

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 FAX: (602) 242-2513

In Reply Refer To:

AESO/SE
02EAAZ00-2013-F-0363

May 13, 2015

Mr. Tom Osen, Forest Supervisor
Apache-Sitgreaves National Forests
Post Office Box 640
Springerville, Arizona 85938-0640

Dear Mr. Osen:

Thank you for your May 29, 2014 letter and Biological Assessment (BA), received on that same day, requesting initiation of formal consultation under section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA). At issue are impacts that may result from the revised programmatic "Land Management Plan for the Apache Sitgreaves National Forests" (LMP) for lands located in Apache, Navajo, and Greenlee Counties, Arizona (dated January 2013). The proposed action may affect the endangered New Mexico meadow jumping mouse (*Zapus hudsonius luteus*), the threatened Mexican spotted owl (*Strix occidentalis lucida*) and its critical habitat, the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) and its critical habitat, the threatened yellow-billed cuckoo (*Coccyzus americanus occidentalis*), the threatened northern Mexican gartersnake (*Thamnophis eques megalops*), the threatened narrow-headed gartersnake (*Thamnophis rufipunctatus*), the threatened Chiricahua leopard frog (*Lithobates chiricahuensis*) and its critical habitat, the endangered Three Forks springsnail (*Pyrgulopsis trivialis*) and its critical habitat, the threatened Apache trout (*Oncorhynchus gilae apache*), the endangered Gila chub (*Gila intermedia*) and its critical habitat, the threatened Gila trout (*Oncorhynchus gilae gilae*), the endangered spikedace (*Meda fulgida*) and its critical habitat, the endangered loach minnow (*Tiaroga cobitis*) and its critical habitat, and the threatened Little Colorado spinedace (*Lepidomeda vittata*) and its critical habitat.

The proposed action will have "no effect" on the razorback sucker (*Xyrauchen texanus*) and its critical habitat and the lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*). Species with "no effect" determinations do not require review by the Fish and Wildlife Service (Service), and are not addressed further in this correspondence.

Additionally, you asked us to concur with your determination that the proposed action is not likely to jeopardize the experimental non-essential population of Mexican gray wolf (*Canis lupus baileyi*) and the candidate roundtail chub (*Gila robusta*) or adversely modify proposed critical habitat for the New Mexico meadow jumping mouse, the yellow billed cuckoo, narrow-headed gartersnake, and the northern Mexican gartersnake. We are providing conference reports for concurrences in Appendix A.

Mr. Tom Osen, Forest Supervisor

This biological and conference opinion (BO/CO) is based on information provided in the May 2014 BA, the January 2013 draft environmental impact statement, and the January 2013 LMP, telephone conversations, and other sources of information. Literature cited in this BO/CO is not a complete bibliography of all literature available on the species of concern, forest management, and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation History

- March 12, 2013 We met with Apache-Sitgreaves National Forests (ASNFs) staff to discuss the consultation process and other relevant items, and updated the species list.
- September 30, 2013 We signed a consultation agreement regarding the process for this consultation.
- May to December 2013 We exchanged emails and telephone calls with comments regarding draft sections of the BA.
- December 18, 2013 The ASNFs sent us the draft BA.
- March 12, 2014 We met with the ASNFs staff to discuss our review of the draft BA.
- May 29, 2014 The ASNFs sent us the final BA.
- June 24, 2014 We initiated formal consultation.
- September 30, 2014 We requested an extension for submitting a draft BO/CO opinion to the ASNFs by October 27, 2014.
- November 3, 2014 We sent the draft BO/CO to the ASNFs.
- November 17, 2014 The ASNFs sent comments on the draft BO/CO Opinion.
- December 23, 2014 We sent the BO Summary to the ASNFs.
- January 28, 2015 We had a conference call with the ASNFs to discuss the incidental take statements for the jumping mouse, willow flycatcher, and yellow-billed cuckoo. We were also requested to add specific template language regarding incidental take for the spotted owl.
- February 2, 2015 We received an email requesting clarification in the BO regarding jumping mouse, willow flycatcher, and narrow-headed gartersnake incidental take.
- February 2, 2015 We had a conference call with the Forest Service Regional Office regarding jumping mouse incidental take. The Forest Service Office of General Counsel was contacting our legal counsel to discuss it.

Mr. Tom Osen, Forest Supervisor

- February 4, 2015 We had an internal conference call between the Arizona Ecological Services Office, New Mexico Ecological Services Office, and our legal counsel to discuss the draft jumping mouse incidental take statement.
- March 4, 2015 We sent a revised draft jumping mouse incidental take statement to the Forest Service Regional Office.
- May 11, 2015 We had a call with the ASNFs and they stated their preference that no incidental take statement be issued for the jumping mouse as part of this consultation. Future activities that may affect the jumping mouse will be analyzed on a project and site specific basis to determine the need to provide an incidental take statement.

Mr. Tom Osen, Forest Supervisor

BIOLOGICAL OPINION

Description of the Proposed Action

The proposed action is the implementation of ASNFs' LMP. The planning area includes all lands under the jurisdiction of the ASNFs. The analysis area includes the planning area and adjacent lands that could be directly or indirectly affected by decisions or actions implemented under the direction of the LMP. The ASNFs occupies 2.1 million acres of Coconino, Navajo, Apache, and Greenlee counties. The LMP does not include ASNFs lands located in New Mexico. Adjacent lands include: the Coconino, Tonto, and Gila National Forests; Fort Apache and San Carlos Indian Reservations, Arizona State Trust lands; and several communities including: Heber, Overgaard, Linden, Show Low, Pinetop-Lakeside, Greer, Springerville, Eager, Alpine, Blue, and Clifton. The ASNFs are divided into five ranger districts (RD): Black Mesa, Lakeside, Springerville, Alpine and Clifton.

Once finalized, the LMP will replace the 1987 ASNFs Land and Resource Management Plan (LRMP) and its amendments, and this BO/CO will replace the BO/CO issued on April 30, 2012, which addressed effects from continued implementation of the 1987 LRMP (USFWS Region 2 file number 2012-F-0001). The LMP provides forest-level direction to meet the Forest Service's mission during management of activities on the ASNFs over the next 15 years. This consultation will cover up to this period or until the LMP is revised, with periodic reviews.

The LMP includes the following plan decisions:

- Desired Conditions - Goals that express an aspiration, often to achieve long-term ecosystem restoration and resiliency. Desired conditions form the basis for projects, activities, and uses that will occur under the LMP. Site-specific projects will be designed to maintain or move towards desired conditions over the long-term. Desired conditions provided in the LMP include goals related to important ecosystem elements such as airsheds, watersheds, vegetation, aquatic and terrestrial wildlife, and resilience to climate change; as well as social and cultural resources including recreation, wilderness, scenic beauty, open space, transportation system, and public access and use opportunities on the ASNFs.
- Objectives - Short-term mechanisms used to reach desired conditions over the long-term. Objectives have two parts: a quantifiable outcome and a time in which to achieve the outcome. Although they are considered realistic short-term goals, there may be unforeseen operational, logistical, environmental, political, or financial considerations that may influence the outcome. To accommodate potential uncertainty, there is a stated or implied range of values for the outcome (e.g., acres treated during the proposed action period).
- Standards and Guidelines - Requirements to limit or guide ASNFs' uses or activities that are expected to occur under the LMP. Standards are activity or project design constraints that must be followed; guidelines allow for some variance from the exact wording, as long as the intent of the guideline is met. Standards and guidelines are often mitigating measures placed on objectives. In many cases, standards and guidelines may serve as conservation measures for projects that occur in listed species habitat.

Mr. Tom Osen, Forest Supervisor

- Suitability Determinations – Determinations that identify areas of land as suitable or unsuitable for the specific uses of livestock grazing, special uses, timber production, motorized uses, and recreation.
- Management and Special Areas, or recommendations for them – Designations that identify areas with differing desired conditions, uses, standards, and/or guidelines than the Forest-wide plan direction. Examples include wilderness, Research Natural Areas, and the Blue Range Primitive Area.
- Monitoring and Evaluation Requirements – Used for LMP implementation to:
 - Determine the degree to which on-the-ground management is maintaining or making progress towards desired conditions;
 - Evaluate plan implementation effectiveness; and
 - Inform adaptive management.

The LMP does not make site-specific decisions about exactly how, when, and where activities will be implemented, or which activities will be implemented. All site-specific activities must conform to the programmatic framework set up in the LMP (they must include the standards and guidelines) and they must meet site-specific National Environmental Policy Act (NEPA) and ESA requirements.

Project implementation and the issuance of incidental take associated with those projects are covered under this programmatic opinion since this consultation supersedes all previous ASNFs LMP consultations; however, this consultation does not eliminate the requirement for site-specific project analyses and the need for site-specific informal or formal ESA section 7(a)(2) consultation with the Service for individual projects implemented under the LMP. Furthermore, amendments (*e.g.*, deleting/changing standards or guidelines) to the LMP for a site-specific project may occur, although rarely. In this situation, the action would be considered outside of the scope of this consultation and would require reinitiation of this section 7(a)(2) consultation to address the effects of the particular project-specific proposed action, if additional effects not considered in this BO/CO may occur.

Although the LMP does not make site-specific decisions, it does provide direction to the ASNFs regarding how future projects and activities will be carried out. Incidental take anticipated in this BO/CO may occur during implementation of site-specific projects and activities. In addition, monitoring to determine overall compliance with the incidental take limits set forth here will be required for this and future project-level BOs. Project-specific monitoring will be designed and implemented to determine if and/or when the incidental take limits set forth in this BO/CO have been exceeded.

The following is a summary of the proposed management on the ASNFs by program area. Each program has desired conditions, objectives, standards, and guidelines that are organized by subheading under each program. In addition, the standards and guidelines function as conservation measures for those programs. We will also work with the ASNFs on the design of future site-specific projects to determine whether additional conservation measures should be incorporated.

Mr. Tom Osen, Forest Supervisor

Wildland Fire Management Program

This program area covers wildfire suppression, wildfire prevention, and aviation (water or fire retardant drops with consideration of aerial fire retardant avoidance areas) with the purpose of protecting communities, watersheds, and species-at-risk. It also covers wildland fire use (planned and unplanned) for resource benefits, hazardous fuels reduction, or ecosystem restoration. The program area also manages residual fuels generated as a result of forest restoration thinning work.

Wildland fire is applied or used to maintain or restore resilient fire-adapted ecosystems. This includes maintaining or moving toward desired conditions relative to reference or historic fire regimes. Activities to attain or move toward desired fire regime condition classes over time are expected to reduce the incidence (extent and frequency) of large scale uncharacteristic wildfires that have the potentially associated risk for substantial or complete loss of habitat.

Ecosystem/Vegetation Health Program

This program includes ecosystem health of both forested and non-forested vegetation. While functioning physical features (see Soils and Watershed program area below) and biotic features such as wildlife (see Wildlife and Rare Plants program area section below) are part of a healthy ecosystem, this program focuses on vegetation (structure and function). The ecosystem health program spans many program areas and all potential natural vegetation types (PNVTs). Its focus is on overall ecosystem health and landscape scale disturbance, and its purpose is to maintain current vegetation condition at or move it towards desired conditions through management of activities in forests, woodlands, grasslands, chaparral, riparian areas and associated floodplains. Considerations are also given to landscape scale disturbances that occur within and are often vital to ecosystems.

This program area also includes forest materials or products that are often a by-product of ecosystem restoration activities. Forest material products include timber, biomass, and fuel wood. These are provided commercially, non-commercially, or in partial exchange for services (e.g., forest thinning). Small forest products (Christmas trees, cones, decorative and specialty wood, mushrooms and other plants, berries or nuts, and wildings) are made available through permits.

Rangeland Management Program

This program covers authorized domestic livestock grazing and invasive and noxious weed management. There are 92 active grazing allotments, including two sheep driveways. Approximately 94 percent of the ASNFs are considered suitable for livestock grazing. This includes areas that are not currently grazed based on livestock grazing decisions or for other reasons (riparian areas or to protect Federally-listed species habitat (USFS 2014)). Due to high elevations on the ASNFs, two-thirds of the allotments are grazed primarily during the summer and fall seasons. The remaining allotments are grazed yearlong or during the winter and spring periods. Most allotments are grazed under a deferred-rotation system. Many of the allotments have completed NEPA analyses and attendant ESA consultation per the Forest Service Chief's schedule. This program area also has responsibility to address livestock grazing adjustments needed as a consequence of drought (Forest Service Handbook 2209.13, Ch. 10-19.1).

Mr. Tom Osen, Forest Supervisor

The invasive species management program includes prevention and treatment of invasive or noxious plants (invasive animals prevention and treatment is covered under the Wildlife, Fish, and Rare Plant program). Treatments follow direction from the ASNFs Integrated Forest-wide Noxious Weed or Invasive Plant Management Plan (2008). In addition, all forest program areas are responsible to prevent the establishment of these species.

Watershed and Soil Management Program

This program area provides watershed and soils specialist input to management and activities in all other program areas. It assures that watershed and soil conditions are maintained or improved to provide sufficient water quantity and quality, and productive soils to support healthy plant and animal populations and human needs. It provides mitigations (*e.g.*, application of site specific best management practices) and assists in developing resource management actions to maintain or move toward applicable desired conditions. The program area assesses watershed condition; prioritizes watersheds for protection or improvement; coordinates with other Federal, State, and Tribal agencies; makes water right applications under State or Federal law to meet National Forest System mandates; and addresses sediment and water quality.

The watershed and soil management program area also:

- Addresses the functionality and protection of riparian areas, floodplains, and other groundwater-dependent ecosystems;
- Conducts burned area emergency response assessments and implements actions to protect property and resources as needed after large wildfires (conducted under emergency consultation); and
- Protects State air quality values and works with the wildland fire program area and the State on air quality matters related to burning and human health.

Engineering Program

This program area is responsible for the management and maintenance of infrastructure necessary for use and management of the ASNFs. Infrastructure includes buildings, parking areas, visitor centers, pavilions, restrooms, towers, and water and waste water systems associated with developed recreation on the ASNFs. The engineering program area is also responsible for implementing the Forest Service Southwestern Region's environmental management system and the environmental compliance and protection program (*e.g.*, handling and disposal of regulated materials).

This program manages the forest transportation system to meet public and administrative needs. This includes design, construction, and maintenance of roads, bridges, and drainage structures, as well as road closures, relocations, and decommissioning.

Travel ways that are not part of the ASNFs road network are considered unauthorized routes. Motorized vehicle use for recreation activities has increased dramatically in recent years. Some adjustments to the road network have been made during project level analyses and decisions, most related to poorly located roadbeds in riparian areas or wet meadows. Temporary roads have been used for forest products extraction where a permanent road is not needed for future access.

Mr. Tom Osen, Forest Supervisor

Travel management planning has been initiated but not completed on the ASNFs. Potential changes to the ASNFs transportation system will be evaluated by the framework provided by the LMP. Once completed, the transportation system will be delineated and published on the motor vehicle use map and motorized travel would be limited to a designated system of roads, trails, and areas. Travel inconsistent with those designations, and inconsistent with the LMP, would be prohibited.

Lands and Minerals Program

This program is responsible for land ownership adjustments including purchases, withdrawals, and land exchanges. It also identifies and addresses property boundaries and encroachments onto the ASNFs. It issues non-recreational special use authorizations for occupancy of water lines, utility and transportation rights-of-way and easements, and common minerals pits on the ASNFs.

This program area also administers mining, oil, gas, and geothermal activities. There is low potential for most of these commodities on the ASNFs because of existing geology and low mineral potential. The demand for salable or common variety mineral material such as rock, gravel, clay, or sand (typically extracted in pits which require annual operating plans) is currently low but growing.

Recreation and Wilderness Program

These program area components include administration and management of resources and visitors at developed recreation sites, dispersed recreation settings, partnerships and tourism, interpretive services, recreation special use permits, designated wilderness areas, a primitive area, visual quality management, trail management, and scenic byways. Recreational facilities (visitor sites, campgrounds, etc.) are covered under the Engineering Program.

This program also manages cultural resources through identification and protection of cultural resources or historic properties by providing opportunities for public education and cultural resource stewardship. The Tribal Government Relations Program (American Indian Rights and Interests) involves the development and maintenance of government to government relationships, cultural interests, sovereignty, treaty rights, self-determination, consultation, religious freedom, and other areas of tribal concern. This includes the use of ASNFs lands and resources for a variety of traditional cultural and religious activities (*e.g.*, plant material collection or ceremonies).

Mr. Tom Osen, Forest Supervisor

Wildlife, Fish, and Rare Plant Program

This program area is used to provide wildlife and fisheries specialist input to management and activities in all other program areas. Habitat for all native and desired non-native wildlife, fish, and plant species is managed in order to maintain viable populations throughout their geographic range with a focus on ecological integrity. Habitat enhancement projects or activities, inventory or monitoring and habitat assessments are conducted. The treatment of invasive animal species, (e.g. nonnative fish) falls under this program area and is most often undertaken in partnership with Arizona Game and Fish Department (AGFD). Conservation strategies, research or studies, and public education are additional important components of this program that are often conducted in collaboration with other resource areas and agencies.

This program area is also used to evaluate impacts to wildlife, habitat, and plants from management and activities associated with other program areas. Through this program, staff often suggest project or activity mitigations to reduce impacts and assists in developing or shaping resource management actions that will maintain or move toward applicable desired conditions for plants, species, and their habitats. Under this program, the Forest Service conducts ESA Section 7 consultations on forest project and management activities. This program is also used to manage Research Natural Areas (RNAs), which are a national network of areas utilized for research and education, and/or to maintain biological diversity on NFS lands. RNAs and recommended RNAs are not suitable for new motorized routes, tree cutting, energy corridors, special use communication sites, or livestock grazing.

INCIDENTAL TAKE REGULATION

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described under each species below are non-discretionary, and must be undertaken by the Forest Service so that they become binding conditions of any grant or permit issued to an applicant/permittee, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest Service has a continuing duty to regulate the activity covered by this incidental take statement. In order to be exempt from the prohibitions of section 9 of the ESA, the ASNFs must comply with the terms and conditions described under each species, which implement the reasonable and prudent measures and outline reporting/monitoring requirements. These terms and conditions are non-discretionary. The Service may approve deviation from these terms and conditions

Mr. Tom Osen, Forest Supervisor

through site-specific project consultation. Examples warranting deviation from these terms and conditions may include, but are not limited to instances where site-specific conditions dictate that full compliance with the condition is not necessary to avoid incidental take; the ASNFs lacks discretionary authority to implement the condition; or, deviation from the condition is needed to meet the purpose and need of a project.

If the Forest Service: (1) fails to assume and implement the terms and conditions, or; (2) fails to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest Service must report the progress of the action and its impact on the species to the USFWS as specified in the incidental take statement [see 50 CFR 402.14(i)(3)].

Incidental take is provided for the New Mexico meadow jumping mouse, Mexican spotted owl, southwestern willow flycatcher, narrow-headed gartersnake, Chiricahua leopard frog, Three Forks springsnail, Apache trout, Gila chub, Little Colorado spinedace, and loach minnow in this biological opinion. This incidental take is specific for the life time of the LMP.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

The jeopardy analysis in this BO/CO relies on four components in our evaluation for each species: (1) the *Status of the Species*, which evaluates the species' range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the species in the planning area, the factors responsible for that condition, and the relationship of the planning area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and, (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the planning area on the species.

The jeopardy analysis in this BO/CO places an emphasis on consideration of the range-wide survival and recovery needs of the species and the role of the planning area in the survival and recovery of the species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination

The adverse modification analysis in this BO/CO relies on four components: 1) the *Status of Critical Habitat*, which evaluates the range-wide condition of designated critical habitat for the species in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall; 2) the *Environmental Baseline*, which evaluates the condition of the critical habitat in the planning area, the factors responsible for that condition, and the recovery role of the critical habitat in the planning area; 3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed

Mr. Tom Osen, Forest Supervisor

Federal action and the effects of any interrelated or interdependent activities on the PCEs and how they will influence the recovery role of affected CHUs; and, 4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the planning area on the PCEs and how they will influence the recovery role of affected CHUs.

For purposes of the adverse modification determination, the effects of the proposed Federal action on each species' critical habitat are evaluated in the context of the range-wide condition of the critical habitat, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional (or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the species. Adverse effects to critical habitat that do not remove a site's ability to maintain or develop PCEs in the future do not lead to an adverse modification determination.

Species Accounts

NEW MEXICO MEADOW JUMPING MOUSE

Status of the Species

The New Mexico meadow jumping mouse (jumping mouse) was listed as an endangered species on June 10, 2014 (USFWS 2014a). Critical habitat for this species, proposed on June 20, 2013 (USFWS 2013a), has not been finalized to date.

Historical distribution included riparian wetlands along streams in the Sangre de Cristo and San Juan Mountains from southern Colorado to central New Mexico, including the Jemez and Sacramento Mountains and the Rio Grande Valley from Espanola to Bosque del Apache National Wildlife Refuge, and the White Mountains in eastern Arizona (USFWS 2014a).

Based on historical and current data, the distribution and abundance of the jumping mouse has declined significantly rangewide with the majority of local extirpations occurring since the late-1980s and early 1990s. Surveys conducted since 2005 documented locations where the subspecies was historically present, but is now apparently absent or at levels too low for detection. Some 70 former locations historically occupied by the jumping mouse are considered no longer occupied (Frey 2005; Frey and Wright 2012; Hicks 2012). Since 2005, there have been 29 documented populations spread across the eight sites (2 in Colorado, 15 in New Mexico, and 12 in Arizona) (USFWS 2014a). Nearly all of the current populations are isolated and widely separated. All 29 populations are in patches of suitable habitat that are too small to support resilient populations of New Mexico meadow jumping mice. In addition, 11 of the 29 populations have been substantially compromised since 2011 (due to water shortages, excessive livestock grazing, or wildfire and postfire flooding) (USFWS 2014b).

Information presented on the jumping mouse in this BO/CO is from a Species Status Assessment completed by the Service (USFWS 2014b), which is incorporated by reference. The jumping mouse is a riparian-wetland obligate species; it requires dense riparian herbaceous vegetation associated with perennial or intermittent water surface flow. It occurs from elevations ranging from 4,500 feet to 9,600 feet. Habitat requirements are characterized by tall herbaceous vegetation, primarily composed of sedges, rushes, and forbs. Often these are within the understory of streamside willows (*Salix sp.*) or alder (*Alnus sp.*).

Mr. Tom Osen, Forest Supervisor

The jumping mouse hibernates for 8 to 9 months per year; conversely it is only active for 3 to 4 months during the summer. It may only be active from early June to September in high elevation montane areas (USFWS 2014b). Due to this short activity period jumping mice typically raise only one litter per year. Jumping mice feed on insects and seeds from sedges, rushes and grasses, and depend on the availability of seeds to build the fat reserves needed for hibernation. As a result, the availability of seeds prior to hibernation is critical for the mouse's survival through hibernation. Jumping mice nest and hibernate in drier upland grassy areas that are adjacent to riparian habitats. It is important that hibernation sites are above the floodplain elevation to avoid flood-related mortality.

ENVIRONMENTAL BASELINE

Status of the species within the planning area

Between 2007 and 2012, the jumping mouse was found in 12 locations on the ASNFs (Frey 2011; Hicks 2012) (Table 1). All of these sites are located within proposed critical habitat. The critical habitat proposed rule uses rangewide verified jumping mouse locations from 2005 to 2012 (USFWS 2013a). Therefore, we are using post-2005 survey information for the status of the jumping mouse in the planning area. In addition there are three historical sites, East Fork of the Little Colorado River at Phelps's Cabin (Morrison 1991), Hannagan Creek (Hall and Davis 1934) and Little Colorado River at Sheep's Crossing (Dodd 1987), in which jumping mice were collected in the past, but not during post-1991 survey attempts (Frey 2008).

See Table 1 on the following page:

Table 1: New Mexico meadow jumping mouse locations and captured numbers from surveys conducted between 2007 and 2012 on the ASNFs, Arizona (ASNFs Mouse Site Names).

Mr. Tom Osen, Forest Supervisor

Location	Frey 2007-2011¹	AGFD 2012²
East Fork Little Colorado River (Montlure)	6	3
San Francisco River (Tal-wi-wi)	1	0
San Francisco River (Noble))	6	0
East Fork Black River (Three Forks)	7	2
Nutriosos Creek (Nutriosos)	3	1
West Fork Black River (Thompson Ranch)	1	0
West Fork Black River (Forest Road 68)	3	2
West Fork Black River (PS Ranch)	2	1
Boggy Creek (Boggy)	4	1
Centerfire Creek (Centerfire)	3	0
Corduroy Creek (Corduroy)	1	1
Campbell Blue Creek (Campbell Blue)	3	0

¹Frey 2011; ²Hicks 2012

Ten of the 12 jumping mouse sites are located within the montane-willow riparian forest PNVT (USFS 2014). The Campbell Blue Creek site is within cottonwood-willow riparian forest PNVT. The West Fork Black River (Thompson Ranch) site is within the wetland cienega PNVT. While the current trend in most ASNFs riparian areas is away from desired riparian conditions, all of the above mouse location sites were likely at or near desired conditions, primarily due to exclusion of livestock grazing, over the last several years (USFS 2014).

Both the montane-willow and wetland cienega PNVTs are found throughout the ASNFs. There are approximately 4,800 and 17,900 acres, respectively of montane-willow and wetland cienega habitat on the ASNFs (USFS 2013). Frey (2011) surveyed many other sites without successfully capturing jumping mice. However, fluctuating capture success rates from one year to the next are common. No jumping mice were captured at Bosque del Apache National Wildlife Refuge in 2013, despite intensive surveys within suitable habitat (USFWS 2013a). However, in June 2014, 19 jumping mice were captured at the Refuge (E. Hein, USFWS pers. comm. 2014). This fluctuation in capture success from one year to the next indicates that species population trends will be difficult to track at known and future determined occupied sites. The lack of one season's trap success cannot support the assumption that sites are assuredly un-occupied. We assume that there are occupied jumping mouse sites within unsurveyed montane-willow and wetland-cienega PNVTs other than those listed above in Table 1.

Mr. Tom Osen, Forest Supervisor

Factors affecting the species and its proposed critical habitat in the planning area

Uncharacteristic wildfire and post-fire flooding can scour and remove jumping mouse habitat. The severity of these impacts depend upon the timing and magnitude of rain events after the fire, effectiveness of implemented erosion control efforts, and recovery time of burned watersheds.

Livestock grazing (both authorized and unauthorized), in addition to feral horses and elk herbivory, can affect jumping mouse habitat when it eliminates or reduces herbaceous plants or alters the riparian plant species composition and structure (USFWS 2014b). The majority of known occupied jumping mouse sites and those proposed for critical habitat are currently protected from livestock grazing by specific pasture management or exclosures that were implemented to protect Apache trout and loach minnow or other important riparian values. While most mouse sites are protected from livestock, they can still be affected by feral horses and elk. Other unsurveyed sites with suitable habitat, where occupancy is unknown, may be affected by livestock, elk and feral horses.

Roads crossing jumping mouse habitat may inhibit movement but it is not known if this is occurring on the ASNFs. The Boggy and Centerfire creeks, and the East and West Fork of the Black River and East Fork of the Little Colorado River have potential habitat and known occupied jumping mouse habitat sites separated by road culverts and an elevated road surface. It is not known if these act as a barrier to jumping mouse movement. Wright and Frey (2011) documented repeated crossings by one jumping mouse of a 16-foot wide gravel road on the Bosque del Apache National Wildlife Refuge, indicating that the road was not a barrier to regular movements.

Dispersed recreational activities such as camping, hiking, fishing, and off-road vehicle use can reduce or eliminate the dense herbaceous riparian vegetation needed by the jumping mouse. Streamside trails and open barren areas in jumping mouse habitat are documented on the ASNFs (Frey 2011).

Drought and climate change may also threaten this species. Drought on the ASNFs has at times reduced the extent of effective (wetter, tall vegetation) habitat (USFS 2014). Loss of beaver and subsequent loss of wetted areas has also been identified as a threat to the species. While beaver are present along the San Francisco River and Campbell Blue Creek, none are in the vicinity of known jumping mouse sites.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Because this is a programmatic consultation, we will only discuss the adverse effects in terms of the general effects we anticipate will occur. We briefly discuss the plan components (desired

Mr. Tom Osen, Forest Supervisor

conditions, objectives, standards, and guidelines) where applicable. We provide a table with desired condition, objectives, standards, and guideline that are specifically referred to in this consultation in Appendix B of this BO/CO. Detailed effects discussions will occur as each project is developed specifically and consulted on separately.

Wildland Fire Management Program

Wildland fire use can result in short-term impacts to the jumping mouse (*e.g.* loss of floodplain or immediate upland area vegetation), especially if the fire is followed by heavy post-fire flooding. Wildland fire suppression activities may also affect the jumping mouse if staging areas are placed in its habitat.

There are two relevant desired conditions that guide management and activities under this program which may offset impacts to the jumping mouse. Desired conditions 42 and 296 would direct management activities to help restore fire to its historic role where large-scale; high-severity fires were rare. Watershed improvement through vegetation treatments including wildland fire use (planned and unplanned) may reduce the likelihood of wildfire entering riparian habitats and future post-fire runoff. In addition, Guidelines 174 and 175, which address aerial fire retardant use and potential ground disturbing activities associated with fire, may reduce the effects of fire suppression impacts from this program on the jumping mouse. This program area could reduce impacts to jumping mouse, although vegetation treatments using wildland fire may result in short-term impacts from post fire flooding or habitat loss from projects occurring in or adjacent to jumping mouse habitat.

Ecosystem/Vegetation Health Program

This program's purpose is to maintain current vegetation condition at or move them towards specific desired conditions set for the different forest and non-forested potential natural vegetation types (PNVT) by planned and unplanned fire ignitions and other vegetation treatments (USFS 2013). Short-term effects of this program may cause increased flood runoff, scouring, and debris deposition in jumping mouse habitat.

There are nine relevant desired conditions that guide management and activities under this program. Desired condition 1 directs management toward development of habitat conditions that sustain animal populations which would include the jumping mouse. Desired conditions 4 and 44 would help contribute to genetic diversity and habitat/population connectivity so that species such as jumping mouse may be able to adjust to climate change. Desired condition 46 directs management actions to provide upland soil cover conditions such that water flow and quality would benefit the riparian habitat in which jumping mouse occur. Desired conditions 43, 75, 79, and 81 direct management to retain or restore native vegetation which would include the willows, alders, and herbaceous vegetation that provide habitat for the jumping mouse. Desired condition 45 would increase riparian vegetation connectivity which could facilitate dispersal of jumping mouse along riparian areas. This specifically addresses the concern regarding the need for adequate habitat extent to support viable jumping mouse populations (USFWS 2013a).

Mr. Tom Osen, Forest Supervisor

Objective 11 has the potential to increase forest ground cover to carry periodic cool ground fires and, with decreased crown densities, to reduce the risk of severe wildfires that can burn intensely into or cause damaging post-fire flooding which could affect jumping mouse habitat.

Standard 4 is intended to limit introduction of invasive and noxious weed species into areas like those with jumping mouse habitat by equipment or activities during restoration treatments. Guideline 23 maintains or reestablishes vegetation and soil cover which may prevent higher flows with debris and sediment from entering jumping mouse habitat. Guideline 30, reducing ground disturbing projects, may protect down slope and downstream jumping mouse habitat.

The implementation of the standards and guidelines associated with this program area could reduce impacts to jumping mouse. However, vegetation treatments implemented to meet desired conditions of the particular PNVTs used by the jumping mouse or within watersheds including jumping mouse habitat could result in short-term impacts to their habitat.

Rangeland Management Program

Livestock grazing has been identified as an adverse effect to streamside vegetation and jumping mouse habitat on the ASNFs (Dodd 1986, Morrison 1991, Frey 2011). The primary concern is the removal of important vegetation that serves as cover and removal or prevention of the development of graminoid seeds needed as food by the mice.

Eleven of twelve known jumping mouse capture sites are excluded from livestock grazing. The Service defines occupied habitat as all suitable habitats for 0.5 miles up and downstream of the site in which jumping mice were captured during past surveys (USFWS 2013a). Occupied habitat is located on 12 livestock grazing allotments. However, occupied habitat is excluded from grazing on five of the twelve allotments by fenced exclosures, retirement of portions of the allotments for conservation reasons, or non-use due to no grazing permit being issued. Grazing management within occupied habitat on the remaining seven allotments is described in Table 2.

Table 2. Current livestock management within occupied jumping mouse habitat (0.5 miles up and downstream of a known jumping mouse location) on the ASNFs.

Allotment	Acres of Grazed (Unprotected) Occupied Habitat¹	Current Management (As of July 11, 2014)
Sprucedale/Reno	45	Not used until fencing is completed
Williams Valley	40	Used from mid- August to end of September
Grandfather	17	Holding pasture used after summer activity period (October)
Reservation	24	Small riparian pasture that receives light use
PS	45	Grazed for 7 days, every other year
South Escudilla	6	Used from mid-September to mid-October
Total unprotected occupied habitat	177	

¹This acreage includes upland habitats within the 100 meters (330 feet) from left and right bankfull locations in proposed critical habitat.

Mr. Tom Osen, Forest Supervisor

The jumping mouse may be found on additional livestock grazing allotments that have not been surveyed or have had insufficient survey effort to document absence. There are at least 30 allotments on the Springerville and Alpine RDs that contain the montane-willow and wetland cienega PNVTs. Not all portions of these PNVTs may support jumping mouse habitat. This will likely be evaluated through future surveys.

There are four desired conditions 60, 64, and 82 that guide range management activities that would benefit jumping mouse habitat. There are four relevant desired conditions that guide rangeland management on the ASNFs, including jumping mouse habitat. Desired condition 170, greater cover in grasses and forbs, would help contribute to lower intensity wildfires that allow ground cover to readily re-sprout, limiting sediment flow into riparian areas where jumping mouse occurs. Desired conditions 60, 64, and 82 address the need for tall, vigorous herbaceous riparian vegetation (cool and warm season growing species), including the need for seed heads for an important food source. Where annual fluctuations and seasonality of forage production are considered, desired condition 278 would help retain sufficient ground cover to help reduce the ability of overland flow to carry sediment and organic matter into areas such as those that are suitable or restorable jumping mouse habitat.

Objective 17 strives to limit the spread of invasive and noxious weeds in riparian areas, which may provide habitat for the jumping mouse.

There are two standards that would benefit the jumping mouse when implemented in its habitat. Standard 3 limit impacts from activities such as control of invasive weeds within habitats needed by the jumping mouse. Standard 11 reduces the risk of new or the spread of existing invasive or undesirable weed species in areas that may be jumping mouse habitat.

Seven guidelines protect or restore riparian or wetland habitat that may provide jumping mouse habitat. Guideline 136 requires that livestock stocking rates are in balance with available forage. Guideline 133 requires that grazing is done at the proper times relative to plant growth needs. Guideline 32 requires that grazing allotments are managed to maintain or improve to desired riparian conditions. Guideline 132 requires that critical areas (*e.g.* riparian areas) should be managed to address special concerns. Critical areas for grazing management are those that should be treated with special consideration because of inherent site factors, size, location, condition, values, or significant potential conflicts. These areas are evaluated separately from the remainder of a management unit because they contain special or unique values. One of the critical areas in the LMP is jumping mouse habitat in riparian areas. Guidelines 134, 138, and 139 reduce livestock management and facility impacts by requiring that water trough, salt or mineral supplement block placement and livestock trailing do not occur in riparian areas, which may include those occupied by the jumping mouse.

Two guidelines, 4 and 81, which are related to invasive weed species management, would protect native riparian vegetation from invasive weed establishment and control actions in jumping mouse habitat.

There are one objective, two standards, and seven guidelines that address invasive and noxious weed control. These plan decisions, if implemented in jumping mouse habitat, would benefit the jumping mouse. Objective 17 may limit the spread of invasive and noxious weeds, although short-term trampling of tall, dense herbaceous riparian vegetation may occur during treatments.

Mr. Tom Osen, Forest Supervisor

Standard 3 will help limit impacts from activities like invasive plant species control by maintaining or moving plant composition towards a moderate to high level of similarity to the site's vegetation potential. Standard 11 will help reduce the risk of new or the spread of existing invasive or undesirable species.

The standards and guidelines applicable to this program area could reduce impacts to jumping mouse from livestock grazing. Current livestock grazing may have minimal effects to jumping mouse habitat due to riparian exclosures, limited pasture use, or timing restrictions for livestock use in riparian areas where they occur. Livestock grazing may still adversely affect important habitats needed by jumping mice. Habitat enhancement projects such as riparian fencing to protect habitat could also have short-term vegetation and soil impacts in adjacent uplands (*e.g.*, vehicles delivering/laying out materials) that may affect the jumping mouse and its habitat. The standards and guidelines required under this program are expected to minimize, but not eliminate these adverse effects. Therefore, over the life of this consultation, we expect that implementation of the Rangeland Program could result in adverse effects to the jumping mouse and their habitat.

Watershed and Soil Management Program

The BA does not specify watersheds or riparian or stream areas that would be treated under the LMP for this program. However, the BA notes that projects to improve watershed and soil conditions could include, but are not limited to, vegetation reestablishment, nonnative invasive plant treatments, erosion control, instream habitat improvement, adjusting the timing and season of grazing, or fence construction. Projects in the riparian areas would promote recruitment and maintenance of native riparian vegetation needed by the jumping mouse. Projects in the riparian and stream habitats would have localized, short-term effects including streambank disturbance, vegetation reduction, sediment deposition into the stream, and disturbance to wildlife, including jumping mice.

There are nine relevant desired conditions that guide management and activities for this program. Desired condition 22 would provide vegetation and soil conditions above the floodplain that protect water quality and aquatic habitat. Desired condition 299 directs management to move toward or maintain satisfactory watershed conditions including soil conditions. Desired condition 77 protects upland soils so they do not degrade riparian habitat. Desired condition 34 would help provide continuous habitat to spatially support self-sustaining jumping mouse populations. This includes floodplains and adjacent upland areas used by nesting or hibernating jumping mouse. Desired conditions 292 and 293 ensure that water is available and not diminished by securing ASNFs water rights and preventing groundwater pumping from diminishing surface water flow. Desired conditions 81 and 83 will help to ensure that streambanks, floodplains, and adjacent upland areas would have diverse habitat components such as vegetative ground cover to stabilize streambanks and provide wildlife habitat which could be used by the jumping mouse for foraging, breeding and hibernation. Desired condition 78 provides for native vegetation, including that used by the jumping mouse.

The objectives under this program are to improve watershed condition and function, and riparian conditions across the ASNFs. The eight objectives provide for a treatment level of approximately 1,000 to 10,000 acres per year, which will improve the overall conditions for the six code watersheds and riparian areas receiving treatments. Collectively these desired conditions and objectives could potentially result in long-term improvements for the jumping

Mr. Tom Osen, Forest Supervisor

mouse if done in occupied or suitable habitats. There are approximately 48,300 acres of riparian PNVT, 22,700 acres of which may be potential jumping mouse habitat on the ASNFs (USFS 2014). The maximum treatment level discussed would eventually lead to improvements in jumping mouse habitat during the life time of the LMP.

Objectives 4 and 6 could improve riparian vegetation composition (native grasses and sedges) and structure (vigorous, tall plant heights) needed by jumping mice. Objective 5 (removing barrier to movement, restoring dewatered stream segments, or connecting fragmented habitat) would help retain and possibly expand potential riparian corridors, which are necessary for jumping mouse movements. Objective 10 reduces animal damage to native willows and other riparian species on an average of 5 miles of riparian habitat. Objective 38 has the potential to help protect water and sustain riparian vegetation where instream flow applications have been filed, which may include some watersheds containing jumping mouse habitat.

All activities completed under this program would be implemented according to standards and guidelines and best management practices as described below and in the BA. Projects would have short-term adverse effects to the species and habitat but would have long-term beneficial effects as watersheds and aquatic and riparian habitats improve towards the desired conditions listed in the LMP. Standards 32 and 33 may protect water flows in jumping mouse habitat from new diversions, groundwater withdrawals, and applied for instream flow rights.

Guideline 2 could minimize impacts to soils resources which would reduce sediment or debris flow into jumping mouse habitat. Guideline 8 helps protect riparian and wetland and adjacent resources from soil and vegetation disturbing equipment, vehicles, and activities. Guidelines 9, 10, 18, and 19 would require that projects, activities, and permits retain sufficient water flows to support riparian vegetation and species which would help retain surface water and protect against the risk of jumping mouse habitat loss. Erosion control measures (*e.g.*, straw waddles) for landscape scale disturbances (Guideline 82) may protect jumping mouse habitat after large scale disturbance events such as severe wildfire and flooding.

The standards and guidelines associated with this program area could reduce impacts to jumping mouse. This program implements projects to improve soils and watershed conditions on the ASNFs. Actions implemented could result in short-term impacts to the jumping mouse from habitat disturbance from projects that re-establish vegetation, control erosion and invasive plant species, and install instream habitat improvements.

Engineering Program

This program includes transportation and management and maintenance of infrastructure (buildings, parking areas, campgrounds, restrooms, etc.). Transportation projects could have localized and short-term adverse effects to jumping mice and their habitat from actions taken near or in-stream. Infrastructure projects, if done near or within jumping mouse habitat, may concentrate visitor use in these areas and cause habitat damage. Desired condition 235 directs that the location and design of roads not impede wildlife and fish movement, which would help address habitat connectivity and jumping mouse movement and population expansion through riparian corridors. Many of the known occupied sites are separated from up or downstream unsurveyed sites with potential habitat by a road.

Mr. Tom Osen, Forest Supervisor

Two objectives, 7 and 8, restore or improve connectivity of riparian areas which the jumping mouse might occupy or use as corridors for expansion and dispersal. They involve the relocation, repair, improvement, or decommissioning of authorized roads and trails and the removal of unauthorized roads and trails that add sediment to streams, damage riparian vegetation, erode streambanks, cause gullies, and compact floodplain soils.

The LMP contains two standards and four guidelines that may help minimize threats of road management to riparian areas used by the jumping mouse. Standard 15 has the potential to limit impacts from motorized vehicle use in riparian, floodplain, and adjacent upland areas where jumping mice may be present. Standard 18, designing road maintenance and construction to reduce sediment, limit sediment-carrying flows from entering jumping mouse habitat. Guidelines 13, 31, 33, and 34 prevent contaminants such as oil, gas, or salt entering riparian habitat. Guidelines 99 and 100 could prevent or reduce road or motorized trail area impacts to jumping mouse habitat by avoiding riparian areas during road and trail construction or authorization. Temporary roads in riparian areas will be closed or relocated after projects are completed. Guideline 105, which requires that roads and motorized trails not impede terrestrial species movements or prevent habitat connectivity, may limit potential barriers to jumping mouse dispersal in or are near riparian areas.

The standards and guidelines associated with this program area could reduce impacts to jumping mouse. Actions implemented, by this program area, could result in short-term impacts to the jumping mouse from habitat disturbance from infrastructure construction and transportation projects.

Lands and Minerals Program

This program administers existing rights-of-way, easements, mineral pits and special use permits for a variety of uses on the ASNFs. It is likely that some of these special use permits and authorizations are located within watersheds occupied by the jumping mouse. Impacts to the jumping mouse from this this program could be caused by the special uses mentioned above if they are authorized in or near riparian areas that support its habitat. Water use for development purposes has been identified as a threat to riparian habitats used by the jumping mouse (Frey 2011, USFWS 2013a).

One standard and one guideline address potential impacts to the jumping mouse. Standard 31 requires that authorized water diversions shall maintain wildlife habitat by retaining water in riparian areas. Guideline 146 may limit material removal from riparian and floodplain areas thereby reducing destruction of streambank vegetation and/or the channel morphology needed to support riparian vegetation. Where special uses or other authorizations (*e.g.*, collection of decorative rock) are issued, guideline 166 may limit impacts to riparian/wetland habitat where jumping mice might occur. In addition, special use permits issued within the Three Forks or Corduroy Creek recommended research natural areas (occupied and proposed critical habitat) may contain measures to limit impacts to jumping mouse and habitat.

The standards and guidelines associated with this program area could reduce impacts to jumping mouse. However, actions implemented, by this program area, may result in short-term impacts to the jumping mouse from habitat disturbance from the minerals removal, issuance of special use permits, and rights-of-way issuance in riparian areas that support jumping mice or their habitat.

Mr. Tom Osen, Forest Supervisor

Recreation and Wilderness Program

Reservoirs and streams and adjacent areas on the ASNFs provide numerous recreational activities. The user demands and concentrated uses in these areas can prevent development of or alter vegetation and habitat needed by the jumping mouse by trampling vegetation or compacting soils in riparian areas.

There are seven developed campgrounds either adjacent to occupied jumping mouse habitat or within proposed critical habitat. The West Fork Campground, located on the West Fork of the Black River, is 0.9 miles upstream of the Middle West Fork of the Black River jumping mouse site. This jumping mouse site is located on AGFD property. There are six developed campgrounds: Diamond Rock, Aspen, Deer Creek, Raccoon, Horse Springs, and Buffalo Crossing, located in proposed critical habitat along the East Fork of the Black River. These campgrounds are not considered a threat to the jumping mouse of its habitat because these sites do not contain habitat for the mouse (Industrial Economics 2014).

Dispersed recreation may occur in jumping mouse habitat including, but not limited to hiking, fishing, camping outside of developed campgrounds, and water play. There is a potential for trampling of jumping mouse habitat and damaging riparian vegetation from activities associated with dispersed camping when recreationists access riparian areas from their campsites. Whether existing trails in riparian areas are a barrier or trail density limits habitat development or persistence of jumping mice is unknown as there is no habitat assessment data to date to determine habitat availability or suitability in these areas. In some cases, there may not be existing trails to access the stream at all desired locations, resulting in the need to walk along the streambank in jumping mouse habitat.

One objective, one standard, and one guideline address potential impacts of recreation to the jumping mouse and its habitat. Objective 18 would rehabilitate an average of five dispersed campsites and associated riparian areas which could include jumping mouse habitat. Standard 13 helps preclude recreation impacts to soils, streambanks, floodplains, and riparian vegetation which includes occupied or potential jumping mouse habitat by requiring that dispersed campsites not be designated within 50 feet of streams and riparian areas. Although this standard may minimize and reduce potential impacts caused by recreation, the possibility still exists for impacts to jumping mouse and its habitat. The 50-foot buffer may prevent camping within wetland meadows and riparian areas used by the jumping mouse; but it is likely still within proposed critical habitat (330 feet from left and right edges of the bankfull channel). Visitors camping outside of the 50 foot buffer may use the riparian or stream area because that is why they likely choose to camp at that location.

Timing restrictions under guideline 94 could limit recreation related impacts to specific times during the year, which coincide with the jumping mouse active summer period. In addition, guideline 95 may preclude dispersed campsites within jumping mouse habitat, reducing or preventing trampling of vegetation and damage to burrows.

Actions implemented, by this program area, could result in short-term impacts from recreational use within riparian areas occupied by jumping mice. Forest visitors may create new trails by trampling riparian vegetation accessing streams. This may reduce riparian cover and available food, needed by the jumping mouse, if significant amounts of vegetation are impacted in occupied habitats. The LMP includes standards and guidelines to reduce the impacts to jumping mice from recreation activities; however, there is also direction in the LMP improve recreational

Mr. Tom Osen, Forest Supervisor

opportunities. Although an increase in recreation is likely to take place over the next 10 to 15 years, there is no direction within the LMP to increase offered recreation opportunities, only to improve existing recreational experience/opportunities. Over the life of the LMP, this may result in impacts to jumping mice and their habitat.

Wildlife, Fish, and Rare Plant Program

This program includes inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, conservation strategy development, administrative studies, research collaboration, and information and education. This program also covers research natural areas and recommended research natural areas. There are five relevant desired conditions that guide management and activities here that may benefit the jumping mouse. Desired condition 6 directs management and activities to provide for habitat configuration and availability to allow for adjustments in wildlife movements (seasonal, migration, foraging, etc.) in response to climate and to provide for genetic diversity. This is very important for the jumping mouse due to its current isolated and disjunct populations. Desired conditions 197 and 200 direct management and activities to maintain and support recovery of wildlife populations and their habitats, which would include the jumping mouse. Desired condition 7 addresses habitat quality, distribution, and abundance to support the recovery of federally listed species, such as jumping mouse. Desired condition 72 supports the presence of beavers and the wetland habitat they created which can also provide jumping mouse habitat.

Objective 10 could help maintain and protect willows and alders by potentially limiting ungulate browsing in riparian habitats that may be occupied by the jumping mouse. Objective 17, annually controlling or eradicating invasive species on at least two stream miles, would improve affected jumping mouse habitat.

Six guidelines address potential impacts of habitat improvement projects on the jumping mouse and its habitat. Guideline 19 requires that stream flows not be impeded such that riparian-dependent species like jumping mouse or their habitat is impacted. Guideline 29 requires monitoring to provide feedback about project implementation effects or effectiveness of mitigation measures to meet LMP desired conditions which would include riparian areas occupied by the jumping mouse. Guideline 71 provides for management towards the dense, herbaceous vegetation needed by species requiring these habitat components which would include the jumping mouse. Guideline 67 requires project and activity mitigation to help provide for and reduce negative impacts to wildlife and their habitat which would include the jumping mouse. Guideline 65 requires activities to comply with listed species recovery plans, which would benefit jumping mice after a recovery plan is developed. Guideline 76 requires that the needs of jumping mice should be considered and provided for during project activities so that their habitats are not lost or degraded.

The LMP considers designated research and recommended research natural areas not suitable for livestock grazing, energy development, communication sites, or timber harvest. The existing Phelps Cabin Research Natural Area encompasses about 0.4 mile of the East Fork Little Colorado River section of proposed critical habitat for the jumping mouse. The Three Forks Closure Area, which contains a jumping mouse site, is within the recommended Three Forks Research Natural Area. This closure prevents human trampling of jumping mouse habitat and is considered not suitable for the uses mentioned above.

Mr. Tom Osen, Forest Supervisor

This program area could reduce impacts to jumping mouse, although species surveys and habitat assessments could result in short-term impacts from vegetation trampling and disturbance to individual jumping mice in the area. Habitat enhancement projects such as riparian fencing to protect habitat could also have short-term vegetation and soil impacts in occupied habitat and adjacent uplands (*e.g.*, vehicles delivering/laying out materials).

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the planning area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Two jumping mouse sites are located on AGFD-owned and private lands: Lower West Fork of the Black River (PS Ranch) and East Fork of the Little Colorado River (Montlure), respectively. Private land activities include some business and homesites with associated structures as well livestock grazing with facilities. Private land grazing is typically heavy and in some areas occurs year-round.

State activities to date have included jumping mouse surveys by AGFD. Arizona Department of Transportation will be paving sections of Forest Road 249 that would likely increase recreation use on the Alpine RD and, in particular, in the East Fork Black River recreation area. AGFD's fish stocking program draws people to jumping mouse sites and proposed critical habitat on the East and West Fork Black Rivers and West and East Forks Little Colorado Rivers.

CONCLUSION

After reviewing the current status of the jumping mouse, the environmental baseline for the planning area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the LMP for the ASNFs will not jeopardize the continued existence of the jumping mouse. Our reasoning for determining that implementation of the LMP for the ASNFs will not jeopardize the jumping mouse is based on the following:

- The majority of known occupied jumping mouse acreage is currently excluded from livestock grazing but if current management changes grazing consultations would be reinitiated;
- The majority of known occupied mouse sites is not within the planning area, but is within New Mexico. Many of the desired conditions and objectives in the LMP, in particular desired conditions 34, 64, 81, 82, and objectives 4 and 6 (see Appendix B for plan decision descriptions) benefit riparian habitats used by the jumping mouse; and
- Many standards and guidelines within the LMP, in particular standard 3 and guidelines 32, 71, 76, and 132, serve as conservation measures that are beneficial to the jumping mouse.

Mr. Tom Osen, Forest Supervisor

INCIDENTAL TAKE STATEMENT

Amount or Extent of Take

We anticipate that the proposed action is not reasonably certain to result in incidental take of the jumping mouse. Currently on the ASNFs, all jumping mouse capture sites and most portions of known occupied habitat (stream reaches 0.5 miles up and downstream from the capture sites) are fenced, excluded from livestock grazing, or closed to public access (Table 2). Approximately 18 percent of occupied habitat is not excluded from livestock grazing. Not all areas, considered as occupied habitat, contain suitable habitat or have the potential to develop suitable habitat (e.g. road crossings, riprap shorelines to protect bridges, or sites too narrow and/or steep to allow adequate herbaceous vegetation to grow and persist). Occupied habitats located in grazed pastures are either grazed during or after the jumping mouse activity period (June 1 to September 15). The occupied, non-excluded habitats are located in areas surrounded by steep terrain or adjacent to a highway which receive little or no livestock use, or are located in pastures that receive very short periods of use or are used after jumping mouse activity period.

All Forest Programs have desired conditions, objectives, standards, and guidelines to reduce their effects to riparian areas, including those that may support or develop jumping mouse habitat. As site specific projects are developed, the potential for adverse effects associated with those projects, including incidental take, will be addressed at that time through site-specific consultation, and standards and guidelines applied to the activity to avoid the likelihood of take.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or CH, to help implement recovery plans, or to develop information.

1. We recommend that the ASNFs work with the Service to conduct jumping mouse surveys over the next several years to attempt to find additional jumping mouse populations in areas outside of exclosures and closed areas. This information will aid us in understanding the short- and long-term impacts of these LMP activities on the jumping mice, and their subsequent effect on the status of the species.
2. Implement actions to collect vegetation data inside and outside of protected areas to determine whether the PCEs of jumping mouse proposed critical habitat can be met under current Forest Program activities. Annual reports will provide information to assist the Service in determining whether these activities, outside of protected areas, are providing suitable habitat for the jumping mouse.

Mr. Tom Osen, Forest Supervisor

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

MEXICAN SPOTTED OWL

Status of the Species

The Mexican spotted owl (spotted owl) was listed as threatened under the ESA on March 16, 1993 (USFWS 1993). Critical habitat was designated for the spotted owl in 2004 (USFWS 2004). The first Recovery Plan for the Mexican spotted owl in was prepared in 1995 (USFWS 1995a); the revised final Mexican spotted owl Recovery Plan (Recovery Plan) in December 2012 (USFWS 2012a).

A detailed account of the taxonomy, biology, and reproductive characteristics of the Mexican spotted owl is found in the Final Rule listing the owl as a threatened species, the original Recovery Plan (USFWS 1995a), and in the revised Recovery Plan (USFWS 2012a). The information provided in those documents is included herein by reference.

The spotted owl occurs in forested mountains and canyon lands throughout the southwestern United States and Mexico (Gutiérrez et al. 1995). It ranges from Utah, Colorado, Arizona, New Mexico, and the western portions of Texas south into several States of Mexico.

The 1995 Recovery Plan subdivided the spotted owl's range into 11 Recovery Units (RUs): six in the United States and five in Mexico. In the revision of the Recovery Plan, we renamed RUs as "Ecological Management Units" (EMUs) to be in accord with current Service guidelines (NMFS and USFWS 2010). There are five EMUs in the United States: Colorado Plateau, Southern Rocky Mountains, Upper Gila Mountains, Basin and Range-West, and Basin and Range-East. The Revised Recovery Plan also delineated five EMUs in Mexico.

Mexican spotted owl surveys completed since the 1995 Recovery Plan have increased information on owl distribution, but not necessarily on owl abundance. Population estimates, based upon owl surveys, recorded 758 owl sites from 1990 to 1993 and 1,222 owl sites from 1990 to 2004 in the United States. The Recovery Plan (USFWS 2012a) lists 1,324 known owl sites in the United States. A spotted owl site is an area used by a single or a pair of adult or subadult owls for nesting, roosting, or foraging. The increase in number of known spotted owl sites is mainly a result of new surveys completed within previously unsurveyed areas (e.g., several National Parks within southern Utah, Arizona, Texas, Colorado, and New Mexico; and in sites within Cibola and Gila National Forests in New Mexico). Thus, an increase in abundance in the species range-wide cannot be inferred from these data (USFWS 2012a). However, an increase in the number of areas considered to be occupied is a positive indicator regarding spotted owl abundance.

Two primary reasons for the original listing of the spotted owl in 1993 were the historical alteration of its habitat as the result of timber management practices and the threat of these practices continuing. The danger of stand-replacing fire was also cited as a looming threat at that time. Since publication of the original Recovery Plan (USFWS 1995a), we have acquired new information on the biology, threats, and habitat needs of the spotted owl. Threats to the U.S.

Mr. Tom Osen, Forest Supervisor

population have transitioned from commercial-based timber harvest to the risk of stand-replacing wildland fire. Recent forest management has moved away from a commodity focus and now emphasizes sustainable ecological function and a return toward pre-settlement fire regimes, both of which have potential to benefit the spotted owl (USFWS 2012a). Southwestern forests have experienced larger and more severe wildland fires from 1995 to the present than prior to 1995. Climate variability combined with unhealthy forest conditions may also synergistically result in increased negative effects to habitat from fire. The intensification of natural drought cycles and the ensuing stress placed upon overstocked forested habitats could result in even larger and more severe fires in spotted owl habitat.

Historical and current anthropogenic uses of spotted owl habitat include both domestic and wild ungulate grazing, recreation, fuels reduction treatments, resource extraction (e.g., timber, oil, gas), and development. These activities have the potential to reduce the quality of owl nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season. Livestock and wild ungulate grazing is prevalent throughout the range of the spotted owl and is thought to have a negative effect on the availability of grass cover for prey species (USFWS 2012a). Recreation impacts are increasing throughout the Southwest, especially in meadow and riparian areas. There is anecdotal information and research that indicates that spotted owls in heavily used recreation areas are much more erratic in their movement patterns and behavior. Fuels reduction treatments, though critical to reducing the risk of severe wildland fire, can have short-term adverse effects to spotted owls through habitat modification and disturbance. As the human population grows in the southwestern United States, small communities within and adjacent to wildlands are being developed. This trend may have detrimental effects to spotted owls by further fragmenting habitat and increasing disturbance during the breeding season.

Several fatality factors have been identified as particularly detrimental to the spotted owl, including predation, starvation, accidents, disease, and parasites. West Nile Virus has been documented in Arizona, New Mexico, and Colorado, and preliminary information suggests that owls may be highly vulnerable to this disease (Courtney et al. 2004). Unfortunately, due to the secretive nature of spotted owls and the lack of intensive monitoring of banded birds, it is not known when spotted owls contract the disease or the extent of its impact range-wide.

Currently, high-intensity, stand-replacing fires are influencing ponderosa pine and mixed conifer forest types in Arizona and New Mexico. Uncharacteristic, high-severity, stand-replacing wildland fire is probably the greatest threat to the spotted owl within the planning area. As throughout the West, fire severity and size have been increasing within this geographic area. Landscape level wildland fires, such as the Rodeo-Chediski Fire (2002), the Wallow Fire (2011), and the Whitewater-Baldy Complex (2012) have resulted in the loss of tens of thousands of acres of occupied and potential nest/roost habitat across significant portions of the spotted owl's range.

Global climate variability may also be a threat to the owl. Changing climate conditions may interact with fire, management actions, and other factors discussed above, to increase impacts to owl habitat. Studies have shown that since 1950, the snowmelt season in some watersheds of the western U.S. has advanced by about 10 days (Dettinger and Cayan 1995, Dettinger and Diaz 2000, Stewart et al. 2004). Such changes in the timing and amount of snowmelt are thought to be signals of climate-related change in high elevations (Smith et al. 2000, Reiners et al. 2003). The impact of climate change is the intensification of natural drought cycles and the ensuing stress placed upon high-elevation montane habitats (IPCC 2007, Cook et al. 2004, Breshears et

Mr. Tom Osen, Forest Supervisor

al. 2005, Mueller et al. 2005). The increased stress put on these habitats is likely to result in long-term changes to vegetation, and to invertebrate and vertebrate populations within coniferous forests and canyon habitats that affect ecosystem function and processes.

Critical Habitat

The Service designated critical habitat for the spotted owl in 2004 on approximately 8.6 million acres of Federal lands in Arizona, Colorado, New Mexico, and Utah (USFWS 2004). Within the designated boundaries, critical habitat includes only those areas defined as protected habitats (defined as PACs and unoccupied slopes greater than 40 percent in the mixed conifer and pine-oak forest types that have not had timber harvest in the last 20 years) and restricted (now called “recovery”) habitats (unoccupied owl foraging, dispersal, and future nest/roost habitat) as defined in the 1995 Recovery Plan (USFWS 1995a). It should be noted that the 1995 Recovery Plan, rather than the newer Recovery Plan, was used as the basis for the 2004 critical habitat rule. The PCEs for spotted owl critical habitat were determined from studies of their habitat requirements and information provided in the Recovery Plan (USFWS 1995a). Since spotted owl habitat can include both canyon and forested areas, PCEs were identified in both areas. The PCEs identified for the spotted owl within mixed-conifer, pine-oak, and riparian forest types that provide for one or more of the spotted owl’s habitat needs for nesting, roosting, foraging, and dispersing are:

- A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 to 45 percent of which are large trees with diameter at breast height (dbh) (4.5 feet above ground) of 12 inches or more;
- A shade canopy created by the tree branches covering 40 percent or more of the ground;
- Large, dead trees (snags) with a dbh of at least 12 inches.
- High volumes of fallen trees and other woody debris;
- A wide range of tree and plant species, including hardwoods; and
- Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.

The PCEs listed above usually are present with increasing forest age, but their occurrence may vary by location, past forest management practices or natural disturbance events, forest-type productivity, and plant succession. These PCEs may also be observed in younger stands, especially when the stands contain remnant large trees or patches of large trees. Certain forest management practices may also enhance tree growth and mature stand characteristics where the older, larger trees are allowed to persist.

Steep-walled rocky canyonlands occur typically within the Colorado Plateau EMU, but also occur in other EMUs. Canyon habitat is used by owls for nesting, roosting, and foraging, and includes landscapes dominated by vertical-walled rocky cliffs within complex watersheds, including many tributary side canyons. These areas typically include parallel-walled canyons up to 1.2 miles (2 kilometers) in width (from rim to rim), with canyon reaches often 1.2 miles (2 kilometers) or greater, and with cool north-facing aspects. The PCEs related to canyon habitat include one or more of the following:

- Presence of water (often providing cooler temperatures and higher humidity than the surrounding areas);

Mr. Tom Osen, Forest Supervisor

- Clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, and/or riparian vegetation; and
- Canyon walls containing crevices, ledges, or caves; and,
- High percent of ground litter and woody debris.

ENVIRONMENTAL BASELINE

Status of the species and its critical habitat within the planning area

Mexican spotted owls are widely distributed in the planning area. The majority of the planning area is within the Upper Gila Mountains EMU. The southern half of the Clifton RD is in the Basin and Range-West EMU. Mexican spotted owls are most commonly found in mixed-conifer forests dominated by Douglas-fir (*Pseudotsuga menziesii*) and/or white fir (*Abies concolor*) and canyons with varying degrees of forest cover. Mexican spotted owls also occur in ponderosa pine (*Pinus ponderosa*)-Gambel oak (*Quercus gambellii*) forest, where they are typically found in stands containing well-developed understories of Gambel oak (Ganey and Dick 1995).

Currently there are 150 PACs on the ASNFs totaling 96,957 acres (USFS 2014). Three PACs (Knoll Lake, Ohaco Lookout, and Leon Limestone) are partially on the Coconino NF and one PAC (Lower Stone Creek) is partially on the Gila NF. These four PACs are managed by the ASNFs. There are an additional five PACs partially on the ASNFs that are managed by the Coconino NF (Leon, Limestone, Weimer, Victorine, Lower Leonard, and Leonard Point) and one PAC (Lower Stone Creek) managed by the Gila NF. These six PACs are not included in the ASNFs count. However, acreage in these six PACs within the ASNFs is included as protected habitat within this analysis. The USFS estimates that there are 504,591 acres of recovery habitat on the ASNFs. These areas of recovery habitat contain key habitat components (e.g., large trees, multi-layered canopies, snags, logs, etc.) for spotted owls and may be occupied. Future surveys within suitable habitat may detect additional spotted owls.

Critical Habitat

Two CHUs, Upper Gila Mountains 7 and 10 (374,536 acres) and (99,949 acres), respectively, are located in the planning area. Only areas identified as protected and recovery habitat within these units are considered critical habitat (USFWS 2004). Therefore, the actual amount of Mexican spotted owl habitat within these two units likely covers less area than is indicated by the unit acreage.

Factors affecting the species and its critical habitat in the planning area

The 2011 Wallow Fire affected 50,399 acres within 74 PACs (USFWS 2012b). Within these PACs, approximately 15,214 acres burned at high severity, 7,053 acres burned at moderate severity, and 26,009 acres were unburned or burned at low severity USFWS 2012b. Prior to the Wallow Fire, other large fires since 2002 have impacted spotted owls and their habitat. The Rodeo-Chediski Fire (USFWS file code number 02-21-02-F-0225) impacted 11 PACs on the Black Mesa RD in 2002. The Blue River Complex/KP/Three Forks fires (USFWS file code number 22410-2011-IE-0276) impacted 62 PACs with 100 acres or more burned at various levels. Eleven of these were re-burned in the Wallow Fire (although only 6 of the 11 had 100 acres or more burned prior to 2011).

Mr. Tom Osen, Forest Supervisor

Since the planning action area consists of NFS lands, there are likely very few, if any, State, tribal, or private actions impacting the spotted owl or its critical habitat in the planning area. The primary activity that has affected the spotted owl within the planning area is vegetation removal associated with fire and fuels management and maintenance of vegetation along utility corridors. We do not know how many large, live conifers (pines and firs) greater than 18 inches dbh, large snags, conifers less than 18 inches dbh, and Gambel oak (or other hardwood tree species) were removed as a result of these actions. The removal of hazard vegetation would have resulted in impacts to the size and species structure of Mexican spotted owl critical habitat along utility corridors. This impact to tree species diversity and loss of certain sized trees undoubtedly resulted in a short-term adverse effect to this PCE. Large, live trees are an important element of Mexican spotted owl habitat, and owl use is often correlated with a medium-to-large tree component. Large trees and snags take many years to develop and are very difficult to replace, even over the long-term. Large snags most likely were reduced following hazard tree removal. The reduction of this habitat component may affect Mexican spotted owl habitat and prey habitat. However, since snags are typically identified as hazard vegetation along utility corridors, it is likely this habitat component was lost within treated Mexican spotted owl habitat, resulting in adverse effects to this PCE. Livestock grazing in PACs and within critical habitat may also reduce cover and food needs for important Mexican spotted owl prey species.

Critical Habitat Unit UGM-7 on the ASNFs was impacted by the 2011 Wallow Fire. According to the ASNFs' 2011 fire effects assessment, 133,608 acres (85 percent of the critical habitat unit) was burned severely or moderately resulting in 50 to 100 percent loss of live tree basal area. Approximately 22,865 acres of critical habitat was not impacted by the fire (USFWS 2012b). A minimum of 101,529 acres of Mexican spotted owl critical habitat experienced complete loss of canopy while 31,842 acres experienced a loss of 75 percent or more of canopy cover.

Pursuant to the PCEs, associated with critical habitat described in the Status of the Species section above, impact to critical habitat from LMP implementation may include the loss of canopy cover, large trees, woody debris, and a range of age classes which provide horizontal diversity. The alteration of these elements could affect the behavior of nesting and roosting Mexican spotted owls within the planning area. In addition, prey species such as deer mice tend to increase following fire. This will also affect the Mexican spotted owl's foraging behavior within the fire perimeter. Snags and downed wood will increase across the fire area as trees die and fall.

Fourteen formal consultations have occurred from 2005 (the year of the original LRMP BO/CO) to the present (please see USFWS 2012b for details). No formal consultations involving the spotted owl have been conducted with the ASNFs since the last reinitiation of the 1987 LMP was completed in April 30, 2012.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent

Mr. Tom Osen, Forest Supervisor

actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Because this is a programmatic consultation, we will only discuss the adverse effects in terms of the general effects we anticipate will occur. We briefly discuss the plan components (desired conditions, objectives, standards, and guidelines) where applicable. We provide a table with desired condition, objectives, standards, and guideline that are specifically referred to in this consultation in Appendix B of this BO/CO. Detailed effects discussions will occur as each project is developed specifically and consulted on separately.

Wildland Fire Management and Ecosystem/Vegetation Health Programs

The Wildland Fire program covers wildland fire prevention, and planned and unplanned use for fuels reduction and ecosystem restoration. The Ecosystem/Vegetation Program's purpose is to maintain current vegetation conditions at or move them towards specific desired conditions set for the different forest and non-forested vegetation types. These two programs are combined in this section because they both emphasize forest restoration and the reduction of active crown fire in ponderosa pine and mixed conifer forests, which would include areas inhabited by Mexican spotted owls. The LMP directs that activities occurring within federally listed species habitat should apply habitat management objectives and species protection measures from recovery plans. Over the long-term, implementing Recovery Plan guidance should result in positive impacts to the owl and its habitat for most project-specific actions associated with this program. The Forest Service typically implements measures to minimize effects to key habitat components (such as retaining large trees, large snags, etc.) and the owl (such as conducting forestry operations outside the owl breeding season when in or near PACs). However, in the short-term, direct and indirect effects to the Mexican spotted owl and its habitat may include disturbance (from noise or activities near PACs, and smoke), the loss of key habitat components, and reduced severe wildfire risk. This section describes the potential effects of future fuels reduction projects to Mexican spotted owls and how actions implemented under the LMP may result in short-term adverse effects to the species and its habitat; however, we also expect that implementation of the LMP would reduce the potential for severe wildfire and provide increased protection to existing and future Mexican spotted owl habitat.

For ponderosa pine, the LMP emphasizes restoration, as these areas are highly departed from the desired conditions. Projects in ponderosa pine, which includes Mexican spotted owl pine-oak habitat, are aimed at restoring forest structure and processes, such as low-intensity fire. The LMP direction is to promote Gambel oak, aspen, openings, and understory production as a part of these treatments.

When treatments occur within pine-oak habitat there is potential for Mexican spotted owl habitat components to be removed, modified, or re-distributed. There is the potential for loss of snags, logs, and large trees and reduced canopy closure within owl habitat due to conflict with restoration needs and/or habitat enhancement goals. Mechanical treatments adequate to meet fuels and restoration management objectives in recovery habitats may result in the short-term loss of some habitat components (USFWS 2012a).

Just as with mechanical thinning and burning in ponderosa pine, there is the potential for mechanical and burning treatments to adversely affect Mexican spotted owls and/or important

Mr. Tom Osen, Forest Supervisor

habitat components in the forested PNVTs (ponderosa pine-oak, dry mixed conifer, wet mixed conifer and spruce fir). Mechanical treatments designed to meet fuels reduction objectives in PACs could result in reduced canopy cover, loss of multi-layered canopy structure, and potentially significant reductions in snags and coarse woody debris.

The Wildland Fire Program has eight relevant desired conditions that guide management and activities in spotted owl habitat. Desired conditions 41, 42, and 296 direct management toward activities and conditions where fire is again able to play its historic role in maintaining fire adapted ecosystems; this would reduce the threat of stand-replacing or uncharacteristic wildfire to spotted owl and its habitat. Desired conditions 93, 112, 128, 145, and 166 direct management towards restoration of natural fire frequency intervals in five specific PNVTs, all of which provide spotted owl habitat.

Guideline 171 has the potential to help maintain or restore the vegetation structural conditions needed by spotted owls and their prey.

Sixteen desired conditions were developed under the Ecosystem/Vegetation Health Program is relevant to the spotted owl and their prey. Four desired conditions (1, 40, 52, and 58) were developed to direct management actions toward forest conditions better able to withstand disturbances, including the threat of insects/disease and climate change. Desired conditions 48, 111, 127, and 144 provides for the characteristics of old growth habitat that are needed by Mexican spotted owls and their prey (e.g., old trees, snags, coarse woody debris, multi-stories) in various PNVTs. Desired conditions 100 and 105 provide the structural complexity of habitat within the ponderosa pine and dry mixed conifer PNVTs (groups or clumps of trees of different sizes, variable tree age-class distribution and tree group spacing) needed by spotted owls and/or their prey. Desired conditions 90, 103, and 167 provide that all Gambel oak ages classes (in particular large trees and snags) are present and in increased distribution within the ponderosa pine and Madrean Pine-Oak PNVTs, which would include areas needed by Mexican spotted owl and their prey. Desired conditions 18, 100, 119, and 138 provide for small animal needs such as down logs and interlocking crowns (e.g., voles, squirrels).

This program has three objectives which change conditions within PVNTs so that they move towards desired conditions. Objective 11 would annually treat 5,000 to 35,000 acres to reduce tree densities, restore natural fire regimes, promote species habitat and ecosystem health, reduce fire hazard, initiate recovery from uncharacteristic disturbance, and provide forest products. It would also leave a desired mix of tree species with a range of desired densities that are resilient to changing climatic conditions. Objective 13 would annually treat or maintain 5,000 to 15,000 acres to promote a highly diverse structure (woodland PNVTs). Objective 36 would annually provide up to 94,000 CCF (73,400 cords) of firewood for personal and commercial use (forest products regardless of PNVT). These objectives, while reducing tree densities to meet specific desired conditions, may cause short-term disturbances to nesting and roosting owls if projects are implemented in Mexican spotted owl habitats.

Standard 3 designs vegetation management treatments to maintain or move plant composition towards a moderate or high degree of similarity to that particular site's potential. Standard 9, requiring that tree harvesting methods be selected based upon their ability to meet a particular PNVT's desired conditions, could potentially limit damage to remaining large trees during tree removal operations. Standard 24 has the potential to limit impacts from forest product harvest to

Mr. Tom Osen, Forest Supervisor

wildlife, including Mexican spotted owl prey (e.g., fungi, cones used by squirrels) by including provisions for this in permits.

Guidelines 24 and 50 provide for wildlife habitat needs, including Mexican spotted owl prey species, by requiring projects leave a mosaic of untreated areas. Guideline 30 would require that riparian habitat, including those used by Mexican spotted owl, be protected from other than short-term impacts as a result of activities such as thinning or burning. Guideline 47 retains and improve Gambel oak, an important habitat component for spotted owl within the ponderosa pine and Madrean Pine-Oak PNVTs. Guideline 59 could potentially provide for the needs of foraging spotted owl within the Madrean pine-oak woodland by modifying treatments in adjacent area where spotted owl might forage. Guideline 65, requiring recovery plan direction, recommends that trees greater than 46 centimeter (18 inches) dbh not be removed in stands designated as recovery nest/roost habitat. Guideline 86 has the potential to help ensure the long-term reestablishment of native deciduous trees after landscape scale disturbance events, which would include areas within spotted owl habitat, although it may take an extended period of time to reestablish nesting structure.

In summary, forest and forest health activities implemented under this program are planned to reduce the risk of severe, stand-replacing wildland fire across the landscape. These activities would be conducted in PACs and recovery habitat. However, even projects with projected long-term benefits may reduce habitat quality for Mexican spotted owls in the short-term. In the short-term, direct and indirect effects to the Mexican spotted owl and its habitat may include disturbance (from noise and/or smoke from prescribed burning) and the loss of key habitat components (e.g., reduced canopy cover, loss of large trees, loss of large snags, etc.), along with reduced wildland fire risk. Therefore, over the life of this consultation, we expect that implementation of the Forestry, Ecosystem/Vegetation Health, and Fuels Program would result in short-term adverse effects to Mexican spotted owls and their habitat.

Rangeland Management Program (including invasive and noxious weed control)

Grazing allotment management plans, as developed under the LMP, provide guidance for managing and monitoring livestock use on vegetation. Livestock grazing may result in minimal effects to PACs in some areas on the ASNFs because of the steep and/or forested areas that provide less forage. However, where there is overlap, improper livestock grazing can adversely affect the spotted owl primarily through four indirect effects: 1) diminished prey availability and abundance; 2) increased susceptibility of habitat to fire, 3) degradation of riparian and meadow plant communities; and, 4) impaired ability of plant communities to recover or develop into more suitable spotted owl habitat (USFWS 2012a). While the ASNFs manage livestock allotments to maintain habitat for the owl and its prey, multiple factors (such as yearly precipitation, season of use, and livestock numbers) may determine the specific influences of livestock on spotted owl habitat. However, the desired conditions for livestock grazing in the LMP should promote understory vegetation production in forested and grassland habitat. The objectives identified in the LMP should aid in improving habitat conditions for prey species across the ASNFs. The desired conditions and guidelines for livestock grazing in montane meadows would help maintain habitat for prey species in these areas.

There are four relevant desired conditions that guide livestock management and activities in areas that may be used by spotted owls. Desired conditions 54 and 64 provide for habitat needs

Mr. Tom Osen, Forest Supervisor

for wildlife, which would include spotted owl prey species and their habitat, by retaining needed amounts and structure of herbaceous vegetation. These desired conditions along with desired condition 61 (adequate vegetation residual and density of vegetation remains with grazing) support the return of fire to its historic role (i.e., low to moderate severity burns), helping reduce the threat of stand-replacing or uncharacteristic wildfire. Where annual fluctuations and seasonality of forage production are considered, desired condition 278 helps retain sufficient ground cover to sustain wildlife needs, which would include Mexican spotted owl prey species.

Standard 3 has the potential to help ensure that plant composition (overstory, understory) needed by wildlife, which would include Mexican spotted owls and their prey, are retained or restored with thinning and burning treatments. Relative to overstory vegetation, this may take an extended period of time to achieve in some areas.

Four guidelines have the potential to help protect or restore riparian habitat and the adjacent uplands that contribute to riparian conditions which would benefit areas used by Mexican spotted owls and their prey. Protection and restoration would be addressed by: stocking in balance with available forage to meet the needs of wildlife, including Mexican spotted owl prey species (guideline 136); proper timing of grazing relative to plant growth (guideline 133); requiring habitat improvement (guideline 32), and; managing for the special concerns within riparian areas which are critical areas for livestock grazing management (guideline 132).

Guidelines 134, 138, and 139 have the potential to help limit impacts from livestock grazing and trampling within riparian areas, including those that are used by Mexican spotted owl and their prey, through judicious placement of water and salt, and limits to livestock trailing. Livestock impacts include concentrated grazing, browsing, and trampling of riparian vegetation. Guideline 135 has the potential, by requiring adjustments in timing of livestock grazing as needed, to help reduce cumulative site and disturbance impacts to Mexican spotted owl and habitat where livestock grazing and projects such as thinning or burning might concurrently take place.

Range Program activities provide guidance for managing livestock on the ASNFs. Livestock grazing may have minimal effects to PACs due to the steep, forested areas where they occur. Livestock grazing may still adversely affect important habitats needed by Mexican spotted owl and their prey species. The standards and guidelines required under this program are expected to minimize, but not eliminate these adverse effects. Therefore, over the life of this consultation, we expect that implementation of the Rangeland Program would result in short-term adverse effects to Mexican spotted owls, their prey species and their habitats.

Watershed and Soil Management Program

This program assures that watershed and soil conditions are taken into account during planning for the other Forest Programs. It assesses and prioritizes watersheds and riparian areas for restoration. These activities under this program have the potential for short-term implementation effects (e.g., disturbance where these restoration efforts occur within spotted owl habitat), but also have the potential for long-term improvement to overall watershed and riparian conditions for the Mexican spotted owl. There are five relevant desired conditions, two objectives, and two guidelines that guide management and activities in this program that are relevant to the Mexican spotted owl. Desired conditions 34 and 85 would provide for structurally diverse, dense, and large tree conditions to support riparian dependent species. Desired conditions 292 and 293 would protect against the risk of diminished water that supports riparian habitat. Desired condition 77 would help protect soil, and hence vegetation density, cover, and height (seedheads)

Mr. Tom Osen, Forest Supervisor

conditions in riparian recovery habitats that may include those needed by Mexican spotted owl prey.

Objective 1 has the potential to improve overall soil and vegetation conditions within selected watersheds through restoration projects (e.g., increase herbaceous ground cover with thinning, re-contour incised channels, plantings of willows and grasses). Where it occurs within recovery habitat, objective 6, which moves 200 to 500 acres of riparian and stream habitat towards desired conditions, may have short-term implementation impacts to Mexican spotted owls (e.g., disturbance to spotted owls and soil or vegetation compaction to prey habitat).

Guidelines 10 and 19 have the potential to help protect water resources that support riparian recovery habitat for Mexican spotted owl and their prey.

Watershed and Soil Program activities restore and maintain watershed and riparian conditions on the ASNFs. These activities could be conducted in PACs and recovery habitat. However, these projects with projected long-term benefits may reduce habitat quality for Mexican spotted owls in the short-term. In the short-term, direct and indirect effects to the Mexican spotted owl and its habitat may include disturbance (from noise and human presence during project implementation) and the short-term loss of key Mexican spotted owl and prey habitat components (e.g., reduced canopy and herbaceous vegetation cover, and loss of riparian vegetation). Therefore, over the life of this consultation, we expect that implementation of the Watershed and Soils Program would result in short-term adverse effects to Mexican spotted owls and their habitat.

Engineering Program

Facets of this program, such as road construction and road maintenance, may indirectly affect spotted owls through noise disturbance and loss and fragmentation of habitat. High road densities can increase human presence into areas and increased human presence and/or activities can result in spotted owls flushing or leaving their roost (Delaney et al. 1999). In general, habitat loss to road construction is minor at a rangewide scale when compared to more significant threats (e.g., wildland fire); however, on a local scale, roads and trails through PACs may fragment habitat continuity, alter natural movement patterns, and increase disturbance to resident owls. Roads in nest/roost replacement and other recovery habitats may also result in a loss of habitat components (e.g., large logs, snags, and hardwoods) as people access these areas for fuelwood cutting.

Under this program, the Forest Service may also seasonally or permanently close existing roads in certain circumstances. Seasonally or permanently closing roads within areas where spotted owls are known to occur would reduce the amount of disturbance, particularly during the breeding season (March 1 to August 31). The actual effects to the Mexican spotted owl and/or owl recovery habitat would be dependent on methods, location, and timing of such activities.

Ongoing activities within the Engineering program include the operation and maintenance of the transportation system on the ASNFs, which consists of roads and trails that provide access to areas on the forest including: private land, structures and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities. We would expect that over the life of the project, there could be additional new and temporary

Mr. Tom Osen, Forest Supervisor

road construction to help support forest restoration activities which may result in short-term adverse effects to Mexican spotted owls and their habitat.

The BA did not identify any specific desired conditions related to this program that are relevant to the Mexican spotted owl, but there are objectives, standards, and guidelines which are relevant. Objective 8 provides for road removal or restoration of unauthorized roads or trails, and has the potential to help reduce noise and disturbance from their use within spotted owl habitat. However, road removal activities also have the potential to disturb spotted owl, if present. Standard 15 could also potentially reduce noise and disturbance to spotted owl and reduce vehicle soil and vegetation impacts across their habitat by limiting motorized vehicle travel to designated roads and motorized trails. Guideline 98 may prevent further habitat impacts and disturbance to spotted owls by locating new roads or motorized trails to avoid spotted owl PACs. Guideline 107 may reduce noise and disturbance in Mexican spotted owl habitat by requiring barriers and signage to control unauthorized motorized use in areas open only to administrative use.

Lands and Minerals Program

This program area administers land ownership adjustments (land purchases, withdrawals, and exchanges) and identifies and addresses property boundaries and encroachments onto the ASNFs. It also issues non-recreational special use authorizations for occupancy of water lines, utility and transportation rights-of-way and easements, and common minerals pits. The objective of the program is to allow for appropriate uses of ASNFs lands; these uses may not always be compatible with Mexican spotted owl management. Mineral extraction, powerlines, and communication sites may result in the removal of owl habitat and/or disturbance to the spotted owl during the breeding season. For example, management of utility corridors on the ASNFs has resulted in the removal of large trees and snags, both of which are key habitat components of owl habitat. The proposed desired conditions and guidelines for these activities would assist in reducing or eliminating these impacts by restricting or prohibiting some surface use in Mexican spotted owl habitat. In addition, efforts to concentrate uses to the extent possible would limit the amount of habitat that would be affected by development of these facilities. The desired conditions and guidelines for mineral and mining activities would only apply to new, not existing, leases.

There are two desired conditions that guide management and activities that are relevant to Mexican spotted owl and their habitat. Desired condition 263, which strives to keep the large contiguous tracts of Forest Service lands intact, would protect Mexican spotted owls from future land exchanges where protected habitat is next to or near private land. There are 15 Mexican spotted owl PACs adjacent to or near private land on the ASNFs. Desired condition 274 would limit impacts from special use forest product permits (*e.g.*, live plants, mushrooms, commercial cone collection animals such as rodents or squirrels which are Mexican spotted owl prey species).

Objective 27 may, during the breeding season, cause short-term disturbance to Mexican spotted owls due to survey and posting of forest/private land boundaries where there are adjacent or nearby PACs.

Standard 31 retains water flows that sustain riparian vegetation which may be used by Mexican spotted owls and their prey. The guideline 121 may help limit the threat of noise and disturbance

Mr. Tom Osen, Forest Supervisor

within Mexican spotted owl PACs adjacent to or near private land. Guideline 146 precludes certain activities that prevent attainment of riparian, channel morphology, or streambank desired conditions. Guideline 155 may reduce the impacts of land development and associated activities (e.g., new communications sites, energy developments, energy corridors, stream gauging stations, or other data collection facilities) if they are proposed near Mexican spotted owl habitat. Guideline 166 protects wildlife and unique habitats, which would include Mexican spotted owl and their habitat, from potential impacts of special use permits issuance.

We cannot predict what might occur in the Lands and Minerals Program may impact Mexican spotted owls or their habitat. However, we know from past consultations (e.g., utility line corridor maintenance) that there are likely to be some impacts to owls and/or their habitat from this program on the ASNFs. This program is likely to have short and long-term adverse effects to the Mexican spotted owl. The standards and guidelines required under this program are expected to minimize, but may not eliminate all of these adverse effects. Therefore, over the life of this consultation, we expect that implementation of the Engineering Program would result in adverse effects to Mexican spotted owls, their prey species and their habitats.

Recreation and Wilderness Program

Recreation activities may affect Mexican spotted owls directly through disturbances caused by human activity (e.g., hiking, shooting, and OHV use at nesting, roosting, or foraging sites) or indirectly through alteration of habitats such as damage to vegetation, soil compaction, illegal trail creation, and increased risk of wildland fire. The nature of the recreation program can come into conflict with Mexican spotted owl management across the forest and may result in disturbance to owls. Typically, this is a result of recreationists wanting to conduct activities (such as OHV group rides) in or adjacent to PACs during the breeding season. Other recreation activities in the region that have resulted in potential adverse effects to the Mexican spotted owl include building trails and developing recreational facilities within PACs.

The BA identified one relevant desired condition (desired condition 211, which provides that recreation does not negatively impact wildlife habitat and populations) that guides management and activities which may occur in Mexican spotted owl habitat. In addition, Objective 18 provides for rehabilitation, stabilization, re-vegetation, or relocation of an average of five dispersed campsites annually. The objective is designed to improve recreation opportunities and/or protect the environment if sites occur within or adjacent to protected habitat, and could potentially reduce impacts to Mexican spotted owls. Standard 16, managing motorized cross-country travel to occur only in designated motorized areas, would reduce the threat of noise and disturbance to Mexican spotted owls. Finally, guidelines 94 and 95 restrict where and when recreation might occur, and could potentially reduce disturbance to Mexican spotted owl and/or impacts to habitat (e.g., trampling of prey habitat), where needed.

The LMP includes standards and guidelines to reduce the impacts to Mexican spotted owls from recreation activities; however, there is also direction in the LMP to improve recreational opportunities. Over the life of the LMP, this could result in impacts to Mexican spotted owls and their habitat.

Mr. Tom Osen, Forest Supervisor

Wildlife, Fish, and Rare Plant Program

This program includes inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, conservation strategy development, administrative studies, research collaboration, and information and education. This program is expected to reduce the effects of other forest programs on the spotted owl. Species surveys and monitoring or habitat assessments could result in short term disturbance impacts to the Mexican spotted owl.

There are two relevant desired conditions that guide management and activities in areas that may be inhabited by Mexican spotted owls. Desired condition 196 directs management toward the recovery of the federally-listed species, such as the spotted owl. Desired condition 198 addresses the threat to wildlife, which would include the spotted owl, from noise and disturbance. Desired conditions 65, 133, and 150 provide habitat components for small mammals, such as those preyed upon by Mexican spotted owls.

Objective 10 protects woody riparian plant species which may benefit Mexican spotted owl and their prey in riparian recovery habitat. Guideline 29 would require monitoring of project implementation effects or the effectiveness of mitigation measures for meeting desired conditions, some of which involve habitat used by Mexican spotted owls. Guideline 65 contributes to Mexican spotted owl recovery by requiring that activities occurring within federally listed species habitat apply habitat management objectives and protection measures from the Mexican spotted owl recovery plans. Guideline 67 incorporates modifications, mitigations, or other measures to project implementations to reduce negative impacts to wildlife, which would include Mexican spotted owls, and their habitats and provides for species needs, consistent with project or activity objectives. Guideline 71 could potentially help provide the dense, cool microhabitat needed by wildlife such as Mexican spotted owls.

Effects of the Action on Mexican Spotted Owl Critical Habitat

In our analysis of the effects of the action on critical habitat, we consider whether or not a proposed action will result in the destruction or adverse modification of critical habitat. In doing so, we must determine if the proposed action will result in effects that appreciably diminish the value of critical habitat for the recovery of a listed species. To determine this, we analyze whether the proposed action will adversely modify any of the PCEs that were the basis for determining the habitat to be critical. To determine if an action results in adverse modification of critical habitat, we must also evaluate the current condition of all designated CHUs and the PCEs of those units, to determine the overall ability of all designated critical habitat to support recovery. Further, the functional role of each of the CHUs in recovery must also be considered because, collectively, they represent the best available scientific information as to the recovery needs of the species.

Primary Constituent Elements related to forest structure (USFWS 2004):

PCE 1: A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 percent to 45 percent of which are large trees with diameter at breast height (dbh) of 12 inches or more.

Mr. Tom Osen, Forest Supervisor

Effect: Actions implemented under the LMP are expected to retain the range of tree species (i.e., conifers and hardwoods associated with spotted owl habitat) and will not reduce the range of tree sizes needed to create the diverse forest and multi-layered forest canopy preferred by spotted owls.

Some loss of trees, of all types and dbh size classes, will occur from actions such as hazard tree removal, prescribed fire, and forest thinning (as implemented under the Fire Management and Ecosystem and Vegetation Health Programs). However, actions implemented under the LMP are expected to maintain a range of tree species and sizes needed to maintain this PCE in PACs and restricted habitat across the ASNFs. The Recovery Plan provides guidelines that strive to retain large trees, canopy cover appropriate for spotted owl habitat, and a diverse range of tree species (such as Gambel oak in pine-oak forests and several conifer species in mixed conifer forest). LMP guideline 65 requires that treatments within federally-listed species include habitat management objectives from the appropriate recovery plan. Removal of trees and various trees species may also occur as part of the Recreation (development of recreation sites) and Engineering Programs (creation, maintenance of roads); but these effects should be small in extent and intensity. The function and conservation role of this PCE would not be compromised by the proposed action.

PCE 2: A shade canopy created by the tree branches covering 40 percent or more of the ground. Previous treatments were not expected to reduce the shaded canopy below 40 percent.

Effect: We expect that tree shade canopy will be reduced following hazard tree removal, thinning, and burning treatments implemented under the LMP in the Fire Management and Ecosystem and Vegetation Health programs. However, we do not expect reduction of canopy cover in spotted owl forested habitat to be reduced below 40 percent. The ASNFs LMP has included guideline 50 which include managing for higher basal area and denser canopy cover in wildlife, which would include the Mexican spotted owl, habitat versus pure ponderosa pine or other forest and woodland habitats. We would expect that some small reduction in existing canopy cover (5 to 10 percent) may actually aid in increasing understory herbaceous vegetation and forb production, which will benefit Mexican spotted owl prey species. The function and conservation role of this PCE would not be compromised by the proposed action.

PCE 3: Large, dead trees (snags) with a dbh of at least 12 inches.

Effect: Large snags would most likely be reduced following proposed prescribed burning and hazard tree removal actions conducted under the Fire Management and Ecosystem and Vegetation Health programs. Any loss of this habitat component may be significant in terms of maintaining spotted owl and prey habitat. Desired condition 50 and guidelines 70 and 87 retain dead snags and downed logs in all forest PNVTs. Some snags will be created through prescribed burning, which could benefit the spotted owl. However, snags currently used by spotted owls for nesting are typically very old, large dbh, highly decayed snags with cavities. In individual burning projects, the ASNFs would attempt to minimize loss of these large snags through conservation measures (such as lining or using lighting techniques to avoid snags). However, it is likely that following burning treatments, approximately 20 percent of these existing snags may be lost within treated (i.e., burned) spotted owl habitat (Randall-Parker and Miller 2000), resulting in short-term adverse effects to this. This is why conservation measures that the ASNFs will implement to protect the largest and oldest snags (particularly those with nest

Mr. Tom Osen, Forest Supervisor

cavities) are so important. As such, the function and conservation role of this PCE would not be compromised by the proposed action.

Primary Constituent Elements related to maintenance of adequate prey species:

PC 4: High volumes of fallen trees and other woody debris.

Effect: Fallen trees and woody debris would likely be reduced by the proposed burning treatments (broadcast, piling, and maintenance burning) as part of the Fire Management Program. Logs can be expected to be reduced by approximately 50 percent following prescribed burning in forested habitat (Randall-Parker and Miller 2000). This loss of large logs would result in short-term adverse effects to this PCE and could result in localized impacts to prey species habitat. However, across the ASNFs, it is likely that hazard tree removal and prescribed burning will also create fallen trees and woody debris as trees are felled (i.e., cut) and left on the ground or die post-burn and fall. Desired conditions 18 and 89 and guideline 87 retain logs and coarse woody debris to benefit wildlife, which would include Mexican spotted owls and their prey. The function and conservation role of this PCE would not be compromised by the proposed action.

PCE 5: A wide range of tree and plant species, including hardwoods.

Effect: This PCE will likely be positively affected by the actions taken under the Fire Management and Forest and Ecosystem/Vegetation Health Programs. Plant species richness would likely increase following thinning and/or burning treatments that result in small, localized canopy gaps. Individual projects conducted under the LMP typically propose conservation measures (guideline 47) that focus on retaining Gambel oaks and other hardwoods, but some level of short-term loss could occur at the individual project level. However, the function and conservation role of this PCE would not be compromised by the proposed action.

PCE 6: Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.

Effect: Short-term decrease in plant cover will result from prescribed burning conducted under the Fire Management Program. We expect long-term increases in residual plant cover because treatments would provide conditions suitable for increased herbaceous plant growth by removing a thick layer of dead plant debris within treated areas. The mosaic effect created by burned and unburned areas and by opening up small patches of forest within protected habitat is also expected to increase herbaceous plant species diversity and, in turn, assist in the production and maintenance of the spotted owl prey base. The combination of low-intensity prescribed burns during restoration projects most likely resulted in short-term adverse effects to the spotted owl with regard to modifying prey habitat within treatment areas. There is the potential for the Rangeland Program to have adverse effects on the production of plant cover post-burning. However, typically the ASNFs includes measures in its allotment (livestock) management plans to maintain healthy levels of forage. The LMP has one desired condition, 60, that directs management to optimize and protect vegetative ground cover and support a diverse mix of warm and cool season plants. The function and conservation role of this PCE would not be compromised by the proposed action.

Mr. Tom Osen, Forest Supervisor

Effects of the Action on the Role of Critical Habitat in Recovery

The proposed action includes actions recommended in the Mexican Spotted Owl Recovery Plan, First Revision (USFWS 2012) as necessary to recover the spotted owl. The ANSNFs would implement these actions in designated critical habitat:

- The ANSNFs has and continues to designate 600 acres surrounding known spotted owl nesting and roosting sites as PACs. These PACs are intended to protect and maintain occupied Mexican spotted owl nest and roost habitat. Nesting and roosting habitat is limited and by identifying these areas for increased protection, the ANSNFs are aiding in recovery.
- The ANSNFs identified and is managing pine-oak, mixed-conifer, and riparian forests that have potential for becoming replacement Mexican spotted owl nest-roost habitat, or is currently providing habitat for Mexican spotted owl foraging, dispersal, or wintering habitats. As stated above, Mexican spotted owl nesting and roosting habitat is a limiting factor. By managing critical habitat for future nest and roost habitat, the ANSNFs are aiding in recovery.
- The ANSNFs' intent is to implement forest restoration projects. The best available Recovery Plan habitat management objectives are to be integrated where possible into forest restoration and/or fuels reduction projects. These have the overall goal to protect PACs from high-severity wildland fire and conduct actions to improve forest sustainability (e.g., thinning and prescribed burning) in order to ensure Mexican spotted owl habitat continues to exist on the forest.
- The ANSNFs are implementing several on-going projects previously consulted on under site specific BOs. BOs issued for these projects have noted adverse effects to PCEs and spotted owls. However, these projects are designed to result in long-term benefits to spotted owls habitat by reducing fuels and the risk of high severity wildland fire (Nutrioso WUI Fuels Reduction Project and Chitty Creek Restoration Project). For example, the Arizona Forest Utility Hazard Tree Removal Phase II Project (USFWS 2008), though it is designed to protect infrastructure through the removal of hazard trees near utility lines, will ultimately reduce the risk of fire risk being ignited from a power line into adjacent spotted owl habitat, particularly PACs.

These actions, in addition to the standards, and guidelines incorporated as conservation measures to reduce Forest Program effects to the different PCEs of Mexican spotted owl critical habitat, should increase the sustainability and resiliency of Mexican spotted owl habitat (particularly through fuels management and forest restoration actions). Therefore, continued implementation of the ANSNFs LMP is not expected to further diminish the conservation contribution of critical habitat to the recovery of the spotted owl.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the planning area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Mr. Tom Osen, Forest Supervisor

Although a small number of Mexican spotted owls most likely occur on privately owned parcels of land adjacent to and within the ASNFs boundary, the majority of known Mexican spotted owls occurring on non-USFS lands inhabit Tribal lands. Tribes are sovereign governments with management authority over wildlife and other Tribal land resources. In this section, we provide some of the specific Management/Conservation Plans for the Mexican spotted owl that were developed by the San Carlos Apache Tribe and White Mountain Apache Tribe, which are both adjacent to the ASNFs. The Service considers all of these plans beneficial overall to the Mexican spotted owl.

San Carlos Apache Tribe: The San Carlos Apache Tribal lands are located between and directly adjacent to the Tonto and ASNFs. Their Forestry Department staff developed the Mexican Spotted Owl Conservation Plan for the San Carlos Apache Indian Reservation (Conservation Plan) which has been approved by their Tribal Council. The San Carlos Apache Tribe conducts Mexican spotted owl surveys to evaluate and design projects that minimize or avoid impacts to the owl and its habitat. The Tribe also conducts periodic surveys within PACs to determine occupancy. Mexican spotted owls are found across the northern third of the San Carlos Apache Indian Reservation; however, most suitable nesting and foraging habitat is in remote, inaccessible areas. Although these areas have very little overlap with commercial forest operations, Mexican spotted owl habitat has generally been deferred from timber harvests since the listing of the Mexican spotted owl. Nevertheless, this continual monitoring of habitat and species occupancy provides current GIS and other information to manage the overall forest resources. The San Carlos Apache Tribe's primary timber management practice is uneven-aged silvicultural systems, using single-tree selection methods. The key factor considered in the Tribe's Conservation Plan is that there is very little overlap between forested lands currently considered practical for commercial harvesting operations and forested lands considered to be Mexican spotted owl habitat. Thus, the majority of the high-potential breeding habitat (steep slopes, mixed-conifer) receives little or no timber management. The Tribe's conservation plan for the Mexican spotted owl addresses identified threats to Mexican spotted owl habitat by maintaining sufficient suitable habitat across the landscape and by using site-specific retention of complex forest structure following timber harvest in those few areas where Mexican spotted owl habitat and timber management overlap. Mexican spotted owl nest and roost habitats, primarily in mixed-conifer and steep slope areas, are not managed for timber extraction and will remain as suitable nest/roost habitat. Foraging habitat will be managed almost entirely by uneven-aged timber harvest methods. Timber sales, thinning, and fuelwood projects are conducted within some Mexican spotted owl habitat to extract resources, improve or maintain current habitat conditions, and increase forest health (e.g., controlling dwarf mistletoe and bark beetles).

Wildland fire is considered to be the greatest threat to Mexican spotted owl habitat on the San Carlos Apache Reservation. Steep slopes and canyons occupied by the Mexican spotted owl are especially at risk. Fire is managed through the Tribe's Wildland Fire Management Plan Programmatic Environmental Assessment (Fire Management Plan).

White Mountain Apache Tribe: The Fort Apache Indian Reservation is directly adjacent to the Tonto and ASNFs. The White Mountain Apache Tribe was one of the first Tribes to develop a management plan for the Mexican spotted owl. The Tribe developed a conservation plan for the Mexican spotted owl shortly after its listing. Areas containing Mexican spotted owls are placed in one of two land management categories, termed Designated Management Areas (DMAs). Areas supporting "clusters" of four or more territories are considered Category-1 DMAs. In

Mr. Tom Osen, Forest Supervisor

these areas, Mexican spotted owl habitat concerns drive management prescription; timber harvest is secondary objective. Category-1 DMAs range approximately 6,000 to 10,000 acres (2,430 to 4,050 hectares) in size and contain 57 percent of known Mexican spotted owl sites on the Reservation. Category-2 DMAs include areas supporting 1 to 3 Mexican spotted owl territories. Habitat outside the territories managed only secondarily for Mexican spotted owls, with other objectives given priority. No timber harvest is allowed in 75 acre (30 hectare) patches around the Mexican spotted owl activity centers. A seasonal restriction on potentially disturbing activities is provided in a 500 acre (202 ha) area, and timber prescriptions within this area should be designated to improve habitat integrity. The Service determined that the White Mountain Apache management plan is adequate to ensure persistence of the Mexican spotted owl.

CONCLUSION

After reviewing the current status of the spotted owl and its designated critical habitat, the environmental baseline for the planning area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the LMP will not jeopardize the continued existence of the spotted owl and will not destroy or adversely modify designated critical habitat. Our reasoning for this conclusion is based on the following:

- The LMP will apply habitat management objectives and species protection measures from the Mexican spotted owl recovery plan (guideline 65);
- Desired conditions and guidelines in the LMP recognize the need to reduce the potential for landscape level, stand-replacing fire in ponderosa pine and mixed conifer forests that the Mexican spotted owl occupies;
- While some adverse effects may occur as part of the proposed action or under site specific actions carried out under the LMP, the desired conditions, standards, guidelines, and objectives will help to minimize those effects; and
- Based on the discussion provided in the Effects to Mexican Spotted Owl Critical Habitat section above, the two CHUs affected by the LMP will continue to serve the function and conservation role of critical habitat for the spotted owl;
- Many of the desired conditions and objectives in the LMP, in particular desired conditions 18, 32, 40, 50, 58, 64, 65, 100, 105, 111, 112, 128, 144, 196, and 296 , and objectives 11 and 13 benefit Mexican spotted owl habitat; and
- Many standards and guidelines within the LMP, in particular standard 3, guidelines 32, 59, 65, 70, and 71, and 171 serve as conservation measures that are beneficial to the Mexican spotted owl.

Across the range of the Mexican spotted owl, the population monitoring described within the 1995 Recovery Plan was never implemented because it was not economically or operationally feasible. A revised population monitoring procedure has been outlined in the Recovery Plan (USFWS 2012) that aims to assess Mexican spotted owl population trends. Although population trend monitoring has not occurred for the Mexican spotted owl to date, our records indicate no decline in the spotted owl population, based upon an increase in known PAC numbers since the owl was listed (see the Status of the Species section). However, some level of range-wide Mexican spotted owl population monitoring is needed in order for us to assess the status of the species. In past LRMP BOs (i.e., USFWS 2005), we included a “reasonable and prudent

Mr. Tom Osen, Forest Supervisor

measure” for occupancy monitoring that was not feasible, but our incidental take statement herein attempts to provide for a level of project-specific implementation monitoring at the individual BO level in order to assess incidental take associated with the site-specific action.

INCIDENTAL TAKE STATEMENT

Amount or Extent of Take

For the purpose of evaluating incidental take of Mexican spotted owls from the action under consultation, incidental take can be anticipated as either the direct fatality of individual birds or the alteration of habitat that affects behavior (e.g., breeding or foraging) of birds only temporarily, or to such a degree that the birds are considered lost as viable members of the population and thus “taken.” Birds experiencing only temporary or short-term effects may fail to breed, fail to successfully rear young, or raise less fit young; longer-term disturbance may result in owls deserting the area because of chronic disturbance or because habitat no longer meets the owl’s needs.

We anticipate that the proposed action is reasonably certain to result in incidental take of spotted owls. It is difficult to quantify the number of individual spotted owls taken because: (1) dead or impaired individuals are difficult to find and losses may be masked by seasonal fluctuations in environmental conditions; (2) the status of the species could change over time through immigration, emigration, and loss or creation of habitat; and (3) the species is secretive and we rarely have information regarding the number of spotted owls occupying a PAC and/or their reproductive status. For these reasons, we will attribute incidental take at the PAC level. This fits well with our current section 7 consultation policy which provides for incidental take if an activity compromises the integrity of an occupied PAC to an extent that we are reasonably certain that incidental take occurred (USFWS Memorandum, February 3, 1997). Actions outside PACs will generally not result in incidental take because we are not reasonably certain the spotted owls are nesting and roosting in areas outside of PACs. We may modify this determination in cases when areas that may support spotted owls have not been adequately surveyed and we are reasonably certain spotted owls may be present.

The reasonable and prudent measures described below are non-discretionary and must be undertaken by the ASNFs so that they become binding conditions of any grant or permit issued to the appropriate entity for the exemption in section 7(o)(2) to apply. The ASNFs has a continuing duty to regulate the activity covered by this incidental take statement. If the ASNFs (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant/permittee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are included in the permit or grant document issued by the ASNFs, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the ASNFs or appropriate entity must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement (see 50 CFR §402.14(i)(3)).

There are 150 known PACs on the ASNFs (USFS 2014). Currently, as a result of the Wallow Fire, we are unclear as to the long-term status of 76 (52 percent) of these PACs. However, the ASNFs states that 29 of these PACs were substantially impacted and that the other PACs should

Mr. Tom Osen, Forest Supervisor

continue to function as nesting/roosting habitat for the spotted owl. Better information (*e.g.*, spotted owl surveys of the area) may show that some areas within the substantially impacted PACs continue to be used by spotted owls. Nonetheless, until we receive site specific occupancy information, we will assume that all of the 150 currently designated PACs are occupied and may continue to be occupied over the life of this project. Therefore, using the best available information and based upon the potential for incidental take to occur as part of implementation of the LMP, we anticipate the following incidental take for the proposed action, which is in addition to previously authorized incidental take resulting from ongoing projects or projects that have yet to be implemented as identified in the “Background Information regarding the Proposed Action” section above:

- Harassment of spotted owls associated with up to 11 PACs per year (approximately 7.3 percent) of the 150 PACs that still are functioning as spotted owl nesting/roosting habitat due to a single or short-term (1 to 3 years) disturbance. Mexican spotted owls associated with an individual PAC may not be harassed over the course of more than three breeding seasons.
- Harm and/or harassment of spotted owls associated with 3 PACs due to long-term or chronic disturbance, or habitat degradation or loss over the over the 15-year life of the LMP. We expect that actions that could result in harm would be very rare under the LMP due to the protective standards and guidelines and other conservation measures included in the forest plan for the spotted owl.

Effect of Take

In this BO, the Service determines that this level of anticipated take is not likely to result in jeopardy to the spotted owl. We have based the number of PACs with anticipated take on the potential future projects to be implemented under the LMP that could have short-term adverse effects, but long-term benefits to the spotted owl (such as, but not limited to fuels reduction projects).

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The USFWS believes the following reasonable and prudent measures are necessary and appropriate to minimize the effects of take of Mexican spotted owls.

1. Eliminate or minimize adverse effects to Mexican spotted owls on the ASNFs.
2. Eliminate or minimize adverse effects to Mexican spotted owl habitat on the ASNFs.
3. Monitor the impacts of site-specific projects implemented on the Mexican spotted owl.

Mr. Tom Osen, Forest Supervisor

TERMS AND CONDITIONS

The following terms and conditions will implement reasonable and prudent measure 1:

- 1.1 The ASNFs shall avoid activities within 0.25 mile of PACs during the breeding season (March 1 to August 31) that could result in disturbance to nesting owls. If the ASNFs determines through protocol surveys that spotted owls are not nesting the year of the proposed project, then this restriction may not apply.
- 1.2 On site specific projects, the ASNFs will work with the Service to identify and implement additional reasonable and prudent measures and terms and conditions specific to the project, as necessary to minimize effects to Mexican spotted owls.

The following terms and conditions will implement reasonable and prudent measure 2:

- 2.1 Where feasible, vegetation management treatments (which could include activities such as fuels reduction, utility line maintenance, etc.) will maintain adequate amounts of important habitat features for owls (such as large trees, large snags, and large logs). The ASNFs will work with the Service during project-specific consultations to define “adequate” based upon site-specific conditions.
- 2.2 On site-specific projects, the ASNFs will work with the Service to identify additional reasonable measures, specific to the project, to minimize effects to owl habitat.

The following terms and conditions will implement reasonable and prudent measure 3:

- 3.1 The ASNF shall monitor incidental take resulting from implementation of the proposed action and report these findings to the Service. Incidental take monitoring shall include information such as when or if the project was implemented, whether the project was implemented as proposed and analyzed in the site-specific BO (including conservation measures and best management practices), and the breeding season(s) over which the project occurred, relevant Mexican spotted owl survey information, and any other pertinent information as described in the site specific BO about the project’s effects on the species habitat.
- 3.2 Annual reports will describe actions taken under this proposed action and impacts to the owl and its critical habitat. The annual report shall be sent to the Arizona Ecological Services Office by March 1 of each year.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to

Mr. Tom Osen, Forest Supervisor

minimize or avoid adverse effects of a proposed action on listed species or CH, to help implement recovery plans, or to develop information.

1. We recommend that the ASNFs work with the Service to conduct spotted owl surveys over the next several years to attempt to determine how owls modify their territories in response to fuels treatments, forest restoration, and wildland fire. This information will aid us in understanding the short- and long-term impacts of these actions on the owl, and their subsequent effect on the status of the species.
2. We recommend that the ASNFs work with the Service to design forest restoration treatments across the forest that protect existing nest/roost replacement habitat from high-severity, stand-replacing fire and enhance existing or potential habitat to aid in sustaining spotted owl habitat across the landscape. PACs can be afforded substantial protection from wildland fire by emphasizing fuels reduction and forest restoration in surrounding areas outside of PACs and nest/roost replacement recovery habitat.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the USFWS requests notification of the implementation of any conservation recommendations.

SOUTHWESTERN WILLOW FLYCATCHER

Status of the Species

The southwestern willow flycatcher (willow flycatcher) was listed as endangered, without critical habitat on February 27, 1995 (USFWS 1995b). Critical habitat was designated on January 3, 2013 (USFWS 2013b). A final recovery plan for the willow flycatcher was completed in August 2002 (USFWS 2002a). The plan describes the reasons for endangerment, current status of the willow flycatcher, addresses important recovery actions, includes detailed issue papers on management issues, and provides recovery goals (USFWS 2002a).

The willow flycatcher breeding season is considered from mid-May to mid-August (Sogge *et al.* 2010). They use dense riparian habitats from sea level in California to approximately 8,500 feet in Arizona and southwestern Colorado. Four basic habitat types can be described for the willow flycatcher: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge *et al.* 2010).

Tamarisk is an important component of the willow flycatcher's nesting and foraging habitat. In 2002 in Arizona, 80 percent of known willow flycatcher nests were built in a tamarisk (Smith *et al.* 2003). Tamarisk had been believed by some to be a habitat type of lesser quality for the willow flycatcher, however comparisons of reproductive performance (USFWS 2002a), prey populations (Durst 2004) and physiological conditions (Owen and Sogge 2002) of willow flycatchers breeding in native and exotic vegetation has revealed no difference (Sogge *et al.* 2010).

The introduced tamarisk leaf beetle was first detected affecting tamarisk within the range of the willow flycatcher in 2008 along the Virgin River in St. George, Utah. Because tamarisk is a component of about 50 percent of all known willow flycatcher territories (Durst *et al.* 2008),

Mr. Tom Osen, Forest Supervisor

continued spread of the beetle has the potential to significantly alter the distribution, abundance, and quality of willow flycatcher nesting habitat and impact breeding attempts.

Durst *et al.* (2008), the most recent compilation of willow flycatcher breeding sites and territories, reported 288 known breeding sites in California, Nevada, Arizona, Utah, New Mexico, and Colorado (all sites from 1993 to 2007 where a territorial willow flycatcher has been detected) holding an estimated 1,299 territories. It is difficult to arrive at a total of southwestern willow flycatcher territories since not all sites are surveyed annually. Numbers have increased since the bird was listed and some habitat remains unsurveyed; however, after nearly a decade of intense surveys, the existing numbers are just past the upper end of Unit's (1987) estimate of 20 years ago (500 to 1,000 pairs). About 50 percent of the 1,299 estimated territories throughout its range are located at four general locations: Cliff/Gila Valley; the middle Rio Grande River in New Mexico; Roosevelt Lake and its inflows, and; the lower San Pedro River/middle Gila River confluence in Arizona.

Therefore, the result of catastrophic events or losses of significant populations either in size or location could greatly change the status and survival of the bird. Conversely, expansion into new habitats or discovery of other populations would improve the known stability and status of the flycatcher.

Critical Habitat

When critical habitat was revised in 2013, the Service determined the PCEs for the willow flycatcher. PCEs include those habitat features required for the physiological, behavioral, and ecological needs of the species (USFWS 2013b):

PCE 1: Riparian vegetation. Riparian habitat along a dynamic river or lakeside, in a natural or manmade successional environment (for nesting, foraging, migration, dispersal, and shelter) that is comprised of trees and shrubs (that can include Gooddings willow, coyote willow, Geyer's willow, arroyo willow, red willow, yewleaf willow, pacific willow, boxelder, tamarisk, Russian olive, buttonbush, cottonwood, stinging nettle, alder, velvet ash, poison hemlock, blackberry, seep willow, oak, rose, sycamore, false indigo, Pacific poison ivy, grape, Virginia creeper, Siberian elm, and walnut) and some combination of:

- (a) Dense riparian vegetation with thickets of trees and shrubs that can range in height from about 2 to 30 meters (about 6 to 98 feet.). Lower-stature thickets (2 to 4 meters or 6 to 13 feet. tall) are found at higher elevation riparian forests and tall-stature thickets are found at middle and lower-elevation riparian forests;
- (b) Areas of dense riparian foliage at least from the ground level up to approximately 4 meters (13 feet.) above ground or dense foliage only at the shrub or tree level as a low, dense canopy;
- (c) Sites for nesting that contain a dense (about 50 percent to 100 percent) tree or shrub (or both) canopy (the amount of cover provided by tree and shrub branches measured from the ground);
- (d) Dense patches of riparian forests that are interspersed with small openings of open water or marsh or areas with shorter and sparser vegetation that creates a variety of habitat that is not uniformly dense. Patch size may be as small as 0.1 hectare (0.25 acres) or as large as 70 hectares (175 acres).

PCE 2: Insect prey populations. A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, which can include: flying ants, wasps, and bees

Mr. Tom Osen, Forest Supervisor

(Hymenoptera); dragonflies (Odonata); flies (Diptera); true bugs (Hemiptera); beetles (Coleoptera); butterflies, moths, and caterpillars (Lepidoptera); and spittlebugs (Homoptera).

ENVIRONMENTAL BASELINE

Status of the Species and its critical habitat within the planning area

There are three willow flycatcher breeding sites on the ASNFs. The Little Colorado-Greer Townsite (hereafter Greer Townsite) and Little Colorado-Greer Reservoir (hereafter Greer Reservoir) are located on the Springerville RD. The San Francisco River-Alpine Horse Pasture (hereafter Alpine HP) is located on the Alpine RD. All three breeding sites consist of the montane willow riparian forest PNV and they are mostly or entirely surrounded by private land.

The two Greer breeding sites consist of dense willow patches on the broad floodplain of the Little Colorado River. The willows are up to 20 feet tall with many younger trees present. These sites did not burn during the 2011 Wallow Fire; however, much of the uplands of the watershed draining into the two Greer sites experienced high burn severity. The public is not excluded from within these two breeding sites and they are popular fishing spots throughout the summer. These two sites are adjacent to the Greer administrative horse pasture used by the Springerville RD. It is only used outside of the willow flycatcher breeding season. Willow flycatchers used the Greer Townsite breeding site between 1996 and 2002 and again in 2006 with the number of territories ranging from 0 to 4 and a maximum of 8 adult birds. The Greer Reservoir site was used in all years surveyed with 1 to 7 territories and a range of 1 to 16 adult birds. Surveys at both sites were discontinued in 2006.

The Alpine HP site contains 55 acres of breeding habitat. Before 2000, heavy elk use impacted willow density and breeding habitat suitability. In 2001, this site was fenced and willows are now 16 to 18 feet tall with many younger trees present. The enclosure is closed to public entry during the breeding season from May through July. Alpine RD riding stock (horses and mules) only graze the un-excluded portion of the horse pasture and only outside of the breeding season. The public is excluded from entry into the Alpine HP breeding site from May through July. Willow flycatchers occupied the Alpine HP site in all years surveyed with 1 to 5 territories and a range of 1 to 10 adult birds. Formal monitoring of these sites ceased after 2006. Informal monitoring by the ASNFs has continued. No flycatchers were located between 2007 and 2009 at the Alpine site; however, in 2010 six adults were observed during one survey attempt. No surveys were conducted in 2011 due to the Wallow Fire; surveys in 2012 and 2013 detected no flycatchers (USFS 2014).

The Nutrioso Wetland, with 45 acres of potential flycatcher breeding habitat, is located south of Nelson Reservoir on the Alpine RD. In 1994, a single flycatcher male was detected at this site. It did not remain and was assumed to be a migrant. Elk heavily impacted this site in the early 2000s. Two enclosures were constructed (25 acres and 50 acres) in 2003.

Mr. Tom Osen, Forest Supervisor

Critical Habitat

There are three critical habitat segments located within the planning area:

- West Fork Little Colorado River and the main stem Little Colorado River (including the community of Greer) for 13.9 miles or encompassing 368 acres. A large portion of this habitat segment is on private land surrounding the community of Greer.
- San Francisco River (northern segment) downstream to Luna Lake and then downstream from the Luna Lake dam to the New Mexico state line for 9.4 miles or encompassing 452 acres. Almost the entire critical habitat in this segment is on private land surrounding the community of Alpine.
- San Francisco River (southern segment) from the New Mexico state line downstream within the Clifton RD (including a small segment of private land along the river) for 22.8 miles or encompassing 1,278 acres.

Factors affecting the species within the planning area

Livestock grazing can degrade and modify hydrology and vegetation structure of riparian habitats needed by breeding willow flycatcher. While livestock grazing is currently excluded from the three willow flycatcher breeding sites, livestock use may be continuing to limit the development of potential nesting, foraging, and riparian migration corridor habitat elsewhere on the ASNFs (USFS 2014). Willows and willow-cottonwood habitats are found scattered across river and stream systems on the ASNFs. Grazing or browsing impacts are compounded by elk impacts to riparian habitat on the ASNFs, even where livestock have been removed.

Water developments and land development are also identified as affects to willow flycatchers. Spring developments that pipe water to private land are common around Greer (11 special use permits) and in Alpine (seven special use permits and one easement for a total of 10 spring developments and four wells), with further development and demand for water likely to occur in the future. These are located both above and below nesting sites and, while there is no way to assess, these water withdrawals could be impacting total water available to support riparian vegetation.

Large scale logging may damage breeding habitat by post-treatment flooding. This has not been observed on the ASNFs after implemented in the Alpine and Nutrioso wildland urban interface areas. Heavy flooding post 2011 Wallow Fire resulted in high flows but damaging debris flows did not reach the three willow flycatcher breeding sites or the Nutrioso Wetland area. All of these sites are located in wide flat valleys that can dissipate flood flow energy and reduce potential damage to habitat during large flood events.

Recreation activities can damage and reduce the extent of willow flycatcher breeding habitat but this has not occurred on the ASNFs. Disturbance to nesting willow flycatcher from recreation activities at the two Greer sites (fishing, hiking) is possible but not likely due to limited use observed by Springerville RD staff. There is a special closure order prohibiting public entry during the nesting season at the Alpine HP willow flycatcher site. The Nutrioso Wetland site receives essentially no recreational use (USFS 2014).

Mr. Tom Osen, Forest Supervisor

Willow flycatchers may be affected by drought and climate change. Since 2000, persistent drought occurred frequently across the ASNFs with reduced stream flows and lowered levels in water bodies such as reservoirs, beaver dams, or cienegas. These may cause lowered water tables in areas supporting willow and cause transition into upland vegetation.

Cowbird nest parasitism may also affect willow flycatchers. Nest monitoring by AGFD between 1993 and 2006 did not detect cowbird nest parasitism at the three ASNFs breeding sites. Based on current livestock grazing decisions and associated informal consultations, all pastures or portions of them within two miles of the Alpine breeding site are not grazed until August 1 or thereafter each year. Nevertheless, domestic livestock grazing occurs on private land adjacent to these breeding site throughout the willow flycatcher breeding season.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Because this is a programmatic consultation, we will only discuss the adverse effects in terms of the general effects we anticipate will occur. We briefly discuss the plan components (desired conditions, objectives, standards, and guidelines) where applicable. We provide a table with desired condition, objectives, standards, and guideline that are specifically referred to in this consultation in Appendix B of this BO/CO. Detailed effects discussions will occur as each project is developed specifically and consulted on separately. In addition, due to the programmatic nature of this consultation, the effects discussions are not specific but general descriptions on how the Forest Programs will affect each species. Therefore to reduce redundancy we refer to the more detailed effects discussions for riparian obligate species, where applicable, prepared under the section 4 jumping mouse.

Wildland Fire Management, Ecosystem/Vegetation Health, Watershed and Soils Management, Engineering, Lands and Minerals, and Recreation and Wilderness Programs

The effects of these programs and the plan decisions (desired conditions, objectives, standards and guidelines) that direct their management to willow flycatchers are the same as those described under the New Mexico meadow jumping mouse. Please see that section for a detailed effects discussion.

Rangeland Management Program (including invasive and noxious weed control)

Livestock do not currently graze in known flycatcher breeding sites on the ASNFs. If livestock grazing is authorized within the currently excluded areas during the 15-year period of the LMP, the desired conditions, standards and guidelines will aid in minimizing the effects of grazing to

Mr. Tom Osen, Forest Supervisor

the willow flycatcher. In addition, such changes in livestock management would need to be addressed in a site-specific allotment management consultation.

Wildlife, Fish, and Rare Plant Program

The effects of this program and guidelines to reduce those effects to willow flycatchers and their critical habitat are the same as those described under the New Mexico meadow jumping mouse. In particular, willow flycatcher surveys may disturb breeding birds. In addition, program activities (inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, conservation strategy development, administrative studies, research collaboration, and information and education) that would benefit the New Mexico meadow jumping mouse would also benefit the willow flycatcher.

Effects of the Action on Southwestern Willow Flycatcher Critical Habitat

In our analysis of the effects of the action on critical habitat, we consider whether or not a proposed action will result in the destruction or adverse modification of critical habitat. In doing so, we must determine if the proposed action will result in effects that appreciably diminish the value of critical habitat for the recovery of a listed species. To determine this, we analyze whether the proposed action will adversely modify any of the PCEs that were the basis for determining the habitat to be critical. To determine if an action results in adverse modification of critical habitat, we must also evaluate the current condition of all designated CHUs and the PCEs of those units, to determine the overall ability of all designated critical habitat to support recovery. Further, the functional role of each of the CHUs in recovery must also be considered because, collectively, they represent the best available scientific information as to the recovery needs of the species.

PCE 1 and 2: Riparian vegetation and insect prey population.

EFFECT: Livestock grazing in flycatcher critical habitat could result in indirect adverse effects through habitat manipulation. Livestock consume young age-class riparian woody vegetation that flycatchers could eventually use for breeding. Continued forage use on young riparian vegetation can result in long-term adverse effects if suitable breeding habitat is not permitted to develop. Insects that the willow flycatcher feeds upon may also be affected by those actions that affect riparian vegetation. LMP guidelines to reduce adverse impacts to the flycatcher critical habitat are the same as those described under the jumping mouse.

Watershed and Soil Program implementation may include instream improvement projects which may have short-term adverse effects to riparian vegetation. There may be localized, short-term adverse effects from projects in riparian zones such as temporary disturbance of habitat through vegetation removal; however, these effects would be minimized by standards and guidelines as previously described. Furthermore, while watershed improvement projects related to instream habitat improvements would likely have short-term adverse effects, we anticipate that long-term benefits to primary constituent elements of critical habitat will occur by maintaining and possibly improving their ability to contribute to the conservation and recovery of the species.

The Engineering Program may have adverse effects if a road is constructed in flycatcher critical habitat. A road constructed in critical habitat would result in the permanent loss of the primary constituent elements of critical habitat associated with riparian habitat. This loss of riparian habitat-related primary constituent elements would not be considered short-term since the area

Mr. Tom Osen, Forest Supervisor

would remain devoid of vegetation in perpetuity. Additionally, if road maintenance activities are required at any time, primary constituent elements related to riparian habitat that have regrown could be diminished. Because we expect new roads to be limited in critical habitat, we do not anticipate that these activities will diminish the ability of critical habitat to contribute to the conservation and recovery of the species.

The Lands and Minerals Program may provide access in willow flycatcher critical habitat from land exchanges, rights-of-way authorizations, and land withdrawals. Adverse effects could occur from increased access or changes in land ownership of critical habitat. Standards and guidelines previously described will be implemented to minimize the effects from these activities. Minerals activities could result in the loss of both the riparian habitat and insect prey base primary constituent elements of critical habitat in those areas. Mining plans of operation will likely require restoration of habitat upon completion of mining activities; however, if mining occurs in willow flycatcher critical habitat, those areas remain devoid of the primary constituent elements of critical habitat, especially the riparian habitat components, throughout the life of the mining activities.

The Recreation and Wilderness Program authorized activities such as dispersed camping, hiking, and other recreation activities could result in diminished riparian habitat through vegetation manipulation and disturbance from activities associated with dispersed camping when recreationists access riparian areas from their campsites. There are numerous plan decisions that address potential impacts of recreation to riparian areas, which would include those designated as critical habitat.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the planning area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Cumulative effects to willow flycatcher and its critical habitat may include displacement from habitat by actions occurring on private land that result in disturbance to nesting birds or loss of riparian habitat. These activities include livestock grazing outside of federally-managed allotments, irrigated agriculture, groundwater pumping, stream diversions, bank stabilization, channelization, and recreation. Continued and future conversion of floodplains and riparian habitats reduce the habitat available for willow flycatcher nesting. Livestock feeding stations, corrals, and other associated structures on private lands, which attract cowbirds, may increase cowbird nest parasitism rates and decrease willow flycatcher productivity. Water developments and diversions on non-ASNFs lands will likely continue to reduce surface water and influence flood regimes necessary to develop and maintain suitable riparian woodland habitat for willow flycatcher nesting.

Mr. Tom Osen, Forest Supervisor

CONCLUSION

After reviewing the current status of the willow flycatcher and its critical habitat, the environmental baseline for the planning area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the ASNFs' LMP will not jeopardize the continued existence of the willow flycatcher, and will not destroy or adversely modify its designated critical habitat. We base our conclusion on the following:

- Watershed improvement projects are anticipated to maintain or improve the ecological condition of willow flycatcher habitat and the primary constituent elements of critical habitat during the 15-year life of the plan.
- Projects related to the Engineering, Lands and Minerals, and Ecosystem/Vegetation Health programs are expected to be limited in nature and frequency. Therefore, where habitat may be affected including primary constituent elements of critical habitat, we anticipate those effects to be negligible compared to the amount of both habitat and critical habitat available to the species rangewide.
- Livestock grazing is not currently authorized in willow flycatcher breeding habitat and where most of its critical habitat occurs in the planning area. If livestock grazing is authorized within the currently excluded areas during the life of this plan, the desired conditions, standards and guides, and objectives incorporated in the LMP will aid in minimizing the effects of grazing to the willow flycatcher. In addition, such changes in livestock management would need to be addressed in a site-specific allotment management plan consultation.
- Many of the desired conditions and objectives in the LMP, in particular desired conditions 4, 7, 34, 35, 64, 75, 78, 81, 82, 83, and objectives 4, 6, and 10 (see Appendix B for plan decision descriptions) benefit riparian habitats used by the willow flycatcher; and
- Many standards and guidelines within the LMP, in particular standard 3, and guidelines 71, 76, 79, 81, 83, and 132, serve as conservation measures that are beneficial to the willow flycatcher.

INCIDENTAL TAKE STATEMENT

Amount or Extent of Take

We are not reasonably certain that the proposed action will result in incidental take of the willow flycatcher. Currently all known breeding habitats are located in exclosures and/or areas with limited public access. All Forest Programs have desired conditions, objectives, standards, and guidelines to reduce their effects to riparian areas, including those that may support or develop willow flycatcher breeding habitat. As site specific projects are developed, the potential for adverse effects associated with those projects, including incidental take, will be addressed at that time through site-specific consultation, and standards and guidelines applied to the activity to avoid the likelihood of take.

Mr. Tom Osen, Forest Supervisor

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Develop and implement a monitoring plan to better determine the distribution, abundance, and trends of willow flycatcher populations on the ASNFs.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

WESTERN YELLOW-BILLED CUCKOO

Status of the Species

The Service listed the Western DPS of the yellow-billed cuckoo (*Coccyzus americanus*) as a threatened species on October 3, 2014 (USFWS 2014c). The proposed rule designating critical habitat was published on August 15, 2014 (USFWS 2014d). The western yellow-billed cuckoo was formerly widespread and locally common in California, Arizona, New Mexico, Oregon, and Washington and uncommon along the western front of the Rocky Mountains north to British Columbia (AOU 1998, Hughes 1999). The species may now be extirpated from British Columbia, Washington, and Oregon (Hughes 1999). The western yellow-billed cuckoo is now very rare in scattered drainages in western Colorado, Idaho, Nevada, and Utah, with single, nonbreeding birds most likely to occur (USFWS 2014c). The largest remaining breeding areas are in southern and central California, Arizona, New Mexico, and in northwestern Mexico (USFWS 2014c). The current breeding population is low, with estimates of approximately 350 to 495 pairs north of the Mexican border and another 330 to 530 pairs in Mexico for a total of 680 to 1,025 breeding pairs (USFWS 2014c).

Yellow-billed cuckoos may be found in a variety of vegetation types during migration, including coastal scrub, secondary growth woodland, hedgerows, humid lowland forests, and forest edges from sea level to 2,500 meters (8,125 feet) (Hughes 1999). Additionally, during migration they may be found in smaller riparian patches than those in which they typically nest. This variety of vegetation types suggests that the habitat needs of the yellow-billed cuckoo during migration are not as restricted as their habitat needs when nesting and tending young.

Yellow-billed cuckoos feed on large insects and small vertebrates such as tree frogs and lizards (Hughes 1999). The yellow-billed cuckoo breeding season may be timed to coincide with outbreaks of insect species, particularly tent caterpillars (Hughes 1999, USFWS 2014c) or cicadas (Halterman 2009).

Mr. Tom Osen, Forest Supervisor

Yellow-billed cuckoos breed in dense riparian woodlands comprised with cottonwood, willow, and mesquite (*Prosopis spp.*) (Laymon and Halterman 1989, Hughes 1999). Yellow-billed cuckoo may nest and forage in tamarisk, but there is usually a native riparian tree component within the occupied habitat (Gaines and Laymon 1984, Johnson *et al.* 2008).

Yellow-billed cuckoos reach their breeding range later than most other migratory breeders, often in June (Rosenberg *et al.* 1982). Nesting usually occurs between late June and late July, but can begin as early as late May and continue until late September (Hughes 1999).

The primary threat to the western yellow-billed cuckoo is loss or fragmentation of high-quality riparian habitat suitable for nesting (Corman and Wise-Gervais 2005). Habitat loss and degradation from several interrelated factors include alteration of flows in rivers and streams, encroachment into the floodplain from agricultural and other development activities, stream channelization and stabilization, diversion of surface and ground water for agricultural and municipal purposes, livestock grazing, wildfire, and establishment of nonnative vegetation, drought, and prey scarcity due to pesticides (USFWS 2014c).

ENVIRONMENTAL BASELINE

Status of the Species in the planning area

While there have been no systematic surveys for yellow-billed cuckoo on the ASNFs; there have been incidental sightings.. Two pairs and a single male were observed at the Blue River and San Francisco River confluence in 1998. One pair and a single male were observed at the Horse Canyon and Blue River confluence in 1998. Yellow-billed cuckoos were heard calling on the Blue River at Bobcat Flat in 2008 and its confluences with the San Francisco River and Horse Canyon. Incidental sightings have also been made along different sections of Eagle Creek between 2007 and 2013 (USFS 2014).

Factors affecting the species within the planning area

For the proposed action, factors that may affect the yellow-billed cuckoo and its proposed critical habitat would be the similar to those described for the willow flycatcher and the jumping mouse since these species' historical, current, and possible future distribution are very similar. While there are differences in the habitats used by each species, the factors affecting these species within the planning area are similar.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Mr. Tom Osen, Forest Supervisor

Because this is a programmatic consultation, we will only discuss the adverse effects in terms of the general effects we anticipate will occur. We briefly discuss the plan components (desired conditions, objectives, standards, and guidelines) where applicable. We provide a table with desired condition, objectives, standards, and guideline that are specifically referred to in this consultation in Appendix B of this BO/CO. Detailed effects discussions will occur as each project is developed specifically and consulted on separately.

Because their historical, current, and possible future distribution is similar, we anticipate that the effects of the proposed action to the yellow-billed cuckoo and its proposed critical habitat would be similar to those for the willow flycatcher. In addition, we determined that, at the programmatic level, the effects of the different forest programs were similar for all riparian-obligate species covered under this consultation. These effects are addressed in detail under the "Effect of the Action" section for the jumping mouse. Please refer to that effects analysis for a description of the effects of the action to the yellow-billed cuckoo.

CUMULATIVE EFFECTS

Because the yellow-billed cuckoo occupies similar habitat within the action area as the southwestern willow flycatcher, cumulative effects to yellow-billed cuckoos would be the same as discussed above for the flycatcher.

CONCLUSION

After reviewing the current status of the yellow-billed cuckoo, the environmental baseline for the planning area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the ASNFs' LMP will not jeopardize the yellow-billed cuckoo. We base our conclusion on the following:

- Watershed improvement projects are anticipated to maintain or improve the ecological condition of yellow-billed cuckoo habitat during the 15-year life of the plan. These projects are likely to aid in improving hydrologic conditions within the watershed and maintain or improve the primary constituent elements of critical habitat in the long-term.
- Projects related to the Engineering, Lands and Minerals, and Ecosystem/ Vegetation Health programs are expected to be limited in nature and frequency. Because of this and the limited documentation of the species on the ASNFs, the amount of habitat expected to be removed is anticipated to be negligible compared to the amount of habitat available to the species rangewide.
- Livestock grazing is not currently authorized where yellow-billed cuckoos have been detected. If livestock grazing is authorized during the life of this plan, the desired conditions, standards, guidelines, and objectives described above will aid in minimizing the effects of grazing to the cuckoo. In addition, such changes in livestock management would need to be addressed in a site-specific allotment management plan consultation.
- Many of the desired conditions and objectives in the LMP, in particular desired conditions 4, 7, 34, 35, 64, 75, 78, 81, 82, 83, and objectives 4, 6, and 10 (see Appendix

Mr. Tom Osen, Forest Supervisor

B for plan decision descriptions) benefit riparian habitats used by the yellow-billed cuckoo; and

- Many standards and guidelines within the LMP, in particular standard 3, and guidelines 71, 76, 79, 81, 83, and 132, serve as conservation measures that are beneficial to the yellow-billed cuckoo.

INCIDENTAL TAKE STATEMENT

Amount or Extent of Take

We are not reasonably certain that the proposed action is likely to result in incidental take of the yellow-billed cuckoo. There have been incidental reports of yellow billed cuckoo observations or audio documentations in the planning area. However, systematic breeding surveys have not been implemented on the ASNFs. If future surveys detect breeding populations in the planning area, the potential for adverse effects associated with specific projects, including incidental take, will be addressed at that time through site-specific consultation.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Develop and implement a monitoring plan to better determine the distribution, abundance, and trends of yellow-billed cuckoo populations on the ASNFs.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

NARROW-HEADED GARTERSNAKE

Status of the Species

The narrow-headed gartersnake was designated a threatened species on July 8, 2014 (USFWS 2014e). Critical habitat was proposed on July 10, 2013 and as of yet, has not been finalized (USFWS 2013d). Please refer to these rules for more in-depth information on the ecology and threats to the species and critical habitat, including references. The final and proposed rules are incorporated herein by reference.

The narrow-headed gartersnake is widely considered to be one of the most aquatic of the gartersnakes (Drummond and Garcia 1983; Rossman *et al.* 1996). This species is strongly associated with clear, rocky streams (Rosen and Schwalbe 1988, Rossman *et al.* 1996). The species has been observed using lake shoreline habitat in New Mexico (Rossman *et al.* 1996).

Mr. Tom Osen, Forest Supervisor

The narrow-headed gartersnake is active between March and November (Nowak 2006). Narrow-headed gartersnakes have a lower preferred temperature for activity as compared to other species of gartersnakes (Fleharty 1967), which may facilitate their highly aquatic nature in cold streams. Narrow-headed gartersnakes specialize on fish as their primary prey item (Rosen and Schwalbe 1988, Nowak 2006).

The narrow-headed gartersnake historically ranged across the Mogollon Rim and along its associated perennial drainages from central and eastern Arizona, southeast to southwestern New Mexico (Rosen and Schwalbe 1988; Rossman *et al.* 1996; Holycross *et al.* 2006).

Population densities have noticeably declined in many populations, as compared to previous survey efforts (Holycross *et al.* 2006). Narrow-headed gartersnakes were detected in only 5 of 16 historical localities in Arizona and New Mexico surveyed by Holycross *et al.* (2006) in 2004 and 2005.

As of 2011, the only remaining narrow-headed gartersnake populations where the species could reliably be found were located at: Whitewater Creek (New Mexico), Tularosa River (New Mexico), Diamond Creek (New Mexico), Middle Fork Gila River (New Mexico), Black River (Arizona) and Oak Creek Canyon (Arizona) (USFWS 2014e). However, populations found in Whitewater Creek and the Middle Fork Gila River were likely significantly affected by the Whitewater-Baldy Complex Fire, which occurred in June 2012. In 2014, the Slide Fire burned within Oak and West Fork of Oak Creek canyons. Post-fire flooding may impact the native fish and trout populations, which would affect narrow-headed gartersnakes. If the Whitewater Creek, Middle Fork Gila River, and Oak and West Fork of Oak Creek populations did decline as a result of these fires, only two populations would remain likely viable across their entire distribution. Our most recent review of the population status finds only six localities of 46 total rangewide localities known, are considered likely viable; the remaining are considered as likely not viable, or may be extirpated (USWFS 2014e). The status of the narrow-headed gartersnake on tribal land is poorly known, due to limited survey access.

The occurrence of harmful nonnative species, such as the bullfrog (*Lithobates catesbiana*), crayfish (*Orconectes virilis*, *Procambarus clarki*), and numerous species of nonnative fish, has contributed to rangewide declines in the narrow-headed gartersnake, and continues to be the most significant threat to this species (USWFS 2014e).

ENVIRONMENTAL BASELINE

Status of the Species and its critical habitat within the planning area

The narrow-headed gartersnake is currently known to occupy 11 sites on the ASNFs (USFWS 2014e):

Blue River: There are several historical and recent records of narrow-headed gartersnakes from the Blue River (Rosen and Schwalbe 1988, Holycross *et al.* 2006, C. Crowder, AGFD pers comm. 2009). One narrow-headed gartersnake was found during native fish surveys at the KP Creek confluence with the Blue River in summer 2010. The narrow-headed gartersnake remains extant in the Blue River but we lack data to conclude whether the population is viable.

Mr. Tom Osen, Forest Supervisor

Dry Blue Creek: There is one record for the narrow-headed gartersnake in Dry Blue Creek (Hellekson USFS pers comm. 2012). We consider the narrow-headed gartersnake to be extant in Dry Blue Creek, and are likely a low-density, non-viable population. The narrow-headed gartersnake population in the Blue River may contribute individuals to this population.

Campbell Blue Creek: We consider the narrow-headed gartersnake to be extant in the Campbell Blue Creek as a low-density population. Both the Blue River and Dry Blue Creek populations may contribute individuals to this population.

Eagle Creek: The narrow-headed gartersnake was observed as abundant in 1987 in Eagle Creek, with 29 detections of varying densities; the highest density population was reported from the lower reach of Eagle Creek (Fernandez and Rosen 1996). More recent surveys in 2004 and 2005 failed to detect narrow-headed gartersnakes. In 2013, a single narrow-headed gartersnake was observed by fisheries biologists at the Sheep Wash confluence (Ehlo *et al.* 2013). This narrow-headed gartersnake population decline is a serious concern. However, their history in Eagle Creek, and an incidental record from 2013, confirms the species remains extant there, likely as a very low-density and non-viable population, possibly augmented from emigration of individuals from the San Francisco River.

Black River: Numerous records document the narrow-headed gartersnake in the Black River (Fernandez and Rosen 1996, Holycross *et al.* 2006, Brennan and Rosen 2009, Brennan 2013). Nonnative, predatory fish have reinvaded the Black River since the 2011 Wallow Fire, but at low numbers and speckled dace, desert sucker, and roundtail chub were observed as abundant in 2014 (A. Lopez, AGFD, pers. comm. 2014). Dense stands of willows were also observed overhanging the stream channel; an important structural component to suitable narrow-headed gartersnake habitat (Holycross *et al.* 2006). Salt River may contribute emigrating individuals to the Black River. We consider the narrow-headed gartersnake to be extant in the Black River as a low density, non-viable population.

East Fork Black River: Seven records for narrow-headed gartersnakes exist for the East Fork Black River (Holycross *et al.* 2006). One record was from 2004, downstream of Three Forks between the confluence with Open Draw and the confluence with Coyote Creek that was documented by an AGFD fisheries biologist during a fish survey (USFWS 2011). The most recent record, an adult and juvenile gartersnakes were observed on the East Fork of the Black River near Buffalo Crossing in August 2014 (J. Sorensen, AGFD, pers. comm. 2014). The species still occurs, possibly as a low density, non-viable population, as a result of adverse ecological interactions with resident crayfish.

West Fork Black River: There are only two records for narrow-headed gartersnakes from the West Fork Black River (Holycross *et al.* 2006). This narrow-headed gartersnake population may receive immigration from the Black River and East Fork Black River where the species is also extant. However, because the populations in the Black and East Fork Black Rivers are considered low-density and likely non-viable, we suspect the same may be true for the West Fork Black River.

Fish Creek: There are two records from 2004 for narrow-headed gartersnakes (two large adults observed together) from Fish Creek that were documented by Arizona Game and Fish Department fisheries biologists during a fish survey (M. Lopez, AGFD, pers. comm. 2004). Fish Creek is a tributary of the Black River, located between the tributaries of Boggy Creek

Mr. Tom Osen, Forest Supervisor

(upstream) and Conklin Creek (downstream). We are not aware of any formal gartersnake surveys from Fish Creek. The Wallow Fire burned at high intensity in the Fish Creek subbasin and was followed by a major monsoon storm; also in 2011. This storm removed a fish barrier and severely scoured the streambed (S. Coleman, USFS, pers. comm., 2014b). A 2011 fish survey after the flood event did not detect any fish; this was the last known survey of Fish Creek (S. Coleman, USFS, pers. comm., 2014b). Apache trout have been documented in two Fish Creek tributaries. Apache trout may have dispersed back into Fish Creek since the 2011 floods. Speckled dace may have also recolonized Fish Creek. Currently, the narrow-headed gartersnake likely exists in Fish Creek, on a sporadic basis, as a very-low density population which is not viable.

Snake Creek: There is a single record for a narrow-headed gartersnake from Snake Creek, a tributary to the Black River (USFWS 2011b). Little is known about the narrow-headed gartersnake population in Snake Creek, but the 2007 record, presence of prey species, and opportunity for individuals to emigrate from the Black River, suggest the narrow-headed gartersnake is extant, likely as a low-density population that might be affected by brown trout predation.

Bear Wallow Creek: There is a single record for a narrow-headed gartersnake, a juvenile, from Bear Wallow Creek in 2003 (USFWS 2011b). Its presence and the apparent lack of harmful nonnative predators, and the expected persistence of a protected resident prey base suggests this population is likely viable, but survey data is needed to gather additional information.

North Fork Bear Wallow Creek: Three individual narrow-headed gartersnakes, an adult female and two juveniles, were found in the North Fork Bear Wallow Creek in 2004 (USFWS 2011b). The presence of young age-classed snakes, an apparent lack of harmful nonnative predators, and the expected persistence of a native fish prey base suggests this population is likely viable, but survey data is needed to gather additional information.

Factors affecting the species within the planning area

Harmful nonnative aquatic species and effects from large wildfires are the primary factors affecting gartersnakes in the planning area. Other factors include but are not limited to: water diversions or other water-related actions that decrease water quantity and quality that would limit native fish needed in gartersnake diets; improper livestock grazing levels if it reduces habitat quality for native fish or riparian habitat structure needed by gartersnakes; unauthorized off road vehicle use in riparian corridors, and intentional or unintentional killing of snakes by forest visitors.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Mr. Tom Osen, Forest Supervisor

Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Because this is a programmatic consultation, we will only discuss the adverse effects in terms of the general effects we anticipate will occur. We briefly discuss the plan components (desired conditions, objectives, standards, and guidelines) where applicable. We refer to the BA Appendix A for more details. Detailed effects discussions will occur as each project is developed specifically and consulted on separately.

Wildland Fire Management Program

Wildland fire use can result in short-term impacts to the gartersnake by burning its habitat or from post-fire flooding. Wildland fire suppression activities may also affect the gartersnake if staging areas are placed in its habitat. There are two relevant desired conditions that guide management and activities under this program which may offset impacts to the gartersnake. Desired conditions 42 and 296 would direct management activities to help restore fire to its historic role where large-scale, high-severity fires were rare. Watershed improvement through vegetation treatments including wildland fire use (planned and unplanned) may reduce the likelihood of wildfire entering riparian habitats and future post-fire runoff. In addition, Guidelines 174 and 175, which address aerial fire retardant use and potential ground disturbing activities associated with fire, may reduce the effects of fire suppression impacts from this program on the gartersnake.

Guidelines 23 and 24 require restoration projects, including that using wildland fire, be spread out spatially and temporally to reduce implementation impacts, which would include excessive post-fire flooding into gartersnake habitat.

This program area has standards and guidelines to reduce impacts to narrow-headed gartersnakes and their fish prey. However, vegetation treatments using wildland fire may result in short-term adverse effects impacts from post fire flooding or habitat loss from projects occurring in or adjacent to narrow-headed gartersnake habitat. These adverse effects may include excessive sediment deposited into important fish prey habitats and direct removal of important habitat structure along occupied streams from burning or postfire flood events.

Ecosystem/Vegetation Health Program

This program maintains current vegetation conditions at or moves them towards specific desired conditions set for the different forest and non-forested vegetation types. There are five relevant desired conditions that guide management and activities that would affect narrow-headed gartersnakes and their habitats. Many of these plan decisions also affect native fish in which narrow-headed gartersnakes depend upon for food. Desired condition 1 provides the development of habitat conditions that sustain animal populations which would include narrow-headed gartersnakes. Desired condition 4 provides the ecological conditions needed for habitat quality, distribution, and abundance to support self-sustaining populations of plants and animals, including narrow-headed gartersnakes. Desired condition 46 provides upland soil cover conditions which benefit water flow and quality, which in turn would benefit native fish which narrow-headed gartersnakes feed upon. Desired conditions 43 and 75 retain or restore native vegetation which would include willows, alders, and herbaceous vegetation needed for streambank stability, improved water quality from shading and trapping sediment, all of which could provide for habitat for terrestrial insects as a food resource for listed fish.

Mr. Tom Osen, Forest Supervisor

Objective 11 may increase forest ground cover to carry periodic cool ground fires and, with decreased crown densities, to reduce the risk of severe wildfires that can burn intensely into or cause damaging post-fire flooding into streams, including those that provide habitat for narrow-headed gartersnakes and the fish they feed upon.

Standard 4 is intended to limit invasive and noxious weed species introduction into streams by equipment or activities during vegetation treatments. Most of these invasive and noxious weed species do not have the dense root characteristics of native wetland plants that are important for streambank stability. The replacement of native riparian/wetland vegetation with non-native vegetation species may cause increased streambank erosion and decreased water and habitat quality for narrow-headed gartersnakes and their prey. This standard also addresses the movement and introduction of nonnative aquatic species. This standard would protect narrow-headed gartersnakes in areas currently unoccupied by bullfrogs and crayfish.

Guideline 23 maintains or reestablishes vegetation and soil cover which may prevent higher flows with debris and sediment from entering into streams where narrow-headed gartersnakes and their prey occur. Guideline 30, reducing ground disturbing projects, may also limit sediment deposition down slope or downstream into narrow-headed gartersnake habitat.

Vegetation treatments implemented under this program may cause short-term increases in flood runoff, scouring and sediment deposition into narrow-headed gartersnake and their fish prey habitats. If this is sufficient to decrease native fish numbers this would be expected to affect narrow-headed gartersnakes. The standards and guidelines described above and in the listed fish portion of the BO are intended to reduce this impact on both narrow-headed gartersnakes and their prey.

Watershed and Soil Management Program

Watershed and soil improvement projects include, but are not limited to, vegetation reestablishment, nonnative invasive plant treatments, erosion control, instream habitat improvement, adjusting the timing and season of grazing, or fencing. In most cases, projects would be limited in extent and amount of ground disturbance. Projects and activities in the riparian areas would improve aquatic and riparian conditions and are expected to reduce sediment deposition into aquatic habitats, which would maintain or improve water quality and healthy native fish populations needed by the narrow-headed gartersnake. These projects would also promote recruitment and maintenance of native riparian vegetation, which provide cover for narrow-headed gartersnakes and maintain suitable water temperature for native fish in the streams.

Projects in narrow-headed gartersnake habitat would have the localized and short-term effects of streambank disturbance, riparian vegetation reduction, sediment deposition into the stream, and disturbance to individual snakes. All activities would implement standards and guidelines and best management practices as described in the BA (USFS 2014). Projects would have short-term adverse effects to the species and habitat but would have long-term beneficial effects as watersheds, aquatic, and riparian habitats move towards desired conditions.

There are five relevant desired conditions that guide management and activities in narrow-headed gartersnake and its prey habitats. Desired condition 22 provides vegetation and soil conditions above the floodplain that protect water quality and aquatic habitat. Desired condition

Mr. Tom Osen, Forest Supervisor

299 directs management to move toward or maintain satisfactory watershed conditions including soil conditions. Desired condition 77 protects upland soils so they do not degrade riparian habitat. Desired conditions 292 and 293 ensure that water is available and not diminished for the needs of wildlife, which could include narrow-headed gartersnakes and their habitats.

The BA does not specify the watersheds or riparian or stream areas that would be treated under the LMP. Objectives 2, 4, and 6 would improve watershed condition and function, and riparian conditions across the planning area. Objective goals are expected to have long-term beneficial impacts, if implemented in streams or watersheds occupied by narrow-headed gartersnakes and their prey, through restoration of hydrologic conditions and functions. Short-term impacts associated with project implementation could result including increases in sedimentation, soil compaction, alterations in hydrologic conditions and functions, and changes in water quality. Mitigation measures are implemented at the project level, and site specific conditions and project activities and timing will determine their efficacy.

Guideline 2 could minimize impacts to soils resources which would reduce sediment or debris flow into narrow-headed gartersnake habitat. Guideline 8 helps protect riparian and wetland and adjacent resources from soil and vegetation disturbing equipment, vehicles, and activities. Guidelines 9, 10, 18, and 19 would require that projects, activities, and permits retain sufficient water flows to support riparian vegetation and species which would help retain surface water and protect against the risk of narrow-headed gartersnake habitat loss. Guideline 82 provides for erosion control measures may help protect narrow-headed gartersnake habitat after large scale disturbance events such as severe wildfire and flooding. Water quality in listed fish habitat would be protected by guidelines 33, 34, and 35, which require fuel and other toxicant and vehicle storage and use be outside of riparian and stream areas.

The primary responsibility of this program is the maintenance and improvement of watershed and soil conditions on the ASNFs. While these activities would benefit the narrow-headed gartersnake, their fish prey and their habitats; we expect short-term adverse effects may occur during project implementation. Projects implemented under this program, if large enough in scale, may cause short-term increases in flood runoff, scouring and sediment deposition into narrow-headed gartersnake and their fish prey habitats. If this is sufficient to decrease native fish numbers this would be expected to affect narrow-headed gartersnakes. The standards and guidelines described above and in the listed fish portion of the BO are intended to reduce this impact on both narrow-headed gartersnakes and their prey.

Engineering Program

Transportation projects could have localized and short-term adverse effects to narrow-headed gartersnakes and their prey and their habitats from actions taken near or in-stream. Roads crossing or being adjacent to streams can remove and alter riparian vegetation, impact stream channel function and structure, and alter and degrade aquatic habitat through changes in water quality and increases in sediment deposition. Narrow-headed gartersnakes may also be injured or killed by vehicle traffic when crossing roads adjacent to their habitat.

Projects improving soil and vegetation condition in the uplands would improve or minimize this program's impacts to aquatic and riparian conditions along streams. Desired condition 235 directs that road location and design does not impede wildlife and fish movement which would

Mr. Tom Osen, Forest Supervisor

help address habitat connectivity and narrow-headed gartersnake movement and population expansion through stream corridors.

Objectives 7 and 8 would restore or improve connectivity of riparian and stream habitats. They involve the relocation, repair, improvement, or decommission of authorized roads and trails and the removal of unauthorized roads and trails that add sediment to streams, damage riparian vegetation, erode streambanks, cause gullies, and/or compact floodplain soils.

The LMP contains two standards and seven guidelines that may minimize threats of road management to narrow-headed gartersnake habitat. Standard 15, authorizing motorized vehicle travel to designated routes, may limit impacts from motorized vehicle use in riparian, floodplain, and adjacent upland areas that contain narrow-headed gartersnake habitat. Standard 18, designing road maintenance and construction to reduce sediment, would limit sediment-carrying flows from entering streams such as those where narrow-headed gartersnake occur.

Guidelines 13, 31, 33, and 34 prevent contaminants such as oil, gas, or salt from entering stream habitat which would benefit prey species for the narrow-headed gartersnake. Guidelines 99 and 100, locating new roads to avoid riparian areas and stream bottoms and removing roads and trails from these areas, helps prevent or reduce road impacts to stream habitat. Guideline 105 designs and locates roads so that they do not impede narrow-headed gartersnake movement.

Ongoing activities within the Engineering Program include the operation and maintenance of the transportation system on the ASNFs, which consists of roads and trails that provide access to areas on the forest including: private land, structures and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities. We would expect that over the life of the project, there could be additional new and temporary road construction to help support forest restoration, watershed and riparian improvement activities which may result in short and long-term adverse effects to narrow-headed gartersnakes, their fish prey and their habitats.

Lands and Minerals

This program area is responsible for the issuance of special use permits for numerous authorized forest activities. Special use permits issuance may adversely affect narrow-headed gartersnakes and their habitats and their native fish prey if the authorized activities affect water quality or impact stream bodies. One standard and two guidelines address potential impacts to narrow-headed gartersnakes and their habitats. Standard 31 requires that special uses for water diversions shall maintain fish, wildlife, and aesthetic values and otherwise protect the environment. Guideline 146 requires that streambed and floodplain alteration or removal of material not occur if it prevents attainment of riparian, channel morphology, or streambank desired conditions. Where special uses or other authorizations (e.g., collection of decorative rock) are issued, guideline 166 incorporates measures to reduce impacts to riparian/wetland habitat such as those where narrow-headed gartersnakes occur.

While these standards and guidelines may limit or prevent short or long-term impacts to narrow-headed gartersnakes; adverse effects may still occur to them and their native fish prey. These may include excessive sediment pulses into stream habitats, temporary or permanent reduction or removal in streambank structure and vegetation that provides cover, and human disturbance during fish prey breeding and spawning periods.

Mr. Tom Osen, Forest Supervisor

Rangeland Management Program (including invasive and noxious weed control)

Effects to narrow-headed gartersnakes from livestock management would mainly be indirect effects associated with important native fish forage species and, to a lesser degree, habitat disturbance. The extent to which grazing-related activities could affect narrow-headed gartersnakes depends on the whether there are harmful nonnative species present and if so, what their relative densities are. The more predation and competition from harmful nonnative species, the more sensitive narrow-headed gartersnakes are to actions that affect their habitat. Many segments of narrow-headed gartersnake habitat are protected from livestock grazing by enclosure fences along most streams or have limited accessibility due to steep terrain. There are seven proposed critical habitat subunits located across 14 grazing allotments on the ASNFs. Most of the proposed critical habitat (Blue River, portions of the San Francisco River near Alpine, and Campbell Blue Creek are located within pastures that are not grazed or have the riparian portions excluded from livestock grazing. Accessible areas of native fish habitat may experience livestock grazing effects to streambanks, riparian vegetation, and water quality.

There are four relevant desired conditions that guide rangeland management which would affect narrow-headed gartersnake and their native fish prey species habitat. Desired condition 278 provide for sufficient or greater cover in grasses and forbs, which would help contribute to lower intensity wildfires and allow vegetation ground cover to readily re-sprout and limit sediment transport and deposition into streams. Desired conditions 60, 64, and 82 address tall and vigorous herbaceous riparian vegetation needed to protect streambanks from erosion which would adversely affect native fish. These desired conditions also promote riparian cover used by the narrow-headed gartersnake.

Four guidelines protect or restore riparian or wetland habitats and the uplands that may influence narrow-headed gartersnake habitat. Guideline 32 requires grazing allotments be managed to maintain or improve riparian areas. Guideline 132 requires critical areas (*e.g.* riparian and stream habitats) are managed with special consideration, separate from the remainder of the grazing management unit. Guidelines 134, 138, and 139 would reduce livestock management and facility impacts (water trough, salt or mineral supplement block placement and livestock trailing) to riparian and stream habitats that may include narrow-headed gartersnake habitat.

Livestock grazing may have minimal effects to narrow-headed gartersnake habitat due to riparian enclosures, limited pasture use, or timing restrictions for livestock use in riparian areas where they are known to occur. There may be unknown narrow-headed gartersnake populations in areas that may not receive the previously mentioned protections from livestock grazing. The standards and guidelines required under this program are expected to minimize but may not eliminate adverse effects. Therefore, over the life of this consultation, we expect that implementation of the Rangeland Program could result in adverse effects to the narrow-headed gartersnake and their habitat.

Recreation and Wilderness Program

Reservoirs and streams and adjacent areas receive high levels of recreational activities than can alter vegetation, riparian areas, water quality, and aquatic habitat. Recreation sites and developments and their associated uses and activities can present threats to maintaining, restoring and recovering narrow-headed gartersnake habitats. Recreational sites and activities can degrade upland and watershed conditions and function, alter riparian vegetation and

Mr. Tom Osen, Forest Supervisor

function, and reduce water quality and increase sediment into streams which could affect native fish which narrow-headed gartersnakes feed upon. Recreational activities within and adjacent to riparian areas and streams can also increase the risk of introductions and spread of invasive or undesirable plants and animals.

One objective and one standard have been included in the LMP that can address potential impacts of recreation to areas that may be inhabited by narrow-headed gartersnakes. Objective 18 relocates or rehabilitates degraded dispersed campsites some of which may be located in or adjacent to streams and riparian areas. Standard 13 requires that dispersed campsites shall not be designated in areas with sensitive soils or within 50 feet of streams, wetlands, or riparian areas to prevent riparian vegetation and bank damage, soil compaction, increased sediment, or soil and water contamination.

The LMP includes standards and guidelines to reduce the impacts to narrow-headed gartersnake from recreation activities; however, there is also direction in the LMP to increase and/or improve recreational opportunities. Over the life of the LMP, this could result in adverse impacts to narrow-headed gartersnakes and their habitat.

Wildlife, Fish, and Rare Plant Program

This program area includes inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, conservation strategy development, administrative studies, research collaboration, and information and education. The most important activities implemented under this program that would affect narrow-headed gartersnakes are those that restore federally-listed native fish to identified recovery streams during the 10 to 15 years following plan approval. These would include approval of the construction and maintenance of fish barriers as well as other projects to improve aquatic habitat for native fish.

Objective 4 would annually enhance or restore 5 to 15 miles of stream and riparian habitat, and objective 5 would complete at least five projects that remove barriers, restore dewatered stream segments, or connect fragmented habitat. Both of these objectives would benefit listed fish, and subsequently, narrow-headed gartersnakes, if done in occupied habitats.

Ten guidelines address potential impacts of habitat improvement projects on narrow-headed gartersnakes and their prey. Guideline 2 requires that ground disturbing projects, such as those that would be implemented to improve narrow-headed gartersnake and native fish habitat, be designed to minimize soil disturbance. Guidelines 33, 34, and 35 require that mechanized equipment that may be used in restoration projects in streams not contaminate water with chemicals or fuels. Guideline 19 would require that stream flows not be impeded such that riparian-dependent species, such as narrow-headed gartersnakes or their habitats are impacted. Guideline 29 would require monitoring to provide feedback about project implementation effects or effectiveness of mitigation measures for these species, and would guide future management toward desired conditions. Guideline 71 has the potential to help provide the dense, herbaceous vegetation that protects and stabilizes streambanks and that could benefit narrow-headed gartersnake habitat. Guidelines 67 and 76 would require project and activity mitigation to help provide for and reduce negative impacts to flowing water and saturated soils.

Mr. Tom Osen, Forest Supervisor

These projects may have localized, short-term adverse effects such as streamflow and streambank alteration, and excess sediment erosion or deposition. These adverse effects could alter water quality; however, we would expect them to be short in duration and intensity.

Actions resulting in disturbance to individual narrow-headed gartersnakes can alter their breeding or feeding behaviors and increase their risk of predation. Project activities would be mitigated by the guidelines described above. Overall, the Wildlife/Fish/Rare Plants program plan components are positive for narrow-headed gartersnakes and their habitats in the long-term and would maintain or improve watershed condition indicators related to water quality, nonnative species, soils, riparian vegetation, and rangeland vegetation.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the planning area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Cumulative effects to the narrow-headed gartersnake and its proposed critical habitat would involve impacts to its riparian habitat and native fish upon which they depend on for food. Cumulative effects would include residential home development on private lands along occupied streams and the resulting impacts to watershed integrity. Continued use of ground and surface water will result in altered hydrologic regimes and increased sedimentation and pollutant to native fish-occupied streams. Other land uses such as livestock grazing, mining, and vegetation treatments are occurring on State, private, and tribal lands.

CONCLUSION

After reviewing the current status of the narrow-headed gartersnake and its proposed critical habitat, the environmental baseline for the planning area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the LMP for the ASNFs will not jeopardize the continued existence of the narrow-headed gartersnake and will not destroy or adversely modify proposed critical habitat. Our reasoning for determining that implementation of the LMP for the ASNFs will not jeopardize the narrow-headed gartersnake and will not adversely modify proposed critical habitat for the species is based on the following:

- Watershed improvement projects are anticipated to maintain or improve the ecological condition of narrow-headed gartersnake habitat during the 15-year life of the plan. These projects are likely to aid in improving hydrologic conditions within the watershed and maintain or improve the PCEs of critical habitat in the long-term.
- Projects related to the Engineering, Lands and Minerals, and Ecosystem/Vegetation Health programs are expected to be limited in nature and frequency. The amount of habitat expected to be removed is anticipated to be negligible compared to the amount of habitat available to the species rangewide.

Mr. Tom Osen, Forest Supervisor

- Livestock grazing is not currently authorized in all areas the narrow-headed gartersnake has been detected. In addition, such changes in livestock management would need to be addressed in a site-specific allotment management plan consultation.
- We anticipate adverse effects from LMP implementation to the narrow-headed gartersnake from effects to its habitat and to its prey items. Many of the Forest Programs involve ground disturbing activities in watersheds or stream corridors that contain narrow-headed gartersnakes and its prey. Other programs such as the Rangeland and Recreation and Wilderness Management programs have activities that occur within the snakes and its prey habitats;
- Many of the desired conditions and objectives in the LMP, in particular desired conditions 4, 7, 20, 22, 24, 32, 34, 35, 64, 75, 78, 81, 83, and objectives 4, 6, 10, and 17 (see Appendix B for plan decision descriptions) benefit riparian and aquatic habitats used by the narrow-headed gartersnake and its fish prey; and
- Many standards and guidelines within the LMP, in particular standards 3 and 11, and guidelines 71, 76, 79, 81, 83, and 132, serve as conservation measures that are beneficial to the narrow-headed gartersnake and its fish prey.

INCIDENTAL TAKE STATEMENT

Amount or Extent of Take

We anticipate that the proposed action is reasonably certain to result in incidental take of the narrow-headed gartersnake. Activities that reduce cover or availability of native fish for food are expected to adversely affect the snake. During the life of the proposed action, we anticipate that increased project implementation may occur within areas known and perhaps not known to be inhabited by narrow-headed gartersnakes. Forest Programs, such as Engineering, Lands and Minerals, and Recreation and Wilderness, may develop infrastructure in occupied or suitable gartersnake habitat. Infrastructure, such as roads and rights-of-way may permanently remove riparian vegetation needed by the narrow-headed gartersnake. Special use permits may authorize temporary or long-term activities in narrow-headed gartersnake habitat. We anticipate that the total number of narrow-headed gartersnakes taken as a result of this action will be difficult to predict because finding a dead or impaired specimen will be difficult. However the level of incidental take can be anticipated by the information we have regarding the potential for narrow-headed gartersnakes to be injured, or killed as a result of the proposed action.

We authorize the incidental take of up to two narrow-headed gartersnakes in the form of direct mortality or injury as a result of construction vehicle strikes or during infrastructure installation. If more than two narrow-headed gartersnakes are injured or killed as a result of activities authorized under the LMP, the amount or extent of incidental take would be exceeded.

Effects of Take

The Service determines that take authorized in this BO, if it does occur as a result of projects implemented in areas occupied by narrow-headed gartersnakes, is not likely to result in jeopardy to the narrow-headed gartersnake. Most known occupied sites are fenced, excluded from

Mr. Tom Osen, Forest Supervisor

livestock grazing, or closed to public access. The best information we currently have suggests that most areas occupied by narrow-headed gartersnakes receive some form of protection.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the effects of take of narrow-headed gartersnake.

1. Eliminate or minimize adverse effects to narrow-headed gartersnake on the ASNFs.
2. Eliminate or minimize adverse effects to narrow-headed gartersnake habitat on the ASNFs.
3. Monitor the impacts of site-specific projects implemented on the narrow-headed gartersnake.

TERMS AND CONDITIONS

The following terms and conditions will implement reasonable and prudent measure 1:

- 1.1 On site specific projects and activities, the ASNFs will work with the Service to identify and implement additional reasonable and prudent measures and terms and conditions specific to the project, to minimize effects to narrow-headed gartersnake.
- 1.2 Surveys will be completed prior to construction of projects that could result in take, and any narrow-headed gartersnakes located will be removed from the project area.

The following terms and conditions will implement reasonable and prudent measure 2:

- 2.1 Forest Program project implementation in narrow-headed gartersnake-occupied or suitable habitat will maintain adequate amounts of important habitat features for narrow-headed gartersnakes (downed trees or logs, debris jams, and appropriate amounts of shrub and sapling-sized plants to allow for thermoregulation and cover from predators). The ASNFs will work with the Service during project-specific consultations to define “adequate” based upon site-specific conditions.
- 2.2 On site-specific projects, the ASNFs will work with the Service to identify additional reasonable and prudent measures, specific to the project, to minimize effects to narrow-headed gartersnake habitat.

The following terms and conditions will implement reasonable and prudent measure 3:

- 3.1 The ASNF shall monitor the impacts of incidental take resulting from implementation of the proposed action and report these findings to the Service. Incidental take monitoring shall include information such as when or if the project

Mr. Tom Osen, Forest Supervisor

was implemented, and whether the project was implemented as proposed and analyzed in the site-specific BO (including conservation measures and best management practices), important life cycle period(s) over which the project occurred, relevant gartersnake survey information, and any other pertinent information as described in the site specific BO about the project's effects on the species habitat.

- 3.2 Annual reports will describe actions taken under this proposed action and impacts to the narrow-headed gartersnake and its proposed critical habitat. The annual report shall be sent to the Arizona Ecological Services Office by March 1 of each year.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Develop and implement a monitoring plan to better determine the distribution, abundance, and trends of narrow-headed gartersnake populations on the ASNFs
2. Within narrow-headed gartersnake habitat, participate with the Service and AGFD in controlling non-native aquatic organisms on the ASNFs, particularly bullfrogs, fish, and crayfish.
3. Maintain active participation in the Gartersnake Conservation Working Group by ensuring forest biologists attend meetings and coordinate in monitoring and recovery planning.
4. Work with the Arizona Department of Environmental Quality, or other suitable partners to install water-quality monitoring equipment.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

NORTHERN MEXICAN GARTERSNAKE

Status of the Species

The northern Mexican gartersnake was designated a threatened species under the ESA on July 8, 2014 (USFWS 2014e). Critical habitat was proposed on July 10, 2013, and as of yet, has not been finalized (USFWS 2013d). Please refer to these rules for more in-depth information on the ecology and threats to the species and critical habitat, including references. The final and proposed rules are incorporated herein by reference.

Mr. Tom Osen, Forest Supervisor

The northern Mexican gartersnake is considered a “terrestrial-aquatic generalist” by Drummond and García (1983). It is a riparian obligate (restricted to riparian areas when not dispersing) and occurs chiefly in the following habitat types: source-area wetlands (*e.g.*, cienegas or stock tanks); large-river riparian woodlands and forests; and streamside gallery forests (Rosen and Schwalbe 1988). In the northern-most part of its range, the northern Mexican gartersnake appears to be most active during July and August, followed by June and September. The northern Mexican gartersnake is an active predator and is thought to heavily depend upon a native prey base (Rosen and Schwalbe 1988). Its diet consists primarily of amphibians and fishes (Rosen and Schwalbe 1988).

The northern Mexican gartersnake historically occurred in every county and nearly every subbasin within Arizona, from several perennial or intermittent creeks, streams, and rivers as well as lentic wetlands such as cienegas, ponds, or stock tanks (Cotton *et al.* 2013). In New Mexico, the gartersnake had a limited distribution that consisted of scattered locations throughout the Upper Gila River watershed in Grant and western Hidalgo Counties (Price 1980, Fitzgerald 1986, Holycross *et al.* 2006). Within Mexico, northern Mexican gartersnakes historically occurred within the Sierra Madre Occidental and the Mexican Plateau, comprising approximately 85 percent of the total rangewide distribution of the subspecies (Rossman *et al.* 1996).

The only reliably detected northern Mexican gartersnake populations are currently in Arizona: the Page Springs and Bubbling Ponds State Fish Hatcheries along Oak Creek lower Tonto Creek, the upper Santa Cruz River in the San Rafael Valley, the Bill Williams River, and the upper and middle Verde River. In New Mexico, the northern Mexican gartersnake may occur in extremely low population densities within its historical distribution. The limited survey effort to date is insufficient to determine extirpation. The status of the northern Mexican gartersnake on tribal lands and Mexico is poorly known due to historically limited survey access and access to any survey data.

We concluded that in as many as 26 of 31 known localities in the United States, a given northern Mexican gartersnake population is likely not viable and may exist at low population densities that could be threatened with extirpation or may already be extirpated (USFWS 2014e). Harmful nonnative species are a concern in almost every northern Mexican gartersnake locality in the United States and the most significant reason for their decline. Harmful nonnative species impact gartersnake populations through competition for space and food or through predation. Other threats include alteration of rivers and streams from dams, diversions, and flood-control projects; groundwater pumping that change flow regimes, and reduces or eliminates habitat, and favor harmful nonnative species; amphibian disease; and effects from climate change and drought (USFWS 2014e).

ENVIRONMENTAL BASELINE

Status of the Species in the planning area

The northern Mexican gartersnake has not been documented within the planning area. Two specimens were collected in 1965 and 1982 along the Black River downstream of the planning area on the Fort Apache Indian Reservation (Holycross *et al.* 2006).

Mr. Tom Osen, Forest Supervisor

Factors affecting the species within the planning area

No northern Mexican gartersnakes are known to occur on the ASNFs at this time.

EFFECTS OF THE ACTION

Northern Mexican gartersnakes are not known to occupy the planning area. Therefore, the proposed action will not affect this species.

CUMULATIVE EFFECTS

Northern Mexican gartersnakes are not known to occupy the planning area. Therefore, there are no expected cumulative effects of to this species.

CONCLUSION

After reviewing the current status of the northern Mexican gartersnake, the environmental baseline for the planning area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the LMP for the ASNFs will not jeopardize the continued existence of the northern Mexican gartersnake because it is not currently known to exist in the planning area.

INCIDENTAL TAKE

Amount or Extent of Take

The Service does not anticipate the proposed action will incidentally take northern Mexican gartersnakes. Northern Mexican gartersnakes have not been found in the planning area. If future surveys detect them in the planning area and as site specific projects are developed, the potential for adverse effects associated with those projects, including incidental take, will be addressed at that time through site-specific consultation, and desired conditions, objectives, standards, and guidelines applied to the activity to avoid the likelihood of take.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

Mr. Tom Osen, Forest Supervisor

1. Develop and implement a monitoring plan to better determine the distribution, abundance, and trends of northern Mexican gartersnake populations on the ASNFs
2. Within northern Mexican gartersnake habitat, participate with the Service and AGFD in controlling non-native aquatic organisms on the ASNFs, particularly bullfrogs, fish, and crayfish.
3. Maintain active participation in the Gartersnake Conservation Working Group by ensuring forest biologists attend meetings and coordinate in monitoring and recovery planning.
4. Work with the Arizona Department of Environmental Quality, or other suitable partners to install water-quality monitoring equipment.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

CHIRICAHUA LEOPARD FROG

Status of the Species

The Chiricahua leopard frog (leopard frog) was listed as a threatened species without critical habitat in 2002 (USFWS 2002b). Critical habitat was designated in 2011 (USFWS 2011). The Chiricahua Leopard Frog Final Recovery Plan (Recovery Plan) was finalized in April 2007 (USFWS 2007a).

The leopard frog inhabits montane and river valley cienegas, springs, pools, cattle (stock) tanks, lakes, reservoirs, streams, and rivers in central and southeastern Arizona; west-central and southwestern New Mexico; and, in Mexico, northeastern Sonora, the Sierra Madre Occidental of northwestern and west-central Chihuahua, and possibly as far south as northern Durango (Platz and Mecham 1984, Degenhardt et al. 1996, Lemos-Espinal and Smith 2007, Rorabaugh 2008).

The primary threats to this species are predation by nonnative species and die-offs caused by the fungal skin disease, chytridiomycosis (Berger et al. 1998, Longcore et al. 1999, Speare and Berger 2000). Additional threats include: drought, floods, degradation and loss of habitat as a result of water diversions and groundwater pumping, poor livestock management, altered fire regimes, mining, development, and other human activities (USFWS 2007a).

Recovery Units

The Chiricahua Leopard Frog Recovery Plan established eight Recovery Units (RUs) in Arizona, New Mexico, and adjoining portions of Mexico (USFWS 2007a). These RUs are natural units in which frog metapopulation dynamics function or could function as the species recovers. Each unit is large enough to buffer against changes due to potential successional processes or environmental disasters (e.g. floods, fire, drought, and climate change). For the leopard frog to be recovered, frog conservation must occur in each RU (USFWS 2007a).

Critical Habitat

There were 39 CHUs (approximately 10,346 acres [4,187 ha]) designated in the eight RUs in Arizona and New Mexico (USFWS 2012c). When critical habitat was proposed in 2012, the

Mr. Tom Osen, Forest Supervisor

Service determined the PCEs for the leopard frog's breeding aquatic habitat and dispersal and non-breeding habitat as follows:

PCE 1: Aquatic breeding habitat and immediately adjacent uplands exhibiting the following characteristics:

- (a) Standing bodies of fresh water (with salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and pollutants absent or minimally present), including natural and manmade (e.g., stock) ponds, slow moving streams or pools within streams, off-channel pools, and other ephemeral or permanent water bodies that typically hold water or rarely dry for more than a month. During periods of drought, or less than average rainfall, these breeding sites may not hold water long enough for individuals to complete metamorphosis, but they would still be considered essential breeding habitat in non-drought years.
- (b) Emergent and/or submerged vegetation, root masses, undercut banks, fractured rock substrates, or some combination thereof, but emergent vegetation does not completely cover the surface of water bodies.
- (c) Nonnative predators (e.g., crayfish, bullfrogs, nonnative fish) absent or occurring at levels that do not preclude presence of the Chiricahua leopard frog.
- (d) Absence of chytridiomycosis, or if present, then environmental, physiological, and genetic conditions are such that allow persistence of Chiricahua leopard frogs.
- (e) Upland habitats that provide opportunities for foraging and basking that are immediately adjacent to or surrounding breeding aquatic and riparian habitat.

PCE 2: Dispersal and nonbreeding habitat, consisting of areas with ephemeral (present for only a short time), intermittent, or perennial water that are generally not suitable for breeding, and associated upland or riparian habitat that provides corridors (overland movement or along wetted drainages) for frogs among breeding sites in a metapopulation with the following characteristics:

- (a) Are not more than 1.0 mile (1.6 kilometers) overland, 3.0 miles (4.8 kilometers) along ephemeral or intermittent drainages, 5.0 miles (8.0 kilometers) along perennial drainages, or some combination thereof not to exceed 5.0 miles (8.0 kilometers).
- (b) In overland and non-wetted corridors, provide some vegetation cover or structural features (e.g., boulders, rocks, organic debris such as downed trees or logs, small mammal burrows, or leaf litter) for shelter, forage, and protection from predators; in wetted corridors, provide some ephemeral, intermittent, or perennial aquatic habitat.
- (c) Are free of barriers that block movement by Chiricahua leopard frogs, including, but not limited to, urban, industrial, or agricultural development; reservoirs that are 50 acres (20 hectares) or more in size and contain nonnative predatory fish, bullfrogs, or crayfish; highways that do not include frog fencing and culverts; and walls, major dams, or other structures that physically block movement.

Mr. Tom Osen, Forest Supervisor

ENVIRONMENTAL BASELINE

Status of the Species and its critical habitat within the planning area

Two of the eight RUs identified in the Chiricahua Leopard Frog Recovery Plan (USFWS 2007a) occur on the ASNFs. These are RU 6 (White Mountains-Upper Gila, Arizona and New Mexico) and RU 7 (Upper-Gila River).

Recovery Unit 6 (White Mountains- Upper Gila, Arizona and New Mexico)

There are three Recovery Management Areas (RMAs) within RU 6 on the ASNFs: Black River, Coleman Creek/Blue River; and Nutrioso and Rudd Creeks. However, only the Black River and Coleman Creek/Blue River RMAs are currently occupied.

The Black River RMA contains the Concho Bill and Deer Creek CHU, consisting of Concho Bill Spring and a meadow-ephemeral stream reach extending for approximately 2,667 feet (813 meters) below the spring. The population was historically small since it was originally stocked in 2000 with frogs generated from captive breeding as well as translocated frogs from Three Forks. Stocking efforts continued sporadically post-2000. After the 2011 Wallow Fire, intensive survey effort was made to salvage any remaining frogs from post-fire effects but no leopard frogs were detected. As of September 2011, leopard frogs appear to be extirpated from this site (USFWS 2012c).

The Coleman Creek/Blue River RMA contains the Campbell Blue and Coleman Creek CHU. This population has been historically been considered small, with generally only a few leopard frogs detected during surveys (USFWS 2012c). However the habitat is complex, making detection of leopard frogs problematic. This CHU is considered occupied.

Recovery Unit 7 (Upper Gila-Blue River, Arizona and New Mexico)

There is one RMA, the San Francisco and Blue Rivers, within RMU 7 on the ASNFs. This RMA contains the following three CHUs:

- The Left Prong of Dix Creek CHU is considered an isolated population. Leopard frogs were found during the survey in 2005. It is assumed to be still occupied due to the lack of significant threats that would otherwise preclude their existence (USFWS 2012c). The Right Prong of Dix Creek is only occupied by lowland leopard frogs (*Lithobates yavapaiensis*) but similarity of appearance between these two species may confound survey results and status in the Left Prong of Dix Creek site (USFWS 2012c).
- The Rattlesnake Pasture Tank and associated tanks CHU consists of three stock tanks Rattlesnake Pasture, Rattlesnake Gap, and Buckhorn. Rattlesnake Pasture Tank is the only one considered occupied. The leopard frog population appears to co-exist with native tiger salamanders (*Ambystoma tigrinum mavortium*), an important predator, at this site.
- The Coal Creek CHU consists of a 3,447 feet reach of Coal Creek. This is another isolated population and is considered occupied. Neither *Bd* nor non-predators are known to occur in this CHU.

Mr. Tom Osen, Forest Supervisor

Factors affecting the species within the planning area

The greatest threats to leopard frogs on the ASNFs are nonnative species, drought, and disease. All water bodies potentially inhabited by leopard frogs are also populated by non-native fish, bullfrogs, crayfish, and native tiger salamanders. Leopard frog disappearance from most historical localities correlates with the appearance of native tiger salamanders and non-native crayfish (Fernandez and Rosen 1996, Fernandez and Bagnara 1995). Tiger salamanders are abundant in numerous stock tanks on the ASNFs.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Because this is a programmatic consultation, we will only discuss the adverse effects in terms of the general effects we anticipate will occur. We briefly discuss the plan components (desired conditions, objectives, standards, and guidelines) where applicable. We refer to the BA Appendix A for more details. Detailed effects discussions will occur as each project is developed specifically and consulted on separately.

Wildland Fire Management, Ecosystem/Vegetation Health, Rangeland Management (including invasive and noxious weed control), Watershed and Soils Management, Engineering, Lands and Minerals, Recreation and Wilderness Programs

The effects of these programs and the specific guidelines to reduce those effects to the leopard frog and its critical habitat are similar to those described under the narrow-headed gartersnake. Please see the narrow-headed gartersnake section for an effects discussion that would apply to the leopard frog. The specific habitats used by these two species may not be identical; however, the effects of implementing projects under these Forest Programs are very similar to both species habitats. Plan decisions (desired conditions, objectives, standards, and guidelines) described under each Forest Program are very general in their effects to riparian, wetland and stream habitats and the fish and wildlife that inhabit these areas. Standard 2, not mentioned under the previous species discussions, is specific in its effects to the leopard frog. This standard requires measures to be taken to prevent the spread of chytrid fungus between systems when water is withdrawn from streams or other water sources.

Wildlife, Fish, and Rare Plant Program

The effects of this program and guidelines to reduce those effects to the leopard frog and its critical habitat are the same as those described under the narrow-headed gartersnake. In addition, program activities (inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, conservation strategy development, administrative studies, research collaboration, and information and education) that may be incorporated for the narrow-headed gartersnake may be done for the leopard frog.

Mr. Tom Osen, Forest Supervisor

Effects of the Action on Chiricahua Leopard Frog Critical Habitat

In our analysis of the effects of the action on critical habitat, we consider whether or not a proposed action will result in the destruction or adverse modification of critical habitat. In doing so, we must determine if the proposed action will result in effects that appreciably diminish the value of critical habitat for the recovery of a listed species. To determine this, we analyze whether the proposed action will adversely modify any of the PCEs that were the basis for determining the habitat to be critical. To determine if an action results in adverse modification of critical habitat, we must also evaluate the current condition of all designated CHUs and the PCEs of those units, to determine the overall ability of all designated critical habitat to support recovery. Further, the functional role of each of the CHUs in recovery must also be considered because, collectively, they represent the best available scientific information as to the recovery needs of the species.

PCE 1: Aquatic Habitats:

EFFECTS: Wildland Fire Management and Ecosystem/Vegetation Health Programs projects that occur in watersheds that contain leopard frog critical habitat are expected to have short-term adverse effects to this PCE as related to water quality. These may include increased sediment input into leopard frog-occupied streams, ponds, and stock tanks. These effects may be minimized by standards and guidelines as previously discussed by program in the effects of the action section for the narrow-headed gartersnake. Standard 2, not mentioned under narrow-headed gartersnake discussion, is specific in its effects to this PCE. This standard requires measures to be taken to prevent the spread of chytrid fungus between systems when water is withdrawn from streams or other water sources.

Watershed and soil improvement projects that involve instream improvement projects, engineering projects that involve roads in or adjacent to streams are expected to have short-term adverse effects to this PCE related to leopard frog habitat components and water quality needs of its larval stages. There may be localized, short-term adverse effects from projects in riparian zones such as localized sediment input into habitat, and temporary disturbance of habitat. However, these effects would be minimized by standards and guidelines as previously described. Furthermore, while watershed improvement projects related to instream habitat improvements would likely have short-term adverse effects, we anticipate that long-term benefits to primary constituent elements of critical habitat will occur by maintaining and possibly improving their ability to contribute to the conservation and recovery of the species.

Rangeland Management Program effects to this PCE are expected to be similar to the indirect effects to narrow-headed gartersnake through habitat modification as described above. Livestock grazing can affect the PCEs of critical habitat as a result of movement along the streams, temporarily reducing hiding cover, trampling streambanks, contributing to sedimentation, and adding waste deposits that can impair water quality which may affect the leopard frog's larval stage. Rangeland Management standards and guidelines, as described above and in the BA, provide guidance to reduce livestock grazing impacts to riparian areas. In addition, the standards and guidelines, discussed above that prevent the spread of nonnative harmful aquatic species and disease during project implementation is expected to benefit the PCEs.

Mr. Tom Osen, Forest Supervisor

The effects to this PCE from native fish restoration projects, implemented under the Wildlife, Fish and Rare Plants Program, are expected to be through habitat modification and invasive fish species removal. ASNFs management actions to support native fish restoration could include practices that would improve aquatic habitat and manage for harmful non-native species which would benefit the leopard frog. These projects would have localized, short-term adverse effects of streamflow alteration and sedimentation. Project implementation would follow appropriate standards and guidelines, as described above, to minimize impacts to this PCE.

PCE 2: Dispersal and non-breeding habitat.

EFFECTS: Actions implemented under the LMP should not result in the loss of stock tanks within critical habitat. Therefore, dispersal and non-breeding habitat should remain intact. Actions implemented under the LMP should not significantly reduce or modify habitats needed for dispersal from one water body to another, nor would they be expected result in the creation of barriers to movement.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the planning area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

All known leopard frog occupied-sites and CHUs are located on ASNFs lands; there are no cumulative effects to these habitats.

CONCLUSION

After reviewing the current status of the leopard frog and its critical habitat, the environmental baseline for the planning area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the LMP will not jeopardize the continued existence of the leopard frog and will not destroy or adversely modify designated critical habitat. Our reasoning is based on the following:

- Watershed improvement projects are anticipated to maintain or improve the ecological condition of leopard frog habitat during the 15-year life of the plan. These projects are likely to aid in improving hydrologic conditions within the watershed and maintain or improve the PCEs of critical habitat in the long-term.
- Projects related to the Engineering, Lands and Minerals, and Ecosystem/Vegetation Health programs are expected to be limited in nature and frequency. Because of this and the limited documentation of the species on the ASNFs, the likelihood of one of these programs affecting leopard frogs is low. As site-specific projects are developed, the potential for adverse effects associated with those projects to leopard frogs, including incidental take, will be addressed through site-specific consultation, and desired conditions, objectives, standards, and guidelines applied to the activity to avoid the likelihood of take.

Mr. Tom Osen, Forest Supervisor

- Many of the desired conditions and objectives in the LMP, in particular desired conditions 4, 7, 20, 22, 24, 32, 34, 35, 64, 75, 78, 81, 83, and objectives 4, 6, 10, and 17 benefit riparian and aquatic habitats used by the leopard frog; and
- Many standards and guidelines within the LMP, in particular standards 2, 3 and 11, and guidelines 71, 76, 79, 81, 83, and 132, serve as conservation measures that are beneficial to the leopard frog.

INCIDENTAL TAKE STATEMENT

Amount or Extent of Take

Incidental take of the leopard frog is reasonably certain to occur as a result of the continued implementation of the ASNFs' LMP. This incidental take is expected to be in the forms of harm (including direct mortality) and harassment resulting from site-specific projects implemented under the LMP. However, it is difficult to quantify the number of individual frogs taken because: (1) dead or impaired individuals are difficult to find (and are readily consumed by predators) and losses may be masked by seasonal fluctuations in environmental conditions; (2) the status of the species could change over time through immigration, emigration, and loss or creation of habitat; and (3) the species is small-bodied, well camouflaged, and occurs under water of varying clarity.

The standard Visual Encounter Surveys (VES) method is the survey protocol used to conduct Leopard frog surveys (USFWS 2007, Appendix E). The VES method will generate presence/absence data if used independently and generate information from which inferences about frog abundance and trends can be made at a specific site. However, we do not have a means of counting all individual frogs at a site. As noted above, we believe that we cannot measure the number of frogs taken as a result of this action because these frogs are difficult to find, particularly if they are dead or impaired, and the frog is difficult to see due to its size, cryptic coloring, and complex habitat. In addition, egg masses and tadpoles are frequently hidden in submerged vegetation and cannot be counted precisely. Therefore, though we can generate counts of frogs seen by surveyors, results from these surveys do not provide an accurate estimate of the number of frogs present at the site. If we are unable to know the number of frogs at a site, it follows logically that we would be unable to count the number of frogs potentially incidentally taken as a result of the proposed action.

Since we cannot estimate the number of individual frogs that will be incidentally taken for the reasons listed above, the Service is providing a mechanism to quantify when take would be considered to be exceeded as a result of the implementing the LMP. We conclude that the incidental take of leopard frogs will be considered exceeded if there is a loss of one of the four known reproductive sites, for a period of three consecutive years, as a result of activities implemented by the LMP as proposed herein. We have identified actions that may result in the incidental take of individual frogs (due to actions implemented under the Management Programs discussed in the Effects section above); however, we do not anticipate the complete loss of an entire occupied site as a result of any action authorized under the LMP. The actions analyzed under the LMP could take several (though we are unable to count the exact number) individual frogs of various life stages (frogs, tadpoles, and eggs) through direct mortality or harm from trampling (human, animal, or machine), and harm and/or harassment through habitat modification (e.g., as a result of roads, livestock, piping of water, and/or the movement of disease or nonnative predators through cleaning of stock tanks, or other action resulting in take

Mr. Tom Osen, Forest Supervisor

authorized under the LMP). If the loss of a currently occupied site occurs, in coordination with the ASNFs, we will determine whether it was the result of the proposed action or if environmental conditions (such as drought) caused the loss. This amount of incidental take will not prevent the population from recovering to pre-take levels because the existing occupied stock tanks are all within frog dispersal distance of one another (frogs can move up to 5 miles) and connected via critical habitat. Therefore, if frogs cease to be present at one site, the frogs will be able to recolonize the site on their own, or we can assist them as we have done in the past. We anticipate the ASNFs will continue to work with the Service and AGFD to continue to implement actions such as captive breeding, habitat protection (e.g., fencing, silt fences, etc.) that will result in an increase in the number and resiliency of occupied stock tanks or other suitable habitats in the planning area.

Effect of Take

In this BO, we determine that while the level of incidental take cannot be specified, it is not likely to result in jeopardy to leopard frogs. Areas where leopard frogs may inhabit are currently protected from livestock grazing and other uses. Forest Program activities may be authorized in leopard frog habitat in the future. We determine that the wide distribution of the leopard frog across its range would likely prevent these activities from resulting in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of leopard frogs.

1. Minimize or eliminate adverse effects to leopard frogs on the ASNFs.
2. Minimize or eliminate adverse effects to leopard frog habitat on the ASNFs.
3. Monitor the impacts of site-specific projects on the leopard frogs.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the ASNFs must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions will implement reasonable and prudent measure 1:

1.1 The ASNFs shall protect occupied breeding sites during implementation of activities authorized under the LMP.

1.2 Where new or existing sites occupied by leopard frogs occur, water shall not be exchanged between sites that support leopard frogs, bullfrogs, crayfish, or fish by ASNFs' employees, permittees, or anyone operating under ASNFs' authorization.

The following terms and conditions will implement reasonable and prudent measure 2:

Mr. Tom Osen, Forest Supervisor

2.1 The ASNFs shall protect occupied breeding sites during implementation of activities authorized under the LMP; which may include fencing of entire or portions of stock tanks, springs, and streams to exclude livestock, recreationists, or other activities under Forest authorization.

2.2 All equipment (vehicles, heavy equipment, aquatic survey equipment and clothing) that comes into contact with aquatic habitats will be cleaned and disinfected before visiting different aquatic sites by removing all soil, mud, and debris and disinfecting or drying equipment to ensure the Bd or other diseases are not spread between sites.

The following terms and conditions will implement reasonable and prudent measure 3:

3.1 The ASNFs shall monitor incidental take resulting from the proposed action and report their findings to the Service. Incidental take (implementation) monitoring shall include information such as when or if the project was implemented, whether the project was implemented as analyzed in the site-specific BO (including conservation measures, and Best Management Practices), and the important life cycle period(s) over which the project occurred, relevant leopard frog survey information, and any other pertinent information as described in the site specific BO about the project's effects on the species habitat.

3.2 Annual reports, which will include this species, shall be sent to the Arizona Ecological Services Office by March 1 of each year.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Develop and implement a monitoring plan to better determine the distribution, abundance, and trends of leopard frog populations on the ASNFs.
2. Work with the Service and the Arizona Game and Fish Department to begin an aggressive program to control non-native aquatic organisms on the ASNFs, particularly bullfrogs, fish, and crayfish.
3. Work with the Arizona Department of Environmental Quality, or other suitable partners, to install water-quality monitoring equipment.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Mr. Tom Osen, Forest Supervisor

THREE FORKS SPRINGSNAIL

Status of the Species

Three Forks springsnail (springsnail) was listed as an endangered species with designated critical habitat on April 17, 2012. Springsnails live in shallow spring heads and spring runs.

Historically, they were known to occur in 28 sites in two spring complexes on the ASNFs: Three Forks and Boneyard Bog springs. Springsnails were considered abundant at the Three Forks complex until 2004, at which time the waters are suspected to have been contaminated by wildfire retardant drift (USFWS 2012d). It is also been speculated that nonnative crayfish predation on springsnails was responsible for their decline (Carpenter and McIvor 1999, T. Myers, pers. comm. 2000). The Three Forks complex is considered extirpated (USFWS 2012b, USFS 2014).

In 2010, an additional springsnail complex was found in Boneyard Creek springs. Both the Bog Creek and Bog Springs complexes consist of a series of several free-flowing spring heads, concrete boxed spring heads, spring runs, and spring seepage. These spring complexes are found in open mountain meadows at 8,200 feet (2,500 meters) elevation and occur over approximately 3.7 miles (6 kilometers) of perennial flowing stream.

Critical Habitat

There are three CHUs designated for the Three Forks springsnail:

- Three Forks Springs Unit;
- Boneyard Bog Springs Unit; and
- Boneyard Creek Springs Unit

When critical habitat was proposed in 2012, the Service determined the PCEs for the Three Forks springsnail as follows:

- (1) Adequately clean spring water (free from contamination) emerging from the ground and flowing on the surface;
- (2) Periphyton (attached algae), bacteria, and decaying organic material for food;
- (3) Substrates that include cobble, gravel, pebble, sand, silt, and aquatic vegetation, for egg laying, maturing, feeding, and escape from predators; and
- (4) Either an absence of nonnative predators (crayfish) and competitors (snails) or their presence at low population levels.

ENVIRONMENTAL BASELINE

Status of the Species and its critical habitat within the planning area

The springsnail and its critical habitat status within the planning area are identical to that which was described under the Status of the Species section.

Mr. Tom Osen, Forest Supervisor

Factors affecting the species within the planning area

Recent changes in livestock management have benefited the springsnail. The Bog Creek springsnail site, within the Nutrioso Summer allotment, has not been grazed by livestock since 1999. The Three Forks and Boneyard Creek sites are within the Black River allotment. A 2001 grazing decision removed authorized livestock grazing at the Three Forks site. Livestock grazing is authorized at the latter site for three weeks per year. However, livestock grazing had not been taking place on the Black River allotment for some time prior to 2001 (initially nonuse, currently the allotment has no permittee).

Elk (*Cervus elaphus*) have access to all spring areas containing springsnails. During the summers of 1999 and 2000, agency biologists became concerned with potential impacts of elk wallowing at Boneyard Bog springs. The primary concern was observed bank degradation of springs and changes in substrate composition within springsnail habitat. Specifically, wallowing seems to result in the filling of gravel substrates with fine sediments, which data suggests are less conducive to occupation by springsnails. Elk impacts appear benign at habitats in the Three Forks Springs complex, likely due to fen hydrology (wetted from deep, underground water). Yet, elk are known to congregate seasonally at Boneyard Bog Springs, resulting in soil disturbance that may alter substrate quality or directly impact springsnails.

Over about the last 15 years, crayfish have proliferated at Three Forks and the Bog Creek sites. Crayfish are also found along Boneyard Creek. Additional threats to this species associated with management or activities on the ASNFs come from potential wildfire, and potential continued springhead inundation from post-Wallow Fire flooding. Some other factors threatening the springsnail existence include predation, overutilization (collection), climate change and drought, and endemism.

Springsnail habitats were also affected by the 2011 Wallow Fire. Although the wet areas of springs did not burn, surrounding forest burned severely (USFS 2011). Although springsnail abundance may have been affected by the wildfire, suppression, and rehabilitation efforts, it is unknown if the landscape-scale distribution of this species will be permanently affected. Springsnail salvage efforts were largely successful and should assist managers in restoring populations that may have been affected by the wildfire, suppression, rehabilitation, and post-fire flooding. Except for an occasional violation, recreational foot traffic impacts have been eliminated at the Three Forks site (recreational impacts are minimal at other sites). Some incidental hiking and fishing occurs at the Boneyard Bog and along Boneyard Creek spring sites.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Mr. Tom Osen, Forest Supervisor

Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Because this is a programmatic consultation, we will only discuss the adverse effects in terms of the general effects we anticipate will occur. We briefly discuss the plan components (desired conditions, objectives, standards, and guidelines) where applicable. We refer to the BA Appendix A for more details. Detailed effects discussions will occur as each project is developed specifically and consulted on separately.

Wildland Fire Management, Ecosystem/Vegetation Health, Engineering, Watershed and Soil Management, and Wildlife, Fish, and Rare Plant Program

The effects of these programs and specific guidelines to reduce those effects to the springsnail and its critical habitat are very similar to those described under the narrow-headed gartersnake and leopard frog. Please see that section for an effects discussion.

Rangeland Management Program (including invasive and noxious weed control)

The springsnail CHUs are currently protected from livestock grazing by enclosure fences or are in pastures or allotments that are currently in nonuse. Effects to springsnails from livestock management would mainly be indirect effects associated with habitat disturbance resulting from upland watershed condition. The effects of this program and specific guidelines to reduce those effects to the springsnail and its critical habitat are the same as those described under the narrow-headed gartersnake and the leopard frog. Please see that section for an effects discussion.

Lands and Minerals Program

The ASNFs proposes to acquire 155.75 acres of private land which encompasses a wet meadow and the creek between the Bog Creek Springs and the Boneyard Creek Springs springsnail sites. This acquisition would provide additional protection for the springsnail at both sites. There would be a concomitant disposal of 2.14 acres of current ASNFs land on which a cabin is situated to adjoin the remaining private land (none of which is springsnail designated critical habitat). The effects of this program and specific guidelines to reduce those effects to the springsnail and its critical habitat are the same as those described under the narrow-headed gartersnake and leopard frog. Please see that section for an effects discussion.

Recreation and Wilderness Program

There are no recreation sites and developments that currently threaten springsnail sites or critical habitat. Boneyard Creek and Boneyard Bog springs are not alongside a road or trail, although incidental hiking may occur there. Boneyard Bog Springs is accessible by a road that passes through private land near Sierra Blanca Lake. The Three Forks critical habitat unit is closed to public access. This site parallels the East Fork of the Black River. This portion of the East Fork of the Black River receives low fishing pressure (M. Lopez, AGFD, pers. comm. 2014) therefore, there is low likelihood of anglers wandering off stream and trampling springsnail habitat. The site is also a large boggy meadow which does not provide suitable locations for dispersed camping.

Mr. Tom Osen, Forest Supervisor

In addition, the effects of this program and specific guidelines to reduce those effects to the springsnail and its critical habitat are the same as those described under the narrow-headed gartersnake and the leopard frog. Please see that section for an effects discussion.

Effects of the Action on Three Forks Springsnail Critical Habitat

In our analysis of the effects of the action on critical habitat, we consider whether or not a proposed action will result in the destruction or adverse modification of critical habitat. In doing so, we must determine if the proposed action will result in effects that appreciably diminish the value of critical habitat for the recovery of a listed species. To determine this, we analyze whether the proposed action will adversely modify any of the PCEs that were the basis for determining the habitat to be critical. To determine if an action results in adverse modification of critical habitat, we must also evaluate the current condition of all designated CHUs and the PCEs of those units, to determine the overall ability of all designated critical habitat to support recovery. Further, the functional role of each of the CHUs in recovery must also be considered because, collectively, they represent the best available scientific information as to the recovery needs of the species.

PCEs 1, 2, and 3: Aquatic habitat needs (clean spring water, attached algae, bacteria, and decaying organic material for food, and proper substrate for egg laying, maturing, feeding, and escape from predators.

EFFECT: Actions implemented under the LMP are expected to retain and protect clean water and feeding and breeding habitats. There are standards and guidelines to ensure that areas supporting listed species are not dewatered or impaired to the point that they cannot support species which would include springsnails. The springsnail CHUs are protected from direct effects of livestock grazing and recreation by enclosure fences or are in pastures or allotments that are currently in nonuse. Any indirect effects would mainly be associated with water quality impacts that may result from upland soil disturbance from ground-disturbing activities associated with the different forest programs. Programs that involved mechanized equipment have guidelines that prevent fuels and other contaminants from entering aquatic habitats. Pesticide use, to control invasive and noxious plant and animals, would be done so as to minimize impacts on non-target species.

PCE 4: Either an absence of nonnative predators (crayfish) and competitors (snails) or their presence at low population levels.

EFFECT: The ASNFs are implementing standards and guidelines to ensure that actions implemented under the LMP, particularly movement of water under the Fire Management and Range Management Programs does not result in the incidental movement of nonnative species into critical habitat.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the planning area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Mr. Tom Osen, Forest Supervisor

There is private land adjacent to springsnail habitat near Bog and Boneyard Creek springs. The ASNFs are working towards acquiring this parcel in exchange of land in the areas outside of springsnail critical habitat. Effects of this private land in the interim period to springsnails and their critical habitat at the site are unknown.

CONCLUSION

After reviewing the current status of the Three Forks springsnail and its critical habitat, the environmental baseline for the planning area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the LMP for the ASNFs will not jeopardize the continued existence of the springsnail and will not destroy or adversely modify designated critical habitat. Our reasoning is based on the following:

- Watershed and Soil Program projects are anticipated to maintain or improve the ecological condition of Three Forks springsnail habitat during the 15-year life of the plan. These projects are likely to aid in improving hydrologic conditions within the watershed and maintain or improve the primary constituent elements of critical habitat in the long-term.
- Projects related to the Engineering, Lands and Minerals, and Ecosystem/Vegetation Health programs are expected to be limited in nature and frequency. The springsnail is found in small isolated locations which can be protected from adverse effects from these programs.
- Livestock grazing is not currently authorized where the Three Forks springsnail is found. Adverse effects may occur from upland watershed effects if storm runoff carries disturbed soils into springsnail habitat. If livestock grazing is authorized during the life of this plan, the standards and guidelines described above will aid in minimizing the effects of grazing to the springsnail.
- Many of the desired conditions and objectives in the LMP, in particular desired conditions 4, 7, 20, 22, 24, 32, 34, 35, 64, 75, 78, 81, 83, and objectives 4, 6, 10, and 17 benefit spring habitats used by the springsnail; and
- Many standards and guidelines within the LMP, in particular standards 3 and 11, and guidelines 71, 76, 79, 81, 83, and 132, serve as conservation measures that are beneficial to the springsnail.

INCIDENTAL TAKE STATEMENT

Amount or Extent of Take

Incidental take of the springsnail is reasonably certain to occur as a result of the ASNFs' LMP. The Service anticipates incidental take of springsnails will be in the form of harm and harassment to the species from the Engineering, Lands and Minerals, Recreation and Wilderness, Watershed and Soils, and Wildlife, Fish and Rare Plants programs. Direct mortality and harm to

Mr. Tom Osen, Forest Supervisor

the species is anticipated through crushing and trampling of individual springsnails, and the impairment of essential behavior patterns, including but not limited to, breeding, feeding, or sheltering, due to spring habitat modification and destruction.

The Service anticipates incidental take of the springsnail will be difficult to detect for the following reason(s): the species is cryptic, small in size, lives in dense vegetation, and accurate quantification of take will be difficult as individuals taken will be difficult to locate. Quantifying anticipated take of springsnails at occupied sites in the planning area is difficult, partially because precise density estimates are not known for the species. In addition, the springsnail exhibits seasonal variation in numbers and occurs in patchy distributions throughout a given population. Determining an estimate of anticipated take is further complicated by the difficulty in detecting snails. Based on the high variation in density estimates, the variability in spatial and temporal distribution of the species in spring habitats, and the difficulty in detecting dead or moribund snails, the Service has determined that the anticipated level of take was most appropriately quantified in terms of numbers of populations with disturbance or habitat alteration resulting from site-specific projects. Incidental take will be considered to be exceeded if one population is extirpated as a result of the proposed action. Each of the numerous springheads within the Boneyard Creek and Boneyard Bog springs complexes will be considered to be a population.

Effect of Take

In this BO, the Service determines that while the level of incidental take cannot be specified, it is not likely to result in jeopardy to the Three Forks springsnail. Areas where springsnail is found are protected from adverse effects of the Forest Programs. Incidental take in the form of harassment, harm, or mortality occurring during the life of the LMP will not jeopardize this species.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the ASNFs must comply with the following terms and conditions, which implement the reasonable and prudent measures, described below and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The proposed action includes standards and guidelines under the different programs that should eliminate direct adverse effects to the springsnail. The following reasonable and prudent measures and terms and conditions are necessary and appropriate to minimize incidental take of springsnails through indirect effects of implementing the different forest programs:

1. Eliminate or minimize adverse effects to springsnail on the ASNFs.
2. Eliminate or minimize adverse effects to springsnail habitat on the ASNFs.
3. Monitor the impacts of site-specific projects on the springsnail.

Mr. Tom Osen, Forest Supervisor

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the ASNFs must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions will implement reasonable and prudent measure 1:

1.1 When designing projects, the ASNFs will minimize adverse effects to the springsnail. The ASNFs will work with the Service during project-specific consultations.

1.2 Consider alternative measures when using chemicals for noxious weed, insect or other pest control within or adjacent to occupied springsnail habitat.

The following term and condition will implement reasonable and prudent measure 2:

2.1 Design projects to reduce negative effects (direct and indirect) with the goal of implementing projects that will have beneficial, insignificant, or discountable effects within occupied springsnail habitat.

The following terms and conditions will implement reasonable and prudent measure 3:

3.1 The ASNF shall monitor incidental take resulting from implementation of the proposed action and report these findings to the Service. Incidental take monitoring shall include information such as when or if the project was implemented, whether the project was implemented as proposed and analyzed in the site-specific BO (including conservation measures and best management practices), and the important life cycle period(s) over which the project occurred, relevant springsnail survey information, and any other pertinent information as described in the site specific BO about the project's effects on the species habitat.

3.2 Annual reports, which will include this species, shall be sent to the Arizona Ecological Services Office by March 1 of each year.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or CH, to help implement recovery plans, or to develop information.

1. Develop and implement a monitoring plan to better determine the distribution, abundance, and trends of Three Forks springsnail populations on the ASNFs.
2. Work with the Service and the Arizona Game and Fish Department to begin an aggressive program to control crayfish on the ASNFs.

Mr. Tom Osen, Forest Supervisor

3. Work with the Arizona Department of Environmental Quality, or other suitable partners, to install water quality monitoring equipment in waters that contain federally-listed species.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

APACHE TROUT, GILA TROUT, GILA CHUB, LITTLE COLORADO SPINEDACE, LOACH MINNOW, AND SPIKEDACE

Status of the Species

Apache Trout

The Apache trout was originally listed as endangered under the Federal Endangered Species Preservation Act of 1966 (USFWS 1967). It later became federally protected with passage of the ESA in 1973. It was down listed to threatened under the ESA in 1975 (USFWS 1975) without critical habitat. Reclassification to threatened status included a 4(d) rule, allowing AGFD to regulate incidental take of the species and to establish sportfishing opportunities.

Historical distribution of Apache trout is unclear. Once Apache trout were recognized as a species separate from Gila trout (Miller 1972), their original distribution was described as the upper Salt River drainage (Black and White Rivers) and headwaters of Little Colorado River in Arizona above 5,905 feet (Miller 1972).

Apache trout now exist primarily in headwater areas upstream from natural and artificial barriers (USFWS 2010). Apache trout generally require water temperatures below 77 degrees Fahrenheit (°F) (25 degrees Celsius (°C) (USFWS 2010). Additional information on specific stream habitat requirements for all life stages of Apache trout can be found in the Apache Trout Recovery Plan (USFWS 2009).

Gila Chub

Gila chub (*Gila intermedia*) was listed as endangered with critical habitat on November 11, 2005 (USFWS 2005). Primary threats to Gila chub such as predation by and competition with nonnative organisms and secondary threats identified as habitat alteration, destruction, and fragmentation are all factors identified in the final rule that contribute to the consideration that Gila chub is endangered or likely to become extinct throughout all or a significant portion of its range (USFWS 2005).

Gila chub generally spawn in late spring and summer; however, in some habitats, it may extend from late winter through early autumn (Minckley 1973). Schultz and Bonar (2006) data from Bonita and Cienega creeks suggested that multiple spawning attempts per year per individual were likely, with a major spawn in late February to early March followed by a secondary spawn in autumn after monsoon rains. Bestgen (1985) concluded that temperature was the most significant environmental factor triggering spawning.

Mr. Tom Osen, Forest Supervisor

Gila chub is considered a habitat generalist (Schultz and Bonar 2006), and commonly inhabits pools in smaller streams, cienegas, and artificial impoundments throughout its range in the Gila River basin at elevations between 609 and 1,676 meters (2,000 to 5,500 feet) (Miller 1946, Minckley 1973, Rinne 1975, Weedman *et al.* 1996).

Historically, Gila chub was recorded from nearly 50 rivers, streams and spring-fed tributaries throughout the Gila River basin in southwestern New Mexico, central and southeastern Arizona, and northern Sonora, Mexico (Miller and Lowe 1967, Minckley 1973). Gila chub now occupies an estimated 10 to 15 percent of its historical range, and is limited to about 30 small, isolated, and fragmented populations throughout the Gila River basin in Arizona and New Mexico (Weedman *et al.* 1996, USFWS 2005a). Currently, the Gila chub is distributed as follows:

Agua Fria River Subbasin

The Agua Fria subbasin is the system furthest downstream in the Gila River basin that currently supports or is historically known to have supported Gila chub. The Agua Fria River mainstem was historically occupied, but that population is now considered extirpated. This subbasin sustains or recently sustained four remnant Gila chub populations: Indian Creek, Little Sycamore Creek, Silver Creek (with replicates Larry and Lousy Canyon), and Sycamore Creek. In 1996, all remnant populations were considered threatened, and two of the four were considered unstable (Weedman *et al.* 1996).

Verde River Subbasin

Gila chub are found in four sites within the Verde subbasin: Red Tank Draw, Spring Creek, Walker Creek, and Williamson Valley Wash. One population, historically collected from Big Chino Wash, is considered extirpated. There have been no replications of any Verde subbasin populations to date.

Santa Cruz River Subbasin

Gila chub populations are known from three remnant sites (Cienega Creek, Sabino Canyon, and Sheehy Spring) in the Santa Cruz subbasin. The Sabino Creek population experienced recent bottlenecks associated with post-fire runoff following the Aspen Fire in 2003, although the population was replicated into nearby Romero Canyon. Gila chub habitat in Sabino Creek seems to be recovering since the Aspen Fire and the stream is protected against upstream invasions of nonnative fishes by a low-head dam.

San Pedro River Subbasin

The San Pedro River Subbasin includes the entire San Pedro River watershed upstream from the confluence with Gila River. Gila chub populations are known from three remnant sites (Hot Springs, O'Donnell, and Redfield canyons). Hot Springs and O'Donnell canyon populations are protected behind constructed fish barriers. A barrier is expected to be constructed in Redfield Canyon during 2015. At least four, and possibly as many as six, of the nine historically-known populations within the subbasin are considered extirpated.

Upper Gila River Subbasin

The Upper Gila River Subbasin includes the entire Gila River watershed upstream of the Salt River confluence, exclusive of the Santa Cruz and San Pedro subbasins. Major sub-drainages include the San Carlos, San Simon, San Francisco, and upper Gila River in New Mexico (including its three forks).

Mr. Tom Osen, Forest Supervisor

There are six remnant populations of Gila chub within this unit: Blue River (San Carlos), Eagle, Bonita, Harden Cienega, and Dix creeks, Arizona; and, Turkey Creek, New Mexico. The Blue River (San Carlos) population is entirely on San Carlos Apache Tribal lands, and there is little information regarding its status. There is a constructed fish barrier on Bonita Creek, although nonnatives remain present in lower Bonita Creek. Harden Cienega appears free of nonnatives, although there is no barrier preventing their encroachment. The Eagle Creek population was significantly impacted by severe runoff following the 2007 Chitty Fire and 2011 Wallow Fire. The Turkey Creek population appears large and relatively stable, although rainbow trout (*Oncorhynchus mykiss*) inhabits the upper reaches and some warm-water nonnative species inhabit the lower reaches.

Critical Habitat

Gila chub critical habitat is designated on 160.3 miles of streams in Arizona and New Mexico. Critical habitat is organized into seven areas:

Area 1 - Upper Gila River, Grant County, New Mexico, and Greenlee County, Arizona, including Turkey Creek (New Mexico), Eagle Creek, Harden Cienega Creek, and Dix Creek;

Area - 2, Middle Gila River, Gila and Pinal Counties Arizona, consisting of Mineral Creek;

Area - 3, Babocomari River, Santa Cruz County, Arizona including O'Donnell Canyon and Turkey Creek (Arizona);

Area 4 - Lower San Pedro River, Cochise and Graham counties, Arizona, including Bass Canyon, Hot Springs Canyon, and Redfield Canyon;

Area 5 - Lower Santa Cruise River, Pima County, Arizona, including Cienega Creek, Mattie Canyon, Empire Gulch, and Sabino Canyon;

Area 6 - Upper Verde River, Yavapai County, Arizona, including Walker Creek, Red Tank Draw, Spring Creek, and Williamson Valley Wash; and

Area 7 - Agua Fria River, Yavapai County, Arizona, including Little Sycamore Creek, Sycamore Creek, Indian Creek, Silver Creek, Lousy Canyon, and Larry Creek (USFWS 2005).

When critical habitat was proposed in 2005, the Service determined the PCEs for the Gila chub as follows:

PCE 1: Perennial pools, areas of higher velocity between pools, and areas of shallow water among plants or eddies all found in headwaters, springs, and cienegas, generally of smaller tributaries;

PCE 2: Water temperatures for spawning ranging from 17 to 24 °C (62.6 to 75.2 °F), and seasonally appropriate temperatures for all life stages (varying from approximately 10 °C to 30 °C).

Mr. Tom Osen, Forest Supervisor

PCE 3: Water quality with reduced levels of contaminants, including excessive levels of sediments adverse to Gila chub health, and adequate levels of pH (ranging from 6.5 to 9.5), dissolved oxygen (ranging from 3.0 to 10.0 milligrams/Liter) and conductivity (100 to 1000 millimhos).

PCE 4: Food base consisting of invertebrates (*e.g.* aquatic and terrestrial insects) and aquatic plants (*e.g.* diatoms and filamentous green algae);

PCE 5: Sufficient cover consisting of downed logs in the water channel, submerged aquatic vegetation, submerged large tree root wads, undercut banks with sufficient overhanging vegetation, large rocks and boulders with overhangs, a high degree of streambank stability, and a healthy, intact riparian vegetation community;

PCE 6: Habitat devoid of nonnative aquatic species detrimental to Gila chub or habitat in which detrimental nonnatives are kept at a level that allows Gila chub to continue to survive and reproduce; and

PCE 7: Streams that maintain a natural flow pattern including periodic flooding.

Gila Trout

The Gila trout was designated as an endangered species under the Federal Endangered Species Preservation Act of 1966 (USFWS 1967), and subsequent designation of the species as endangered continued under the ESA (USFWS 1975). Reasons for listing included hybridization, competition, and predation by nonnative rainbow trout, cutthroat trout (*O. clarkii*), and brown trout, and habitat degradation. The Gila trout was listed as federally-endangered before the Service developed a critical habitat policy, therefore there is no critical habitat for this species (USFWS 2006).

The Gila trout recovery plan was completed in 1979 in collaboration with the Service, Forest Service, AGFD, New Mexico Game and Fish Department, and academic institutions. The Recovery Plan was most recently revised in 2003 (USFWS 2003). In 2001, the Gila Trout Recovery Team recommended to the Service that the Gila trout be down-listed from endangered to threatened, based in part on successful reestablishments of the species in New Mexico and Arizona. By 2003, Gila trout were reported to be found in 14 populations in the wild (USFWS 2003). The species was down-listed to threatened status in 2006 (USFWS 2006).

Gila trout require well-oxygenated and cool water (below 77° F (25° C), coarse sand, gravel and cobble substrate; stable streambanks, and abundant overhanging banks, pools and cover for optimal habitat (Propst and Stefferud 1997, USFWS 2003). Spawning occurs mainly in April when temperatures are 43 to 46 °F (6 to 8 °C) (Rinne 1980).

Gila trout historically occupied streams in the upper Gila River and portions of the San Francisco River drainages in Arizona and New Mexico; in the Verde River, and possibly the Agua Fria River drainages in Arizona (Benke 2002).

Arizona: The Arizona Gila trout populations were believed to have been extirpated by the time the species was described in 1950 (Propst et al. 1992). There have been several introductions

Mr. Tom Osen, Forest Supervisor

efforts made with varying success in Gap Creek, Dude Creek, Raspberry Creek, Grapevine Spring, and the Pinaleno Mountains.

New Mexico: When the Gila trout was listed as endangered, it was thought that its range had been reduced to five streams within the Gila National Forest: Iron, McKenna, Spruce, Main Diamond, and South Diamond Creeks. Beginning in 1970, Gila trout from each of the five relict populations were translocated into 16 other streams. There are four confirmed relict populations known today (Main Diamond, South Diamond, Spruce, and Whiskey Creeks).

In 2012, the Whitewater-Baldy Fire in the Gila Mountains burned over 290,000 acres in Gila trout-occupied habitat. Seven of the 14 occupied Gila trout recovery streams were severely impacted. In response to the Whitewater-Baldy Fire in the Gila Mountains, Gila trout from Whiskey, Langstroth, and Spruce creeks were salvaged. Trout were transported to the Mora National Fish Hatchery or the New Mexico Fish and Wildlife Conservation Office. Trout from Spruce Creek were also taken to Ash Creek in Arizona. Later in 2012, 3,000 Gila trout were returned to the West Fork of the Gila River.

In 2013, the Silver Fire burned 139,000 acres in the Black Range in southwestern New Mexico. The Gila trout in McKnight Creek were eliminated; trout in Black Canyon were greatly reduced.

To date, there are 12 Gila trout populations (two additional populations have unknown status due to access issues) in New Mexico and three Gila trout populations in Arizona.

Little Colorado Spinedace

The spinedace was listed as threatened with critical habitat on October 16, 1987 (USFWS 1987). Identified threats were habitat alteration and destruction, predation by and competition with non-native aquatic organisms, and recreational fishery management.

Forty-four stream miles of critical habitat were designated in Arizona: 18 miles of East Clear Creek immediately upstream and 13 miles downstream from C.C. Cragin Reservoir (formerly called Blue Ridge Reservoir) in Coconino County; 8 miles of Chevelon Creek in Navajo County; and 5 miles of Nutrioso Creek in Apache County. When critical habitat was proposed in 1987, the Service determined the primary biological factors of critical habitat consist of clean, permanent flowing water with pools and a fine gravel or silt-mud substrate (see USFWS 1987, p. 35038 for additional detail).

This fish occurs in disjunct populations throughout much of the Little Colorado River drainage in Apache, Coconino, and Navajo counties. Extensive collections summarized by Miller (1963) indicated that the spinedace had been extirpated from much of the historical range from 1939 to 1960. Although few collections were made of the species prior to 1939, the species is believed to have inhabited the northward flowing Little Colorado River tributaries of the Mogollon Rim, including the northern slopes of the White Mountains.

Mitochondrial DNA work on the spinedace was initiated in the 1990s and indicated the existence of three sub-groups identifiable by geographic area (Tibbets et al. 1994): the East Clear Creek drainage; Chevelon Creek; and the upper Little Colorado River including Nutrioso and Rudd creeks. The study concluded that the genetic patterns seen were likely the result of populations isolated and differentiated by both natural and human-caused events. The East Clear Creek and Chevelon Creek sub-groups are more individually distinctive, likely the result of a higher degree of isolation, and possess unique haplotypes. Individuals from the upper Little Colorado sub-

Mr. Tom Osen, Forest Supervisor

group are more similar to each other. Possibly, until recent time, there was one population with considerable gene flow until various dams and diversions increased local isolation. The cause and exact time of the isolation of the three sub-groups are not known, but Tibbets et al. (1994) recommend that all of these populations be maintained to conserve genetic variation in this species.

The spinedace is found in a variety of habitats (Blinn and Runck 1990, Miller 1963, Nisselson and Blinn 1989). It is unclear whether occupancy of these habitats reflects the local preferences of the species or its ability to tolerate less-than-optimal conditions. Available information indicates that suitable habitat for the spinedace is characterized by clear, flowing pools with slow to moderate currents, moderate depths, and gravel substrates (Miller 1963, Minckley and Carufel 1967). Cover provided by undercut banks or large rocks is often a feature. Spinedace have also been found in pools and flowing water conditions over a variety of substrates, with or without aquatic vegetation, in turbid and clear water (Denova and Abarca 1992, Nisselson and Blinn 1991). Water temperatures in occupied habitats ranged from 58 to 78 °F (14.4 to 25.5 °C) (Miller 1963).

As with most aquatic habitats in the southwest, the Little Colorado River basin contains a variety of aquatic habitat types and is prone to rather severe seasonal and yearly fluctuations in water quality and quantity. Both mountain streams and lower-gradient streams and rivers have provided habitat for the spinedace. Residual pools and spring areas are important refuges during periods of normal low water or drought. From these refuges, spinedace are able to recolonize other stream reaches during wetter periods. This ability to quickly colonize an area has been noted in the literature (Minckley and Carufel 1967) as well as in observations by others familiar with the species. Populations seem to appear and disappear over short time frames and this has made specific determinations on status and exact location of populations difficult. This tendency has been observed by both researchers and land managers (Miller 1963, Minckley 1973) and has led to concerns for the species' survival.

Non-native fish presence was one of the primary reasons the species was listed, and may contribute to the disjunct distribution patterns observed and the spinedace's retreat to what may be suboptimal habitats. Non-native fish may compete with, prey upon, harass, and alter habitat utilized by native fish. In the last 100 years, at least ten non-native fish species have been introduced or expanded into spinedace habitats. These include rainbow trout, fathead minnow (*Pimephales promelas*), and golden shiner (*Notemigonus crysoleucus*). Surveys in East Clear Creek have documented the presence of these three non-native species and brown trout in the watershed (Denova and Abarca 1992). Data from research experiments and field observations indicate that at least the rainbow trout is a predator and potential competitor with the spinedace (Blinn et al. 1993).

The spinedace is assumed to still occupy the streams it is known from historically (Chevelon, Silver, Nutrioso, East Clear Creek, and the Little Colorado River). Populations are generally small and the true population size for any occupied stream is unknown due to the yearly fluctuations and difficulty in locating fish. Spinedace have a tendency to disappear from sampling sites from one year to the next and may not be found for several years. This ephemeral nature makes management of the species difficult since responses of the population to changes within the watershed cannot be measured with certainty. However, all of the known populations have decreased since 1993 and drought conditions continue to put additional strain on all known populations.

Mr. Tom Osen, Forest Supervisor

The most recent survey and habitat data for each watershed are indicated below:

Chevelon Creek Watershed: Currently, the spinedace occupies a section of Chevelon Creek, several miles upstream of Chevelon Creek's confluence with the Little Colorado River on the privately owned Rock Art Ranch. Chevelon Creek through the ranch supports robust populations of spinedace. There are non-native species present throughout this reach, but green sunfish (*Lepomis cyanellus*) and crayfish, predators of spinedace, were found to be uncommon in areas where spinedace numbers were highest. However, AGFD has reported that largemouth bass (*Micropterus salmoides*) appear to be increasing in abundance above The Steps. At this time, the distribution and abundance of largemouth bass in this reach and how that may be impacting spinedace populations in the area is unknown. In addition, Willow Springs Lake, a reservoir located at the head of Chevelon Creek, contains a thriving population of smallmouth bass (*Micropterus dolomieu*). Though the smallmouth bass are currently located many miles upstream of known spinedace locations in Chevelon Creek, their occurrence and ability to move downstream may pose a threat to spinedace and other native fish in the drainage.

On July 23, 2007, AGFD stocked 95 spinedace into five pools on West Chevelon Creek on the ASNFs. In July 2008, surveys located spinedace within the perennial pools where they were originally stocked and downstream of the area in ephemeral reaches. It is unclear how many fish are still present or if they spawned in 2008. Further surveys and stockings of this area are needed to verify that spinedace persist in this Chevelon Creek tributary.

The Service, AGFD, and the ASNFs stocked 150 spinedace in a large pool in Willow Creek, a tributary of Chevelon Creek in fall 2013.

East Clear Creek Watershed: Spinedace currently occupy small, perennial pool habitats in West Leonard Canyon, Leonard Canyon (including Dines Tank), Bear Canyon, Dane Canyon, and Yeager Canyon. The populations and available habitat are all relatively small throughout the watershed, but West Leonard and Leonard Canyons continue to be the most dependable locations to find spinedace in the entire watershed. The Bear, Dane, and Yeager Canyon populations are sustained by moving spinedace from West Leonard Canyon and Dines Tank to these areas.

Little Colorado River (including Nutrioso Creek and Rudd Creek): Spinedace are documented in several locations in the Little Colorado River from Springerville downstream to St. Johns, Arizona (Dorum and Young 1995). Spinedace occur on both the AGFD Wenima and Becker Wildlife Areas within this reach of the Little Colorado River in small to moderate numbers. Survey efforts in July 2009 found 238 spinedace at Wenima and 90 spinedace at Becker Wildlife Area. Surveys conducted in 2008 by the AGFD and Bureau of Land Management (BLM) located spinedace above Lyman Lake in the Little Colorado River (USFWS 2012b). AGFD found spinedace approximately 1.5 miles downstream of the project site, Neilson Property, in June 2008 (USFWS 2012b).

Spinedace have been located in middle Nutrioso Creek from the ASNFs boundary upstream to Nelson Reservoir and from Nelson Reservoir upstream to Nutrioso, Arizona (Lopez et al. 2001a). In the spring 2005, AGFD personnel surveyed several 328-foot transects in Nutrioso Creek. A total of seven spinedace were captured upstream of Nelson Reservoir in Nutrioso Creek. No spinedace were found below the reservoir, but many fathead minnow and green sunfish were captured. April 2006 surveys were conducted in Nutrioso Creek and located 128 spinedace upstream of Nelson Reservoir of which the largest concentration was found on the EC Bar Ranch. No spinedace were located downstream of Nelson Reservoir (in Nutrioso Creek).

Mr. Tom Osen, Forest Supervisor

However, in June 2006, AGFD located 415 spinedace in a drying pool in Nutrioso Creek that were moved to a more permanent pool on the EC Bar Ranch. Surveys conducted in 2008 located spinedace above Nelson Reservoir, and above and below the gauging station on Nutrioso Creek (USFWS 2012b).

Spinedace were first located in Rudd Creek in 1994 (Lopez et al. 2001b). In the spring 2005, AGFD personnel surveyed several 328-foot transects in Rudd Creeks. Only a single spinedace and a few speckled dace (*Rhinichthys osculus*) were captured in those surveys. No spinedace were found in Rudd Creek during April 2006 surveys. However, two months later, 74 spinedace were found in Rudd Creek (USFWS 2012b). Spinedace were found on lower Rudd Creek, below AGFD's Sipes White Mountain Wildlife Area property in 2008 (USFWS 2012b).

On June 18, 2011; in response to the Wallow Fire on the ASNFs; AGFD, Service, and USFS personnel salvaged 185 Little Colorado spinedace from Rudd and Nutrioso Creeks. Upper Rudd and Nutrioso Creek watersheds burned severely and impacts to the stream from ash flows and post-fire flooding were expected, including a likely fish kill. AGFD and Service translocated the spinedace to the spinedace refuge pond at AGFDs' Grasslands Wildlife Area, near Greer, Arizona, the same day.

Silver Creek: As stated above, spinedace were thought to be extirpated from Silver Creek until a small number of fish were discovered in lower Silver Creek in July 1997 (Lopez et al. 1999). However, numerous surveys since then have failed to find spinedace, including an extensive survey in 2004 funded by a cooperative agreement with the BLM (McKell 2005). It is believed that changes to the habitat since 1997 have likely increased habitat for non-native fishes. If spinedace are still present in Silver Creek, it may be that they exist at such low numbers that our current sampling techniques are insufficient to detect them in this altered habitat.

In addition to the above in-stream populations of spinedace, there are currently two refugial populations of spinedace. We have a refugial population of East Clear Creek spinedace located at the Rocky Mountain Research Station Greenhouse and cared for by Service staff and a population of Little Colorado River spinedace at AGFD's Grasslands Wildlife Management Area.

Loach Minnow

Loach minnow was originally listed as a threatened species on October 28, 1986 (USFWS 1986) and was reclassified as an endangered species on February 23, 2012 (USFWS 2012e). Critical habitat has been designated (USFWS 1994) and re-designated (USFWS 2000, USFWS 2007b) in response to legal concerns and policy changes. The current critical habitat designation was published simultaneously with the reclassification of loach minnow to endangered status on February 23, 2012 (USFWS 2012e).

The limited taxonomic and genetic data available for loach minnow indicate there are substantial differences in morphology and genetic makeup between remnant loach minnow populations. Tibbets (1993) concluded that variation for loach minnow follows drainage patterns, suggesting little gene flow among rivers. Genetic difference between the mitochondrial DNA (mtDNA) and allozyme data was that mtDNA suggest that the San Francisco/Blue and Gila groups of loach minnow are separate, while the allozyme data places the Gila group within the San

Mr. Tom Osen, Forest Supervisor

Francisco/Blue group. Tibbets (1993) concluded that the level of divergence in both allozyme and mtDNA data indicated that all three main populations (Aravaipa Creek, Blue/San Francisco Rivers, and Gila River) were historically isolated and represent evolutionarily distinct lineages.

Loach minnow is a bottom-dwelling inhabitant of shallow, swift water over gravel, cobble, and rubble substrates (Rinne 1989; Propst and Bestgen 1991). Loach minnow uses the spaces between, and in the lee of, larger substrate for resting and spawning (Propst *et al.* 1988; Propst and Bestgen 1991; Rinne 1989). It is rare or absent from habitats where fine sediments fill the interstitial spaces (Propst and Bestgen 1991). Loach minnow feeds exclusively on aquatic insects (Schreiber 1978; Abarca 1987). Spawning occurs March through May (Britt 1982; Propst *et al.* 1988); however, under certain circumstances loach minnow also spawn in the autumn (Vives and Minckley 1990). The eggs of loach minnow are attached to the underside of a rock that forms the roof of a small cavity in the substrate on the downstream side.

Loach minnow are believed to occupy approximately 15 to 20 percent of their historical range, and are now restricted to portions of the Gila River and its tributaries, the West, Middle, and East Fork Gila River (Grant, Catron, and Hidalgo Counties, New Mexico) (Paroz and Propst 2007; Propst 2007; Propst *et al.* 2009); the San Francisco and Tularosa rivers and their tributaries Negrito and Whitewater creeks (Catron County, New Mexico) (Propst *et al.* 1988; Arizona State University (ASU) 2002; Paroz and Propst 2007; Propst 2007); the Blue River and its tributaries Dry Blue, Campbell Blue, Pace, and Frieborn creeks (Greenlee County, Arizona and Catron County, New Mexico) (Miller 1998; ASU 2002; Carter 2005; Clarkson *et al.* 2008); Aravaipa Creek and its tributaries Turkey and Deer creeks (Graham and Pinal Counties, Arizona) (Stefferdud and Reinthal 2005); Eagle Creek (Graham and Greenlee Counties, Arizona), (Knowles 1994; Bahm and Robinson 2009); and the North Fork East Fork Black River (Apache and Greenlee Counties, Arizona) (Robinson *et al.* 2009); and possibly the White River and its tributaries, the East and North Fork White River (Apache, Gila, and Navajo Counties, Arizona).

Loach minnow have recently been placed in additional streams as part of the recovery efforts for the species. In 2007, loach minnow were translocated into Hot Springs Canyon, in Cochise County, Arizona, and Redfield Canyon, in Cochise and Pima Counties, Arizona, and these streams were subsequently augmented (Robinson 2008a; Robinson *et al.* 2013). Both Hot Springs and Redfield canyons are tributaries to the San Pedro River. Augmentation efforts have been suspended in Redfield Canyon due to drought and a lack of adequate flowing water. Augmentation efforts have been suspended at Hot Springs Canyon to allow managers to better evaluate if recruitment of loach minnow is occurring without further augmentation. Monitoring will continue at this site, and future augmentations may occur if needed.

In 2007, loach minnow were translocated into Fossil Creek, within the Verde River subbasin (Carter 2007), with additional fish added in 2008 and 2011 (Carter 2007; Carter 2008; Robinson 2009; Boyarski *et al.* 2010; T. Robinson, AGFD, pers. comm 2011). In 2008, loach minnow were translocated into Bonita Creek, a tributary to the Gila River in Graham County, Arizona (H. Blasius BLM, pers. comm. 2008; T. Robinson, AGFD, pers. comm. 2008b). Bonita Creek augmentations have been temporarily suspended due to re-invasion by nonnative species above the fish barrier. We anticipate that augmentations with additional fish will occur for the next several years at these sites, if adequate numbers of fish are available, and habitats remain suitable. Monitoring at each of these sites is ongoing; however, insufficient time has elapsed to allow us to determine if these translocation efforts will ultimately be successful and result in establishment of new populations of loach minnow in these locations.

Mr. Tom Osen, Forest Supervisor

Critical Habitat

The loach minnow critical habitat designation includes eight units based on river subbasins, including the Verde River, Salt River, San Pedro, Bonita Creek, Eagle Creek, San Francisco River, Blue River, and Gila River subbasins. When critical habitat was designated in 2012, the USWFS determined the PCEs for loach minnow:

PCE 1: Habitat to support all egg, larval, juvenile, and adult loach minnow which includes:

PCE 1a. Perennial flows with a stream depth of generally less than 1 meter (3.3 feet), and with slow to swift flow velocities between 0 and 80 centimeters per second (0.0 and 31.5 inches per second).

PCE 1b. Appropriate microhabitat types including pools, runs, riffles, and rapids over sand, gravel, cobble, and rubble substrates with low or moderate amounts of fine sediment and substrate embeddedness.

PCE 1c. Appropriate stream habitats with a low stream gradient of less than 2.5 percent and are at elevations below 2,500 meters (8,202 feet).

PCE 1d. Water temperatures in the general range of 8.0 to 25.0 °C (46.4 to 77 °F).

PCE 2: An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddisflies, stoneflies, and dragonflies.

PCE 3: Streams with no or no more than low levels of pollutants.

PCE 4: Perennial flows, or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted.

PCE 5: No nonnative aquatic species or levels of nonnative aquatic species that is sufficiently low to allow persistence of loach minnow.

PCE 6: Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of transporting sediments.

Spikedace

Spikedace was originally listed as a threatened species on July 1, 1986 (USFWS 1986b), and was reclassified as an endangered species on February 23, 2012 (USFWS 2012e). Critical habitat was originally designated on March 8, 1994 (USFWS 1994), then re-designated on April 25, 2000 (USFWS 2000) and March 21, 2007 (USFWS 2007b) in response to legal concerns and policy changes. The current critical habitat designation was published simultaneously with the reclassification of spikedace to endangered status on February 23, 2012 (USFWS 2012e).

Spikedace live in flowing water with slow to moderate velocities over sand, gravel, and cobble substrates (Propst *et al.* 1986; Rinne and Kroeger 1988). Spikedace spawns from March through May with some yearly and geographic variation (Barber *et al.* 1970; Anderson 1978; Propst *et al.* 1986). Actual spawning has not been observed in the wild, but spawning behavior and captive studies indicate eggs are laid over gravel and cobble where they adhere to the substrate. It feeds

Mr. Tom Osen, Forest Supervisor

primarily on aquatic and terrestrial insects (Schreiber 1978, Barber and Minckley 1983; Marsh *et al.* 1989).

The spikedace was once common throughout much of the Gila River basin, including the mainstem Gila River upstream of Phoenix, and the Verde, Agua Fria, Salt, San Pedro, and San Francisco subbasins. Habitat destruction and competition and predation by nonnative aquatic species reduced its range and abundance (Miller 1961; Lachner *et al.* 1970; Ono *et al.* 1983; Moyle 1986; Moyle *et al.* 1986; Propst *et al.* 1986). Spikedace are now restricted to portions of the upper Gila River (Grant, Catron, and Hidalgo Counties, New Mexico); Aravaipa Creek (Graham and Pinal Counties, Arizona); Eagle Creek (Graham and Greenlee Counties, Arizona); and the Verde River (Yavapai County, Arizona) (Marsh *et al.* 1990; M. Brouder, pers. comm. 2002; Stefferud and Reinthal 2005; Propst 2007).

Spikedace were translocated into Fossil Creek, a tributary to the Verde River in Gila County, Arizona, in 2007, and were subsequently augmented in 2008 and 2011 (Carter 2007a; Carter 2008; Robinson 2009; Boyarski *et al.* 2010; Robinson 2011b). Spikedace continue to be detected (Robinson *et al.* 2014).

In 2008, spikedace were translocated into Bonita Creek, a tributary to the Gila River in Graham County, Arizona (H. Blasius, BLM, pers. comm. 2008; Robinson *et al.* 2009), and were repatriated to the upper San Francisco River in Catron County, New Mexico (D. Propst, NMDGF pers. comm. 2010). Augmentations at Bonita Creek have been temporarily suspended due to re-invasion by nonnative species above the fish barrier. Spikedace were also translocated to the San Francisco River in New Mexico in 2008; however, augmentation and monitoring has not been completed to date.

Spikedace is common only in Aravaipa Creek in Arizona (Arizona State University (ASU) 2002; P. Reinthal, University of Arizona, pers. comm. 2008, P. Reinthal University of Arizona, pers. comm. 2011) and one section of the Gila River south of Cliff, New Mexico (NMDGF 2008; Propst *et al.* 2009). The Verde River is presumed occupied; however, the last captured fish from this river was from a 1999 survey (M. Brouder, 2002, pers. comm. 2002; AGFD 2004). Spikedace from the Eagle Creek population have not been seen for over a decade (Marsh 1996), although they are still thought to exist in numbers too low for the sampling efforts to detect (Carter *et al.* 2007; see Minckley and Marsh 2009). The Middle Fork Gila River (Arizona) population is thought to be very small and has not been seen since 1991 (Jakle 1992), but sampling is localized and inadequate to detect a sparse population.

Critical Habitat

The spikedace critical habitat designation includes eight units based on river subbasins, including the Verde River, Salt River, San Pedro, Bonita Creek, Eagle Creek, San Francisco River, Blue River, and Gila River subbasins. When critical habitat was designated the Service determined PCEs for spikedace as follows:

PCE 1: Habitat to support all egg, larval, juvenile, and adult spikedace, which includes:

PCE 1a: Perennial flows with a stream depth generally less than 1 meter (3.3 feet), and with slow to swift flow velocities between 5 and 80 centimeters per second (1.9 and 31.5 inches per second).

Mr. Tom Osen, Forest Supervisor

PCE 1b. Appropriate stream microhabitat types including glides, runs, riffles, and the margins of pools and eddies, and backwater components over sand, gravel, and cobble substrates with low or moderate amounts of fine sediment and substrate embeddedness.

PCE 1c. Appropriate stream habitat with a low gradient of less than approximately 1.0 percent, at elevations below 2,100 meters (6,890 feet).

PCE 1d. Water temperatures in the general range of 8.0 to 28.0 °C (46.4 to 82.4 °F).

PCE 2: An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddisflies, stoneflies, and dragonflies.

PCE 3: Streams with no or no more than low levels of pollutants.

PCE 4: Perennial flows, or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted.

PCE 5: No nonnative aquatic species or levels of nonnative aquatic species that are sufficiently low as to allow persistence of spikedace.

PCE 6: Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of transporting sediments.

ENVIRONMENTAL BASELINE

Status of the Species and its critical habitat within the planning area

Apache Trout

There are 13 existing and potential Apache trout recovery populations/streams in the planning area:

The Bear Wallow Creek population is managed for Apache trout recovery. It is located primarily within the Bear Wallow Wilderness. There are two barriers on Bear Wallow (one on the ASNFs and the other on the San Carlos Apache Reservation); both of which are ineffective in preventing nonnative trout from downstream hybridizing with Apache trout. This stream will be renovated in the future.

The Centerfire/Boggy/Wildcat Creeks population has a constructed barrier on Centerfire Creek. Boggy and Wildcat creeks are tributaries to Centerfire Creek.

Conklin Creek is currently unpopulated by Apache trout. There is a barrier that has recently undergone modifications to improve its efficacy.

The Coyote/Mamie Creek population has a constructed barrier. This population has persisted since the late 1960s, although current population numbers are likely very low.

The East Fork Little Colorado River and Lee Valley Creek (and reservoir) populations occur above two artificial barriers on the East Fork Little Colorado River. The current population

Mr. Tom Osen, Forest Supervisor

within the East Fork Little Colorado River is limited to the stream above Coulter Dam, and has been recently stocked with Apache trout, but it is likely their numbers are still relatively low. Apache trout were stocked into Lee Valley Creek above Lee Valley Reservoir in 2004 after chemically treating the stream to remove nonnative trout, and their current status within the stream is unknown.

The Fish Creek population has a constructed barrier about three-quarters of a mile upstream of the confluence with the Black River. Approximately 250 Apache trout from the upper portion of the West Fork Black River were stocked into Fish Creek in 2006 and 2007. The Wallow Fire resulted in approximately 48 percent of the watershed burned under high severity conditions, resulting in the loss of the artificial barrier under post fire flooding.

The Hayground Creek population has a constructed barrier that is located approximately one-quarter mile upstream of the confluence with the West Fork Black River. Apache trout were stocked into this stream in 2005 after it was chemically treated to remove nonnative fish. At present the artificial barrier is not effective, and nonnative trout are now present within the stream.

The Mineral Creek population has a constructed barrier. Apache trout were introduced into this stream in the late 1960s. This is the only Apache trout recovery stream that was not impacted by the 2011 Wallow Fire. This population has always been small, and current numbers are likely low.

The Snake Creek population has an artificial barrier. The barrier is currently ineffective in preventing the upstream movement of nonnative trout. It was chemically treated to remove nonnative fish in 2003. An AGFD survey in 2007 found only brown trout and rainbow/Apache hybrid trout.

The South Fork Little Colorado River population has two artificial barriers within the lower two miles above the Little Colorado River. This area was chemically treated in 2007 and 2008 to remove nonnative fish and Apache trout were stocked. This river was heavily impacted by the 2011 Wallow Fire. If Apache trout are still present it is anticipated that they are in low numbers.

The Stinky Creek population has a constructed barrier approximately 0.25 mile upstream of its confluence with the West Fork of the Black River. Apache trout are not in this stream. The barrier has not been effective in preventing upstream movement of nonnative trout. The barrier is scheduled for improvements.

The West Fork Black River population is located above two artificial barriers approximately 0.5 mile downstream of the Forest Road 116 crossing of the stream. Burro and Thompson Creeks are tributaries that flow into the West Fork Black River above the barriers. Apache trout were stocked into this system in 1997 after chemical removal of the nonnative trout. Some brook and brown trout have since been collected upstream of the barriers and on the portion of the West Fork Black River on White Mountain Apache Tribal lands. This population has been a source of Apache trout to stock into other streams for more recent recovery efforts. Planning is currently underway for the extension of this population downstream approximately 8 to 9 miles. Construction of an artificial barrier could occur as early as 2016, with a chemical treatment to remove nonnative fish on ASNFs lands occurring in 2017, and the introduction of Apache trout following in 2018.

Mr. Tom Osen, Forest Supervisor

The West Fork Little Colorado River population is located above two artificial barriers. The barriers were constructed in 2004. This stream was chemically treated to remove nonnative trout and was stocked with Apache trout in 2008. The barriers have not been effective in preventing the movement of nonnative trout. AGFD stocks catchable Apache trout weekly during the summer at Sheeps Crossing at Highway 273.

Gila Chub

Gila chub occur in six streams on the ASNFs: Eagle Creek, East Eagle Creek, Dix Creek, Left Prong Dix Creek, Right Prong Dix Creek, and Harden Cienega Creek. These six streams will be discussed as three separate complexes: Eagle/East Eagle Creek, Dix Creek, and Harden Cienega Creek.

The Eagle/East Eagle Creek population is located within the upper portion of this watershed, and Eagle Creek drains off the ASNFs before entering the Gila River approximately 21.5 miles downstream of the forest boundary. The Eagle/East Eagle Creeks watershed has primarily been impacted by livestock grazing, overgrown forest conditions due to fire suppression, and vegetation alterations, timber harvest, recreation, roads, and the Chitty and Wallow Fires.

In 2006, Arizona State University sampled eight sites on the upper portion of Eagle Creek. A total of 85 Gila chub were collected; 26 at the Honeymoon Camp site, 57 at the first road crossing downstream of Honeymoon, and two at the second road crossing downstream of Honeymoon. In 2009, the ASNFs found Gila chub in Eagle Creek from Honeymoon Campground downstream to just above Willow Creek. Overall, few individuals were found and the numbers decreased the further downstream sampling occurred. Marsh and Associates surveyed Eagle Creek in the past four years and did not capture any Gila chub during their survey efforts (Marsh and Associates 2011, 2012, 2013, and 2014). The post Chitty and Wallow fire effects of ash in Eagle Creek has dissipated and moved through the system and water quality is expected to be near background conditions. However, given the available habitat throughout the drainage and the overall health of the stream, we believe the species persists in Eagle Creek.

Dix and Harden Cienega creeks are tributaries of the San Francisco River. The Dix Creek watershed is entirely within the ASNFs. Harden Cienega Creek, on the Harden Cienega allotment in Arizona, is located and managed by the Gila National Forest because the allotment extends into New Mexico.

The Dix Creek watershed has primarily been impacted from livestock grazing, loss of the ecological role of fire from fire suppression and alterations to vegetation, and roads. The lowermost portion of the watershed at the confluence with the San Francisco River contains approximately 150 acres in private ownership. Impacts associated with the private lands are not specifically known, but are likely similar to those on the ASNFs, as well as water developments and diversions.

The Harden Cienega Creek watershed consists of approximately 13,604 acres on the ASNFs, with the upper portion of the watershed occurring on the Gila National Forest. The watershed has primarily been impacted from livestock grazing, the loss of the ecological role of fire by fire suppression and alterations in vegetation, and roads.

Mr. Tom Osen, Forest Supervisor

Critical Habitat

Gila chub critical habitat on the ASNFs was designated in six streams for the three separate populations as follows:

- Eagle Creek and East Eagle Creek for 39.2 kilometers (24.4 miles) of creek extending from the confluence of Eagle Creek with an unnamed tributary upstream to its confluence with East Eagle Creek, and including East Eagle Creek to its headwaters just south of Highway 191.
- Harden Cienega Creek for 22.6 kilometers (14.0 miles), beginning from its confluence with the San Francisco River and continuing upstream to its headwaters. Approximately 50 percent (7 miles) is located on the ASNFs.
- Dix Creek for 0.9 kilometers (0.6 miles) beginning 1 mile upstream from the confluence with the San Francisco River at a natural rock barrier to the confluence of the right and left forks of Dix Creek. The critical habitat also includes the Left Prong Dix Creek as it continues upstream 2.0 kilometers (1.2 miles), and the Right Prong Dix Creek as it continues upstream 4.8 kilometers (3.0 miles).

Gila Trout

Raspberry Creek is the only stream on the ASNFs that could potentially have Gila trout present. Gila trout were introduced into this stream in 2000. The AGFD found no trout in Raspberry Creek in 2011. The current status is unknown, but if Gila trout have persisted, it is likely their numbers are very low. There are eight recovery streams in the planning area: Chitty, Castle, Buckalou, Coleman, Grant, KP, Lanphier, McKittrick, and Raspberry creeks (USFWS 2003).

Little Colorado spinedace

The spinedace occurs in Leonard Canyon and Willow Creek (tributaries of Clear Creek), West Chevelon Creek (tributary of Chevelon Creek) and Nutrioso and Rudd creeks. All of these creeks flow eventually flow into the Little Colorado River. Leonard Canyon is located along the western boundary of the ASNFs. The Nutrioso Creek population occurs above and below Nelson Reservoir. The upper Chevelon Creek currently does not have any spinedace within the ASNFs boundaries, but they do occur downstream within designated critical habitat. Chevelon Creek above Chevelon Canyon Reservoir has been identified as a refugia and introduction site for this species and this may occur sometime in the future. The West Chevelon Creek population occurs above Forest Road 100. The Willow Creek population was established in 2013.

Critical Habitat

Critical habitat occurs on the ASNFs within the lower seven miles of Nutrioso Creek on the Springerville RD, from Nelson Reservoir Dam downstream to the ASNFs boundary.

Loach Minnow

Loach minnow occupy the lower Campbell Blue and Eagle creeks and the San Francisco and Blue rivers. They may occupy the Three Forks area of the East Fork of the Black River. All the

Mr. Tom Osen, Forest Supervisor

populations are in low abundance which can be attributed to many factors. Recent surveys (present to last 25 years) have not documented the presence of this species within the East Fork Black River, Eagle Creek, or the San Francisco River. We believe that loach minnow are present, but exist at such low numbers that our current sampling techniques are insufficient to detect them. It is likely that these populations may no longer occur, or do so in numbers that is too low to detect. Recent Blue River surveys documented loach minnow; this population is likely more stable than the others although it had been impacted by the 2011 Wallow Fire. An artificial barrier is planned for the lower portion of the West Fork of the Black River; which could potentially provide for the introduction of loach minnow as early as 2018.

Critical Habitat

Approximately 110 miles of critical habitat was designated for loach minnow in the Blue River (45.3 miles), Campbell Blue Creek (6 miles), Little Blue Creek (3.1 miles), Eagle Creek (12.1 miles), East Fork Black River (11.9 miles), North Fork East Fork Black River (4.4 miles), Boneyard Creek (1.4 miles), Coyote Creek (2.1 miles), and the San Francisco River (23.7 miles) within the planning area.

Spikedace

Spikedace have only been documented in Eagle Creek within the planning area. The San Francisco River was likely historical habitat that would have been occupied by the species. Spikedace is still considered by some to be present within Eagle Creek on the ASNFs, even though it has not been collected for over 20 years. Spikedace were released in the Blue River, between the barrier at Juan Miller Crossing and the Blue Box in 2012; however, augmentation efforts have stopped at this site due to reinvasion by nonnatives and concerns regarding habitat quality post-Wallow Fire.

Critical Habitat

Approximately 90-miles of spikedace critical habitat occurs in the planning area: the Blue River (45.3 miles), Campbell Blue Creek (6 miles), Little Blue Creek (3.1 miles), Eagle Creek (12.1 miles), and the San Francisco River (23.7 miles).

Factors affecting the species within the planning area

Apache and Gila Trout

The primary factor affecting Apache and possible Gila trout if present in the planning area is hybridization, competition, or predation by with non-native trout. Numerous barriers have been constructed to prevent movement of non-native trout into native trout occupied-habitat but most have failed due to design or from post-fire flooding from the 2011 Wallow Fire.

Gila Chub

Land ownership within Gila chub habitat and critical habitat in the planning area is ASNFs lands and private land inclusions along the streams. Portions of Eagle Creek flow west into the San Carlos Apache Indian Reservation and then return. The main land use activities in the area include livestock grazing and dispersed recreation activities such as OHV use and hunting.

Mr. Tom Osen, Forest Supervisor

Occupied Gila chub habitat on the forest is protected from direct impact from management activities with exclosures around occupied sites or rough terrain that restricts access to the stream and limits effects from livestock grazing and recreation. However, the species distribution and abundance in each stream has been negatively impacted due to the presence of nonnative aquatic species, and in the case of Eagle Creek, sedimentation from the 2007 Chitty Fire and 2011 Wallow Fire. Gila chub are also affected by non-native fish and crayfish which predate or compete with the chub.

Roads, and to a lesser extent trails, may be a source of increased sediments into Gila chub habitats on the ASNFs. Both Dix and Harden Cienega creeks are in remote areas with few roads within their watersheds. There are several stream crossings that occur on Eagle Creek on both ASNFs and private lands.

Little Colorado spinedace

Recent impacts to the species are due to drought, nonnative species, and alteration of natural hydrographs in occupied habitat. Livestock and wild ungulate grazing have also been identified as contributing to poor watershed conditions which exacerbate the effects of drought and result in diminished habitat quality. Fuels reduction and forest restoration projects and wildland fire have also contributed to altered hydrographs and sediment loads in streams occupied by spinedace.

Little Colorado River flow and physical attributes have been affected by at least three upstream diversions. Drought and increasing water demands have affected the species range wide including in the planning area. The reduction of riparian vegetation, from livestock grazing or clearing, has resulted in deeply eroded streambanks that contribute large sediment loads. These streambanks are steep and high enough that large sediment masses likely collapse into the Little Colorado River regardless if a flood is occurring. Channel substrate embeddedness (excessive fines deposited within the interstitial spaces of larger gravels and cobbles) also affect spinedace habitat. Spinedace are also vulnerable from predation and competition from non-native aquatic species including crayfish, green sunfish, and fathead minnow.

Loach minnow

The primary threats in the planning area are nonnative fishes and crayfish that are predatory and/or competitive with the loach minnow. Livestock grazing occurs throughout suitable rangelands in all watersheds that contain loach minnow habitat. Many segments of listed fish habitat are protected from livestock grazing by exclosure fences along most streams or have limited accessibility due to steep terrain.

Spikedace

The primary threats in the planning area include nonnative fishes and crayfish that are predatory and/or competitive with the spikedace. Livestock grazing occurs throughout suitable rangelands in all watersheds that contain spikedace and its critical habitat. While livestock grazing is not currently authorized in spikedace critical habitat located in the Campbell Blue and Eagle creeks, Blue River, and most of the San Francisco River; the LMP classifies these stream bodies as

Mr. Tom Osen, Forest Supervisor

suitable for livestock grazing. Many segments of listed fish habitat are protected from livestock grazing by enclosure fences along most streams or have limited accessibility due to steep terrain.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Because this is a programmatic consultation, we will only discuss the adverse effects in terms of the general effects we anticipate will occur. Since the effects described under each fish species in the BA were very similar, we combined all fish species into this discussion. We briefly discuss the plan components (desired conditions, objectives, standards, and guidelines) where applicable. We refer to the BA Appendix A for more details. Detailed effects discussions will occur as each project is developed specifically and consulted on separately.

Adverse effects to all listed fishes and their critical habitat could occur as a result of implementing the forest programs discussed in the LMP. These effects are discussed below for all species of listed fish on the ASNFs.

Wildland Fire Management Program

Watershed improvement through vegetation treatments including wildland fire use (planned and unplanned) may reduce the likelihood of future unplanned wildfires from entering riparian habitats and limiting post-fire runoff into listed fish habitat. Fire use can result in short-term impacts to listed fish habitat (e.g., temporary inputs of sediment into occupied habitat, loss of streamside or adjacent flood plain vegetation), especially if followed by a heavy rainfall event.

This program does not have standards or guidelines that specifically address listed fish or their habitats. However, guideline 23, under the all PNVTs, states that landscape-scale restoration projects should be designed to spread out treatments spatially and/or temporally to reduce the magnitude and implementation of impacts and allow reestablishment of vegetation and soil cover. This guideline could help reduce or minimize short term impacts that may result from prescribed fire activities by not treating entire listed fish-occupied watersheds at one time. Adequate upland vegetation would still be present to ameliorate indirect effects from runoff and erosion. Guideline 30 requires that ground disturbing activities, including prescribed fire, will not cause long-term degradation to riparian areas. There may be short-term adverse effects if there is inadequate ground cover to prevent excessive sediment, above what is tolerable to listed fish at their different life stages, from being transported into their habitats.

Ecosystem/Vegetation Health Program

This program maintains current vegetation conditions at or moves them towards specific desired conditions set for the different forest and non-forested vegetation types. In most cases, projects would be limited in extent and amount of ground disturbance. Upland project impacts would

Mr. Tom Osen, Forest Supervisor

include increased runoff and sediment movement from the removal of vegetative cover during treatments. Projects in the uplands would be limited spatially and temporarily to reduce these watershed impacts. However, there may still be short-term adverse effects before adequate vegetation cover has returned. Projects in the riparian and stream zones would have localized, short-term effects including streambank disturbance, vegetation reduction, sedimentation into the stream, and disturbance to individuals. There are seven relevant desired conditions that guide management and activities that would affect listed fish and their habitats (see BA Appendix A for details). Desired condition 1 provides the development of habitat conditions that sustain animal populations which would include listed fish. Desired condition 4 provides the ecological conditions needed for habitat quality, distribution, and abundance to support self-sustaining populations of plants and animals, including listed fish. Desired condition 46 provides upland soil cover conditions which benefit water flow and quality, which in turn would benefit listed fish habitat. Desired conditions 43 and 75 retain or restore native vegetation which would include willows, alders, and herbaceous vegetation needed for streambank stability, improved water quality from shading and trapping sediment, all of which could provide for terrestrial insects as a food resource for listed fish.

Objective 11 may increase forest ground cover to carry periodic cool ground fires and, with decreased crown densities, to reduce the risk of severe wildfires that can burn intensely into or cause damaging post-fire flooding into streams, including those that provide habitat for listed fish. Vegetation treatments implemented under this program may cause short-term increases in flood runoff, scouring and sediment deposition in listed fish habitat.

Standard 4 is intended to limit invasive and noxious weed species introduction into streams by equipment or activities during vegetation treatments. Most of these invasive and noxious weed species do not have the dense root characteristics of native wetland plants that are important for streambank stability. The replacement of native riparian/wetland vegetation with non-native vegetation species may cause increased streambank erosion and decreased water and habitat quality for listed fish.

Guideline 23 maintains or reestablishes vegetation and soil cover which may prevent higher flows with debris and sediment from entering into streams where listed fish occur. Guideline 30, reducing ground disturbing projects, may also limit sediment deposition down slope or downstream into listed fish habitat.

Vegetation treatments implemented under this program may cause short-term increases in flood runoff, scouring and sediment deposition into listed fish habitat. The standards and guidelines described above are intended to reduce this impact on listed fish and their habitat.

Rangeland Management Program (including invasive and noxious weed control)

Rangeland management program activities include implementation and effectiveness monitoring of individual allotments, development of structural and non-structural improvements to facilitate better livestock management and to improve wildlife habitat and watershed conditions.

Livestock grazing would continue throughout suitable rangelands on forest lands within the planning area. Many segments of listed fish habitat are protected from livestock grazing by enclosure fences along most streams or have limited accessibility due to steep terrain. Adverse livestock management effects to listed fish and their habitats would primarily be indirect effects

Mr. Tom Osen, Forest Supervisor

associated with habitat disturbance in upland areas. Accessible areas of listed fish habitat may experience effects to streambanks, riparian vegetation, and water quality.

The BA did not provide riparian or aquatic habitat condition information for listed fish-occupied streams. Current range condition on the ASNFs are reflective of past and ongoing grazing activities, and landscape scale conditions have not changed significantly since the 1980s (ASNF 2014). Range conditions on watersheds containing listed fish are predominately fair (26 percent) to poor (56 percent) (ASNF 2014); however, much of this information needs to be updated.

There are four relevant desired conditions that guide rangeland management in listed fish habitat (see BA Appendix A for details). Desired condition 278 provides for sufficient or greater cover in grasses and forbs, which would help contribute to lower intensity wildfires and allow vegetation ground cover to readily re-sprout and limit sediment transport and deposition into streams, including listed fish habitat. Desired conditions 60, 64, and 82 address tall and vigorous herbaceous riparian vegetation needed to protect streambanks from erosion which would adversely affect listed fish habitat if present. Stable streambanks reduce sediment deposition and maintain narrow deeper channels which provide higher quality listed fish habitat. This is especially important for the two trout species that require cooler and less sediment-laden waters.

There are one objective, two standards, and seven guidelines that address invasive and noxious weed control in listed fish habitat. The effects of invasive and noxious weeds to listed fish habitat were discussed above under the Wildland Fire program.

Four guidelines (32, 132, 133, and 136) protect or restore riparian or wetland habitats and the uplands that may influence listed fish habitat. Guideline 132 requires that critical areas (*e.g.* riparian and stream habitats) are managed with special consideration, separate from the remainder of the grazing management unit. These critical areas would include streams occupied by listed fish species. Guidelines 134, 138, and 139 reduce livestock management and facility impacts (water trough, salt or mineral supplement block placement and livestock trailing) to riparian and stream habitats that may include listed fish habitat.

Livestock grazing may have minimal effects to listed fish habitat due to riparian exclosures, limited pasture use, or timing restrictions for livestock use in riparian areas where it occurs. Livestock grazing may still adversely affect important habitats needed by listed fish outside of these protected or specially-managed areas. The standards and guidelines required under this program are expected to minimize, these adverse effects. Therefore, over the life of this consultation, we expect that implementation of the Rangeland Program could result in adverse effects to listed fish and their habitats outside of areas specifically managed for them.

Watershed and Soil Management Program

Watershed and soil improvement projects include, but are not limited to, vegetation reestablishment, nonnative invasive plant treatments, erosion control, instream habitat improvement, adjusting the timing and season of grazing, or fencing. In most cases, projects would be limited in extent and amount of ground disturbance. Projects in the riparian areas would improve aquatic and riparian conditions and are expected to reduce sediment deposition into aquatic habitats, which would maintain or improve water quality and healthy macroinvertebrate populations. They would also promote recruitment and maintenance of native

Mr. Tom Osen, Forest Supervisor

riparian vegetation, which would maintain suitable water temperature for listed fishes in the streams.

Projects in listed fish habitat would have the localized and short-term effects of streambank disturbance, riparian vegetation reduction, sediment deposition into the stream, and disturbance to individual fish. All activities would implement standards and guidelines and best management practices as described in the BA (USFS 2014). Projects would have short-term adverse effects to the species and habitat but would have long-term beneficial effects as watersheds, aquatic, and riparian habitats move towards desired conditions.

There are five relevant desired conditions that guide management and activities here (see BA Appendix A for details). Desired condition 22 would provide vegetation and soil conditions above the floodplain that protect water quality and aquatic habitat. Desired condition 299 directs management to move toward or maintain satisfactory watershed conditions including soil conditions. Desired condition 77 protects upland soils so they do not degrade riparian habitat. Desired conditions 292 and 293 ensure that water is available and groundwater is not diminished for the needs of wildlife, which could include listed fish and their habitats.

The BA does not specify the watersheds or riparian or stream areas that would be treated under the LMP. The objectives improve watershed condition and function, and riparian conditions across the planning area. The eight objectives provide for a treatment level of approximately 1,000 to 10,000 acres per year, which will improve the overall conditions for the six code watersheds and riparian areas receiving treatments.

Objective goals are expected to have long-term beneficial impacts, if implemented in streams or watersheds occupied by listed fish, through restoration of hydrologic conditions and functions. Short-term impacts associated with project implementation could result, including increases in sedimentation, soil compaction, alterations in hydrologic conditions and functions, and changes in water quality. Mitigation measures are implemented at the project level, and site specific conditions and project activities and timing will determine their efficacy.

Guideline 2 could minimize impacts to soils resources which would reduce sediment or debris flow into listed fish habitat. Guideline 8 helps protect riparian and wetland and adjacent resources from soil and vegetation disturbing equipment, vehicles, and activities. Guidelines 9, 10, 18, and 19 would require that projects, activities, and permits retain sufficient water flows to support riparian vegetation and species which would help retain surface water and protect against the risk of listed fish habitat loss. Erosion control measures (*e.g.*, straw waddles) for landscape scale disturbances (Guideline 82) may help protect listed fish habitat after large scale disturbance events such as severe wildfire and flooding. Water quality in listed fish habitat would be protected by guidelines 33, 34, and 35, which require fuel and other toxicants and vehicle storage and use be outside of riparian and stream areas.

Vegetation treatments implemented under this program that involve ground disturbance and are of sufficient size may cause short-term increases in flood runoff, scouring and sediment deposition into listed fish habitats. This is expected to affect listed fish until adequate ground cover has re-established on the treatment site. The standards and guidelines required under this program are intended to reduce this impact on listed fish and their habitats. We expect that over

Mr. Tom Osen, Forest Supervisor

the life of the LMP projects implemented under this program may result in short and long-term adverse effects to listed fish and their habitats.

Engineering Program

Transportation projects could have localized and short-term adverse effects to listed fish in the project area and their habitat from actions taken near or in-stream. Erosion from roads that deposit sediment or concentrate runoff into streams may impact listed fish. Roads crossing or being adjacent to streams can remove and alter riparian vegetation, impact stream channel function and structure, and alter and degrade aquatic habitat through changes in water quality and increases in sediment deposition. Improperly designed culverts can create barriers to fish movement and effect habitat by causing downstream erosion during high flow events.

Projects improving soil and vegetation condition in the uplands would improve or minimize this program's impacts to aquatic and riparian conditions along streams. Desired condition 235 directs that road location and design does not impede wildlife and fish movement which would help address habitat connectivity and listed fish movement and population expansion through stream corridors.

Two objectives 7 and 8 restore or improve connectivity of riparian and stream habitats. They involve the relocation, repair, improvement, or decommission of authorized roads and trails and the removal of unauthorized roads and trails that add sediment to streams, damage riparian vegetation, erode streambanks, cause gullies, and/or compact floodplain soils.

The LMP contains one standard and four guidelines that may minimize threats of road management to listed fish habitat. Standard 15, authorizing motorized vehicle travel to designated routes, may limit impacts from motorized vehicle use in riparian, floodplain, and adjacent upland areas that contain listed fish habitat. Standard 18, designing road maintenance and construction to reduce sediment, limit sediment-carrying flows from entering streams such as those where listed fish occur.

Guidelines 13, 31, 33, and 34 prevent contaminants such as oil, gas, or salt entering listed fish habitat. Guidelines 99 and 100, locating new roads to avoid riparian areas and stream bottoms and removing roads and trails from these areas, helps prevent or reduce road impacts to stream habitat. Guideline 105 designs and locates roads so that they do not impede fish movement.

Ongoing activities within the Engineering Program include the operation and maintenance of the transportation system on the ASNFs, which consists of roads and trails that provide access to areas on the forest including: private land, structures and improvements under special use permit, recreational opportunities, and facilities that support land and resource management activities. We would expect that over the life of the project, there could be additional new and temporary road construction to help support forest restoration activities which may result in short and long-term adverse effects to listed fish and their habitat.

Lands and Minerals Program

This program area is responsible for the issuance of special use permits for numerous authorized forest activities. Special use permits issuance may adversely affect listed fish and/or their habitats if the authorized activities affect water quality or impact stream bodies. One standard and two guidelines address potential impacts to riparian/wetland habitat, such as those where

Mr. Tom Osen, Forest Supervisor

listed fish occur. Standard 31 requires that special uses for water diversions shall maintain fish, wildlife, and aesthetic values and otherwise protect the environment. Guideline 146 requires streambed and floodplain alteration or removal of material should not occur if it prevents attainment of riparian, channel morphology, or streambank desired conditions. Where special uses or other authorizations (e.g., collection of decorative rock) are issued, guideline 166 incorporates measures to reduce impacts to riparian/wetland habitat such as those where listed fish occur.

While these standards and guidelines may limit or prevent long-term impacts to listed fish; short-term adverse effects may still occur. These may include excessive sediment pulses into fish habitat, temporary reduction in streambank vegetation that provides cover and protects water quality, alteration of important stream channel habitat, and human disturbance in streams during spawning.

Recreation and Wilderness Program

Reservoirs and streams and adjacent areas receive many types of recreational activities. The user demands and concentrated uses in these areas can alter vegetation, riparian areas, water quality, and aquatic habitat. Recreation sites and developments and their associated uses and activities can present threats to maintaining, restoring and recovering listed fish and their critical habitats. Recreational sites and activities can degrade upland and watershed conditions and function, alter riparian vegetation and function, and reduce water quality and increase sediment into streams. The concentration of recreational activities within and adjacent to riparian areas and streams can also increase the risk of introductions and spread of invasive or undesirable plants and animals.

One objective and one standard have been included in the LMP that can address potential impacts of recreation to listed fish and their habitats. Objective 18 improves degraded dispersed campsites and associated riparian areas within or upslope or upstream of listed fish habitat.

Standard 13 requires that dispersed campsites shall not be designated in areas with sensitive soils or within 50 feet of streams, wetlands, or riparian areas to prevent riparian vegetation and bank damage, soil compaction, increased sediment, or soil and water contamination.

The LMP includes standards and guidelines to reduce the impacts to listed fish from recreation activities; however, there is also direction in the LMP to increase and/or improve recreational opportunities. Over the life of the LMP, this could result in adverse impacts to listed fish and their habitat.

Wildlife, Fish, and Rare Plant Program

This program area includes inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, conservation strategy development, administrative studies, research collaboration, and information and education. The ASNFs are proposing to work with Service and AGFD to restore listed fish species to identified recovery streams during the 10 to 15 years following plan approval. ASNFs management actions needed to support listed fish restoration could include approval of the construction and maintenance of fish barriers as well as other projects to improve aquatic habitat for these species. These projects may have localized, short-term adverse effects such as streamflow and

Mr. Tom Osen, Forest Supervisor

streambank alteration, and excess sediment erosion or deposition. These adverse effects could alter water quality; however, we would expect them to be very short in duration and intensity. Actions resulting in disturbance to individual fish can alter their breeding or feeding behaviors and increase their risk of predation. Project activities would be mitigated by the guidelines described below, listed in the proposed action, and additional actions Service and AGFD typically conduct with fish restoration projects. Overall, the Wildlife/Fish/Rare Plants program plan components are positive for all of the listed fishes and their habitats in the long-term and would maintain or improve watershed condition indicators related to water quality, nonnative species, soils, riparian vegetation, and rangeland vegetation.

Objective 4, annually enhancing or restoring 5 to 15 miles of stream and riparian habitat and objective 5, completing at least five projects that remove barriers, restore dewatered stream segments, or connect fragmented habitat would benefit listed fish if done in occupied habitats.

Seven guidelines address potential impacts of habitat improvement projects on listed fish and their habitats. Guideline 19 would require that stream flows not be impeded such that riparian-dependent species, such as listed fish or their habitats are impacted. Guideline 29 would require monitoring to provide feedback about project implementation effects or effectiveness of mitigation measures for these species, and would guide future management toward desired conditions. Guideline 71 has the potential to help provide the dense, herbaceous vegetation that protects and stabilizes streambanks and that could benefit listed fish habitat. Guidelines 67 and 76 would require project and activity mitigation to help provide for and reduce negative impacts to flowing water and saturated soils. Guideline 65, by requiring activities to comply with listed species recovery plans, would benefit all listed fish species in the planning area.

This program area could reduce impacts to listed fish, although species surveys and habitat assessments could result in short-term impacts from streambank and stream bed disturbance and disturbance to individual listed fish in the area. Habitat enhancement projects such as riparian fencing to protect habitat could also have short-term vegetation and soil impacts in occupied habitat and adjacent uplands (*e.g.*, vehicles delivering/laying out materials, fences being constructed across or alongside occupied habitats).

Effects of the Action on Listed Fish Critical Habitats

In our analysis of the effects of the action on critical habitat, we consider whether or not a proposed action will result in the destruction or adverse modification of critical habitat. In doing so, we must determine if the proposed action will result in effects that appreciably diminish the value of critical habitat for the recovery of a listed species. To determine this, we analyze whether the proposed action will adversely modify any of the PCEs that are the basis for critical habitat. To determine if an action results in adverse modification of critical habitat, we must also evaluate the current condition of all CHUs, and the PCEs of those CHUs, to determine the overall ability of all critical habitat to support recovery. Further, the functional role of each of the CHUs in recovery must also be considered because, collectively, they represent the best available scientific information as to the recovery needs of the species.

Implementation of the LMP may result in projects with adverse effects to critical habitat. The PCEs related to listed fish aquatic needs and the potential effects from implementation of the LMP are described for those species with designated critical habitat below:

Mr. Tom Osen, Forest Supervisor

Gila Chub Critical Habitat

PCE 1: Perennial pools, areas of higher velocity between pools, and areas of shallow water among plants or eddies all found in headwaters, springs, and cienegas, generally of smaller tributaries.

EFFECT: There may be localized, short-term adverse effects to this PCE from watershed improvement projects, roads and trails, livestock grazing, and minerals projects in aquatic habitats such as streambank disturbance and sediment input which may deposit in important pool habitats. These projects may temporarily reduce the function of critical habitat through diminished pool habitat; however, we anticipate that this PCE would be maintained or improved in the long-term. In the long-term, projects are expected to improve soil and vegetation condition in the uplands and will likely improve or at least minimize impacts to aquatic and riparian conditions along streams. Implementation of standards and guidelines previously described are anticipated to reduce the effects of forest programs in the sub-watersheds occupied by Gila chub.

PCE 2: Water temperatures for spawning and seasonally appropriate temperatures for all life stages.

EFFECT: The effects described under PCEs 1 and 3 indirectly address water temperature thresholds required to meet Gila chub life cycle needs.

PCE 3: Water quality with reduced levels of contaminants, including excessive levels of sediments adverse to Gila chub health, and adequate levels of pH, dissolved oxygen, and conductivity (100 to 1000 millimhos).

EFFECT: Critical habitat in Eagle Creek is protected from livestock grazing by enclosure fences, pasture closures, or have limited accessibility due to rough terrain. Livestock grazing in critical habitat on Harden Cienega Creek is not administered by the ASNFs. This area, although in Arizona, is managed by the Gila National Forest in New Mexico. The critical habitat located on the Left and Right Prongs of Dix Creek is accessible to livestock grazing in the Pleasant Valley Allotment. Areas accessible to livestock within critical habitat could result in short-term adverse effects to streambanks, riparian vegetation and water quality from waste deposits into or near habitat. Impacts to water quality would be greatest during seasonal low flow periods and during droughts. The Rangeland Management Program may cause short-term adverse effects to water quality-related PCEs, but we anticipate that that these activities will be limited in location, duration, and frequency and would not decrease the functionality or conservation potential of critical habitat over the long-term. In addition, there are numerous program desired conditions, objectives, standards, and guidelines that address preventing excessive sediment, fuel, and other contaminants from entering aquatic habitats. We do not anticipate that livestock activities would diminish the ability of critical habitat to contribute to the conservation and recovery of the species.

PCE 4: Food base consisting of invertebrates and aquatic plants.

EFFECT: These effects are discussed under PCEs 2 and 3. The aquatic insect food base relies on adequate water quality (temperature, dissolved oxygen, contaminant-free water) for numerous life cycle stages. Programs that involve mechanized equipment have guidelines that prevent fuels and other contaminants from entering aquatic habitats. Forest program objectives that

Mr. Tom Osen, Forest Supervisor

improve riparian vegetation would increase the availability of both, the terrestrial organic matter that many aquatic and terrestrial insects, which are prey for Gila chub, require.

PCE 5: Sufficient cover.

EFFECT: This PCE may be affected by large magnitude floods that scour cover structure from the stream channel. All forest programs have desired conditions, objectives, standards, and guidelines that would minimize effects from authorized activities in the watershed or stream channel. The availability of cover depends upon the presence of woody riparian vegetation growing along the stream channel where it may provide cover or do so when it falls into the channel. The LMP has numerous plan decisions that protect or promote the growth of riparian vegetation along stream habitats that include Gila chub critical habitat.

PCE 6: Nonnative aquatic species.

EFFECT: While nonnatives may already be present in some streams, the ASNFs are implementing conservation measures to ensure that actions implemented under the LMP, particularly movement of water under the Fire Management and Range Management Programs does not result in the incidental movement of nonnative species into critical habitat.

PCE 7: Streams that maintain a natural flow pattern including periodic flooding.

EFFECT: Actions implemented under the LMP are expected to retain and recover this PCE for Gila chub. There are desired conditions, objectives, standards, and guidelines to ensure that areas supporting listed species are not dewatered or impaired to the point that they cannot support Gila chub. These plan decisions also protect instream flow, consistent with existing water rights and laws, that are expected to retain and protect this PCE.

Little Colorado Spinedace Critical Habitat

PCE 1: Clean, permanently flowing water.

EFFECT: Actions implemented under the LMP have desired conditions, objectives, standards, and guidelines to protect instream flow, consistent with existing water rights and laws, that are expected to retain and protect this PCE. Programs that involved mechanized equipment have guidelines that prevent fuels and other contaminants from entering aquatic habitats. Pesticide use, to control invasive and noxious plant and animals, would be done so as to minimize impacts on non-target species. Actions implemented under the LMP are expected to retain and recover this PCE for Little Colorado spinedace. There are desired conditions, objectives, standards, and guidelines to ensure that areas supporting listed species are not dewatered or impaired to the point that they cannot support spinedace.

PCE 2: Pools

EFFECT: There may be localized, short-term adverse effects to this PCE from watershed improvement projects, roads and trails, livestock grazing, and minerals projects in aquatic habitats such as streambank disturbance and sediment input. These projects may temporarily reduce the function of critical habitat through diminished pool habitat. However, we anticipate that this PCE would be maintained or improved in the long-term. Projects are expected to improve soil and vegetation condition in the uplands and likely improve or at least minimize impacts to aquatic and riparian conditions along streams. Implementation of standards and

Mr. Tom Osen, Forest Supervisor

guidelines previously described are anticipated to reduce the effects of forest programs in the sub-watersheds occupied by Little Colorado spinedace.

PCE 3: Fine gravel or silt-mud substrates

EFFECT: The LMP has numerous plan decisions that address desired conditions, objectives, standards and guidelines that require Forest Programs to take into account listed fish habitats. This would include actions that provide for the appropriate substrate size in Little Colorado spinedace habitat that stable stream channel conditions would support.

Loach Minnow Critical Habitat

PCE 1: Habitat to support all egg, larval, juvenile, and adult loach minnow which includes:

PCE 1a. Perennial flows.

EFFECT: Actions implemented under the LMP are expected to retain and protect this PCE. There are standards and guidelines to ensure that areas supporting listed species are not dewatered or impaired to the point that they cannot support loach minnow. Actions implemented under the LMP have required standards and guidelines to protect instream flow, consistent with existing water rights and laws, that are expected to retain and protect this PCE.

PCE 1b. Appropriate microhabitat types including pools, runs, riffles, and rapids.

EFFECT: There may be localized, short-term adverse effects to this PCE from watershed improvement projects, roads and trails, livestock grazing, and minerals projects in aquatic habitats such as streambank disturbance and sediment input. We anticipate that this PCE would be maintained or improved in the long-term. In the long-term, projects are expected to improve soil and vegetation condition in the uplands and will likely improve or at least minimize impacts to aquatic and riparian conditions along streams. Implementation of standards and guidelines previously described are anticipated to reduce the effects of forest programs in the sub-watersheds occupied by loach minnow.

PCE 1c. Appropriate stream gradient of less than 2.5 percent.

EFFECT: Activities that may potentially increase stream gradients above the 2.5 percent threshold include those in the watershed that greatly increase flood magnitude so that stream channel downcutting and straightening occurs. In-channel activities, such as sand and gravel extraction, may cause gradient increases if channel incision and straightening occurs as a result of head cut forming and moving upstream. All forest programs have standards and guidelines that would prevent these affects from occurring as a result of authorized activities in the watershed or stream channel.

PCE 1d. Appropriate water temperatures.

EFFECT: The effects described under PCEs 1a, 1b, and 6 discuss water quantity and quality which may indirectly address temperature thresholds required to meet loach minnow life cycle needs. Actions implemented under the LMP are expected to retain or recover this PCE for the loach minnow.

Mr. Tom Osen, Forest Supervisor

PCE 2. An abundant aquatic insect food base.

EFFEFFECT: The aquatic insect food base relies on adequate water quality (temperature, dissolved oxygen, contaminant-free water) for numerous life cycle stages. Programs that involve mechanized equipment have guidelines that prevent fuels and other contaminants from entering aquatic habitats. Forest program objectives that improve riparian vegetation would increase the availability of organic matter that many aquatic insects require as a food source.

PCE 3. Streams with no or no more than low levels of pollutants.

EFFEFFECT: Programs that involved mechanized equipment have guidelines that prevent fuels and other contaminants from entering aquatic habitats. Pesticide use, to control invasive and noxious plant and animals, would be done so to minimize impacts on non-target species.

PCE 4. Perennial flows, or interrupted stream courses that serve as connective corridors between occupied or seasonally occupied habitat.

EFFEFFECT: Actions implemented under the LMP are expected to retain and recover this PCE for loach minnow. There are standards and guidelines to ensure that areas supporting listed species are not dewatered or impaired to the point that they cannot support fish, which would include the loach minnow.

PCE 5. Nonnative aquatic species.

EFFEFFECT: The ASNFs are implementing conservation measures to ensure that actions implemented under the LMP, particularly movement of water under the Fire Management and Range Management Programs does not result in the incidental movement of nonnative species into critical habitat.

PCE 6. Streams with a natural, unregulated flow regime or, if flows are modified or regulated, a flow regime that allows for flows capable of transporting sediments.

EFFEFFECT: Actions implemented under the LMP are expected to retain and recover this PCE for loach minnow. There are standards and guidelines to ensure that areas supporting listed species are not dewatered or impaired to the point that they cannot support fish, which would include the loach minnow. Actions implemented under the LMP have required standards and guidelines to protect instream flow, consistent with existing water rights and laws, that are expected to retain and protect this PCE.

Spikedace Critical Habitat

The PCEs of spikedace critical habitat are very similar to those developed for the loach minnow. The effects of the proposed action to these PCEs would be the same as those described above under loach minnow.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the planning area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Mr. Tom Osen, Forest Supervisor

Lands adjacent to the southern and western boundaries of the ASNFs are White Mountain Apache and San Carlos Apache tribal lands. Numerous listed fish-occupied streams along this boundary have their headwaters located on tribal lands before they enter and flow onto the ASNFs. Tribal land activities are not specifically known, but have likely included impacts similar to those on ASNFs lands; although likely much reduced in their extent and intensity, and probably limited to timber harvest, livestock grazing, and the management and introduction of nonnative fish species.

Activities on private lands that occur within watersheds containing listed fish may include livestock grazing outside of federally-managed allotments, irrigated agriculture, groundwater pumping, stream diversions, bank stabilization, channelization, and recreation. Increasing recreational, residential, or commercial use of the non-Federal lands near the aquatic habitats would likely result in increased cumulative effects to occupied, as well as potentially-occupied native fish habitat and critical habitat through increases in water use, pollution, and alteration of the streambanks from riparian vegetation suppression, bank trampling, and erosion.

CONCLUSION

After reviewing the current status of the Apache trout, Gila trout, Gila chub, Little Colorado spinedace, loach minnow, and spikedace and their critical habitats, the environmental baseline for the planning area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the ASNFs' LMP will not jeopardize the continued existence of the above mentioned species, and will not destroy or adversely modify their designated critical habitats. We base our conclusion on the following:

- Watershed improvement and transportation projects are anticipated to maintain or improve the ecological condition of listed fish habitat during the 10 to 15-year life of the plan. These projects are likely to aid in improving hydrologic conditions within the watershed and maintain or improve the primary constituent elements of critical habitat in the long-term;
- Native fish restoration projects are anticipated to reduce or remove nonnative fish in listed fish habitat. Reducing nonnative fish is a primary constituent element of critical habitat for these species and will allow critical habitat to continue to contribute to the conservation and recovery of the species;
- Livestock access to occupied habitat is excluded or limited in many areas due to enclosures, pasture management, and rough terrain. We do not expect that the ability of critical habitat to contribute to the conservation and recovery of the species to be diminished; and
- Many of the desired conditions and objectives in the LMP, in particular desired conditions 4, 7, 20, 22, 24, 32, 34, 35, 64, 75, 78, 81, 83, and objectives 4, 6, 10, and 17 (see Appendix B for plan decision descriptions) benefit aquatic habitats used by the listed fish; and
- Many standards and guidelines within the LMP, in particular standards 3 and 11, and guidelines 71, 76, 79, 81, 83, and 132, serve as conservation measures that are beneficial to listed fish.

Mr. Tom Osen, Forest Supervisor

INCIDENTAL TAKE STATEMENT

Amount or Extent of Take

Apache Trout

Incidental take of Apache trout in the form of harm and harass is expected to result from the implementation of the ASNFs' LMP. We anticipate, however, that incidental take of Apache trout associated with the proposed action cannot be directly quantified and will be difficult to detect for the following reasons: finding a dead or impaired specimen is unlikely, and; many effects are the result of non-point sources, and losses may be masked by seasonal fluctuations in environmental conditions and fish numbers. The Service has determined that the anticipated level of incidental take was most appropriately quantified in terms of numbers of populations with disturbance or habitat alteration resulting from site-specific projects. Incidental take will be considered to have been exceeded if one population is extirpated as a result of the proposed action, *i.e.*, implementation of the LMP. Refer to the "Status of the Species within the Action Area" section for a complete list of current extant populations of Apache trout on the ASNFs.

Effect of Take

The Service has determined that this level of anticipated incidental take will not result in jeopardy to the Apache trout. Implementation of projects under the LMP program would involve the application of required standards and guidelines. Although there are some projects that would result in adverse effects, use of the desired conditions, objectives, standards and guidelines should help minimize or eliminate those effects. As a result, our analysis of the LMP at the programmatic level indicates that a no jeopardy determination is appropriate.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of the Apache trout:

1. Minimize or eliminate adverse effects to Apache trout on the ASNFs.
2. Minimize or eliminate adverse effects to Apache trout habitat on the ASNFs.
3. Monitor the impacts of site-specific projects on the Apache trout.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the USFS must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

Mr. Tom Osen, Forest Supervisor

The following term and condition will implement reasonable and prudent measure 1:

1.1 On site-specific projects, the ASNFs will work with the Service to identify and implement additional reasonable and prudent measures and terms and conditions specific to the project, to minimize effects to Apache trout.

The following terms and conditions will implement reasonable and prudent measure 2:

2.1 Emphasize maintaining or improving important Apache trout habitat characteristics when planning projects in or near occupied and/or recovery streams.

2.2 Strive to maintain or reduce road densities in occupied Apache trout watersheds with the goal of every occupied 6th Code watershed below 2.5 mi/mi².

The following terms and conditions will implement reasonable and prudent measure 3:

3.1 The ASNF shall monitor incidental take resulting from implementation of the proposed action and report these findings to the Service. Incidental take monitoring shall include information such as when or if the project was implemented, whether the project was implemented as proposed and analyzed in the site-specific BO (including conservation measures and best management practices), and the important life cycle period(s) over which the project occurred, relevant Apache trout survey information, and any other pertinent information as described in the site specific BO about the project's effects on the species habitat.

3.2 Annual reports, which will include this species, shall be sent to the Arizona Ecological Services Office by March 1 of each year.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Federal action agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Renovate more streams to improve habitat for Apache trout, in coordination with the Service and AGFD.
2. Populations of Apache trout should continue to be replicated, in coordination with the Recovery Team, into streams that are geographically separate to ensure that natural or human-induced disasters do not extirpate the populations.

Mr. Tom Osen, Forest Supervisor

3. Work with the Arizona Department of Environmental Quality, or other suitable partners, to install water quality monitoring equipment.

Gila chub

Incidental take of the Gila chub is reasonably certain to occur as a result of the ASNFs implementation of the LMP. Incidental take is expected to be in the forms of harm, harassment, and mortality to the species from LMP implementation. The Service anticipates, however, that the aforementioned incidental take will be difficult to detect for the following reasons: finding a dead or impaired specimen is unlikely, and losses may be masked by seasonal fluctuations in environmental conditions and fish numbers. Therefore, it is not possible to provide precise numbers of Gila chub that will be harassed, harmed, or killed as a result of the proposed action. As a result, we define incidental take in terms of the number of extant populations. The extant populations of Gila chub within the ASNFs are Harden Cienega, Dix Creek, and Eagle Creek. The Service concludes that incidental take of Gila chub will be considered to be exceeded if, presence/absence surveys fail to detect Gila chub in any currently extant population over a period of two consecutive years as a result of the proposed action.

Effect of Take

The Service has determined that this level of anticipated incidental take will not result in jeopardy to the Gila chub. Implementation of projects under the LMP program would involve the application of required standards and guidelines. Although there are some projects that would result in adverse effects, use of the desired conditions, objectives, standards and guidelines should help minimize or eliminate those effects. As a result, our analysis of the LMP at the programmatic level indicates that a no jeopardy determination is appropriate.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of the Gila chub:

1. Minimize or eliminate adverse effects to Gila chub on the ASNFs due to LMP activities.
2. Minimize or eliminate adverse effects to Gila chub habitat on the ASNFs due to implementation of the LMP.
3. Monitor the impacts of implementing the proposed action on the Gila chub and its habitat and report the findings to the Service.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the USFS must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

Mr. Tom Osen, Forest Supervisor

The following terms and conditions will implement reasonable and prudent measure 1:

1.1 On site-specific projects, the ASNFs will work with the Service to identify and implement additional reasonable and prudent measures and terms and conditions specific to the project, to minimize effects to Gila chub.

The following terms and conditions will implement reasonable and prudent measure 2:

2.1 Develop and implement conservation measures and best management practices associated with site-specific projects (*i.e.* watershed or riparian restoration) as they are developed under the LMP to minimize or eliminate adverse effects to all occupied Gila chub habitat.

2.2 Emphasize maintaining or improving important Gila chub habitat characteristics when planning projects in or near occupied and/or recovery streams.

The following terms and conditions will implement reasonable and prudent measure 3:

3.1 The ASNF shall monitor incidental take resulting from implementation of the proposed action and report these findings to the Service. Incidental take monitoring shall include information such as when or if the project was implemented, whether the project was implemented as proposed and analyzed in the site-specific BO (including conservation measures and best management practices), and the important life cycle period(s) over which the project occurred, relevant Gila chub survey information, and any other pertinent information as described in the site specific BO about the project's effects on the species habitat.

3.2 Annual reports, which will include this species, shall be sent to the Arizona Ecological Services Office by March 1 of each year.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Federal action agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following conservation activities:

1. Continue to identify factors that limit the recovery of the Gila chub on ASNFs' lands and work to correct them.
2. Acquire instream flow water rights to ensure perennial flow in streams with Gila chub.

Mr. Tom Osen, Forest Supervisor

3. Work with the Service and AGFD to remove nonnative species and reestablish Gila chub throughout its historical range in and Arizona.
4. Work with the Arizona Department of Environmental Quality, or other suitable partners, to install water quality monitoring equipment.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effect or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Gila Trout

Effect of Take

We are not reasonably certain that the proposed action is likely to result in the incidental take of Gila trout. Recent surveys have failed to detect their presence in the planning area. If future surveys detect them or future recovery actions re-establish Gila trout in the planning area, the potential for adverse effects associated with specific projects, including incidental take, will be addressed at that time through site-specific consultation.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Renovate more streams to improve habitat for Gila trout, in coordination with the Recovery Team.
2. Populations of Gila trout should continue to be replicated, in coordination with the Recovery Team, into streams that are geographically separate to ensure that natural or human-induced disasters do not extirpate the populations.
3. Work with the Arizona Department of Environmental Quality, or other suitable partners, to install water quality monitoring equipment.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effect or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Mr. Tom Osen, Forest Supervisor

Little Colorado Spinedace

Incidental take of the spinedace is reasonably certain to occur as a result of the continued implementation of the ASNFs' LMP. This incidental take is expected to be in the forms of harm (*e.g.*, fatality) and harassment of spinedace and to result from the Engineering, Forestry and Ecosystem/Vegetation Health, and Wildlife programs on the ASNFs.

However, we believe that the aforementioned incidental take will be difficult to detect for the following reasons: finding a dead or impaired specimen (adult, young-of-year, or egg) is unlikely, and losses may be masked by seasonal fluctuations in environmental conditions and fish numbers. Therefore, it is not possible to provide precise numbers of Little Colorado spinedace that will be harassed or harmed during projects implemented under the plan amendment.

Although we cannot estimate the number of individual Little Colorado spinedace that will be taken as a result of the proposed action, the Service is providing a mechanism for when incidental take would be considered exceeded at the population level. There are currently three populations of Little Colorado spinedace in the planning area, in Nutrioso, Rudd, and West Chevelon Creeks. The Service concludes that incidental take of Little Colorado spinedace will be exceeded if there is a loss of one population in the current number of spinedace populations on the ASNFs as a result of the proposed action, that are not offset by new populations established by the Service and AGFD under guidance of the Little Colorado Spinedace Recovery Plan. This surrogate is reasonable to use to measure when take is exceeded for the following reasons:

- 1) As stated above, Little Colorado spinedace populations naturally fluctuate. Some years we find only a few individual fish and in other years we find more individuals, but the number of individual fish (*i.e.*, adults, young-of-year, eggs) in a particular system is not static; therefore, we cannot use a single number of individuals to identify if incidental take has occurred or not.
- 2) Because individual populations of Little Colorado spinedace within single drainages are discrete from other populations on the ASNFs, we may infer the absence of Little Colorado spinedace from a particular drainage if none are found during surveys. As stated above, numbers naturally fluctuate, but if numbers are so low we are not detecting Little Colorado spinedace, it is likely that the population cannot recover without management assistance.

Effect of the Take

The Service determined that this level of anticipated incidental take is not likely to result in jeopardy to the Little Colorado spinedace.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of spinedace:

1. Minimize or eliminate adverse effects to spinedace on the ASNFs due to LMP activities.

Mr. Tom Osen, Forest Supervisor

2. Minimize or eliminate adverse effects to spinedace habitat on the ASNFs during implementation of the LMP.
3. Monitor the impacts of implementing the proposed action on spinedace and its habitat and report the findings to the Service.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the USFS must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

The following term and condition will implement reasonable and prudent measure 1:

- 1.1 On site-specific projects, the ASNFs will work with the Service to identify and implement additional reasonable and prudent measures and terms and conditions specific to the project to minimize effects to Little Colorado spinedace.

The following term and condition will implement reasonable and prudent measure 2:

- 2.1 Design projects to reduce negative effects (direct and indirect) with the goal of implementing projects that have beneficial, insignificant, or discountable effects within occupied Little Colorado spinedace habitat.

The following terms and conditions will implement reasonable and prudent measure 3:

- 3.1 The ASNF shall monitor incidental take resulting from implementation of the proposed action and report these findings to the Service. Incidental take monitoring shall include information such as when or if the project was implemented, whether the project was implemented as proposed and analyzed in the site-specific BO (including conservation measures and best management practices), and the important life cycle period(s) over which the project occurred, relevant Little Colorado spinedace survey information, and any other pertinent information as described in the site specific BO about the project's effects on the species habitat.

- 3.2 Annual reports, which will include this species, shall be sent to the Arizona Ecological Services Office by March 1 of each year.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Federal action agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Mr. Tom Osen, Forest Supervisor

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends that the ASNFs:

1. Continue working with Service, AGFD, and our other partners to implement the *East Clear Creek Watershed Recovery Strategy for the Little Colorado spinedace and other Riparian Species* (USFS 1999).
2. Continue to identify factors that limit the recovery potential of the Little Colorado spinedace on lands under their jurisdiction and work to correct them.
3. Work with the Arizona Department of Environmental Quality, or other suitable partners, to install water quality monitoring equipment.

Loach Minnow

The Service anticipates that the proposed action will incidentally take loach minnow. Most of the Forest Programs involve ground-disturbing activities which if done at a large enough scale may contribute excess sediment into occupied loach minnow habitats. All ground disturbing projects, within the appropriate Forest Program, have required standards and guidelines to minimize these effects to listed fish species.

We anticipate that the take of individual loach minnow will be difficult to detect because finding a dead or impaired specimen is unlikely. Therefore, it is not possible to provide the specific numbers of loach minnow that will be harassed or harmed as a result of the proposed action. In such instances where take is difficult to detect and/or quantify, take may be quantified in terms of the species habitat that may be diminished or removed by the action. Incidental take of loach minnow on the ASNFs will be considered to be exceeded if a total of five miles of temporary impact (*e.g.*, impacts that may cause excessive runoff and scouring or results in excessive sediment being deposited in occupied habitat not to exceed one year) or one mile of permanent impact (*e.g.*, stream channel or substrate effect that is irreversible) occur as a result of any Forest Program implementation.

Effect of Take

In this BO/CO, the Service determined that these levels of anticipated incidental take will not jeopardize the loach minnow.

Mr. Tom Osen, Forest Supervisor

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the ASNFs must comply with the following terms and conditions, which implement the reasonable and prudent measures, described below and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following reasonable and prudent measures and terms and conditions are necessary and appropriate to minimize incidental take of loach minnow:

1. Eliminate or minimize adverse effects to loach minnow on the ASNFs.
2. Eliminate or minimize adverse effects to loach minnow habitat on the ASNFs.
3. Monitor the impacts of site-specific projects on loach minnow.

TERMS AND CONDITIONS

The following term and condition will implement reasonable and prudent measure 1:

- 1.1 On site-specific projects, the ASNFs will work with Service staff to identify additional reasonable and prudent measures, specific to the project, to minimize effects to the loach minnow.

The following term and condition will implement reasonable and prudent measure 2:

- 2.1 Design projects to reduce negative effects (direct and indirect) with the goal of implementing projects that have beneficial, insignificant, or discountable effects within occupied loach minnow habitat.

The following terms and conditions will implement reasonable and prudent measure 3:

- 3.1 The ASNF shall monitor incidental take resulting from implementation of the proposed action and report these findings to the Service. Incidental take monitoring shall include information such as when or if the project was implemented, whether the project was implemented as proposed and analyzed in the site-specific BO (including conservation measures and best management practices), and the important life cycle period(s) over which the project occurred, relevant loach minnow survey information, and any other pertinent information as described in the site specific BO about the project's effects on the species habitat.
- 3.2 Annual reports, which will include this species, shall be sent to the Arizona Ecological Services Office by March 1 of each year.

Mr. Tom Osen, Forest Supervisor

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Federal action agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Develop and implement a monitoring plan to better determine the distribution, abundance, and trends of native fish populations on the ASNFs.
2. Work with the Service and the AGFD to begin an aggressive program to control non-native aquatic organisms on the ASNFs, particularly bullfrogs, fish, and crayfish.
3. Work with the Arizona Department of Environmental Quality, or other suitable partners, to install water quality monitoring equipment.
4. Continue coordination on ongoing loach minnow recovery projects on the ASNFs.

Spikedace

We are not reasonably certain that the proposed action will result in incidental take of the spikedace. Spikedace are only present in the action area on the Blue River downstream of the Blue Box. This is a recently stocked population in an area with no previous records, and we are unable to conclude with reasonable certainty that the proposed action will result in incidental take of spikedace. All Forest Programs have desired conditions, objectives, standards, and guidelines to reduce their effects to aquatic systems. As site specific projects are developed, the potential for adverse effects associated with those projects, including incidental take, will be addressed at that time through site-specific consultation, and standards and guidelines applied to the activity to avoid the likelihood of take.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Develop and implement a monitoring plan to better determine the distribution, abundance, and trends of native fish populations on the ASNFs.

Mr. Tom Osen, Forest Supervisor

2. Work with the Service and the AGFD to begin an aggressive program to control non-native aquatic organisms on the ASNFs, particularly bullfrogs, fish, and crayfish.
3. Work with the Arizona Department of Environmental Quality, or other suitable partners, to install water quality monitoring equipment.
4. Continue coordination on ongoing loach minnow recovery projects on the ASNFs.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in your request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required when discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

This also concludes the conference for proposed critical habitat for the jumping mouse, northern Mexican gartersnake and narrow-headed gartersnake, and for the yellow-billed cuckoo. You may ask the Service to confirm the conference opinion as a biological opinion issued through formal consultation if critical habitat is designated for the jumping mouse, gartersnakes, or the yellow-billed cuckoo is listed. The request must be in writing. If the Service reviews the proposed action and finds there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion for the project and no further section 7 consultation will be necessary.

After listing as threatened or endangered and any subsequent adoption of this conference opinion, the Federal agency shall request reinitiation of consultation if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect the species in a manner or to an extent not considered in the conference opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the species that was not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action.

The incidental take statement provided in this conference opinion does not become effective until the species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the project will be reviewed to determine whether any take of the proposed species has occurred. Modifications of the opinion and incidental take statement may be appropriate to reflect that take. No take of the proposed species may occur between the listing of the species and the adoption of the conference opinion through formal consultation, or the completion of a subsequent formal consultation. Although not required, we recommend that the Federal agency implement any reasonable and prudent measures and terms and conditions herein prior to our final listing decision. If the species is subsequently listed, implementation of reasonable prudent measures and terms and conditions in any conference opinion adopted as a biological opinion, is mandatory.

Mr. Tom Osen, Forest Supervisor

In keeping with our trust responsibilities to American Indian Tribes, we encourage you to continue to coordinate with the Bureau of Indian Affairs in the implementation of this consultation and, by copy of this biological opinion, are notifying affected Tribes of its completion. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

We appreciate the Forest Service's efforts to identify and minimize effects to listed species from this project. For further information please contact Dave Smith (928-556-2183) or Mary Richardson (602-242-0210 X242). Please refer to the consultation number, 02EAAZ00-2013-F-0363, in future correspondence concerning this project.

Sincerely,

/s/ Steven L. Spangle
Field Supervisor

cc (electronic):

Regional Supervisor, Arizona Game and Fish Department, Pinetop, AZ
Wildlife Biologist, Fish and Wildlife Service, Phoenix, Flagstaff, Tucson, AZ
(Attn: J. Servoss, S. Hedwall, L. Fitzpatrick, S. Sferra, G. Beatty, R. Gordon)
Regional Office, Ecological Services, Fish and Wildlife Service, Albuquerque, NM
(Attn: Susan Jacobsen)

Mr. Tom Osen, Forest Supervisor

Literature Cited

- Abarca, F.J. 1987. Seasonal and diet patterns of feeding in loach minnow (*Tiaroga cobitis* Girard). Proceedings of the Desert Fishes Council 20:20.
- American Ornithologists Union (AOU). 1998. Checklist of North American birds. 7th edition. American Ornithologists' Union, Washington, D.C.
- Arizona State University (ASU). 2002. Lower Colorado Basin fish database. Produced for the U.S. Bureau of Reclamation and U.S. Fish and Wildlife Service by Arizona State University, Tempe, Arizona.
- Bahm, J. and A. Robinson. 2009. Spikedace and loach minnow survey in Eagle Creek, Greenlee and Graham counties, July – August 2008. Arizona Game and Fish Department, Research Branch. Phoenix, Arizona. 7 pages.
- Berger L., R. Speare, P. Daszak, D.E. Green, A.A. Cunningham, C.L. Goggins, R. Slocombe, M.A. Ragan, A.D. Hyatt, K.R. McDonald, H.B. Hines, K.R. Lips, G. Marantelli, and H. Parkes. 1998. Chytridiomycosis causes amphibian mortality associated with population declines in the rain forests of Australia and Central America. Proceedings of the National Academy of Science 95:9031-9036.
- Bestgen, K.R. 1985. Distribution, biology and status of the roundtail chub, *Gila robusta*, in the Gila River basin, New Mexico. Unpublished Master of Science thesis, Colorado State University, Fort Collins, Colorado. 104 pages.
- Blasius, H. 2008. October 16, 2008, email transmission from H. Blasius, U.S. Bureau of Land Management, to M. Richardson, U.S. Fish and Wildlife Service re: Bonita Creek.
- Blinn, D.W. and C. Runck. 1990. Importance of predation, diet, and habitat on the distribution of *Lepidomeda vittata*: a federally listed species of fish. Report submitted to the Coconino National Forest by the Department of Biological Science, Northern Arizona University, Flagstaff, Arizona.
- Blinn, D.W., C. Runck, and D.A. Clark. 1993. Effects of rainbow trout predation on Little Colorado spinedace. Transactions of the American Fisheries Society 122:139-143.
- Brennan, T. C. 2013. Report on Black River (*Thamnophis rufipunctatus*) collecting trip, June 2013. Report submitted to the Arizona Game and Fish Department. 1 page.
- Brennan, T. C. and P. C. Rosen. 2009. Report on narrow-headed gartersnake (*Thamnophis rufipunctatus*) surveys at Oak Creek and the Black River, Arizona. Report submitted to the Arizona Game and Fish Department. 23 pages.
- Breshears, D.D., N.S. Cobb, P.M. Rich, K.P. Price, C.D. Allen, R.G. Balice, W.H. Romme, J.H. Kastens, M.L. Floyd, J. Belnap, J.J. Anderson, O.B. Myers, and C.W. Meyers. 2005. Regional vegetation die-off in response to global-change-type drought. Proceedings of the National Academy of Sciences 102(42): 15144-48.

Mr. Tom Osen, Forest Supervisor

- Britt, K.D., Jr. 1982. The reproductive biology and aspects of life history of Tiaroga cobitis in southwestern New Mexico. Unpublished Master of Science thesis. New Mexico State University, Las Cruces, New Mexico. 56 pages.
- Brouder, M. 2002. July 25, 2002 e-mail from Mark Brouder to Marianne Meding, Arizona Game and Fish Department re: Verde River survey info.
- Carpenter, J. and C. McIvor. 1999. Effects of an introduced crayfish on native Arizona fishes. Final report to Arizona Game and Fish Department. IIPAM Project No. I95034. Arizona Cooperative Fish and Wildlife Research Unit, Tucson, AZ. 100 pages.
- Carter, C. 2005. Upper Blue River loach minnow summary 2004 and 2005. Arizona Game and Fish Department, Phoenix, Arizona.
- Carter, C. 2007. Fossil Creek spikedace and loach minnow stocking, November 2, 2007. Arizona Game and Fish Department, Phoenix, Arizona.
- Carter, C., J. Chapman, D. Seidner, and J. Gamble. 2007. Upper Eagle Creek loach minnow and spikedace survey, May 8-9, 2007. Arizona Game and Fish Department. Phoenix, Arizona. 11 pages.
- Carter, C. 2008. Fossil Creek loach minnow supplemental stocking, May 21, 2008. Arizona Game and Fish Department, Research Branch. Phoenix, Arizona.
- Carter, C., J. Chapman, D. Seidner, and J. Gamble. 2007. Upper Eagle Creek loach minnow and spikedace survey, May 8-9, 2007. Arizona Game and Fish Department. Phoenix, Arizona. 11 pages.
- Clarkson, R.W., P.C. Marsh, J.A. Stefferud, and B.R. Kesner. 2008. Fishery survey of lower Blue River, Greenlee County, Arizona, May 19-22, 2008. 5 pages.
- Coleman, S. 2014. August 13, 2014 Phone call from J. Servoss USFWS to S. Coleman (ASNFs) regarding the native fish community in Fish Creek.
- Cook, E.R., C.A. Woodhouse, C.M. Eakin, D.M. Meko, and D.W. Stahle. 2004. Long-term aridity changes in the western United States. *Science* 306: 1015-1018.
- Corman, T.E. and Wise-Gervais, C. (*Editors*). 2005. Arizona Breeding Bird Atlas. University of New Mexico Press, Albuquerque, New Mexico. 636 pages.
- Cotton, T. B., J. D. Miller, and D. D. Grandmaison. 2013. Geographic distribution: *Thamnophis eques* (Mexican gartersnake). *Herpetological Review* 44(1):111.
- Courtney, S.J., J.A. Blakesley, R.E. Bigley, M.L. Cody, J.P. Dumbacher, R.C. Fleischer, A.B. Franklin, J.F. Franklin, R.J. Guitierrez, J.M. Marzluff, and L. Sztukowski. 2004. Scientific Evaluation of the Status of the Northern Spotted Owl. Sustainable Ecosystems Institute, Portland, Oregon. 508 pages.
- Crowder, C. 2009. June 10, 2009 e-mail correspondence from Clayton Crowder (AGFD) to Mary Richardson (USFWS).
- Crowder, C. 2013. July 27, 2013 e-mail correspondence from Clayton Crowder (AGFD) to Jeff Servoss. USFWS).

Mr. Tom Osen, Forest Supervisor

- Degenhardt, W.G., C.W. Painter, and A.H. Price. 1996. Amphibians and reptiles of New Mexico. University of New Mexico Press, Albuquerque, New Mexico.
- Delaney, D. K., T. G. Grubb, and P. Beier. 1999. Activity patterns of nesting Mexican spotted owls. *Condor* 101:42-49.
- Denova, B., and F.J. Abarca. 1992. Distribution, abundance, and habitat for the Little Colorado spinedace (*Lepidomeda vittata*) in the Coconino and Apache-Sitgreaves National Forests along East Clear Creek and its tributaries. Report submitted to Coconino National Forest and Fish and Wildlife Service on Project E5-3, Job 4. Arizona Game and Fish Department, Phoenix, Arizona.
- Dettinger, M.D. and D.R. Cayan. 1995. Large scale atmospheric forcing of recent trends toward early snowmelt runoff in California. *Journal of Climate* 8: 606-623.
- Dettinger, M.D. and H.F. Diaz. 2000. Global characteristics of streamflow seasonality and variability. *Journal of Hydrometeorology* 1: 289-310.
- Dodd, N. 1987. Riparian mammal, live trapping results, relationships to riparian conditions. Arizona Game and Fish Department. Unpublished report, Phoenix, Arizona. 1 page.
- Dorum, D.B. and K.L. Young. 1995. Little Colorado spinedace project summary report. Nongame and Endangered Wildlife Program, Technical Report 88. Arizona Game and Fish Department, Phoenix, Arizona. 104 pages.
- Drummond, H. and M. Garcia. 1983. Limitations of a generalist: a field comparison of foraging snakes. *Behaviour* 108(1/2):23-43.
- Durst, S.L. 2004. Southwestern willow flycatcher potential prey base and diet in native and exotic habitats. M.S. Thesis, Northern Arizona University, Flagstaff, Arizona. 86 pp.
- Durst, S.L., M.K. Sogge, S.D. Stump, H.A. Walker, B.E. Kus, and S.J. Sferra. 2008. Southwestern willow flycatcher breeding sites and territory summary – 2007. U.S. Geological Survey Open File report 2008-1303. 31 pages.
- Ehlo, C. A., B. R. Kesner, K. A. Patterson, and J. B. Wisenhall. 2013. Trip report: Eagle Creek, Arizona July 8-10, 2013. Native Fish Lab, Marsh and Associates, LLC. Tempe, Arizona. 6 pages.
- Fernandez, P.J., and J.T. Bagnara. 1995. Recent changes in leopard frog distribution in the White Mountains of east central Arizona. Page 4 in abstracts of the First Annual Meeting of the Southwestern Working Group of the Declining Amphibian Populations Task Force, Phoenix, Arizona. 17 pages.
- Fernandez, P.J., and P.C. Rosen. 1996. Effects of the introduced crayfish *Orconectes virilis* on the native aquatic herpetofauna in Arizona. Report to the Arizona Game and Fish Department, Heritage Program, IIPAM Project No. I94054. 56 pages + Appendices.
- Fitzgerald, L. A. 1986. A preliminary status survey of *Thamnophis rufipunctatus* and *Thamnophis eques* in New Mexico. Unpublished report to New Mexico Department of Game and Fish, Albuquerque, New Mexico.

Mr. Tom Osen, Forest Supervisor

- Fleharty, E. D. 1967. Comparative ecology of *Thamnophis elegans*, *T. cyrtopsis*, and *T. rufipunctatus* in New Mexico. *The Southwestern Naturalist* 12(3):207-229.
- Frey, J.K. 2005. Status assessment of montane populations of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) in New Mexico. Final Report Professional Services Contract number 05-516.57, submitted to the Conservation Services Division, New Mexico Department of Game and Fish, Santa Fe, New Mexico. 74 pages.
- Frey, J.K. 2008. Historical records of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) in the White Mountains, Arizona. Unpublished Report. Frey Biological Research, Radium Springs, New Mexico. 4 pages.
- Frey, J.K. 2011. Arizona Game and Fish Department Heritage Grant “Inventory of the meadow jumping mouse in Arizona” I09004. Final Report submitted to Arizona Game and Fish Department, Phoenix, Arizona. 114 pages.
- Frey, J.K., and G.D. Wright. 2012. Multiple scale habitat selection by a small mammal habitat specialist (*Zapus hudsonius luteus*) in a managed floodplain landscape. Department of Fish Wildlife and Conservation Ecology, New Mexico State University, Las Cruces, New Mexico. 152 pages.
- Gaines, D. and S.A. Laymon. 1984. Decline, status, and preservation of the yellow-billed cuckoo in California. *Western Birds* 15:49–80.
- Ganey, J. L. and J. L. Dick, Jr., 1995. Habitat relationships of the Mexican Spotted Owl: current knowledge. Chapter 4:1-42 in *Recovery plan for the Mexican Spotted Owl (Strix occidentalis lucida)* (W. M. Block, F. Clemente, J. F Cully, J. L. Dick, Jr., A. B. Franklin, J. L. Ganey, F. P. Howe, W. H. Moir, S. L. Spangle, S. E. Rinkevich, D. L. Urban, R. Vahle, J. P. Ward, Jr., and G. C. White, Primary authors). Volume II. Technical supporting information. U.S. Department of the Interior Fish and Wildlife Service. Albuquerque, New Mexico.
- Gutiérrez, R. J., A. B. Franklin, and W. S. LaHaye. 1995. Spotted Owl (*Strix occidentalis*). *The birds of North America*. The Academy of Natural Sciences Philadelphia, and The American Ornithologists Union, Washington, D.C.. No. 179:28 pages.
- Hall, E.R. and W.B. Davis. 1934. Notes on Arizona rodents. *Proceedings of the Biological Society of Washington*. 47:51-56.
- Halterman, M.D. 2009. Sexual dimorphism, detection probability, home range, and parental care in the yellow-billed cuckoo. Ph.D. Dissertation, University of Nevada, Reno, Nevada.
- Hein, E. 2014. July 15, 2014 phone call between E. Hein. New Mexico Ecological Services Office, U.S. fish and Wildlife Service and D. Smith, Arizona Ecological Services Office, U.S. Fish and Wildlife Service regarding jumping mouse surveys on the Bosque del Apache National Wildlife Refuge.
- Hellekson, L. 2012b. August 29, 2012 e-mail correspondence from Lyndsay Hellekson, Gila National Forest Supervisors Office to J. Servoss. Arizona Ecological Services Office, U.S. Fish and Wildlife Service.

Mr. Tom Osen, Forest Supervisor

Hicks, H. 2012. 2012 New Mexico meadow jumping mouse surveys in the White Mountains of Arizona. Arizona Game and Fish Department. Unpublished report. Phoenix, Arizona.

Holycross, A.T., W.P. Burger, E.J. Nigro, and T.C. Brennan. 2006. Surveys for *Thamnophis eques* and *Thamnophis rufipunctatus* in the Gila River watershed of Arizona and New Mexico. Unpublished Report submitted to the Arizona Game and Fish Department, Phoenix, Arizona. 114 pages.

Hughes, J.M. 1999. Yellow-billed cuckoo (*Coccyzus americanus*), The Birds of North America Online (A. Poole, *editor*). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/418>. Accessed on October 22, 2014.

Industrial Economics Incorporated. 2014. Consideration of economic impacts: Screening analysis of the likely economic impacts of critical habitat designation for the New Mexico meadow jumping mouse. Memorandum to USFWS February 18, 2014, USFWS Albuquerque, New Mexico. 22 pages.

Intergovernmental Panel on Climate Change (IPCC). 2007. Summary for policy makers. In: Climate Change 2007: The physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Quin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller (Editors)]. Cambridge University Press, Cambridge, United Kingdom and New York, New York. Available at <http://www.ipcc.ch/>. Accessed on September 25, 2014.

Jakle, M. 1992. Memo February 26, 1992 - Summary of fish and water quality sampling along the San Pedro River from Dudleyville to Hughes Ranch near Cascabel, October 24 and 25, 1992, and the Gila River from Coolidge Dam to Ashurst/Hayden Diversion Dam, October 28 - 31, 1991. U.S. Bureau of Reclamation, Phoenix, Arizona. 11 pages.

Jameson, D.A. 1967. The relationship of tree overstory and herbaceous understory vegetation. *Journal of Forestry* 20(4):247-249.

Johnson, M.J., S.L. Durst, C.M. Calvo, L. Stewart, M.K. Sogge, G. Bland, and T. Arundel. 2008. Yellow-billed cuckoo distribution, abundance, and habitat use along the lower Colorado River and its tributaries, 2007 annual report. USGS Open-file report 2008-1177. 284 pages.

Jones, A. 2000. Effects of cattle grazing on North American arid ecosystems: a quantitative review. *Western North American Naturalist* 60(2):155-164.

Knowles, G. 1994. Fisheries surveys of the Apache-Sitgreaves National Forests, first through fourth trip reports covering May through August 1994.

Laymon, S.A. and M.D. Halterman. 1989. A proposed habitat management plan for yellow-billed cuckoos in California. U.S. Department of Agriculture, Forest Service General Technical Report PSW-110: 272-277.

Mr. Tom Osen, Forest Supervisor

- Lemos-Espinal, J.A., and H.M. Smith. 2007. Anfibios y reptiles del Estado de Chihuahua, México/Amphibians and Reptiles of the State of Chihuahua, México. Universidad Nacional Autonoma de México y CONABIO, México D.F.
- Longcore, J.E., A.P. Pessier, and D.K. Nichols. 1999. *Batrachyrium dendrobatidis* gen. Et sp. Nov., a chytrid pathogenic to amphibians. *Mycologia* 91(2):219-227.
- Lopez, M.A., R.J. Dreyer, and G.A. Gonzales. 1999. Silver Creek Fish Management Report, Fisheries Technical Report 99-02. Statewide Fisheries Investigations Survey of Aquatic Resources Federal Aid Project F-7-M-41. Arizona Game and Fish Department, Phoenix, Arizona. 34 pages.
- Lopez, M.A., J.R. Novy, R.J. Dreyer, and G.R. Gonzales. 2001a. Nutrioso Creek fish management report. Fisheries Technical Report 01-01. Statewide Fisheries Investigations, Federal Aid Project F-7-M-43. Arizona Game and Fish Department, Phoenix, Arizona. 58 pages.
- Lopez, M.A., R.J. Dreyer, and J. Novy. 2001b. Rudd Creek fish management report. Fisheries Technical Report 01-02. Statewide Fisheries Investigations, Federal Aid Project F-7-M-44. Arizona Game and Fish Department, Phoenix, Arizona. 38 pages.
- Lopez, M.A. 2014. Phone call from D. Smith (Service) to M. Lopez requesting information regarding fish on the east Fork of the Black River near Three Forks springs. July 15, 2014.
- Marsh and Associates, LLC. 2011. Trip Report: Eagle Creek, Arizona. June 14-16 and August 2-3, 2011. 6 pages.
- Marsh and Associates, LLC. 2014. Trip Report: Eagle Creek, Arizona. July 9-11, 2014. Tempe, Arizona. 4 pages.
- Marsh, P.C., F.J. Abarca, M.E. Douglas, and W.L. Minckley. 1989. Spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*) relative to introduced red shiner (*Cyprinella lutrensis*). Arizona Game and Fish Department, Phoenix, Arizona. 116 pages.
- Marsh, P.C., J.E. Brooks, D.A. Hendrickson, and W.L. Minckley. 1990. Fishes of Eagle Creek, Arizona, with records for threatened spikedace and loach minnow (*Cyprinidae*). *Journal of the Arizona-Nevada Academy of Science* 23(2):107-116.
- McKell, M.D. 2005. Region 1 Surveys of Nutrioso and Rudd Creeks, May 16-19, 2005. Unpublished Report. Arizona Game Fish Department Region 1, Pinetop, Arizona.
- Miller, D. 1998. Fishery survey report, Negrito Creek within the Gila NF New Mexico, 29 and 30 June 1998. Western New Mexico University, Biology Department, for the Gila NF. Silver City, New Mexico. 6 pages.
- Miller, R.R. 1961. Man and the changing fish fauna of the American southwest. *Papers of the Michigan Academy of Science, Arts, and Letters* XLVI:365-404.
- Miller, R. R. 1946. Gila cypha, a remarkable new species of cyprinid fish from the Colorado River in Grand Canyon, Arizona. *Journal of the Washington Academy of Sciences*. 36(12): 409-415.

Mr. Tom Osen, Forest Supervisor

Miller, R.R. 1963. Distribution, variation, and ecology of *Lepidomeda vittata*, a rare cyprinid fish endemic to Eastern Arizona. *Copeia* (1):1-5.

Miller, R.R. 1972. Classification of the native trouts of Arizona with the description of a new species, *Salmo apache*. *Copeia* 1972:401-422.

Miller, R.R., and C.H. Lowe. 1967. Fishes of Arizona, Part 2. In *The vertebrates of Arizona*, Second edition. C.H. Lowe, pages. 133-151. Tucson: University of Arizona Press, Tucson, Arizona.

Minckley, W.L. 1973. *Fishes of Arizona*. Arizona Game and Fish Department, Phoenix, Arizona. 293 pages.

Minckley, W.L. and L.H. Carufel. 1967. The Little Colorado spinedace, *Lepidomeda vittata*, in Arizona. *The Southwestern Naturalist* 12(3):291-302.

Minckley, W.L. and P.C. Marsh. 2009. *Inland fishes of the greater southwest. Chronicle of a vanishing biota*. The University of Arizona Press, Tucson, Arizona. 426 pages.

Morrison, J.L. 1991. Distribution and status of the New Mexico meadow jumping mouse, *Zapus hudsonius luteus* on the Apache-Sitgreaves National Forest, 1991. Cost-share agreement 0301-91-034. Unpublished report for the U.S. Forest Service, Apache Sitgreaves National Forest, 26 pages.

Mueller, R.C., C.M. Scudder, M.E. Porter, R.T. Trotter III, C.A. Gehring and T.G. Whitham. 2005. Differential tree mortality in response to severe drought: Evidence for long-term vegetation shifts. *Journal of Ecology* 93(6): 1085-1093.

Myers, T.L. 2000. January 7, 2000 letter from Terry Myers, U.S. Forest Service to Mike Martinez U.S. Fish and Wildlife Service cited from USFWS 2011 Biological and Conference Opinion for Federal Funding of Aquatic Inventory, Survey, and Monitoring Activities, and Conservation Activities for Aquatic Species by Arizona Game and Fish Department, 2011-2020. AESO/SE 22410-2011-F-0290.

National Marine Fisheries Service and U.S. Fish and Wildlife Service (NMFS and USFWS). 2010. *Interim Endangered and Threatened Species Recovery Planning Guidance*. Version 1.3. Revised June 2010. 122 pages.

Nisselson, C.L. and D.W. Blinn. 1989. Aquatic habitat assessment for *Lepidomeda vittata* in East Clear Creek, Arizona. Report to the Coconino National Forest from the Department of Biological Sciences, Northern Arizona University, Flagstaff, Arizona.

Nisselson, C.L. and D.W. Blinn. 1991. Aquatic habitat assessment for *Lepidomeda vittata* in East Clear Creek, Arizona. Final Report to the Coconino National Forest from the Department of Biological Sciences, Northern Arizona University, Flagstaff, Arizona.

Nowak, E. 2006. Monitoring surveys and radio-telemetry of narrow-headed gartersnakes (*Thamnophis rufipunctatus*) in Oak Creek, Arizona. Final Report to the Arizona Game and Fish Department. Phoenix, Arizona. 40 pages.

Mr. Tom Osen, Forest Supervisor

- Owen, J. C., and M. K. Sogge. 2002. Physiological condition of southwestern willow flycatchers in native and saltcedar habitats. US Geological Survey report to the Arizona Department of Transportation, Phoenix, Arizona.
- Paroz, Y.M. and D.L. Propst. 2007. Distribution of spikedace, loach minnow, and chub species in the Gila River Basin, New Mexico, 1908-2007. Submitted to the U.S. Fish and Wildlife Service and U.S. Bureau of Reclamation. New Mexico Department of Game and Fish, Conservation Services Division, Santa Fe, New Mexico. 23 pages.
- Platz, J.E., and J.S. Mecham. 1984. *Rana chiricahuensis*. Catalogue of American Amphibians and Reptiles 347.1.
- Price, A. H. 1980. Geographic Distribution Notes: *Thamnophis eques megalops*. Herpetological Review 11(2):39.
- Propst, D.L. 2007. Systematic investigations of warmwater fish communities. Performance Report FW-17-R-34, 1 July 2006 – 30 June 2007. New Mexico Department of Game and Fish, Santa Fe, New Mexico. 27 pages.
- Propst, D. 2010. February 8, 2010, email transmission from D. Propst, New Mexico Department of Game and Fish, to M. Richardson, U.S. Fish and Wildlife Service re: San Francisco spikedace.
- Propst, D.L., K.R. Bestgen, and C.W. Painter. 1986. Distribution, status, biology, and conservation of the spikedace (*Meda fulgida*) in New Mexico. Endangered Species Report No. 15. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 93 pages.
- Propst, D.L., K.R. Bestgen, and C.W. Painter. 1988. Distribution, status, biology, and conservation of the loach minnow (*Tiaroga cobitis*) in New Mexico. Endangered Species Report No. 17. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 75 pages.
- Propst, D.L. and K.R. Bestgen. 1991. Habitat and biology of the loach minnow, *Tiaroga cobitis*, in New Mexico. Copeia 1991(1):29-38.
- Propst, D. L., J. A. Stefferud, and P. R. Turner. 1992. Conservation and status of Gila trout, *Oncorhynchus gilae*. Southwestern Naturalist 37:117–125.
- Propst, D. L., and J. A. Stefferud. 1997. Population dynamics of Gila trout in the Gila River drainage of the south-western United States. Journal of Fish Biology 51:1137–1154.
- Propst, D.L., Y.M. Paroz, S.M. Carman, and N.D. Zymonas. 2009. Systematic investigations of warmwater fish communities. Performance Report FW-17-R-36, 1 July 2008 – 30 June 2009. New Mexico Department of Game and Fish, Santa Fe, New Mexico. 26 pages.
- Randall-Parker, T. and R. Miller. 2002. Effects of prescribed fire in ponderosa pine on key wildlife habitat components: preliminary results and a method for monitoring. Pages 823-834 In USDA Forest Service General Technical Report PSW-GTR-181.
- Reiners, W.A., W.L. Baker, J.S. Baron, D.M. Debinski, S.A. Elias, D.B. Fagre, J.S. Findlay, L.O. Mearns, D.W. Roberts, T.R. Seastedt, T.J. Stohlgren, T.T. Veblen, and F.H. Wagner. 2003. Natural Ecosystems 1: The Rocky Mountains Pages 145-184. In Wagner, F.H. (Editor.), Preparing for climate change: Rocky Mountain/Great Basin Regional

Mr. Tom Osen, Forest Supervisor

Assessment Team for the U.S. Global Change Research Program. Utah State University. 240 pages.

Reinthal, P. 2011. October 17, 2011, email transmission from Peter Reinthal, University of Arizona to Mary Richardson, U.S. Fish and Wildlife Service regarding Fall 2011 survey data.

Rinne, J.N. 1975. Changes in minnow populations in a small desert stream resulting from natural and artificially induced factors. *Southwest Naturalist* 202(2): 185-195.

Rinne, J. N. 1980. Spawning habitat and behavior of Gila trout, a rare salmonid of the southwestern United States. *Transactions of the American Fisheries Society* 109:83–91.

Rinne, J.N. 1989. Physical habitat use by loach minnow, *Tiaroga cobitis* (Pisces: Cyprinidae), in southwestern desert streams. *The Southwestern Naturalist* 34(1):109-117.

Rinne, J.N., and E. Kroeger. 1988. Physical habitat use by spikedace, *Meda fulgida*, in Aravaipa Creek, Arizona. *Proceedings of the Western Association of Fish and Wildlife Agencies Agenda* 68:1-10.

Robinson, A. 2008a. Muleshoe Cooperative Management Area native fish repatriations, one-year post-stocking monitoring and first augmentation September 15-17 2008. Arizona Game and Fish Department, Research Branch. Phoenix, Arizona. 23 pages.

Robinson, A. 2008b. October 16, 2008, email transmission from T. Robinson, Arizona Game and Fish Department, to M. Richardson, U.S. Fish and Wildlife Service re: Bonita – The Natives Have Been Returned!

Robinson, A. 2009. Repatriation of native fishes to Fossil Creek: monitoring and stocking during 2008. Arizona Game and Fish Department, Phoenix, Arizona. 17 pages.

Robinson, A. 2011. October 13, 2011, email transmission to fossilcreek@nativefishlab.net and others re: Fossil Creek native fish stockings – October 12, 2011.

Robinson, A. 2012. Gila River Basin Native Fishes Conservation Program: Cooperative Agreement 201819J853 Semi-Annual Report for the Period May 1 thru October 31, 2011. Report by Arizona Game and Fish Department to U.S. Fish and Wildlife Service, Arizona Ecological Services, Tucson.

Robinson, A., C. Crowder, and D. Pearson. 2013. Muleshoe Cooperative Management Area native fish restoration: 2012 monitoring. A Gila River Basin Native Fishes Conservation Program Progress Report for Task 3-75f; U.S. Fish and Wildlife Service Cooperative Agreement No. F09AC00084. Arizona Game and Fish Department, Nongame Branch, Phoenix, Arizona.

Robinson, A. T., C. D. Crowder, and D. B. Pearson. 2014. Repatriation of native fishes to Fossil Creek: summary of monitoring and stocking during 2013. A Gila River Basin Native Fishes Conservation Program progress report for task 3-75l, U.S. Fish and Wildlife Service Cooperative Agreement No. F09AC00084. Arizona Game and Fish Department, Phoenix, Arizona.

Mr. Tom Osen, Forest Supervisor

- Robinson, A., D. Orabutt, and C. Crowder. 2009. Loach minnow survey of East Fork Black River and tributaries during July 2009. Arizona Game and Fish Department, Research Branch. Phoenix, Arizona. 6 pages.
- Rorabaugh, J.C. 2008. An introduction to the herpetofauna of mainland Sonora, México, with comments on conservation and management. *Journal of the Arizona-Nevada Academy of Science* 40(1):20-65.
- Rosen, P.C. and C.R. Schwalbe. 1988. Status of the Mexican and Narrow-headed garter snakes (*Thamnophis eques megalops* and *Thamnophis rufipunctatus rufipunctatus*) in Arizona. Arizona Game and Fish Department, Phoenix. 50 pages.
- Rosenberg, K.V., R.D. Ohmart, and B.W. Anderson. 1982. Community organization of riparian breeding birds: response to an annual resource peak. *The Auk* 99(2):260-274.
- Rossmann, D.A., N.B. Ford, and R.A. Seigel. 1996. *The gartersnakes: Evolution and ecology*. University of Oklahoma Press, Norman, Oklahoma. 332 pages.
- Schreiber, D.C. 1978. Feeding interrelationships of fishes of Aravaipa Creek, Arizona. Arizona State University, Tempe, Arizona. 312 pages.
- Schultz, A.A. and Bonar, S.A.. 2006. Spawning and Culture of Gila Chub. Final Report to the Arizona Game and Fish Department. Fisheries Research Report 02-07. Arizona Cooperative Fish and Wildlife Research Unit, U.S. Geological Survey, University of Arizona, Tucson, Arizona.
- Smith, S.J, T. Wigley, and J.A. Edmonds. 2000. "A new route toward limiting climate change?" *Science* 290 (5494): 1109-1110.
- Smith, A.B., A.A. Woodward, P.E.T. Dockens, J.S. Martin, and T.D. McCarthy. 2003. Southwestern willow flycatcher 2002 survey and nest monitoring report. Technical Report 210. Nongame and Endangered Wildlife Program. Arizona Game and Fish Department, Phoenix, Arizona. 57 pages.
- Sogge, M.K., D. Ahlers, and S.J. Sferra. 2010. A natural history summary and survey protocol for the southwestern willow flycatcher. U.S. Geological Survey Techniques and Methods 2A-10. 38 pages.
- Sorensen, J. 2014. December 8, 2014, email transmission from J. Sorensen, Arizona Game and Fish Department, to D. Smith, U.S. Fish and Wildlife Service re: August 2014 narrow-headed gartersnake observations on the East Fork of the Black River near Buffalo Crossing.
- Stefferd, S.E. and P.N. Reinthal. 2005. Fishes of Aravaipa Creek, Graham and Pinal Counties, Arizona. Literature review and history of research and monitoring. Report to U.S. Bureau of Land Management, Safford, Arizona. Cooperative Agreement AAA000011, Task Order AAF030025. University of Arizona, Tucson, Arizona. 80 pages.
- Stewart, I.T., D.R. Cayan, and M.D. Dettinger. 2004. Changes in snowmelt runoff timing in western North American under a "business as usual" climate change scenario. *Climate Change* 62: 217-232.

Mr. Tom Osen, Forest Supervisor

- Tibbets, C.A. 1993. Patterns of genetic variation in three cyprinid fishes native to the American southwest. MS Thesis, Arizona State University, Tempe, Arizona. 127 pages.
- Tibbets, C.A., A.C. Weibel, and T.E. Dowling. 1994. Genetic variation within and among populations of the Little Colorado spinedace. Abstract. American Fisheries Society Western Division Meeting, May 1994.
- Unitt, P. 1987. *Empidonax traillii extimus*: an endangered subspecies. *Western Birds* 18(3):137-162.
- U. S. Fish and Wildlife Service (USFWS). 1967. Native fish and wildlife – Endangered Species. *Federal Register* 32(48):6.
- U. S. Fish and Wildlife Service (USFWS). 1975. Endangered and threatened wildlife. Threatened status for three species of trout. *Federal Register* 40(137): (126):29863-29864.
- U. S. Fish and Wildlife Service (USFWS). 1986a. Endangered and threatened wildlife and plants: Determination of threatened status for the loach minnow. *Federal Register* 51(208):39468-39478.
- U. S. Fish and Wildlife Service (USFWS). 1986b. Endangered and threatened wildlife and plants: Determination of threatened status for the spikedace. *Federal Register* 51(126):23769-23781.
- U. S. Fish and Wildlife Service (USFWS). 1987. Endangered and threatened wildlife and plants: Final rule to determine *Lepidomeda vittata* (Little Colorado spinedace) to be a threatened species with critical habitat. *Federal Register* 52(179):25034-35041.
- U. S. Fish and Wildlife Service (USFWS). 1993. Endangered and threatened wildlife and plants: Final rule to list the Mexican spotted owl as a threatened species. *Federal Register* 58:14248-14271.
- U. S. Fish and Wildlife Service (USFWS). 1994. Endangered and threatened wildlife and plants: Determination of critical habitat for the threatened loach minnow and threatened spikedace. *Federal Register* 51(126):23769-23781.
- U. S. Fish and Wildlife Service (USFWS). 1995a. Recovery Plan for the Mexican Spotted Owl: Vol. I. Albuquerque, New Mexico. 172 pages.
- U. S. Fish and Wildlife Service (USFWS). 1995b. Endangered and threatened wildlife and plants: Final rule determining endangered status for the southwestern willow flycatcher. *Federal Register* 60(38):10694-10715.
- U. S. Fish and Wildlife Service (USFWS). 2000. Endangered and threatened wildlife and plants: Final designation of critical habitat for the spikedace and loach minnow. *Federal Register* 65(80):24328-24372.
- U.S. Fish and Wildlife Service (USFWS). 2001. Endangered and Threatened Wildlife and Plants; 12-Month Finding for a Petition to List the Yellow-billed Cuckoo (*Coccyzus americanus*) in the Western Continental United States. 66 FR 38611.

Mr. Tom Osen, Forest Supervisor

U. S. Fish and Wildlife Service (USFWS). 2002a. Recovery plan for the southwestern willow flycatcher. Albuquerque, New Mexico. 140 pages.

U.S. Fish and Wildlife Service (USFWS). 2002b. Endangered and threatened wildlife and plants; Listing of the Chiricahua leopard frog (*Rana chiricahuensis*). Federal Register 67(114):41790-811.

U.S. Fish and Wildlife Service (USFWS). 2003. Gila trout recovery plan (third revision). U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

U. S. Fish and Wildlife Service (USFWS). 2004. Endangered and threatened wildlife and plants; final designation of critical habitat for the Mexican Spotted Owl: final rule. Federal Register 69(168): 53182-53230.

U. S. Fish and Wildlife Service (USFWS). 2005. Endangered and threatened wildlife and plants; Listing Gila chub as endangered with critical habitat: Final Rule. Federal Register 70(211):66664-66721.

U. S. Fish and Wildlife Service (USFWS). 2006. Endangered and threatened wildlife and plants; withdraw of proposed rule to reclassify the Gila trout (*Oncorhynchus gilae*) from endangered to threatened; special rule for Gila Trout in New Mexico and Arizona. Federal Register 71:40657–40674.

U.S. Fish and Wildlife Service (USFWS). 2007a. Chiricahua leopard frog (*Rana chiricahuensis*) recovery plan. Region 2, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

U. S. Fish and Wildlife Service (USFWS). 2007b. Endangered and threatened wildlife and plants: Designation of critical habitat for the spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*). Federal Register 72(54):13356-13422.

U.S. Fish and Wildlife Service. (USFWS). 2008. Biological and Conference Opinion for the Phase II Utility Maintenance in Utility Corridors on Arizona Forests. USFWS File Number 22410-2007-F-0365. Phoenix, Arizona. 103 pages.

U.S. Fish and Wildlife Service. (USFWS). 2009. Apache Trout Recovery Plan, Second Revision. Albuquerque, New Mexico.

U.S. Fish and Wildlife Service. 2011. Biological Assessment of the Arizona Game and Fish Department's Statewide and Urban Fisheries Stocking Program for the years 2011-2021. Wildlife and Sport Fish Restoration Program, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

U. S. Fish and Wildlife Service (USFWS). 2012a. Recovery plan for the Mexican spotted owl (*Strix occidentalis lucida*), First Revision. Albuquerque, New Mexico. 414 pages.

U.S. Fish and Wildlife Service (USFWS). 2012b. Biological opinion for the continued implementation of the land and resource management plan for the Apache-Sitgreaves National Forests of the southwestern region. USFWS File Code Number 2012-F-0001. Albuquerque, New Mexico.

Mr. Tom Osen, Forest Supervisor

U.S. Fish and Wildlife Service (USFWS). 2012c. Endangered and threatened wildlife and plants; Listing and designation of critical habitat for the Chiricahua leopard frog. Federal Register 76(50):14126-41207.

U.S. Fish and Wildlife Service (USFWS). 2012d. Endangered and threatened wildlife and plants; Determination of endangered status for Three Forks springsnail and threatened status for San Bernardino springsnail throughout their ranges and designation of critical habitat for both species. Federal Register 77(74):23060-23092.

U.S. Fish and Wildlife Service (USFWS) 2012e. Endangered and threatened wildlife and plants; Endangered status and designations of critical habitat for spikedace and loach minnow. Federal Register 77(36):10810-10932.

U.S. Fish and Wildlife Service (USFWS). 2013a. Endangered and threatened wildlife and plants; Proposed designation of critical habitat for the New Mexico meadow jumping mouse: Proposed Rule. Federal Register 78(119):37328-37363.

U.S. Fish and Wildlife Service (USFWS). 2013b. Endangered and threatened wildlife and plants; Designation of critical habitat for the southwestern willow flycatcher. Federal Register 78(2):344-534.

U.S. Fish and Wildlife Service (USFWS). 2013d. Endangered and threatened wildlife and plants; Designation of critical habitat for the northern Mexican gartersnake and narrow-headed gartersnake: Proposed Rule. Federal Register 78(132):41550-41608.

U.S. Fish and Wildlife Service (USFWS). 2013e. Final biological opinion on the Foote Creek Allotment Management Plan, Alpine Ranger District. Arizona Ecological Services, Phoenix, Arizona. 32 pages.

U. S. Fish and Wildlife Service (USFWS) 2014a. Endangered and threatened wildlife and plants; Determination of endangered status for the New Mexico meadow jumping mouse throughout its range. Federal Register 79(111):33119-33137.

U. S. Fish and Wildlife Service (USFWS) 2014b. Species status assessment report: New Mexico meadow jumping mouse (*Zapus hudsonius luteus*). U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 149 pages.

U.S. Fish and Wildlife Service. (USFWS). 2014c. Endangered and threatened wildlife and plants; Determination of threatened status for the western distinct population segment of the yellow-billed cuckoo (*Coccyzus americanus*): Final Rule. Federal Register 79(192):59992-60038.

U.S. Fish and Wildlife Service. (USFWS). 2014d. Endangered and threatened wildlife and plants; Designation of critical habitat for the western distinct population segment of the yellow-billed cuckoo: Proposed Rule. Federal Register 79(158):48548-48652.

U.S. Fish and Wildlife Service. (USFWS). 2014e. Endangered and threatened wildlife and plants; Threatened status for the northern Mexican gartersnake and narrow-headed gartersnake. Federal Register 79(130):38678-38746.

Mr. Tom Osen, Forest Supervisor

U.S. Forest Service. (USFS) 2011. Apache-Sitgreaves NFs 2011 Fire Report and Potential Changes to Threatened and Endangered Species Status. September 15, 2011. 75 pages.

U.S. Forest Service. (USFS). 2013. Proposed land management plan for the Apache Sitgreaves national Forests: Apache, Coconino, Greenlee and Navajo Counties, Arizona. Southwestern Region MB-R3-01-6. Albuquerque, New Mexico. 274 pages.

U.S. Forest Service. (USFS). 2014. Final Biological Assessment for the Apache-Sitgreaves National Forests USDA Forest Service, Southwestern Region (R3) Apache, Coconino, Greenlee, and Navajo Counties, Arizona Land Management Plan. May 29, 2014. Springerville, Arizona. 310 pages.

Vives, S.P. and W.L. Minckley. 1990. Autumn spawning and other reproductive notes on loach minnow, a threatened cyprinid fish of the American southwest. *The Southwestern Naturalist* 35(4):451-454.

Weedman, D., A.L. Girmendonk, and K. Young. 1996. Status Review of Gila Chub, *Gila intermedia*, in the United States and Mexico. Technical Report 91, Nongame and Endangered Wildlife Program, Arizona Game and Fish Department. 120 pages.

Wright, G. and J.K. Frey. 2011. Cool season activity of the meadow jumping mouse in the middle Rio Grande, 2010, Share with Wildlife Grant T-32-P-2, 24, 18 pp. cited from U. S. Fish and Wildlife Service (USFWS) 2014b. Species status assessment report: New Mexico meadow jumping mouse (*Zapus hudsonius luteus*). U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 149 pages.

Mr. Tom Osen, Forest Supervisor

APPENDIX A – CONFERENCE REPORT

In your correspondence requesting consultation on the effects of the programmatic LMP you concluded that the proposed action would not jeopardize the continued existence of the non-essential experimental population (10j) of Mexican wolf. For the purposes of section 7(a)(2) of the ESA, we treat a non-essential experimental population as a species proposed to be listed, except when it occurs in an area within the National Wildlife Refuge System or National Park System. You also concluded that the proposed action would not jeopardize the continued existence of the candidate roundtail chub. We agree with your determinations and provide our rationales below. As part of an informal conference, we also provide advisory recommendations to reduce any adverse effects to proposed species from the proposed action. Should the roundtail chub become listed, you should review your action regarding ongoing affects to the species and request consultation with us as appropriate. Similarly, if critical habitat is proposed and subsequently designated, you should review your action regarding ongoing affects to critical habitat and request consultation with us as appropriate.

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is described above in the Biological Opinion/Conference Opinion (BO/CO) and is included herein by reference. In summary, the proposed action is the implementation of the LMP on the ASNFs. The LMP directs how future activities will be implemented for the programs operated by the ASNFs, including Wildland Fire Management, Ecosystem/Vegetation health, Rangeland Management, Watershed and Soil Management; Engineering Program, Lands and Minerals, Recreation and Wilderness Program, and Wildlife, Fish and Rare Plant Program. A summary of these programs, the ongoing and planned future activities for each program, and standards and guidelines, which minimize the effects of program activities on species and their habitats, are included above in the BO/CO.

Mexican Wolf

The U.S. Fish and Wildlife Service (Service) reintroduced the endangered Mexican gray wolf (*Canis lupus baileyi*) into the Blue Range Wolf Recovery Area, a designated area within the subspecies' probable historic range in 1998. The Blue Range Wolf Recovery Area consists of the entire Apache and Gila National Forests in east-central Arizona and west-central New Mexico (USFWS 1998).

We concur with your determination that the proposed action “is not likely to jeopardize” the Mexican gray wolf because of the wolves' status as an experimental, non-essential population. Wolves found in Arizona are treated as though they are proposed for listing for section 7 consultation purposes. By definition, an experimental, non-essential population is not essential to the continued existence of the species. Thus, no proposed action impacting a population so designated could lead to a jeopardy determination for the entire species.

Mr. Tom Osen, Forest Supervisor

Roundtail Chub

Roundtail chub are found in the Black River and Chevelon and Eagle creeks. In 2012 roundtail chub were introduced into the Blue River on the ASNFs, and it will likely take several years to determine if a population becomes established.

CUMULATIVE EFFECTS

Lands adjacent to the southern and western boundaries of the ASNFs are White Mountain Apache and San Carlos Apache tribal lands. Roundtail chub-occupied streams along this boundary have their headwaters and/or significant tributaries located on tribal lands before they enter and flow onto the ASNFs. Tribal land activities are not specifically known, but have likely included impacts similar to those on ASNFs lands; although likely much reduced in their extent and intensity, and probably limited to timber harvest, livestock grazing, and the management and introduction of nonnative fish species.

Activities on private lands that occur within watersheds containing roundtail chub may include livestock grazing outside of federally-managed allotments, irrigated agriculture, groundwater pumping, stream diversions, bank stabilization, channelization, and recreation. Increasing recreational, residential, or commercial use of the non-Federal lands near the aquatic habitats would likely result in increased cumulative effects to occupied, as well as potentially-occupied roundtail chub habitat through increases in water use, pollution, and alteration of the streambanks from riparian vegetation suppression, bank trampling, and erosion.

CONCLUSION

We agree with your determination that the proposed action will not jeopardize the continued existence of the roundtail chub for the following reasons:

- Management under the LMP is directed towards achieving desired conditions, which include sustaining flows and natural flow regimes in streams; maintaining water quality suitable for supporting growth, reproduction, and migration of native aquatic species, which includes roundtail chub; and maintaining a diversity of instream habitats and organic materials that support fish and aquatic invertebrates.
- Watershed improvement and transportation projects, associated with the Watershed and Soil Management and Engineering programs, are anticipated to maintain or improve the ecological condition of listed and candidate fish habitat during the 10 to 15-year life of the plan. These projects are likely to aid in improving hydrologic conditions within the watershed. Projects that occur for instream improvements could have short-term adverse effects to roundtail chub and their habitat, with an overall beneficial effect. The standards and guidelines detailed in the BA are expected to minimize the effects of the Watershed and Soils Program in the long term.
- Native fish restoration projects are anticipated to reduce or remove nonnative fish in listed fish habitat. These projects would also benefit the roundtail chub.
- Although livestock grazing can impact riparian and aquatic habitats, standards and guidelines include avoiding yearlong grazing in riparian areas, and managing grazing intensity, frequency, and occurrence in a manner that maintains or enhances habitat for

Mr. Tom Osen, Forest Supervisor

wildlife. Livestock access to roundtail chub-occupied habitat is either excluded or limited in many areas due to exclosures, pasture management, and rough terrain.

- The Wildlife, Fish, and Rare Plants Program has 15 desired conditions (4, 7, 20, 23, 24, 26, 27, and 30 through 37) and two objectives (4 and 5) that are integrated into the Watershed and Soils and Ecosystem and Vegetation Health programs that would improve watershed, riparian, aquatic habitat conditions and functions across the ASNFs. Objective 4 sets an annual goal to enhance or restore 5 to 15 miles of stream and riparian habitat. Objective 5 requires completion of at least five projects that remove barriers to fish movement and restores dewatered stream segments. Roundtail chub would benefit from these plan decisions if they are implemented in streams in which they occupy.

These plan decisions may have short-term effects to roundtail chub if ground disturbing projects are done in chub-occupied habitats. There are one standard (2) and seven guidelines (7, 8, 13, 17, 18, 19, and 21) that protect water quality and quantity and stream habitat during these projects. These plan decisions would benefit roundtail chub when they are implemented for projects if they occur in streams in which they occupy.

- The Wildland Fire Management Program uses fire and mechanical treatments to move vegetation towards desired conditions. It also includes wildfire suppression and prevention. The desired conditions associated with this program that affect all forested PVNTs would apply to watersheds that contain roundtail chub. These projects would improve watershed health and restore hydrologic conditions that would improve or maintain roundtail chub habitat. Projects in the watersheds, riparian, and stream zones would have localized, short-term effects including upland soil disturbance, streambank disturbance, vegetation reduction, sedimentation into the stream, and disturbance to roundtail chub. The effects of this program and specific guidelines to reduce those effects to roundtail chub-occupied streams are the same as those described in the BO under listed fish. Please see that section for additional information.
- Implementation of the Recreation and Wilderness, Engineering, Lands and Minerals, and Ecosystem and Vegetation Health Programs have required desired conditions, objectives, standards, and guidelines for each program. These plan decisions include numerous standards and guidelines to reduce or eliminate short-term effects from project implementation on wildlife and fish, which would include roundtail chub. These short-term effects are the same as those described in the biological opinion under listed fish. Please see that section for additional information.

CONSERVATION RECOMMENDATIONS

1. We recommend that the ASNFs work with the Service and AGFD to identify potential habitat to stock and/or reintroduce roundtail chub at additional sites on the ASNFs.
2. We recommend that the ASNFs work with the Service and AGFD to reduce or eliminate non-native fish, bullfrogs, and crayfish from occupied and potential reintroduction streams.
3. Work with the Arizona Department of Environmental Quality, or other suitable partners, to install water quality monitoring equipment.

Mr. Tom Osen, Forest Supervisor

4. We recommend that the ASNFs continue to work to improve the proper functioning condition of perennial and intermittent waters in order to improve existing and potential roundtail chub habitat and connectivity of habitats.
5. We recommend that the ASNFs continue to work with the Service and AGFD to explore opportunities to conserve roundtail chub populations on the ASNFs, including participating in future conservation actions.

New Mexico Meadow Jumping Mouse Proposed Critical Habitat

A total of eight CHUs are proposed, with one unit in Arizona, one unit in Colorado, and the remaining six units in New Mexico (USFWS 2013a). Within each critical habitat unit, there are subunits. In Unit 5 in Arizona, which is within the planning area, there are eight proposed critical habitat subunits. When critical habitat was proposed in 2013, the Service proposed the following PCEs for the jumping mouse, as follows:

PCE 1: Riparian communities along rivers and streams, springs and wetlands, or canals and ditches characterized by one of two wetland vegetation community types: (a) Persistent emergent herbaceous wetlands dominated by beaked sedge (*Carex rostrata*) or reed canarygrass (*Phalaris arundinacea*) alliances; or (b) Scrub-shrub riparian areas that are dominated by willows (*Salix* spp.) or alders (*Alnus* spp.);

PCE 2: Flowing water that provides saturated soils throughout the New Mexico meadow jumping mouse's active season that supports tall (average stubble height of herbaceous vegetation of at least 69 centimeters (27 inches) and dense herbaceous riparian vegetation (cover averaging at least 61 vertical centimeters (24 inches) composed primarily of sedges (*Carex* spp. or *Schoenoplectus pungens*) and forbs, including, but not limited to one or more of the following associated species: spikerush (*Eleocharis macrostachya*), beaked sedge (*Carex rostrata*), reed canarygrass (*Phalaris arundinacea*), rushes (*Juncus* spp. and *Scirpus* spp.), and numerous species of grasses such as bluegrass (*Poa* spp.), slender wheatgrass (*Elymus trachycaulus*), brome (*Bromus* spp.), foxtail barley (*Hordeum jubatum*), or Japanese brome (*Bromus japonicas*), and forbs such as water hemlock (*Circuta douglasii*), field mint (*Mentha arvensis*), asters (*Aster* spp.), or cutleaf coneflower (*Rudbeckia laciniata*);

PCE 3: Sufficient areas of 9 to 24 kilometers (5.6 to 15 miles) along a stream, ditch, or canal that contain suitable or restorable habitat to support movements of individual New Mexico meadow jumping mice; and

PCE 4: Include adjacent floodplain and upland areas extending approximately 100 meters (330 feet) outward from the water's edge (as defined by the bankfull stage of streams).

Effects of the Action on Proposed Critical Habitat

PCE 1: Riparian communities along rivers and streams, springs and wetlands, or canals and ditches.

EFFECT: The Rangeland Management Program authorizes livestock grazing in proposed critical habitat which may result in indirect adverse effects through habitat manipulation. Livestock use

Mr. Tom Osen, Forest Supervisor

on riparian vegetation can result in long-term adverse effects if suitable habitat is not permitted to develop. Watershed and Soil Program implementation may include instream improvement projects which may have localized, short-term adverse effects from projects in riparian zones such as temporary disturbance of habitat through vegetation removal; however, these effects would be minimized by standards and guidelines as previously described. Furthermore, while watershed improvement projects related to instream habitat improvements would likely have short-term adverse effects, we anticipate that long-term benefits to primary constituent elements of critical habitat will occur by maintaining and possibly improving their ability to contribute to the conservation and recovery of the species.

The Engineering Program may have adverse effects if a road is constructed in jumping mouse proposed critical habitat. A road constructed in jumping mouse habitat would result in the permanent loss of the primary constituent elements of critical habitat associated with riparian habitat. Additionally, if road maintenance activities are required at any time, primary constituent elements related to riparian habitat that have regrown could be diminished.

The Lands and Minerals Program may provide access in jumping mouse proposed critical habitat from land exchanges, rights-of-way authorizations, and land withdrawals. Adverse effects could occur from increased access or changes in land ownership of proposed critical habitat. Minerals activities could result in the loss of riparian habitat in those areas.

The Recreation and Wilderness Program authorized activities such as dispersed camping, hiking, and other recreation activities may adversely impact riparian habitat through vegetation manipulation and disturbance. There are numerous plan decisions that address potential impacts of recreation to riparian areas, which would include those proposed as critical habitat. The LMP includes standards and guidelines to reduce the impacts to riparian habitats, including those inhabited by jumping mice; however, there is also direction in the LMP to increase and/or improve recreational opportunities. Over the life of the LMP, this could result in impacts to jumping mouse proposed critical habitat.

PCE 2: Flowing water that provides saturated that supports tall and dense herbaceous riparian vegetation.

EFFECT: Actions implemented under the LMP are expected to retain and protect this PCE. There are standards and guidelines to ensure that areas supporting listed species are not dewatered or impaired to the point that they cannot support riparian and aquatic species and the habitats they require. Actions implemented under the LMP have required standards and guidelines to protect instream flow, consistent with existing water rights and laws, that are expected to retain and protect this PCE.

PCE 3: Sufficient areas of along a stream, ditch, or canal that contain suitable or restorable habitat to support movements of individual New Mexico meadow jumping mice.

EFFECT: The Forest Program effects described under *PCE 1* would apply here. In addition, there are objectives that would enhance or restore stream and riparian habitat which would connect existing habitats and allow movement of riparian obligate species, such as the jumping mouse, between them. Other objectives remove barrier to riparian and aquatic species

Mr. Tom Osen, Forest Supervisor

movement and connect habitats. Roads and motorized trails would be designed and located so as to not impede terrestrial and aquatic species movement and connectivity.

PCE 4: Include adjacent floodplain and upland areas extending approximately 100 meters (330 feet) outward from the water's edge (as defined by the bankfull stage of streams).

EFFECT: The Forest Program effects described under *PCE 1* would apply here, in particular those that do not allow for floodplain development in systems that normally support them (unincised channels). These activities could limit jumping mouse habitat in these reaches if there is no suitable or accessible floodplain and/or upland habitat available for foraging for grass seeds or for hibernation.

CUMULATIVE EFFECTS

Two jumping mouse sites are located on private and AGFD-owned lands: Lower West Fork of the Black River and East Fork of the Little Colorado River. Private land activities include some business and homesites with associated structures as well livestock grazing with facilities. Private land grazing is typically heavy and in some areas occurs year-round.

State activities to date have included jumping mouse surveys by AGFD. AGFD's fish stocking program draws people to jumping mouse sites and proposed critical habitat on the East and West Fork Black Rivers and West and East Forks Little Colorado Rivers.

CONCLUSION

After reviewing the jumping mouse proposed critical habitat, the environmental baseline for the planning area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the ASNFs' LMP will not destroy or adversely modify proposed critical habitat. Our reasoning for determining that implementation of the LMP will not adversely modify proposed critical habitat for the species is as follows:

- The majority of proposed critical habitat is excluded from livestock grazing and/or protected from other Forest Program activities;
- Not all proposed critical habitat is within the planning area; CHUs are also located in New Mexico and Colorado;
- Many of the desired conditions and objectives in the LMP, in particular desired conditions 34, 64, 81, 82, and objectives 4 and 6 (see Appendix B for plan decision descriptions) benefit riparian habitats proposed for critical habitat; and
- Many standards and guidelines within the LMP, in particular standard 3 and guidelines 71 and 76, serve as conservation measures that would benefit proposed critical habitat.

Yellow-billed Cuckoo Proposed Critical Habitat

There are 80 units of proposed critical habitat for the yellow-billed cuckoo in California, Arizona, New Mexico, Colorado, Utah, Idaho, Wyoming, and Texas (USFWS 2014d, pages 48557-48558). Two of these proposed critical habitats units are in the planning area. Unit 25 San Francisco River 1 (AZ-17) includes 1,327 acres (4 mile continuous segment from the Arizona-New Mexico Stateline) and a segment at the river's confluence with Dix Creek. Unit 39

Mr. Tom Osen, Forest Supervisor

Blue River (AZ-31) includes 1,025 acres (8- mile continuous segment) of ASNFs-administer lands.

The Service proposed the following PCEs for yellow-billed cuckoo critical habitat:

PCE 1: Riparian woodlands. Riparian woodlands with mixed willow and cottonwood vegetation, mesquite-thorn forest vegetation, or a combination of these that contain habitat for nesting and foraging in contiguous or nearly contiguous patches that are greater than 325 feet (100 meters) in width and 200 acres (81 hectares) or more in extent. These habitat patches contain one or more nesting groves, which are generally willow-dominated, have above average canopy closure (greater than 70 percent), and have a cooler, more humid environment than the surrounding riparian and upland habitats.

PCE 2: Adequate prey base. Presence of a prey base consisting of large insect fauna (for example, cicadas, caterpillars, katydids, grasshoppers, large beetles, dragonflies) and tree frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas.

PCE 3: Dynamic riverine processes. River systems that are dynamic and provide hydrologic processes that encourage sediment movement and deposits that allow seedling germination and promote plant growth, maintenance, health, and vigor (e.g. lower gradient streams and broad floodplains, elevated subsurface groundwater table, and perennial rivers and streams). This allows habitat to regenerate at regular intervals, leading to riparian vegetation with variously aged patches from young to old.

Effects of the Action on Proposed Critical Habitat

The yellow-billed cuckoo proposed critical habitat would be affected by the same activities and factors discussed above in the BO for the willow flycatcher. Although there are minor differences in the proposed PCEs for yellow-billed cuckoo and those designated for the willow flycatcher, overall the PCEs of the two bird species are almost identical. The differences in project-level effects between these two species will be addressed through project-specific consultations. Please refer to the effects analysis for the willow flycatcher in the BO for a description of the effects to yellow-billed cuckoo proposed critical habitat.

CUMULATIVE EFFECTS

The cumulative effects to yellow-billed cuckoo proposed critical habitat would be the same as those describe above under the willow flycatcher critical habitat. Please see that section for details.

CONCLUSION

After reviewing the proposed critical habitat, the environmental baseline for the planning area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the ASNFs' LMP will not not destroy or adversely modify yellow-billed cuckoo proposed critical habitat. We base our conclusion on the following:

- Watershed improvement projects are anticipated to maintain or improve the ecological condition of yellow-billed cuckoo proposed critical habitat during the life of the plan.

Mr. Tom Osen, Forest Supervisor

- Projects related to the Engineering, Lands and Minerals, and Ecosystem/Vegetation Health programs are expected to be limited in nature and frequency. Therefore, we anticipate those effects to be negligible compared to the amount of proposed critical habitat available to the species rangewide.
- Livestock grazing is not currently where most proposed critical habitat occurs in the planning area. If livestock grazing is authorized within the currently excluded areas during the life of this plan, the desired conditions, standards and guides, and objectives incorporated in the LMP will aid in minimizing the effects of grazing to the proposed critical habitat. In addition, such changes in livestock management would need to be addressed in a site-specific allotment management plan consultation.
- Many of the desired conditions and objectives in the LMP, in particular desired conditions 4, 7, 34, 35, 64, 75, 78, 81, 82, 83, and objectives 4, 6, and 10 (see Appendix B for plan decision descriptions) benefit riparian habitats proposed as critical habitat for the yellow-billed cuckoo.
- Many standards and guidelines within the LMP, in particular standard 3, and guidelines 71, 76, 79, 81, 83, and 132, serve as conservation measures that are beneficial to proposed critical habitat for the yellow-billed cuckoo.

Narrow-headed Gartersnake Proposed Critical Habitat

Critical habitat for narrow-headed gartersnake was proposed in 6 subbasin units in Arizona and New Mexico on July 10, 2013 (USFWS 2013d). In Arizona, proposed critical habitat is located on portions of the Verde, Upper Salt, Middle Gila, Upper Gila, and San Francisco rivers and Tonto Creek. In New Mexico, proposed critical habitat is located on portions of the San Francisco and Upper Gila rivers.

There is a total of approximately 152 miles of proposed critical habitat for the narrow-headed gartersnake on the ASNFs. These are located on Eagle and Campbell Blue creeks and the San Francisco, Black, and Blue rivers (USFWS 2013d).

When critical habitat was proposed in 2013, the Service determined the PCEs for the narrow-headed gartersnake. The proposed PCEs include:

PCE 1: Stream habitat, which includes:

- A. Perennial or spatially intermittent streams with sand, cobble, and boulder substrate and low or moderate amounts of fine sediment and substrate embeddedness, and that possess appropriate amounts of pool, riffle, and run habitat to sustain native fish populations;
- B. A natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads;
- C. Shoreline habitat with adequate organic and inorganic structural complexity (e.g., boulders, cobble bars, vegetation, and organic debris such as downed trees or logs, debris jams), with appropriate amounts of shrub- and sapling-sized plants to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities; and
- D. Aquatic habitat with no pollutants or, if pollutants are present, levels that do not affect survival of any age class of the narrow-headed gartersnake or the maintenance of prey populations.

Mr. Tom Osen, Forest Supervisor

PCE 2: Adequate terrestrial space (600 feet (182.9 meters) lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation.

PCE 3: A prey base consisting of viable populations of native fish species or soft-rayed nonnative fish species.

PCE 4: An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs, and/or crayfish, or occurrence of these nonnative species at low enough levels such that recruitment of narrow-headed gartersnakes and maintenance of viable native fish or soft-rayed nonnative fish populations (prey) is still occurring.

Effects of the Action on Proposed Critical Habitat

PCE 1: Stream Habitat.

EFFECTS: There may be localized, short-term adverse effects to this PCE from watershed improvement projects, roads and trails, livestock grazing, and minerals projects in aquatic habitats such as streambank disturbance and sediment input which may deposit in important native fish habitats. These projects may temporarily reduce the function of critical habitat through diminished native fish habitat; however, we anticipate that this PCE would be maintained or improved in the long-term. In the long-term, projects are expected to improve soil and vegetation condition in the uplands and will likely improve or at least minimize impacts to aquatic and riparian conditions along streams. Implementation of standards and guidelines previously described are anticipated to reduce the effects of forest programs in the sub-watersheds occupied by narrow-headed gartersnakes and their prey.

Actions implemented under the LMP are expected to retain and protect perennial or intermittent flow. There are standards and guidelines to ensure that areas supporting listed species are not dewatered or impaired to the point that they cannot support riparian and aquatic species and the habitats they require. Actions implemented under the LMP have required standards and guidelines to protect instream flow, consistent with existing water rights and laws, that are expected to retain and protect this PCE.

Programs that involved mechanized equipment have guidelines that prevent fuels and other contaminants from entering aquatic habitats. Pesticide use, to control invasive and noxious plant and animals, would be done so to minimize impacts on non-target species.

PCE 2: Adequate terrestrial space adjacent to designated stream systems to support life-history functions such as gestation, immigration, emigration, and brumation.

EFFECTS: The Forest Program effects described above under New Mexico meadow jumping mouse proposed critical habitat would apply here, in particular those that do not allow for floodplain development in systems that normally support them (un-incised channels). These activities could limit narrow-headed gartersnake habitat in these reaches if there is no suitable or accessible floodplain and/or upland habitat available for hibernation.

PCE 3: A prey base consisting of viable populations of native fish species or soft-rayed nonnative fish species.

Mr. Tom Osen, Forest Supervisor

EFFECTS: Program actions that involve ground disturbing projects in the uplands and within riparian and aquatic habitats are expected to have short-term adverse effects to the PCEs of proposed critical habitat related to prey base. There may be localized, short-term adverse effects from projects in watersheds and riparian zones such as sediment input to the streams, temporary disturbance of habitat, and temporary disruption of prey base. Long-term adverse effects may occur when roads, trails, or other heavy use areas are located within proposed critical habitat. However, these effects would be minimized by standards and guidelines as previously described under the narrow-headed gartersnake and listed fish species discussions above.

PCE 4: An absence of harmful nonnative aquatic species or their occurrence is at low enough levels such that recruitment of narrow-headed gartersnakes and important fish prey occurs.

EFFECTS: The ASNFs are implementing conservation measures to ensure that actions implemented under the LMP, particularly movement of water under the Fire Management and Range Management Programs does not result in the incidental movement of nonnative species into critical habitat.

CUMULATIVE EFFECTS

Cumulative effects to the narrow-headed gartersnake proposed critical habitat would involve impacts to its riparian habitat and native fish upon which they depend on for food. Cumulative effects would include residential home development on private lands along occupied streams and the resulting impacts to watershed integrity. Continued use of ground and surface water will result in altered hydrologic regimes and increased sedimentation and pollutant to native fish-occupied streams. Other land uses such as livestock grazing, mining, and vegetation treatments are occurring on State, private, and tribal lands.

CONCLUSION

After reviewing the current status of the narrow-headed gartersnake proposed critical habitat, the environmental baseline for the planning area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the ASNFs' LMP will not destroy or adversely modify proposed critical habitat. Our reasoning for this conclusion is based on the following:

- Watershed improvement projects are anticipated to maintain or improve the ecological condition of narrow-headed gartersnake proposed critical habitat during the 15-year life of the plan. These projects are likely to aid in improving hydrologic conditions within the watershed and maintain or improve the PCEs of critical habitat in the long-term.
- Projects related to the Engineering, Lands and Minerals, and Ecosystem/Vegetation Health programs are expected to be limited in nature and frequency. The amount of habitat expected to be removed is anticipated to be negligible compared to the amount of proposed critical habitat available to the species rangewide.
- Livestock grazing is not currently authorized in all areas proposed as narrow-headed gartersnake critical habitat. In addition, such changes in livestock management would need to be addressed in a site-specific allotment management plan consultation.
- Many of the desired conditions and objectives in the LMP, in particular desired conditions 4, 7, 20, 22, 24, 32, 34, 35, 64, 75, 78, 81, 83, and objectives 4, 6, 10, and 17

Mr. Tom Osen, Forest Supervisor

(see Appendix B for plan decision descriptions) benefit riparian and aquatic habitats that are proposed as critical for the narrow-headed gartersnake.

- Many standards and guidelines within the LMP, in particular standards 3 and 11, and guidelines 71, 76, 79, 81, 83, and 132, serve as conservation measures that are beneficial to the riparian and aquatic habitats proposed as narrow-headed gartersnake critical habitat.

Northern Mexican gartersnake

Critical habitat for northern Mexican gartersnake was proposed in 14 subbasin and national wildlife refuge units in Arizona and New Mexico on July 10, 2013 (USFWS 2013d). In Arizona, proposed critical habitat is located in portions of the Verde, Agua Fria, Bill Williams, Upper Salt, San Pedro, Babocomari, Upper Santa Cruz and Upper Gila rivers, Tonto and Cienega Creeks, Redrock Canyon, and Buenos Aires and San Bernardino National Wildlife Refuges. In New Mexico, proposed critical habitat is located in portions of Mule Creek and the Upper Gila River.

There are 18.8 miles of proposed critical habitat, within the Upper Salt River Subbasin Unit, for the northern Mexican gartersnake on the ASNFs, all on the Black River from the confluence of the East and West Forks of the Black River downstream to the White Mountain Apache Indian Reservation. These 18.8 miles on the Black River overlap the proposed critical habitat for narrow-headed gartersnake on the Black River.

When critical habitat was proposed in 2013, the Service determined the PCEs for the northern Mexican gartersnake as follows:

PCE 1: Aquatic or riparian habitat that includes:

- A. Perennial or spatially intermittent streams of low to moderate gradient that possess appropriate amounts of in channel pools, off-channel pools, or backwater habitat, and that possess a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads; or
- B. Lentic wetlands such as livestock tanks, springs, and cienegas;
- C. Shoreline habitat with adequate organic and inorganic structural complexity to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities (*e.g.*, boulders, rocks, organic debris such as downed trees or logs, debris jams, small mammal burrows, or leaf litter); and
- D. Aquatic habitat with characteristics that support a native amphibian prey base, such as salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and pollutants absent or minimally present at levels that do not affect survival of any age class of the northern Mexican gartersnake or the maintenance of prey populations.

Mr. Tom Osen, Forest Supervisor

PCE 2: Adequate terrestrial space (600 feet (182.9 meters) lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation.

PCE 3: A prey base consisting of viable populations of native amphibian and native fish species.

PCE 4: An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs, and/or crayfish, or occurrence of these nonnative species at low enough levels such that recruitment of northern Mexican gartersnakes and maintenance of viable native fish or soft-rayed nonnative fish populations (prey) is still occurring.

Effects of the Action on Proposed Critical Habitat for the Northern Mexican Gartersnake

The northern Mexican gartersnake proposed critical habitat would be affected by some of the same activities and factors discussed under that of the narrow-headed gartersnake. There are minor differences in the proposed PCEs between the two gartersnake species. The northern Mexican gartersnake proposed critical habitat PCEs include lentic wetlands (livestock stock tanks, springs, and cienegas) and aquatic habitats and water quality thresholds needed to support a native amphibian prey base (USFWS 2013d). The differences in project-level effects between these two gartersnake species will be addressed through project-specific consultations. Please refer to the effects analysis for the narrow-headed gartersnake above for a description of the effects to northern Mexican gartersnake proposed critical habitat.

CUMULATIVE EFFECTS

The Upper Salt River Subbasin Unit of northern Mexican gartersnake proposed critical habitat, with exception to the portion within the San Carlos Apache Indian Reservation, in the planning area is entirely located on ASNFs lands. There are no cumulative effects expected to proposed critical habitat.

CONCLUSION

After reviewing the current status of the northern Mexican gartersnake proposed critical habitat, the environmental baseline for the planning area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the ASNFs' LMP will not destroy or adversely modify proposed critical habitat. Our reasoning for this conclusion is based on the following:

- Watershed improvement projects are anticipated to maintain or improve the ecological condition of narrow-headed gartersnake proposed critical habitat during the 15-year life of the plan. These projects are likely to aid in improving hydrologic conditions within the watershed and maintain or improve the PCEs of proposed critical habitat in the long-term.
- Projects related to the Engineering, Lands and Minerals, and Ecosystem/Vegetation Health programs are expected to be limited in nature and frequency. The amount of habitat expected to be removed is anticipated to be negligible compared to the amount of proposed critical habitat available to the species rangewide.

Mr. Tom Osen, Forest Supervisor

- Many of the desired conditions and objectives in the LMP, in particular desired conditions 4, 7, 20, 22, 24, 32, 34, 35, 64, 75, 78, 81, 83, and objectives 4, 6, 10, and 17 (see Appendix B for plan decision descriptions) benefit riparian and aquatic habitats that are proposed as critical habitat for the northern Mexican gartersnake.
- Many standards and guidelines within the LMP, in particular standards 3 and 11, and guidelines 71, 76, 79, 81, 83, and 132, serve as conservation measures that are beneficial to the riparian and aquatic habitats proposed as northern Mexican gartersnake critical habitat.

Appendix B

Forest Land Management Plan Decisions specifically-referred to in this Biological Opinion (Desired Condition = DC; Objective = OBJ; Standard = ST; and Guideline = GL)¹.

DC 1	Ecological components (e.g., soil, vegetation, water) are resilient to disturbances including human activities, and natural ecological disturbances (e.g., fire, drought, wind, insects, disease, pathogens).
DC 4	Ecological conditions for habitat quality, distribution, and abundance contribute to self-sustaining populations of native and desirable nonnative plants and animals that are healthy, well-distributed, connected, and genetically diverse. Conditions provide for the life history, distribution, and natural population fluctuations of the species within the capability of the landscape.
DC 6	Habitat configuration and availability allows wildlife populations to adjust their movements (e.g., seasonal migration, foraging) in response to climate change and promote genetic flow between wildlife populations.
DC 7	Habitat quality, distribution, and abundance exist to support the recovery of federally listed species and the continued existence of all native and desirable nonnative species.
DC 18	Logs and other woody material are distributed across the surface to maintain soil productivity.
DC 20	Water quality, stream channel stability, and aquatic habitats retain their inherent resilience to natural and other disturbances.
DC 22	Vegetation and soil conditions above the floodplain protect downstream water quality, quantity, and aquatic habitat.
DC 23	Instream flows provide for channel and floodplain maintenance, recharge of riparian aquifers, water quality, and minimal temperature fluctuations.
DC 24	Streamflows provide connectivity among fish populations and provide unobstructed routes critical for fulfilling needs of aquatic, riparian dependent, and many upland species of plants and animals.
DC 26	Stream channels and floodplains are dynamic and resilient to disturbances. The water and sediment balance between streams and their watersheds allow a natural frequency of low and high flows.
DC 27	Stream condition is sufficient to withstand floods without disrupting normal stream characteristics (e.g., water transport, sediment, woody material) or uncharacteristically altering stream dimensions (e.g., bankfull width, depth, slope, sinuosity).

Mr. Tom Osen, Forest Supervisor

DC 30	Water quality meets the needs of desirable aquatic species such as the California floater (<i>Anodonta californiensis</i>), northern (<i>Rana pipiens</i>) and Chiricahua leopard frog, and invertebrates that support fish populations.
DC 31	Streams and aquatic habitats support native fish and/or other aquatic species providing the quantity and quality of aquatic habitat within reference conditions.
DC 32	Habitat conditions contribute to the recovery of federally listed species.
DC 33	Streamflows, habitat, and water quality support native aquatic and riparian-dependent species and habitat.
DC 34	Habitat and ecological conditions are capable of providing for self-sustaining populations of native, riparian dependent plant and animal species.
DC 35	Native fish, reptile, amphibian, and invertebrate populations are free from or minimally impacted by nonnative plants and animals.
DC 36	Aquatic species habitat conditions provide the resiliency and redundancy necessary to maintain species diversity and metapopulations.
DC 37	Desirable nonnative fish species provide recreational fishing in waters where those opportunities are not in conflict with the recovery of native species.
DC 40	The vegetative conditions and functions are resilient to the frequency, extent, and severity of ecological disturbances (e.g., fire, insects and disease, flood, climate change). The landscape is a functioning ecosystem that contains all its components, processes, and better able to cope with climate change.
DC 41	Natural processes and human and natural disturbances (e.g., wildland fire, mechanical vegetation treatments) provide desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling. Natural fire regimes are restored. Uncharacteristic fire behavior is minimal or absent on the landscape.
DC 42	Wildfire maintains and enhances resources and, as nearly as possible, is allowed to function in its natural ecological role
DC 43	Native plant communities dominate the landscape.
DC 44	Species genetic diversity remains within native vegetation and animal populations, thus enabling species to adapt to changing environmental and climatic conditions.
DC 45	Vegetative connectivity provides for species dispersal, genetic exchange, and daily and seasonal movements across multiple spatial scales.
DC 46	Vegetation characteristics (e.g., density, litter) provide favorable conditions for waterflow and quality.
DC 48	Diverse vegetation structure, species composition, densities, and seral states provide quality habitat for native and desirable nonnative plant and animal species throughout their life cycle and at multiple spatial scales. Landscapes provide for the full range of ecosystem diversity at multiple scales, including habitats for those species associated with late seral states and old growth.
DC 50	Old or large trees, multistoried canopies, large coarse woody debris, and snags provide the structure, function, and associated vegetation composition as appropriate for each forested and woodland PNVTs.
DC 52	Insect and disease populations are at endemic levels with occasional outbreaks. A variety of seral states usually restricts the scale of localized insect and disease outbreaks.

Mr. Tom Osen, Forest Supervisor

DC 54	Herbivory is in balance with available forage (i.e., grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed available forage production within established use levels).
DC 58	Stand densities and species compositions are such that vegetation conditions are resilient under a variety of potential future climates.
DC 60	Vegetative ground cover (herbaceous vegetation and litter cover) is optimized to protect and enrich soils and promote water infiltration. There is a diverse mix of cool and warm season grasses and desirable forbs species.
DC 61	Grasses, forbs, shrubs, and litter are abundant and continuous to support natural fire regimes.
DC 64	Herbaceous vegetation amount and structure (e.g., plant density, height, litter, seed heads) provides habitat to support wildlife and prey species.
DC 65	Some isolated infestations of mistletoe provide for a diversity of habitat components (e.g., food, nesting, cover) for a variety of species such as owls, squirrels, and some birds and insects.
DC 72	Beavers occupy capable stream reaches and help promote the function and stability of riparian areas.
DC 75	Willows (e.g., Bebb (<i>Salix bebbiana</i>), Geyer (<i>S. geyeriana</i>), Arizona (<i>S. arizonica</i>), and Goodding's (<i>S. goodingii</i>)) are reproducing with all age classes present, where the potential exists.
DC 77	Sedimentation and soil compaction from forest activities (e.g., vehicle use, recreation, and livestock grazing) does not negatively impact riparian areas.
DC 78	Riparian vegetation consists mostly of native species that support a wide range of vertebrate and invertebrate species and are free of invasive plant and animal species.
DC 79	Diversity and density of riparian forest vegetation provides for breeding, escape, hiding, and resting cover for wildlife and provides travel ways between other habitat areas and seasonal ranges.
DC 81	Riparian obligate species within wet meadows, along streambanks, and active floodplains provide sufficient vegetative ground cover (herbaceous vegetation, litter, and woody riparian species) to protect and enrich soils, trap sediment, mitigate flood energy, stabilize streambanks, and provide for wildlife and plant needs.
DC 82	Riparian soil productivity is optimized as described by the specific TES map unit under consideration as indicated by the vigor of the herbaceous vegetation community. Based on species composition, ungrazed plant heights range from 10 inches to 36 inches.
DC 83	Floodplains and adjacent upland areas provide diverse habitat components (e.g., vegetation, debris, logs) as necessary for migration, hibernation, and brumation (extended inactivity) specific to the needs of riparian-obligate species (e.g., New Mexico meadow jumping mouse, Arizona montane vole (<i>Microtus montanus arizonensis</i>), narrow-headed gartersnake).
DC 85	Vegetation is structurally diverse, often dense, providing for high bird species diversity and abundance, especially neotropical migratory birds. It includes large trees and snags in the cottonwood-willow and mixed broadleaf deciduous riparian forests to support species such as beaver (<i>Castor Canadensis</i>), yellow-billed cuckoo, bald eagles (<i>Haliaeetus leucocephalus</i>), Arizona gray squirrel (<i>Sciurus arizonensis</i>), and various bat species.

Mr. Tom Osen, Forest Supervisor

DC 89	Coarse woody debris, including logs, ranges from 3 to 10 tons per acre. Logs average 3 per acre within the forested area of the landscape.
DC 90	Where it naturally occurs, Gambel oak is present with all age classes represented. It is reproducing to maintain or expand its presence on capable sites across the landscape. Large Gambel oak snags are typically 10 inches or larger in diameter and are well distributed.
DC 93	Frequent, low to mixed severity fires occurring approximately every 2 to 17 years, are characteristic in this PNVT (Applies to the Ponderosa Pine PNVT).
DC 100	Trees typically occur in irregularly shaped groups and are variably spaced with some tight clumps. Tree crowns in the mid- to old-aged groups are interlocking or nearly interlocking providing for species such as Abert's squirrel.
DC 103	Where Gambel oak occurs, the majority are single trunk trees over 8 inches in diameter with full crowns.
DC 105	The forest arrangement consists of small clumps and groups of trees interspersed within variably-sized interspaces of grass, forb, and shrub vegetation associations similar to reference conditions. Size, shape, number of trees per group, and number of groups per area are variable across the landscape. Where they naturally occur, groups of Gambel oak are healthy and maintained or increased. Tree density may be greater in some locations, such as north-facing slopes and canyon bottoms.
DC 111	Old growth occurs throughout the landscape, in small, discontinuous areas consisting of clumps of old trees, or occasionally individual old trees. Other old growth components are also present including dead trees (snags), downed wood (coarse woody debris), and/or structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).
DC 112	Frequent, low to mixed severity fires occurring every 10 to 22 years are characteristic in this PNVT (Dry Mixed Conifer).
DC 119	Trees typically occur in irregularly-shaped groups and are variably spaced with some tight clumps. Tree crowns in the mid- to old-aged groups are interlocking or nearly interlocking providing for species such as red squirrel.
DC 127	Old growth occurs over large, continuous areas. Old growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and/or structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality) (Applies to Wet Mixed Conifer PNVT).
DC 128	Mixed severity fire is characteristic of this forest. High severity fires rarely occur. (Applies to Wet Mixed Conifer PNVT).
DC 133	Coarse woody debris, including logs, varies by seral state, ranging from 5 to 20 tons per acre for early-seral states; 20 to 40 tons per acre for mid-seral states; and may be as high as 35 tons per acre, or greater, for late-seral states. These conditions also provide an abundance of fungi including mushrooms and truffles used by small mammals.
DC 138	In mid-aged and older forests, trees are typically variably spaced with crowns interlocking (grouped and clumped trees) or nearly interlocking providing for species such as red squirrel. Trees within groups can be of similar or variable species and ages.

Mr. Tom Osen, Forest Supervisor

DC 144	Old growth occurs over large, continuous areas. Old growth components include old trees, dead trees (snags), downed wood (coarse woody debris), and/or structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality) (Applies to the Spruce-Fir PNVT).
DC 145	In the spruce-fir PNVT, mixed to high severity fires occur infrequently.
DC 150	Coarse woody debris, including logs, varies by seral state, ranging from 5 to 30 tons per acre for early-seral states; 30 to 40 tons per acre for mid-seral states; and 40 tons per acre or greater for late-seral states. These conditions also provide an abundance of fungi including mushrooms and truffles used by small mammals.
DC 166	Fires are typically of low or occasionally moderate severity and occur every 5 to 20 years (Applies to Madrean Pine-Oak PVNT).
DC 167	Some large patches in the Madrean pine-oak woodland are closed canopy, have multiple age classes, large trees, and old growth-like characteristics (e.g., numerous snags, large coarse woody debris) in order to provide for wildlife such as Mexican spotted owl and black bear (<i>Ursus americanus</i>) that need denser habitat.
DC 196	Habitat conditions contribute to the recovery of federally listed species.
DC 197	Habitat is well distributed and connected.
DC 198	Wildlife are free from harassment and disturbance at a scale that impacts vital functions (e.g., breeding, rearing young) that could affect persistence of the species.
DC 200	Localized rare plant and animal communities are intact and functioning.
DC 211	Recreation use does not negatively affect wildlife habitat and populations. Negative interactions between people and wildlife are minimized.
DC 235	The location and design of roads and trails does not impede wildlife and fish movement.
DC 263	The ASNFs exist in a pattern that promotes efficient management which consists of large contiguous tracts of National Forest System lands.
DC 274	The collection of live plants, mushrooms, and other forest products does not impact species persistence onsite.
DC 278	Livestock grazing is in balance with available forage (<i>i.e.</i> , grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed available forage production within established use levels).
DC 292	ASNFs water rights are secure and contribute to livestock, recreation, wildlife, and administrative uses.
DC 293	Surface water is not diminished by groundwater pumping.
DC 296	Wildland fires burn within the range of frequency and intensity of natural fire regimes. Uncharacteristic high-severity fires rarely occur and do not burn at the landscape scale
DC 299	Watershed condition rating is at satisfactory.
OBJ 1	During the planning period, improve the condition class on at least 10 priority 6th level HUC watersheds by removing or mitigating degrading factors.
OBJ 4	Annually, enhance or restore 5 to 15 miles of stream and riparian habitat to restore structure, composition, and function of physical habitat for native fisheries and riparian-dependent species.
OBJ 5	During the planning period, complete at least five projects (e.g., remove barriers, restore dewatered stream segments, or connect fragmented habitat) to provide for aquatic and riparian associated species and migratory species.

Mr. Tom Osen, Forest Supervisor

OBJ 6	Annually, move 200 to 500 acres toward desired composition, structure, and function of streams, floodplains, and riparian vegetation.
OBJ 7	Within the planning period, relocate, repair, improve, or decommission a minimum of 4 miles of National Forest System roads or trails that add sediment to streams, damage riparian vegetation, erode streambanks, cause gullies, and/or compact floodplain soils
OBJ 8	Annually, remove an average of 2 miles of unauthorized roads or trails that add sediment to streams, damage riparian vegetation, erode streambanks, cause gullies, and/or compact floodplain soils.
OBJ 10	Annually, work with partners to reduce animal damage to native willows and other riparian species on an average of 5 miles of riparian habitat.
OBJ 11	Annually, treat 5,000 to 35,000 acres to reduce tree densities, restore natural fire regimes, promote species habitat and ecosystem health, reduce fire hazard, maintain desired conditions, initiate recovery from uncharacteristic disturbance, and provide forest products, leaving a desired mix of species with the range of desired densities that are resilient to changing climatic conditions.
OBJ 17	Annually, control or eradicate invasive species (e.g., tamarisk, bullfrogs) on at least 2 stream miles.
OBJ 18	Annually, rehabilitate, stabilize, revegetate, or relocate an average of five dispersed campsites to improve recreation opportunities and/or protect the environment.
OBJ 27	Annually, survey and post on average 2 to 5 miles of un-posted National Forest System boundary.
ST 2	When drafting (withdrawing) water from streams or other water bodies, measures will be taken to prevent entrapment of fish and aquatic organisms and the spread of parasites or disease (e.g., Asian tapeworm (<i>Bothriocephalus acheilognathi</i>), chytrid fungus (<i>Batrachochytrium dendrobatids</i>), whirling disease (<i>Myxobolus cerebralis</i>).
ST 3	Across the planning unit, within each PNVT, vegetation management activities shall be designed to maintain or move plant composition towards a moderate to high plant community similarity as compared to site potential.
ST 4	Vegetation treatments shall include measures to reduce the potential for introduction of invasive plants and animals and damage from nonnative insects and diseases.
ST 9	Harvesting systems shall be selected based on their ability to meet desired conditions and not strictly on their ability to provide the greatest dollar return.
ST 11	Projects and authorized activities shall be designed to reduce the potential for introduction of new species or spread of existing invasive or undesirable aquatic or terrestrial nonnative populations.
ST 13	Dispersed campsites shall not be designated in areas with sensitive soils or within 50 feet of streams, wetlands, or riparian areas to prevent vegetation and bank damage, soil compaction, additional sediment, or soil and water contamination.
ST 15	Motorized vehicle travel shall be managed to occur only on the designated system of National Forest System roads and motorized trails and designated motorized areas.
ST 16	Unless specifically authorized, motorized cross-country travel shall be managed to occur only in designated motorized areas.
ST 18	Road maintenance and construction activities shall be designed to reduce sediment (e.g., water bars, sediment traps, grade dips) while first providing for user safety.

Mr. Tom Osen, Forest Supervisor

ST 24	Authorizations to cut, collect, or use forest products for any personal, commercial, or scientific purpose (<i>i.e.</i> , permits, contracts, agreements) shall include provisions to ensure the needs of wildlife, which depend upon those forest products, will continue to be met (<i>e.g.</i> , fungi and cone collection with respect to overwinter forage needs of squirrels).
ST 31	Special uses for water diversions shall maintain fish, wildlife, and aesthetic values and otherwise protect the environment.
GL 2	Projects with ground-disturbing activities should be designed to minimize long and short term impacts to soil resources. Where disturbance cannot be avoided, project specific soil and water conservation practices should be developed.
GL 4	Locally collected seed should be used where available and cost effective. Seeds should be tested to ensure they are free from noxious weeds and invasive nonnative plants at a State certified seed testing laboratory before acceptance and mixing.
GL 7	Streams, streambanks, shorelines, lakes, wetlands, seeps, springs, and other bodies of water should be protected from detrimental changes in water temperature and sediment to protect water quality, aquatic species and riparian habitat.
GL 8	Aquatic management zones should be in place between streams and disturbed areas and/or road locations to maintain water quality and suitable stream temperatures for aquatic species.
GL 9	As State of Arizona water rights permits (<i>e.g.</i> , water impoundments, diversions) are issued, the base level of instream flow should be retained by the ASNFs.
GL 10	Constraints (<i>e.g.</i> , maximum limit to which water level can be drawn down or minimum distance from a connected river, stream, wetland, or groundwater-dependent ecosystem) should be established for new groundwater pumping sites permitted on National Forest System lands in order to protect the character and function of water resources.
GL 13	To protect water quality and aquatic species, heavy equipment and vehicles driven into a water body to accomplish work should be completely clean of petroleum residue. Water levels should be below the gear boxes of the equipment in use. Lubricants and fuels should be sealed such that inundation by water should not result in leaks.
GL 17	To prevent degradation of native species habitat and the incidental or accidental introduction of diseases or nonnative species, aquatic species should not be transferred through management activities from one 6 th level HUC watershed to another.
GL 18	Sufficient water should be left in streams to provide for aquatic species and riparian vegetation.
GL 19	Projects and activities should avoid damming or impounding free-flowing waters to provide stream flows needed for aquatic and riparian-dependent species.
GL 21	When new water diversions are created or existing water diversions are reanalyzed, measures should be taken to prevent entrapment of fish and aquatic organisms.
GL 23	Landscape scale restoration projects should be designed to spread treatments out spatially and/or temporally within the project area to reduce implementation impacts and allow reestablishment of vegetation and soil cover.
GL 24	Restoration methods, such as thinning or prescribed fire, should leave a mosaic of untreated areas within the larger treated project area to allow recolonization of treated areas by plants, small mammals and insects (<i>e.g.</i> , long-tailed voles (<i>Microtus longicaudus</i>), fritillary butterflies (Family: Nymphalidae)).

Mr. Tom Osen, Forest Supervisor

GL 29	Projects should include quantitative and/or qualitative objectives for implementation monitoring and effectiveness monitoring to assist in moving toward or maintaining desired conditions.
GL 30	Ground-disturbing projects (including prescribed fire) which may degrade long-term riparian conditions should be avoided.
GL 31	Wet meadows, springs, seeps, and cienegas should not be used for concentrated activities (e.g., equipment storage, forest product or mineral stockpiling, livestock handling facilities, special uses) that cause damage to soil and vegetation.
GL 32	Active grazing allotments should be managed to maintain or improve to desired riparian conditions.
GL 33	Storage of fuels and other toxicants should be located at least 100 feet outside of riparian areas to prevent spills that could impair water quality or harm aquatic species.
GL 34	Equipment should be fueled or serviced at least 100 feet outside of riparian areas to prevent spills that could impair water quality or harm aquatic species.
GL 35	Construction or maintenance equipment service areas should be located at least 100 feet and treated to prevent gas, oil, or other contaminants from washing or leaching into streams.
GL 47	Where Gambel oak or other native hardwood trees and shrubs are desirable to retain for diversity, treatments should improve vigor and growth of these species.
GL 50	Where consistent with project or activity objectives, canopy cover should be retained on the south and southwest sides of small, existing forest openings that are naturally cooler and moister. These small (generally one-tenth to one-quarter acre) shaded openings provide habitat conditions needed by small mammals, plants, and insects (e.g., Merriam's shrew (<i>Sorex merriami</i>), Mogollon clover (<i>Trifolium rusbyi neurophyllum</i>), four-spotted skipperling butterfly (<i>Piruna polingii</i>)). Where these openings naturally occur across a project area, these conditions should be maintained on an average of 2 or more such openings per 100 acres.
GL 59	Where Mexican spotted owls are found nesting in canyons or on north slopes within the Madrean pine-oak woodland, adjacent treatments should be modified to meet the needs of foraging owls.
GL 65	Activities occurring within federally listed species habitat should apply habitat management objectives and species protection measures from recovery plans.
GL 67	Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives.
GL 70	During treatments, snags should be retained in the largest diameter classes available as needed to meet wildlife or other resource needs.
GL 71	Cool and/or dense vegetation cover should be provided for species needing these habitat components (e.g., Goodding's onion (<i>Allium goodingii</i>), black bear, White Mountains chipmunk (<i>Tamias sp.</i>), western yellow-billed cuckoo).
GL 76	The needs of localized species (e.g., New Mexico meadow jumping mouse, Bebb willow, White Mountains paintbrush (<i>Castilleja sulphurea</i>)) should be considered and provided for during project activities to ensure their limited or specialized habitats are not lost or degraded.
GL 81	Pesticide use should minimize impacts on nontarget plants and animals.

Mr. Tom Osen, Forest Supervisor

GL 86	Management should emphasize long-term reestablishment of native deciduous trees, shrubs, and herbaceous vegetation to maintain ecosystem diversity.
GL 87	An adequate number and size of snags and logs, appropriate for the affected PNVT, should be retained individually and in clumps to provide benefits for wildlife and coarse woody debris for soil and other resource benefits.
GL 94	Timing restrictions on recreation uses should be considered to reduce conflicts with wildlife needs or soil moisture conditions.
GL 95	Dispersed campsites should not be located on or adjacent to archaeological sites or sensitive wildlife areas.
GL 99	New roads, motorized trails, or designated motorized areas should be located to avoid meadows, wetlands, riparian areas, stream bottoms, sacred sites, and areas with high concentrations of significant archaeological sites. The number of stream crossings should be minimized or mitigated to reduce impacts to aquatic species.
GL 100	As projects occur in riparian or wet meadow areas, unneeded roads or motorized trails should be closed or relocated, drainage restored, and native vegetation reestablished to move these areas toward their desired condition.
GL 105	Roads and motorized trails should be designed and located so as to not impede terrestrial and aquatic species movement and connectivity.
GL 132	Critical areas should be managed to address the inherent or unique site factors, conditions, values, or potential conflicts associated with them.
GL 133	Grazing use on seasonal allotments should be timed to the appropriate plant growth stage and soil moisture.
GL 134	New livestock troughs, tanks, and holding facilities should be located out of riparian areas to reduce concentration of livestock in these areas. Existing facilities in riparian areas should be modified, relocated, or removed where their presence is determined to inhibit movement toward desired riparian or aquatic conditions.
GL 136	Forage, browse, and cover needs of wildlife, authorized livestock, and wild horses should be managed in balance with available forage.
GL 138	To minimize potential resource impacts from livestock, salt or nutritional supplements should not be placed within a quarter of a mile of any riparian area or water source. Salt or nutritional supplements should also be located to minimize herbivory impacts to aspen clones.
GL 139	To prevent resource damage (<i>e.g.</i> , streambanks) and disturbance to federally listed and sensitive wildlife species, trailing of livestock should not occur along riparian areas. Where no alternative route is available, approval may be granted where effective mitigation measures are implemented (<i>e.g.</i> , timing of trailing, number of livestock trailed at one time).
GL 146	Streambed and floodplain alteration or removal of material should not occur if it prevents attainment of riparian, channel morphology, or streambank desired conditions.
GL 166	As applicable, issuance of special use authorizations should incorporate measures to reduce potential impacts to wildlife and avoid rare and unique habitats (<i>e.g.</i> , bogs, fens).
GL 171	Wildland fire may be used to meet PNVT desired conditions and enable natural fire regimes.
GL 174	Firelines, helispots, and fire camps should be located to avoid disturbance to critical species and impacts to cultural resources.

Mr. Tom Osen, Forest Supervisor

GL 175	Aerial retardant drops should avoid threatened, endangered, proposed, or candidate, or identified sensitive species and waterways).
GL 206	Research special use authorizations should limit impacts to sensitive resources, unique features, and species within recommended RNAs.

¹ Not all plan decisions in the LMP are relevant to this biological opinion.