methods

The survey methods for documenting the presence/absence of Southwestern Willow Flycatchers rely on broadcast call-playback technique. An electronic recording of a Willow Flycatcher is played to elicit a response from a territorial bird, thereby increasing the detectability of a resident bird. Surveys should be initiated in the pre-dawn hours and continue until all suitable habitat has been covered, or until environmental factors or adverse anthropogenic sources hinder a full and adequate survey being conducted. There are a differing number of visits for general surveys versus project-related surveys, with a minimum of one survey within each of the three survey periods for general surveys. For project-related surveys, one survey within the first survey period must be conducted and the second and third survey periods must have two surveys conducted. Surveys must be conducted with at least five days between surveys. Survey periods are as follows: Survey Period 1 occurs May 15–31, Survey Period 2 occurs June 1–24, and Survey Period 3 occurs June 25–July 17.

History of Results

LANS biologists conduct surveys annually in the Sandia and Pajarito wetlands following linear transects. A Monitoring Avian Productivity and Survivorship-banding station operated in the Sandia Wetlands since 2014 has captured multiple Willow Flycatchers of unknown subspecies during the spring migration period. A fall-banding station operated since 2010 within the Pajarito Wetlands has captured multiple Willow Flycatchers of unknown subspecies during the fall migration period. A history of Southwestern Willow Flycatcher survey results are detailed in Table 3.

Table 3. Southwestern Willow Flycatcher Survey Results at LANL

Year	Pajarito Canyon	Sandia Canyon
1995	N	—
1996	N	—
1997	P	—

Year	Pajarito Canyon	Sandia Canyon
1998	P	—
1999	N	—
2000	N	—
2001	N	—
2002	N	—
2003	N	—
2004	N	—
2005	P	—
2006	N	—
2007	N	—
2008	N	—
2009	N	—
2010	P*	—
2011	P	—
2012	N*	—
2013	N*	—
2014	N*	—
2015	N	N*
2016	P*	N*
2017	N	N

N = Negative survey; — = No data; P = Positive survey; * = Unknown subspecies captured and released during banding operations

Yellow-billed Cuckoo

General Biology

The Yellow-billed Cuckoo (*Coccyzus americanus*) is a neotropical migrant bird with a mostly yellow bill, brownish back, rufous wings, and all white underneath. In flight and when perched, large white spots and edging to tail feathers are prominent. The Yellow-billed Cuckoo is a riparian obligate species; therefore, they nest almost exclusively in low-mid elevation riparian/riverine habitat dominated by a cottonwood-willow matrix (Halterman et al. 2015). They are a late spring migrant, and therefore have one of the shortest nesting phases of any bird species. The cuckoo tends to time its breeding to coincide with locally abundant food supplies (Hughes 2015).

Conservation History and Current Status

The Yellow-billed Cuckoo was noted as declining in California as early as 1944 (Grinnell and Miller 1944). The Yellow-billed Cuckoo was first posted to the Federal Register for review of possible listing as an endangered or threatened species on December 30, 1982 (USFWS 1982).

On October 3, 2013, the U.S. Fish and Wildlife Service proposed listing the Western Distinct Population Segment of the Yellow-billed Cuckoo as threatened. Following multiple public comment periods and a proposal to designate critical habitat for the Yellow-billed Cuckoo, the U.S. Fish and Wildlife Service designated it as a threatened species within the western United States, Canada, and Mexico (USFWS 2014a). The species is no longer thought to breed in western Canada or the northwestern continental United States areas of Washington, Oregon, and Montana (USFWS 2014a).

Survey Methods

Surveys are conducted by permitted biologists along the Rio Grande on LANL's eastern boundary, following a continuous linear transect with a broadcast call-playback technique. A minimum of one survey per survey period must be conducted with no fewer than 12 days and no more than 15 days between surveys in survey periods 1 and 3: Survey Period 1 occurs June 15–July 1 and Survey Period 3 occurs July 31–August 15. A minimum of two surveys must be conducted in Survey Period 2 (July 1–July 31). The surveys start at first light and continue until all points or suitable habitat have been covered. Special attention should be made to complete the survey route before 11:00 in the morning, since activity levels decrease significantly after this time (Haltermann et al. 2015). The survey protocol should consist of five contact calls, (e.g., *kowlp*) spaced one minute apart with an initial minute of listening for calls when arriving at survey points. Survey points should be approximately 328 ft (100 m) apart. However, if a cuckoo is identified at a survey point, the researcher should move at least 984 ft (300 m) away so an individual is not recounted.

History of Results

In 2016, LANS biologists surveyed a stretch of potential habitat along LANL's southern boundary; those surveys were negative for the cuckoo. No surveys were conducted in 2017 due to the lack of a programmatic need for surveys. There is only one account of a Yellow-billed Cuckoo within the section of the Rio Grande near LANL (BISON-M 2017).

New Mexico Meadow Jumping Mouse

General Biology

The New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*) is endemic to the states of New Mexico, Arizona, and portions of southern Colorado (Hafner et al. 1981). The jumping mouse is grayish-brown on the back, yellowish-brown on the sides, and white underneath. The species is about 7 to 10 in. (187 to 255 mm) in total length with elongated feet and an extremely long, bicolored tail. It nests in dry soils, but uses moist, streamside, and dense riparian/wetland vegetation up to elevations of about 8,000 ft (2,438 m; Frey 2006). The meadow jumping mouse appears to only utilize riparian community types that consist of persistent, emergent herbaceous wetlands such as beaked sedge (*Carex rostrata* Stokes) and reed canarygrass (*Phalaris arundinacea* L.) alliances and scrub-shrub wetlands such as riparian areas along perennial streams composed of willows and alders (*Alnus* spp.; Frey 2005). The jumping mouse is generally nocturnal, but occasionally diurnal. It is active only during the growing season of the

grasses and forbs on which it depends. During the growing season, the jumping mouse accumulates fat reserves by consuming seeds and insects to sustain it through hibernation.

Conservation History and Current Status

The U.S. Fish and Wildlife Service first proposed adding the jumping mouse as a threatened or endangered animal on September 18, 1985 (USFWS 1985). The meadow jumping mouse was given protection under the Endangered Species Act as an endangered species on July 10, 2014, with a final determination of critical habitat forthcoming (USFWS 2014b).

Survey Methods

There are no formal survey methods approved by the U.S. Fish and Wildlife Service at the time of this report.

History of Results

There are no records of the meadow jumping mouse from within the LANL boundary or Los Alamos County (BISON-M 2017, LANL 2009).

ACKNOWLEDGEMENTS

We thank the following for field support in 2017: T. Espinoza, M. Musgrave, E. Phillips, A. Skinner, M. Salazar, and former staff and interns that helped in previous years. We thank T. Hiteman for document preparation and support.

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