

FINAL ENVIRONMENTAL ASSESSMENT
for the
DESIGNATION OF CRITICAL HABITAT
for the
JEMEZ MOUNTAINS SALAMANDER

Prepared by Mangi Environmental Group
For the
Department of Interior
U.S. Fish & Wildlife Service

**FINAL ENVIRONMENTAL ASSESSMENT FOR THE DESIGNATION OF
CRITICAL HABITAT FOR THE JEMEZ MOUNTAINS SALAMANDER**

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Summary

The purpose of this Environmental Assessment (EA) is to identify and disclose the environmental consequences resulting from the Proposed Action of designating critical habitat for the Jemez Mountains salamander (*Plethodon neomexicanus*), proposed concurrently for listing as endangered on September 12, 2012, under the Endangered Species Act of 1973 (Act), as amended (77 FR 56482). The need for the Proposed Action is to comply with the Act.

A detailed history of previous actions is contained in the proposed listing/designation rule (77 FR 56482, September 12, 2012). In December 1982, the Service 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. The most recent sequence of events began when the Service received a petition dated October 9, 2008, from WildEarth Guardians requesting that the Jemez Mountains salamander be listed as either an endangered or threatened species under the Act, and that critical habitat be designated. On August 11, 2009, the Service 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 Service published a 12-month finding on September 9, 2010, that listing the salamander as either an endangered or threatened species was warranted but precluded by higher priority actions (75 FR 54822). On September 12, 2012, the Service published a proposed rule to list the Jemez Mountains salamander as an endangered species and to designate critical habitat (77 FR 56482).

The ESA requires that, to the maximum extent prudent and determinable, the Secretary shall designate critical habitat at the time the species is determined to be endangered or threatened. The ESA states (16 U.S.C. 1533 §(b)(1)(A)), “the Secretary shall make determinations required by subsection (a)(1) of this section [species listing status] solely on the basis of the best scientific and commercial data available...” However, a court opinion of the Tenth Circuit ruled that “the

Secretary must comply with NEPA when designating critical habitat under ESA (*Catron County Board of Commissioners v. U.S. Fish & Wildlife Service*, 75 F. 3d 1429, 10th Circuit, 1996). Therefore, this EA analyzes the impacts of the proposed designation of critical habitat, which is contained in the proposal for listing the species as endangered (77 FR 56482), but does not analyze other impacts of the listing itself.

The Jemez Mountains salamander is one of two species of plethodontid salamanders endemic (native and restricted to a particular region) to New Mexico: the Jemez Mountains salamander and the Sacramento Mountains salamander (*Aneides hardii*). Unlike most other North American plethodontid salamanders, these two species are geographically isolated from all other species of *Plethodon* and *Aneides*. 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 the USFS, the National Park Service (Bandelier National Monument), Valles Caldera National Preserve (VCNP), and Los Alamos National Laboratory, with some habitat located on tribal land and private lands (NMEST 2000).

The Service has determined that the primary constituent elements (PCEs) specific to the Jemez Mountains salamander's forested habitat are: (1) Moderate to high tree canopy cover, typically 50 to 100 percent canopy closure, that provides shade and maintains moisture and high relative humidity at the ground surface, and consists of the following tree species alone or in any combination: Douglas fir (*Pseudotsuga menziesii*); blue spruce (*Picea pungens*); Engelman spruce (*Picea engelmannii*); white fir (*Abies concolor*); limber pine (*Pinus flexilis*); ponderosa pine (*Pinus ponderosa*); and aspen (*Populus tremuloides*); and has an understory that predominantly comprises: Rocky Mountain maple (*Acer glabrum*); New Mexico locust (*Robinia neomexicana*); oceanspray (*Holodiscus* sp.); or shrubby oaks (*Quercus* spp.); (2) Elevations from 6,988 to 11,254 feet (2,130 to 3,430 meters); (3) Ground surface in forest areas with moderate to high volumes of large fallen trees and other woody debris, especially coniferous logs at least 10 inches (25 centimeters) in diameter, particularly Douglas fir, which are in contact with the soil in varying stages of decay from freshly fallen to nearly fully decomposed; or structural features, such as rocks, bark, and moss mats that provide the species with food and cover; and (4) Underground habitat in forest or meadow areas containing interstitial spaces provided by igneous rock with fractures or loose rocky soils; rotted tree root channels; or burrows of rodents or large invertebrates.

Two alternatives were considered in this EA: the No Action Alternative, under which no critical habitat would be designated; and Alternative A, under which two occupied units are proposed for designation: (1) Western Jemez Mountains Unit and (2) Southeastern Jemez Mountains Unit. Both units are currently occupied by the species.

The environmental threats identified by the Service during resource analysis are those raised by the types of actions taken by public and private land managers in the region. Such threats include: historical and current fire management practices; severe wildland fire; forest composition and structure conversions; post-fire rehabilitation; forest management; roads, trails, and habitat fragmentation; recreation; and climate change. Furthermore, disease and the use of

fire retardants or other chemicals may threaten the salamander, and may need special management considerations. The proposed critical habitat designation is mostly on public land.

The designation of critical habitat for the Jemez Mountains salamander would not have direct impacts on the environment; designation is not expected to impose land use restrictions or prohibit land use activities. Moreover, the Service may use habitat as a proxy for the number of individuals taken and thus anticipates that a jeopardy analysis and an adverse modification analysis would be the same. Therefore, it is expected that the same number of projects would likely undergo consultation with critical habitat as without. Specific recommendations to avoid destruction or adverse modification of critical habitat and to avoid jeopardy include the following: (1) implement actions on the landscape that reduce the risk of large-scale, stand replacing wildfire; (2) maintain key salamander components (e.g. large decomposing Douglas fir logs) when implementing fire use and forest management actions; (3) conduct studies directed to efficiently maintain high moisture microhabitats by maintaining high tree canopy cover while allowing for fire use and forest management actions; and (4) determine and utilize least harmful chemicals for broadscale use in salamander habitat (e.g. fire retardant).

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CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

The United States Department of the Interior (USDI), Fish and Wildlife Service (Service) has prepared this Environmental Assessment (EA) to analyze the potential effects on physical and biological resources and social and economic conditions that may result from the designation of critical habitat for the Jemez Mountains salamander (*Plethodon neomexicanus*), proposed for listing as endangered under the Endangered Species Act of 1973 (ESA), as amended. The proposed rule to list the species and designate critical habitat was published in the Federal Register on September 12, 2012 (77 FR 56482). This EA is used by the Service to decide whether critical habitat will be designated as proposed, if the proposed action requires refinement, or if further analyses are needed through preparation of an Environmental Impact Statement. If the proposed action is selected as described or with minimal changes and no further environmental analyses are needed, a Finding of No Significant Impact (FONSI) will be prepared. This EA has been prepared pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA) as implemented by the Council on Environmental Quality (CEQ) regulations 40 Code of Federal Regulations (CFR) Part 1500 et seq. and USDI NEPA procedures.

In December 1982, the Service published a notice of review classifying the salamander as a Category 2 species (47 FR 58454, December 30, 1982). Category 2 status includes 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, the Service received a petition to list the Jemez Mountains salamander as threatened, and subsequently published a substantial 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, the Service 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 either an 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, the Service 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, the Service 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, the Service 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 Jemez Mountains 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 Jemez Mountains 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, the Service received a petition dated October 9, 2008, from WildEarth Guardians requesting that the Service list the Jemez Mountains salamander as either an endangered or threatened species under the Act, and designate critical habitat. On August 11, 2009, the Service 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 Service published a 12-month finding on September 9, 2010, that listing the salamander as either an endangered or threatened species was warranted but precluded by higher priority actions (75 FR 54822).

1.2 Purpose and Need of the Action

Protection of the habitat of an endangered species is a crucial element for the conservation of that species. A primary purpose of the ESA is to "provide a means whereby the ecosystems upon which endangered species and threatened species may be conserved" (section 2[b]). The purpose of critical habitat designation as specified in the ESA is to provide protection of habitat that is essential to the conservation of listed species. The purpose of this action is to consider the

environmental impacts of designation of critical habitat for the salamander on other human activities and interests.

The ESA defines critical habitat as follows (16 U.S.C. §1532(5)(A)):

The term “critical habitat” for a threatened or endangered species means—

- (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features
 - (I) essential to the conservation of the species and
 - (II) which may require special management considerations or protection; and
- (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species.

The designation also describes the elements of physical and biological features that provide for the species’ life-history processes and are essential to the conservation of the species. These are known as the primary constituent elements (PCEs).

This action complies with the ESA Section 4(a)(3), which requires the Secretary of the Interior to designate critical habitat if such a designation is prudent and determinable. In the absence of a finding that the designation of critical habitat would increase threats to a species, if there are any benefits to a critical habitat designation, then a prudent finding is warranted. The potential benefits of critical habitat to the salamander include: (1) triggering consultation under section 7 of the Act in new areas for actions in which there may be a Federal nexus where it would not otherwise occur because, for example, it has become unoccupied or the occupancy is in question; (2) focusing conservation activities on the most essential features and areas; (3) providing educational benefits to State or county governments or private entities; and (4) preventing people from causing inadvertent harm to the species.

1.3 Proposed Action

The Proposed Action (Alternative A) consists of two units to be designated as critical habitat for the Jemez Mountains salamander. These critical habitat areas constitute the Service’s current best assessment of areas that meet the definition of critical habitat for the species. The two units we propose as critical habitat are: (1) Western Jemez Mountains Unit and (2) Southeastern Jemez Mountains Unit. Both units are currently within the geographical area occupied by the species. The areas being proposed include both above-ground and below-ground critical habitat components. The proposed units cover approximately 90,716 ac (36,711 ha). They are described briefly in section 2.2 and incorporated here by reference to the proposed listing and critical habitat rule (77 FR 56482).

1.4 Background

1.4.1 Critical Habitat

1.4.1.1 Provisions of the ESA

Section 4(a)(3) of the ESA states that critical habitat shall be designated to the maximum extent prudent and determinable and that such designation may be revised periodically as appropriate. Section 4(b)(2) of the ESA requires that critical habitat designation be based on the best scientific information available and that economic, national security, and other relevant impacts must be considered. Areas may be excluded from critical habitat designation if it is determined that the benefits of exclusion outweigh the benefits of inclusion unless, based on the best available scientific and commercial data available, failure to include the areas in critical habitat would result in the extinction of the species. In section 3(5)(A) of the ESA, critical habitat is defined as (i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the provisions of section 4 of the ESA, on which are found those physical or biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by a species at the time it is listed in accordance with the provisions of section 4 of the Act, upon the determination by the Secretary of the Interior that such areas are essential for the conservation of the species. Section 3(5)(C) also states that critical habitat “shall not include the entire geographic area which can be occupied by the threatened or endangered species,” except when the Secretary of the Interior determines that the areas are essential for the conservation of the species.

1.4.1.2 Section 4(b)(2) Exclusion Process

Section 4(b)(2) of the ESA allows the Secretary of the Interior to exclude any area from the critical habitat designation after considering the economic, national security, or other relevant impacts of designating the area if the Secretary determines that the benefit of excluding the area exceeds the benefit of designating it as critical habitat, unless the exclusion would result in the extinction of the species. After reviewing public comment on the critical habitat proposal, this EA, and the economic analysis, the Secretary will decide whether to designate critical habitat for the Jemez Mountains salamander, according to the alternative described in Chapter 2. This is as provided for in ESA section 4(b)(2) and in implementing regulations at 50 CFR Part 424.19. The Service is not proposing any exclusions in its designation of critical habitat.

1.4.1.3 Section 7 Consultation Process

Section 7(a)(2) of the ESA requires Federal agencies to consult with the Service to “insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined to be critical.” Each agency is required to use the best scientific and commercial data available. This consultation process is typically referred to as *section 7 consultation*. Section 7 of the ESA does not apply to

state, local, or private land unless there is a Federal nexus (i.e., Federal funding, authorization, or permitting). Designation of critical habitat can help focus conservation efforts by identifying areas that are essential for the conservation of the species. Designation of critical habitat also serves to alert the public and land management agencies to the importance of an area for conservation of a listed species. As described above, critical habitat receives protection from destruction or adverse modification through required consultation under section 7 of the ESA. Aside from outcomes of consultation with the Service under section 7, the ESA does not automatically impose any restrictions on lands designated as critical habitat.

The section 7 consultation process begins with a determination of the effects on a listed species and designated critical habitat by a Federal action agency. If the Federal action agency determines that there would be no effect on listed species or designated critical habitat, then the section 7 process concludes at that point. If the Federal action agency determines that listed species or designated critical habitat may be affected, then consultation with the Service is initiated. Once it is determined that the proposed Federal action may affect a listed species or critical habitat, the Federal action agency and the Service may enter into informal section 7 consultation. Informal consultation is an optional process for identifying affected species and critical habitat, determining potential effects, and exploring ways to modify the action to remove or reduce adverse effects on listed species or critical habitat (50 CFR Part 402.13). During this process the Service may make suggestions concerning project modifications, which then can be adopted by the action agency. If the action agency decides to further modify the project as suggested by the Service, the Service would then concur in writing or recommend formal consultation.

The informal section 7 consultation process concludes in one of two ways: (1) the Service concurs in writing that the proposed action is not likely to adversely affect listed species or critical habitat or (2) the Service determines that adverse effects are likely to occur. Formal consultation is initiated when it is determined that the proposed Federal action is likely to adversely affect listed species or critical habitat (50 CFR Part 402.14). Formal consultation concludes with a biological opinion issued by the Service on whether the proposed Federal action is likely to jeopardize the continued existence of a listed species or to destroy or adversely modify critical habitat (50 CFR Part 402.14[h]).

In making a determination on whether an action will result in jeopardy, the Service begins by looking at the current status of the species, or "baseline." Added to the baseline are the various effects – direct, indirect, interrelated, and interdependent – of the proposed Federal action. The Service also examines the cumulative effects of other non-Federal actions that may occur in the action area, including state, tribal, local, or private activities that are reasonably certain to occur in the project area. The Service's analysis is then measured against the definition of jeopardy. Under the ESA, jeopardy occurs when an action is reasonably expected, directly or indirectly, to diminish a species' numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild is appreciably reduced.

Independent analyses are made under both the jeopardy and the adverse modification standards. While the jeopardy analysis evaluates potential impacts on the species as described above, the

adverse modifications analysis specifically evaluates potential impacts on designated critical habitat.

The Ninth Circuit Court has determined that there is an additional difference between the two standards. In *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, 378 F.3d 1059 (9th Cir. 2004), the court held that while the jeopardy standard concerns the survival of a species or its risk of extinction, the adverse modification standard concerns the value of critical habitat for the recovery, or eventual delisting, of a species. As pointed out in the Ninth Circuit decision, survival of a species and recovery (or conservation) of a species are distinct concepts in the ESA. Implementation of the two standards, therefore, involves separate and distinct analyses based on these concepts. In light of the Gifford Pinchot decision, the Service no longer relies on the regulatory definition of “destruction or adverse modification” of critical habitat at 50 CFR 402.02. Instead, the Service relies on the statutory provisions of the ESA to complete the analysis with respect to critical habitat. The potential for destruction or adverse modification of critical habitat by a Federal action is assessed by determining the effects of the proposed Federal action on PCEs of habitat qualities that are essential to the conservation of the species. These anticipated effects are then analyzed to determine how they will influence the function and conservation role of the affected critical habitat. This analysis provides the basis for determining the significance of anticipated effects of the proposed Federal action on critical habitat. The threshold for destruction or adverse modification is evaluated in the context of whether the critical habitat would remain functional to serve the intended conservation role for the species.

Critical habitat is defined in section 3(5)(A) of the ESA as those areas that are essential for conservation of the species, and the definition of conservation includes species recovery.

An activity adversely affecting critical habitat must be of a severity or intensity that the PCEs are compromised to the extent that the critical habitat can no longer meet its intended conservation function before a destruction or adverse modification determination is reached.

A “non-jeopardy” or “no adverse modification” opinion concludes consultation, and the proposed action may proceed under the ESA. The Service may prepare an incidental take statement with reasonable and prudent measures to minimize take and associated, mandatory terms and conditions that describe the methods for accomplishing the reasonable and prudent measures. Discretionary conservation recommendations may be included in a biological opinion based on the effects on the species. Conservation recommendations, whether they relate to the jeopardy or adverse modification standard, are discretionary actions recommended by the Service. These recommendations may address minimizing adverse effects on listed species or critical habitat, identifying studies or monitoring, or suggesting how action agencies can assist species under their own authorities and section 7(a)(1) of the ESA.

There are no ESA section 9 prohibitions for critical habitat. Therefore, a biological opinion that concludes no destruction or adverse modification of critical habitat may contain conservation recommendations but would not include an incidental take statement, reasonable and prudent alternatives, or other terms and conditions. In a biological opinion that results in a jeopardy or adverse modification conclusion, the Service develops mandatory reasonable and prudent alternatives to the proposed action. Reasonable and prudent alternatives are actions that the

Federal agency can take to avoid jeopardizing the continued existence of the species or adversely modifying the critical habitat. Reasonable and prudent alternatives may vary from minimal project changes to extensive redesign or relocation of the project, depending on the situations involved. Reasonable and prudent alternatives must be consistent with the intended purpose of the proposed action, and they also must be consistent with the scope of the Federal agency’s legal authority. Furthermore, the reasonable and prudent alternatives must be economically and technically feasible. A biological opinion that results in a jeopardy finding, based on effects on the species, may also include an incidental take statement, reasonable and prudent measures alternatives, terms and conditions, and conservation recommendations. A biological opinion that results in an adverse modification finding (but no jeopardy to the species) may include reasonable and prudent alternatives and conservation recommendations but no incidental take statement or associated reasonable and prudent measures alternatives and terms and conditions.

1.4.2 Jemez Mountains salamander

The following briefly summarizes key information about the physical and biological features (PBFs) of the Jemez Mountains salamander and the primary constituent elements (PCEs) that are essential to the conservation of the species. For more detail, a description of the species, and information about its life history, habitat, and distribution, consult the proposed listing and critical habitat rule (77 FR 56482, September 12, 2012).

1.4.2.1 Physical and Biological Features for Jemez Mountains salamander Critical Habitat

In determining which areas to propose as critical habitat within the geographical area occupied at the time of listing, the Service considered the PBFs essential to the conservation of the species that may require special management considerations or protection. The Service lists five categories of PBFs, but the specific PBFs required for a species are derived from the studies of this species’ habitat, ecology, and life history as described below in Table 1.1. The specific needs for the salamander are described in detail in the proposed critical habitat rule (77 FR 56481, September 12, 2012), and additional information on the salamander ecology can be found in the Cooperative Management Plan (NMEST 2000).

Table 1.1. Summary of the Physical and Biological Features specific to the Jemez Mountains salamander

PBF	Summary of Jemez Mountains salamander specific PBFs
Space for individual and population growth and for normal behavior.	Forested areas of the Jemez Mountains, ranging in elevation from 6,998 to 10,990 ft (2,133 to 3,350 m). The aboveground habitat occurs within forested areas that primarily contain Douglas fir, blue spruce, Engelman spruce, white fir, limber pine, ponderosa pine, Rocky Mountain maple, and aspen
Food, water, air, light, minerals, or other nutritional or physiological requirements.	Salamanders must address hydration needs above all other life-history needs because the salamander must obtain its water from its habitat and it has no physiological mechanism to stop dehydration or water loss to the environment. Based on this information, soil moisture is the most important factor in the ecology of this species. Thus, moist and cool microhabitats are essential for the

PBF	Summary of Jemez Mountains salamander specific PBFs
	conservation of the species.
Cover or shelter.	Jemez Mountains salamanders are generally found in association with decaying coniferous logs, particularly Douglas fir, considerably more often than deciduous logs, likely due to the differences in physical features (e.g., coniferous logs have blocky pieces with more cracks and spaces than deciduous logs) Large-diameter (greater than 10 in (25 cm)) decaying logs provide important aboveground habitat because they are moist and cool compared to other cover; larger logs maintain higher moisture and lower temperature longer than smaller logs. Currently, we do not fully understand how salamanders utilize areas like meadows, where the aboveground vegetation component differs from areas where salamanders are more commonly encountered (e.g., forested areas). However, salamanders have been found in high-elevation meadows. Therefore, meadows are considered part of the physical or biological features for the Jemez Mountains salamander.
Sites for breeding, reproduction, or or development of offspring.	Because the salamander spends the majority of its life below ground, eggs are probably laid and hatch underground. However, we currently lack the information to identify the specific elements of the physical or biological features needed for breeding, reproduction, or rearing of offspring.
Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.	We believe that the Jemez Mountains salamander is distributed in areas not burned by large-scale, stand-replacing fires. These areas are believed to contain the PBFs essential to the conservation of the species. Managing for an appropriate vegetation composition and designing forest restoration treatments to minimize the risk of wildfire are difficult because of the lack of information to quantify or qualify these historical attributes. Specific research is needed on forest restoration treatments that could minimize impacts and maximize benefits to the salamander.

1.4.2.2 Primary Constituent Elements for Jemez Mountains salamander Critical Habitat

For inclusion in a critical habitat designation the habitat within the geographical area occupied by the species at the time it was listed must contain physical and biological features essential to the conservation of the species and be included only if those features may require special management considerations or protection. Critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical and biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat), focusing on the principal biological or physical constituent elements (PCEs) within an area that are essential to the conservation of the species (such as roost sites, nesting grounds, seasonal wetlands, water quality, tide, soil type). Primary constituent elements are the elements of physical and biological features that provide for a species’ life-history processes and are essential to the conservation of the species.

Based on the current knowledge of the physical or biological features and habitat characteristics required to sustain the species’ life-history processes, the Service determines that the primary constituent elements (PCEs) specific to the Jemez Mountains salamander’s forested habitat are:

- (1) Moderate to high tree canopy cover, typically 50 to 100 percent canopy closure, that provides shade and maintains moisture and high relative humidity at the ground surface, and:

(a) Consists of the following tree species alone or in any combination: Douglas fir (*Pseudotsuga menziesii*); blue spruce (*Picea pungens*); Engelmann spruce (*Picea engelmannii*); white fir (*Abies concolor*); limber pine (*Pinus flexilis*); Ponderosa pine (*Pinus ponderosa*); and aspen (*Populus tremuloides*); and

(b) Has an understory that predominantly comprises: Rocky Mountain maple (*Acer glabrum*); New Mexico locust (*Robinia neomexicana*); oceanspray (*Holodiscus* spp.); or shrubby oaks (*Quercus* spp.).

(2) Elevations from 6,988 to 11,254 ft (2,130 to 3,430 m).

(3) Ground surface in forest areas with:

(a) Moderate to high volumes of large fallen trees and other woody debris, especially coniferous logs at least 10 in (25 cm) in diameter, particularly Douglas fir, which are in contact with the soil in varying stages of decay from freshly fallen to nearly fully decomposed; or

(b) Structural features, such as rocks, bark, and moss mats, that provide the species with food and cover.

(4) Underground habitat in forest or meadow areas containing interstitial spaces provided by:

(a) Igneous rock with fractures or loose rocky soils;

(b) Rotted tree root channels; or

(c) Burrows of rodents or large invertebrates.

The features essential to the conservation of this species may require special management considerations or protection to reduce the following threats: historical and current fire management practices; severe wildland fire; conversions of forest composition and structure; post-fire rehabilitation; forest management (including silvicultural practices); roads, trails, and habitat fragmentation; recreation; and climate change. Furthermore, disease and the use of fire retardants or other chemicals may threaten the salamander, and may need special management considerations.

1.5 Permits Required for Implementation

No permits are required for critical habitat designation. Designation of critical habitat occurs through a rulemaking process under the Administrative Procedures Act (5 U.S.C. §551–59, 701–06, 1305, 3105, 3344, 5372, 7521) and the ESA.

1.6 Related Laws, Authorizations, and Plans

Related provisions of the ESA require Federal agencies to consult with the Service when there are potential effects to endangered or threatened species, independent of critical habitat. The ESA also prohibits any person from “taking” the species without a permit from the Service. Other Federal laws address various aspects of conservations of fish and wildlife and their habitat, which apply to the Jemez Mountains salamander. The Lacey Act (16 USC §3371 et seq.), as amended in 1982, prohibits the import, export, sale, receipt, acquisition, purchase, and engagement in interstate or foreign commerce of any species taken, possessed, or sold in

violation of any law, treaty, or regulation of the United States, and Tribal law, or any law or regulation of any state.

In addition, New Mexico State law provides some protection to the salamander. The salamander was reclassified by the State of New Mexico from threatened to endangered in 2005 (NMDGF 2005). This designation provides protection under the New Mexico Wildlife Conservation Act of 1974 (i.e., State Endangered Species Act) (19 NMAC 33.6.8) by prohibiting direct take of the species without a permit issued from the State. 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). Status as a New Mexico State endangered species only conveys protection from collection or intentional harm to the animals themselves, but does not provide habitat protection.

A Cooperative Management Plan and Conservation Agreement were completed in 2000 by the New Mexico Endemic Salamander Team. These documents were intended to be a mechanism to provide for conservation and protection in lieu of listing the species under the Endangered Species Act, as amended (U.S. General Accounting Office 1993). 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). 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.

1.7 Issues and Concerns from Public Comments

The proposed rule to list and designate critical habitat for the Jemez Mountains salamander was published on September 12, 2012, and provided a 60-day period for public comments. A total of nine comments were received, including from the U.S. Forest Service (Santa Fe National Forest). The following concerns were raised in the comments:

- The scientific surveys for salamander have not provided sufficient evidence that the salamander meets the criteria for listing on the endangered species list.
- Before any future mining activities are approved, surveys for salamander within the footprint of proposed mining activity should be conducted.
- Many projects within Santa Fe National Forest have been conducted in successful cooperation with the New Mexico Endemic Salamander Team without the species having been listed or critical habitat designated. Thus, the Service’s rule is unnecessary.
- The Service should consider the impact of the application of insecticides used to control Western spruce budworm and bark beetles.
- The Service’s actions could restrict fire management in salamander habitat. The U.S. Forest Service has published an update to its 1982 Planning Rule (now the 2012 Planning Rule), which sets forth new goals and objectives for Forest Management Plans undertaken after publication.

1.8 Topics Analyzed in Detail in this Environmental Assessment

Based on internal scoping within the Service and a review of public comments, the Service analyzed the potential impacts of critical habitat designation on the following resources:

- Water Resources;
- Fish, Wildlife, and Plants;
- Land Use;
- Climate Change;
- Fire Management;
- Soil Resources;
- Construction, Development, Infrastructure; and
- Socioeconomics/Recreation.

1.8.1 Topics Considered But Dismissed from Further Analysis Because They Will Have No or Negligible Impacts

Federal regulations (40 CFR §1500 et seq.) require that certain topics be addressed as part of a NEPA analysis. The Service reviewed the mandatory topics listed below and determined that the proposed action would produce no or negligible impacts. Therefore, these topics have been dismissed from further analysis in this document.

- *Energy requirements and conservation potential (1502.16)*. Additional section 7 consultations resulting from critical habitat designation of the salamander would not require any increase in energy consumption in the form of fuel for vehicles or from other conservation actions.
- *Natural or depletable resource requirements and conservation potential (1502.16)*. Pumice mines are located within areas of volcanic substrate that are unlikely to support salamanders (USFS 2009a).
 - Associated infrastructure from a proposed expansion of the El Cajete Mine (which is undergoing reclamation), 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 of this writing (USFS 2009a), these activities would be small in scale and not likely considered a threat to the species, either currently or in the future.
 - Copar South Pit Mine, located near proposed habitat, has proposed a 48-ac (19-ha) expansion. However, salamander occurrence within the proposed expansion area is considered unlikely; the nearest occupied forest stands are approximately 1.9 miles (mi) (3.1 kilometers (km)) away.
 - The Forest Service has begun the National Environmental Policy Act (NEPA) analysis for a proposed (20-acre, 8-ha) Duran-2010 Pumice Mine. The nearest boundary of the proposed mine area is approximately 4 mi (6.4 km) southwest of proposed critical habitat Unit 2.
- *Urban quality and design of the built environment (1502.16)*. The proposed critical habitat segments are not located in urban or other built environments and would not affect the quality of such environments.

- *Prime and unique agricultural lands (1508.27)*. Prime agricultural land is defined (7 U.S.C. 4202(a)) as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. Unique agricultural land is defined as land other than prime farmland that is used for the production of specific high-value food and fiber crops (e.g., citrus, tree nuts, olive, cranberries, fruits, and vegetables). There is no prime agricultural land that would be directly or indirectly impacted by the designation. For this reason, this topic is dismissed from further consideration.
- *Important scientific, archeological, and other cultural resources, including historic properties listed in or eligible for the National Register of Historic Places (NRHP) (1508.27)*. Unit 2 of proposed critical habitat overlaps with one of the two portions of Bandelier National Monument that are listed on the NRHP. This area contains the Yapashi and San Miguel prehistoric Indian ruins. The proposed designation would not result in any ground-disturbing activities that have the potential to affect these cultural resources.
- *Ecologically critical areas, Wild and Scenic Rivers, or other unique natural resources (1508.27)*. The East Fork Jemez River, which crosses into Unit 2, is a Wild and Scenic River. In addition, a portion of Bandelier Wilderness Area is in Unit 2. However, designation of critical habitat would not cause or authorize any activities in those areas that could produce adverse impacts. Therefore, there would be no impacts to ecologically sensitive areas from the critical habitat designation.
- *Public health and safety (1508.27)*. Fire use and fire management are activities occurring within proposed critical habitat that have potential public health and safety impacts. These topics are discussed in section 3.6 of this EA. Because conservation measures or project modifications resulting from a jeopardy consultation would be the same as those recommended to prevent adverse modification of habitat, there would be no incremental impact to public health and safety anticipated from designation of critical habitat.
- *Livestock Grazing*— Historical livestock grazing has contributed to changes in the Jemez Mountains ecosystem by removing understory grasses, contributing to altered fire regimes and vegetation composition and structure, and increasing 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. However, some livestock grazing does occur in the VCNP and Santa Fe NF: in the VCNP, grazing of approximately 500-700 animals still occurs in meadow areas within the preserve, and some grazing does occur on Santa Fe NF in designated critical habitat areas. Therefore, some impacts to the salamander and its habitat resulting from livestock grazing are possible and formal consultation on range improvements is anticipated. Impacts may include small-scale habitat modification, such as: livestock trail establishment or soil compaction; limitations on access to grazing allotments by livestock managers through road closures or decommissioning, or direct effects, such as trampling. Also, if it was determined that grazing could cause significant impacts to an important area or areas, seasonal restrictions or exclusions of small but important areas could occur. However, livestock are managed to maintain a grassy forest understory, and the USFS and VCNP would not be expected to limit low-intensity fires in the future. In addition, overlap of current grazing with salamander habitat is rare, because

salamanders tend to occupy mountainous, forested areas. Therefore, even though consultations on grazing-related actions in the Santa Fe NF and VCNP that would include the salamander are anticipated, the Service believes these consultations would result in no more than negligible impacts to livestock grazing. In addition, the Service anticipates that the consultation workload would be similar with and without critical habitat, because any analyses conducted for critical habitat will have been conducted for any areas where the salamander occurs or may occur.

- *Tribal Resources*-- There are no tribal lands within the critical habitat designation. However, the designation includes lands within the Santa Fe National Forest and VCNP that are adjacent to the Santa Clara Pueblo (Pueblo). Much of these adjacent areas within the Santa Fe National Forest and VCNP were severely burned during the Las Conchas Fire of 2011. These lands include culturally important areas for the Pueblo and have unhealthy, unburned forest conditions that make them a continued, immediate threat to catastrophic wildfire spreading onto Pueblo lands (Santa Clara Pueblo 2013). Therefore, the Pueblo has entered in discussions with the Santa Fe National Forest pursuant to the Tribal Forest Protection Act (TFPA) to co-manage stewardship projects on these lands, including hazardous fuels reduction and ensuring there are proper fuel breaks to protect remnant unburned areas on Pueblo lands from fires coming off National Forest lands. Consultations with the Santa Fe National Forest on fire management activities proposed on Pueblo-adjacent lands will be conducted in accordance with the Service's responsibilities as outlined in Secretarial Order 3206, which states in its Appendix, Section 3(C)3(c), "When the Services enter into formal consultations with agencies not in the Departments of Interior or Commerce, on a proposed action which may affect tribal rights or tribal trust resources, the Services shall notify the affected Indian tribe(s) and encourage the action agency to invite the affected tribe(s) and the BIA to participate in the consultation process." (Service 1997).¹

1.9 Decision to be Made

Critical habitat is designated in a Federal rule-making process that includes publication of notices for the proposed and final rule in the *Federal Register*. The proposed rule solicits public comment. The decision by the Secretary that is addressed in this Environmental Assessment is whether to designate critical habitat for the Jemez Mountains salamander according to the Alternative described in Chapter 2.

¹ The Tribal Forest Protection Act (Public Law 108-278) was passed in July 2004. The Act provides a tool for tribes to propose work and enter into contracts and agreements with the Forest Service (FS) or Bureau of Land Management (BLM) to reduce threats on Federal lands adjacent to Indian trust land and Indian communities (USFS 2013).

CHAPTER 2

ALTERNATIVES, INCLUDING THE NO ACTION ALTERNATIVE

This section describes the alternatives for critical habitat designation for the Jemez Mountains salamander. For the purposes of this EA, alternatives provide a clear basis for choice by the decision-maker and the public for critical habitat designation, as described in Chapter One, which can be summarized as determining which areas meet the definition of critical habitat for the Jemez Mountains salamander. In addition, the analysis of alternatives can provide information useful in an evaluation of whether any of the proposed critical habitat units should be excluded from the final designation.

2.1 Development of Alternatives

In developing the action alternatives, the Service based decisions on the best scientific and commercial data available in determining areas within the geographical area occupied at the time of listing that contain the features essential to the conservation of the Jemez Mountains salamander, and areas outside of the geographical area occupied at the time of listing that are essential for the conservation of the species.

Critical habitat units are proposed for designation based on sufficient PCEs being present to support the salamander's life history processes. Both proposed units satisfy these criteria, as they are areas that the Service has determined are occupied by the salamander at the time of listing and contain sufficient elements of physical or biological features to support life-history processes essential for the conservation of the species. The critical habitat designation is defined by the map or maps, as modified by any accompanying regulatory text, presented at the end of the proposed rule (77 FR 56511, September 12, 2012). The rule also contains a detailed description of the methods used to determine the boundaries of critical habitat (77 FR 56505, September 12, 2012).

Based on the above criteria, the Service chose two alternatives for impact analysis:

- No Action Alternative; and
- Alternative A, Critical habitat designation with two occupied units.

2.2 No Action Alternative

The No Action Alternative would be no designation of critical habitat for the Jemez Mountains salamander. An analysis of a No Action Alternative is required by NEPA and provides a baseline for analyzing effects of the action alternatives. Analysis of this alternative describes the existing environment and consequences that are anticipated as a result of the proposed listing status of the species, without the designation of critical habitat from the proposed rule (77 FR 56482, September 12, 2012). Therefore, this alternative would have no effects beyond those incurred from the concurrent listing of the Jemez Mountains salamander as endangered.

2.3 Alternative A—Critical Habitat Designation--Two Occupied Units

Alternative A consists of a designating two occupied units of critical habitat for the Jemez Mountains salamander. Both units are within the geographical area occupied by the salamander and contain elements of essential physical or biological features.

Unit 1: Western Jemez Mountains Unit

Unit 1 consists of 42,445 ac (17,177 ha) in Sandoval and Rio Arriba Counties in the western portion of the Jemez Mountains of which 41,467 ac (16,781 ha) is federally managed, with 26,532 ac (10,737 ha) on USFS lands, 14,935 ac (6,044 ha) on VCNP lands, and 978 ac (396 ha) on private lands. This unit is located in the western portion of the distribution of the Jemez Mountains salamander and includes Redondo Peak.

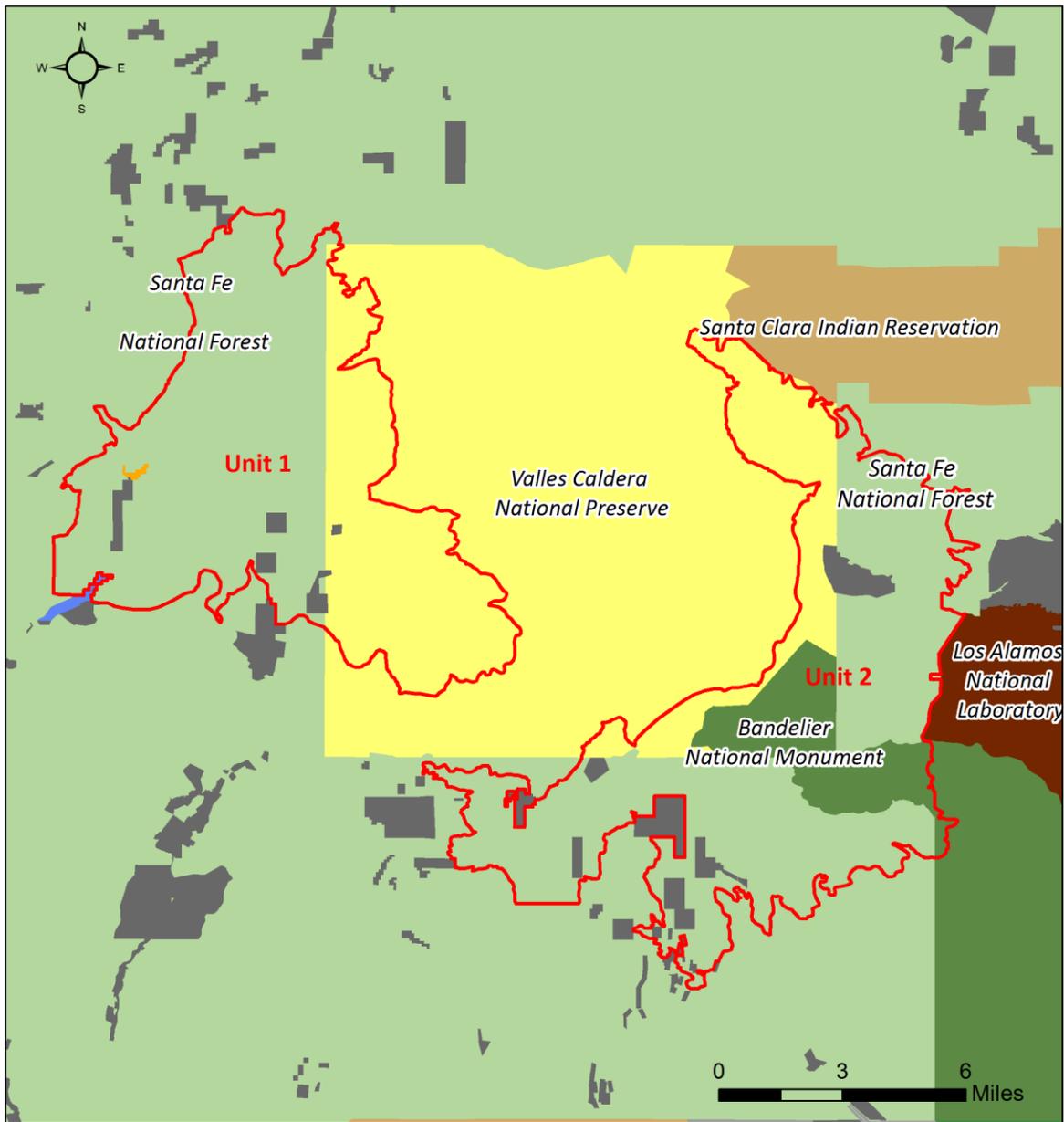
Unit 2: Southeastern Jemez Mountains Unit

Unit 2 consists of 48,344 ac (19,564 ha) in Sandoval and Los Alamos Counties in the eastern, southern, and southeastern portions of the Jemez Mountains of which 46,505 ac (18,820 ha) is federally managed, with 30,502 ac (12,344 ha) on USFS lands, 8,784 ac (3,555 ha) on VCNP lands, and 7,219 ac (2,921 ha) on National Park Service lands (Bandelier National Monument), and 1,839 ac (744 ha) are on private lands.

Table 2.1. Proposed Critical Habitat Units

Critical Habitat Unit	Land Ownership by Type	Size of Unit in Acres (Hectares)
Unit 1-- Western Jemez Mountains Unit	Federal	41,466 (16,781)
	Private	906 (367)
	State	73 (30)
	Total Unit 1	42,445 (17,177)
Unit 2--Southeastern Jemez Mountains Unit	Federal	46,374 (18,767)
	Private	1,897 (768)
	Total Unit 2	48,271 (19,535)
Total	Federal	87,840 (35,548)
	Private	2,803 (1,134)
	State	73 (30)
	Total	90,716 (36,711)

Note: Area sizes may not sum due to rounding.



Legend

Proposed Critical Habitat

Land Owner

Indian/Tribal

National Park Service

New Mexico State Game and Fish

New Mexico State Park

Other Federal Agency

Private

US Department of Energy

USDA Forest Service

Figure 1. Proposed Critical Habitat Units

2.4 Comparison of Potential Impacts of Jemez Mountains Salamander Proposed Critical Habitat Designation

The following table (Table 2.2) summarizes the potential effects of the alternative critical habitat designations. Potential effects on resources are summarized from the analyses presented in Chapter 3.

Table 2.2. Comparison of Potential Effects of Jemez Mountains Salamander Proposed Critical Habitat Designation

Resource	No Action	Alternative A—Designate Two Occupied Units
Water Resources	<ul style="list-style-type: none"> No impacts to water resource management beyond any conservation measures or project modifications resulting from the listing of the salamander and associated requirements of section 7 of the ESA. 	<ul style="list-style-type: none"> Addition of adverse mod analyses to section 7 consultations that would be undertaken for the species Negligible to minor impacts from delays, increased costs, or project alterations resulting from expanded section 7 consultations, including species monitoring, mapping, surveying Likely beneficial effects from any project modifications designed to protect the salamander that would also likely protect water resources within and surrounding the two critical habitat units.
Biological Resources	<ul style="list-style-type: none"> If consultations occur, no consideration of adverse modification to unoccupied unit. 	<ul style="list-style-type: none"> Compared with No Action Alternative, the addition of adverse modification analyses to section 7 consultations that would be undertaken for the species Likely beneficial impacts on wildlife, especially for species that require maintained forested areas.

Resource	No Action	Alternative A—Designate Two Occupied Units
Land Use	<ul style="list-style-type: none"> • No impacts beyond those resulting from the listing of the salamander and associated requirements of section 7, ESA 	<ul style="list-style-type: none"> • Minor impacts anticipated from expansions of consultations that would otherwise occur for jeopardy analysis related to land use management activities in newly designated habitat. • Minor impacts anticipated from implementation of conservation measures in newly designated habitat
Climate Change	<ul style="list-style-type: none"> • No impacts beyond those resulting from the listing of the salamander and associated requirements of section 7, ESA 	<ul style="list-style-type: none"> • Minor impacts anticipated from administrative costs and project modifications related to section 7 consultations in newly designated habitat.
Fire Management	<ul style="list-style-type: none"> • No adverse effects beyond any conservation measures or project modifications resulting from the listing of the salamander and associated requirements of section 7 of the ESA. 	<ul style="list-style-type: none"> • Compared with No Action Alternative, the addition of adverse mod analyses to section 7 consultations that would result in minor administrative cost increases, but any project modifications (and thus impacts) would be the same for jeopardy as for adverse mod, since habitat will be used as a surrogate for species presence in analyzing incidental take. • Actions that reduce the intensity and severity of wildland fires are beneficial to critical habitat and provide long-term protection to the salamander and its habitat

Resource	No Action	Alternative A—Designate Two Occupied Units
Soil Resources	<ul style="list-style-type: none"> • No impact beyond those conservation measures resulting from listing of the salamander and associated requirements of section 7, ESA. 	<ul style="list-style-type: none"> • Addition of adverse mod analyses to section 7 consultations that would be undertaken for the salamander • Likely beneficial impacts on soils resulting from project modifications to minimize impact to the habitat of the Salamander
Development	<ul style="list-style-type: none"> • No adverse impacts anticipated beyond the conservation measures or project modifications resulting from the concurrent listing and associated section 7 requirements. 	<ul style="list-style-type: none"> • Compared with the No Action Alternative, the addition of conservation measures would cause minor, adverse impacts. • Likely beneficial impacts on wildlife, especially where development of roads and trails are reduced. Potentially adverse impacts if conservation measures for different species conflict.
Socioeconomics & Recreation	<ul style="list-style-type: none"> • No adverse impacts on socioeconomic and recreational resources beyond any conservation measures or project modifications resulting from the listing of the salamander and associated requirements of section 7 of the ESA • Listing and section 7 requirements of salamander may prompt conservation measures or project modifications to recreation opportunities. 	<ul style="list-style-type: none"> • Minor adverse impacts to recreation opportunities (e.g. OHV and motorcycle use) from conservation measures benefiting habitat values for the salamander. • Likely beneficial impacts from increased section 7 consultations for recreation-related activities, which could result in maintenance of PCEs through conservation measures within designated critical habitat.

CHAPTER 3

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This chapter is organized by resource categories that may potentially be affected by designating critical habitat for the Jemez Mountains salamander. These resource categories were selected based on issues and concerns identified by the Service in the proposed listing and critical habitat rule (77 FR 56482, September 12, 2012) and subsequent public comments. Within each resource category, a description of the existing condition and threats is followed by an evaluation of potential environmental consequences resulting from the designation of critical habitat. Potential effects are evaluated for both alternatives described in Chapter 2, including the No Action Alternative.

Under the No Action Alternative, no critical habitat would be designated for the Jemez Mountains salamander.

Alternative A includes designating two occupied units of critical habitat for the Jemez Mountains salamander. Both units are within the geographical area occupied by the salamander and contain elements of essential physical or biological features. The proposed designation is 97 percent Federally-owned land.

3.1.1 Methodology

Descriptions of the affected environment presented in this document are based on a number of sources. These include:

- Published literature;
- Available state and Federal agency reports and management plans;
- Proposed listing rule and critical habitat designation for the Jemez Mountains salamander (77 FR 56482, September 12, 2012); and
- The 2012 economic analysis for the proposed designation of critical habitat (IEc 2012).

The designation of critical habitat imposes no universal rules or restrictions on land use, nor does it automatically prohibit or alter any land use or water development activity. With respect to critical habitat, the purpose of section 7 consultation is to ensure that actions of Federal agencies do not adversely modify critical habitat. The Service is working to update the regulatory definition of adverse modification since it was invalidated by a prior court ruling. In the meantime, the Service relies on the statutory provisions of the ESA to complete the section 7 consultation analysis with respect to critical habitat. Adverse modification of critical habitat means an action that, directly or indirectly, adversely alters the primary constituent elements (PCEs) of the physical or biological features that are essential to the conservation of the species or habitat quality (or the ability of PCEs to be functionally established) such that the ability of

the critical habitat unit to function and serve its conservation (recovery) role is appreciably reduced.

The salamander's physical or biological features require special management or protection from the following activities:

- Large-scale, stand-replacing wildfire;
- Actions that would disturb salamander habitat by warming and drying;
- Actions that reduce the availability of aboveground cover objects including downed logs; or
- Actions that would compact or disturb the soil or otherwise interfere with the capacity of salamanders to move between subterranean habitat and aboveground habitat.

Individuals, organizations, local governments, states, and other non-Federal entities are potentially affected by the designation of critical habitat only if their actions have a connection to Federal actions—a nexus—that is, only if those actions occur on Federal lands, require a Federal permit or license, or involve Federal funding.

Regarding critical habitat for the Jemez Mountains salamander, the Service may determine adverse modification when an action has an effect that would appreciably diminish the functionality of an area to meet recovery, such as either drying the habitat, raising the temperature of the habitat, or removing the habitat altogether. An adverse modification analysis would take into account the role of the critical habitat in the particular area in question, the quality and distribution of other critical habitat areas that are already protected, and the total habitat needed for the species' recovery. Taking into consideration habitat that is "already protected" is appropriate because only habitat that is protected is likely to serve its continued conservation role for the species.

In some circumstances, critical habitat designation generally increases the potential for more section 7 consultations, both reinitiated and new, with their associated costs and outcomes. Designating critical habitat has the potential to result in formal consultations over and above those required for a listed species with no designated critical habitat: Federal action agencies may consult on project activities they otherwise would not have consulted on because the affected habitat was thought to be unoccupied by or unsuitable for the listed species. Likewise, project proponents that are not involved with recovery efforts for the species have not requested consultations for actions that may affect the species, but may do so after critical habitat is designated due to increased awareness of the species presence in an area based on delineation of critical habitat.

In the case of the Jemez Mountains salamander, the Service may use habitat as a proxy for the number of individuals taken because they spend the bulk of their time underground, and so it is not possible to determine the population size at a particular location or across the range of the species. It is difficult to survey for this species because they are small, elusive, and only some unknown proportion is active above ground during the summer monsoonal rains, when relatively warmer and wet conditions moisten the habitat above ground, typically from July through September). The concept of using habitat as a proxy for species numbers was upheld in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service*, 378 F.3d 1059 (9th Cir. 2004), as amended

by 387 F.3d 968 (9th Cir. Wash., Oct. 28, 2004). The same factual information concerning impacts to habitat would also be considered in determining whether adverse modification of critical habitat is likely to occur.

Federal agencies that would likely go through the section 7 consultation process concerning critical habitat are the same as those that would undergo consultations to determine jeopardy to the species if critical habitat is not designated. They include:

- U.S. Forest Service, the Valles Caldera National Preserve, and Bandelier National Monument—for forest management, use of wildfire or prescribed fire, post-fire rehabilitation or resource management actions, livestock grazing (prohibited only in Bandelier), road construction or removal, development for recreational purposes, fire retardant use, and pesticide use; and
- US Fish & Wildlife Service--when it considers issuing section 10(a)(1)(B) permit applications for actions on private lands that could result in incidental take of the salamander (such actions require a Habitat Conservation Plan that identifies impacts to listed species and measures to avoid or minimize them)

Some of the activities described above could be conducted outside of the proposed boundaries of critical habitat, while potentially creating indirect impacts within it. Although the circumstances that could lead to consultation are identified above, the Service cannot predict with certainty or detail whether section 7 consultations will occur for actions that could affect proposed critical habitat. Because the species has not been previously listed, there have been no consultations to date for actions that could jeopardize the survival of the species.

The evaluation of impacts in this chapter focuses on costs and outcomes of the potential increase in section 7 consultations resulting from the designation of critical habitat for salamander. If consultations were to occur, impacts could include the following:

- Additional expenditures of time and money by Federal agencies, including the Service, and non-Federal proponents to complete the consultations.
- Additional time and costs to implement the reasonable and prudent alternatives and (possibly) discretionary conservation recommendations specified in biological opinions in which adverse modification was concluded.
- Additional time and costs to implement conservation measures that are part of an agency's proposed action to minimize adverse effects to critical habitat.
- A greater probability that the PCEs identified in section 1.4 would be maintained, thus increasing the likelihood of species survival. The requirement to consult on activities that may adversely modify designated critical habitat may cause action agencies and project proponents to alter their proposals to reduce, minimize, or avoid impacts on PCEs. Such alterations may obviate the need for consultation. If a consultation is initiated, then the outcome of critical habitat designation could be the modification of the proposal to limit the impacts on PCEs or the imposition of reasonable and prudent alternatives that would reduce impacts on PCEs.

In the case of the salamander, the Service expects that the same agencies and types of projects would go through the section 7 consultation process with or without critical habitat, and that the same number of projects would likely undergo consultation with critical habitat as without.

Therefore, the analysis of impacts to resources and activities focuses on the impacts of expanding jeopardy consultations to include analysis of adverse modification.

3.1.2 Economic Analysis

A separate analysis was conducted by Industrial Economics Incorporated (IEc 2012) to assess the potential economic effects of measures to protect salamander and its habitat in the proposed critical habitat areas. Dollar estimates of future economic impacts consider all of the conservation activities related to the Jemez Mountains salamander predicted to occur in the proposed critical habitat areas over the next 20 years. These impacts are categorized based on whether they would occur with listing of the species but without designating critical habitat (called “baseline impacts”), or if they would only occur if the designation occurred (“incremental impacts”). This categorization of impacts conforms to the analysis of the No Action Alternative and Alternative A in this Environmental Assessment. Where appropriate, information from the economic analysis was incorporated into this EA.

3.2 Water Resources

3.2.1 Existing Conditions

A physical or biological feature (PBF) important to the salamander is a moist environment. Because the Jemez Mountains salamander must address hydration needs above all other life-history needs, the salamander must obtain water from its habitat, and the salamander has no physical mechanism to stop dehydration or water loss to the environment. Though the salamander does not require standing water, respiration occurs through the skin and requires a moist microclimate for gas exchange. In particular, soil moisture is one of the most important factors in the ecology of the salamander. Moist and cool microhabitats are considered essential for the conservation of this species (77 FR 56482).

After the 2000 Cerro Grande Fire, water retention dams were constructed within potential salamander habitat to minimize soil erosion within burned areas, and additional dams or flood control features could be constructed within salamander habitat in the future. While individual salamanders could be killed or injured during construction of dams it is not anticipated that the construction of dams will pose a significant threat to the species or habitat, now or in the future.

Table 3.1. Critical Habitat Units and Watersheds

Critical Habitat Unit	Watershed	Critical Habitat within Watershed Hectares (Acres)
Unit 1	Jemez Watershed	42,445 (17,177)
Unit 2	Upper Rio Grande Watershed	5,800 (2,347)
	Rio Grande - Santa Fe Watershed	27,755 (11,232)
	Jemez Watershed	14,787 (5,984)

Source: USGS 2005

The entire Unit 1 and 14,787 ac (5,984 ha) of Unit 2 are found within the Jemez Watershed. The Jemez Watershed drains approximately 1,034 mi² (2,678 km²) of land and its main watercourse is the Jemez River, a tributary of the Rio Grande. The New Mexico’s Unified Watershed Assessment (UWA) identifies the Jemez Watershed as a Category I watershed: a watershed in most urgent need of restoration (Jemez Watershed Group 2005). The majority of critical habitat proposed in this watershed is managed by the Federal government with approximately 57 percent managed by the Santa Fe National Forest (NF) (USFS), 40 percent managed by the Valles Calderas National Preserve (VCNP), and less than one percent managed by the National Park Service (NPS) (USGS 2011).

There are 5,800 ac (2,347 ha) of Unit 2 located in the Upper Rio Grande Watershed. This watershed is located in north central New Mexico and southern Colorado and drains approximately 3,252 mi² (8,423 km²) of land. There are 7,971 mi (12,828 km) of water courses found within this watershed, and land use and land cover within the watershed includes evergreen forests, herbaceous grasslands, shrublands, agricultural fields, deciduous forests, developments, mining, roads and transportation, mixed forests, open water, and bare rock (NRCS No Date[a]). The majority of critical habitat proposed in this watershed is managed by the Federal government with approximately 90 percent managed by the Santa Fe NF, and 8 percent managed by the VCNP (BLM 2012).

The remaining 27,755 ac (11,232 ha) of Unit 2 are found within the Rio Grande-Santa Fe Watershed. The Rio Grande-Santa Fe Watershed is located in central New Mexico and drains approximately 1,854 mi² (4,803 km²) of land (USGS 2005). In 2011, the Las Conchas Fire burned approximately 86,315 ac (34,934 ha) in this watershed resulting in flash floods on and near burn scars. The main types of land cover and land use within this watershed include shrublands, grasslands/herbaceous fields, evergreen forests, low intensity residential areas, high intensity residential areas, and agriculture. There are 4,249 mi (6,838 km) of water courses in this watershed with 217 perennial streams and 3,480 intermittent streams or rivers (NRCS No Date[b]). The majority of critical habitat proposed in this watershed is managed by the Federal

government with approximately 68 percent managed by the Santa Fe NF, 25 percent managed by the NPS, and 3 percent managed by the VCNP (BLM 2012).

Water Rights

Water rights in New Mexico are held solely, jointly, collectively, or in the name of a corporation, organization, tribe, or government agency, and are based on the doctrine of prior appropriation. Surface and groundwater appropriation and distribution are controlled by the New Mexico State Engineer (NMOSE), whose responsibilities include supervision, measurement, appropriation, and distribution of the state's water. Thus, any changes to water rights must be approved by NMOSE (NMOSE 2005a; Jemez y Sangre Water Planning Council 2003).

In 1931, New Mexico passed the groundwater code that set the procedure for obtaining groundwater rights. These procedures are similar to gaining surface water rights, with several important differences: NMOSE regulates declared underground water basins. Authority is given to NMOSE to establish such basins when regulation is necessary to protect prior appropriations, ensure water is put to beneficial use, and to maintain orderly development of the State's water resources (NMOSE 2005b).

3.2.2 Environmental Consequences

Activities that could occur on or near critical habitat units that affect water resources include channel alteration, prescribed fires, alterations of watersheds and floodplains, release of chemical or biological pollutants, release of effluents into the surface or groundwater from a point source or non-point source, livestock waste pollution, silviculture practices, aerial pesticide application, and fire retardant application. While critical habitat designation could affect water supply operations if it causes (1) limits on reservoir capacity to avoid impacts on designated habitat; (2) requiring the release of otherwise stored and delivered water; (3) requirements to purchase replacement water at greatly increased cost; or (4) disruption of established water contracts and water rights. Because the Jemez Mountains salamander does not require standing water, it is not anticipated that water supply operations would be affected.

3.2.2.1 No Action

Under the No Action Alternative, no critical habitat would be designated for the Jemez Mountain Salamander. The section 7 consultation process would be implemented for projects that are large in scale and result in warmer and drier habitats, but without additional consideration of critical habitat and associated PCEs. Section 7 consultations would be initiated only for may affect determinations of effects to the Jemez Mountains salamander. These consultations would analyze relevant land, resource, and fire management plans proposed for Federal lands occupied by the salamander. As they relate to water resources, such consultations would likely include:

- U.S. Forest Service, the Valles Caldera National Preserve, and Bandelier National Monument —for forest management, use of wildfire or prescribed fire, post-fire rehabilitation or resource management actions, livestock grazing (prohibited only in Bandelier), road construction or removal, development for recreational purposes, fire retardant use, and pesticide use.

Therefore, this alternative would not have any impacts on water resource management beyond any conservation measures or project modifications resulting from the listing of the salamander and associated requirements of section 7 of the ESA.

3.2.2.2 Alternative A

All proposed critical habitat areas are within the geographical area occupied by the salamander, therefore, actions that include water resources within or surrounding proposed critical habitat units would be subject to section 7 consultations irrespective of the area's status as critical habitat. Alternative A (both proposed units, no exclusions) would not likely increase the number of section 7 consultations based solely on the presence of designated critical habitat. However, compared to the No Action Alternative, Alternative A would add the addition of an analysis of adverse modification of critical habitat to future section 7 consultations on the Jemez Mountains salamander in critical habitat.

The consultation analyses for effects on a listed species and effects on critical habitat are similar in many respects and are parallel processes because the health of a species cannot be disassociated from the health of its habitat. The outcomes of these future consultations would depend on the details of project proposals and the analysis of effects, which are unknown at this time. Adverse modification of critical habitat may occur if the proposed action:

- Reduces the quality of the critical habitat unit, degrade the quality of the PCEs, or preclude the ability of the PCEs to be established, or
- Makes it so a given unit can no longer contribute to the recovery of the species when taking into consideration the environmental baseline of the critical habitat.

The additional consultations, and the additional time required to complete consultations that would only have considered effects on the species, would increase administrative costs to the Service and to the action agencies. However, the Service anticipates that in cases where an action is found to adversely modify critical habitat for the salamander, the action would also be found to jeopardize the species. That is, actions which the Service is likely to recommend to avoid adverse modification are the same as those to avoid jeopardy. Thus, the incremental impacts of the critical habitat designation for the salamander appear unlikely to include additional conservation actions, project modifications, and implementation costs.

Outcomes of consultations for critical habitat cannot be predicted precisely; however, types of additional management actions that may be required to avoid both jeopardy and adverse modification include, but are not limited to: (1) reduce the size or configuration of the proposed project to avoid, reduce, or eliminate the effects to critical habitat; (2) mitigate the effects to the species in critical habitat by increasing permanent protection within the same watershed; (3) move the project so that it does not affect designated critical habitat and/or (4) offer recommendations to modify the action that would maintain important habitat features to the salamander within the action area (Service 2012a).

In summary, the effects of critical habitat designation on water resource management activities are expected to be negligible to minor, because any modifications resulting from conservation of critical habitat would likely be similar in nature to those recommended in consultations for listed

species, and additional section 7 consultations are not anticipated from the designation of critical habitat alone. Beneficial effects are anticipated on water resources, because any project modifications designed to protect the salamander would most likely also protect water resources within and surrounding the two critical habitat units.

3.3 Biological Resources: Wildlife, Plants and Threatened and Endangered Species

3.3.1 Existing Conditions

The two proposed critical habitat units include parts of the Santa Fe National Forest within the Jemez Mountains, the Valles Caldera National Preserve, and Bandelier National Monument, as well as relatively smaller portions of New Mexico State-owned land and private property. These areas include a mosaic of habitats such as coniferous forest woodlands and subalpine meadows, but the area is considered to be in the Southern Rocky Mountains Ecoregion (NMDGF 2006). The most prominent vegetative community is the mixed conifer forest dominated by Douglas fir (*Pseudotsuga menziesii*) along with other true firs (*Abies* spp) and spruces (*Picea* sp) (NMDGF 2006). Gambel oak (*Quercus gambelii*) and aspen (*Populus fremontii*) are prominent in areas after disturbance events. The area has ample precipitation during the long growing season, which maintains well-watered soils that are conducive to tree growth (NMDGF 2006). The forest provides habitat for common species such as mule deer (*Odocoileus hemionus*), bats (Family Vespertilionidae), black bear (*Ursus americanus*), coyote (*Canis latrans*), eagles (*Haliaeetus leucocephalus*), elk (*Cervus elaphis*), and migratory passerines such as empidonax flycatchers (*Empidonax* spp.) and warblers (Family Parulidae) as well as some rare species such as the American pika (*Ochotona princeps*), Williamson's sapsucker (*Sphyrapicus thyroideus*), olivesided flycatcher (*Contopus cooperi*), yellow warbler (*Dendroica petechia*), red-faced warbler (*Cardellina rubrifrons*), Grace's warblers (*Dendroica graciae*), Allen's big-eared bat (*Idionycteris phyllotis*) and Northern goshawk (*Accipiter gentilis*) (NMDGF 2006).

The primary threats to the region include logging and fire disturbance. Until the late 1800s fires occurred erratically about every 10 years, attributable to the mosaic composition of communities in various stages of succession (NMDGF 2006). However, as a result of fire suppression and subsequent tree regeneration, dense sapling understories of the more fire-sensitive Douglas fir and white fir species developed in the mixed-conifer forest. Logging has removed forest stands directly and fragmented habitat through timber removal as well as the construction of extensive road networks (NMDGF 2006).

3.3.1.1 Threatened and Endangered Wildlife Species

Table 3.2 lists species that are threatened, endangered, or have been determined to be candidates for such listing in Sandoval, Rio Arriba, and Los Alamos Counties, New Mexico. The spotted owl (*Strix occidentalis*) is the only species with critical habitat that overlaps with the proposed Jemez mountain salamander critical habitat.

The Mexican spotted owl is a medium sized owl with ashy-chestnut brown feathers and white and brown spots on their abdomen, back and head (NatureServe 2012). These owls are commonly found in old-growth or mature forests near water and therefore are probably found in the same habitats as the salamander. The existing critical habitat for the spotted owl has overlap with portions of both proposed units of critical habitat for the salamander (Service No Date).

Table 3.2. Federally-listed Species in Sandoval, Rio Arriba, and Los Alamos Counties, New Mexico

Species	Federal Status	Critical Habitat Overlap?
Birds		
Yellow-billed cuckoo <i>Coccyzus americanus</i>	Candidate	No
Mexican spotted owl <i>Strix occidentalis lucida</i>	Threatened	Yes
Southwestern willow flycatcher <i>Empidonax trailii extimus</i>	Endangered	No
Least tern <i>Sterna antillarum</i>	Endangered	No
Mammals		
New Mexico meadow jumping mouse <i>Zapus hudsonius luteus</i>	Candidate	No
Canada lynx <i>Lynx canadensis</i>	Candidate	No
Fish		
Rio Grande silvery minnow <i>Hybognathus amarus</i>	Endangered	No
Rio Grande cutthroat trout <i>Oncorhynchus clarkia virginialis</i>	Candidate	No

Source: Service 2012b; Service No Date

While there are multiple species with critical habitat in the counties above, their ranges do not necessarily overlap. Most significantly, the Rio Grande silvery minnow occurs only in the Rio Grande south of Cochiti Dam, outside of the range of the salamander.

3.3.2 Environmental Consequences

3.3.2.1 No Action

Under the No Action Alternative, no critical habitat would be designated for the Jemez Mountains salamander. The section 7 consultation process would be implemented for actions with a Federal nexus that may affect the species, but without additional consideration of PCEs. Section 7 consultations would be initiated only for *may affect* determinations of effects to the Jemez Mountains salamander. Such consultations would analyze relevant Land Management Plans, Grazing Management Plans, Fire Management Plans, Conservation Plans, and include

both site-specific and programmatic projects within the proposed area. As they relate to biological resources, such consultations would likely include:

- U.S. Forest Service, the Valles Caldera National Preserve, and Bandelier National Monument—for forest management, use of wildfire or prescribed fire, post-fire rehabilitation or resource management actions, livestock grazing (prohibited only in Bandelier), road construction or removal, development for recreational purposes, fire retardant use, and pesticide and herbicide use.

The Service assumes that USFS and VCNP will each consult on their noxious weed management actions in 2013 and again ten years later, resulting in a total of four consultations (IEc 2013). In addition, the Seven Springs Fish Hatchery, which is state-run but received Federal funding through the Sport Fish Restoration Act, is expected to conduct two consultations, one for operations, and another for a planned pipeline from Calaveras Canyon to the hatchery (IEc 2013).

A Cooperative Management Plan and Conservation Agreement were completed in 2000 by the New Mexico Endemic Salamander Team. The intent of the agreement was to protect the salamander and its habitat on lands administered by the U.S. Forest Service; however, there have been some projects that have negatively affected the species and the Cooperative Management Plan and Conservation Agreement do not address threats or include lands outside of lands administered by the U.S. Forest Service. 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 currently provide adequate protection for the salamander or its habitat.

Some protection for the salamander may be provided in areas where occupied salamander habitat overlaps with the Mexican Spotted Owl or its designated critical habitat in the Jemez Mountains, especially as the two species use similar forest habitats.

3.3.2.2 Alternative A

The consultations from the addition of adverse modification analysis, and the additional time required to complete consultations that would only have considered effects on the species, would increase administrative costs to the Service and to the action agencies. However, the Service anticipates that in cases where an action is found to adversely modify critical habitat for the salamander, the action would also be found to jeopardize the species. That is, actions which the Service is likely to recommend avoidance of adverse modification are the same as those to avoid jeopardy. Thus, the incremental impacts of the critical habitat designation for the salamander appear unlikely to include additional conservation actions, project modifications, and implementation costs. Recommended modifications could include, but are not limited to, the following (Service 2012a):

- Maintain key habitat components to provide adequate moisture and temperature regimes;
- Relocate the project to an area outside of occupied salamander habitat;
- Minimize the use of chemicals in terrestrial habitats; and/or

- Monitor for salamanders on site before or while construction or other activities occur within occupied salamander habitat areas.

The same agencies and types of projects would be expected to trigger consultation with or without critical habitat. The same number of projects would also likely undergo consultation with critical habitat as without. In the case of the Jemez Mountains salamander, habitat may be used as a proxy for the number of individuals taken and thus a jeopardy analysis and an adverse modification analysis would be the same.

If an action adversely modifies critical habitat then the Service anticipates that it would also determine that the action would jeopardize the species (Service 2012a). This is so because both a jeopardy analysis and an adverse modification analysis would focus on the effects of a proposed project's impacts to the physical features, PCEs, or other habitat characteristics determined by the Secretary to be essential for the conservation of the species in areas designated as critical habitat. Therefore, the actions recommended to avoid adverse modification would be the same as those for avoiding jeopardy. Given these estimates, the effects of Alternative A (designation of critical habitat) would not be significantly different from the No Action Alternative (no designation of critical habitat).

Specific recommendations to avoid destruction or adverse modification of critical habitat and to avoid jeopardy include the following:

- Implement actions on the landscape that reduce the risk of large-scale, stand replacing wildfire;
- Maintain key salamander components (e.g. large decomposing Douglas fir logs) when implementing fire use and forest management actions;
- Conduct studies to efficiently maintain high canopy cover while allowing for fire use and forest management actions; and
- Determine and utilize least harmful chemicals for broadscale use in salamander habitat (e.g. fire retardant).

These actions would serve to maintain habitat and habitat connectivity for the salamander. As a result, native fish, wildlife, and plants, including candidate, proposed, or listed species would benefit. The species most likely to benefit are species that also depend on the maintenance of forest stands, such as the spotted owl. Native vegetation would benefit through measures to restore, enhance and protect habitat within the critical habitat units. The beneficial effects of Alternative A on fish, wildlife, and plants are expected to be minor because the outcomes of consultations for critical habitat are not likely to substantially change management practices, proposed and existing projects, or various uses of proposed critical habitat segments.

In summary, the effects of critical habitat designation with regards to wildlife are expected to be minor because (1) projects are not expected to trigger consultation based solely on the presence of designated critical habitat because all proposed units are within the geographic area occupied by the salamander; (2) any reasonable and prudent alternatives developed under jeopardy analysis would not likely be changed substantially with the addition of adverse modification analysis; and (3) very few if any additional conservation measures would be proposed to address critical habitat, beyond those already proposed in jeopardy consultations.

3.4 Land Use and Management

3.4.1 Existing Conditions

The proposed critical habitat designation includes lands under Federal (approximately 96 percent), state (less than 1 percent), and private (approximately 3 percent) land ownership. Much of the Federal land is managed by the USDA Forest Service in Santa Fe National Forest and the National Park Service in Bandelier National Monument. The Valles Caldera National Preserve also comprises a large portion of proposed critical habitat (see Figure 1). The preserve is managed by a Federal board of trustees (Trust) appointed by the President of the United States (VCNP 2012a). Federal lands are managed according to the pertinent management plan for each Forest Service district office, NPS unit, and for the Valles Caldera Trust. There are no proposed critical habitat units on tribal lands (77 FR 56482, September 12, 2012).

Table 3.3. Approximate Proposed Critical Habitat Acres (hectares) by Land Ownership

Land Owner	Acres (ha)
Federal	87,840 (35,548)
State	73 (30)
Private	2,803 (1,134)
Total	90,716 (36,711)

There is a variety of land uses in designated critical habitat units. Forest Service lands dominate the Federal holdings, comprising approximately 62 percent of the Federal lands, with Valles Caldera National Preserve comprising 26 percent, and National Park Service lands comprising 8 percent.

The Forest Service manages habitat for the salamander on the Santa Fe National Forest (SFNF) in the Jemez (Units 1 and 2) and Espanola Ranger Districts (Unit 2). On Forest Service land, the principal land management activities affecting critical habitat units include forest thinning, use of wildfire or prescribed fire, post-fire rehabilitation or resource management actions, livestock grazing, road maintenance, construction, and removal, recreation and recreation development, fire retardant use, and pesticide use (USFS 2010). These activities and their impacts are discussed in the individual resource sections of this chapter.

On Valles Caldera National Preserve land, the principal land management activities affecting critical habitat units include forest thinning, use of wild or prescribed fire, riparian and wetland

restoration, road maintenance, and recreation (VCNP 2012a). In recent years, prescribed fire at Valles Caldera National Preserve has been limited, with only one burn in 2004 (Service 2012a).

National Park Service land includes Bandelier National Monument. This area is managed under the principles of multiple-use and sustained yield for future generations. Hunting, ORV use and grazing activities are not permitted on NPS lands. Principal land management activities at Bandelier National Monument affecting critical habitat units include recreation, forest management activities, use of wild or prescribed fire, and habitat restoration (NPS 2012a).

The proposed designation includes 2,803 ac (1,134 ha) of private land, which supports a variety of land uses:

- Private land within the Santa Fe National Forest—the Horseshoe Land Exchange, completed in 1998, transferred minimally developed Federal land to private ownership. At the time of the land exchange, the land contained 47 recreation cabins (CLG 2011). This land may be further developed in the future.
- Geothermal energy testing wells—through a cooperative geothermal energy development/testing project that occurred in 1982, 40 wells were drilled within salamander habitat in the Jemez Mountains. Due to the proven difficulty of extracting large quantities of hot fluids from the resources in the area, there are no current or future plans to construct large- or small-scale geothermal power production projects.
- Residential land—there are houses within the proposed critical habitat units. New housing and associated roads and infrastructure are anticipated in the southern and eastern portions of the species' range.
- Pajarito Mountain Ski Area—land management activities within the 719-ac (290-ha) ski area include recreation and trail maintenance (which may include large tree removal and bulldozing associated with significant soil disturbance).
- Mining—pumice mining activities associated with the Copar South Pit Pumice Mine and the El Cajete Pumice Mine, along with associated infrastructure such as access roads and heavy equipment staging areas, have the potential to be located and expanded within proposed critical habitat.

3.4.2 Environmental Consequences

Land management activities on critical habitat units include livestock management; recreation; fire suppression and prescribed fire; habitat restoration; surface disturbance construction activities including road construction and maintenance, mining, timber thinning, and recreation developments and activities including permitted off-road vehicle use.

3.4.2.1 No Action

Under the No Action Alternative, no critical habitat would be designated for the Jemez Mountains salamander. The Service estimates that without critical habitat, they would conduct on average approximately 4 informal and 2 formal consultations per year, for a total of approximately 40 formal and 85 informal consultations from 2013-2032. Roughly half of these consultations would be related to fire management, and the majority of the others for other

Federal and State land management activities, with a small number relating to transportation and development, as discussed in later sections. As they relate to land use and management, such consultations would likely include (Service 2012a):

- U.S. Forest Service, the Valles Caldera National Preserve, and Bandelier National Monument—for forest management, use of wildfire or prescribed fire, post-fire rehabilitation or resource management actions, livestock grazing (prohibited only in Bandelier), road construction or removal, development for recreational purposes, fire retardant use, and pesticide use.
- The U.S. Fish and Wildlife Service—when considering issuing section 10(a)(1)(B) permit applications.

Therefore, this alternative would not have any impacts on land use and management beyond any conservation measures or project modifications resulting from the listing of the Jemez Mountains salamander and associated requirements of section 7 of the ESA.

3.4.2.2 Alternative A

All proposed critical habitat units are within the geographical area occupied by the Jemez Mountains salamander; therefore, land management actions in those units would be subject to section 7 consultations irrespective of the area's status as critical habitat. Therefore, compared to the No Action Alternative, Alternative A (both proposed units, no exclusions) would be estimated to result in no additional section 7 consultations for land management actions based solely on the presence of designated critical habitat. However, designation would trigger the addition of an analysis of adverse modification of critical habitat to future section 7 consultations on the Jemez Mountains salamander in critical habitat.

The expansion of consultations to include adverse modification analysis would increase administrative costs to the Service and to the action agencies. Based on previous activity within designated units, project proponents could include the National Park Service and U.S. Forest Service, although specific locations of these types of projects in critical habitat are unknown at this time.

Implementing conservation measures resulting from expanded consultations would not be likely to increase costs for action agencies, however, because any reasonable and prudent alternatives or conservation measures developed to avoid adverse modification would likely be the same as those developed under jeopardy analysis. These outcomes cannot be predicted precisely; however, management actions that may be required include:

- Implementing actions on the landscape that reduce the risk of large-scale, stand replacing wildfire;
- Maintaining key salamander components (e.g. large decomposing Douglas fir logs) when implementing fire use and forest management actions;
- Conducting studies to efficiently maintain high canopy cover while allowing for fire use and forest management actions; and
- Determining and utilizing least harmful chemicals for broad-scale use in salamander habitat (e.g. fire retardant).

In summary, the effects of critical habitat designation on land use and management are expected to be minor because (1) no additional projects would be subject to consultations based solely on the presence of designated critical habitat, because both of the proposed units are occupied by the salamander; (2) any reasonable and prudent alternatives developed under jeopardy analysis would not likely be changed substantially with the addition of adverse modification analysis; and (3) very few if any additional conservation measures would be proposed to address critical habitat, beyond those that would be proposed in jeopardy consultations.

3.5 Climate Change

3.5.1 Existing Conditions

As defined by the Intergovernmental Panel on Climate Change (IPCC) “climate” refers to the average level and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007). “Climate change” refers to a change in the average level or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007).

Past Trends

The Nature Conservancy of New Mexico analyzed recent changes in New Mexico’s climate and concludes the following regarding climate conditions in New Mexico and the Jemez Mountains (77 FR 56499):

- (1) Over 95 percent of New Mexico has experienced average temperature increases; warming has been greatest in the Jemez Mountains.
- (2) Ninety-three percent of New Mexico’s watersheds experienced increasing annual trends in moisture stress during 1970–2006, that is, they have become relatively drier.
- (3) Snowpack has declined in 98 percent of sites analyzed in New Mexico; the Jemez Mountains has experienced significant declines in snowpack.
- (4) The Jemez Mountains have experienced warmer and drier conditions during the 1991–2005 time period.
- (5) The Jemez Mountains ranked highest of 248 sites analyzed in New Mexico in climate exposure—a measure of average temperature and average precipitation departures.

Future Predictions

Although the extent of warming likely to occur is not known with certainty at this time, the IPCC (2007) predicts that changes in the global climate system during the 21st century will very likely be larger than those observed during the 20th century. It is estimated that the summer season will experience the greatest increase in warming in the Southwest (IPCC 2007a). For the next two decades, a warming of about 0.4 degrees Fahrenheit (°F) per decade is projected (IPCC 2007). Climate simulations of Palmer Drought Severity Index (PDSI) (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. Annual average precipitation is likely to decrease in the Southwest as well as the length of snow season and snow depth (IPCC 2007a). Most models project a widespread decrease in snow depth in the Rocky Mountains and earlier snowmelt (IPCC 2007a, p. 891). Models also indicate 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, researchers found that fire in New Mexico appears to be acutely sensitive to summer climate and temperature changes and may respond dramatically to climate warming.

Relationship of Climate Change to the Jemez Mountains Salamander

The proposed critical habitat rule includes a discussion of how climate change could impact Jemez Mountains salamander habitat (77 FR 56482-56512). It concludes, “In summary, we [the Service] 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 active above ground, and increase the moisture demands and subsequent physiological stress on salamanders. Warming and drying trends in the Jemez Mountains currently are threats to the species, and these threats are projected to continue into the future.”

Habitat drying affects salamander physiology, behavior, and viability; affects the occurrence of natural events such as fire, drought, and forest die-off; and increases the risk of disease and infection. 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 by causing dehydration, to which Jemez Mountains salamanders are particularly susceptible. Therefore, any action that reduces habitat quality by either warming the habitat or drying the habitat, or both, or reduces the timing or duration that the species can be active aboveground reduces individual and population survival and reduces opportunities for recovery (77 FR 56482-56512).

Climate Change in Critical Habitat Units

Actions that are large in scale and could result in warmer or drier (or both) habitat conditions could include forest thinning, logging, salvage logging, some types of prescribed burning, or fire use. Such changes in forest composition and structure may exacerbate severe wildland fires and are, therefore, considered a threat to the salamander. Changes in forest composition and structure may threaten the salamander by directly altering soil moisture, soil temperature, soil pH, relative humidity, and air temperature. These issues and their impacts are discussed in the individual resource sections of this chapter.

3.5.2 Environmental Consequences

As mentioned above, activities on critical habitat units that could result in warmer or drier (or both) habitat conditions include include forest thinning, logging, salvage logging, some types of prescribed burning, or fire use. Such changes in forest composition and structure may exacerbate severe wildland fires and are, therefore, considered a threat to the salamander.

The Forest Service issued a document titled “Climate Change Considerations in Project Level NEPA Analysis” in 2009, to guide the analysis of climate change for future projects (USFS 2009b). It discusses the two types of effects of climate change:

- (1) The effect of the proposed action on climate change. The designation of critical habitat units would not impact climate change as it would not initiate or implement projects that produce greenhouse gas emissions; and
- (2) The effect of climate change on the proposed action. Expected shifts in rainfall patterns are an example of such an effect, and would have the potential to affect Jemez Mountains salamander critical habitat units. The Forest Service would conduct its own NEPA climate change analysis of its proposed actions, as appropriate.

Therefore, while the Service expects long-term climate trends associated with a drier climate to have an overall negative effect on Jemez Mountains salamanders through warmer climate conditions, reduction in suitable salamander habitat, and increased moisture demands and physiological stresses on the salamander, the designation of critical habitat itself will neither create impacts to climate change (since it does not initiate or implement projects that create emissions) nor contribute to the expected adverse impacts of climate change on critical habitat (because it would not contribute to the changes in temperature or hydrologic cycles). To the extent that designation of habitat contributes to the maintenance of PCEs, it may produce beneficial impacts by improving the resilience of PCEs to the adverse impacts of climate change.

3.5.2.1 No Action

Under the No Action Alternative, no critical habitat would be designated for the Jemez Mountains salamander. The section 7 consultation process would continue as presently conducted without consideration of PCEs. Such consultations would analyze relevant management plans on Federal lands currently occupied by the species. As they relate to climate, such consultations would likely include:

- U.S. Forest Service, National Park Service—for fire management plans, fire suppression, fuel reduction treatments, resource management plans and forest plans

Therefore, this alternative would not have any impacts on climate beyond any conservation measures or project modifications resulting from the listing of the Jemez Mountains salamander and associated requirements of section 7 of the ESA.

Activities occurring within occupied salamander habitat could impact the quality of habitat and influence the survivability of salamanders. How significant that loss is overall to the species will depend on such things as the amount of area where warming or drying or both occur, the extent of departure from preferred temperature and moisture conditions, or the departure from timing and duration salamanders can be active above ground.

3.5.2.2 Alternative A

Both proposed critical habitat areas are occupied by the Jemez Mountains salamander; therefore, management actions in those areas would be subject to section 7 consultations irrespective of the area’s status as critical habitat. However, designation would lead to the addition of an analysis

of adverse modification of critical habitat to future section 7 consultations on the Jemez Mountains salamander in critical habitat.

Consultations on the species would increase administrative costs to the Service and to the action agencies. However, the Service anticipates that in cases where an action is found to adversely modify critical habitat for the salamander, the action would also be found to jeopardize the species. That is, actions which the Service is likely to recommend to avoid adverse modification are the same as those to avoid jeopardy. Thus, the incremental impacts of the critical habitat designation for the salamander appear unlikely to include additional conservation actions, project modifications, and implementation costs. Outcomes of consultations cannot be predicted precisely; however, types of management actions that may be required to avoid both jeopardy and adverse modification include, but are not limited to:

- Project modifications that reduce the effect of the proposed action to a level where it would not impact the species' numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild would not be appreciably reduced.
- Maintenance of key habitat components to provide adequate moisture and temperature regimes
- Relocation of projects to areas outside of occupied salamander habitat
- Minimization of the use of chemicals in terrestrial habitats
- Monitoring for salamanders on site before or while construction or other activities occur within occupied salamander habitat areas.

In summary, while climate change has the potential to adversely impact salamander habitat, the effects of critical habitat designation on climate are expected to be minor because (1) any reasonable and prudent alternatives developed under jeopardy analysis would not likely be changed substantially with the addition of adverse modification analysis; and 2) very few if any additional conservation measures would be proposed to address critical habitat, beyond those that would already be proposed in jeopardy consultations.

3.6 Fire Management

3.6.1 Existing Conditions

Threats to the Jemez Mountains salamander and its habitat include historical fire management activities, such as fire exclusion, suppression, and severe wildland fires, post-fire rehabilitation, and mechanical treatment of hazardous fuels; and forest management practices including logging. Primary constituent elements (PCEs) of the salamander's habitat that could be affected by fire management and forestry activities include:

- Tree canopy cover greater than 58 percent consisting of Douglas fir (*Pseudotsuga menziesii*), blue spruce (*Picea pungens*), Engleman spruce (*P. engelmannii*), white fir (*Abies concolor*), limber pine (*Pinus flexilis*), ponderosa pine (*Pinus ponderosa*), and aspen (*Populus tremuloides*) with an understory consisting of Rocky Mountain maple (*Acer glabrum*), New Mexico locust (*Robinia neomexicana*), oceanspray (*Holodiscus sp.*), or shrubby oaks (*Quercus spp.*);

- Ground surface in forest areas with (1) at least 25 percent or greater of ground surface area of coniferous logs at least 10 in (25 cm) in diameter, particularly Douglas fir and other woody debris, which are in contact with the soil in varying stages of decay from freshly fallen to nearly fully decomposed, or (2) structural features such as rocks, bark, and moss mats that provide the species with food and cover; and
- Underground habitat in forest or meadow areas containing interstitial spaces provided by igneous rock with fractures or loose rocky soils, rotted tree root channels, or burrows of rodents or large invertebrates (77 FR 56481).

Fire Management

Fire management activities can include the combined use of wildland fire and prescribed fire applications, broadcast burning, digging fire lines, targeting the reduction of large decaying logs, the use of flares and fire-retardant chemicals, grass seeding, heavy equipment operation, bulldozing, tilling, hydromulching, mulching, erosion control fabric, backfiring, water dropping from helicopters, chipping vegetation, tree-felling, removal of aboveground rocks to build rock dams, contour felling, and cutting and scattering rounds. While some of these activities, such as contour felling of logs and cutting and scattering rounds, may reduce some of the short-term effects of fire to the salamander and its habitat, most of these treatments could cause further impacts to salamander habitat beyond impacts caused by wildland fires, including reducing canopy cover, compacting soil, drying of the soil, changing soil pH, or reducing the quantity of large, decaying logs (77 FR 56482).

Within the Jemez Mountains, over 100 years of fire suppression and fire exclusion have altered forest composition and structure, increasing the threat of wildfire in Ponderosa pine and mixed-conifer forests. For at least several thousand years, fire has been an important process in this area. Frequent, low-intensity surface fires and patchy, small-scale, high-intensity fires historically maintained salamander habitat. In the late 1800s these historic fire patterns were changed by the elimination of fine fuels due to livestock overgrazing and managed fire suppression activities. Over time, low- to moderate severity fire regimes with small, patchy fires were converted to high-severity, large-scale, stand-replacing fires that have the potential to significantly destroy or degrade salamander habitat (77 FR 56482). Recently, the frequency of large-scale, high severity, stand-replacing wildland fires has increased, with severe wildland fires occurring in the Jemez Mountains in 1993, 1996, 1997, 2000, 2002, 2011, and 2012. The majority of wildfires over the past 20 years have exhibited crown fire behavior and burned in the direction of the prevailing south or southwest winds (77 FR 56482).

Severe wildland fires have significantly degraded important features of salamander habitat by removing tree canopy and shading, increasing soil temperature, decreasing soil moisture, increasing soil pH, reducing or eliminating soil organic matter, reducing soil porosity, and creating short-term hydrophobic soils. These and other effects limit the amount of aboveground habitat available for the salamander and alter the timing and duration of when the salamander can be active aboveground, which negatively impacts salamander behavior (e.g., maintenance of water balance, foraging, and mating) and physiology (e.g., increased dehydration, heart rate and oxygen consumption, and increased energy demand). The threat of wildland fires and the effects they have on salamander habitat will likely continue into the future, because areas that have not burned in the past 15 years are still at extreme high risk for wildland fires, and areas that have

experienced severe wildfires in the last 15 years have degraded habitat that continues to adversely affect the salamander (77 FR 56482).

Though fire use and hazardous fuel treatments are not always beneficial to the salamander, they reduce the chance of high-intensity, severe fires and therefore are important to the long-term protection of the salamander's habitat. Similarly, while fire suppression activities may also negatively impact both the salamander and its habitat, they improve the chances of quick fire suppression, thus promoting relatively smaller-scaled wildland fires (77 FR 56482).

Forest Management

Changes in forest composition and structure from forest management activities could also harm the salamander and its habitat by exacerbating wildland fires or by directly altering soil moisture, soil temperature, soil pH, relative humidity, and air temperature. Ecological changes resulting from forest composition changes could also result in altered prey availability.

Many of the forests in the Jemez Mountains have been fragmented by past forest management practices, especially through silviculture practices including timber harvesting. While salamanders still occupy areas where timber harvesting has occurred the effects of timber harvesting on salamander habitat continue to adversely affect the salamander and its habitat. Timber harvesting in the Jemez Mountains that could adversely affect the salamander's habitat includes clear-cut logging and salvage cutting. Timber harvests remove large-diameter trees that, when they fall and decompose, provide high-quality, relatively cool, high-moisture, diurnal aboveground habitat, alter forest canopy structure, compact soil, and disturb other important habitat features of the salamander. Timber harvesting can also promote high fuels increasing the risk of large-scale stand replacing wildfire, warm or dry salamander habitat, and have cascading effects on soil moisture and temperatures. Timber harvest activities that likely pose no threat to the continued existence of the salamander include removing safety hazard trees which have minimal disturbance to the surround soils or substrates (77 FR 56482).

Fire and Forest Management on Federal Lands within Proposed Critical Habitat

The majority of proposed critical habitat is located on Federal lands where fire management activities occur and include the Santa Fe National Forest (NF), Valles Calderas National Preserve (VCNP), and the National Park Service's (NPS) Bandelier National Monument. Both the Santa Fe NF and VCNP are administered by the United States Forest Service (USFS) and these lands are also affected by silviculture practices.

Current Federal fire management practices conform to the National Fire Plan, which was developed by Federal agencies in 2001 to address the causes of changing fire regimes and to guide wildland fire management (FY 2001 Interior and Related Agencies Appropriations Act [Public Law 106-291]). The implementation plan for this collaborative effort, called the 10-year Comprehensive Strategy, outlines a comprehensive approach to the management of wildland fire, hazardous fuels, and ecosystem restoration and rehabilitation on Federal and adjacent state, Tribal, and private forest and range lands in the United States.

The four primary goals of this strategy are to (1) improve prevention and suppression, (2) reduce hazardous fuels, (3) restore fire-adapted ecosystems, and (4) promote community assistance. Possible fire management actions depend on specific circumstances and may include:

- Reduction of hazardous fuel loads by mechanical, chemical, or biological means;
- Reduction of hazardous fuel loads or habitat restoration with prescribed fire, which is any fire ignited by management actions to meet specific objectives;
- Wildland fire use, which is the management of naturally ignited wildland fires to accomplish specific restated resource management objectives in predefined geographic areas; and
- Wildland fire suppression.

Consistent with national policy, the focus of fire management has increasingly been on the wildland-urban interface (WUI), which comprises areas where flammable wildland fuels meet or intermingle with structures and other human development. If human development and recreation increases in the Jemez Mountains, the presence of WUIs could increase within and around proposed critical habitat.

Section 7 consultations regarding fire management are often programmatic in nature, covering broad-based fire management plans and programs, but consultations may be required for individual burn and rehabilitation plans. Emergency section 7 consultations for wildland fire suppression are typically conducted after the fact.

Fire management on Bandelier National Monument is guided by the Bandelier National Monument 2005 Fire Management Plan, which was developed in accordance with the 2001 Federal Fire Policy. It includes these goals:

- Prevent or mitigate impacts due to fire suppression activities;
- Restore and maintain fire-dependent ecosystems with the appropriate use of fire;
- Use prescribed fire to meet fire and resource management goals and objectives; and
- Allow natural fires to function in fire dependent ecosystems.

In 1991, the New Mexico Department of Game and Fish, USFS, and the Service signed the Memorandum of Agreement (MOA) for the Conservation of the Jemez Mountains Salamander. Under this MOA a cooperative management plan for the salamander on lands administered by the USFS was developed in 2000. In addition, the MOA requires that all proposed activity in occupied and potential salamander habitat on Forest Lands must first be reviewed and evaluated by the New Mexico Endemic Salamander Team (NMEST). Management objectives of this plan are to (1) remove or reduce threats to the salamander on lands administered by the USFS; (2) ensure its long-term viability through the maintenance and protection of its historic, occupied, and potential habitat; and (3) use adaptive management as needed to modify the actions taken to conserve the species.

Under this management plan, the salamander habitat is divided into three management zones: essential zones, survey zones, and peripheral zones. Essential zones are the most crucial for long term maintenance of salamander populations and contain most of the known salamander populations. Management guidelines are provided for this essential zone for both fire management and silviculture practices. Within this zone fire management activities such as

thinning, prescribed burning, or prescribed natural fire would only be allowed if the following conditions are met:

- Activities are designed to meet the management objective of the Jemez Mountains salamander;
- Projects are reviewed by the NMSET;
- Projects are designed to ultimately contribute to the long-term ecosystem stability and long-term maintenance of the salamander populations;
- Surveys are conducted to determine the presence or absence of salamanders; and
- Project incorporates all reasonable efforts to minimize impacts to known salamander locations (e.g. only conduct activities during salamander inactivity) and incorporate appropriate monitoring efforts (NMEST 2000).

The management plan also states that when possible and practical, unnatural stand-replacing fires in occupied Jemez Mountains salamander habitat should be prevented through active management and suppression. Specific guidelines for fire suppression, rehabilitation, and management-ignited fire in this zone include:

- Jemez Mountains salamander location and management zone maps should be utilized during fire suppression activities and biologists familiar with the species and management plan should be dispatched to support suppression activities;
- Use of Minimum Impact Suppression Tactics² (MIST) by avoiding use of heavy equipment if possible. When heavy equipment is required, steps will be taken to minimize any impact to the salamander's habitat; and
- Maintain as much of the live canopy and downed log cover as possible.

Silviculture practices within this zone would be allowed if:

- They are designed to meet the management objective of the Jemez Mountains Salamander Management Plan;
- Surveys are conducted prior to implementing the silviculture activity to determine the presence or absence of salamander; and
- Actions are reviewed by the New Mexico Endemic Salamander Team.

In addition silviculture treatments will be designed to protect, maintain, or improve habitat conditions for the salamander (NMEST 2000).

Within the Survey Zone, surveys are required for any habitat altering activities including fire management and silviculture practices. Viable populations of the salamander should be maintained at all occupied sites in this zone. Within the Peripheral Zone surveys are conducted prior to management activities only for areas that meet salamander habitat characteristics. Habitat monitoring is also a requirement of the Jemez Mountains Salamander Management Plan (NMEST 2000).

² The concept of MIST is to use the minimum amount of force necessary to effectively achieve the fire management protection objectives consistent with land and resource management objectives. It is a mind set on how to suppress a wildfire yet minimize the long-term effects of the suppression action on the land. MIST may also require greater rehabilitation efforts than previously practiced (BLM 2004).

For the Lakes and BMG Wildfire Timber Salvage Plan, the NMEST reviewed the timber salvage plan and supported the Alternative that addressed the key wildlife issues by eliminating units of the plan to protect salamander populations. The NMEST also requested that the following stipulations be incorporated into the final plan:

- A pre-treatment, 2 person-hour presence/absence survey should be conducted for every 20 acres (8 ha) within each treatment unit. Surveyors should select optimum habitat for surveys within each 20-acre plot based on known preferred salamander habitat.
- If Jemez Mountains salamanders are found with a 20-acre sub-unit, the entire unit should receive the full range of mitigation stipulations designed for occupied sites, including no treatment during the salamander activity period of July 1 through October 15.
- The Team would like to be notified before the surveys occur, so we may provide assistance with the surveys if possible (NMEST 2003).

Prescribed fire at VCNP, within the Santa Fe NF, has been limited with only one burn in 2004 and a prescribed fire plan is expected to be developed in the future for the VCNP. Since 1972, only minor selective logging has occurred on the VCNP and no commercial logging is proposed or likely in the foreseeable future. Some tree thinning of secondary growth forests is anticipated to occur to prevent severe wildfires (77 FR 56481 56513).

3.6.2 Environmental Consequences

3.6.2.1 No Action

Under the No Action Alternative, no critical habitat would be designated for the Jemez Mountain Salamander. The section 7 consultation process would be implemented for projects that are large in scale and result in warmer and drier habitats, but without additional consideration of critical habitat and associated PCEs. These consultations would analyze relevant land, resource, and fire management plans proposed for federal lands occupied by the salamander. As they relate to fire and forest management, such consultations would likely include:

- U.S. Forest Service, the Valles Caldera National Preserve, and Bandelier National Monument—for forest management, use of wildfire or prescribed fire, post-fire rehabilitation or resource management actions, livestock grazing (prohibited only in Bandelier), road construction or removal, development for recreational purposes, fire retardant use, and pesticide use. The Service estimates 20 formal fire management consultations over the next 20 years (IEc 2013).

Therefore, this alternative would not have any impacts on forest and fire management beyond any conservation measures or project modifications resulting from the listing of the salamander and associated requirements of section 7 of the ESA.

3.6.2.2 Alternative A

Both proposed critical habitat areas are within the geographical area occupied by the salamander, therefore, actions that include fire or forest management within or surrounding proposed critical habitat units would be subject to section 7 consultations irrespective of the area's status as critical habitat. Alternative A (both proposed units, no exclusions) would not likely increase the number of section 7 consultations based solely on the presence of designated critical habitat. However, compared to the No Action Alternative, Alternative A would add the addition of an analysis of adverse modification of critical habitat to future section 7 consultations on the Jemez Mountains salamander in critical habitat. .

Adverse modification of critical habitat may occur if the proposed action:

- Reduce the quality of the critical habitat unit, degrading the quality of the PCEs, or precluding the ability of the PCEs to be established, or
- Make it so a given unit can no longer contribute to the recovery of the species when taking into consideration the environmental baseline of the critical habitat.

The additional consultations, and the additional time required to complete consultations that would only have considered effects on the species, would increase administrative costs to the Service and to the action agencies. However, the Service anticipates that in cases where an action is found to adversely modify critical habitat for the salamander, the action would also be found to jeopardize the species. That is, actions which the Service is likely to recommend to avoid adverse modification are the same as those to avoid jeopardy. Thus, the incremental impacts of the critical habitat designation for the salamander appear unlikely to include additional conservation actions, project modifications, and implementation costs.

Outcomes of consultations cannot be predicted precisely; however, types of additional management actions that may be required to avoid both jeopardy and adverse modification include, but are not limited to:

- Reduce the size or configuration of the proposed project to avoid, reduce, or eliminate the effects to critical habitat;
- Mitigate the effects to the species in critical habitat by increasing permanent protection within the same watershed;
- Move the project so that it does not affect designated critical habitat;
- Limitations on the timing and route of access to a forest management project
- Design project to meet the management objective of the Jemez Mountains Salamander Management Plan;
- Conduct surveys prior to implementing the silviculture activity to determine the presence or absence of salamander;
- Design projects to contribute to the long-term ecosystem stability and long-term maintenance of the salamander populations;
- Conduct projects only during salamander inactivity;
- Utilize Jemez Mountains salamander location and Management zone maps during fire suppression activities;
- Use Minimum Impact Suppression Tactics activities to minimize adverse effects to the salamander; and

- Maintain as much of the live canopy and downed log cover as possible (Service 2012a; NMEST 2000; NMEST 2003).

It is important to note that critical habitat designation does not preclude the proactive treatments necessary to reduce the risk of catastrophic fire or proactively managing forests to restore them to old growth conditions, nor are there survey requirements associated with this designation. In addition, critical habitat does not preclude adaptive management or the incorporation of new information on the interaction between natural disturbance events and forest ecology.

Incremental economic impacts associated with fire management are estimated to be \$120,000 in present value terms, using a seven percent discount rate. These costs are incremental administrative consultation costs.

In summary, the effects of critical habitat designation on fire and forestry management activities are expected to be minor to moderate, because any modifications resulting from the conservation of critical habitat would likely be similar in nature to those recommended in consultations for listed species and additional section 7 consultations are not anticipated from designating critical habitat alone. Also many of the conservation measures that could be required to provide protection to critical habitat are already implemented by the USFS. In addition, even though fire and forestry management activities can adversely affect critical habitat, practices that reduce the intensity and severity of wildland fires are beneficial to critical habitat and provide long-term protection to the salamander and its habitat. Fire and forestry management actions in salamander habitat that reduce hazardous fuels and restore the fire-adapted ecosystem while minimizing short-term adverse affects to the salamander can benefit the salamander and its habitat long-term.

3.7 Soil Resources

3.7.1 Existing Conditions

Soils in the proposed Jemez Mountains Salamander have colluvial parent material—they are made up of rock fragments carried downslope and tend to be coarse and gravelly. Most of the soil units in the critical habitat are well drained, meaning that water is removed from the soil readily, but not rapidly and it provides sufficient wetness for plants during most of the growing season (NRCS 2006). The condition of the soil is an important factor in the life of the salamander, because it lives underground and must be able to move readily through the soil, and because it requires a moist upper soil layer for respiration. In addition, soil temperature is also an important factor in salamander ecology. Interstitial spaces in underground forest or meadow habitat, created by loose rocky soils, are a primary constituent element of salamander critical habitat.

In 2000, the Cerro Grande Fire caused soil temperature to exceed the salamander's threshold. Since the salamander lives underground it is not generally directly burned or killed by wildfire, but if the wildfire is severe it can raise soil temperature to levels that cause severe physiological stress or death to the salamander. Over the last 30 years severe wildland fires have been degrading soil conditions in the area through increases in temperature, decreases in moisture,

increased pH levels, reduction of soil organic matter and porosity, and the short-term creation of water-repelling soils (Service 2012a).

3.7.2 Environmental Consequences

Activities that occur on critical habitat units that affect soil resources include use of heavy equipment, road construction, pipeline installation, mechanical treatment of hazardous fuels, and post-fire rehabilitation treatments.

3.7.2.1 No Action

Under the No Action Alternative, critical habitat for the Jemez Mountains salamander would not be designated. The section 7 consultation process would occur without consideration of PCEs. Such consultations would analyze relevant actions on Federal lands currently within the geographic area occupied by the species. As they relate to soil resources, such consultations would likely include:

- U.S. Forest Service, the Valles Caldera National Preserve, and Bandelier National Monument—for forest management, use of wildfire or prescribed fire, post-fire rehabilitation or resource management actions, livestock grazing (prohibited only in Bandelier), road construction or removal, development for recreational purposes, fire retardant use, and pesticide use.

Because the Service intends to use habitat as a proxy for the number of individuals taken in a jeopardy analysis, there may be no difference between jeopardy analysis and adverse modification. Therefore, this alternative would not have any impacts on soil resources beyond the conservation measures or project modifications resulting from the concurrent listing of the salamander and associated requirements of section 7 of the ESA.

3.7.2.2 Alternative A

As it relates to soil resources, recommendations to modify project actions would likely have the goal of reducing the amount of soil compaction that occurs from the project. Soil compaction decreases the permeability of the soil, therefore decreasing the moisture available, and interferes with the ability of the salamander to move underground. Outcomes of consultations for critical habitat could include reasonable and prudent alternatives and other conservation measures designed to maintain salamander PCEs. These outcomes cannot be predicted precisely; however, types of additional management actions that may be required include, but are not limited to: (1) reduce the size or configuration of the proposed project to avoid, reduce, or eliminate the effects to critical habitat; (2) mitigate the effects to the species in critical habitat by increasing permanent protection within the same watershed; (3) move the project so that it does not affect designated critical habitat and/or (4) offer recommendations to modify the action that would maintain important habitat features to the salamander within the action area.

Because the salamander lives mostly underground, any action to protect its habitat would have subsequent beneficial impacts to the soil. Therefore, the effects of the critical habitat designation for the Jemez Mountains salamander would be beneficial to soil resources.

3.8 Development—Roads, Trails, Residential, Infrastructure

The proposed rule lists private residential development, construction of roads and trails (motorized vehicle, bicycle, and foot trails), and road clearing and maintenance activities as threats to the salamander's critical habitat. The proposed designation makes clear that critical habitat does not include any manmade structures already in place at the time of listing, such as buildings, fire lookout stations, runways, roads, and other paved areas (77 FR 56512).

3.8.1 Existing Conditions

At this time the Service is unaware of any major construction projects planned within the proposed critical habitat (Service 2012a). Areas in Rio Arriba and Sandoval counties with proposed critical habitat are characterized by relatively low population densities. Los Alamos County, the smallest county in the state, is also the most densely populated of the three counties. Major roads in the proposed units include State Highways 126 and 4. While several Federal agencies manage land within salamander critical habitat, major construction and development projects are not consistent with many of the Federal management plans and goals. Projects that increase human disturbances in remote locations like residential development, construction of roads and trails in recreational areas, and road clearing and maintenance activities, could adversely affect the species and its habitat.

The Forest Service manages habitat for the salamander on the Santa Fe National Forest (SFNF) in the Jemez (Units 1 and 2) and Espanola Ranger Districts (Unit 2). The Santa Fe National Forest Plan (Plan) includes goals intended to minimize effects from development within salamander habitat, including:

- Identify, protect and enhance habitat that contains threatened, endangered, and sensitive species of plants and animals to contribute toward the goal of species recovery; and
- Minimize the number of electronic sites and utility corridors by allowing only those that are most appropriately located on Forest lands. Utilize existing corridors whenever possible from a need and resource management standpoint.

The Plan's Best Management Practices (BMPs) for road design, construction, and management that could reduce impacts to the salamander include:

- Locate roads away from watercourses. Determine the minimum distance between roads and watercourses after considering the following factors:
 - Hill slope to water source;
 - Soil erodibility;
 - Geologic stability;
 - Channel stability; and
 - Obstruction such as fallen logs, boulders, and brush clumps.
- Design roads so grades are less than 10 percent. If grades must exceed 10 percent, reduce the distance between drainage dips so water concentrations cannot erode the road surface or fill slopes.

- Minimize construction of midslope roads where side slopes exceed 60 percent. When this construction is deemed necessary, full bench the roads and dispose of excavated material at a suitable location.
- Provide road surface drainage by frequent rolling of the road grade, construction of drainage dips, or construction of lateral ditches.
- Evaluate the need for aggregate surfacing for roads located on soils with low bearing strength or high plasticity.
- Minimize the period that disturbed areas are not vegetated by revegetating and/or mulching cuts and fill slopes.
- Maintain all roads to ensure proper function of drainage structures.
- Avoid location of temporary roads on unstable or sensitive soils, steep slopes, and watercourses. Revegetation should be accomplished as soon as temporary use is completed, using site adapted seed mixtures and planting during moist seasons.

Forestwide management direction for “electronic” sites (i.e., sites that transmit electrical currents or electronic signals, such as utility poles or transmission towers) that could reduce impact to the salamander includes:

- Maintenance of individual site roads and trails will be carried out jointly through cooperative maintenance, payments proportionate to the amount of use, or maintenance by the users.
- Clearing of vegetation will be limited to that which poses a hazard to facilities and operational efficiency.
- Coordinate additions to existing electronic sites with existing users and other potentially affected parties.
- Provide for joint use in corridors and combine uses to extent possible in light of technical and environmental constraints.

Some forest-wide goals for lands and special uses (i.e. electronic sites) have the potential to adversely impact salamander habitat values. For instance, placing all existing and future utility lines that degrade Visual Quality Objectives underground could disturb the soil and interfere with the capacity of salamanders to move between subterranean and aboveground habitat (USFS 2010).

The U.S. Forest Service’s Final Environmental Impact Statement for Travel Management on the Santa Fe National Forest analyzes different alternative configurations of motorized systems. All proposed action alternatives attempt to minimize the amount of authorized roads or trails in known occupied salamander habitat and would prohibit the majority of motorized cross-country travel within the range of the species. None of the action alternatives propose any ground-disturbing activities such as obliterating roads, constructing new routes, or installing gates or berms (USFS 2012).

The U.S. Forest Service manages the Jemez National Recreation Area (JNRA) for the promotion of fishing, camping, rock climbing, hunting, and hiking. Off-road use continues to occur, resulting in new roads being created or decommissioned roads being reopened. The following goals, standards, and guidelines are required by law under the 1993 statute that authorized the JNRA:

- Provide recreational facilities within the recreation area. Such facilities shall be constructed so as to minimize impacts on the scenic beauty, the natural character, and the archaeological and religious sites of the recreation area; and
- Employ BMPs to mitigate actions such as conducting road construction/reconstruction activities in upland and riparian zones.

Two major roads cross salamander habitat and exist within the JNRA boundary: State Highways 4 and 126. State Highway 126 traverses the western portion of Unit 1, and was reconstructed and repaved pursuant to the Federal Highway Administration's 2001 Final Environmental Impact Statement. State Highway 4, designated by the State of New Mexico as a *Scenic and Historic Byway*, forms the lower boundary of Unit 1 and continues eastward to intersect Unit 2. Major construction and development projects do not currently exist in the JNRA.

The VCNP is managed by a Federal board of trustees appointed by the President of the United States. Since 2000, the trust has completed deferred maintenance on the main roads that were already in place upon acquisition, but no new roads have been developed and the roads are still gravel, single lane roads with turn-outs. Similarly, critical deferred maintenance on some of the buildings was completed. A temporary visitor contact station has been established (without power or water), but a visitor center or main portal for access has not been built. No recreational infrastructure such as parking lots, trailheads, picnic areas, or campgrounds have been constructed.

In light of the VCNP's Strategic Goal (Public Access and Use) to "encourage public understanding and enjoyment of the preserve, including the development of facilities and infrastructure to expand the capacity for visitors consistent with resource protection," the Federal board of trustees is preparing to make a final decision about where (or if) to develop a permanent entrance and visitor facilities on the VCNP. It will also be decided what scale of facility development and what type of transportation system is best suited. Based on this decision, design and construction of the entrance, facilities, as well as amenities and infrastructure to further expand the public's access (e.g., roads, trailheads, parking, restrooms, day-use amenities, campgrounds and possibly cabins) would ensue. These projects could trigger section 7 consultations for the salamander and its critical habitat.

The National Park Service manages habitat for the salamander in Unit 2 on the Bandelier National Monument. The National Park Service has initiated a process to complete a Transportation Plan/Environmental Assessment (Plan/EA) to improve transportation conditions in Bandelier National Monument. The proposed alternatives will address documented traffic congestion at the park entrance and a lack of adequate parking at Bandelier National Monument. Recent fires and flooding events have contributed to a reduction in available parking in Frijoles Canyon further challenging the park's transportation system (NPS 2012). These projects could trigger section 7 consultations for the salamander and its critical habitat.

Private land within the Santa Fe National Forest represents 2,803 ac (1,134 ha) of proposed critical habitat. The Horseshoe Land Exchange, completed in 1998, transferred minimally developed Federal land to private ownership. At the time of the land exchange, the land contained 47 recreation cabins (CLG 2011). This land may be further developed in the future, though no plans currently exist.

Because the salamander is not currently a Federally-listed species, no section 7 consultations for the salamander have occurred to date.

3.8.2 Environmental Consequences

Development of roads, trails, recreational facilities, and residential real estate development could create adverse impacts from the removal, destruction, degradation, and fragmentation of salamander habitat. The construction of roads and trails degrades habitat by compacting soil and eliminating interstitial spaces above and below ground. Road clearing and maintenance activities can also cause localized adverse impacts to the salamander from the use of heavy equipment, 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, increasing the chances of extirpation of isolated populations, especially when movement between suitable habitat is not possible (77 FR 56482).

3.8.2.1 No Action Alternative

Under the No Action Alternative, no critical habitat would be designated for the salamander. The section 7 consultation process would continue as presently conducted for proposed actions with a Federal nexus, but without consideration of PCEs. These consultations would analyze relevant land, resource, and other management projects proposed for Federal lands (or lands with a Federal nexus) occupied by the salamander. As they relate to development of roads, trails, real estate development, and recreational facilities and infrastructure, such consultations would likely include:

- U.S. Forest Service, the Valles Caldera National Preserve, and Bandelier National Monument—for forest management, use of wildfire or prescribed fire, post-fire rehabilitation or resource management actions, livestock grazing (prohibited only in Bandelier), road construction or removal, development for recreational purposes, fire retardant use, and pesticide use;
- U.S. Fish and Wildlife Service - when considering issuing section 10(a)(1)(B) permit applications;
- U.S. Army Corps of Engineers – issuance of section 404 Clean Water Act permits; and
- Federal Highway Administration – construction and maintenance of roads or highways.

The Service estimates five formal consultations on road development projects within the next 20 years. The conservation measures implemented as a result of section 7 consultation under the No Action Alternative may prompt specific modifications to development opportunities. These modifications may limit, restrict, relocate, or reroute some types of construction activities, thus increasing administrative costs to agencies. Outcomes of consultations cannot be predicted precisely and depend on the details of project proposals and the analysis of effects; however, management actions that may be required include, but are not limited to:

- Relocate the project to an area outside of occupied salamander habitat;
- Minimize the use of chemicals in terrestrial habitats;

- Monitor for salamanders on site before or while construction or other activities occur within occupied salamander habitat areas; and
- Reduce the size or configuration of the proposed project to avoid, reduce, or eliminate the effects to critical habitat (Service 2012a).

Because the Service intends to use habitat as a proxy for the number of individuals taken in a jeopardy analysis, there may be no difference between jeopardy analysis and adverse modification. Therefore, this alternative would not have any impacts on development activities beyond the conservation measures or project modifications resulting from the concurrent listing of the salamander and associated requirements of section 7 of the ESA.

3.8.2.2 Alternative A

Both of the proposed critical habitat units are within the geographic area occupied by the Jemez Mountains salamander; therefore, road, trails, and infrastructure development or maintenance in those areas would be subject to section 7 consultations irrespective of the area's status as critical habitat. Therefore, compared to the No Action Alternative, Alternative A would likely result in no new section 7 consultations for development actions based solely on the presence of designated critical habitat. However, designation would trigger the addition of an analysis of adverse modification of critical habitat to future section 7 consultations on the salamander in critical habitat.

The consultation analyses for effects on a listed species and effects on critical habitat are similar in many respects and are parallel processes because the health of a species cannot be disassociated from the health of its habitat. Though there would not be additional consultations that result from designation, only expansions of consultations that would otherwise occur for jeopardy analysis, this would increase administrative costs to the Service and to the action agencies. Based on previous activity with designated units, project proponents could include the National Park Service, the U.S. Forest Service, the Department of Energy, and the County of Los Alamos. Although precise locations of future projects in critical habitat are unknown at this time, several potential projects are described in section 3.8.1 above. The expansions of consultations, and the additional time needed to complete consultations that would have only considered effects on the species, would increase administrative costs.

However, the Service anticipates that in cases where an action is found to adversely modify critical habitat for the salamander, the action would also be found to jeopardize the species. That is, actions which the Service is likely to recommend to avoid adverse modification are the same as those to avoid jeopardy. Thus, the incremental impacts of the critical habitat designation for the salamander appear unlikely to include additional conservation actions, project modifications, and implementation costs. Conservation measures may affect development of roads, trails, recreational facilities and infrastructure, and real estate as described under the No Action Alternative.

Incremental economic impacts to transportation projects are estimated to be \$71,000 in present value terms, discounted at seven percent (IEc 2012). These are administrative consultation costs.

In summary, the effects of critical habitat designation on development are expected to be minor because (1) no additional projects would be subject to consultations based solely on the presence of designated critical habitat, because both of the proposed units are within the geographic area occupied by the salamander; (2) any reasonable and prudent alternatives developed under jeopardy analysis would not likely be changed substantially with the addition of adverse modification analysis; (3) few additional conservation measures would be proposed to address critical habitat, beyond those that would be proposed in jeopardy consultations.

3.9 Socioeconomics and Recreation

A separate economic analysis of critical habitat designation for the salamander has been conducted in response to the 2012 proposed rule (IEc 2012).

Several types of recreational activities take place in or near proposed critical habitat areas for the Jemez Mountains salamander. Recreational opportunities include hiking, mountain biking, hunting, birding, wildlife viewing, photography, pleasure-driving, angling, camping, skiing, horseback riding, and off-highway vehicle (OHV) and motorcycle use. Level of use and type of activity vary by site characteristics, landownership, management policy, and accessibility.

3.9.1 Existing Conditions

Socioeconomics

The proposed critical habitat designation consists largely of rural lands, in variously low levels of development and population density. Los Alamos and Sandoval Counties have population densities higher than the statewide average. Rio Arriba County’s poverty rate is higher than that of the state at 19.7 percent. Los Alamos County, on the other hand, has the lowest poverty rate in the state (and is the richest county in the western U.S.).

Table 3.4. Socioeconomic Profile of Counties Containing Critical Habitat

State	County	Population Density (persons/sq. mile, 2010)	Population (2010)	Percent of Statewide Population (2010)	Percent Change (2000-2010)	Per Capita Income (2010 dollars)*	Poverty Rate (2010)
New Mexico	State Total	17.0	2,059,179	100	13.2	\$22,966	18.4
	Los Alamos	164.4	17,950	.87	-2.2	\$49,474	2.4
	Rio Arriba	6.9	40,246	2.0	-5.1	\$19,913	19.7
	Sandoval	35.5	131,561	6.3	46.3	\$25,979	11.4

Source: U.S. Census Bureau, 2010 Census and State & County QuickFacts.

* In 2010 inflation-adjusted dollars

Table 3.5 provides an overview of the key economic sectors in the counties that comprise the designation, as measured by number of enterprises and number of employees.

Table 3.5. Economic Activity in Counties Containing Proposed Salamander Critical Habitat

NUMBER OF EMPLOYEES (EMP) AND ESTABLISHMENTS (EST) BY INDUSTRY (2010)						
Industry	NEW MEXICO					
	Los Alamos County		Rio Arriba County		Sandoval County	
	EMP.	EST.	EMP.	EST.	EMP.	EST.
Agriculture, forestry, fishing, and hunting	-	-	A	9	A	3
Mining, quarrying, and oil and gas extraction	-	-	20	8	27	9
Utilities	-	-	E	7	129	15
Construction	167	35	337	91	1,823	242
Manufacturing	40	6	93	23	3,050	59
Wholesale trade	23	5	67	12	371	45
Retail trade	452	29	1,469	91	3,422	191
Transportation & warehousing	A	4	B	17	432	42
Information	62	10	110	13	G	33
Finance and insurance	E	18	242	30	917	99
Real Estate and rental and leasing	60	17	71	24	226	81
Professional, scientific, & technical services	I	80	78	34	H	161
Management of companies and enterprises	-	-	227	5	E	8
Administrative & support & waste management & remediation	669	23	460	17	1,369	103
Educational services	25	7	136	11	214	26
Health care and social assistance	914	58	1,654	90	2,002	172
Arts, entertainment, and recreation	E	35	E	13	1,283	29
Accommodation and food services	444	11	993	80	3,142	149
Other services (except public administration)	260	38	242	49	1,010	141
Industries not classified	-	-	A	2	L	4
Total for all sectors	I	376	7,126	626	24,395	1,612

Source: U.S. Census Bureau, 2010 County Business Patterns (NAICS).

A: 0-19 employees

B: 20-99 employees

C: 100-249 employees

E: 250-499 employees

F: 500-999 employees

G: 1,000-2,499 employees

H: 2,500-4,999 employees

I: 5,000-9999 employees

J: 10,000-24,999 employees

K: 25,000-49,999 employees

L: 50,000-99,999 employees

M: 100,000 or more

S: Withheld because estimate did not meet public standards

D: Withheld to avoid disclosing data for individual companies data are included in higher level totals

In the counties that contain designated habitat, sectors providing principal sources of employment are health care, tourism, and retail trade (ranked respectively). In Sandoval County, manufacturers like Intel employed over 3,000 people in 2010. The largest employer in Los Alamos County is the Los Alamos National Laboratory. In this context of overall economic activity, specific economic sectors that could be impacted by the designation of critical habitat are discussed below.

Recreation

Recreational areas in the proposed critical habitat exist on Federal and state-owned lands, including Santa Fe National Forest (USFS), Bandelier National Memorial (NPS), and New Mexico State lands.

Table 3.6 below lists Federal recreational sites that have at least partial overlap with proposed critical habitat units.

Table 3.6. Critical Habitat Units that include Federal recreation sites

Federal Property	Managing Agency	Recreational Area
Western Jemez Mountains Unit (Unit 1)		
Santa Fe National Forest	USFS – Jemez Ranger District	Seven Springs Picnic Site; San Antonio Campground
Santa Fe National Forest	USFS – Jemez Ranger District	Jemez National Recreation Area
Valles Caldera National Preserve	USFS (VCNP Board of Trustees)	Redondo Peak
Southeastern Jemez Mountains Unit (Unit 2)		
Valles Caldera National Preserve	USFS (VCNP Board of Trustees)	Cerros de los Posos; Sierro de los Valles; Cerro Grande; Rabbit Mountain; Valle Grande Staging Area; South Mountain
Santa Fe National Forest	USFS – Espanola Ranger District	Las Conchas Trailhead; Las Conchas Fishing Access; Camp May; Water Canyon Trail; Perimeter Trail; Valle Trail; Parajito Canyon Trail; Pajarito Nordic Ski Trail
Santa Fe National Forest	USFS – Jemez Ranger District	Jemez National Recreation Area
Bandelier National Monument	National Park Service	Main Loop Trail and Falls Trail

The U.S. Forest Service manages 26,532 acres (10,737 ha) of habitat for the salamander on the Sante Fe National Forest (SFNF) in the Western Jemez Mountains Unit, or Unit 1; and 30,502 acres (12,344 ha) of habitat in the Southeastern Jemez Mountains Unit (Unit 2).

The National Visitor Use Monitoring program provides estimates of the volume and characteristics of recreation visits to the National Forest system. A National Forest Visit is defined as the entry of one person into a national forest to participate in recreation activities for an unspecified period of time. Table 3.7 presents the most recent annual visitation numbers to the entire National Forest (visitation numbers for individual recreation sites within designated critical habitat are not available).

Table 3.7. Annual Santa Fe National Forest Visitation Estimates

Visit Type	Visits (000s)
Total Estimated Site Visits	1,496
Day Use Developed Site Visits	207
Overnight Use Developed Site Visits	66
General Forest Area Visits	1,191
Designated Wilderness Visits	32
Total Estimated National Forest Visits	1,385
Special Events and Organized Camp Use	0

Source: USFS, 2009c.

The activities most likely to be impacted by the designation of critical habitat are Off-Highway Vehicle (OHV) and motorcycle use, which are authorized on certain roads in Santa Fe National Forest. Motorized use on roads and trails affect amphibians by removing the vegetation—including downed logs when people collect wood—that composes its habitat. Roads and trails fragment habitat for these small creatures, which potentially reduces their genetic variability because they cannot move freely (USFS 2012).

The Santa Fe National Forest Plan includes Standards and Guidelines for recreation within salamander habitat, including to:

- Provide and maintain a variety of Forest trails, consistent with planned recreation opportunities. Include foot, horse, winter, and motorized trails, as well as opportunities for the handicapped;
- Establish off-road vehicle use areas and closures as needed to provide off-road vehicle opportunities while protecting resources and minimizing conflicts with other users;
- Identify, protect and enhance habitat that contains threatened, endangered, and sensitive species of plants and animals to contribute toward the goal of species recovery; and
- Increase opportunities for wildlife and fish oriented recreation activities.

The U.S. Forest Service’s Final Environmental Impact Statement for Travel Management on the Santa Fe National Forest analyzes different alternative configurations of motorized systems. All

proposed action alternatives attempt to minimize the amount of authorized roads or trails in known to be within the geographic area occupied by the salamander and its habitat and would prohibit the majority of motorized cross-country travel within the range of the species. None of the action alternatives propose any ground-disturbing activities such as obliterating roads, constructing new routes, or installing gates or berms (USFS 2012). Elements of the Travel Management Plan that are common to all action alternatives include:

- Motor vehicle use by the public off the designated system of roads, trails, and areas is prohibited, except as identified on the motor vehicle use map or where exempted under 36 CFR 212.51;
- Prohibit motorized cross-country travel in all management areas;
- Allow motorized cross-country travel on some acres in management areas where it had previously been prohibited for the purpose of motorized access to dispersed camping and to retrieve big game; and
- Allow motorized use of some roads and trails in management areas where it had previously been prohibited. The miles of roads and trails affected vary by alternative (USFS 2012).

Proposed mitigation included in the 2012 FEIS specifies that unauthorized roads and trails traversing salamander habitat won't be published on the motor vehicle use map until they have been assessed for potential resource concerns and appropriate actions are taken to minimize effects to resources. Potential impacts to the salamander were analyzed based on (1) the total number of miles of designated roads and motorized trails, (2) the location(s) of these roads and trails, (3) cross-country use, and (3) mitigation measures proposed to protect the salamander. The Forest Service concluded that the preferred alternative may impact individuals but is not likely to result in a trend toward loss of species viability of the Jemez Mountains salamander (USFS 2012). This Travel Management Plan could be subject to consultation if the species is listed.

The U.S. Forest Service manages the Jemez National Recreation Area (JNRA), comprising 57,650 acres (23,330 ha), for the promotion of fishing, camping, rock climbing, hunting, and hiking. It is estimated that nearly 1.6 million people visit the Jemez National Recreation Area for recreational opportunities each year. Despite an existing average road density of approximately 2.5 mi (4.0 km) of road per square mi (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.

The following recreation goals, standards, and guidelines are required by law under the 1993 JNRA Act:

- Permit hunting and fishing on lands and waters within the recreation area in accordance with applicable Federal and State laws;
- Provide recreational facilities within the recreation area. Such facilities shall be constructed so as to minimize impacts on the scenic beauty, the natural character, and the archaeological and religious sites of the recreation area; and
- When rehabilitating existing recreation facilities, consider the dispersed area that the recreation facility serves and consider resource capacities associated with the dispersal area (USFS 2002).

The Valles Caldera National Preserve (VCNP) is managed by a Federal board of trustees appointed by the President of the United States. The Preserve has nearly 100,000 visitors annually, mostly “backcountry” activities since none are supported by developed amenities. “Backcountry” activities currently include hiking and fishing; neither of which is supported by recreational infrastructure such as parking lots, trailheads, picnic areas, or campgrounds. The 11,254 foot high peak of Redondo lies to the north of the JNRA boundary on the Valles Caldera National Preserve.

Among the management goals Congress assigned in 2000 within the Valles Caldera Preservation Act:

- The protection and preservation of the scientific, scenic, geologic, watershed, fish, wildlife, historic, cultural and recreational values of the Preserve; and
- Public use of and access to the Preserve for recreation.

The Public Access and Use Performance Goal and Objective includes establishment of sustainable outdoor recreational programs for hiking, camping, biking, equestrian, hunting and fishing by 2015. As such, the Board is preparing to make a final decision about where (or if) to develop a permanent entrance and visitor facilities on the VCNP. It will also be decided what scale of facility development and what type of transportation system is best suited to the Preserve. Based on this decision, design and construction of the entrance, facilities, as well as amenities and infrastructure to further expand the public’s access (e.g., roads, trailheads, parking, restrooms, day-use amenities, campgrounds and possibly cabins) would ensue (VCPN 2012).

The National Park Service manages the Bandelier National Memorial in the Southeastern Jemez Mountain Unit (Unit 2). Recreational activities at the 33,000-acre Bandelier National Memorial include hiking short or long trails, cross-country skiing, bird watching, and camping. There are numerous archeological sites along the Main Loop Trail (1.2 mi round trip) and on the additional mile round-trip trail to Alcove House (NPS 2012a). In 2010 there were 234,896 total recreation visits to the Bandelier National Memorial. No hunting is allowed in this park (NPS 2010). The National Park Service manages habitat for the salamander in Unit 2 on the Bandelier National Monument.

The National Park Service has initiated a process to complete a Transportation Plan/Environmental Assessment (Plan/EA) to improve transportation conditions in Bandelier National Monument. The proposed alternatives will address documented traffic congestion at the park entrance and a lack of adequate parking at Bandelier National Monument. Recent fires and flooding events have contributed to a reduction in available parking in Frijoles Canyon further challenging the park's transportation system (NPS 2012b).

Because the salamander is not a federally listed species, no section 7 consultations for the salamander have occurred to date. Future proposed actions resulting from the plans described above are among actions that could trigger future consultations, regardless of whether critical habitat is designated.

3.9.2 Environmental Consequences

Direct impacts of designation on socioeconomic resources could include impacts to small entities from making project modifications or implementing conservation measures on projects subject to section 7 consultations, and the incremental costs of such consultations to the Service, Federal agencies, or project proponents. Indirect impacts faced by project proponents, land managers and landowners could include the following:

- **Time Delays** – Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
- **Regulatory Uncertainty** – The Service conducts each section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species- and site-specific information. As a result, government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation.
- **Stigma** – In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not within the boundaries of critical habitat due to perceived limitations or restrictions. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. To the extent that potential stigma effects on markets are probable and identifiable, these impacts are considered indirect, incremental impacts of the designation.

As mentioned above, the Service anticipates that actions which the Service is likely to recommend to avoid adverse modification are the same as those to avoid jeopardy. This means that incremental project modifications or conservation measures to avoid adverse modification are unlikely, which limits the incremental economic impacts of critical habitat designation to the administrative costs of addressing potential adverse modification in section 7 consultations.

3.9.2.1 No Action Alternative

Under the No Action Alternative, no critical habitat would be designated for the Jemez Mountains salamander. The section 7 consultation process would continue as presently conducted for proposed actions with a Federal nexus, but without consideration of PCEs. Those actions that could have impacts on recreational and socioeconomic resources include OHV and

motorcycle use; private residential development; and development of recreational facilities and infrastructure. Such consultations would analyze relevant travel, economic, and recreation management plans on Federal lands (or lands with a Federal nexus) currently occupied by the species. As they relate to recreational and socioeconomic resources, such consultations would likely include:

- U.S. Forest Service, the Valles Caldera National Preserve, and Bandelier National Monument—for forest management, use of wildfire or prescribed fire, post-fire rehabilitation or resource management actions, livestock grazing (prohibited only in Bandelier), road construction or removal, development for recreational purposes, fire retardant use, and pesticide use.
- The U.S. Fish and Wildlife Service—when considering issuing section 10(a)(1)(B) permit applications.

The Service anticipates consultations for SFNF and VCNP on their travel management plans, and for Bandelier National Monument for recreation planning. Each of these consultations would occur every 10 years, thus totaling six consultations for travel and recreation management plans during the 20-year period of analysis. The conservation measures implemented as a result of section 7 consultation under the No Action Alternative may prompt specific modifications to recreation opportunities. These modifications may limit some types of recreation activities, restrict construction of recreational facilities in critical habitat, and/or increase administrative costs to agencies. These outcomes cannot be predicted precisely; however, based on past consultations for other species, types of management actions that may be triggered include, but are not limited to:

- Revising/drafting resource and habitat management plans;
- Mapping, surveying, and monitoring salamander habitat and preparing survey and monitoring reports;
- Limiting roadway widening and construction projects; and
- Limiting the construction of new powerlines and pipelines.

However, because the Service intends to use habitat as a proxy for the number of individuals taken in a jeopardy analysis, there may be no difference between jeopardy analysis and adverse modification. Therefore, beyond any conservation measures or project modifications resulting from the listing of the salamander and associated requirements of section 7 of the ESA, this alternative would not have any direct impacts on socioeconomic and recreational resources.

3.9.2.2 Alternative A

The proposed critical habitat on recreational lands is within the geographic area occupied by the salamander; therefore, proposed actions related to recreation in those areas would be subject to section 7 consultations irrespective of the area's status as critical habitat. Therefore, compared to the No Action Alternative, Alternative A would likely result in no new section 7 consultations for development actions based solely on the presence of designated critical habitat. However, designation would trigger the addition of an analysis of adverse modification of critical habitat to future section 7 consultations on the salamander in critical habitat.

The consultation analyses for effects on a listed species and effects on critical habitat are similar in many respects and are parallel processes because the health of a species cannot be disassociated from the health of its habitat. The outcomes of these future consultations would depend on the details of project proposals and the analysis of effects, which are unknown at this time.

The additional consultations, and the additional time needed to complete consultations that would have only considered effects on the species, would increase administrative costs to the Service and to the action agencies. Based on previous activity within designated units, project proponents could include the National Park Service, the U.S. Forest Service, and Valles Caldera for proposed recreational activities in both units.

Conservation measures may adversely affect recreational opportunities where they overlap with critical habitat, primarily by limiting the activities such as OHV and motorcycle use in the Santa Fe National Forest. Conservation measures may also include restrictions on constructing recreational facilities (e.g., Valles Caldera National Preserve, Bandelier National Monument) to reduce impacts from construction, maintenance, and use by recreationists. However, the Service anticipates that in cases where an action is found to adversely modify critical habitat for the salamander, the action would also be found to jeopardize the species. That is, actions which the Service is likely to recommend to avoid adverse modification are the same as those to avoid jeopardy. Thus, the incremental impacts of the critical habitat designation for the salamander appear unlikely to include additional conservation actions, project modifications, and implementation costs.

A potential benefit of increasing section 7 consultations for recreation-related activities would be maintenance of salamander PCEs through conservation measures within designated critical habitat. The conservation of habitat values that would result may benefit such recreational activities as birding, wildlife viewing, photography, and hiking.

Based on past impacts to recreational opportunities within the areas of proposed designated critical habitat, there would potentially be minor, indirect, adverse impacts from critical habitat designation on some recreational opportunities and activities within designated critical habitat (e.g., OHV and motorcycle use, mountain biking, hiking) from the limitations and restrictions imposed on recreational activities to preserve PCEs. However, other recreational activities and opportunities would be enhanced, and could benefit from critical habitat designation (e.g., birdwatching, wildlife viewing, hiking), because of increased habitat conservation. The effects of critical habitat designation on recreation are expected to be minor because (1) few projects would be subject to new consultations based solely on the presence of designated critical habitat, because the proposed units are within the geographic area occupied by the salamander; (2) any reasonable and prudent alternatives developed under jeopardy analysis would not likely be changed substantially with the addition of adverse modification analysis; and (3) few additional conservation measures would be proposed to address critical habitat.

In its economic analysis, the Service estimates the present value of all incremental impacts to be approximately \$264,000 over 20 years, assuming a seven percent discount rate. These incremental costs are administrative costs resulting from the consideration of adverse

modification in section 7 consultations regarding fire management (\$120,000), road maintenance (\$71,000), and other Federal and state land management activities, such as noxious weed control, recreational management, livestock grazing, and the operation of the Seven Springs Fish Hatchery (\$73,000) (IEc 2012).

When a Federal agency proposes regulations, the Regulatory Flexibility Act requires the agency to prepare an analysis that describes the effect of the rule on small entities (small businesses, small organizations, and small government jurisdictions). As described in the Economic Analysis, the designation of critical habitat for the salamander is unlikely to directly affect any small entities; 97 percent of land in the designation is Federally owned. Anticipated incremental impacts in proposed critical habitat are primarily related to the formal and informal consultations on fire management and other Federal land management activities; the remaining forecasted impacts result from consultations on road and highway maintenance projects. Little to no impact to third parties is expected from these activities. Therefore, little or no impacts to small entities are anticipated from the designation of critical habitat.

3.10 Cumulative Impacts

The Council on Environmental Quality's regulations define cumulative effects as "the impact on the environment which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." (40 CFR §1508.7) Actions that could have cumulative impacts on critical habitat typically include: (1) section 7 outcomes from consultations on other species; (2) designation of critical habitat for other species; and (3) past, present, or future actions contained in land management or habitat restoration plans. As described earlier, in the case of the salamander, the Service expects that the same agencies and types of projects would go through the section 7 consultation process with or without critical habitat, and that the same number of projects would likely undergo consultation with critical habitat as without. Therefore, the analysis of impacts to resources and activities focuses on the impacts of expanding jeopardy consultations to include analysis of adverse modification.

Water Resources—The designation of critical habitat could result in new consultations, project modifications, and conservation measures based on critical habitat. Because there is another threatened and endangered species and critical habitat in the area, Federal agencies are already required to consult with the Service under the ESA for water resources in regards to the Mexican spotted owl. Future consultations for critical habitat would likely result in minor project modifications. Therefore, when considering that water resource projects are not anticipated to harm the PCEs of the salamander and would likely require negligible to minor project modifications, this critical habitat designation will likely contribute only minor cumulative impacts, given the small number and limited nature of additional project modifications anticipated.

Wildlife, Plants, Threatened and Endangered Species—All proposed critical habitat areas are within the geographic area occupied by the Jemez Mountains salamander; therefore, management actions in those areas would be subject to section 7 consultations irrespective of the

area's status as critical habitat. The designation of critical habitat may result in new section 7 consultations for actions that could impact PCEs and the addition of an analysis of adverse modification to future section 7 consultations, with a limited increase in project modifications and conservation measures. Additional project modifications would likely be minor, because all of the proposed units are within the geographic area occupied by the species and, therefore, would be subject to consultation. Further, any such modifications or conservation measures to protect PCEs in critical habitat are likely to benefit native wildlife and vegetation, beyond their direct benefits to the salamander. In addition to the protections from the overlap of Mexican spotted owl critical habitat and resulting consultations, the designation of critical habitat would be expected to produce minor beneficial cumulative impacts to natural resources.

Land Use—Because the Jemez Mountains salamander is not yet listed under the Endangered Species Act of 1973, as amended, no consultations have been conducted. The designation of critical habitat would not likely result in additional projects that would be subject to consultations based solely on the presence of designated critical habitat, because both of the proposed units are within the geographic area occupied by the salamander. Because the health of the species is so closely tied to habitat health, any reasonable and prudent alternatives developed under jeopardy analysis would not likely be changed substantially with the addition of adverse modification analysis. Very few if any additional conservation measures would be proposed to address critical habitat, beyond those that would be proposed in jeopardy consultations. Critical habitat is designated for the Mexican spotted owl in the units proposed as critical habitat for the salamander. The Service anticipates that future consultations for critical habitat would likely result in minor project modifications. Therefore, when considering other present and future consultations and land management plans, this critical habitat designation will likely contribute negligible to minor cumulative impacts, given the number and nature of additional project modifications anticipated.

Climate Change—Because the Jemez Mountains salamander is not yet listed under the Endangered Species Act of 1973, as amended, no consultations have been conducted. The designation of critical habitat would not likely result in additional projects that would be subject to consultations based solely on the presence of designated critical habitat, because both of the proposed units are within the geographic area occupied by the salamander. Because the health of the species is so closely tied to habitat health, any reasonable and prudent alternatives developed under jeopardy analysis would not likely be changed substantially with the addition of adverse modification analysis. Very few if any additional conservation measures would be proposed to address critical habitat, beyond those that would be proposed in jeopardy consultations. Critical habitat is designated for the Mexican spotted owl in the units proposed as critical habitat for the salamander. The Service anticipates that future consultations for critical habitat would likely result in minor project modifications. The designation of critical habitat for the salamander will not impact climate change, either on an individual or cumulative level. Therefore, when considering other present and future consultations, this critical habitat designation will likely contribute negligible cumulative impacts, given the number and nature of additional project modifications anticipated.

Fire and Forest Management—Critical habitat for the Mexican spotted owl overlaps proposed critical habitat for the salamander, therefore Federal agency fire and forestry management plans

are already required to undergo consultation with the Service under the ESA. Fire and forest management activities can be beneficial to the owl if they (1) reduce the accumulated woody fuel to more natural levels, (2) decrease the density of small trees, (3) promote a more rapid development of large trees, and (4) increase the number of, and acreage of openings (Service 1999). Past consultations for fire and forestry management for the spotted owl have resulted in project modifications that have not eliminated or fundamentally changed projects. Because habitat requirements for the owl are different than the salamander, additional requirements to protect salamander habitat may be recommended or required. While reducing the accumulated woody fuel to more natural levels could reduce the risk of wildland fires on salamander habitat, creating increases in the number and acreage of forest openings would decrease the amount of available habitat to the salamander.

On private and state land, designation of critical habitat does not limit fire or forest management programs, except where a Federal license, permit, or funding may be sought or required or collaboration with state and local fire agencies occur. Although additional project modifications to fire and forestry management projects beyond those required for the spotted owl could be required within and surrounding salamander critical habitat, it is not anticipated that these projects would be prevented due to the presence of salamander critical habitat. Therefore, future consultation with regards to critical habitat would likely result in moderate cumulative impacts to forestry and fire management projects.

Soils—Because there is Mexican Spotted Owl critical habitat in the proposed area, Federal agency actions that may affect that species would already trigger section 7 consultation with the Service under the ESA. It is likely that some future modifications requested on behalf of the proposed critical habitat would already occur based on the presence of critical habitat for the Mexican Spotted Owl. However, because the Mexican Spotted Owl habitat is not as closely linked to the soil as the salamander, there may be additional project modifications that would be different than those for the Mexican Spotted Owl. However, given that all proposed habitat is within the geographic area occupied by the salamander, any such modifications would likely be recommended under jeopardy consultations for the species, absent a designation of critical habitat. Therefore, this critical habitat designation would only contribute minor cumulative impacts at most, given the small number and limited nature of additional project modifications anticipated.

Development—Cumulative impacts would occur from overlapping critical habitat designations for the Mexican spotted owl in Units 1 and 2. As such, construction and development projects with a Federal nexus are already required to consult with the Service under the ESA. Many of the conservation measures taken to mitigate construction and development projects to the salamander could also benefit other protected species. For example, the reduction of routes and motorized cross-country travel associated with the proposed action alternatives included in the FEIS for Travel Management on the SFNF is likely to improve habitat and promote the recovery of the Mexican spotted owl; and likewise the Jemez Mountains salamander (USFS 2012). Additional conservation measures beyond those in place for other species could create additional negligible to minor, adverse impacts to development. However, when considering other present and future consultations, this critical habitat designation will likely contribute only minor

cumulative impacts overall, given the small number and limited nature of additional project modifications anticipated.

Socioeconomics and Recreation—Designation of critical habitat would lead to incremental consultation costs of approximately \$260,000, as described in Section 3.9.2.2. Cumulative impacts to recreational resources could occur from overlapping critical habitat designations for the Mexican spotted owl in Units 1 and 2. The proposed designation could result in additional, minor restrictions to areas where these previous designations have already led to limitations on recreational uses. These cumulative impacts are likely to be minor, however, because many of the modifications or conservation measures recommended for the salamander in these units would already be implemented to avoid adverse species impacts.

3.11 Relationship Between Short-Term and Long-Term Productivity

Proposed designation of critical habitat is a programmatic action that would not impact short-term or long-term productivity.

3.12 Irreversible and Irretrievable Commitment of Resources

NEPA requires a review of irreversible and irretrievable effects that result from the Proposed Action. Irretrievable effects apply to losses of use, production, or commitment of non-renewable natural resources caused by the action. Irreversible effects apply primarily to the use of non-renewable resources, such as minerals or cultural resources, or to those resources that are only renewable over long periods of time, such as soil productivity and forest health. Irreversible effects can also include the loss of future opportunities in the area of impact. The types of impacts caused by the designation of critical habitat for the Jemez Mountains salamander—possible (but unlikely) new consultations, additional conservation measures, and potential project modifications-- would not result in lost production or use of non-renewable natural resources. There would be no loss of future opportunities resulting from designation of critical habitat, because designation does not limit activities on private land that are not authorized, funded, or permitted by a Federal agency.

CHAPTER 4

ANALYSIS OF SIGNIFICANCE

The primary purpose of preparing an environmental assessment under NEPA is to determine whether a proposed action would have significant impacts on the human environment. If significant impacts may result from a proposed action, then an environmental impact statement is required (40 CFR §1502.3). Whether a proposed action exceeds a threshold of significance is determined by analyzing the *context* and the *intensity* of the proposed action (40 CFR §1508.27).

Context refers to the setting of the proposed action and potential impacts of that action. The context of a significance determination may be society as a whole (human, national), the affected region, the affected interests, or the locality. Intensity refers to the severity of the impacts. The context of short and long-term impacts of the proposed designation of critical habitat for the Jemez Mountains salamander includes approximately 90,716 ac (36,711 ha) in three New Mexico counties. The proposed designation includes 2,803 ac (1,134 ha) of private land, or roughly 3 percent of the total designation. Federal lands comprise 97 percent of the proposed designation. Impacts of critical habitat designation in this context would not be significant because of the small areas they represent and the limited potential impacts of designation. The designation includes only areas considered occupied by the salamander; therefore, there will not be additional consultations required for adverse modification of habitat in unoccupied areas.

Under regulations of the Council of Environmental Quality (CEQ), intensity is determined by considering 10 criteria (CFR 40 §1508.27[b]): (1) beneficial and adverse impacts; (2) the degree of impacts on health and safety; (3) impacts on the unique characteristics of the area; (4) the degree to which the impacts would likely be highly controversial; (5) the degree to which the proposed action would impose unique, unknown, or uncertain risks; (6) the degree to which the proposed action might establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration; (7) whether the proposed action is related to other actions, which cumulatively could produce significant impacts; (8) the degree to which the proposed action might adversely affect locales, objects, or structures eligible for listing in the National Register of Historic Places; (9) the degree to which the proposed action might adversely affect an endangered or threatened species or its habitat, as determined to be critical under the ESA of 1973; and (10) whether the proposed action threatens a violation of Federal, state, or local law.

Potential impacts on environmental resources, both beneficial and adverse, would be minor. Impacts of critical habitat designation on natural resources within the areas proposed as salamander critical habitat were analyzed and discussed in Chapter 3 of this EA. Applying the analysis of impacts to the significance criteria identified above, the Service concludes that the adverse impacts of critical habitat designation would not be significant, based on the following judgments:

- There would be no impacts on public health or safety from the proposed designation of critical habitat and no impacts on unique characteristics of the geographic area. There would be only minor impacts on fire management activities, because any modifications

resulting from the conservation of critical habitat would likely be similar in nature to those imposed from consultations for listed species and additional Section 7 consultations are not anticipated from designating critical habitat alone. Also many of the conservation measures that could be required to provide protection to critical habitat are already implemented by the USFS. In addition, even though fire and forestry management activities can adversely affect critical habitat, practices that reduce the intensity and severity of wildland fires are beneficial to critical habitat and provide long-term protection to the salamander and its habitat.

- Potential impacts on the quality of the environment are not likely to be highly controversial, because very few (if any) project modifications would result from consultations on adverse modification of habitat that would not be required in jeopardy consultations for the same action.
- Impacts on water management and resource activities are not expected to be controversial because, as discussed in the analysis of impacts on water resources, the modifications to current water management activities are expected to be limited. If section 7 consultations were to occur, modifications or limitations related to proposed designated critical habitat would be similar to those imposed from species-related consultation.
- There would be no impacts to the unique characteristics of the area. The East Fork Jemez River, which crosses into Unit 2, is a Wild and Scenic River. In addition, a portion of Bandelier Wilderness Area is in Unit 2. However, designation of critical habitat would not cause or authorize any activities in those areas that could produce adverse impacts. Actions taken to conserve the species and its habitat within these areas will increase the ecological health on such unique areas.
- The impacts do not pose any uncertain, unique, or unknown risks. The principal threats to salamander habitat are from fire management activities in Santa Fe National Forest. While there have been no previous consultations for the Jemez Mountains salamander, outcomes from other consultations on fire management plans have led to recommendations that will not compromise the effectiveness of future fire management activities.
- The designation of critical habitat by the Service for the conservation of endangered and threatened species is not a precedent-setting action with significant effects. The agency has designated critical habitat for hundreds of other species.
- The Proposed Action is not related to other actions which could produce cumulatively significant impacts. When considering other present and future consultations, this critical habitat designation will likely contribute only minor cumulative impacts overall, given the small number and limited nature of additional project modifications anticipated. Cumulative impacts of this designation and other Federal actions on land management activities on private lands would not occur because actual land management restrictions only apply where a Federal permit, license, or funding may be required, and the conservation measures that would accompany a Federal permit, license, or funding would not impose major restrictions on management activities.
- Critical habitat designation is not likely to affect sites, objects, or structures of historical, scientific, or cultural significance. Unit 2 of proposed critical habitat overlaps with one of the two portions of Bandelier National Monument that are listed on the NRHP. This area contains the Yapashi and San Miguel prehistoric Indian ruins.

The proposed designation would not result in any ground-disturbing activities that have the potential to affect these cultural resources.

- Critical habitat designation would not adversely affect an endangered or threatened species or its habitat. Designation will have long-term, beneficial, conservation-related impacts on salamander survival and recovery through maintenance of PCEs when section 7 consultations occur.
- Critical habitat designation would not violate any Federal, state, or local laws. The designation of critical habitat to the maximum extent prudent and determinable is required by law in order to comply with the ESA.

CHAPTER 5

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CHAPTER 6

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