Region 8, 1595 Wynkoop Street, Denver, Colorado 80202–1129, (303) 312–6633.

• *Hand delivery:* Environmental Protection Agency, 1595 Wynkoop Street, Denver, Colorado. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

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Docket: All documents in the docket are listed in the *http://www.regulations.gov* index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in the hard copy. Publicly available docket materials are available either electronically in *http://www.regulations.gov* or in hard copy at: U.S. Environmental Protection Agency Region 8 Records Center, 1595 Wynkoop Street, Denver, CO 80202, Hours: M–F, 8 a.m. to 4 p.m., Colorado Department of Public Health and the Environment, 4300 Cherry Creek Drive South, Denver, CO 80246, Hours: M–F, 8 a.m. to 5 p.m.

FOR FURTHER INFORMATION CONTACT: Rebecca Thomas, Project Manager (8EPR–SR), U.S. EPA Region 8, 1595 Wynkoop Street, Denver, Colorado 80202–1129, (303) 312–6552, *thomas.rebecca@epa.gov.*

SUPPLEMENTARY INFORMATION: In the "Rules and Regulations" Section of today's **Federal Register,** we are publishing a direct final Notice of Partial Deletion for each of the 11 operable units, with the exception of groundwater contamination associated with Operable Unit 8, of the Denver Radium Superfund Site without prior Notice of Intent for Partial Deletion because EPA views this as a noncontroversial revision and anticipates no adverse comment. We have explained our reasons for this partial deletion in the preamble to the direct final Notice of Partial Deletion, and those reasons are incorporated herein. If we receive no adverse comment(s) on this partial deletion action, we will not take further action on this Notice of Intent for Partial Deletion. If we receive adverse comment(s), we will withdraw the direct final Notice of Partial Deletion, and it will not take effect. We will, as appropriate, address all public comments in a subsequent final Notice of Partial Deletion based on this Notice of Intent for Partial Deletion. We will not institute a second comment period on this Notice of Intent for Partial Deletion. Any parties interested in commenting must do so at this time.

For additional information, see the direct final Notice of Partial Deletion which is located in the Rules section of this **Federal Register.**

List of Subjects in 40 CFR Part 300

Environmental protection, Air pollution control, Chemicals, Hazardous waste, Hazardous substances, Intergovernmental relations, Penalties, Reporting and recordkeeping requirements, Superfund, Water pollution control, Water supply.

Authority: 33 U.S.C. 1321(c)(2); 42 U.S.C. 9601–9657; E.O. 12777, 56 FR 54757, 3 CFR, 1991 Comp., p. 351; E.O. 12580, 52 FR 2923; 3 CFR, 1987 Comp., p. 193.

Dated: August 31, 2010.

James B. Martin,

Regional Administrator, Region 8.

[FR Doc. 2010–22488 Filed 9–8–10; 8:45 am]

BILLING CODE 6560–50–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R2–ES–2009–0041]
[MO 92210–0–008]

Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Jemez Mountains Salamander (*Plethodon neomexicanus*) as Endangered or Threatened With Critical Habitat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 12–month petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 12–month finding on a petition to list the Jemez Mountains salamander (*Plethodon neomexicanus*) as an endangered or threatened species and to designate critical habitat under the Endangered Species Act of 1973, as amended (Act). After review of all available scientific and commercial information, we find that listing the Jemez Mountains salamander as endangered or threatened throughout its range is warranted. Currently, however, listing the Jemez Mountains salamander is precluded by higher priority actions to amend the Lists of Endangered and Threatened Wildlife and Plants. Upon publication of this 12–month petition finding, we will add the Jemez Mountains salamander to our candidate species list. We will develop a proposed rule to list the Jemez Mountains salamander as our priorities allow. We will make any determination on critical habitat during development of the proposed rule. In the interim period, we will address the status of the candidate taxon through our annual Candidate Notice of Review (CNOR).

DATES: The finding announced in this document was made on September 9, 2010.

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at Docket Number FWS-R2-ES-2009-0041. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours by contacting the U.S. Fish and Wildlife Service, New Mexico Ecological Services Office, 2105 Osuna NE, Albuquerque, NM 87113. Please submit any new information, materials, comments, or questions concerning this finding to the above address.

FOR FURTHER INFORMATION CONTACT: Wally Murphy, Field Supervisor, New Mexico Ecological Services Office (see **ADDRESSES**); by telephone at 505-346-2525; or by facsimile at 505-346-2542. If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(B) of the Act (16 U.S.C. 1531 *et seq.*), requires that, for any petition to revise the Federal Lists of Threatened and Endangered Wildlife and Plants that contains substantial scientific or commercial information indicating that listing the species may be warranted, we make a finding within 12 months of the date of receipt of the petition. In this finding we determine that the petitioned action is: (a) Not warranted, (b) warranted, or (c) warranted, but immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are endangered or threatened, and expeditious progress is being made to add or remove qualified species from the Lists of Endangered and Threatened Wildlife and Plants. Section 4(b)(3)(C) of the Act requires that we treat a petition for which the requested action is found to be warranted but precluded as though resubmitted on the date of such finding, that is, requiring a subsequent finding to be made within 12 months. We must publish these 12–month findings in the **Federal Register**.

Previous Federal Actions

We initially considered the Jemez Mountains salamander (*Plethodon neomexicanus*) for listing under the Act in the early 1980s (General Accounting Office 1993, p. 30). In December 1982, we published a notice of review classifying the salamander as a Category 2 species (47 FR 58454, December 30, 1982). Category 2 status included those taxa for which information in the Service's possession indicated that a proposed listing rule was possibly appropriate, but for which sufficient data on biological vulnerability and threats were not available to support a proposed rule.

On February 21, 1990, we received a petition to list the salamander as threatened. Subsequently, we published a positive 90–day finding, indicating that the petition contained sufficient information to suggest that listing may be warranted (55 FR 38342; September 18, 1990). In the Candidate Notice of Review (CNOR) published on November 21, 1991, we announced the salamander as a Category 1 species with a "declining" status (56 FR 58814). Category 1 status included those species for which the Service had on file substantial information regarding the species' biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species. The "declining" status indicated decreasing numbers, increasing threats, or both.

On May 30, 1991, the Service, the U.S. Forest Service (USFS), and the New Mexico Department of Game and Fish (NMDGF) signed a Memorandum of Agreement outlining actions to be taken to protect the salamander and its habitat on the Santa Fe National Forest lands, including the formation of a team of agency biologists to immediately implement the Memorandum of Agreement and to develop a management plan for the species. The management plan was to be incorporated into the Santa Fe National Forest Plan. On April 3, 1992, we published a 12–month finding that listing the salamander was not warranted because of the conservation measures and commitments within the Memorandum of Agreement (57 FR 11459). In the November 15, 1994, CNOR, we included the salamander as a Category 2 species, with a trend status of "improving" (59 FR 58982). A status of "improving" indicated those species known to be increasing in numbers or whose threats to their continued existence were lessening in the wild.

In the CNOR published on February 28, 1996, we announced a revised list of animal and plant taxa that were regarded as candidates for possible addition to the List of Endangered and Threatened Wildlife and Plants (61 FR 7596). The revised candidate list included only former Category 1 species. All former Category 2 species were dropped from the list in order to reduce confusion about the conservation status of those species, and to clarify that the Service no longer regarded them as candidates for listing. Because the salamander was a Category 2 species, it was no longer recognized as a candidate species as of the February 28, 1996, CNOR.

In January 2000, the New Mexico Endemic Salamander Team (NMEST), a group of interagency biologists representing NMDGF, the Service, the U.S. Geological Survey, and the Santa Fe National Forest, finalized a Cooperative Management Plan for the salamander on lands administered by the Santa Fe National Forest (Cooperative Management Plan), and the agencies signed an updated Conservation Agreement that superseded the Memorandum of Agreement. The stated purpose of the Conservation Agreement and the Cooperative Management Plan was to provide for the long-term conservation of salamanders by reducing or removing threats to the species and by proactively managing their habitat (NMEST 2000 Conservation Agreement, p. 1). In a Decision Notice and Finding of No Significant Impact for the Forest Plan Amendment for Managing Special Status Species Habitat, signed on December 8, 2004, the Cooperative Management Plan was incorporated into the Santa Fe National Forest Plan.

On October 15, 2008, we received a petition dated October 9, 2008, from WildEarth Guardians requesting that we list the Jemez Mountains salamander (*Plethodon neomexicanus*) (salamander) as endangered or threatened under the Act, and designate critical habitat. On August 11, 2009, we published a 90–day finding that the petition presented substantial information that listing the salamander may be warranted and that initiated a status review of the species (74 FR 40132). On December 30, 2009, WildEarth Guardians filed suit against the Service for failure to issue a 12–month finding on the petition (*WildEarth Guardians* v. *Salazar,* No. 09-1212 (D.N.M.)). Under a stipulated settlement agreement, the 12–month finding is due to the **Federal Register** by September 8, 2010. This notice constitutes our 12–month finding for the petition to list the Jemez Mountains salamander as endangered or threatened.

Species Information

The salamander is uniformly dark brown above, with occasional fine gold to brassy coloring with stippling dorsally (on the back and sides) and is sooty gray ventrally (underside). The salamander is slender and elongate, and it possesses foot webbing and a reduced fifth toe. This salamander is strictly terrestrial and is a member of the family Plethodontidae. The salamander does not use standing surface water for any life stage. Respiration occurs through the skin, which requires a moist microclimate for gas exchange.

Taxonomy and Species Description

The salamander was originally reported as *Spelerpes multiplicatus* (=*Eurycea multiplicata*) in 1913 (Degenhardt *et al.* 1996, p. 27); however, it was described and recognized as a new and distinct species (*Plethodon neomexicanus*) in 1950 (Stebbins and Riemer, pp. 73-80). No subspecies are recognized.

It is a member of the Plethodontidae family. Two species of plethodontid salamanders are endemic (native and restricted to a particular region) to New Mexico: the Jemez Mountains salamander and the Sacramento Mountains salamander (*Aneides hardii*). Unlike all other North American plethodontid salamanders, these two species are geographically isolated from all other species of *Plethodon* and *Aneides*.

Distribution

The distribution of plethodontid salamanders in North America has been highly influenced by past changes in climate and associated Pleistocene glacial cycles. In the Jemez Mountains, the lack of glacial landforms indicates that alpine glaciers did not develop here, but the abundance of evidence from exposed rock surfaces that have been quickly broken up by frost action may reflect near-glacial conditions during the Wisconsin Glacial Episode (Allen 1989, p. 11). Conservatively, the salamander has likely occupied the Jemez Mountains for at least 10,000 years, but this could be as long as 1.2 million years, colonizing the area subsequent to volcanic eruption.

The salamander is restricted to the Jemez Mountains in northern New Mexico, in Los Alamos, Rio Arriba, and Sandoval Counties, around the rim of the collapsed caldera (large volcanic crater), with some occurrences on topographic features (e.g., resurgent domes) on the interior of the caldera. The majority of salamander habitat is located on federally managed lands including USFS, Valles Caldera National Preserve (VCNP), National Park Service (Bandelier National Monument), and Los Alamos National Laboratory, with some habitat located on tribal land and private lands (NMEST 2000, p. 1). The species predominantly occurs at an elevation between 2,200 and 2,900 meters (m) (7,200 and 9,500 feet (ft)) (Degenhardt *et al.* 1996, p. 28), but has been found as low as 2,133 m (6,998 ft) (Ramotnik 1988, p. 78) and as high as 3,350 m (10,990 ft) (Ramotnik 1988, p. 84).

We divided known salamander distributional data into 5 units (Unit 1-Western; Unit 2-Northern; Unit 3-East-South-Eastern; Unit 4-Southern; and Unit 5-Central) to provide clarity in describing and analyzing the potential threats that may differ across the species' range. We developed these units based on the best information available to us, but some of the unit boundaries are based on incomplete occupancy information. These units reflect where surveys have occurred and generally follow breaks in topography. For example, there are areas (e.g., VCNP) where few surveys have been conducted and occupancy may not be uniform. Because the salamander has been found to occupy a wide variety of sites, we do not know the extent of geographic or genetic connectivity between localities. The VCNP is located west of Los Alamos, New Mexico, and is owned by the U.S. Department of Agriculture (part of the National Forest System), but run by a nine-member Board of Trustees: the Supervisor of Bandelier National Monument, the Supervisor of the Santa Fe National Forest, and seven other members with distinct areas of experience or activity appointed by the President of the United States (Valles Caldera Trust 2005, pp. 1-11). Prior to Federal ownership in 2000, the VCNP was privately held.

Habitat

The terrestrial salamander predominantly inhabits mixed conifer forest, consisting primarily of Douglas fir (*Pseudotsuga menziesii*), blue spruce (*Picea pungens*), Engelman spruce (*P. engelmannii*), white fir (*Abies concolor*), limber pine (*Pinus flexilis*), Ponderosa pine (*P. ponderosa*), Rocky Mountain maple (*Acer glabrum*), and aspen (*Populus tremuloides*) (Degenhardt *et al.* 1996, p. 28; Reagan 1967, p. 17). The species can also be found in stands of pure Ponderosa pine and in spruce-fir and aspen stands, but these forest types have not been adequately surveyed. Predominant understory includes Rocky Mountain maple (*Acer glabrum*), New Mexico locust (*Robinia neomexicana*), oceanspray (*Holodiscus sp.*), and various shrubby oaks (*Quercus spp.*) (Degenhardt *et al.* 1996, p. 28; Reagan 1967, p. 17). Salamanders are generally found in association with decaying coniferous logs, and in areas with abundant white fir, Ponderosa pine, and Douglas fir as the predominant tree species (Ramotnik 1988, p. 17; Reagan 1967, pp. 16-17). Salamanders use decaying coniferous logs considerably more often than deciduous, likely due to the physical features (e.g., blocky chunks with cracks and spaces) that form as coniferous logs decay (Ramotnik 1988, p. 53). Still, the species may be found beneath some deciduous logs and excessively decayed coniferous logs, because these can provide surface habitat and cover (Ramotnik 1988, p. 53).

Biology

The salamander is strictly terrestrial and does not possess lungs. The salamander does not use standing surface water for any life stage. Respiration occurs through the skin, which requires a moist microclimate for gas exchange. The salamander spends much of its life underground; it can be found at the surface from July through September, when relative environmental conditions are warm and wet. When active at the surface, the species is usually found under decaying logs, rocks, bark, moss mats, or inside decomposing stumps. The salamander's underground habitat appears to be deep, fractured, sub-surface rock in areas with high soil moisture (NMEST 2000, p. 2) where the geologic and moisture constraints likely limit the distribution of the species. Soil pH (acidity) may limit distribution as well. It is unknown whether the species forages or carries on any other activity below ground, although it is presumed that eggs are laid and hatch beneath the surface.

The surface microhabitat temperature for 577 Jemez Mountains salamanders ranged from 6.0 to 17.0 degrees Celsius (°C) (43 to 63 degrees Fahrenheit (°F)), with a mean of 12.7 °C (54.9 °F) (Williams 1972, p. 18). Significantly more salamanders were observed under logs where temperatures are closest to the mean temperature (12.5 °C (54.5 °F)) than inside logs where temperatures deviated the most from the mean temperature (13.3 °C (55.9 °F)) (Williams 1972, p. 19). Changes to microhabitat temperatures are discussed under Factors A and E, below.

Sexual maturity is attained at 3 to 4 years in females and 3 years in males (Williams 1976, pp. 31, 35). Reproduction in the wild has not been observed; however, based on observed physiological changes, reproduction is believed to occur above ground between mid-July and mid-August (Williams 1976, pp. 31-36). Based on examination of 57 female salamanders in the wild and one clutch of eggs laid in a laboratory setting, Williams (1978, p. 475) concluded that females likely lay 7 or 8 eggs every other year or every third year. Eggs are thought to be laid underground the spring after mating occurs (Williams 1978, p. 475). Fully-formed salamanders hatch from the eggs. The lifespan of the salamander in the wild is unknown; however, based on reproductive information that indicates the species is not sexually mature until age 3 or 4 years and that it only lays eggs every 2 or 3 years, and considering the estimated lifespan of other terrestrial plethodontid salamanders, we estimate that the species likely lives more than 10 years.

Salamander prey from above ground foraging is diverse in size and type, with ants, mites, and beetles being most

important in the salamander's diet (Cummer 2005, p. 43). Cummer (2005, pp. 45-50) found that specialization on invertebrate species was unlikely, but there was likely a preferential selection of prey.

Overview of Survey Data

Standardized survey protocols have been used for the salamander since 1987 (NMDGF 2000, p. 2), but the number and location of surveys have been variable and opportunistic. Survey methods involve searching under potential cover objects (e.g., logs, rocks, bark, moss mats) and inside decomposing coniferous logs when environmental conditions are likely best for detecting surface-active salamanders, generally May through September, when summer monsoon rains occur. Unfortunately, methods for determining locations to survey salamanders over the past 20 years have not been systematic, and though we have conducted a comprehensive review, the data have not been consistently available to allow comparison of the status of the salamander over its entire range.

Three survey protocols have been in use since 1987 (NMEST 2000b, pp. 27-29). Protocol A (presence or absence) has been used when attempting to determine whether an area is occupied (NMEST 2000b, p. 27). Following this protocol, surveys cease after 2 "person-hours" of effort (e.g., one person searching for 2 hours or two people searching for 1 hour) or when the first salamander is observed, whichever comes first. Because the salamander utilizes underground habitat and an unknown number of individuals may be active at the surface, repeated surveys may be necessary to determine occupancy of a locality (NMEST 2000b, p. 27).

Protocol B (population levels and trends) has been used for comparing plots, monitoring trends through time, or evaluating how salamander localities fluctuate in response to environmental variables (NMEST 2000b, p. 28). For this protocol, a survey is conducted for 2 person-hours, with all salamanders tallied.

Protocol C (detailed environmental data) collects microhabitat data to characterize potential salamander habitat (NMEST 2000b, p. 28). This protocol involves collecting data on important habitat features within a 50 m (160 ft) by 2 m (6.6 ft) transect, in addition to surveying for salamanders under cover objects.

The rangewide population size of the salamander is also unknown. Monitoring the absolute abundance of plethodontid salamanders is inherently difficult because of the natural variation associated with surface activity (Hyde and Simons 2001, p. 624), which ultimately affects the probability of detecting a salamander. The probability of detection varies over space and time and is highly dependent upon the environmental and biological parameters that drive surface activity (Hyde and Simons 2001, p. 624). Given the known bias of detection probabilities and the inconsistent survey effort across years, population size estimates using existing data cannot be made accurately.

Despite our inability to assess the rangewide population of the salamander in a comprehensive manner, the survey data are useful to understand that persistence of the salamander in localities may vary across the range of the species. For example, some localities where the salamander was once considered abundant or common (e.g., many parts of Unit 2, the Type Locality or the location where the salamander was originally found (Unit 4), and VCNP-Old Beaver Pond (Unit 5)), either the salamander no longer persists, or it persists at very low numbers. Alternatively, there are also three localities (Redondo Border, VCNP (Unit 5), and North East Slope VCNP (northern part of Unit 3)) where the salamander continues to be relatively abundant compared to most currently occupied sites. However, the numbers in these relatively abundant areas are far less than historic reports for the type locality, where 659 individuals were captured in a single year (1970), 394 of them in a single month (Williams 1976, p. 26). We know of no location where salamander abundance is similar to that observed in 1970. Overall, a few localized areas appear to be stable; however, there appears to be a decreasing trend within areas (decrease in numbers of salamanders observed during surveys) and a possible rangewide declining trend (an increase in the number of areas where salamanders were once present and have not been observed in recent surveys). The apparent declining trend is evident in Units 1 and 3, where we have the best survey information. Because it appears that the species is relatively long-lived, has relatively low reproductive output, has limited dispersal ability, and a small home range, it is likely that the apparent decreasing and declining trends both within localized areas and across the landscape represent actual declines in salamanders over the past 20 to 30 years.

Summary of Information Pertaining to the Five Factors

Section 4 of the Act (U.S.C. 1533 *et seq.*) and implementing regulations (50 CFR 424) set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, a species may be determined to be endangered or threatened based on any of the following five factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

In considering what factors might constitute threats to the species, we must look beyond the exposure of the species to a factor to evaluate whether the species may respond to the factor in a way that causes actual impacts to the species. If there is exposure to a factor and the species responds negatively, the factor may be a threat and, during the subsequent status review, we attempt to determine how significant a threat it is. The threat is significant if it drives, or contributes to, the risk of extinction of the species such that the species may warrant listing as endangered or threatened as those terms are defined in the Act. However, the identification of factors that could impact a species negatively may not be sufficient to compel a finding that the information in the petition and our files is substantial. The information must include evidence sufficient to suggest that these factors may be operative threats that act on the species to the point that the species may meet the definition of endangered or threatened under the Act.

In making this finding, information pertaining to the salamander in relation to the five factors provided in section 4(a)(1) of the Act is discussed below.

Factor A. Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Under Factor A, we considered whether the Jemez Mountains salamander is threatened by the following: fire exclusion and severe wildland fires; forest composition and structure conversions; post-fire rehabilitation; forest and fire management (fire use, fire suppression, mechanical treatment of hazardous fuels, and forest silvicultural practices

(timber harvest, salvage logging, forest thinning, and forest restoration projects)); dams and mining; private (residential) development; geothermal development; roads, trails, and habitat fragmentation; recreation; and livestock grazing.

Fire Exclusion and Severe Wildland Fires

Fire exclusion and wildfire threaten the salamander. In the Jemez Mountains, the results of over 100 years of fire suppression and fire exclusion (along with cattle grazing and other stressors) have altered forest composition and structure and increased the threat of wildfire in Ponderosa pine and mixed conifer forests in semi-arid western interior forests (Belsky and Blumenthal 1997, p. 318). Fire has been an important process in the Jemez Mountains for at least several thousand years (Allen 1989, p. 69), indicating the salamander evolved with fire. Frequent, low-intensity, surface fires and patchy, small scale, high-intensity fires in the Jemez Mountains historically maintained salamander habitat. These fires spread widely through the grassy understory fuels, or erupted on very small scales. The natural fire intervals prior to the 1900s ranged from 5 to 25 years across the Jemez Mountains (Allen 2001, p. 4). Dry mixed conifer forests burned on average every 12 years, whereas wet mixed conifer forests averaged every 20 years. Historically, patchy surface fires within mixed conifer forests would have thinned stands and created natural fuel breaks that would limit the extent of fires. Still, in very dry years, there is evidence of fires occurring across entire watersheds, but they did not burn with high severity over entire mountain sides (Jemez Mountains Adaptive Planning Workshop Session II Final Notes 2010, p. 7). Aspen stands are evidence of historic patchy crown fires that represent the relatively small-scale, stand-replacing fires that have historically occurred in the Jemez Mountains, which are also associated with significantly dry years (Margolis *et al.* 2007, p. 2236).

These historic fire patterns were interrupted in the late 1800s through the elimination of fine fuels as a result of livestock overgrazing and managed fire suppression. This interruption and exclusion of fire promoted the development of high forest stand densities with heavy accumulations of dead and downed fuel, and growth of ladder fuels (the dense mid-story trees that favor development of crown fires) (Allen 2001, pp. 5-6). In fact, fire exclusion in this area converted historically low- to moderate-severity fire regimes with small, patchy fires to high-severity, large-scale, stand-replacing fires that have the potential to significantly destroy or degrade salamander habitat (USFS 2009a, pp. 8-9). The disruption of the natural cycle of fire and subsequent accumulation of continuous fuels within the coniferous forests on south and north-facing slopes has increased the chances of a severe wildfire affecting large areas of salamander habitat within the Jemez Mountains (e.g., see USFS 2009a, 2009b).

Prescribed fire at VCNP has been limited, with only one burn in 2004 that was described as creating a positive vegetation response (ENTRIX 2009, p. 97). A prescribed fire plan is expected to be developed (ENTRIX 2009, p. 97), as there is concern for severe wildland fires to occur (Parmenter 2009, cited in Service 2010). The planned Scooter Peak prescribed burn between the VCNP and Bandelier National Monument is a fuel reduction project in occupied salamander habitat, but is small in scale (approximately 960 acres (ac) (390 hectares (ha)) (ENTRIX 2009, p. 2). Although future thinning of secondary growth may somewhat lessen the risk of severe wildland fires in areas, these efforts are not likely at a sufficient geographic scale to lessen the overall threat to the salamander.

The frequency of large-scale, high-severity, stand-replacing wildland fires has increased in the latter part of the 20th century in the Jemez Mountains. This increase is due to landscape-wide buildup of woody fuels associated with removal of grassy fuels from extreme year-round livestock overgrazing in the late 1800s, and subsequent fire suppression (Allen 1989, pp. 94-97; 2001, pp. 5-6). The majority of wildfires over the past 20 years has exhibited crown fire behavior and burned in the direction of the prevailing south or southwest winds (USFS 2009a, p. 17). The first severe wildland fire in the Jemez Mountains was the La Mesa Fire in 1977, burning 15,400 ac (6,250 ha). Subsequent fires included the Buchanon Fire in 1993 (11,543 ac (4,671 ha)), the Dome Fire in 1996 (16,516 ac (6,684 ha)), the Oso Fire in 1997 (6,508 ac (2,634 ha)), the Cerro Grande Fire in 2000 (42,970 ac (17,390 ha)), and the Lakes Fire Complex (Lakes and BMG Fires) in 2002 (4,026 ac (1,629 ha)) (Cummer 2005, pp. 3-4). Over the past 15 years, severe wildland fires have burned about 36 percent of modeled or known salamander habitat on USFS lands (USFS 2009, p. 1). Following the Cerro Grande Fire, the General Accounting Office reported that these conditions are common in much of the western part of the United States turning areas into a "virtual tinderbox" (General Accounting Office 2000, p. 15). The threat of severe wildland fires to salamander habitat remains high due to the tons of dead and down fuel, overcrowded tree conditions leading to poor forest health, and dense thickets of small-diameter trees. There is a 36 percent probability of having at least one large fire of 4,000 ac (over 1,600 ha) every year for the next 20 years in the southwest Jemez Mountains (USFS 2009a, p. 19). Moreover, the probability of exceeding this estimated threshold of 4,000 ac (1,600 ha) burned in the same time period is 65 percent (USFS 2009a, p. 19). As an example of the severe fire risk, the Thompson Ridge-San Antonio area, in Unit 1, has extensive ladder fuels and surface fuels estimated at over 20 tons per acre, and the understory in areas contains over 800 dense sapling trees per acre within the mixed conifer and Ponderosa pine stands (USFS 2009a, pp. 24-25). The canyon topography aligns with south winds and steep slopes, making this area more susceptible to crown fire (USFS 2009a, pp. 24-25).

Increases in soil and microhabitat temperatures, which generally increase with increasing burn severity, can have profound effects on salamander behavior and physiology, and thus their ability to persist subsequent to severe wildland fires. Following the Cerro Grande Fire, soil temperatures were recorded under potential salamander cover objects in areas occupied by the salamander (Cummer and Painter 2007, pp. 26-37). Soil temperatures in areas of high severity burn exceeded the salamander's thermal tolerance, which would have resulted in the death of any salamanders present (Spotila 1972, p. 97; Cummer and Painter 2007, pp. 28-31). Even in moderate and high-severity burned areas where fires did not result in the death of salamanders, the microhabitat conditions, such as those occurring during the Cerro Grande Wildfire, would limit the timing and duration that the salamanders could be surface active (feeding and mating). Moreover, elevated temperatures lead to increases in oxygen consumption, heart rate, and metabolic rate, resulting in decreased body water and body mass (Whitford 1968, pp. 247-251). Physiological stress from elevated temperatures may also increase susceptibility to disease and parasites. Effects from temperature increases are discussed in greater detail under Factor E.

Severe wildland fires typically increase soil pH, which could affect the

salamander. In one study of the Jemez Mountains salamander, soil pH was the single best indicator of relative abundance of salamanders at a site (Ramotnik 1988, pp. 24-25). Sites with salamanders had a pH of 6.6 (± 0.08) and sites without salamanders had a pH of 6.2 (± 0.06). In another species of a terrestrial plethodontid salamander, the red-backed salamander (*Plethodon cinereus*), soil pH influences and limits its distribution and occurrence as well as its oxygen consumption rates and growth rates (Wyman and Hawksley-Lescault 1987, p. 1823). Similarly, Frisbie and Wyman (1991, p. 1050) found the disruption of sodium balance by acidic conditions in three species of terrestrial salamanders. A low pH substrate can also reduce body sodium, body water levels, and body mass (Frisbie and Wyman 1991, p. 1050). Changes in soil pH following wildfire likely impact the salamander either by making the habitat less suitable or through physiological stress.

Several regulatory attempts have been made to address and correct the altered ecological balance of New Mexico's forests resulting from a century of fire suppression, logging, and livestock grazing. Congress enacted the Community Forest Restoration Act to promote healthy watersheds and reduce the threat of large, high-intensity wildfires; insect infestation; and disease in the forests in New Mexico (H.R. 2389, Public Law 106-393). The subsequent Omnibus Public Land Management Act, also called the "Forest Landscape Restoration Act" (Title, IV, Public Law III-II, 2009), established a national program that encourages ecological, economic, and social sustainability and utilization of forest restoration byproducts to benefit local rural economies and improve forest health. As a result, the Santa Fe National Forest is preparing the Southwest Jemez Mountains Landscape Assessment that, if funded, may reduce the threat of severe wildland fire in Units 1 and 4 of the salamander's range over the next 10 years (USFS 2009, p. 2). However, funding of this project is not certain, nor is it likely to address the short-term risk of severe wildland fire; thus, the efficacy of this program is unsure.

We are not aware of any recently completed or currently funded large-scale projects to address the risk of severe wildland fire on the Jemez Ranger District of the Santa Fe National Forest. Thinning and burning activities in the Southwest Jemez Restoration Assessment area have ranged from 12 ac (5 ha) to about 7,100 ac (2,900 ha) since 1989 (USFS 2009f, pp. 16-18). Still, most of these activities have focused on Ponderosa pine, with precommercial thinning (removing trees less than 9 inches (in) (23 centimeters (cm)) in diameter at breast height (dbh)) occurring on only 6,000 ac (2,400 ha) since 1986 (USFS 2009f, p. 18). Many of the forest stands remain densely stocked, creating multi-tiered fuels that add to crown fire risk. As such, the limited scale of these thinning and burning activities has not reduced the overall risk of severe crown fire in the area (e.g., see USFS 2009, 2009a, 2009b). The existing risk of wildfire on the VCNP and surrounding areas is uncharacteristically high and is a significant departure from historic conditions over 100 years ago (VCNP 2010, p. 3.1; Allen 1989, pp. ii-346; 2001, pp. 1-10). Therefore, it is highly probable that the overall risk of severe wildland fire will not be significantly reduced or eliminated on USFS lands, National Park Service lands, the VCNP, or surrounding lands in the foreseeable future.

Since 1977, these severe wildland fires have significantly degraded important features of salamander habitat including removal of tree canopy and shading, increases of soil temperature, decreases of soil moisture, increased pH, loss or reduction of soil organic matter, reduced porosity, and short-term creation of water-repelling soils. These and other effects limit the amount of available surface habitat and the timing and duration when salamanders can be surface active, which negatively impacts salamander behavior (e.g., foraging and mating). For these reasons, severe wildland fires have led to a reduction in the quality and quantity of the available salamander habitat rangewide. For this reason, the USFS believes, and we concur, that habitat loss from extensive, stand-replacing wildland fire threatens the salamander (USFS 2009c, p. 1). These effects will likely continue into the foreseeable future because we do not anticipate large-scale changes to funding or initiation of projects that would significantly alleviate the currently high risk of wildfire. Therefore, we believe that fire exclusion and suppression has substantially affected the salamander and this trend is expected to continue.

Forest Composition and Structure Conversions

Changes in forest composition and structure threaten the salamander by directly altering soil moisture, soil temperature, soil pH, relative humidity, and air temperature. With an increase of small-diameter trees on the Jemez Mountains, there is an increase in demand for water required for evapotranspiration, which in turn can lead to increased drying of the soil. Limited water leads to drought-stressed trees, and increases their susceptibility to burning, insects, and disease. This is especially true on south-facing slopes, where less moisture is available or during times of earlier snowmelt. Furthermore, reduced soil moisture may disrupt surface activities of salamanders (e.g., foraging) or alter prey availability. The degree of these impacts is currently unknown; however, alteration of forest composition and structure contribute to increased risk of forest die-offs from disease and insects throughout the range of the salamander (USFS 2002, pp. 11-13; 2009d, p. 1; 2009a, pp. 8-9; 2010, pp. 1-11; Allen 2001, p. 6). We find that the interrelated contributions from changes in vegetation to large-scale, high-severity wildfire and forest die-offs are of a significant magnitude across the range of the species (e.g., see "Fire Exclusion and Severe Wildland Fires" section, above), and in addition to continued predicted future changes to forested habitat within the range of the species, threaten the salamander.

Preliminary data collected from the VCNP indicates that an increase in the amount of tree canopy cover in an area influences the amount of snow that is able to reach the ground, and can decrease the amount of soil moisture and infiltration (Enquist *et al.* 2009, p. 8). On the VCNP, 95 percent of coniferous forests have thick canopy cover with heavy understory fuels (VCNP 2010, pp. 3.3-3.4; USFS 2009a, p. 9). In these areas, snow accumulates in the tree canopy over winter, and in the spring can quickly evaporate without reaching or infiltrating the soil. For this reason, recent increases in canopy cover, resulting from fire exclusion and suppression, could be having significant drying effects on salamander habitat and threaten the salamander now and in the foreseeable future.

Post-fire Rehabilitation

Post-fire management practices are often needed to restore forest dynamics (Beschta *et al.* 2004, p. 957). In 1971, USFS was given formal authority by Congress for Burn Area Emergency Rehabilitation (BAER) (Robichaud *et al.* 2000, p. 1) and integrated the evaluation of fire severity, funding request procedures, and treatment options. Treatment options implemented by USFS and BAER teams include hillslope treatments (grass seeding, contour-felled logs, mulch, and other methods to reduce surface runoff and keep post-fire soil in place, such as tilling, temporary fencing, erosion control fabric, straw wattles, lopping, and scattering of slash) and channel treatments (straw bale

check dams, log check dams, rock dams, and rock cage dams (gabions)) (Robichaud *et al.* 2000, pp. 11-21). Rehabilitation actions following the Cerro Grande fire in salamander habitat included heavy equipment and bulldozer operation, felling trees for safety reasons, mulching with straw and placement of straw bales, cutting and trenching trees (contour felling and securing on slope), hand and aerial seeding, and aerial hydromulch (wet mulch with fertilizer and seed) (USFS 2001, p. 1). Some contour felling is likely beneficial for the salamander post-fire because it can slow erosion and, in cases where surface rocks are not present or present in low numbers, the logs can also provide immediate cover. Following the Cerro Grande Fire, the BAER Team recommended felling large-diameter Douglas fir logs and cutting four disks off each log (rounds) to provide immediate cover for salamanders before summer rains (Interagency BAER Team 2000, p. 87; USFS 2001, p. 1). It remains unknown if these measures are effective, but they probably benefit the salamander in the short term. Alternatively, some post-fire treatments (e.g., grass seeding, tilling, erosion control fabrics, and removal of surface rocks to build rock dams) likely negatively impact the salamander. The most common BAER treatment is grass seeding dropped from aircraft (Robichaud *et al.* 2000, p. 11). This treatment is inexpensive, rapidly increases water infiltration, and stabilizes soil (Robichaud *et al.* 2000, p. 11). Nonnative grasses are typically seeded because they are fast-growing and have extensive fibrous roots (Robichaud *et al.* 2000, p. 11). Nevertheless, these nonnative grasses have created thick mats that are impenetrable to the salamander because the species has short legs and cannot dig tunnels. The existing spaces in the soil fill with extensive roots, altering the sub-surface habitat in a manner that is unusable to the salamander. Finally, grass seeds can also contain fertilizer that is broadcast over large areas of habitat (e.g., hydromulch used in post-fire treatments for the Cerro Grande Fire). Fertilizers can contain nitrate, which is toxic to amphibians at certain levels (Rouse *et al.* 1999, p. 799). While the effects of seeding with nonnative grasses and the use of fertilizers on salamanders have not been specifically studied, this action has likely caused widespread adverse impacts to the salamander. Because this action is a common post-fire treatment, it will likely continue to negatively impact salamander localities from both past and future treatments.

In summary, some post-fire treatments could benefit the salamander, such as some contour felling of logs. Additional measures, such as cutting and scattering rounds, can also benefit the salamander. However, other post-fire treatments negatively impact the salamander. Small-scale impacts could occur from removing rocks from habitat to build rock dams, and large-scale impacts include grass seeding and associated chemicals. We conclude that while the effects of high-severity, stand-replacing wildfire, also referred to as severe wildland fires, are the most significant threat to the salamander, actions taken subsequent to the wildfires could determine whether the salamander will persist in or return to those areas. We therefore find that post-fire rehabilitation treatments are currently a threat to the salamander, and are expected to continue in the future.

Fire Use

Fire use includes the combination of wildland fire use (the management of naturally ignited wildland fires to accomplish specific resource management objectives) and prescribed fire (any fire ignited by management actions to meet specific objectives) applications to meet natural resource objectives (USFS 2010b, p. 1). Fire use can benefit the salamander in the long term by reducing the risk of severe wildland fires and by returning the natural fire cycle to the ecosystem. Alternatively, other practices such as broadcast burning (i.e., conducting prescribed fires over large areas) consume ground litter that helps to create moist conditions and stabilize soil and rocky slopes. Depending on time of year, fire use can also impact the salamander if the species is active on the surface, which is typically from July to September. Conditions for salamander surface activity (wet) are often not conducive to fire. Prescribed fire in the Jemez Mountains is often planned for the fall (when the salamanders are not active), because low wind and increased moisture during this time allow more control, lowering chances of the fire's escape. Because fire historically occurred prior to July (i.e., pre-monsoon rains), the majority of fires likely preceded surface activity. Prescribed fires conducted after September, when salamanders typically return to their underground retreats, would be similar to a natural fire regime in the spring with low direct impacts because most salamanders are subsurface. However, it is unknown what the indirect impacts to the salamander would be by altering the time of year when fire is present on the landscape.

Other impacts to the salamander from fire use can include digging fire lines, targeting the reduction of large decomposing logs, and chemical use (such as flares and fire retardant) in salamander habitat. Some impacts to the salamander can be avoided through seasonal timing of prescribed burns and modifying objectives (e.g., leaving large diameter logs, greater canopy cover) and techniques (e.g., not using flares or chemicals) of the prescribed fire in salamander habitat (Cummer 2005, pp. 2-7). As part of the Southwest Jemez Restoration Project proposal, the Santa Fe National Forest has set specific goals pertaining to the salamander including reduction of the risk of high-intensity wildfire in salamander habitat and retention of a moisture regime that will sustain high-quality salamander habitat (USFS 2009a, p. 11). The Santa Fe National Forest intends to minimize impacts to the salamander and to work towards its recovery (USFS 2009, p. 4), but specific actions or recommendations to accomplish this goal have not yet been determined. If the salamander is not considered, fire use could make its habitat less suitable (warmer; drier; fewer large, decomposing logs) and kill or injure salamanders that are surface active. Alternatively, the species may benefit if seasonal restrictions and maintaining key habitat features (e.g., large logs and sufficient canopy cover to maintain moist microhabitats) are part of managing the fire. Given the current condition of forest composition and structure, the risks of severe wildland fire on a large geographic scale will take a long-term planning strategy. Fire use is critical to the long-term protection of the salamander's habitat, although some practices are not beneficial to the species and may threaten the salamander.

Fire Suppression Activities

Similarly, fire suppression activities both protect and negatively impact the salamander or its habitat. For example, fire suppression actions that occurred in salamander habitat during the Cerro Grande Fire included hand line construction, backfiring with the capacity of burning off heavy ground cover, fire retardant drops, and bulldozer line (USFS 2001, p. 1). Water dropping from helicopters is another fire suppression technique used in the Jemez Mountains, where water is collected from accessible streams, ponds, or stock tanks. By dropping surface water into terrestrial habitat, there is a significant increased risk of

spreading aquatic pathogens into terrestrial habitats (see Factor C, Disease).

Fire retardants and fire fighting foams are addressed under Factor E. Fire suppression actions including the use of fire retardants, water dropping, backfiring, and fire line construction likely impact the salamander; however, the magnitude of impacts from fire suppression remains unknown, and we do not have enough information at this time to determine if fire suppression actions threaten the salamander. However, these activities improve the chances of quick fire suppression and would be relatively smaller in scale and could have fewer impacts than a severe wildland fire. Therefore, we do not find that fire suppression activities are a threat to the salamander, nor do we expect them to become a threat in the future.

Mechanical Treatment of Hazardous Fuels

Mechanical treatment of hazardous fuels refers to the process of grinding or chipping vegetation (trees and shrubs) to meet forest management objectives. When these treatments are used, resprouting vegetation often grows back in a few years, if the area is not maintained through prescribed fire. Mechanical treatment may include the use of heavy equipment or manual equipment to cut vegetation (trees and shrubs) and to scrape slash and other debris into piles for burning or mastication. Mastication equipment uses a cutting head attached to an overhead boom to grind, chip, or crush wood into smaller pieces and is able to treat vegetation on slopes up to 35 to 45 percent while generally having little ground impact (soil compaction or disturbance). The debris is left on the ground where it decomposes and provides erosion protection or it is burned after drying out.

Mechanical treatment of hazardous fuels such as manual or machine thinning (chipping and mastication) may cause localized disturbances to the forest structure that can impact the salamander. For example, removal of overstory tree canopy or ground cover within salamander habitat may cause desiccation of soil or rocky substrates. Additionally, tree-felling or use of heavy equipment has the potential to disturb the substrate, resulting in destabilization of talus and compaction of soil, which may reduce sub-surface interstices used by salamanders as refuges or for their movements. Similarly, if salamanders are surface active, any of these activities could crush salamanders present under surface cover objects (through use of heavy equipment or heavy foot traffic).

Also of concern is soil compaction from the use of heavy equipment. The masticator largely operated on skid trails (temporary trails used to transport trees, logs, or other forest products), and mastication did not increase soil compaction, because the machinery traveled on trails covered with masticated materials (wood chips, etc.), which more evenly distributed the weight of the machinery and reduced soil compaction (Moghaddas and Stephens 2008, p. 3104). Activities that compact soil, remove excessive canopy cover, or are conducted while salamanders are surface active would be detrimental to the salamander and its habitat. If mechanical treatment and hazardous fuels activities are conducted in a manner that minimizes impacts to the salamander while reducing the risk of severe wildland fire, the salamander could ultimately benefit from the reduction in the threat of severe wildland fire and the improvement in the structure and composition of the forest. While mechanical treatments likely impact a few individual salamanders, we do not have enough information at this time to determine whether mechanical treatments threaten the species.

Forest Silvicultural Practices

Forest silvicultural practices (the care and cultivation of forest trees) threaten the salamander. Many areas of the landscape in the Jemez Mountains has been fragmented by past commercial (trees greater than 9 in (23 cm) dbh) and pre-commercial (trees less than 9 in (23 cm) dbh) timber harvesting. Much of the forests of the Jemez Mountains lack large-diameter trees and have become overgrown with small-diameter trees. Salamander localities are found generally within the intact stands of mature forest, but can still be found in areas where evidence of logging exists. We assessed whether timber harvest (logging) or salvage logging threaten the salamander.

From 1935 to 1972, logging (particularly clear-cut logging) was conducted on VCNP (ENTRIX 2009, p. 164). These timber activities resulted in about 50 percent of VCNP being logged, with over 1,600 kilometers (km) (1,000 miles (mi)) of 1960s era logging roads (ENTRIX 2009, p. 164) being built in winding and spiraling patterns around hills (ENTRIX 2009, pp. 59-60). On the VCNP, 95 percent of forest stands contain dense thickets of small-diameter trees (VCNP 2010, pp. 3.3-3.4). This multi-tiered forest structure is similar to surrounding areas and provides ladder fuels that favor the development of crown fires (Allen 2001, pp. 5-6; USFS 2009a, p. 10). Additionally, all forest types on the VCNP contain very few late-stage mature trees greater than 16 in (41 cm) dbh (less than 10 percent of the overall cover) (VCNP 2010, pp. 3.4, 3.6-3.23). The lack of large trees is an artifact of intense logging, mostly from clear-cutting practices in the 1960s (VCNP 2010, p. 3.4), and we believe this to be similar for surrounding forests. Clear-cutting degrades forest floor microhabitats by eliminating shading and leaf litter, increasing soil surface temperature, and reducing moisture (Petranka 1998, p. 16).

In a comparison of four logged sites and five unlogged sites in Jemez Mountains salamander habitat, Ramotnik (1986, p. 8) reports that a total of 47 salamanders were observed at four of the five unlogged sites, while no salamanders were observed on any of the logged sites. It is unclear whether salamanders were observed at the sites prior to logging, but significant differences in habitat features (soil pH, litter depth, and log size) between the logged and unlogged sites are reported. On the unlogged sites, salamanders were associated with cover objects that were closer together and more decayed, and that had a higher canopy cover, greater moss and lichen cover, and lower surrounding needle cover, compared to cover objects on logged sites (Ramotnik 1986, p. 8). Cover objects on logged sites were less decomposed and accessible by the salamanders, had a shallower surrounding litter depth, and were associated with a more acidic soil than were cover objects on the unlogged sites (Ramotnik 1986, p. 8).

Consistent with the findings of Ramotnik (1986, p. 8), deMaynadier and Hunter (1995; in Olson *et al.* 2009, p. 6) reviewed 18 studies and found that salamander abundance after timber harvest was 3.5 times greater on controls than in clear-cut areas. Furthermore, Petranka *et al.* (1993; in Olson *et al.* 2009, p. 6) found that *Plethodon* abundance and richness in mature forest were five times higher than those in recent clear cuts, and they estimated that it would take as much as 50 to 70 years for clearcut populations to return to pre-clearcut levels. In the Jemez Mountains, historic clearcut logging practices likely led to significant habitat loss for the salamander with effects that continue today.

The majority of salamander habitat has been heavily logged, which has resulted in changes in stand structure and a paucity of large-diameter trees. This lack of large-diameter trees means

that there is a limited source for future large, decomposing logs needed for high-quality salamander habitat. Ramotnik (1986, p. 12) reports that logs with salamanders present were significantly larger and wetter than those without salamanders. Further, most salamanders were found in well decomposed logs. In a similar plethodontid salamander, large logs provide refuge from warmer temperatures and resiliency from impacts that can warm and dry habitat (Kluber *et al.* 2009, p. 31).

On the VCNP, only minor selective logging has occurred since 1972, and it is expected that some thinning of second growth forests will continue to occur to prevent severe wildfires. However, no commercial logging is proposed or likely in the foreseeable future (Parmenter 2009b, cited in Service 2010). Although commercial timber harvest on the Santa Fe National Forest has declined appreciably since 1988 (Fink 2008, pp. 9, 19), the effects from historical logging and associated roads will continue to threaten the salamander and are expected to continue in the foreseeable future.

Salvage cutting (logging) removes dead, dying, damaged, or deteriorating trees while the wood is still merchantable (Wegner 1984, p. 421). Sanitation cutting, similar to salvage, removes the same kinds of trees as well as those susceptible to attack, but for the purpose of reducing the spread of biotic pests (Wegner 1984, p. 421). Both types of cutting are used in salamander habitat, and are referred to as "salvage logging." Salvage logging is a common response to forest disturbance (Lindenmayer *et al.* 2008, p. 4) and, in salamander habitat, is most likely to occur after a forest die-off resulting from fire, disease, insects, or drought. The purposes for salvage logging in the Jemez Mountains have included firewood for local use, timber for small and large mills, salvage before economic decay, creation of diverse healthy and productive timber stands, management of stands to minimize insect and disease losses (USFS 1996, p. 4), and recovery of the timber value of fire-killed trees (USFS 2003, p. 1). When conducted in salamander habitat, it can further reduce the quality of the habitat remaining after the initial disturbance by removing or reducing the shading afforded by dead standing trees (Moeur and Guthrie 1984, p. 140) and future salamander cover objects (removal of trees precludes their recruitment to the forest floor), and by interfering with habitat recovery (Lindenmayer *et al.* 2008, p. 13).

Recent salvage logging within the range of the salamander occurred following the Lakes and BMG Wildfire. The USFS stated that mitigation measures for the Lakes and BMG Wildfire Timber Salvage Project would further protect the salamander and enhance salamander habitat by immediately providing slash and down logs (USFS 2003, pp. 4-5). Mitigation for the salvage logging project included conducting activities during winter to avoid soil compaction, and providing for higher snag retention (by leaving all Douglas fir trees (16 percent fire-killed trees) and 10 percent of other large snags) to provide future down log habitat (USFS 2003, p. 29). These mitigation measures were developed in consultation with NMEST in an effort to minimize impacts to salamander from salvage logging; however, NMEST recommended that salvage logging be excluded from occupied salamander habitat because it was not clear that even with the additional mitigations that it would meet the conservation objectives of the Cooperative Management Plan (NMEST 2003, p. 1). The mitigation measures would likely benefit the salamander in the short term if conducted without salvage logging. It is not known if mitigation measures offset the impacts of salvage logging in salamander habitat; however, Lindenmayer *et al.* (2008, p. 13) reports that salvage logging interferes with natural ecological recovery and may increase the likelihood and intensity of subsequent fires. We believe that removal of trees limits the amount of future cover and allows additional warming and drying of habitat. The potential for large-scale forest die-offs from wildfire, insect outbreak, disease, or drought is high in the Jemez Mountains (see Factors A and E), which may result in future salvage logging in salamander habitat in the foreseeable future. We believe that salvage logging in salamander habitat further diminishes habitat quality and may be a determining factor of salamander persistence subsequent to forest die-off.

Some timber harvest activities likely pose no threat to the salamander. For example, removal of hazard trees may have minimal disturbance to surrounding soils or substrates, especially if removal is conducted when the species is not surface-active (i.e., seasonal restrictions). This type of localized impact may affect a few individuals but is not likely to affect a population or be considered a threat. Likewise, precommercial thinning (removal of trees less than 9 in (22.9 cm) dbh) or shrub and brush removal (without the use of herbicides) to control vegetation, and without disturbing or compacting large areas of the surrounding soils, likely could be conducted without adverse effects on the salamander.

In summary, current commercial logging levels are very low and do not threaten the salamander. Because most of the high-quality, large-diameter trees have been removed from the Jemez Mountains, we believe that commercial logging levels will remain low for the foreseeable future. Nevertheless, impacts from past commercial logging activities continue to have detrimental effects to the salamander and its habitat. These past activities removed large-diameter trees, removed forest canopy, created roads, compacted soil, and disturbed other important habitat features. These effects of historic logging include the warming and drying of habitat, and no source for future large cover objects (decomposing logs) that contribute to habitat complexity and resiliency. Salvage logging further diminishes salamander habitat subsequent to disturbance. Therefore, we conclude that the salamander continues to be threatened by forest silvicultural practices, including salvage logging, and we expect that these practices and the resulting threats to the species will continue in the future.

Dams

Following the 2000 Cerro Grande Fire, water retention dams were constructed within potential salamander habitat to minimize soil erosion within burned areas (NMDGF 2001, p. 1; NMEST 2002, pp.1-2; Kutz 2002, p. 1). Surveys were not conducted prior to construction, and we do not know if the areas were occupied by salamanders, but the areas are in the vicinity of occupied salamander habitat. Because these types of structures were installed to slow erosion subsequent to wildfire, additional dams or flood control features could be constructed within salamander habitat in the foreseeable future following severe wildland fires. Some individual salamanders may be killed or injured by this activity; however, the impact to the species and habitat from construction of retention dams would be relatively minor. For this reason, we do not consider the construction of dams to currently be a significant threat to the salamander, nor do we expect dam construction to be a threat to the species in the future.

Mining

Pumice mining activities (e.g., Copar Pumice Company, the Copar South Pit Pumice Mine, and the El Cajete Pumice Mine) have been evaluated for impacts to the salamander (USFS 1995, pp. 1-14;

1996, pp. 1-3). Pumice mines are located within areas of volcanic substrate that are unlikely to support salamanders (USFS 2009c, p. 2). However, associated infrastructure from expansion of the El Cajete Mine, such as access roads and heavy equipment staging areas, may have the potential to be located in potential salamander habitat. Although no decision on authorizing the extension to the El Cajete Mine has been made (USFS 2009. p. 2), these activities would be small in scale and not likely considered a threat to the species, either currently or in the future.

Private (Residential) Development

Private property development threatens the salamander. Although the majority of salamander habitat is located on Federally managed lands, private land contains substantially sized, contiguous areas of salamander habitat. Additionally, some areas with salamander habitat on the Santa Fe National Forest could be developed for private use (as proposed in USFS 1997, pp. 1-4; USFS 1998, pp. 1-2). Development can destroy and fragment habitat through the construction of homes and associated infrastructure (e.g., roads, driveways, and buildings), making those areas unusable to salamanders and likely resulting in mortalities to salamanders within those areas. These activities have reduced the quantity and quality of salamander habitat primarily within the southern part of Unit 1, the central and eastern parts of Unit 3, and large inholdings in Unit 4. As the human population continues to increase in New Mexico, we believe development will likely continue to directly affect the salamander within these units in the foreseeable future. These activities will likely be in the form of new housing and associated roads and infrastructure. Because development occurs, or is likely to occur, in part of the range of the salamander, and because we anticipate the continuing loss and degradation of habitat in these areas, we determine that private property development currently threatens the salamander, and this threat will continue in the future.

Geothermal Development

Geothermal development does not threaten the salamander. A large volcanic complex in the Jemez Mountains is the only known high-temperature geothermal resource in New Mexico (Fleischmann 2006, p. 27). Geothermal energy was explored for possible development on the VCNP between 1959 and 1983 (USFS 2007, p. 126). In July 1978, the U.S. Department of Energy, Union Oil Company of California (Unocal), and the Public Service Company of New Mexico began a cooperative geothermal energy project (USFS 2007, p. 126). The demonstration project drilled 20 exploratory wells over the next 4 years. One of the geothermal development locations was south of Redondo Peak on the VCNP, and the canyon in this area was occupied by the salamander (Sabo 1980, pp. 2-4). An Environmental Impact Statement analyzed a variety of alternatives, including placement of transmission towers and lines (U.S. Department of Energy cited in Sabo 1980, pp. 2-5). Nevertheless, the project ended in January 1982, because Unocal's predictions concerning the size of geothermal resources were not met. Out of the 40 wells drilled in the Valles Caldera in the Redondo Creek and Sulphur Springs areas, only a few yielded sufficient resources to be considered production wells (USFS 2007, p. 126). In some cases, primarily in Unit 5, this occurred in salamander habitat and concrete well pads were built. Although the geothermal resources are found within the range of the salamander in the Jemez Mountains, extraction of large quantities of hot fluids from these rocks has proven difficult and not commercially viable (USFS 2007, p. 127). As such, we are not aware of any current or future plans to construct large or small-scale geothermal power production projects within salamander habitat. Moreover, in 2006, the mineral rights on the VCNP were condemned, including geothermal resources (VallesCaldera.com 2010, p. 1). For these reasons, geothermal development does not present a current or foreseeable threat to the salamander.

Roads, Trails, and Habitat Fragmentation

Roads, trails, and habitat fragmentation have had significant detrimental impacts that threaten the salamander now and in the foreseeable future. Construction of roads and trails has historically eliminated or reduced the quality or quantity of salamander habitat, reducing blocks of native vegetation to isolated fragments and creating a matrix of native habitat islands that have been altered by varying degrees from their natural state. Allen (1989, pp. 46, 54, 163, 216-242, and 302) collected and analyzed changes in road networks (railroads, paved roads, improved roads, dirt roads, and primitive roads) in the Jemez Mountains from 1935 to 1981. Landscape-wide road density increased 11.75 times from 0.382 km (0.237 mi) of road per square km (0.386 square mi) in 1935 to 4.490 km (2.790 mi) of road per square km in 1981, and in surface area of the map area from 0.131 percent (247 ha; 610 ac) to 1.667 percent (3,132 ha; 7,739 ac) (Allen 1989, pp. 236-240). Allen (1989, p. 240) reports that of 8,443 km (5,246 mi) of roads in the Jemez Mountains in 1981, 74 percent was mapped on USFS lands (3,607 km; 2,241 mi) and private lands (2,649 km; 1,646 mi). These roads generally indicate past logging activity (Allen 1989 p. 236). Ongoing effects of roads and their construction on the VCNP may exceed the effects of the timber harvests for which the roads were constructed (Balmat and Kupfer 2004, p. 46). The majority of roads within the range of the salamander are unpaved, and the compacted soil typically has very low infiltration rates that generate large amounts of surface runoff (Robichaud *et al.* 2010, p. 80). Increasing runoff and decreasing infiltration has led to the drying of adjacent areas of salamander habitat.

The construction of roads and trails degrades habitat by compacting soil and eliminating interstitial spaces on the surface and sub-surface. Furthermore, roads and trails reduce or eliminate important habitat features (e.g., lowering canopy cover or drying of soil) and prevent gene flow (Saunders *et al.* 1991, p. 25; Burkey 1995, pp. 527, 528; Frankham *et al.* 2002, p. 310; Noss *et al.* 2006, p. 219). Vehicular and off-highway vehicle (OHV) use of roads and trails can kill or injure salamanders. Roads are known to fragment terrestrial salamander habitat and act as partial barriers to movement (deMaynadier and Hunter 2000, p. 56; Marsh *et al.* 2005, p. 2004). We find that the establishment of roads and trails will likely continue to impact the salamander and its habitat, increasing the risk of extirpation of some localities.

Road clearing and maintenance activities can also cause localized adverse impacts to the salamander from scraping and widening roads and shoulders or maintaining drainage ditches or replacing culverts. These activities may kill or injure individuals through crushing by heavy equipment. Existing and newly constructed roads or trails fragment habitat, accelerating extirpation of localities, especially when movement between suitable habitat is not possible (Burkey 1995, p. 540; Frankham *et al.* 2002, p. 314). Isolated populations or patches are vulnerable to random events, which could easily destroy part of or an entire salamander locality, or decrease a locality to such a low number of individuals that the risk of extirpation from human disturbance, natural catastrophic events, or genetic

and demographic problems (e.g., loss of genetic diversity, uneven male to female ratios) would increase greatly (Shaffer 1987, p. 71; Burkey 1995, pp. 527, 528; Frankham *et al.* 2002, pp. 310-324).

Terrestrial salamanders are impacted by edge effects, typically adjacent to roads and areas of timber harvest, because microclimate conditions within forest edges often exhibit higher air and soil temperatures, lower soil moisture, and lower humidity, compared to interior forested areas (Moseley *et al.* 2009, p. 426). Moreover, by creating edge effects, roads can reduce the quality of adjacent habitat by increasing light and wind penetration, exposure to pollutants, and the spread of invasive species (Marsh *et al.* 2005, pp. 2004-2005). Due to the physiological nature of terrestrial salamanders, they are sensitive to these types of microclimate alterations, particularly to changes to temperature and moisture (Moseley *et al.* 2009, p. 426). Generally, more salamanders are observed with increasing distance from some edge types, which is attributed to reduced moisture and microhabitat quality (Moseley *et al.* 2009, p. 426).

Road construction on New Mexico State Highway 126 around the town of Seven Springs in 2007-2008 occurred in occupied salamander habitat in Unit 1. Measures were implemented by the USFS reduce the impact of these road construction activities on salamanders including limiting construction to times when salamanders would not be active on the surface and felling of approximately 300 trees in the project area to replace large woody debris used as salamander habitat. However, at least 24 ac (9.7 ha) of salamander habitat were directly impacted by this project (USFS 2009c, p. 2), which resulted in the destruction and fragmentation of occupied salamander habitat. Continued maintenance of State Highway 126 in the future will likely involve the use of salts for road de-icing, and increase the exposure of adjacent areas to chemicals and pollution from vehicular traffic. Fragmentation of parts of Unit 1 and subsequent edge effects have reduced the quality and quantity of salamander habitat.

In 2007, the NMEST concluded that impacts from OHVs and motorcycles were variable depending on their location relative to salamander habitat. Since the width of a trail is generally smaller than a road, canopy cover typically remains over trails. In some cases (e.g., flat areas without deeply cut erosion), the trails do not likely impede salamander movement. Alternatively, severe erosion caused by heavy trail use in some places formed trenches approximately 2 ft wide by 2 to 3 ft deep (0.6 m wide by 0.6 to 0.9 m deep), which would likely prevent salamander movement, fragment local populations, and trap salamanders that fall into the trenches. Often, the most severely impacted areas from OHVs had been the best salamander habitat prior to OHV use, because they were located on steep, north-facing slopes, with loose rocky soils that are easily eroded.

In November 2005, the USFS issued the Travel Management Rule that requires designation of a system of roads, trails, and areas for motor vehicle use by vehicle class and, if appropriate, by time of year (70 FR 68264; November 9, 2005). As part of this effort, the USFS inventoried and mapped roads and motorized trails, and is currently completing a Draft Environmental Impact Statement to change the usage of some of the current system within the range of the salamander. The Santa Fe National Forest is attempting to minimize the amount of authorized roads or trails in known occupied salamander habitat and will likely prohibit the majority of motorized cross-country travel within the range of the species (USFS 2009c, p. 2). Nevertheless, by closing some areas to OHV use, the magnitude of impacts in areas open to OHV use in salamander habitat will be greater (NMEST 2008, p. 2). We acknowledge that some individual salamanders may be killed or injured by vehicles and OHVs and that OHV use impacts salamander habitat. However, we believe the Santa Fe National Forest is attempting to minimize impacts to the salamander and its habitat. Furthermore, we believe that the revised travel management regulations will reduce the impact of motorized vehicles on the salamander and its habitat by providing a consistent policy that can be applied to all classes of motor vehicles, including OHVs. We conclude that OHV and motorcycle use threatens the salamander if left unmanaged, but with the implementation of the forthcoming management of motorized trails on the Santa Fe National Forest, the threat will be greatly reduced.

In summary, the extensive roads that currently exist in the Jemez Mountains have significantly impacted the salamander and its habitat due to death and injury of salamanders; fragmentation and population isolation; habitat loss; habitat modification from edges; and in some cases, increased exposure to chemicals, salts, and pollution. Roads associated with private development are most likely to be constructed in the future in portions of Units 3 and 4, which has the most private land. However, new roads may also be constructed through Federal lands within the salamander's range. Roads and trails have significantly fragmented habitat and likely reduced persistence of existing salamander localities. Therefore, we conclude that roads, trails, and the resulting habitat fragmentation currently present a threat to the salamander, and this threat will continue in the future.

Recreation

Recreational activities threaten the salamander now and in the foreseeable future. The Jemez Mountains are heavily used for dispersed recreational activities that have the potential to impact the species, including camping, hiking, mountain biking, hunting, and skiing; OHV use is addressed above. There is overlap of the Jemez National Recreation Area, a 57,650 ac (23,330 ha) area of the southwestern Jemez Mountains, and salamander Units 1 and 4. It is estimated that nearly 1.6 million people visit the Jemez National Recreation Area for recreational opportunities each year (Jemez National Recreation Area 2002, p. 2). Despite an existing average road density of approximately 2.5 mi (4.0 km) of road per square mile (2.6 square km) on the Jemez National Recreation Area, off road use continues to occur resulting in new roads being created or decommissioned roads being reopened (Jemez National Recreation Area 2002, pp. 10, 11). Using current population and travel trends, the potential visitation demand on the VCNP is between 250,000 and 400,000 visits per year (Entrix 2009, p. 93). Of this projection, the VCNP is expected to realize 120,000 visitors per year by the year 2020 (Entrix 2009, p. 94). To put this in context, from 2002 to 2007 the VCNP averaged about 7,600 visitors per year (Entrix 2009, p. 13). Bandelier National Monument, which has a smaller proportion of salamander habitat, overlaps with the southern portion of Unit 3, and attracts an average annual visitation of over 250,000 people (Entrix 2009, p. 92). Fenton Lake State Park in Unit 1 also contains salamander habitat. The park received over 120,000 visitors on its 70 ac (28 ha) containing hiking trails and a fishing lake (Entrix 2009, p. 92).

Campgrounds and associated parking lots and structures have likely impacted the salamander through modification of small areas of habitat from soil compaction and vegetation removal. Similarly, compaction of soil from hiking or mountain biking trails has modified a relatively small amount of habitat. The majority of these trails likely do not act as barriers to

movement nor create edge effects similar to roads because they are narrow and do not reduce canopy cover. However, similar to OHV trails, deeply eroded mountain bike trails could act as barriers and entrap salamanders.

The Pajarito Ski Area in Los Alamos County was established in 1957 and expanded through 1994. Ski runs were constructed within salamander habitat. A significant amount of high-quality habitat (north-facing mountain with mixed conifer forests and many salamander observations) was destroyed with construction of the ski areas and the runs and roads have fragmented and created a high proportion of edge areas. Nevertheless, surveys conducted in 2001 in two small patches of forested areas between ski runs detected salamanders (Cummer *et al.* 2001, pp. 1, 2). Most areas between runs remain unsurveyed. However, because of the large amount of habitat destroyed, the extremely small patch sizes that remain, and relatively high degree of edge effects, the salamander will likely not persist in these areas in the long term.

Adjacent to the downhill ski runs are cross country ski trails. These trails are USFS lands, but maintained by a private group. In 2001, trail maintenance and construction with a bulldozer was conducted by the group in salamander habitat during salamander surface activity period (NMEST 2001, p. 1). Trail maintenance was reported as leveling all existing ski trails with a bulldozer, that involved substantial soil disturbance, cutting into slopes as much as 2 ft (0.6 m), filling other areas in excess of 2 ft (0.6 m), widening trails, and downing some large trees (greater than 10 in (25.4 cm) dbh), ultimately disturbing approximately 2 to 5 ac (1 to 2 ha) of occupied salamander habitat (Sangre de Christo Audubon Society 2001, pp. 2-3). This type of trail maintenance while salamanders are surface active could result in direct impacts to salamanders, and further fragment and dry habitat. We do not know if there are future plans to modify or expand the existing ski area.

The Jemez Mountains are currently heavily used for recreational activities, and as human populations in New Mexico continue to expand, there will likely be an increased demand in the foreseeable future for recreational opportunities in the Jemez Mountains. Large-scale recreational projects in salamander habitat would threaten the salamander. Therefore, we conclude that recreational activities currently threaten the salamander, and will continue to be a threat in the future.

Livestock Grazing

Historical livestock grazing changed the Jemez Mountains ecosystem by removing understory grasses, contributing to altered fire regimes, altered vegetation composition and structure, and increased soil erosion. Livestock grazing generally does not occur within salamander habitat because cattle concentrate outside of forested areas where grass and water are more abundant. We have no information that indicates livestock grazing is directly or indirectly threatening the salamander or its habitat. However, small-scale habitat modification, such as livestock trail establishment or trampling, in occupied salamander habitat is possible. The USFS and VCNP manage livestock to maintain fine grassy fuels and should not limit low-intensity fires in the future. Indirect effects from livestock activities may include the risk of aquatic disease transmission from earthen stock ponds that create areas of standing surface water. Earthen stock tanks are often utilized by tiger salamanders (*Ambystoma tigrinum*), which are known to be vectors for disease (i.e., they can carry and spread disease) (Davidson *et al.* 2003, pp. 601-607). Earthen stock tanks can also concentrate tiger salamanders, increasing chances of disease. Some tiger salamanders use adjacent upland areas and may transmit disease to the Jemez Mountains salamander in areas where they co-occur. However, we do not have enough information to draw conclusions on the extent or role tiger salamanders may play in disease transmission. Although some small-scale habitat modification is possible, livestock are managed to maintain a grassy forest understory, and the connection between earthen stock tanks for livestock and aquatic disease transmission is unclear. Therefore, we conclude that livestock grazing is not a current threat to the salamander, nor do we believe it will be in the future.

Summary

In summary, the salamander and its habitat are threatened by historical and current fire management practices; severe wildland fire; forest composition and structure conversions; post-fire rehabilitation; forest management (including silvicultural practices); private (residential) development; roads, trails, and habitat fragmentation; and recreation. Due to the limited extent of habitat occupied by the salamander, the severity and magnitude of the threat of severe wildland fire, and ongoing impacts from the existing extensive road network and previous logging practices, we have determined that the present or threatened destruction, modification, or curtailment of habitat and range represents a current significant threat to the salamander, and will continue to be so in the future.

Factor B. Overutilization For Commercial, Recreational, Scientific, or Educational Purposes

Overutilization does not threaten the salamander now or in the foreseeable future, but has likely caused salamander extirpation at the most abundant location known historically. Between 1960 and 1999, nearly 1,000 salamanders were collected from the wild for scientific or educational purposes. The majority (738 salamanders) were collected between 1960 and 1979 (Painter 1999, p. 1). Since 1999, very few salamanders have been collected, and all were collected under a valid permit issued by either NMDGF or USFS. This species is difficult to maintain in captivity, and we know of no salamanders in the pet trade or in captivity for educational or scientific purposes.

In 1967, salamanders were only known from seven localities (Reagan 1967, p. 13). Only one of these localities (the "Type Locality") was considered to have an abundant salamander population (Reagan 1967, p. 8). The species was originally described using specimens collected from this type locality within Unit 4 (Stebbins and Reimer 1950, pp. 73-80). Reagan (1967, p. 11) collected 165 salamanders from this locality between 1965 and 1967, whereas Williams collected an additional 67 of 659 salamanders found at this locality in 1970 (1972, p. 11). Although surveys have been conducted at this locality since the 1990s, no salamanders have been found, suggesting that salamanders in the area have likely been extirpated from overcollection. We are not aware of any other localities where the species has been extirpated from overcollection. Nevertheless, it is apparent that repeated collections of individuals can lead to extirpation. Still, we believe this is no longer a threat because collections are stringently regulated through permits issues by NMDGF and the USFS (see Factor D below). Additionally, due to these measures, we do not believe that collection will be a threat in the future.

Survey techniques can alter salamander habitat by disturbing and drying the areas underneath the objects that provide cover, and destroying decaying logs by searching inside them. Surveyors are now trained to replace cover objects as they were found and to

leave part of every log intact; however, impacts still occur. When surveys are dispersed and there are multiple intervening years, impacts are likely lessened; however, when a location is repeatedly surveyed, habitat quality is diminished. We are aware of only a few locations that have received impacts from repeated surveys (e.g., Activity Plots).

We do not have any recent evidence of risks to the salamander from overutilization for commercial, recreational, scientific, or educational purposes, and we have no reason to believe this factor will become a threat to the species in the future. Therefore, based on a review of the available information, we find that overutilization for commercial, recreational, scientific, or educational purposes is not a threat to the salamander now or in the foreseeable future.

Factor C. Disease or Predation

The petition did not present any information indicating that disease or predation threatens the salamander. Additionally, we have no information in our files that indicates that disease or predation are a threat to the salamander currently or likely to become a threat in the future.

The amphibian pathogenic fungus *Batrachochytrium dendrobatidis* (*Bd*) was found in a wild-caught salamander in 2003 (Cummer *et al.* 2005, p. 248). *Batrachochytrium dendrobatidis* causes the disease chytridiomycosis, whereby the *Bd* fungus attacks keratin in amphibians. In adult amphibians, keratin primarily occurs in the skin. The symptoms of chytridiomycosis can include sloughing of skin, lethargy, morbidity, and death. Chytridiomycosis has been linked with worldwide amphibian declines, die-offs, and extinctions, possibly in association with climate change (Pounds *et al.* 2006, p. 161). In New Mexico, *Bd* has caused significant population declines and local extirpations in the federally threatened Chiricahua leopard frog (*Lithobates [Rana] chiricahuensis*) (USFWS 2007, p. 14). It is also implicated in the decline of other leopard frogs and the disappearance of the boreal toad (*Bufo boreas*) from the State (NMDGF 2006, p. 13). Prior to the detection of *Bd* in the salamander, *Bd* was considered an aquatic pathogen (Longcore *et al.* 1999, p. 221; Cummer *et al.* 2005, p. 248). The salamander does not have an aquatic life stage and is strictly terrestrial; thus the mode of transmission of *Bd* remains unknown. It is possible that the fungus was transported by other amphibian species that utilize the same terrestrial habitat. Both the tiger salamander and the boreal chorus frog (*Pseudacris maculata*) are amphibians that have aquatic life stages and share terrestrial habitat with the salamander. In California, *Bd* has been present in wild populations of another strictly terrestrial salamander since 1973, without apparent population declines (Weinstein 2009, p. 653).

Cummer (2006, p. 2) reported that noninvasive skin swabs on 66 Jemez Mountains salamanders, 14 boreal chorus frogs, and 24 tiger salamanders from the Jemez Mountains were all negative for *Bd*. The observation of *Bd* in the salamander indicates that the species may be susceptible. However, virulence relative to the salamander remains unknown. Although *Bd* can be highly infectious and lethal, we have no information to suggest that the disease threatens the salamander currently or in the future. We intend to monitor the prevalence of *Bd* in the salamander using noninvasive skin swabs. Therefore, we do not find that disease or predations is currently a threat to the salamander, nor do we find it likely they will be so in the future.

Factor D. Inadequacy of Existing Regulatory Mechanisms

One of the primary threats to the salamander is the loss, degradation, and fragmentation of habitat. As described below, existing regulatory mechanisms are not sufficient to protect the salamander or its habitat. New Mexico State law provides limited protection to the salamander. The salamander was reclassified by the State of New Mexico from threatened to endangered in 2005 (NMDGF 2005, p. 2). This designation provides protection under the New Mexico Wildlife Conservation Act of 1974 (i.e., State Endangered Species Act) (19 NMAC 33.6.8), but only prohibits direct take of species, except under issuance of a scientific collecting permit. The New Mexico Wildlife Conservation Act defines "take" or "taking" as harass, hunt, capture, or kill any wildlife or attempt to do so (17 NMAC 17.2.38). In other words, New Mexico State status as an endangered species only conveys protection from collection or intentional harm to the animals themselves. New Mexico State statutes do not address habitat protection, indirect effects, or other threats to these species. There is no formal consultation process to address the habitat requirements of the species or how a proposed action may affect the needs of the species. Because most of the threats to the species are from effects to habitat, protecting individuals will not ensure their long-term conservation and survival.

The New Mexico State statutes require the NMDGF to develop a recovery plan that will restore and maintain habitat for the species. Although the species does not have a finalized recovery plan, NMDGF has the authority to consider and recommend actions to mitigate potential adverse effects to the salamander during its review of development proposals. There is no requirement to follow the recommendations as seen during the construction and realignment of Highway 126, when NMDGF made recommendations, but none of the measures recommended were incorporated into the project design to limit impacts to the salamander or its habitat (New Mexico Game Commission 2006, pp. 12–13) (see *Factor A. Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range* section, above).

The NMEST Cooperative Management Plan and Conservation Agreement were completed in 2000 (see *Previous Federal Actions* section above). The goal of these non-regulatory documents was to "...provide guidance for the conservation and management of sufficient habitat to maintain viable populations of the species" (NMEST 2000, p. i.). However, they have been ineffective in preventing the ongoing loss of salamander habitat, and they are not expected to prevent further declines of the species. As discussed elsewhere, the intent of the agreement was to protect the salamander and its habitat on lands administered by the USFS; however, there have been projects that have negatively affected the species (e.g., State Highway 126 project) (WildEarth Guardians 2008, pp. 28–54). The Cooperative Management Plan and Conservation Agreement have been unable to prevent ongoing loss of habitat, and they are not expected to prevent further declines of the species. They do not provide adequate protection for the salamander or its habitat.

Under the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 *et seq.*) and the National Forest Management Act of 1976 (16 U.S.C. 1600 *et seq.*), the USFS is directed to prepare programmatic-level management plans to guide long-term resource management decisions. Under this direction, the salamander has been on the Regional Forester's Sensitive Species List since 1990 (USFS 1990). The Regional Forester's Sensitive Species List policy is applied to projects implemented under the 1982 National Forest Management Act Planning Rule (49 FR 43026, September 30, 1982). All

existing Plans continue to operate under the 1982 Planning Rule and all of its associated implementing regulations and policies.

The intent of the Regional Forester's sensitive species designation is to provide a proactive approach to conserving species, to prevent a trend toward listing under the Act, and to ensure the continued existence of viable, well-distributed populations. The USFS policy (FSM 2670.3) states that Biological Evaluations must be completed for sensitive species and signed by a journey-level biologist or botanist. The Santa Fe National Forest will continue developing biological evaluation reports and conducting analyses under the National Environmental Policy Act (42 U.S.C. 4321 *et seq.*) for each project that will affect the salamander or its habitat. The Santa Fe National Forest is also preparing the Southwest Jemez Mountains Landscape Assessment that, if funded, may reduce the threat of severe wildland fire in Units 1 and 4 of the salamander's range over the next 10 years (USFS 2009c, p. 2). At this time, funding of this project is not certain, nor is it likely to address short-term risk of severe wildland fire. While the Regional Forester's sensitive species designation provides for consideration of the salamander during planning of activities, it does not preclude activities that may harm salamanders or their habitats on the Santa Fe National Forest.

Finally, populations of salamanders have been observed on Tribal lands, Los Alamos National Laboratory lands, the VCNP, and private lands. Los Alamos National Laboratory has committed to, whenever possible, retaining trees in order to maintain greater than 80 percent canopy cover, and avoiding activities that either compact soils or dry habitat (Los Alamos National Laboratory 2010, p. 7).

In summary, the salamander currently does not receive adequate regulatory protection through the USFS sensitive species designation, State regulations, or the guidelines provided in the Cooperative Management Plan and Conservation Agreement. Outside of the limited protection from collection and intentional harm through the New Mexico Wildlife Conservation Act, there are no State or Federal regulations providing specific protections for the salamander or its habitat on these areas.

The existing regulatory mechanisms are inadequate to ensure the species' long-term conservation and survival because they do not specifically prevent threats to its habitat. We believe this lack of effective regulatory protection will affect the overall ability of the species to persist into the future. In light of this information, we conclude that the existing regulatory mechanisms have been ineffective and inadequate at preventing actions that threaten the salamander and its habitat, and this is expected to continue into the foreseeable future.

Factor E. Other Natural or Manmade Factors Affecting the Species' Continued Existence

Under Factor E, we considered whether the Jemez Mountains salamander is threatened by chemical use and climate conditions.

Chemical Use

There is a potential for the salamander to be impacted by chemical use. Chemicals are used to suppress wildfire and for noxious weed control. Because the salamander has permeable skin, and breathes and carries out physiological functions with its skin, it may be susceptible if it comes in contact with fire retardants or herbicides. Many of these chemicals have not been assessed for effects to amphibians, and none have been assessed for effects to terrestrial amphibians. Therefore, we do not have enough information to determine whether chemical use threatens the salamander.

Prior to 2006 (71 FR 42797; July 28, 2006), fire retardant used by the USFS contained sodium ferrocyanide, which is highly toxic to fish and amphibians (Pilliod *et al.* 2003, p. 175). Fire retardant was used in salamander habitat for the Cerro Grande Fire (Unit 3), but we do not know the quantity or location of this effort (USFS 2001, p. 1). While sodium ferrocyanide is no longer used by USFS to suppress wildfire, similar retardants and foams may still contain ingredients that are toxic to the salamander. Beginning in 2010, the USFS will begin phasing out the use of ammonium sulfate because of its toxicity to fish and replacing it with ammonium phosphate (USFS 2009e, p. 1), which still may have adverse effects to the salamander. One of the ingredients of ammonium phosphate (a type of salt) appeared to have the greatest likelihood of adverse effects to terrestrial species assessed (birds and mammals) through ingestion (USFS/LABAT Environmental 2007, pp. 24-27), and in amphibians, salts can disrupt osmoregulation (regulation of proper water balance and osmotic or fluid pressure within tissues and cells). Currently, we do not have enough information to determine whether the chemicals within fire retardants or foams threaten the salamander. However, we will continue to evaluate whether these chemicals may be a threat to this species.

The USFS is in the process of completing an Environmental Impact Statement regarding the use of herbicides to manage noxious or invasive plants (Orr 2010, p. 2). Chemicals that could be used include 2,4,D; Clopyralid; Chorsulfuron; Dicamba; Glyphosate; Hexazinone; Imazapic; Imazapyr; Metasulfuron Methyl; Sulfometuron Methyl; Picloram; and Triclopyr (Orr 2010, p. 2). We reviewed the ecological risk assessments for these chemicals at *http://www.fs.fed.us/foresthealth/pesticide/risk.shtml*, but found few studies and data relative to amphibians. We found a single study for Sulfometuron Methyl conducted on the African clawed frog (*Xenopus laevis*) (an aquatic frog not native to the United States). This study resulted in alterations in limb and organ development and metamorphosis (Klotzbach and Durkin 2004, pp. 4-6, 4-7). The use of chemicals listed above by hand-held spot treatments or road-side spraying (Orr 2010, p. 2) in occupied salamander habitat could result in impacts to the salamander. Because of the lack of toxicological studies of these chemicals, we do not know if there is a threat to the salamander. However, we will continue to evaluate whether these chemicals are a threat to the salamander.

Climate Conditions

Climate conditions have contributed to the status of the salamander now and will continue to in the foreseeable future. Habitat drying affects salamander physiology, behavior, and persistence; will affect the occurrence of natural events such as fire, drought, and forest die-off; and will increase the risk of disease and infection. Trends in climate change and drought conditions have contributed to temperature increases in the Jemez Mountains, with a corresponding decrease in precipitation. Because the salamander is terrestrial, constrained in range, and isolated to the higher elevations of the Jemez Mountains, continued temperature increases and precipitation decreases could threaten the viability of the species over its entire range.

Climate simulations of Palmer Drought Severity Index (PSDI) (a calculation of the cumulative effects of precipitation and temperature on surface moisture balance) for the Southwest for the periods of 2006–2030 and 2035–2060 show an increase in drought severity with surface warming. Additionally, drought still increases during wetter simulations because of the effect of heat-related moisture loss

(Hoerling and Eicheid 2007, p. 19). Annual mean precipitation is likely to decrease in the Southwest as well as the length of snow season and snow depth (International Panel on Climate Change (IPCC) 2007b, p. 887). Most models project a widespread decrease in snow depth in the Rocky Mountains and earlier snowmelt (IPCC 2007b, p. 891). Exactly how climate change will affect precipitation is less certain, because precipitation predictions are based on continental-scale general circulation models that do not yet account for land use and land cover change effects on climate or regional phenomena. Consistent with recent observations in climate changes, the outlook presented for the Southwest and New Mexico predict warmer, drier, drought-like conditions (Seager *et al.* 2007, p. 1181; Hoerling and Eischeid 2007, p. 19).

McKenzie *et al.* (2004, p. 893) suggest, based on models, that the length of the fire season will likely increase further and that fires in the western United States will be more frequent and more severe. In particular, they found that fire in New Mexico appears to be acutely sensitive to summer climate and temperature changes and may respond dramatically to climate warming.

Plethodontid salamanders have a low metabolic rate and relatively large energy stores (in tails) that provide the potential to survive long periods between unpredictable bouts of feeding (Feder 1983, p. 291). Despite these specializations, terrestrial salamanders must have sufficient opportunities to forage and build energy reserves for use during periods of inactivity. As salamander habitat warms and dries, the quality and quantity of habitat decreases along with the amount of time that salamanders could be surface active. Wiltenmuth (1997, pp. ii-122) concluded that the Jemez Mountains salamanders likely persist by utilizing moist microhabitats and they may be near their physiological limits relative to water balance and moist skin. During field evaluations, the species appeared to be in a dehydrated state. If the species has difficulty maintaining adequate skin moisture (e.g., see Wiltenmuth 1997, pp. ii-122), it will likely spend less time being active. As a result, energy storage, reproduction, and long-term persistence would be reduced.

Wiltenmuth (1997, p. 77) reported rates of dehydration and rehydration were greatest for the Jemez Mountains salamander compared to the other salamanders, and suggested greater skin permeability. While the adaptation to relatively quickly rehydrate and dehydrate may allow the salamander to more quickly rehydrate when moisture becomes available, it may also make it more susceptible and less resistant to longer dry times because it also quickly dehydrates. Dehydration affects the salamander by increasing heart rate, oxygen consumption, and metabolic rate (Whitford 1968, p. 249), thus increasing energy demand, limiting movements (Wiltenmuth 1997, p. 77), increasing concentration and storage of waste products (Duellman and Trueb 1986, p. 207), decreasing burst locomotion (stride length, stride frequency, and speed) (Wiltenmuth 1997, p.45), and sometimes causing death. Moisture-stressed salamanders prioritize hydration over all else, thereby reducing salamander survival and persistence. Additional impacts from dehydration could include increased predation because burst locomotion is impaired (which reduces ability to escape) and increased susceptibility to pathogens resulting from depressed immunity from physiological stress of dehydration. Any of these factors, alone or in combination, could lead either to the reduction or extirpation of salamander localities, especially in combination with the threats of habitat-altering activities, as discussed under Factor A. The IPCC (2007, pp. 12, 13) predicts that changes in the global climate system during the 21st century will very likely be larger than those observed during the 20th century. For the next 2 decades, a warming of about 0.2 °C (0.4 °F) per decade is projected (IPCC 2007, p. 12). The Nature Conservancy of New Mexico analyzed recent changes in New Mexico's climate. Parts I and II of a three-part series have been completed. In Part I, the time period 1961–1990 was used as the reference condition for analysis of recent departures (1991–2005; 2000–2005). This time period is consistent with the baseline used by National Oceanic and Atmospheric Administration and the IPCC for presenting 20th-century climate anomalies and generating future projections (Enquist and Gori 2008, p. 9). In Part II, trends in climate water deficit (an indicator of biological moisture stress, or drying), snowpack, and timing of peak stream flows were assessed for the period of 1970–2006 (Enquist *et al.* 2008, p. iv). The Nature Conservancy of New Mexico concludes the following regarding climate conditions in New Mexico and the Jemez Mountains:

(1) Over 95 percent of New Mexico has experienced mean temperature increases; warming has been greatest in the Jemez Mountains (Enquist and Gori 2008, p. 16);

(2) 93 percent of New Mexico's watersheds have experienced increasing annual trends in moisture stress during 1970–2006, that is, they have become relatively drier (Enquist *et al.* 2008, p. iv);

(3) Snowpack has declined in 98 percent of sites analyzed in New Mexico; the Jemez Mountains has experienced significant declines in snowpack (Enquist *et al.* 2008, p. iv);

(4) Between 1980–2006, the timing of peak run-off from snowmelt occurred 2 days earlier than in the 1951–1980 period (Enquist *et al.* 2008, pp. 9, 25);

(5) The Jemez Mountains have experienced warmer and drier conditions during the 1991–2005 time period (Enquist and Gori 2008, pp. 16, 17, 23); and

(6) The Jemez Mountains ranked highest of 248 sites analyzed in New Mexico in climate exposure—a measure of mean temperature and mean precipitation departures (Enquist and Gori 2008, pp. 10, 22, 51-58).

Although the extent of warming likely to occur is not known with certainty at this time, the IPCC (2007a, p. 5) has concluded that the summer season will experience the greatest increase in warming in the Southwest (IPCC 2007b, p. 887). Temperature has strong effects on amphibian immune systems and may be an important factor influencing susceptibility of amphibians to pathogens (e.g., see Raffel *et al.* 2006, p. 819); thus increases in temperature in the Jemez Mountains have the potential to increase the salamander's susceptibility to disease and pathogens. As noted, we have no information that indicates disease threatens the salamander currently or in the future, but we intend to evaluate this further.

Climate Conditions Summary

In summary, we find that current and future effects from warmer climate conditions in the Jemez Mountains could reduce the amount of suitable salamander habitat, reduce the time period when the species can be surface active, and increase the moisture demands and subsequent physiological stress on salamanders. Warming and drying trends in the Jemez Mountains currently threaten the species, and these threats are projected to continue into the foreseeable future.

Finding

As required by the Act, we conducted a review of the status of the species and considered the five factors in assessing whether the salamander is endangered or threatened throughout all or a significant portion of its range. We examined the best scientific and commercial information available regarding the past, present, and future

threats faced by the salamander. We reviewed the petition, information available in our files, and other available published and unpublished information, and we consulted with salamander experts and other Federal, State, and tribal agencies.

On the basis of the best scientific and commercial information available, we find that the petitioned action to list the Jemez Mountains is warranted, due to a combination of risk of historical and current fire management practices, severe wildland fire, forest composition and structure conversions, post-fire rehabilitation treatments, forest management (including silvicultural practices), private residential development, roads, trails, habitat fragmentation, and recreation. The salamander may also be threatened by disease and chemical use. Some of these threats may be exacerbated by the current and projected effects of climate change, and we have determined that the current and projected effects from climate change directly threaten the salamander. The loss of one of the largest known populations, the documented modification of the habitat from fire exclusion, and severe wildland fire places this species at great risk. Cumulative threats to the salamander are not being adequately addressed through existing regulatory mechanisms. Because of the limited distribution of this endemic species and its lack of mobility, threats are likely to render the species at risk of extinction in the foreseeable future. We will make a determination on the status of the species as endangered or threatened when we prepare a proposed listing determination. However, as explained in more detail below, an immediate proposal of a regulation implementing this action is precluded by higher priority listing actions, and progress is being made to add or remove qualified species to or from the Lists of Endangered and Threatened Wildlife and Plants.

We reviewed the available information to determine if the existing and foreseeable threats render the species at risk of extinction now such that issuing an emergency regulation temporarily listing the species under section 4(b)(7) of the Act is warranted. We determined that issuing an emergency regulation temporarily listing the species is not warranted for this species at this time because, within the current distribution of the species throughout its range, there are at least some populations of the salamander that exist in relatively natural conditions that are unlikely to change in the short term. However, if at any time we determine that emergency listing of the salamander is warranted, we will initiate an emergency listing.

The Service adopted guidelines on September 21, 1983 (48 FR 43098), to establish a rational system for allocating available appropriations to the highest priority species when adding species to the Lists of Endangered or Threatened Wildlife and Plants or reclassifying threatened species to endangered status. The system places greatest importance on the immediacy and magnitude of threats, but also factors in the level of taxonomic distinctiveness by assigning priority in descending order to monotypic genera, full species, and subspecies (or equivalently, distinct population segments of vertebrates). As a result of our analysis of the best available scientific and commercial information, we assigned the Jemez Mountains salamander a listing priority number (LPN) of 2, based on our finding that the species faces imminent and high-magnitude threats from the present or threatened destruction, modification, or curtailment of its habitat and the inadequacy of existing regulatory mechanisms. The salamander and its habitat are threatened by historical and current fire management practices; severe wildland fire; forest composition and structure conversions; post-fire rehabilitation; forest management (including silvicultural practices); private (residential) development; roads, trails, and habitat fragmentation; and recreation. Due to the limited extent of habitat occupied by the salamander, the severity and magnitude of the threat of severe wildland fire, and ongoing impacts from the existing extensive road network and previous logging practices, we have determined that the present or threatened destruction, modification, or curtailment of habitat and range represents a current significant threat to the salamander. Existing regulatory mechanisms are inadequate to ensure the species' long-term conservation and survival because they do not specifically prevent threats to its habitat. One or more of the threats discussed above is occurring or is expected to occur throughout the entire range of this species. These threats are ongoing and, in some cases (e.g., loss of habitat through forest management), considered irreversible. While we conclude that listing the Jemez Mountains salamander is warranted, an immediate proposal to list this species is precluded by other higher priority listings, which we address below.

Significant Portion of the Range

The Act defines an endangered species as one "in danger of extinction throughout all or a significant portion of its range," and a threatened species as one "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The term "significant portion of its range" is not defined by the statute. For the purposes of this finding, a significant portion of a species' range is an area that is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a decrease in the ability to conserve the species.

If an analysis of whether a species is endangered or threatened in a significant portion of its range is appropriate, we engage in a systematic process that begins with identifying any portions of the range of the species that warrant further consideration. The range of a species can theoretically be divided into portions in an infinite number of ways. However, there is no purpose in analyzing portions of the range that are not reasonably likely to be significant and endangered or threatened. To identify only those portions that warrant further consideration, we determine whether there is substantial information indicating that (i) the portions may be significant and (ii) the species may be in danger of extinction there or likely to become so within the foreseeable future. In practice, a key part of this analysis is whether the threats are geographically concentrated in some way. If the threats to the species are essentially uniform throughout its range, no portion is likely to warrant further consideration. Moreover, if any concentration of threats applies only to portions of the range that are unimportant to the conservation of the species, such portions will not warrant further consideration.

On the basis of an analysis of factors that may threaten the Jemez Mountains salamander, we have determined that listing is warranted throughout its range. Therefore, it is not necessary to conduct further analysis with respect to the significance of any portion of its range at this time. We will further analyze whether threats may be disproportionate and warrant further consideration as a significant portion of the species' range when we develop a proposed listing determination.

Preclusion and Expeditious Progress

Preclusion is a function of the listing priority of a species in relation to the resources that are available and competing demands for those resources. Thus, in any given fiscal year (FY),

multiple factors dictate whether it will be possible to undertake work on a proposed listing regulation or whether promulgation of such a proposal is warranted but precluded by higher priority listing actions.

The resources available for listing actions are determined through the annual Congressional appropriations process. The appropriation for the Listing Program is available to support work involving the following listing actions: Proposed and final listing rules; 90–day and 12–month findings on petitions to add species to the Lists of Endangered and Threatened Wildlife and Plants (Lists) or to change the status of a species from threatened to endangered; annual determinations on prior "warranted but precluded" petition findings as required under section 4(b)(3)(C)(i) of the Act; critical habitat petition findings; proposed and final rules designating critical habitat; and litigation-related, administrative, and program-management functions (including preparing and allocating budgets, responding to Congressional and public inquiries, and conducting public outreach regarding listing and critical habitat). The work involved in preparing various listing documents can be extensive and may include, but is not limited to: Gathering and assessing the best scientific and commercial data available and conducting analyses used as the basis for our decisions; writing and publishing documents; and obtaining, reviewing, and evaluating public comments and peer review comments on proposed rules and incorporating relevant information into final rules. The number of listing actions that we can undertake in a given year also is influenced by the complexity of those listing actions; that is, more complex actions generally are more costly. For example, during the past several years, the cost (excluding publication costs) for preparing a 12–month finding, without a proposed rule, has ranged from approximately $11,000 for one species with a restricted range and involving a relatively uncomplicated analysis to $305,000 for another species that is wide-ranging and involving a complex analysis.

We cannot spend more than is appropriated for the Listing Program without violating the Anti-Deficiency Act (see 31 U.S.C. 1341(a)(1)(A)). In addition, in FY 1998 and for each fiscal year since then, Congress has placed a statutory cap on funds which may be expended for the Listing Program, equal to the amount expressly appropriated for that purpose in that fiscal year. This cap was designed to prevent funds appropriated for other functions under the Act (for example, recovery funds for removing species from the Lists), or for other Service programs, from being used for Listing Program actions (see House Report 105-163, 105th Congress, 1st Session, July 1, 1997).

Recognizing that designation of critical habitat for species already listed would consume most of the overall Listing Program appropriation, Congress also put a critical habitat subcap in place in FY 2002 and has retained it each subsequent year to ensure that some funds are available for other work in the Listing Program: "The critical habitat designation subcap will ensure that some funding is available to address other listing activities" (House Report No. 107 - 103, 107th Congress, 1st Session, June 19, 2001). In FY 2002 and each year until FY 2006, the Service has had to use virtually the entire critical habitat subcap to address court-mandated designations of critical habitat, and consequently none of the critical habitat subcap funds have been available for other listing activities. In FY 2007, we were able to use some of the critical habitat subcap funds to fund proposed listing determinations for high-priority candidate species. In FY 2009, while we were unable to use any of the critical habitat subcap funds to fund proposed listing determinations, we did use some of this money to fund the critical habitat portion of some proposed listing determinations so that the proposed listing determination and proposed critical habitat designation could be combined into one rule, thereby being more efficient in our work. In FY 2010, we are using some of the critical habitat subcap funds to fund actions with statutory deadlines.

Thus, through the listing cap, the critical habitat subcap, and the amount of funds needed to address court-mandated critical habitat designations, Congress and the courts have in effect determined the amount of money available for other listing activities. Therefore, the funds in the listing cap, other than those needed to address court-mandated critical habitat for already listed species, set the limits on our determinations of preclusion and expeditious progress.

Congress also recognized that the availability of resources was the key element in deciding, when making a 12–month petition finding, whether we would prepare and issue a listing proposal or instead make a "warranted but precluded" finding for a given species. The Conference Report accompanying Public Law 97-304, which established the current statutory deadlines and the warranted-but-precluded finding, states (in a discussion on 90–day petition findings that by its own terms also covers 12–month findings) that the deadlines were "not intended to allow the Secretary to delay commencing the rulemaking process for any reason other than that the existence of pending or imminent proposals to list species subject to a greater degree of threat would make allocation of resources to such a petition [that is, for a lower-ranking species] unwise."

In FY 2010, expeditious progress is that amount of work that can be achieved with $10,471,000, which is the amount of money that Congress appropriated for the Listing Program (that is, the portion of the Listing Program funding not related to critical habitat designations for species that are already listed). However these funds are not enough to fully fund all our court-ordered and statutory listing actions in FY 2010, so we are using $1,114,417 of our critical habitat subcap funds in order to work on all of our required petition findings and listing determinations. This brings the total amount of funds we have for listing actions in FY 2010 to $11,585,417. Our process is to make our determinations of preclusion on a nationwide basis to ensure that the species most in need of listing will be addressed first and also because we allocate our listing budget on a nationwide basis. The $11,585,417 is being used to fund work in the following categories: compliance with court orders and court-approved settlement agreements requiring that petition findings or listing determinations be completed by a specific date; section 4 (of the Act) listing actions with absolute statutory deadlines; essential litigation-related, administrative, and listing program-management functions; and high-priority listing actions for some of our candidate species. In 2009, the responsibility for listing foreign species under the Act was transferred from the Division of Scientific Authority, International Affairs Program, to the Endangered Species Program. Starting in FY 2010, a portion of our funding is being used to work on the actions described above as they apply to listing actions for foreign species. This has the potential to further reduce funding available for domestic listing actions, although there are currently no foreign species issues included in our high-priority listing actions at this time. The allocations for each specific listing action are identified in the Service's FY 2010 Allocation Table (part of our administrative record).

In FY 2007, we had more than 120 species with an LPN of 2, based on our

September 21, 1983, guidance for assigning an LPN for each candidate species (48 FR 43098). Using this guidance, we assign each candidate an LPN of 1 to 12, depending on the magnitude of threats (high vs. moderate to low), immediacy of threats (imminent or nonimminent), and taxonomic status of the species (in order of priority: monotypic genus (a species that is the sole member of a genus); species; or part of a species (subspecies, distinct population segment, or significant portion of the range)). The lower the listing priority number, the higher the listing priority (that is, a species with an LPN of 1 would have the highest listing priority). Because of the large number of high-priority species, we further ranked the candidate species with an LPN of 2 by using the following extinction-risk type criteria: International Union for the Conservation of Nature and Natural Resources (IUCN) Red list status/rank, Heritage rank (provided by NatureServe), Heritage threat rank (provided by NatureServe), and species currently with fewer than 50 individuals, or 4 or fewer populations. Those species with the highest IUCN rank (critically endangered), the highest Heritage rank (G1), the highest Heritage threat rank (substantial, imminent threats), and currently with fewer than 50 individuals, or fewer than 4 populations, comprised a group of approximately 40 candidate species (''Top 40''). These 40 candidate species have had the highest priority to receive funding to work on a proposed listing determination. As we work on proposed and final listing rules for these 40 candidates, we are applying the ranking criteria to the next group of candidates with an LPN of 2 and 3 to determine the next set of highest priority candidate species.

To be more efficient in our listing process, as we work on proposed rules for these species in the next several years, we are preparing multi-species proposals when appropriate, and these may include species with lower priority if they overlap geographically or have the same threats as a species with an LPN of 2. In addition, available staff resources are also a factor in determining high-priority species provided with funding. Finally, proposed rules for reclassification of threatened species to endangered are lower priority, since as listed species, they are already afforded the protection of the Act and implementing regulations.

We assigned the Jemez Mountains salamander an LPN of 2, based on our finding that the species faces immediate and high magnitude threats from the present or threatened destruction, modification, or curtailment of its habitat; predation; and the inadequacy of existing regulatory mechanisms. One or more of the threats discussed above are occurring in each known population in the United States. These threats are ongoing and, in some cases (e.g., nonnative species), considered irreversible. Under our 1983 Guidelines, a ''species'' facing imminent high-magnitude threats is assigned an LPN of 1, 2, or 3 depending on its taxonomic status. Because the Jemez Mountains salamander is a species, we assigned it an LPN of 2 (the highest category available for a species). Therefore, work on a proposed listing determination for the Jemez Mountains salamander is precluded by work on higher priority candidate species; listing actions with absolute statutory, court ordered, or court-approved deadlines; and final listing determinations for those species that were proposed for listing with funds from previous fiscal years. This work includes all the actions listed in the tables below under expeditious progress.

As explained above, a determination that listing is warranted but precluded must also demonstrate that expeditious progress is being made to add or remove qualified species to and from the Lists of Endangered and Threatened Wildlife and Plants. (Although we do not discuss it in detail here, we are also making expeditious progress in removing species from the Lists under the Recovery program, which is funded by a separate line item in the budget of the Endangered Species Program. As explained above in our description of the statutory cap on Listing Program funds, the Recovery Program funds and actions supported by them cannot be considered in determining expeditious progress made in the Listing Program.) As with our ''precluded'' finding, expeditious progress in adding qualified species to the Lists is a function of the resources available and the competing demands for those funds. Given that limitation, we find that we are making progress in FY 2010 in the Listing Program. This progress included preparing and publishing the following determinations:

TABLE 1: FY 2010 COMPLETED LISTING ACTIONS

Publication Date	Title	Actions	FR Pages
10/08/2009	Listing *Lepidium papilliferum* (Slickspot Peppergrass) as a Threatened Species Throughout Its Range	Final Listing Threatened	74 FR 52013-52064
10/27/2009	90-day Finding on a Petition To List the American Dipper in the Black Hills of South Dakota as Threatened or Endangered	Notice of 90–day Petition Finding, Not substantial	74 FR 55177-55180
10/28/2009	Status Review of Arctic Grayling *(Thymallus arcticus*) in the Upper Missouri River System	Notice of Intent to Conduct Status Review	74 FR 55524-55525
11/03/2009	Listing the British Columbia Distinct Population Segment of the Queen Charlotte Goshawk Under the Endangered Species Act: Proposed rule.	Proposed Listing Threatened	74 FR 56757-56770
11/03/2009	Listing the Salmon-Crested Cockatoo as Threatened Throughout Its Range with Special Rule	Proposed Listing Threatened	74 FR 56770-56791
11/23/2009	Status Review of Gunnison sage-grouse *(Centrocercus minimus*)	Notice of Intent to Conduct Status Review	74 FR 61100-61102

TABLE 1: FY 2010 COMPLETED LISTING ACTIONS—Continued

Publication Date	Title	Actions	FR Pages
12/03/2009	12-Month Finding on a Petition to List the Black-tailed Prairie Dog as Threatened or Endangered	Notice of 12–month petition finding, Not warranted	74 FR 63343-63366
12/03/2009	90-Day Finding on a Petition to List Sprague's Pipit as Threatened or Endangered	Notice of 90–day Petition Finding, Substantial	74 FR 63337-63343
12/15/2009	90-Day Finding on Petitions To List Nine Species of Mussels From Texas as Threatened or Endangered With Critical Habitat	Notice of 90–day Petition Finding, Substantial	74 FR 66260-66271
12/16/2009	Partial 90-Day Finding on a Petition to List 475 Species in the Southwestern United States as Threatened or Endangered With Critical Habitat	Notice of 90–day Petition Finding, Not substantial and Subtantial	74 FR 66865-66905
12/17/2009	12–month Finding on a Petition To Change the Final Listing of the Distinct Population Segment of the Canada Lynx To Include New Mexico	Notice of 12–month petition finding, Warranted but precluded	74 FR 66937-66950
1/05/2010	Listing Foreign Bird Species in Peru and Bolivia as Endangered Throughout Their Range	Proposed ListingEndangered	75 FR 605-649
1/05/2010	Listing Six Foreign Birds as Endangered Throughout Their Range	Proposed ListingEndangered	75 FR 286-310
1/05/2010	Withdrawal of Proposed Rule to List Cook's Petrel	Proposed rule, withdrawal	75 FR 310-316
1/05/2010	Final Rule to List the Galapagos Petrel and Heinroth's Shearwater as Threatened Throughout Their Ranges	Final Listing Threatened	75 FR 235-250
1/20/2010	Initiation of Status Review for *Agave eggersiana* and *Solanum conocarpum*	Notice of Intent to Conduct Status Review	75 FR 3190-3191
2/09/2010	12–month Finding on a Petition to List the American Pika as Threatened or Endangered	Notice of 12–month petition finding, Not warranted	75 FR 6437-6471
2/25/2010	12-Month Finding on a Petition To List the Sonoran Desert Population of the Bald Eagle as a Threatened or Endangered Distinct Population Segment	Notice of 12–month petition finding, Not warranted	75 FR 8601-8621
2/25/2010	Withdrawal of Proposed Rule To List the Southwestern Washington/Columbia River Distinct Population Segment of Coastal Cutthroat Trout *(Oncorhynchus clarki clarki*) as Threatened	Withdrawal of Proposed Rule to List	75 FR 8621-8644
3/18/2010	90-Day Finding on a Petition to List the Berry Cave salamander as Endangered	Notice of 90–day Petition Finding, Substantial	75 FR 13068-13071
3/23/2010	90-Day Finding on a Petition to List the Southern Hickorynut Mussel *(Obovaria jacksoniana*) as Endangered or Threatened	Notice of 90–day Petition Finding, Not substantial	75 FR 13717-13720
3/23/2010	90-Day Finding on a Petition to List the Striped Newt as Threatened	Notice of 90–day Petition Finding, Substantial	75 FR 13720-13726
3/23/2010	12-Month Findings for Petitions to List the Greater Sage-Grouse *(Centrocercus urophasianus*)as Threatened or Endangered	Notice of 12–month petition finding,Warranted but precluded	75 FR 13910-14014
3/31/2010	12-Month Finding on a Petition to List the Tucson Shovel-Nosed Snake *(Chionactis occipitalis klauberi*) as Threatened or Endangered with Critical Habitat	Notice of 12–month petition finding,Warranted but precluded	75 FR 16050-16065

TABLE 1: FY 2010 COMPLETED LISTING ACTIONS—Continued

Publication Date	Title	Actions	FR Pages
4/5/2010	90-Day Finding on a Petition To List Thorne's Hairstreak Butterfly as or Endangered	Notice of 90–day Petition Finding, Substantial	75 FR 17062-17070
4/6/2010	12–month Finding on a Petition To List the Mountain Whitefish in the Big Lost River, Idaho, as Endangered or Threatened	Notice of 12–month petition finding, Not warranted	75 FR 17352-17363
4/6/2010	90-Day Finding on a Petition to List a Stonefly *(Isoperla jewetti*) and a Mayfly *(Fallceon eatoni*) as Threatened or Endangered with Critical Habitat	Notice of 90–day Petition Finding, Not substantial	75 FR 17363-17367
4/7/2010	12-Month Finding on a Petition to Reclassify the Delta Smelt From Threatened to Endangered Throughout Its Range	Notice of 12–month petition finding,Warranted but precluded	75 FR 17667-17680
4/13/2010	Determination of Endangered Status for 48 Species on Kauai and Designation of Critical Habitat	Final ListingEndangered	75 FR 18959-19165
4/15/2010	Initiation of Status Review of the North American Wolverine in the Contiguous United States	Notice of Initiation of Status Review	75 FR 19591-19592
4/15/2010	12-Month Finding on a Petition to List the Wyoming Pocket Gopher as Endangered or Threatened with Critical Habitat	Notice of 12–month petition finding, Not warranted	75 FR 19592-19607
4/16/2010	90-Day Finding on a Petition to List a Distinct Population Segment of the Fisher in Its United States Northern Rocky Mountain Range as Endangered or Threatened with Critical Habitat	Notice of 90–day Petition Finding, Substantial	75 FR 19925-19935
4/20/2010	Initiation of Status Review for Sacramento splittail *(Pogonichthys macrolepidotus)*	Notice of Initiation of Status Review	75 FR 20547-20548
4/26/2010	90-Day Finding on a Petition to List the Harlequin Butterfly as Endangered	Notice of 90–day Petition Finding, Substantial	75 FR 21568-21571
4/27/2010	12-Month Finding on a Petition to List Susan's Purse-making Caddisfly *(Ochrotrichia susanae*) as Threatened or Endangered	Notice of 12–month petition finding, Not warranted	75 FR 22012-22025
4/27/2010	90–day Finding on a Petition to List the Mohave Ground Squirrel as Endangered with Critical Habitat	Notice of 90–day Petition Finding, Substantial	75 FR 22063-22070
5/4/2010	90-Day Finding on a Petition to List Hermes Copper Butterfly as Threatened or Endangered	Notice of 90–day Petition Finding, Substantial	75 FR 23654-23663
6/1/2010	90-Day Finding on a Petition To List *Castanea pumila* var. *ozarkensis*	Notice of 90–day Petition Finding, Substantial	75 FR 30313-30318
6/1/2010	12–month Finding on a Petition to List the White-tailed Prairie Dog as Endangered or Threatened	Notice of 12–month petition finding, Not warranted	75 FR 30338-30363
6/9/2010	90-Day Finding on a Petition To List van Rossem's Gull-billed Tern as Endangered orThreatened.	Notice of 90–day Petition Finding, Substantial	75 FR 32728-32734
6/16/2010	90-Day Finding on Five Petitions to List Seven Species of Hawaiian Yellow-faced Bees as Endangered	Notice of 90–day Petition Finding, Substantial	75 FR 34077-34088
6/22/2010	12-Month Finding on a Petition to List the Least Chub as Threatened or Endangered	Notice of 12–month petition finding,Warranted but precluded	75 FR 35398-35424
6/23/2010	90-Day Finding on a Petition to List the Honduran Emerald Hummingbird as Endangered	Notice of 90–day Petition Finding, Substantial	75 FR 35746-35751

TABLE 1: FY 2010 COMPLETED LISTING ACTIONS—Continued

Publication Date	Title	Actions	FR Pages
6/23/2010	Listing *Ipomopsis polyantha* (Pagosa Skyrocket) as Endangered Throughout Its Range, and Listing *Penstemon debilis* (Parachute Beardtongue) and *Phacelia submutica* (DeBeque Phacelia) as Threatened Throughout Their Range	Proposed ListingEndangeredProposed Listing Threatened	75 FR 35721-35746
6/24/2010	Listing the Flying Earwig Hawaiian Damselfly and Pacific Hawaiian Damselfly As Endangered Throughout Their Ranges	Final ListingEndangered	75 FR 35990-36012
6/24/2010	Listing the Cumberland Darter, Rush Darter, Yellowcheek Darter, Chucky Madtom, and Laurel Dace as Endangered Throughout Their Ranges	Proposed ListingEndangered	75 FR 36035-36057
6/29/2010	Listing the Mountain Plover as Threatened	Reinstatement of Proposed ListingThreatened	75 FR 37353-37358

Our expeditious progress also includes work on listing actions that we funded in FY 2010 but have not yet been completed to date. These actions are listed below. Actions in the top section of the table are being conducted under a deadline set by a court. Actions in the middle section of the table are being conducted to meet statutory timelines, that is, timelines required under the Act. Actions in the bottom section of the table are high-priority listing actions. These actions include work primarily on species with an LPN of 2, and selection of these species is partially based on available staff resources, and when appropriate, include species with a lower priority if they overlap geographically or have the same threats as the species with the high priority. Including these species together in the same proposed rule results in considerable savings in time and funding, as compared to preparing separate proposed rules for each of them in the future.

Actions funded in FY 2010 but not yet completed	
Species	Action
Actions Subject to Court Order/Settlement Agreement	
6 Birds from Eurasia	Final listing determination
Flat-tailed horned lizard	Final listing determination
Mountain plover	Final listing determination
6 Birds from Peru	Proposed listing determination
Sacramento splittail	Proposed listing determination
Gunnison sage-grouse	12–month petition finding
Wolverine	12–month petition finding
Arctic grayling	12–month petition finding
Agave eggergsiana	12–month petition finding
Solanum conocarpum	12–month petition finding
Mountain plover	12–month petition finding
Thorne's Hairstreak Butterfly	12–month petition finding
Hermes copper butterfly	12–month petition finding
Actions with Statutory Deadlines	
Casey's june beetle	Final listing determination
Georgia pigtoe, interrupted rocksnail, and rough hornsnail	Final listing determination
African penguin	Final listing determination
3 Foreign bird species (Andean flamingo, Chilean woodstar, St. Lucia forest thrush)	Final listing determination

Actions funded in FY 2010 but not yet completed	
Species	Action
5 Penguin species	Final listing determination
Southern rockhopper penguin – Campbell Plateau population	Final listing determination
5 Bird species from Colombia and Ecuador	Final listing determination
7 Bird species from Brazil	Final listing determination
Queen Charlotte goshawk	Final listing determination
Salmon-crested cockatoo	Proposed listing determination
Black-footed albatross	12–month petition finding
Mount Charleston blue butterfly	12–month petition finding
Mojave fringe-toed lizard[1]	12–month petition finding
Pygmy rabbit (rangewide)[1]	12–month petition finding
Kokanee – Lake Sammamish population[1]	12–month petition finding
Delta smelt (uplisting)	12–month petition finding
Cactus ferruginous pygmy-owl[1]	12–month petition finding
Northern leopard frog	12–month petition finding
Tehachapi slender salamander	12–month petition finding
Coqui Llanero	12–month petition finding
White-sided jackrabbit	12–month petition finding
Dusky tree vole	12–month petition finding
Eagle Lake trout[1]	12–month petition finding
29 of 206 species	12–month petition finding
Desert tortoise – Sonoran population	12–month petition finding
Gopher tortoise – eastern population	12–month petition finding
Amargosa toad	12–month petition finding
Pacific walrus	12–month petition finding
Wrights marsh thistle	12–month petition finding
67 of 475 southwest species	12–month petition finding
9 Southwest mussel species	12–month petition finding
14 parrots (foreign species)	12–month petition finding
Berry Cave salamander[1]	12–month petition finding
Striped Newt[1]	12–month petition finding
Fisher – Northern Rocky Mountain Range[1]	12–month petition finding
Mohave Ground Squirrel[1]	12–month petition finding
Puerto Rico Harlequin Butterfly	12–month petition finding
Western gull-billed tern	12–month petition finding
Ozark chinquapin *(Castanea pumila* var. *ozarkensis*)	12–month petition finding
HI yellow-faced bees	12–month petition finding
Southeastern pop snowy plover & wintering pop. of piping plover[1]	90–day petition finding

Actions funded in FY 2010 but not yet completed	
Species	Action
Eagle Lake trout[1]	90–day petition finding
Smooth-billed ani[1]	90–day petition finding
Bay Springs salamander[1]	90–day petition finding
32 species of snails and slugs[1]	90–day petition finding
Calopogon oklahomensis[1]	90–day petition finding
White-bark pine	90–day petition finding
42 snail species (Nevada & Utah)	90–day petition finding
Red knot *roselaari* subspecies	90–day petition finding
Peary caribou	90–day petition finding
Plain bison	90–day petition finding
Giant Palouse earthworm	90–day petition finding
Mexican gray wolf	90–day petition finding
Spring Mountains checkerspot butterfly	90–day petition finding
Spring pygmy sunfish	90–day petition finding
San Francisco manzanita	90–day petition finding
Bay skipper	90–day petition finding
Unsilvered fritillary	90–day petition finding
Texas kangaroo rat	90–day petition finding
Spot-tailed earless lizard	90–day petition finding
Eastern small-footed bat	90–day petition finding
Northern long-eared bat	90–day petition finding
Prairie chub	90–day petition finding
10 species of Great Basin butterfly	90–day petition finding
6 sand dune (scarab) beetles	90–day petition finding
Golden-winged warbler	90–day petition finding
Sand-verbena moth	90–day petition finding
Aztec (beautiful) gilia	90–day petition finding
Arapahoe snowfly	90–day petition finding
High Priority Listing Actions[3]	
19 Oahu candidate species[3] (16 plants, 3 damselflies) (15 with LPN = 2, 3 with LPN = 3, 1 with LPN =9)	Proposed listing
17 Maui-Nui candidate species[3] (14 plants, 3 tree snails) (12 with LPN = 2, 2 with LPN = 3, 3 with LPN = 8)	Proposed listing
Sand dune lizard[3] (LPN = 2)	Proposed listing
2 Arizona springsnails[3] *(Pyrgulopsis bernadina* (LPN = 2), *Pyrgulopsis trivialis* (LPN = 2))	Proposed listing
2 New Mexico springsnails[3] *(Pyrgulopsis chupaderae* (LPN = 2), *Pyrgulopsis thermalis* (LPN = 11))	Proposed listing
2 mussels[3] (rayed bean (LPN = 2), snuffbox No LPN)	Proposed listing
2 mussels[3] (sheepnose (LPN = 2), spectaclecase (LPN = 4),)	Proposed listing

Actions funded in FY 2010 but not yet completed	
Species	Action
Ozark hellbender[2] (LPN = 3)	Proposed listing
Altamaha spinymussel[3] (LPN = 2)	Proposed listing
8 southeast mussels (southern kidneyshell (LPN = 2), round ebonyshell (LPN = 2), Alabama pearlshell (LPN = 2), southern sandshell (LPN = 5), fuzzy pigtoe (LPN = 5), Choctaw bean (LPN = 5), narrow pigtoe (LPN = 5), and tapered pigtoe (LPN = 11))	Proposed listing

[1] Funds for listing actions for these species were provided in previous FYs.
[2] We funded a proposed rule for this subspecies with an LPN of 3 ahead of other species with LPN of 2, because the threats to the species were so imminent and of a high magnitude that we considered emergency listing if we were unable to fund work on a proposed listing rule in FY 2008.
[3] Funds for these high-priority listing actions were provided in FY 2008 or 2009.

We have endeavored to make our listing actions as efficient and timely as possible, given the requirements of the relevant law and regulations, and constraints relating to workload and personnel. We are continually considering ways to streamline processes or achieve economies of scale, such as by batching related actions together. Given our limited budget for implementing section 4 of the Act, these actions described above collectively constitute expeditious progress.

The Jemez Mountains salamander will be added to the list of candidate species upon publication of this 12–month finding. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

We intend that any proposed listing action for the Jemez Mountains salamander will be as accurate as possible. Therefore, we will continue to accept additional information and comments from all concerned governmental agencies, the scientific community, industry, or any other interested party concerning this finding.

References Cited

A complete list of all references is available on the Internet at *http://www.regulations.gov* or upon request from the Field Supervisor, New Mexico Ecological Services Field Office (see **ADDRESSES** section).

Authors

The primary authors of this rule are the staff members of the New Mexico Ecological Services Office.

Authority

The authority for this section is section 4 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: August 23, 2010.

Wendi Weber,

Acting Deputy Director, Fish and Wildlife Service.

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