Ms. Teresa A. Chase, Forest Supervisor  
Prescott National Forest  
344 South Cortez Street  
Prescott, Arizona 86303

RE: Biological and Conference Opinion – Land and Resource Management Plan for the  
Prescott National Forest

Dear Ms. Chase:

Thank you for your January 24, 2014 letter, received January 27, 2014, 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 and Resource Management Plan for the Prescott National Forest” (LRMP) for lands  
located in Coconino and Yavapai Counties, Arizona (dated January 2014). The proposed action  
may affect the endangered Gila chub (*Gila intermedia*) and its critical habitat, endangered Gila  
topminnow (*Poeciliopsis occidentalis occidentalis*), threatened Gila trout (*Oncorhynchus gilae*),  
edangered spikedace (*Meda fulgida*) and its critical habitat, endangered loach minnow (*Tiaroga  
cobitis*) and its critical habitat, endangered razorback sucker (*Xyrauchen texanus*) and its critical  
habitat, threatened Mexican spotted owl (*Strix occidentalis lucida*) and its critical habitat,  
edangered southwestern willow flycatcher (*Empidonax traillii extimus*) and its critical habitat,  
threatened northern Mexican gartersnake (*Thamnophis eques megalops*) and its proposed critical  
habitat, threatened narrow-headed gartersnake (*Thamnophis rufipunctatus*) and its proposed  
critical habitat, and proposed threatened yellow-billed cuckoo (*Coccyzus americanus occidentalis*).  
Additionally, you asked us to concur with your determination that the proposed  
action is not likely to jeopardize the experimental non-essential population of Colorado  
pikeminnow (*Ptychocheilus lucius*), candidate Sonoran desert tortoise (*Gopherus morafkai*), and  
candidate roundtail chub (*Gila robusta*). We are providing conference reports for the Colorado  
pikeminnow, Sonoran desert tortoise, and roundtail chub (Appendix A).
This biological and conference opinion (BO/CO) is based on information provided in the January 2014 biological assessment (BA), the August 2012 draft environmental impact statement (DEIS), the January 2014 revised LRMP, 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

- November 28, 2012 – We provided comments on the draft EIS and draft LRMP through the Department of the Interior Office of Environmental Policy and Compliance.
- April 16, 2013 – We confirmed the species list for this consultation.
- April 19, 2013 – We signed a consultation agreement regarding the process for this consultation.
- May 15, 2013 – We met with Prescott National Forest (NF; Forest) and Forest Service Regional Office staff to discuss the consultation process and other relevant items, and updated the species list.
- May to September 2013 – We exchanged emails and telephone calls with comments regarding draft sections of the BA.
- October 30, 2013 – We met with Prescott NF staff to discuss effects to species and the consultation schedule.
- November 27, 2013 – We provided comments via email on the preliminary draft BA.
- January 9, 2014 – We received a final draft BA for review.
- January 23, 2014 – We responded to your request for comments on the final draft BA.
- January 27, 2014 – We initiated formal consultation.
- May 23, 2014 – We provided a draft BO/CO for your review.
- June 20, 2014 – We received your comments on the draft BO/CO.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action being analyzed in this BO/CO is the implementation of the revised Prescott NF LRMP. The action area addressed in this BO/CO includes all lands under the jurisdiction of the Prescott NF (Figure 1) and all adjacent lands that could be directly or indirectly affected by
decisions or actions implemented under the direction of the revised LRMP. The Prescott NF occupies 1.25 million acres of west-central Arizona within Yavapai and Coconino Counties, with nearly 97 percent occurring within Yavapai County. Adjacent lands include: the Coconino, Kaibab, and Tonto National Forests; the Agua Fria National Monument managed by the Bureau of Land Management; Arizona State Trust lands; and several communities including Prescott, Camp Verde, and Cottonwood. The Prescott NF is divided into three ranger districts: Bradshaw, Chino Valley, and Verde.

Once finalized, the revised LRMP will replace the 1987 Prescott NF LRMP and its amendments, and this BO/CO will replace the BO/CO issued on March 30, 2012, which addressed effects from continued implementation of the 1987 LRMP (USFWS Region 2 file number 2012-F-0009). This revised LRMP provides forest-level direction to meet the Forest Service’s mission during management of activities on the Prescott NF over the next 10 to 15 years. The revised LRMP does not specifically authorize any projects or activities. Site-specific actions would be subject to future consultations, as required. This consultation will cover up to a 15-year period or until the LRMP is revised, with periodic reviews.

The revised LRMP includes the following types of decisions:

- Desired conditions are goals that express an aspiration, often to achieve long term ecosystem restoration and resiliency. They form the basis for projects, activities, and uses that will occur under the LRMP. Site-specific projects will be designed to maintain or move towards desired conditions over the long term. Desired conditions provided in the revised LRMP include goals related to important ecosystem elements such as resilience to climate change, airsheds, watersheds, vegetation, and aquatic and terrestrial wildlife; as well as social and cultural resources including recreation, wilderness, scenic beauty, open space, transportation system, and public access and use opportunities on the Forest.

- Objectives are the short-term mechanisms that will be used during the planning period 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 set sideboards on the achievement of desired conditions and objectives by setting requirements to limit or guide Forest uses or activities that are expected to occur under the LRMP. 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. Thus, standards and guidelines are often mitigating measures placed on objectives.

- Suitability determinations identify areas of land as suitable or unsuitable for the specific uses of timber, livestock grazing, and recreation activities.

- Management area and special designations, or recommendations for special designations, identify areas with differing desired conditions, uses, standards, and/or guidelines than
the Forest-wide plan direction. Examples include wilderness, botanical areas, and wild and scenic rivers.

- Monitoring and evaluation requirements for LRMP implementation are used to:
  1) determine the degree to which on-the-ground management is maintaining or making progress towards desired conditions, 2) evaluate plan implementation effectiveness, and 3) inform adaptive management. Required monitoring and evaluation are among the proposed actions being consulted on.

The LRMP does not make site-specific decisions about exactly how, when, and where these activities will be carried out. However, all site-specific activities must conform to the programmatic framework set up in the LRMP (they must include the standards and guidelines) and they must meet site-specific National Environmental Policy Act (NEPA) and ESA requirements. Implementation of ongoing projects and the issuance of incidental take associated with those projects are covered under this programmatic opinion since this consultation supersedes all previous Prescott NF LRMP consultations.

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 Fish and Wildlife Service (FWS) for individual projects implemented under the LRMP. Furthermore, it should be noted that amendments (e.g., deleting/changing standards or guidelines) to the LRMP 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. Furthermore, wildfire and wildland fire use are not analyzed in this BO/CO as they will be covered under separate emergency ESA section 7(a)(2) consultation as required.

Although the LRMP does not make site-specific decisions, it does provide direction to the Prescott NF regarding how current and future activities will be carried out. Incidental take anticipated in this BO/CO would 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 Prescott NF by program area. The standards and guidelines for each program also function as conservation measures for those programs. We will also work with Prescott NF on design of future site-specific projects to determine whether additional conservation measures should be incorporated.

**Watershed and Soils**

The watershed and soils program is responsible for maintaining or improving the condition of watersheds managed by the Prescott NF. Desired conditions were developed from the subbasin to subwatershed scales (BA Table 2) to assist with the restoration and maintenance of watershed integrity, and to increase the resilience and adaptive capacity of watersheds and riparian...
corridors on the Forest during climate changes. Methods used to meet the overall objectives of the program include assessing watershed condition; prioritizing watersheds for protection or improvement; coordinating with other Federal, State, and tribal agencies; securing water rights under State or Federal law to meet National Forest System management; improving and maintaining water quality through the use of best management practices; improving and protecting riparian areas and other groundwater dependent ecosystems; protecting floodplains; and planning and implementing burned area emergency response (BAER) activities. Projects would be designed to protect and improve watershed condition and would employ best management practices, standards and guidelines, and mitigation measures to protect soils and watershed resources.

The revised LRMP includes four objectives with direction for watershed and soils program activities during the 10 years following plan approval:

- **Obj-18**: Implement 5 to 50 essential projects within high-priority watersheds that improve or maintain watershed conditions. Activities could include, but would not be limited to, range improvements to distribute grazing, treatments to increase vegetative ground cover, stream stabilization, and mining restoration.
- **Obj-19**: Implement projects to counter 1 to 3 critical threats to riparian system functionality. Activities could include, but are not limited to, vegetation reestablishment, nonnative invasive plant treatments, erosion control, instream habitat improvements, adjusting the timing and season of grazing, and fencing.
- **Obj-23**: Maintain or enhance 25 to 55 discrete sites that are water dependent ecosystems containing seeps and springs.
- **Obj-31**: Apply for at least 8 instream flow water rights to enable the Prescott NF to provide for channel and floodplain maintenance and recharge of riparian aquifers.

**Standards and guidelines** for watershed and soils include:

- Construction or maintenance equipment service areas shall be located at least 100 feet from the edges of all riparian corridors, seeps, and springs to prevent gas, oil, or other contaminants from washing or leaching into aquatic and riparian habitats.
- Equipment working on open water and wetlands shall be cleaned prior to entry into such areas to remove gas, oil, and other contaminants.
- Containment measures shall be employed within 100 feet from the edge of all riparian corridors, seeps, and springs for storage of fuels and other toxicants to prevent degradation of water quality and aquatic habitat.
- Ground-disturbing projects should not alter the long term hydrologic regime within 6th level hydrologic units (subwatersheds). The long term hydrologic effects analysis should evaluate the level of disturbance; type of activity; and soil, geologic, and streamflow characteristics and expected recovery periods.
- Riparian-dependent resources should be managed to maintain and improve productivity and diversity of riparian-dependent species. Riparian communities should provide for the sustainability of aquatic and riparian species.
- Potential adverse effects to stream channel features (e.g., streambanks, obligate riparian vegetation) should be minimized by modifying management actions. Examples of
modification could include, but are not limited to, adjusting timing and season of grazing, limiting use and location of heavy machinery, or avoiding placing trails or other recreation structures where recreation use could negatively affect stream channel features.

- Ground cover sufficient to filter runoff and prevent erosion should be retained in riparian corridors, seeps, and springs.
- New infrastructure or facilities (e.g., roads, trails, parking lots, trailheads, and energy transmission lines) should be located outside of riparian corridors. If crossing such areas with transmission lines is unavoidable, design features should be used to maintain hydrologic function and minimize impacts on riparian habitats.
- Infrastructure or facilities locations that lead to erosion or negative impacts to riparian systems should be mitigated and/or corrected. If no permanent correction is possible, they should be relocated outside of riparian corridors as opportunities arise.
- Operation of heavy equipment, such as dozers, backhoes, or vehicles, in stream channels, seeps, and springs should be avoided. If use of equipment in such areas is required, site-specific design features should be implemented to minimize disturbance to soil and vegetation. Restoration or stabilization should occur immediately following disturbance.
- Along perennial streams, perennial intermittent streams, and spring ponds, mitigations such as off-site water for livestock should be provided to reduce impacts on riparian communities and groundwater dependent sites.
- Measures that restrict use should be considered as a way to mitigate recurring negative impacts to aquatic species and riparian plants. These could include, but are not limited to, installation of barriers, road closures, area closures, or seasonal restrictions.
- Projects should be designed to limit activities that would cause long term impacts to soils such as loss of ground cover, severely burned soils, detrimental soil displacement, erosion, puddling, or compaction. Where disturbance cannot be avoided, project-specific soil and water conservation practices should be developed.
- Down logs and coarse woody debris should be retained at the appropriate tonnage per potential natural vegetation type (PNVT) as outlined in the “Vegetation” desired condition sections to retain soil productivity.
- Operation of heavy equipment, such as dozers, backhoes, or vehicles, on slopes with a grade of 40 percent or greater should be avoided. If use of equipment in such areas is required, site-specific design features should be implemented to minimize disturbance to soil and vegetation.
- Project-specific design features to avoid soil impacts should be used when projects occur on slopes with a grade of 40 percent or greater or on soils that are sensitive to degradation when disturbed.
- Ground-disturbing activity should be avoided when the soil moisture level is such that activity would cause damage to the soil character or function.

**Wildlife/Fish/Rare Plants**

The wildlife/fish/rare plants program involves a variety of activities conducted by the Prescott NF and its partners, including inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, development of
conservation strategies, administrative studies, collaboration with research, and information and education.

The wildlife/fish/rare plants program is tasked to manage habitats for all existing native and desired nonnative wildlife, fish, and plant species in order to maintain viable populations (Forest Service Manual 2620.1). Desired conditions for terrestrial and aquatic wildlife species include managing vegetation and aquatic conditions for federally-listed species that are consistent with recovery plans, ecological and habitat conditions that contribute to survival and recovery, and habitat conditions that help to preclude listing of candidate and proposed species as threatened or endangered. Additional desired conditions for aquatic wildlife include streams, springs, and wetlands that have the potential to support native fish and aquatic species; quantity and timing of flows that enhance aquatic habitat and ecological functions; suitable water quality to support the life functions of these species; riparian vegetation communities trending towards properly functioning condition; and aquatic habitats free of negative impacts from nonnative plant and animal species.

Five objectives (24-28) include direction for wildlife/fish/rare plants program activities; objective 24 is pertinent to this consultation and includes direction to work with FWS and Arizona Game and Fish Department (AGFD) to restore native fish species to 2 to 3 stream reaches during the 10 years following plan approval. Possible locations for restoration of native species include reaches along the upper Verde River as well as portions of Sycamore Creek, downstream from Pine Mountain Wilderness.

Standards and guidelines for wildlife, fish, and rare plants include:

**Terrestrial Wildlife Species**

- Habitat management objectives and terrestrial species protection measures from approved recovery plans should be applied to activities occurring within federally-listed species habitat.
- Design features and mitigation measures should be incorporated in all Forest Service projects as needed to ensure that Southwestern Region sensitive species do not trend toward listing as threatened or endangered species.
- Design features and mitigation measures should be incorporated in all Forest Service projects as needed to ensure compliance with other Federal laws governing wildlife such as, but not limited to, the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA).
- Projects should be designed to minimize the long-term impacts to wildlife from human activities in or adjacent to animal movement corridors.
- Water developments or open impoundments, such as those for wildlife, livestock, or mining operations, should incorporate design features to prevent animal entrapments or assist in escape.
- All open top vertical pipes with an inside diameter greater than one inch should incorporate design features to prevent animal entrapments. Examples could include pipe for used for fences, survey markers, building plumbing vents, or sign posts.
- Projects in forested and woodland communities that change stand structure should generally retain at least historic frequencies of trees by species across broad age and
diameter classes at the mid-scale. As such, the largest and oldest trees are usually retained.

- Project design should also identify replacement features to assure continuous representation of old growth over time. Features that should be retained include: old trees, dead trees (snags), downed wood (coarse woody debris), and diverse stand structure.
- Landscape scale restoration projects should be designed to spread out treatments (e.g. wildland fire, mechanical thinning, etc.) spatially and/or temporally to reduce implementation impacts and allow for recovery, establishment, and regrowth of native vegetation.

**Aquatic and Riparian Wildlife Species**

- Habitat management objectives and aquatic/riparian species protection measures from approved recovery plans should be applied to activities and special uses occurring within federally-listed species habitat.
- Design features, mitigation, and project timing considerations should be incorporated into ground-disturbing projects that may affect Southwestern Region sensitive species’ occupied habitat near streams, seeps, and springs. Examples include, but are not limited to: undisturbed areas, timing restrictions, adjusted intensity of use, and avoiding use of large equipment.
- Water developments (such as a diversion or well) should be avoided near streams or seeps and springs where there is high risk of dewatering aquatic habitats.
- To prevent the spread of invasive species and fungal disease within aquatic habitats, the following should be cleaned of plant, animal, and mud material before coming into the Prescott NF:
  - Mechanized equipment and tools used for projects
  - Equipment (including suction dredges and hoses)
  - Watercraft, boating equipment, and personal gear (e.g., personal flotation devices, waders, wading boots/shoes) used for projects or surveys
  - Gear used for permitted activities
  - Items should again be cleaned at takeout and suction devices should be drained and cleaned prior to leaving the project site in accordance with the most recent decontamination and cleaning procedures.

**Native, Rare, or Endemic Plant Species**

- Collection of Southwestern Region sensitive plants shall occur for research or scientific purposes only.
- When treating nonnative and invasive plant species to protect endangered, threatened, proposed, and candidate wildlife and plant species and their habitats, design features in appendix B of the Final EIS for Integrated Treatment of Noxious or Invasive Weeds (USFS 2005) or the most current direction must be followed.
- Design features and/or mitigation measures should be incorporated in all Forest Service projects, as needed, to ensure that Southwestern Region sensitive plant species do not trend toward listing as threatened or endangered species.
- Applicable design features in appendix B—Design Features, Best Management Practices, Required Protection Measures and Mitigation Measures—from the Final EIS for
Integrated Treatment of Noxious or Invasive Weeds (USFS 2005) or more current direction—should be followed in treating nonnative invasive plant species and for managing site-disturbing projects and maintenance.

- Efforts to improve severely disturbed sites, especially those within the vicinity of occupied Southwestern Region sensitive plant species habitat, should be undertaken to reduce nonnative invasive plant species colonization, protect soils, and improve watershed condition.
- In efforts to improve severely disturbed sites, especially those within the vicinity of occupied Southwestern Region sensitive plant species habitat, should be undertaken to reduce nonnative invasive plant species colonization, protect soils, and improve watershed condition.
- In choosing materials for revegetation, the following should be used:
  - Plant or seed materials that are appropriate to the site, capable of becoming established, and are not listed as a State noxious weed species.
  - Certified weed-free seed and weed-free erosion control materials.
- In cases where plant collection permits are issued, collecting seeds or cuttings should be encouraged; digging or physically removing whole plants should be discouraged.
- Within the Verde Formation:
  - New developments for mineral materials and motorized trails should be located outside of areas identified as medium or high potential rare plant habitat.
  - Plant surveys for Southwestern Region sensitive species should be carried out before using any heavy equipment for the implementation of projects.

**Wildland Fire and Fuels Management**

The wildland fire and fuels management program combines elements of wildland fire prevention, response and management; post-fire area stabilization and rehabilitation; and hazardous fuels planning, implementation, and monitoring.

The Forest Service does not plan in advance the management actions they will take in response to individual wildfires; these responses are covered under ESA section 7(a)(2) emergency procedures, as needed. Therefore, the Prescott NF has not included wildland fire response actions as part of their proposed action for this consultation. However, the Forest Service has committed to work closely with the FWS on management responses and emergency consultation procedures as wildfires occur during the life of the LRMP.

Prescribed fire and mechanical treatments are actions that are part of the hazardous fuels program designed to protect communities, watersheds, and species-at-risk; and to restore and maintain resilient ecosystems. Fuel reduction activities focus on treating landscapes in fire regimes I, II and III; adjacent to the wildland-urban interface (WUI); and in condition class 2 or 3.

Desired conditions related to wildland fire and fuels management include a focus on establishing ecosystem resilience within each potential natural vegetation type. Returning a natural fire regime and reducing wildfire hazards to life and property are important goals for the fire and fuels management program.

The revised LRMP objectives for wildland fire and fuels management activities during the 10-year planning period include:
• **Obj-1**: Treat 25,000 to 65,000 acres with wildland fire within the semi-desert grassland PNVT.

• **Obj-2**: Treat 1,000 to 5,000 acres with wildland fire within the Great Basin grasslands PNVT.

• **Obj-3**: Treat 20,000 to 90,000 acres with wildland fire or mechanical methods within the juniper grasslands, pinyon-juniper evergreen shrub, and pinyon-juniper woodlands PNVTs.

• **Obj-4**: Treat 40,000 to 100,000 acres with wildland fire or mechanical methods within the interior chaparral PNVT.

• **Obj-5**: Treat 25,000 to 50,000 acres with wildland fire within the ponderosa pine-evergreen oak and ponderosa pine-Gambel oak PNVTs.

**Standards and guidelines** for wildland fire and fuels management include:

- During response to wildland fire, risks to firefighters and the public shall be mitigated. Protection of human life overrides all other priorities.
- Within the desert communities PNVT, fire shall not be used as a tool for management and all fires will be suppressed.
- Determinations of responses to wildfire should be based on risk assessments that include preseason analysis and review as well as on-scene and immediate risk assessments by those initially responding to the wildfire incident. Such assessments should be on an appropriate scale and timeline relative to the time of the assessment and the time available during the incident. Such risk assessments should include, but are not limited to, the following:
  - Evaluation of the threats to firefighter and public safety
  - Evaluation of the threats to both natural and human-made resource values
  - Evaluation of seasonal and/or climatic conditions
  - Evaluations of cost-effective strategies that contribute to the success of the appropriate wildfire objective(s)
- Strategies to manage wildland fire (wildfire and prescribed fire) that restore and maintain the natural fire regime of affected PNVTs should be encouraged.
- Within the Protection Zone identified on Map 6 (revised LRMP, p. 150), a management objective of protection should be used to manage wildfires that occur to minimize the risk of loss or damage to human life and property.
- Mechanical or manual treatment of hazardous fuels should be considered where the use of wildland fire (wildfire and prescribed fire) may cause unacceptable damage to other resources or pose an unacceptable risk to life and private property.
- Project-specific design features to avoid undesired impacts should be used when fire operations occur within or near riparian corridors or seeps and springs. For example, provide screens on water hoses when drafting water to prevent the entrapment of fish.
- Give WUI areas high priority for fuel reduction treatments.

Management of wildland fire would be coordinated across jurisdictional boundaries whenever there is potential for managing a wildfire or a prescribed fire on more than one jurisdiction.
Recreation

The recreation program provides a wide range of recreation settings, opportunities, and services. Program 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, congressionally designated areas, visual quality management, trail management, and scenic byways. Desired conditions include providing opportunities for visitor enjoyment of biophysical resources while protecting those resources. Objectives include designating dispersed camping areas, relocating or rehabilitating recreation areas that show resource damage, and improving signage along wilderness area boundaries to minimize motorized/mechanized uses.

Additionally, the Prescott NF proposes new sustainable recreation area development that would respond to changing conditions and help provide recreation opportunities desired by the community. New facilities could include a campground, a day-use area, a boat ramp or developed river access, developed trailheads with toilet facilities, or an interpretive area. There may be an opportunity to coordinate with the Verde River communities and add developed recreation sites in a location within the Verde Valley. Other possible locations could include the vicinity of Bear Siding, Perkinsville Bridge, Forest Road 638, or Camp Wood. Such development could provide desired recreation opportunities as well as a Forest Service presence to discourage illegal activity.

Standards and guidelines for recreation include:

- Motorized use within areas identified as providing a nonmotorized recreation setting may take place on a case-by-case basis as documented in site-specific permits. Examples of such permits include, but are not limited to, grazing permits, recreation event permits, or communication site permits.
- Native plant species, when suitable and available, should be used during the design of new or improved recreation sites. Invasive weeds should be removed or treated on existing sites before they become widespread within recreation sites.
- Unauthorized travel routes should be returned to natural conditions to discourage continued use.
- Management tools (e.g., education, engineering, and enforcement) should be used to prevent resource damage due to recreation activities. Examples of such tools include, but are not limited to: traffic control devices, designation of campsites, time limits, site rotation, group size limitation, registration, public contact, written information, permits, seasonal closures, fencing, enforcement activity, and current information posted on the Internet.
- Redesign, restoration, or rehabilitation of recreation sites should be carried out where recreation activities have caused unacceptable natural and social resource impacts.
- New developed campgrounds and designated dispersed campsites should be located away from riparian areas, floodplains, and other environmentally sensitive areas.
- To guide appropriate motorized use, accurate and understandable signs should be placed in effective locations to discourage encroachment of motorized vehicles into nonmotorized areas.
- Within developed campgrounds, vegetation removal should promote visitor safety, scenic values, and vegetation health.
- In areas outside of the Prescott Basin Management Area (revised LRMP, Figure 3) camping by each individual or group should not exceed a period of 14 days in a 30-consecutive day period within the Prescott NF, unless specifically designated otherwise.

**Transportation**

The transportation system on the Prescott NF 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. The Prescott NF provides management of the transportation system including conducting inventories, surveys, and analyses; formulating plans; and executing reconstruction, maintenance, and obliteration operations. Desired conditions for transportation and forest access balance the desire for public access with potential for ecological impacts; and roads and trails that provide diverse visitor opportunities, but do not impede wildlife and fish movements.

The motorized transportation system for the Prescott NF is composed of 29.5 miles of roads managed and maintained for passenger cars and about 1,300 miles of roads managed and maintained for high-clearance vehicles; 28 miles of roads closed to all motorized vehicles; and 408 miles of trails open to motorized vehicles less than 50 inches wide. The miles of road open to motorized use include roads where access may be restricted on a seasonal basis. Any road, regardless of maintenance level, may be closed during extreme weather conditions for public safety or to minimize resource damage. Cross-country motorized travel is restricted to two designated areas on the Prescott NF, Alto Pit (41 acres) and Hayfield Draw (80 acres), and for motorized big game retrieval. Motor vehicle use off of the designated system of roads, trails, and areas is prohibited except as identified on the motor vehicle use map (MVUM) and as authorized by law, permits, and orders in connection with resource management and public safety.

The revised LRMP objectives that direct transportation program activities over the 10-year planning period include:

- **Obj-20**: Repair or relocate 20 to 100 miles of NFS roads or trails that impact watershed integrity. Projects could include, but are not limited to, the following activities related to roads and trails: relocation, decommissioning, recontouring, revegetating, improving to standard, or maintaining features for resource protection.
- **Obj-21**: Obliterate, recontour, or revegetate a minimum of 10 miles of unauthorized routes that are impacting watershed integrity.
- **Obj-22**: Improve 15 to 25 stream or drainage crossings associated with roads or trails to facilitate flow and sediment transport. Examples of activities that could be done to fulfill this objective include ensuring that culvert sizes match what is needed to handle flood flows and avoid washouts that deposit road material into a stream, adjusting culvert height to ensure aquatic species are not prevented from moving along the stream, or installing drainage structures across roads where needed.
Standards and guidelines for the transportation program include:

- Where the creation of alternate routes does not lead to excessive damage to other resources, opportunities to relocate and restore motorized roads or trails in riparian areas and in proximity to other watercourses should have priority.
- Roads and trails removed from the transportation network should be rehabilitated as soon as possible. Treatments may include reshaping travel ways, removing stream crossing structures, restoring and armoring natural drainages, stabilizing ground surface, revegetation, and maintaining or restoring fish passage.
- Roads and trails should be designed to not impede terrestrial and aquatic wildlife species movements and habitat connectivity.
- Seasonal road and trail closures or other management methods should be used to manage and protect resources and infrastructure.
- When system roads are constructed or reconstructed, efforts should be focused on reducing cumulative watershed effects. This could include, but is not limited to, using design features that minimize sedimentation, reduce the number or length of system roads, or rehabilitate unneeded system roads and user-created routes.
- Only designated roads, motorized trails, and motorized use areas as depicted and described on the motor vehicle use map (MVUM) are open to public motorized vehicle use.
- Only designated roads, motorized trails, and motorized use areas depicted and described on the MVUM are open for motorized big game retrieval. Motorized big game retrieval is precluded in areas where motorized travel is prohibited, such as wilderness.
- For the purpose of motorized big game retrieval:
  - Use of motor vehicles should be limited to within 1 mile of designated roads and motorized trails to retrieve a legally hunted and tagged elk during elk hunting seasons as designated by the AGFD, and for 24 hours following the end of each season.
  - Only one vehicle (i.e., one trip in and one trip out) per harvested animal should be operated off of designated roads and motorized trails.
  - Hunters should use the most direct and least ground-disturbing route to accomplish the retrieval.
  - Motorized big game retrieval should not occur when conditions are such that travel would cause damage to natural and/or cultural resources.
  - Motor vehicles should not cross riparian corridors, streams, and rivers except at hardened crossings or crossings with existing culverts.

Wilderness and Special Areas

The Prescott NF contains eight designated wilderness areas, totaling over 100,000 acres. Adjacent to these wilderness areas, extensions totaling 23,000 acres are recommended for future wilderness designation as part of the revised LRMP. Desired conditions for wilderness include allowing natural processes to influence ecosystems with little or no human intervention; and protecting the wilderness character of recommended wilderness areas.

The Verde River below Camp Verde is designated as a wild and scenic river (WSR), and a 37-mile segment of the upper Verde River (extending from the Prescott NF boundary downstream to
Clarkdale) is identified as eligible for WSR designation. Desired conditions for wild and scenic river segments include retaining their free-flowing character and outstandingly remarkable values and classifications.

The Prescott NF also contains 11 inventoried roadless areas (IRAs), characterized as having an undeveloped character and valued for many resource benefits including wildlife habitat, biological diversity, and dispersed recreation opportunities.

Special areas, such as research natural areas, botanical areas, and geological areas, are designated to ensure protection and special management of their specific biological and geological communities. Grapevine Botanical Area (800 acres) was designated to protect the 12 perennial springs and associated Arizona alder-Arizona walnut vegetation community found in the area. Desired conditions for special areas include recognition of the unique ecological features for which they were designated; and that their inherent physical and biological processes flourish, with little evidence of human intervention or disturbance.

**Standards and guidelines** for wilderness and special areas include:

- Wilderness characteristics and values shall take precedence over recreation uses where conflicts occur.
- Natural ecological processes shall be allowed to occur freely in wilderness to the extent that they retain the wilderness character, except where public and firefighter safety and private property is put at risk. Activities allowed in wilderness shall be managed to preserve the wilderness character and value.
- All fire management actions within wilderness shall be conducted in a manner compatible with overall wilderness desired conditions including the character and values associated with each individual wilderness area.
- Where agency or applicant objectives can be met outside of designated wilderness, special use permits should not be issued in wilderness.
- Wilderness maximum group size should be limited to 15 people except for occasional Forest Service maintenance crews, organized rescue parties, or firefighting forces performing official duties.
- Unless otherwise approved under permit, the maximum size of a party traveling or camping at one location with riding or pack animals should be limited to 10 animals.
- Wilderness boundary posting should be maintained in areas where nonconforming use is likely to occur.
- Where active intervention is warrant to preserve the wilderness character, corrective activities should be initiated for areas that become degraded as a result of human activities.
- Minimum Impact Suppression Tactics (MIST) should be used when managing both wildfire and prescribed fire within wilderness.
- Helispots, spike camps, and water source locations outside of wilderness should be considered over locations within designated wilderness.
- Decisions for the appropriate suppression tool or tactic in the wilderness should receive the same considerations for firefighter and public safety and the protection of values at
risk as they would outside of wilderness. If such considerations are not urgent, the use of retardant in wilderness should be avoided if possible.

- Management actions should maintain the wilderness characteristics of a recommended wilderness area until further action is initiated by the Forest Service to forward it to Congress for designation.
- Within river segments that are eligible for wild/scenic river designation, identified outstandingly remarkable values shall be afforded adequate protection, subject to valid existing rights, until the eligibility determination is superseded (i.e., the segment is determined not suitable for designation or Congress makes a decision regarding designation). Authorized uses shall not be allowed to adversely affect either eligibility or the tentative classification (i.e., actions that would change a classification from wild to scenic).
- Within the Grapevine Botanical Area, no livestock grazing, trailing, or driving shall take place within the botanical area; livestock may trail through the Bootlegger-Grapevine Unit on established roads to Forest Road 87A and then Trail 304. This movement of livestock shall be controlled and not be accomplished by drifting.

**Lands and Special Uses**

The Prescott NF lands program is responsible for identification and maintenance of land line locations between Forest Service lands and lands of other ownership, and land adjustments. The effects of future development projects such as for utilities and transportation systems will be addressed on a site-specific basis and mitigated individually following Forest Service policy regarding special uses. Mitigation is typically accomplished by consolidating new developments along existing routes and corridors or through construction techniques that disturb less land and improve reclamation success.

Objectives within the revised LRMP that direct lands and open space management activities include acquiring lands within and around the Prescott NF to retain open space values, and securing legal access to areas where historic access to the Forest has been lost.

**Standards and guidelines** for lands and special uses include:

- New recreational residences shall not be established.
- Right-of-way authorizations should help provide adequate access to the Prescott NF.
- When responding to land exchange proposals, consideration should be given to the effects they have on visual characteristics; cultural resources; recreation opportunities; threatened, endangered or sensitive species impacts; and community vision statements. In coordination with general factors to consider in 36 CFR 254.3(1), proposals for acquisition should meet one or more of the following criteria:
  - Lands within designated wilderness.
Lands that contain important wildlife habitat, including that needed for species viability, such as habitat needed to maintain migration patterns or important habitat linkages.

- Wetlands, riparian areas, and other water-oriented lands.
- Lands that contain unique, natural, or cultural values.
- Lands that provide needed access, protect public lands from fire or trespass, or prevent damage to resources.

- Lands offered by the United States in a land exchange should generally meet one or more of the following criteria:
  - Lands needed to meet the needs of communities and the public, such as land for a water treatment plant.
  - Lands where public land management would be improved by transferring them to others.
  - Lands that have lost their wildland character.

- The following are among the guidelines that apply to communication sites:
  - Height of towers, including appurtenances (attachments), should be less than 200 feet above natural ground level. Exceptions to the height limitation may be granted by the forest supervisor, if allowing an increase in height would result in placement of fewer towers, or if a greater height is necessary for emergency services or homeland security. The applicant must prove that the requested height is the minimum necessary to provide communication services.
  - The use of existing facilities (i.e., colocation) should be maximized prior to authorizing new facilities.
  - Lot plans as previously established should be eliminated. Sites should be allocated only the actual ground space (footprint) they occupy.
  - Vegetation clearing should be limited to defensible space within: (a) the communication sites, (b) fuel breaks around the perimeter of the sites, and (c) areas that pose a hazard to facilities and operational efficiency.
  - New and replacement towers should be self-supporting and should incorporate design features to minimize bat and bird impacts.

- Energy sources should be managed according to the guidelines below:
  - New energy proposals should be located within existing corridors, including the Westwide Energy Corridor, unless valid concerns about the reliability and integrity of the state’s electrical grid indicate otherwise.
  - Towers for 69-kV lines and above should be self-weathering with nonreflective lines, and where geomorphology allows, located in areas that blend in with the terrain or background.
  - Low growing plant communities that do not interfere with overhead lines should be maintained within power line corridors.
  - Less than 69-kV power lines should be placed underground where physically and economically feasible.
  - Overhead utilities should have approved corridor management plans or operating plans in place prior to all vegetation treatments.
  - Solar and wind power facilities should be co-located within compatible corridors or located in areas with the least visual impacts to maintain natural appearing vistas.
When locating new power line corridors, areas in proximity to existing power line corridors or substations should be considered first.

Utility companies and wind power facilities should incorporate design features to minimize bat and avian collisions.

Current FWS and AGFD guidelines for wind and solar energy development should be considered for avoiding or minimizing impacts to wildlife.

Wildlife movement corridors should be considered when energy sources and transmission lines are located.

Minerals Management

Minerals of economic interest are classified as leasable, saleable, or locatable. Locatable minerals are subject to the General Mining Law of May 10, 1872, as amended, and for the most part are outside the scope of the LRMP.

The Prescott NF has abundant mineral deposits, and mining is common both on and off the Forest. Existing mining activities on the Prescott NF include five mineral material contracts for removal of flagstone, one contract for schist removal, one contract for removal of decomposed granite, one limestone operation with an approved commercial plan of operations, and numerous recreational gold placer mining operations. The vast majority of mining claims do not have any on-the-ground operations associated with them; many of them are for speculative purposes.

Copper is the most abundant metallic mineral on the Forest, and there is an active plan of operations for exploratory drilling of copper on the Verde Ranger District. High demand growth is expected to continue for copper, and this is likely to increase interest in copper mining on the Prescott NF. Geologic surveys and studies suggest that the highest concentrations of metallic minerals exist in the western parts of the forest. Areas with exploration potential for large tonnage deposits of copper and gold are near Copper Basin, Groom Creek, Big Bug Creek, Crooks Canyon, Crown King, and Goodwin.

There is substantial production of construction related materials (e.g., cinders, crushed stone, dimension stone, landscape rock) on the Forest. Demand tends to be highly influenced by local conditions and has varied considerably in recent years. The Prescott NF does not currently produce any energy or fuel minerals such as uranium, oil, natural gas, or coal.

Desired conditions for minerals management include meeting legal mandates in a manner that minimizes the impacts of mineral exploration and development on natural and cultural resources; and sufficiently reclaim past and present mine facilities to provide for public safety and minimize impacts to cultural and natural resources.

Standards and guidelines for minerals management include:

- Surface disturbance shall be limited to the minimum necessary for the extraction of minerals; however, land management decisions must not preclude the ability of private mineral owners to make reasonable use of the surface, as defined by deed and public law.
• Closed roads or routes not on the MVUM shall not be used for mining activity without written authorization.
• Approval of mining activities shall include the use of reclamation bonds to protect and restore surface resources.
• Provisions should be provided for recreational gold panning and dry mining activities that are allowed on the Prescott NF. These could include but would not be limited to:
  o Only operating one area at a time, and refilling holes and restoring areas of operation as nearly as possible to their pre-mining appearance.
  o Minimizing disturbance to riparian vegetation.
  o Avoiding disturbance to upland vegetation.
  o Following guidance found in 36 CFR Part 228.
• Given that the Forest Service function is the management and protection of surface resources in a manner compatible with reasonable and logical mining operations, the following should be included in plans of operations for locatable minerals:
  o Structures and support facilities for mining activity should be located outside of riparian areas. Where no alternative to locating facilities in riparian areas exists, site-specific design features should be developed to minimize impacts.
  o Mine waste that has the potential to generate hazardous material should be located outside of riparian areas. If there is no reasonable alternative, design features should be applied to minimize impacts.
  o Mitigation measures should be used for Southwestern Region sensitive species to minimize impacts to populations due to mineral exploration or extraction activity.
  o Watershed protection and mitigations should be incorporated to avoid degradation of aquatic systems, including water quality, during mineral extraction.
  o Closing and reclaiming abandoned mine lands should be given high priority.
• Restoration plans shall be prepared before development and use of new mineral material sources. Existing pits that have not been used as a source for mineral materials for two years shall require a reclamation plan and bonding before approval is granted to new applicants.
• Mineral material activities shall not be permitted in designated wilderness and other withdrawn areas.
• Avoid adverse effects to aquatic and other riparian-dependent resources from mineral material operations.
• Mineral material activities should not be permitted in designated or recommended special areas (e.g., recommended wilderness, WSR segments).
• Occupied Southwestern Region sensitive species habitat should be avoided during development of new mineral material extraction sites. Heavy equipment use and material removal should not take place in occupied Southwestern Region sensitive species habitat within current or new permitted sandstone or dolomitic limestone quarries.

Rangeland Management

The Prescott NF authorizes livestock grazing on as many as 68 allotments covering 920,779 suitable acres (73 percent of the forest). Of the 62 active grazing allotments, 19 are used seasonally (31 percent) and 43 are used yearlong (69 percent). Allotments are managed using an adaptive management strategy whereby results from long and short-term monitoring are used to
guide managers concerning yearly stocking rates, pasture rotations, and whether other adjustments are needed in order to meet management objectives and desired conditions for rangelands.

Areas where grazing is excluded include: Prescott municipal watershed (Goldwater Lake), Lane Mountain watershed, Lynx Lake and Granite Basin Recreation Areas, Grapevine Botanical Area, and the designated WSR segments of the Verde River. Periodic review of allotment management plans also results in decisions to exclude livestock grazing on individual allotments in response to drought, wildfire, and other factors that influence range conditions.

Desired conditions for rangelands include providing sustainable amounts of forage (grass and forbs) for authorized livestock and wildlife species, and managing herbivory to sustain or improve native vegetation cover and composition.

Standards and guidelines for livestock grazing include:

- Yearlong livestock grazing in riparian areas (streams, springs, and seeps) shall be avoided to prevent adverse impacts to water quality and riparian habitat in those areas.
- Water troughs shall incorporate escape devices to prevent animal entrapments.
- The placement of salt, minerals, and/or other supplements for the purposes of livestock management should be located further than one-quarter mile from riparian areas or seasonally present water.
- For structural improvements:
  - Implement design features that incorporate wildlife needs and reduce barriers to movement and entrapment hazards.
  - Consider wildlife needs in fence placement and design to reduce barriers and hazards to movement and minimize chances of entrapment.
  - Remove fencing when it is no longer needed.
- After occurrence of wildland fire or mechanical activity that removes most vegetation, a time period for recovery, establishment, and regrowth of vegetation should be determined and applied to meet site-specific objectives.
- Livestock salting should be located away from known locations of Southwestern Region sensitive plant species so that plants are not adversely affected by associated trampling.
- Livestock use of woody riparian species (e.g., cottonwood, willow, ash, and alder) should provide for maintenance of those species and allow regeneration of new individuals leading to diverse age classes of woody riparian species where potential for native woody vegetation exists.
- Grazing intensity, frequency, occurrence, and period should provide for growth and reproduction of desired plant species while maintaining or enhancing habitat for wildlife.

Grazing capacity and management success of grazing operations is monitored and evaluated in numerous ways including assessment of rangeland features and conditions, annual range allotment inspections (forage utilization and stocking levels), and periodic revision of allotment management plans. These assessments serve as inputs for decision-making within an adaptive management framework.
Forestry and Forest Health

Forest products sold on the Prescott NF include both sawtimber and firewood. The harvest of sawtimber on the Prescott NF is solely a byproduct of thinning forested areas where the primary purpose is to improve forest health and wildlife habitat or to reduce hazardous fuels in the WUI. The demand for wood products other than sawtimber has been driven by local and regional needs for firewood.

Desired conditions include: on lands deemed suitable for timber production, harvest activities provide for a diversity of plant and animal communities and other resources to meet overall multiple-use objectives; and forest products are removed from unsuitable lands solely to benefit forest health, mitigate insect and disease damage, reduce hazardous fuels, improve wildlife habitat, create recreation opportunities, or to perform research or administrative studies.

Desired conditions for all vegetation include diverse vegetation structure, species composition, and densities that 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 old growth conditions. Native plant communities dominate the landscape, while nonnative invasive species are nonexistent or in exist in low quantities. Establishment of invasive plant species new to the Prescott NF is prevented, and existing invasive plant species are prioritized for eradication, containment, or control. Specifically, the landscape-scale desired condition in the revised LRMP states that natural processes and human and natural disturbances 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.

The revised LRMP includes three objectives that direct forest health management activities over the 10-year planning period:

- **Obj-3**: Use mechanical treatments to improve watershed and rangeland conditions, vegetation structure, and wildlife habitat within the pinyon-juniper PNVT.
- **Obj-5**: Thin or harvest 2,500 to 8,000 acres in ponderosa pine-evergreen oak and ponderosa pine-Gambel oak PNVTs.
- **Obj-6**: Treat at least 50 percent of nonnative invasive plant species populations within 1 to 2 years of detection.

Standards and guidelines for forestry and forest health include:

- Regulated timber harvest activities shall occur only on those lands classified as suitable for timber production.
  - Lands deemed suitable for timber production shall be on a regulated timber harvest schedule.
  - Intermediate treatments, such as precommercial thinning between harvest intervals, shall be used to maintain tree vigor, provide growing space for regeneration, and reduce hazardous fuels.
• If individual harvest openings created by even-aged silvicultural practices are proposed that would exceed 40 acres, then National Forest Management Act requirements regarding public notification and approval shall be followed. These requirements do not apply to the size of areas harvested because of catastrophes such as, but not limited to, fire, insect and disease attacks, or windstorms.  
• Regulated timber harvest activities shall only be used when there is reasonable assurance of restocking within 5 years after final regeneration harvest.  
• Restocking level is prescribed in a site-specific silviculture prescription for a project treatment unit and is determined to be adequate depending on the objectives and desired conditions for the plan area. In some instances, such as when lands are harvested to create openings for fuel breaks and vistas or to prevent encroaching trees, it is adequate not to restock.  
• Even-aged stands shall generally have reached or surpassed culmination of mean annual increment (CMAI) (95 percent of CMAI as measured by cubic volume) prior to regeneration harvest, unless the following conditions have been identified during project development:  
  o When such harvesting would assist in reducing fire risk within the WUI.  
  o When harvesting of stands will trend landscapes toward vegetation desired conditions.  
• Harvesting systems should be selected based on their ability to meet desired conditions and not on their ability to provide the greatest dollar return.  
• Ponderosa pine site treatment timing and residual green slash accumulations should be managed to reduce opportunities for *Ips* beetle populations to increase.  
• Projects in forested and woodland communities that change stand structure should generally retain at least historic frequencies of trees by species across broad age and diameter classes at the mid-scale. As such, the largest and oldest trees are usually retained.  
• Project design should also identify replacement features to assure continuous representation of old growth over time. Features that should be retained include: old trees, dead trees (snags), downed wood (coarse woody debris), and diverse stand structure.  
• Landscape scale restoration projects should be designed to spread out treatments (e.g. wildland fire, mechanical thinning, etc.) spatially and/or temporally to reduce implementation impacts and allow for recovery, establishment, and regrowth of native vegetation.

For project prescriptions within WUI, post-treatment vegetation conditions may need to be on the more open end of the desired range to accommodate growth between treatments and to influence wildfire behavior and reduce hazards to life and property.  

Restoration work in ponderosa pine and pinyon-juniper PNVTs would be implemented using two primary types of prescriptions: free thinning all sizes to a target basal area and group selection cuts with matrix thinning to a target basal area.
Other Management

The revised LRMP also provides management direction for resources that are not included in the program areas described above, including: ecosystem resilience, air quality, and heritage resources.

The revised LRMP includes a plan monitoring strategy that identifies monitoring questions organized according to six themes: (1) legally required monitoring (1982 planning rule provisions); (2) conserving biological diversity; (3) retaining ecosystem resilience; (4) maintaining watershed, soil, and air quality; (5) sustaining recreational and social benefits; and (6) maintaining infrastructure capacity. See the revised LRMP and EIS for more information about the monitoring strategy.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

In accordance with policy and regulation, 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 action area, the factors responsible for that condition, and the relationship of the action 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 action area on the species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the species’ current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

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 action 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

In accordance with policy and regulation, 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 action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; 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 PCEs and how they will influence the recovery role of affected critical habitat units; and, 4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how they will influence the recovery role of affected critical habitat units.

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.

**STATUS OF THE SPECIES AND CRITICAL HABITAT**

The information in this section summarizes the rangewide status of each species that is considered in this BO/CO. Further information on the status of these species can be found in documents on our web page (www.fws.gov/southwest/es/arizona) under Document Library, Document by Species, and in other references cited in each summary below.

**Gila chub**

Gila chub (*Gila intermedia*) was listed as endangered with critical habitat on November 11, 2005 (USFWS 2005). The final rule cites collection records, historical habitat data, the 1996 AGFD Gila chub status review (Weedman et al. 1996), and FWS information documenting currently occupied habitat to conclude that Gila chub has been eliminated from 85 to 90 percent of formerly occupied habitat. It was also estimated that 90 percent of the currently occupied habitat is degraded due to the presence of nonnative species and land management actions. Due to fragmented and often small population sizes, extant populations are susceptible to environmental conditions such as drought, flood events, and wildfire. Primary threats to Gila chub include predation by and competition with nonnative organisms; secondary threats are habitat alteration, destruction, and fragmentation.

Gila chub is a member of the roundtail chub (*Gila robusta*) complex that also includes headwater chub (*G. nigra*). The roundtail chub complex has had a turbulent and controversial taxonomic history that includes an assortment of classification schemes. Much of the debate has centered on whether the complex represents a number of nominal species or subspecies of *Gila robusta*. A nomenclatorial synonymy for Gila chub can be found in Minckley (1973).

Gila chub has long been recognized as distinct. Miller (1945), following the arrangement of Jordan and Evermann (1896), supported full generic rank for the genus *Gila* (Baird and Girard 1853) with a “*Gila robusta* complex” that included Gila chub. Miller (1946) considered Gila chub to be an “ecological subspecies” of *G. robusta* (i.e., *G. r. intermedia*) characteristic of the small tributaries they inhabit. Rinne (1969, 1976), using univariate analyses of morphological
and meristic characters, argued for recognition of both *G. robusta* and *G. intermedia* as distinct species and against the ecological subspecies concept. This approach was supported by some (e.g. Minckley 1973; Minckley et al. 1986), but it was not until further evidence was generated by DeMarais (1986, 1995) that the specific status for *G. intermedia* was generally accepted. DeMarais (1995) supported continued recognition of *G. intermedia* based on the following arguments: 1) phenotypic extremes between *G. intermedia* and *G. robusta* are widely divergent and each possesses many morphologically uniform populations; (2) the geographic distributions of both species is an overlapping mosaic, therefore not satisfying traditional geographic criteria; and, (3) contiguous populations of *G. intermedia* and *G. robusta* show no evidence of genetic exchange, thus each species maintains its evolutionary independence.

Gila chub is a thick-bodied species, chunky in aspect, whereas roundtail chub is slender and elongate, and headwater chub is intermediate in meristic and morphometric characteristics (Rinne 1969, 1976; Minckley 1973; DeMarais 1986; Minckley and DeMarais 2000; Minckley and Marsh 2009). Females can reach 250 mm in total length (TL), but males rarely exceed 150 mm (Minckley 1969, 1973; Rinne and Minckley 1991; Schultz and Bonar 2006). Body coloration is typically dark overall, sometimes black or with diffuse, longitudinal stripes, with a lighter belly speckled with gray. The lateral scales often appear to be darkly outlined, lighter in center. Breeding males, and to a lesser extent females, develop red or orange on lower parts of the head and body and on bases of the pectoral, pelvic, and anal fins.

While most reproductive activity by Gila chub occurs during late spring and summer, 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. Reproductive activities in Monkey Spring (where Gila chub are now extirpated) reportedly occurred for longer periods than in other populations, as breeding appeared to last virtually all season (Minckley 1969, 1973, 1985). Bestgen (1985) concluded that temperature was the most significant environmental factor triggering spawning. Spawning probably occurs over beds of submerged aquatic vegetation or root wads. Minckley (1973) observed a single female closely followed by several males over a bed of aquatic vegetation in a pond. Nelson (1993) also suspected deep pools with vegetation in Cienega Creek were important sites for spawning but did not witness any associated behavior near submerged vegetation.

The 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 m (2,000 to 5,500 ft) (Miller 1946, Minckley 1973, Rinne 1975, Weedman et al. 1996).

Gila chub is a highly secretive species, remaining near cover including undercut banks, terrestrial vegetation, boulders, root wads, fallen logs, and thick overhanging or aquatic vegetation in deeper waters, especially pools (Rinne and Minckley 1991, Nelson 1993, Weedman et al. 1996). Recurrent flooding and a natural hydrograph are important in maintaining Gila chub habitats and in helping the species maintain a competitive edge over invading nonnative aquatic species (Propst et al. 1986, Minckley and Meffe 1987). They can survive in larger stream habitats, such as the San Carlos River, and artificial habitats, like the Buckeye Canal (Minckley 1985, Rinne

Young Gila chub are active throughout the day and feed on small invertebrates as well as aquatic vegetation (especially filamentous algae) and organic debris (Bestgen 1985, Griffith and Tiersch 1989, Rinne and Minckley 1991). Adult Gila chub are crepuscular feeders, consuming a variety of terrestrial and aquatic invertebrates, and fishes (Griffith and Tiersch 1989, Rinne and Minckley 1991). Benthic feeding may also occur, as suggested by presence of small gravel particles.

Gila chub evolved in a fish community with low species diversity and where few predators existed, and as a result developed few or no mechanisms to deal with predation (Carlson and Muth 1989). This species is known to be associated with speckled dace (*Rhinichthys osculus*), longfin dace (*Agosia chrysogaster*), desert sucker (*Pantosteus clarki*), Sonora sucker (*Catostomus insignis*), Gila topminnow (*Poeciliopsis occidentalis*), desert pupfish (*Cyprinodon macularius*), and Monkey Spring pupfish (*Cyprinodon arcuatus*). Prior to the widespread introduction of nonnative fishes, Gila chub was probably the most predatory fish within the habitats it occupied. In the presence of the nonnative green sunfish (*Lepomis cyanellus*) in lower Sabino Creek, Arizona, Gila chub failed to recruit young (Dudley and Matter 2000). Direct predation by green sunfish on young Gila chub was the acknowledged cause of this observation.

Historically, Gila chub were 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, Rinne and Minckley 1970, Minckley 1973, Rinne 1976, DeMarais 1986, Sublette et al. 1990, Weedman et al. 1996); and, occupancy of Gila chub throughout its range was more dense, and currently-occupied sites were likely more expansive in distribution (Hendrickson and Minckley 1984, Minckley 1985, Rinne and Minckley 1991). Gila chub now occupies an estimated 10 to 15 percent of its historical range (Weedman et al. 1996, USFWS 2005) and approximately 25 of these current localities are considered occupied, but all are small, isolated and face one or more threats (Weedman et al. 1996, USFWS 2005). The biological status of several of these populations is uncertain, and the number of localities currently occupied may overestimate the number of remnant populations in that some might not persist if its core connected population was extirpated (eliminated).

The Gila chub occurs in the Agua Fria River, the Verde River, Santa Cruz, San Pedro, and Upper Gila subbasins. The Agua Fria and Verde River subbasins are within the project area and are discussed further in the environmental baseline. Information regarding the Santa Cruz, San Pedro, and Upper Gila subbasins is included in FWS files.

**Critical habitat**

Critical habitat for Gila chub is designated for approximately 160.3 miles of stream reaches in Arizona and New Mexico that includes cienegas, headwaters, spring-fed streams, perennial streams, and spring-fed ponds. Critical habitat includes the area of bankfull width plus 300 feet on either side of the banks. The bankfull width is the width of the stream or river at bankfull
discharge (i.e., the flow at which water begins to leave the channel and move into the floodplain) (Rosgen 1996, USFWS 2005). Critical habitat is organized into seven areas or river units:

Area 1 - Upper Gila River, Grant County, New Mexico, and Greenlee County, Arizona, includes Turkey Creek (New Mexico), Eagle Creek, Harden Cienega Creek, and Dix Creek; 
Area 2, Middle Gila River, Gila and Pinal Counties Arizona, consists of Mineral Creek; 
Area 3, Babocomari River, Santa Cruz County, Arizona includes O’Donnell Canyon and Turkey Creek (Arizona); 
Area 4 - Loser San Pedro River, Cochise and Graham counties, Arizona, includes Bass Canyon, Hot Springs Canyon, and Redfield Canyon; 
Area 5 - Lower Santa Cruz River, Pima County, Arizona, includes Cienega Creek, Mattie Canyon, Empire Gulch, and Sabino Canyon; 
Area 6 - Upper Verde River, Yavapai County, Arizona, includes Walker Creek, Red Tank Draw, Spring Creek, and Williamson Valley Wash; and 
Area 7 - Agua Fria River, Yavapai County, Arizona, includes Little Sycamore Creek, Sycamore Creek, Indian Creek, Silver Creek, Lousy Canyon, and Larry Creek (USFWS 2005).

There are seven PCEs of critical habitat, which include those habitat features required for the physiological, behavioral, and ecological needs of the species:

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; 
2. Water temperatures for spawning ranging from 63°F to 75 °F, and seasonally appropriate temperatures for all life stages (varying from about 50°F to 86 °F); 
3. Water quality with reduced levels of contaminants, including excessive levels of sediments adverse to Gila chub health, and adequate levels of pH (e.g. ranging from 6.5 to 9.5), dissolved oxygen (i.e., ranging from 3.0 ppm to 10.0 ppm) and conductivity (i.e., 100 mmhos to 1,000 mmhos); 
4. Prey base consisting of invertebrates (i.e., aquatic and terrestrial insects) and aquatic plants (i.e., diatoms and filamentous green algae); 
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 stream bank stability, and a healthy, intact riparian vegetation community; 
6. Habitat devoid of non-native aquatic species detrimental to Gila chub or habitat in which detrimental nonnative species are kept at a level that allows Gila chub to continue to survive and reproduce; and, 
7. Streams that maintain a natural flow pattern including periodic flooding.

Our information indicates that, rangewide, more than 32 consultations have been completed or are underway for actions affecting Gila chub. These opinions primarily include the effects of livestock grazing, water developments, fire, species control efforts, recreation, sportfish stocking, native fish restoration efforts, and mining.
Gila topminnow

Gila topminnow (*Poeciliopsis o. occidentalis*) was listed as endangered in 1967 without critical habitat (USFWS 1967). Only Gila topminnow populations in the United States, and not in Mexico, are listed under the ESA. The reasons for decline of this fish include past dewatering of rivers, springs and marshlands, impoundment, channelization, diversion, regulation of flow, land management practices that promote erosion and arroyo formation, and the introduction of predacious and competing nonnative fishes (Miller 1961, Minckley 1985). Life history information can be found in the 1984 recovery plan (USFWS 1984), the draft revised Gila topminnow recovery plan (Weedman 1999), and references cited in these plans. This information is incorporated herein by reference.

Gila topminnow are highly vulnerable to adverse effects from nonnative aquatic species (Johnson and Hubbs 1989). Predation and competition from nonnative fishes have been a major factor in their decline and continue to be a major threat to the remaining populations (Meffe et al. 1983, Meffe et al. 1985, Brooks 1986, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Weedman and Young 1997, Minckley and Marsh 2009). The native fish fauna of the Gila basin and of the Colorado basin overall, was naturally depauperate and contained few fish that were predatory on or competitive with Gila topminnow (Carlson and Muth 1989). In the riverine backwater and side-channel habitats that formed the bulk of Gila topminnow natural habitat, predation and competition from other fishes was essentially absent. Thus Gila topminnow did not evolve mechanisms for protection against predation or competition and is predator- and competitor-naive. Due to the introduction of many predatory and competitive nonnative fish, frogs, crayfish, and other species, Gila topminnow could no longer survive in many of their former habitats, or the small pieces of those habitats that had not been lost to human alteration. Both large (Bestgen and Propst 1989) and small (Meffe et al. 1983) nonnative fish cause problems for Gila topminnow as can nonnative crayfish (Fernandez and Rosen 1996) and bullfrogs.

Historically, the Gila topminnow was abundant in the Gila River drainage in Arizona and was one of the most common fishes of the Colorado River basin, particularly in the Santa Cruz system (Hubbs and Miller 1941). Gila topminnow were also recorded from the Gila River basin in New Mexico (Minckley and Marsh 2009). In the last 50 years, this was reduced to only 16 naturally occurring populations. Presently, only 9 of the 16 known natural Gila topminnow populations are considered extant (Weedman and Young 1997, Voeltz and Bettaso 2003, USFWS files). Only eight have no nonnative fish present and therefore can be considered secure from nonnative fish threats. There have been at least 200 wild sites stocked with Gila topminnow, however, topminnow persist at only 33 of these localities. Of these, two sites are outside topminnow historical range and one contains nonnative fish (Voeltz and Bettaso 2003). All of these sites except two are in New Mexico. Many of the reestablished sites are very small and may not contain viable populations, as defined in the draft revised recovery plan (Weedman 1999). In addition several of the 33 sites have been reestablished in the last few years, and their eventual disposition is unknown.

The status of the species is mixed. A recovery program actively stocks Gila topminnow in Arizona and New Mexico, reestablishing topminnow in “new” sites (Robinson 2011, 2012,
2013). However, natural sites continue to slowly decline. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at about 42 localities (9 natural and 33 stocked). Many of these localities are small and highly threatened. The theory of island biogeography can be applied to these isolated habitat remnants, as they function similarly (Meffe et al. 1982, Launersdon and Hocutt 1985). Species on islands are more prone to extinctions than continental areas that are similar in size (MacArthur and Wilson 1967). Meffe et al. (1982) considered extinction of Gila topminnow populations almost as critical as recognized species extinctions.

Our information indicates that, rangewide, over 100 formal consultations have been completed for actions affecting Gila topminnow. These opinions primarily include the effects of grazing, water developments, fire, species control efforts, recreation, land management planning, native fish restoration efforts, and mining.

**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. Reasons for listing included hybridization, competition, and predation by nonnative rainbow trout (*O. mykiss*), cutthroat trout (*O. clarkii*), and brown trout (*Salmo trutta*), and habitat degradation. The Gila trout was listed as federally-endangered before the FWS designated critical habitat, therefore there is no critical habitat for this species (USFWS 2006a).

The Gila trout recovery plan was completed in 1979 in collaboration with the FWS, 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 FWS 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 2006a).

Gila trout require well-oxygenated and cool water (below 77°F (25°C), coarse sand, gravel and cobble substrate; stable stream banks, 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). More detailed life history and biology information can be found in USFWS (2003 and 2006a), and is included herein by reference.

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 (Minckley 1973, Behnke 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 efforts made with varying success in Gap Creek, Dude Creek, Raspberry Creek, Grapevine
Spring, and the Pinaleno Mountains. Specific information about these sites is in our files. Information on Grapevine Spring is located on the Prescott NF and information about this site is included in the environmental baseline of this document for the Gila trout.

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 NF: 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, 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 (D. Myers, USFWS, pers. comm. April 28, 2014).

Since listing in 1973, at least 18 Federal agency actions have undergone (or are currently under) formal section 7 consultation throughout the Gila trout’s range. This list of consultations can be found in the administrative record for this consultation.

Spikedace

Spikedace (Meda fulgida) was originally listed as a threatened species on July 1, 1986 (USFWS 1986) and reclassified as endangered on February 23, 2012 (USFWS 2012). Critical habitat has been designated (USFWS 1994) and redesignated (USFWS 2000, 2007) in response to legal concerns and policy changes (see summary discussion at USFWS 2010 p. 66485). The current critical habitat designation was published simultaneously with the reclassification of spikedace to endangered status on February 23, 2012 (USFWS 2012).

Spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin (Minckley 1973). Spikedace live in flowing water with slow to moderate velocities over sand, gravel, and cobble substrates (Propst et al. 1986; Rinne and Kroeger 1988). Specific habitat for this species consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at the downstream riffle edges (Propst et al. 1986). Spikedace spawn 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. Spikedace lives about two years with reproduction occurring primarily in one-year old fish (Barber et al. 1970; Anderson 1978; Propst et al. 1986). It feeds primarily on aquatic and terrestrial insects (Schreiber 1978, Barber
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; Brouder 2002, pers. comm.; Stefferud and Reinhart 2005; Paroz et al. 2006; Propst 2007).

In 2007, spikedace 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 2008b, pers. comm.; Orabutt 2009, pers. comm.; Robinson 2009a; Robinson et al. 2010a; Robinson et al. 2010b; Robinson 2011a, pers. comm.). 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 spikedace is occurring without further augmentation. Monitoring will continue at this site, and future augmentations may occur if needed.

Spikedace have also been translocated into Fossil Creek (tributary to the Verde River) and Bonita Creek (tributary to the Gila River). Spikedace were translocated into Fossil Creek in 2007, and were subsequently augmented in 2008 and 2011 (Carter 2007; Carter 2008; Robinson 2009b; Boyarski et al. 2010; Robinson 2011b). Survey efforts in 2013 indicate spikedace are persisting in lower Fossil Creek (C. Crowder, pers. comm. 2013). In 2008, spikedace were translocated into Bonita Creek (Blasius 2008, pers. comm.; Robinson et al. 2009), and were repatriated to the upper San Francisco River in Catron County, New Mexico (Propst 2010, pers. comm.). Augmentations at Bonita Creek 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 all 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 spikedace in these locations.

Spikedace is now common only in Aravaipa Creek in Arizona (Arizona State University (ASU) 2002; Reinhart 2008; Reinhart 2011, pers. comm.) and one section of the Gila River south of Cliff, New Mexico (New Mexico Department of Game and Fish [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 (Brouder 2002, pers. comm.; 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. For a current list of areas occupied by spikedace, see USFWS 2012.

Planning among several State and Federal agencies is underway for restoration of native fish species, including spikedace, in the Blue River through construction of a barrier that will exclude nonnative fish from moving upstream from the lower San Francisco River, and allow for translocation of spikedace. Barrier construction was completed in mid-2012, and plans to translocate spikedace to the Blue River are still in the planning phase.

Taxonomic and genetic work on spikedace indicates there are substantial differences in morphology and genetic makeup between remnant spikedace populations. Remnant populations occupy isolated fragments of the Gila basin and are isolated from each other. Anderson and Hendrickson (1994) found that spikedace from Aravaipa Creek are morphologically distinguishable from spikedace from the Verde River, while spikedace from the upper Gila River and Eagle Creek have intermediate measurements and partially overlap the Aravaipa and Verde populations. Mitochondrial DNA and allozyme analyses have found similar patterns of geographic variation within the species (Tibbets 1992; Tibbets 1993).

Critical habitat

When critical habitat was designated in 2012, the FWS determined the PCEs for spikedace. PCEs include those habitat features required for the physiological, behavioral, and ecological needs of the species. The PCEs describe appropriate flow regimes, velocities, and depths; stream microhabitats; stream gradients; water temperatures; and acceptable pollutant and nonnative species levels (see USFWS 2012, p. 10837).

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 (see USFWS 2012 for additional detail on occupancy by subbasin). Critical habitat has been designated in each of these subbasins (see USFWS 2012 for additional detail).

Our information indicates that, rangewide, more than 390 consultations have been completed or are underway for actions affecting spikedace and loach minnow, which often co-occur. The majority of these consultations concerned the effects of road and bridge construction and maintenance, grazing, water developments, fire, species control efforts, or recreation. There are a large number of consultations for urban development and utilities; however, these projects typically do not result in adverse effects to the species but are for technical assistance only. Small numbers of projects occur for timber, land acquisition, agriculture, sportfish stocking, flooding, habitat conservation planning, native fish restoration efforts, alternative energy development, and mining.

Loach minnow

Loach minnow (Tiaroga cobitis) was reclassified as an endangered species on February 23, 2012 (USFWS 2012) and was originally listed as a threatened species on October 28, 1986 (USFWS
Ms. Teresa A. Chase, Forest Supervisor

1986). Critical habitat has been designated (USFWS 1994), and re-designated on April 25, 2000 (USFWS 2000) and on March 21, 2007 (USFWS 2007) 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 2012).

Loach minnow is a small fish from the minnow family Cyprinidae. 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. The levels of divergence present in the data set indicated that populations within rivers are unique, and represent evolutionarily independent lineages. Genetic difference between the 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 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). Some studies have indicated that the presence of filamentous algae may be an important component of loach minnow habitat (Barber and Minckley 1966). 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; 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; Carter 2008a, pers. comm.; Clarkson et al. 2008; Robinson 2009a); Aravaipa Creek and its tributaries Turkey and Deer creeks (Graham and Pinal Counties, Arizona) (Steffenderd 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) (Leon 1989; 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; Orabutt 2009, pers. comm.; Robinson et al. 2010a; Robinson et al. 2010b; Robinson 2011a, pers. comm.). 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 2008b; Robinson 2009b; Boyarski et al. 2010; Robinson 2011b). Loach minnow do not appear to be persisting in Fossil Creek at this time. In 2008, loach minnow were translocated into Bonita Creek, a tributary to the Gila River in Graham County, Arizona (Blasius 2008, pers. comm.; Robinson 2008b, pers. comm.). Augmentations at Bonita Creek have been temporarily suspended due to re-invasion of 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.

**Critical habitat**

When critical habitat was designated in 2012, the Fish and Wildlife Service determined the PCEs for loach minnow. PCEs include those habitat features required for the physiological, behavioral, and ecological needs of the species. The PCEs describe appropriate flow regimes, velocities, and depths; stream microhabitats; stream gradients; water temperatures; and acceptable pollutant and nonnative species levels (see USFWS 2012, p. 10837).

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. Occupancy within these units is described in USFWS 2012. Critical habitat has been designated in each of these subbasins (see USFWS 2012 for additional detail).

Our information indicates that, rangewide, more than 390 consultations have been completed or are underway for actions affecting spikedace and loach minnow, which often co-occur. The majority of these opinions concerned the effects of road and bridge construction and maintenance, grazing, water developments, fire, species control efforts, or recreation. There are a high number of consultations for urban development and utilities, however, these projects typically do not result in adverse effects to the species but are for technical assistance only. Small numbers of projects occur for timber, land acquisition, agriculture, sportfish stocking, flooding, habitat conservation planning, native fish restoration efforts, alternative energy development, and mining.
Razorback sucker

The razorback sucker (*Xyrauchen texanus*) was first proposed for listing under the ESA on April 24, 1978, as a threatened species. The proposed rule was withdrawn on May 27, 1980, due to changes to the listing process included in the 1978 amendments to the ESA. A new proposed rule to list the species as endangered was published on May 22, 1990, and the final rule was published on October 23, 1991, with an effective date of November 22, 1991. The Razorback Sucker Recovery Plan was released in 1998 (USFWS 1998). Recovery Goals were approved in 2002 (USFWS 2002).

The razorback sucker is the only representative of the genus *Xyrauchen* and was described from specimens taken from the “Colorado and New Rivers” (Abbott 1861) and Gila River (Kirsch 1889) in Arizona. This native sucker is distinguished from all others by the sharp-edged, bony keel that rises abruptly behind the head. The body is robust with a short and deep caudal peduncle (Bestgen 1990). The razorback sucker may reach lengths of 3.3 feet and weigh 11 to 13 pounds (Minckley 1973). Adult fish in Lake Mohave reached about half this maximum size and weight (Minckley 1983). Razorback suckers are long-lived, reaching the age of at least the mid-40s (McCarthy and Minckley 1987).

The razorback sucker was once abundant in the Colorado River and its major tributaries throughout the basin, occupying 3,500 miles of river in the United States and Mexico (USFWS 2002). Records from the late 1800s and early 1900s indicated the species was abundant in the lower Colorado and Gila River drainages (Kirsch 1889, Gilbert and Scofield 1898, Minckley 1983, Bestgen 1990).

Adult razorback suckers use most of the available riverine habitats, although there may be an avoidance of whitewater type habitats. Main channel habitats used tend to be low velocity ones such as pools, eddies, nearshore runs, and channels associated with sand or gravel bars (Bestgen 1990). Adjacent to the main channel, backwaters, oxbows, sloughs, and flooded bottomlands are also used by this species. From studies conducted in the Upper Basin, habitat selection by adult razorback suckers changes seasonally. They move into pools and slow eddies from November through April, runs and pools from July through October, runs and backwaters during May, and backwaters, eddies, and flooded gravel pits during June. In early spring, adults move into flooded bottomlands. They use relatively shallow water (ca. three feet) during spring, and deeper water (five to six feet) during winter (McAda and Wydoski 1980, Tyus and Karp 1989, Osmundson and Kaeding 1989).

Data from radio-telemetered razorback suckers in the Verde River showed they used shallower depths and slower velocities than in the upper basin. They avoided depths less than 1.3 feet, but selected depths between 2.0 and 3.9 feet, which likely reflected a reduced availability of deeper waters compared to the larger upper basin rivers. However, use of slower velocities (mean = 0.1 ft/sec) may have been an influence of rearing in hatchery ponds. Similar to the upper basin, razorback suckers were found most often in pools or runs over silt substrates, and avoided substrates of larger material (Clarkson et al. 1993).
Much of the information on spawning behavior and habitat comes from fishes in reservoirs where observations can readily be made. They typically spawn over mixed cobble and gravel bars on or adjacent to riffles or in shallow shorelines in reservoirs in water 3 to 10 feet deep (Minckley et al. 1991). Spawning takes place in the late winter to early summer depending upon local water temperatures. Various studies have presented a range of water temperatures at which spawning occurs. In general, temperatures from 10° to 20° C are appropriate (summarized in Bestgen 1990).

Habitat needs of larval and juvenile razorback sucker are reasonably well known. In reservoirs, larvae are found in shallow backwater coves or inlets (USFWS 1998a). In riverine habitats, captures have occurred in backwaters, creek mouths, and wetlands. These environments provide quiet, warm water where there is a potential for increased food availability. During higher flows, flooded bottomland and tributary mouths may provide these types of habitats.

Razorback suckers are somewhat sedentary; however, considerable movement over a year has been noted in several studies (USFWS 1998). Spawning migrations have been observed or inferred in several locales (Jordan 1891, Minckley 1973, Osmundson and Kaeding 1989, Bestgen 1990, Tyus and Karp 1990). In the Verde River, radio-tagged and stocked razorback suckers tend to move downstream after release. Larger fish did not move as much from the stocking site as did smaller fish (Clarkson et al. 1993).

Razorback sucker diet varies depending on life stage, habitat, and food availability. Larvae feed mostly on phytoplankton and small zooplankton and, in riverine environments, on midge larvae. Diet of adults taken from riverine habitats consisted chiefly of immature mayflies, caddisflies, and midges, along with algae, detritus, and inorganic material (USFWS1998).

The razorback sucker is currently found in several locations in the Upper Basin and in the mainstem Colorado River from the lower Grand Canyon through Lake Mead to Imperial Dam and the Verde River. In the Lower Basin, only the Lake Mead and Lake Mohave populations contain wild-born adults, however most of the current Lake Mohave population is of stocked fish. Lake Mead contains a wild, recruiting population (Albrecht et al. 2008).

Razorback suckers are actively stocked into occupied habitats in the Upper and Lower Basins to prevent extirpation of the species from the wild. The stocking efforts rely on the captive broodstocks in the basins, and the capture of wild-born larvae from Lake Mead and Lake Mohave to provide sub-adult fish for stocking programs.

Since the arrival of Euro-Americans in the Southwest, the range and abundance of razorback sucker have been devastated by water manipulations, habitat degradation, and importation and invasion of nonnative species. Construction of dams, reservoirs, and diversions destroyed, altered, and fragmented habitats needed by the sucker. Channel modifications reduced habitat diversity, and degradation of riparian and upland areas altered stream morphology and hydrology. Finally, invasion of these degraded habitats by a host of nonnative predacious and competitive species has created a hostile environment for razorback sucker larvae and juveniles. Although the suckers bring off large spawns each year and produce viable young, the larvae are largely eaten by the nonnative fish species (Minckley et al. 1991). The range-wide trend for the
razorback sucker is a continued decrease in wild populations due to a lack of sufficient recruitment due to predation by non-native species on the eggs and larvae and the loss of old adults due to natural mortality.

Clarkson et al. (1993) noted high infestation levels of the nonnative parasite Lernaea cyprinacea (anchorworm) on reintroduced razorbacks in the Verde River near Perkinsville. They suspected that high levels of parasitism increased mortality of the reintroduced fish, and considered that this could represent another obstacle to reestablishment of the species. Robinson et al. (1998) found levels of parasitism on both native and nonnative fishes were higher at Perkinsville than at Childs, but rated all fishes examined as “healthy”, and concluded that parasitism was not seriously affecting Verde River fishes.

The Upper Colorado River Endangered Fish Recovery Program (UCREFRP) has implemented considerable research, habitat management, nonnative species removal, and stocking actions to benefit the razorback sucker Colorado, Utah, and Wyoming. The San Juan Program works in the San Juan River in New Mexico and Utah. The Lower Colorado River Multi-Species Conservation Plan (LCR MSCP) is also engaged in research and stocking actions to benefit the razorback in the lower Colorado River of Arizona, California, and Nevada. The razorback sucker is also a covered species in the Bartlett-Horseshoe HCP on the Verde River and continues to be stocked annually into the Verde River.

**Critical habitat**

Critical habitat was designated in 15 river reaches in the historical range of the razorback sucker on March 21, 1994, with an effective date of April 20, 1994 (USFWS 1994). Critical habitat included portions of the Colorado, Duchesne, Green, Gunnison, San Juan, White, and Yampa rivers in the Upper Colorado River Basin (Upper Basin), and the Colorado, Gila, Salt, and Verde rivers in the Lower Colorado River Basin (Lower Basin).

The following are the physical and biological factors (PBFs) identified for razorback sucker critical habitat. The biological support document (Maddux et al. 1993) discusses in depth how each designated reach PBFs. The PBFs are:

- **Water** - This includes a quantity of water of sufficient quality (i.e., temperature, dissolved oxygen, lack of contaminations, nutrients, turbidity, etc.) that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage.

- **Physical habitat** - this includes areas of the Colorado River system that are inhabited by fish or potentially habitable for use in spawning, nursery, feeding, rearing, or corridors between these areas. In addition to river channels, these areas also include bottomlands, side channels, secondary channels, oxbows, backwaters, and other areas in the 100-year floodplain, which, when inundated, provide spawning, nursery, feeding, and rearing habitats.

- **Biological environment** - Food supply, predation, and competition are important elements of the biological environment and are considered components of this constituent element. Food supply is a function of nutrient supply, productivity, and availability to each life
stage of the species. Predation, although considered a normal component of this environment, may be out of balance due to introduced fish species in some areas. This may also be true of competition, particularly from non-native fish species.

Section 7 consultations on razorback sucker include programmatic efforts for the Upper Basin and San Juan recovery programs and Lower Colorado River Multi-Species Conservation Program for new water diversions or changes in points of diversion. Information on these programs is available at their websites. Biological opinions on actions potentially affecting razorback suckers in Arizona may be found at our website www.fws.gov/southwest/es/arizona in the Section 7 Biological Opinion page of the Document Library. Since 2000, there have been 41 formal consultations on effects to razorback sucker and/or its critical habitat in Arizona that have been completed or are underway.

**Northern Mexican gartersnake**

The Federal Register notice listing the northern Mexican gartersnake as threatened under the Act was published on July 8, 2014 (USFWS 2014). This listing will become effective August 7, 2014. Critical habitat was proposed on July 10, 2013 (USFWS 2013) and has not yet been designated. 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 northern Mexican gartersnake ranges in color from olive to olive-brown or olive-gray with three lighter-colored stripes that run the length of the body, the middle of which darkens towards the tail. It may occur with other native gartersnake species and can be difficult for people without specific expertise to identify because of its similar appearance to sympatric gartersnake species. The snake may reach a maximum length of 44 in (112 cm).

Throughout its rangewide distribution, the northern Mexican gartersnake occurs at elevations from 130 to 8,497 ft (40 to 2,590m) (Rossman et al. 1996) and is considered a “terrestrial-aquatic generalist” by Drummond and Marcias-García (1983). The northern Mexican gartersnake is a riparian obligate (restricted to riparian areas when not dispersing) and occurs chiefly in the following habitat types: 1) source-area wetlands (e.g., cienegas or stock tanks); 2) large-river riparian woodlands and forests; and 3) streamside gallery forests (Hendrickson and Minckley 1984, Rosen and Schwalbe 1988). Emmons and Nowak (2013), when surveying in the upper Verde River region, found this subspecies most commonly in protected backwaters, braided side channels and beaver ponds, isolated pools near the river mainstem, and edges of dense emergent vegetation that offered cover and foraging opportunities. 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). Northern Mexican gartersnakes forage along vegetated banklines, searching for prey in water and on land, using different strategies (Alfaro 2002). Generally, its diet consists of amphibians and fishes, such as adult and larval (tadpoles) native leopard frogs, as well as juvenile and adult native fish (Rosen and Schwalbe 1988). In
situations where native prey species are rare or absent, this snake’s diet may include nonnative species, including larval and juvenile bullfrogs, western mosquitofish (Holycross et al. 2006, Emmons and Nowak 2013), or other soft-rayed fishes.

Native predators of the northern Mexican gartersnake include birds of prey, other snakes, wading birds, mergansers, belted kingfishers, raccoons, skunks, and coyotes (Rosen and Schwalbe 1988, Brennan et al. 2009). Historically, large, highly predatory native fish species such as Colorado pikeminnow may have preyed upon northern Mexican gartersnake where they co-occurred. Native chubs may also prey on neonatal gartersnakes.

Sexual maturity in northern Mexican gartersnakes occurs at two years of age in males and at 2 to 3 years of age in females (Rosen and Schwalbe 1988). Northern Mexican gartersnakes are viviparous (bringing forth living young rather than eggs). Mating has been documented in April and May followed by the live birth of between 7 and 38 newborns in July and August (Rosen and Schwalbe 1988, Nowak and Boyarski 2012).

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 (Brennan and Holycross 2006, 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, Degenhardt et al. 1996, 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 viable northern Mexican gartersnake populations in the United States where the subspecies remains reliably detected are all in Arizona: 1) The Page Springs and Bubbling Ponds State Fish Hatcheries along Oak Creek, 2) lower Tonto Creek, 3) the upper Santa Cruz River in the San Rafael Valley, 4) the Bill Williams River, and 5) the upper Verde River. In New Mexico, the northern Mexican gartersnake may occur in extremely low population densities within its historical distribution; limited survey effort is inconclusive to determine extirpation. The status of the northern Mexican gartersnake on tribal lands, such as those owned by the White Mountain or San Carlos Apache Tribes, is poorly known due to historically limited survey access and access to any survey data. Less is known about the current distribution of the northern Mexican gartersnake in Mexico due to limited surveys and limited access to information on survey efforts and field data from Mexico.

We have concluded that in as many as 24 of 29 known localities in the United States (83 percent), the 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. Only five populations of northern Mexican gartersnakes in the United States are considered likely viable where the species remains reliably detected. 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 contribute to starvation of gartersnake populations through competitive mechanisms, and reduce or eliminate recruitment of young
gartersnakes through predation. The threat from harmful nonnative species is the most severe and geographically pervasive of all threats affecting the northern Mexican gartersnake. Other threats include alteration of rivers and streams from dams, diversions, flood-control projects, and groundwater pumping that change flow regimes, reduce or eliminate habitat, and favor harmful nonnative species; and effects from climate change and drought (USFWS 2014).

**Proposed critical habitat**

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 2013b). 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.

The following are the PCEs proposed for northern Mexican gartersnake critical habitat:

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; and
   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.

2. Adequate terrestrial space (600 ft [182.9 m] 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 (extended inactivity).

3. A prey base consisting of viable populations of native amphibian and native fish species.

4. An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs, and/or crayfish (*O. virilis*, *P. clarki*, etc.), 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.
Narrow-headed gartersnake

The Federal Register notice listing the narrow-headed gartersnake as threatened under the Act was published on July 8, 2014 (USFWS 2014). This listing will become effective August 7, 2014. Critical habitat was proposed on July 10, 2013 (USFWS 2013) but has not yet been designated. Please refer to these rules for more in-depth information on the ecology and threats to the species, including references. The final and proposed rules are incorporated herein by reference.

The narrow-headed gartersnake is a small to medium-sized gartersnake with a maximum total length of 44 in (112 cm mm) (Painter and Hibbitts 1996). Its eyes are set high on its unusually elongated head, which narrows to the snout, and it lacks striping on the dorsum (top) and sides, which distinguishes its appearance from other gartersnake species with which it could co-occur (Rosen and Schwalbe 1988). Degenhardt et al. (1996), Rossman et al. (1996), and Ernst and Ernst (2003) further describe the species.

The narrow-headed gartersnake is widely considered to be one of the most aquatic of the gartersnakes (Drummond and Marcias Garcia 1983; Rossman et al. 1996). This species is strongly associated with clear, rocky streams, using predominantly pool and riffle habitat that includes cobbles and boulders (Rosen and Schwalbe 1988; Degenhardt et al. 1996; Rossman et al. 1996; Ernst and Ernst 2003). Rossman et al. (1996) also note the species has been observed using lake shoreline habitat in New Mexico. Narrow-headed gartersnakes occur at elevations from approximately 2,300 to 8,200 ft (700 to 2,500 m), inhabiting Petran Montane Conifer Forest, Great Basin Conifer Woodland, Interior Chaparral, and the Arizona Upland subdivision of Sonoran Desertscrub communities (Rosen and Schwalbe 1988; Brennan and Holycross 2006). An extensive evaluation of habitat use of narrow-headed gartersnakes along Oak Creek in Arizona is provided in Nowak and Santana-Bendix (2002). Rosen and Schwalbe (1988) found narrow-headed gartersnake densities may be highest at the conjunction of cascading riffles with pools, where waters were deeper than 20 in (0.5 m) in the riffle and deeper than 40 in (1 m) in the immediately adjoining area of the pool, but more than twice the number of snakes were found in pools rather than riffles.

Where narrow-headed gartersnakes are typically found in the water, little aquatic vegetation exists (Rosen and Schwalbe 1988). However, bank-line vegetation is an important component to suitable habitat for this species. Narrow-headed gartersnakes will usually bask in situations where a quick escape can be made, whether that is into the water or under substrate such as rocks (Fleharty 1967). Rosen and Schwalbe (1988) noted that the composition of bank-side plant species and canopy structure were less important to the species’ needs than was the size class of the plant species present; narrow-headed gartersnakes prefer to use shrub- and sapling-sized plants for thermoregulating (basking) at the waters’ edge (Degenhardt et al. 1996).

The narrow-headed gartersnake is surface-active generally between March and November (Nowak 2006). Little information on suitable temperatures for surface activity of the narrow-headed gartersnake exists; however, it is presumed to be rather cold-tolerant based on its natural history and foraging behavior that often involves clear, cold streams at higher elevations. Along Oak Creek in Arizona, Nowak (2006) found the species to be active in air temperatures ranging
from 52 to 89 °F (11 to 32 °C) and water temperatures ranging from 54 to 72 °F (12 to 22 °C). Jennings and Christman (2011) found body temperatures of narrow-headed gartersnakes along the Tularosa River averaged approximately 68 °F (20 °C) during the mid-morning hours and 81 °F (27 °C) in the late afternoon during the period from late July and August. Variables that affect their body temperature include the temperature of the microhabitat used and water temperature (most predictive), but slope aspect and the surface area of cover used also influenced body temperatures (Jennings and Christman 2011). 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; Degenhardt et al. 1996; Rossman et al. 1996; Nowak and Santana-Bendix 2002; Nowak 2006) and are thought to be mainly visual hunters, heavily dependent on visual cues when foraging based on comparative analyses among other species of gartersnakes (de Queiroz 2003). Unlike many other species of gartersnakes that are active predators (actively crawl about in search of prey), narrow-headed gartersnakes are considered to be ambush predators (sit-and-wait method) (Brennan and Holycross 2006; Pierce 2007). Native fish species most often associated as prey items for the narrow-headed gartersnake include Sonora sucker (Catostomus insignis), desert sucker (C. clarki), speckled dace (Rhinichthys osculus), roundtail chub, Gila chub, and headwater chub (Gila nigra) (Rosen and Schwalbe 1988; Degenhardt et al. 1996). Nonnative species used as prey by narrow-headed gartersnakes are most often salmonid species (trout); most commonly brown (Salmo trutta) and rainbow trout (Oncorhynchus mykiss), as these species are commonly stocked in, or near, occupied narrow-headed gartersnake habitat (Rosen and Schwalbe 1988; Nowak 2006). Fleharty (1967) reported narrow-headed gartersnakes eating green sunfish, but green sunfish are not considered a suitable prey item due to the risk of injury to the gartersnake during ingestion (Nowak and Santana-Bendix 2002).

The narrow-headed gartersnake will also prey upon frogs, tadpoles, and salamanders (Stebbins 1985; Degenhardt et al. 1996; Ernst and Ernst 2003). Fitzgerald (1986) referenced the Stebbins (1985) account as the only substantiated account of the species accepting something other than fish as prey, apparently as the result of finding a small salamander larva in the stomach of an individual in Durango, Mexico. Despite several studies focusing on the ecology of narrow-headed gartersnakes in recent times, there are no other records of narrow-headed gartersnakes, under current taxonomic recognition, feeding on prey items other than fish.

Native predators of the narrow-headed gartersnake include birds of prey, other snakes such as kingsnakes, whipsnakes, or regal ring-necked snakes, wading birds, mergansers, belted kingfishers, raccoons, skunks, and coyotes (Rosen and Schwalbe 1988; Brennan et al. 2009). Historically, large, highly predatory native fish species such as Colorado pikeminnow may have preyed upon narrow-headed gartersnakes where the species co-occurred. Native chubs may also prey on neonatal gartersnakes.

Sexual maturity in narrow-headed gartersnakes occurs at 2.5 years of age in males and at 2 years of age in females (Degenhardt et al. 1996). Narrow-headed gartersnakes are viviparous. The reproductive cycle for narrow-headed gartersnakes appears to be longer than other gartersnake species; females begin the development of follicles in early March, and gestation takes longer
Female narrow-headed gartersnakes breed annually and give birth to 4 to 17 offspring from late July into early August, perhaps earlier at lower elevations (Rosen and Schwalbe 1988). Sex ratios in narrow-headed gartersnake populations can be skewed in favor of females (Fleharty 1967).

The historical distribution of the narrow-headed gartersnake ranged across the Mogollon Rim and along its associated perennial drainages from central and eastern Arizona, southeast to southwestern New Mexico at elevations ranging from 2,300 to 8,000 ft (700 to 2,430 m) (Rosen and Schwalbe 1988; Rossman et al. 1996; Holycross et al. 2006). The species was historically distributed in headwater streams of the Gila River subbasin that drain the Mogollon Rim and White Mountains in Arizona, and the Gila Wilderness in New Mexico; major subbasins in its historical distribution included the Salt and Verde River subbasins in Arizona, and the San Francisco and Gila River subbasins in New Mexico (Holycross et al. 2006). Holycross et al. (2006) suspect the species was likely not historically present in the lowest reaches of the Salt, Verde, and Gila rivers, even where perennial flow persists. Numerous records for the narrow-headed gartersnake in Arizona are maintained in the AGFD’s Heritage Database. The narrow-headed gartersnake as currently recognized does not occur in Mexico.

Population status information suggests that the narrow-headed gartersnake has experienced significant declines in population density and distribution along streams and rivers where it was formerly well-documented and reliably detected. Many areas where the species may occur likely rely on emigration of individuals from occupied habitat into those areas to maintain the species, provided there are no barriers to movement. Holycross et al. (2006) represents the most recent, comprehensive survey effort for narrow-headed gartersnakes in Arizona. Our most current information on the species’ status in New Mexico comes from a species expert who is completing a graduate degree focused on the relationship between narrow-headed gartersnake populations and fish communities in the upper Gila and San Francisco river drainages (Helleckson 2012, pers. comm.). 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. Population densities have noticeably declined in many populations, as compared to previous survey efforts (Holycross et al. 2006, and significantly more effort is required to detect this species in areas where it was formerly robust, such as along Eagle Creek (AZ), the East Verde River (AZ), the San Francisco River (NM), the Black River (AZ), and the Blue River (AZ).

As of 2011, the only remaining narrow-headed gartersnake populations where the species could reliably be found were located at: (1) Whitewater Creek (New Mexico), (2) Tularosa River (New Mexico), (3) Diamond Creek (New Mexico), (4) Middle Fork Gila River (New Mexico), and (5) Oak Creek Canyon (Arizona). However, populations found in Whitewater Creek and the Middle Fork Gila River were likely significantly affected by the Whitewater-Baldy Complex Fire in New Mexico, which occurred in June 2012. In addition, salvage efforts were initiated for these two populations, which included the removal of 25 individuals from Whitewater Creek and 14 individuals from the Middle Fork Gila River before the onset of summer rains in 2012. The status of those populations has likely deteriorated as a result of subsequent declines in resident fish communities due to heavy ash and sediment flows, resulting fish kills, and the removal of snakes, but subsequent survey data have not been collected. If the Whitewater Creek and Middle
Fork Gila River populations did decline as a result of these factors, only three remaining populations of this species remain viable today across their entire distribution. Such unnaturally large wildfires have become increasingly common across the Mogollon Rim of Arizona and New Mexico where the narrow-headed gartersnake historically occurred. The status of the narrow-headed gartersnake on tribal land is poorly known, due to limited survey access.

*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 2013). In Arizona, proposed critical habitat is located in 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 in portions of the San Francisco and Upper Gila rivers.

The following are the primary constituent elements of the physical and biological factors proposed for narrow-headed gartersnake critical habitat:

1. Stream habitat that 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.
2. Adequate terrestrial space (600 ft [182.9 m] 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.
3. A prey base consisting of viable populations of native fish species or soft-rayed nonnative fish species.
4. An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs (*Lithobates catesbeianus*), and/or crayfish (*Orconectes virilis, Procambarus clarki*, etc.), 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.
Mexican spotted owl

In 1993, the FWS listed the Mexican spotted owl (hereafter, referred to as Mexican spotted owl, spotted owl, and owl) as threatened under the ESA. The FWS appointed the Mexican spotted owl Recovery Team in 1993 (USDI FWS 1993), which produced the Recovery Plan for the Mexican spotted owl in 1995 (USDI FWS 1995). The FWS released the final Mexican spotted owl Recovery Plan, First Revision (Recovery Plan) in December 2012 (USDI FWS 2012). Critical habitat was designated for the spotted owl in 2004 (USDI FWS 2004).

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 (USDI FWS 1993), the original Recovery Plan (USDI FWS 1995), and in the revised Recovery Plan (USDI FWS 2012). The information provided in those documents is included herein by reference.

The spotted owl occurs in forested mountains and canyonlands 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. Although the owl’s entire range covers a broad area of the southwestern United States and Mexico, it does not occur uniformly throughout its range. Instead, the Mexican spotted owl occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases steep, rocky canyon lands. Known owl locations indicate that the species has an affinity for older, uneven-aged forest, and the species is known to inhabit a physically diverse landscape in the southwestern United States and Mexico.

In addition to this natural variability in habitat influencing owl distribution, human activities also vary across the owl’s range. The combination of natural habitat variability, human influences on owls, international boundaries, and logistics of implementation of the Recovery Plan necessitates subdivision of the owl’s range into smaller management areas. The 1995 Recovery Plan subdivided the 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 FWS guidelines. We divide the Mexican spotted owl’s range within the United States into five EMUs: Colorado Plateau (CP), Southern Rocky Mountains (SRM), Upper Gila Mountains (UGM), Basin and Range-West (BRW), and Basin and Range-East (BRE) (Figure 2). Within Mexico, the Revised Recovery Plan delineated five EMUs: Sierra Madre Occidental Norte, Sierra Madre Occidental Sur, Sierra Madre Oriental Norte, Sierra Madre Oriental Sur, and Eje Neovolcanico.

Mexican spotted owl surveys since the 1995 Recovery Plan have increased our knowledge of owl distribution, but not necessarily of 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 (USDI FWS 2012) lists 1,324 known owl sites in the United States. An 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 owl sites is mainly a product of new owl surveys being completed within previously unsurveyed areas (e.g., several National Parks within southern Utah, Grand Canyon National Park in Arizona, Guadalupe National Park in West Texas, Guadalupe Mountains in southeastern New Mexico and West Texas, Dinosaur National
Monument in Colorado, Cibola National Forest in New Mexico, and Gila National Forest in New Mexico). Thus, an increase in abundance in the species range-wide cannot be inferred from these data (USDI FWS 2012). However, we do assume that an increase in the number of areas considered to be occupied is a positive indicator regarding owl abundance.

Two primary reasons were cited for the original listing of the Mexican spotted owl in 1993: 1) the historical alteration of its habitat as the result of timber-management practices; and, 2) 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 (USDI FWS 1995), we have acquired new information on the biology, threats, and habitat needs of the Mexican spotted owl. Threats to its population in the U.S. (but likely not in Mexico) 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. 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 owl habitat. Several fatality factors have been identified as particularly detrimental to the Mexican spotted owl, including predation, starvation, accidents, disease, and parasites.

Historical and current anthropogenic uses of Mexican 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 owl and is thought to have a negative effect on the availability of grass cover for prey species. Recreation impacts are increasing throughout the Southwest, especially in meadow and riparian areas. There is anecdotal information and research that indicates that 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 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 Mexican spotted owl, including predation, starvation, accidents, disease, and parasites. For example, West Nile Virus also has the potential to adversely impact the Mexican spotted owl. The 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, we will most likely not know when owls contract the disease or the extent of its impact to the owl 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 Mexican spotted owl within the action 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 Mexican spotted owl’s range.

Finally, 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 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 FWS designated critical habitat for the Mexican spotted owl in 2004 on approximately 8.6 million acres (3.5 million hectares) of Federal lands in Arizona, Colorado, New Mexico, and Utah (USDI FWS 2004). Within the designated boundaries, critical habitat includes only those areas defined as protected habitats (defined as PACs and unoccupied slopes >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 (USDI FWS 1995). The PCEs for Mexican spotted owl critical habitat were determined from studies of their habitat requirements and information provided in the Recovery Plan (USDI FWS 1995). Since owl habitat can include both canyon and forested areas, PCEs were identified in both areas. The PCEs identified for the owl within mixed-conifer, pine-oak, and riparian forest types that provide for one or more of the 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 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 and often higher humidity than the surrounding areas);
- Clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, and/or riparian vegetation;
- Canyon walls containing crevices, ledges, or caves; and,
- High percent of ground litter and woody debris.

Overall, the status of the owl and its designated critical habitat has not changed significantly range-wide in the U.S. (which includes Utah, Colorado, Arizona, New Mexico, and extreme southwestern Texas), based upon the information we have, since issuance of the 2012 LRMP BO/CO for the PNF (USFWS 2012). What we mean by this is that the distribution of owls continues to cover the same area, and critical habitat is continuing to provide for the life history needs of the Mexican spotted owl throughout all of the EMUs located in the U.S. We do not have detailed information regarding the status of the Mexican spotted owl in Mexico, so we cannot make inferences regarding its overall status.

However, this is not to say that significant changes have not occurred within the owl’s U.S. range. Wildland fire has resulted in the greatest loss of PACs and critical habitat relative to other actions (e.g., such as forest management, livestock grazing, recreation, etc.) throughout the U.S. range of the Mexican spotted owl. These wildland fire impacts have mainly impacted Mexican spotted owls within the UGM EMU (e.g., Rodeo-Chediski and Wallow Fires on the Apache-Sitgreaves NF and Whitewater-Baldy Complex on the Gila NF) and BRW EMU (e.g., Horseshoe 2 Fire on the Coronado NF); but other EMUs have been impacted as well (SRM EMU, the Santa Fe NF by the Las Conchas Fire, CP EMU by the Warm Fire). However, we do not know the extent of the effects of these wildland fires on actual owl numbers.

**Southwestern willow flycatcher**

The southwestern willow flycatcher was listed as endangered, without critical habitat on February 27, 1995 (USFWS 1995). Critical habitat was later designated on July 22, 1997 (USFWS 1997a). A correction notice was published in the Federal Register on August 20, 1997.
to clarify the lateral extent of the designation (USFWS 1997b). On May 11, 2001, the Tenth Circuit Court of Appeals set aside designated critical habitat in those states under its jurisdiction (New Mexico). The FWS set aside critical habitat designated for the southwestern willow flycatcher in all other states (California and Arizona) until it could re-assess the economic analysis. On October 19, 2005, the FWS re-designated critical habitat for the southwestern willow flycatcher (USFWS 2005a). The lateral extent of critical habitat included areas within the 100-year floodplain. On August 15, 2011, the FWS proposed a revision to the critical habitat designation, identifying stream segments in each of the 29 Management Units where there are recovery goals (USFWS 2011). On January 3, 2013, the FWS completed the southwestern willow flycatcher critical habitat revision by designating approximately 1,227 stream miles as critical habitat (USFWS 2013).

A final recovery plan for the southwestern willow flycatcher was signed by the FWS Region 2 Director in March 2003 (USFWS 2002). The Plan describes the reasons for endangerment, current status of the southwestern willow flycatcher, addresses important recovery actions, includes detailed issue papers on management issues, and provides recovery goals.

The southwestern willow flycatcher is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Howell and Webb 1995). The historical breeding range of the Southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987).

The southwestern willow flycatcher breeds in dense riparian habitats from sea level in California to approximately 8,500 feet in Arizona and southwestern Colorado. Historical egg/nest collections and species' descriptions throughout its range describe the southwestern willow flycatcher's widespread use of willow (Salix spp.) for nesting (Phillips 1948, Unitt 1987). Four basic habitat types can be described for the southwestern willow flycatcher: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge et al. 1997).

The southwestern willow flycatcher’s habitat is dynamic and can change rapidly: nesting habitat can grow out of suitability; saltcedar habitat can develop from seeds to suitability in about four to five years; heavy runoff can remove/reduce habitat suitability in a day; or river channels, floodplain width, location, and vegetation density may change over time. Southwestern willow flycatcher habitat can quickly change and vary in suitability, location, use, and occupancy over time (Finch and Stoleson 2000).

Tamarisk is an important component of the southwestern willow flycatcher’s nesting and foraging habitat. In 2001 in Arizona, 80 percent of known southwestern willow flycatcher nests were built in a tamarisk (Smith et al. 2002). Tamarisk had been believed by some to be a habitat type of lesser quality for the southwestern willow flycatcher, however comparisons of reproductive performance (USFWS 2002), prey populations (Durst 2004) and physiological conditions (Owen and Sogge 2002) of southwestern willow flycatchers breeding in native and exotic vegetation has revealed no difference (Sogge et al. 2005).
The introduced tamarisk leaf beetle was first detected affecting tamarisk within the range of the southwestern willow flycatcher in 2008 along the Virgin River in St. George, Utah. Because tamarisk is a component of about 50 percent of all known southwestern willow flycatcher territories (Durst et al. 2008), continued spread of the beetle has the potential to significantly alter the distribution, abundance, and quality of southwestern willow flycatcher nesting habitat and impact breeding attempts.

There are currently 288 known southwestern willow flycatcher breeding sites in California, Nevada, Arizona, Utah, New Mexico, and Colorado (all sites from 1993 to 2007 where a territorial southwestern willow flycatcher has been detected) holding an estimated 1,299 territories (Durst et al. 2008). 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 Unitt’s (1987) estimate of 20 years ago (500-1000 pairs). About 50 percent of the 1,299 estimated territories throughout the subspecies range are located at four general locations (Cliff/Gila Valley – New Mexico, Roosevelt Lake and inflows - Arizona, lower San Pedro River/middle Gila River confluence – Arizona, Middle Rio Grande, New Mexico).

While numbers have significantly increased in Arizona (145 to 459 territories from 1996 to 2007) (English et al. 2006, Durst et al. 2008), overall distribution of southwestern willow flycatchers throughout the state has changed little. Currently, population stability in Arizona is believed to be largely dependent on the presence of two large populations (Roosevelt Lake and San Pedro/Gila River confluence). 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 southwestern willow flycatcher.

**Critical habitat**

The FWS identified the PBFs essential to the conservation of the southwestern willow flycatcher in areas occupied at the time of listing, focusing on the features’ PCEs (USFWS 2013). In general, the PBFs of critical habitat for nesting southwestern willow flycatchers are found in the riparian areas within the 100-year floodplain or flood-prone area. Southwestern willow flycatcher habitat is ephemeral in its presence, and its distribution is dynamic in nature because riparian vegetation is prone to periodic disturbance (such as flooding) (USFWS 2002). These PBFs include, but are not limited to:

1. Space for individual and population growth and for normal behavior;
2. Food, water, air, light, minerals, or other nutritional or physiological requirements;
3. Cover or shelter;
4. Sites for breeding, reproduction, or rearing (or development) of offspring; and
5. Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.
The PCEs of designated critical habitat are based on riparian plant species, structure and quality of habitat and insects for prey.

1. Primary Constituent Element 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 m (about 6 to 98 ft.). Lower-stature thickets (2 to 4 m or 6 to 13 ft. 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 m (13 ft.) 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 ha (0.25 ac) or as large as 70 ha (175 ac).

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

A variety of river features such as broad floodplains, water, saturated soil, hydrologic regimes, elevated groundwater, fine sediments, etc. help develop and maintain these constituent elements and are also an important component to evaluate.

Since listing in 1995, at least 226 Federal agency actions have undergone (or are currently under) formal section 7 consultation throughout the southwestern willow flycatcher’s range. Since southwestern willow flycatcher critical habitat was finalized in 2005, at least 33 formal opinions have been completed in Arizona (within and outside designated critical habitat). While many opinions were issued for the previous critical habitat designation, the stream reaches and constituent elements have changed.

Conservation measures associated with some consultations and Habitat Conservation Plans have helped to acquire lands specifically for southwestern willow flycatchers on the San Pedro, Verde,
and Gila rivers in Arizona, and the Kern River in California. Additionally, along the lower Colorado River, the U.S. Bureau of Reclamation is currently attempting to establish riparian vegetation to expand and improve the distribution and abundance of nesting southwestern willow flycatchers. A variety of tribal management plans in California, Arizona, and New Mexico have been established to guide conservation of the southwestern willow flycatcher. Additionally, during the development of the critical habitat rule, management plans were developed for some private lands along the Owens River in California and Gila River in New Mexico. These plans are a portion of the conservation actions that have been established across the subspecies’ range.

**Yellow-billed cuckoo**

The Western Distinct Population Segment (DPS) of the yellow-billed cuckoo became a candidate for listing under the ESA in 2001, after a 12-month finding determined that listing was warranted but precluded by higher listing priorities (USFWS 2001). The FWS published a proposed rule to list the Western DPS of the yellow-billed cuckoo (*Coccyzus americanus*) as a threatened species on October 3, 2013 (USFWS 2013).

Morphologically, the yellow-billed cuckoos throughout the western continental United States and Mexico are generally larger, with significantly longer wings, longer tails, and longer and deeper bills (Franzreb and Laymon 1993). Birds with these characteristics occupy the Western DPS and we refer to them as the “western yellow-billed cuckoo.” Only the Western DPS has been proposed for listing as a threatened species (USFWS 2013). Yellow-billed cuckoos in the west arrive on the breeding grounds four to eight weeks later than eastern yellow-billed cuckoos at similar latitude (Franzreb and Laymon 1993, Hughes 1999). Some information exists suggesting that the western population segment described in the scientific literature as the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is distinguishable at the subspecific level; however, there is enough literature to conclude that recognition of the subspecies is not justified at this time (USFWS 2013).

The yellow-billed cuckoo winters in South America and breeds in North America. The breeding range of the entire species formerly included most of North America from southeastern and western Canada (southern Ontario and Quebec and southwestern British Colombia) to the Greater Antilles and northern Mexico (American Ornithologists Union [AOU] 1957, AOU 1983, AOU 1998).

Based on historical accounts, the western yellow-billed cuckoo was formerly widespread and locally common in California and Arizona, more narrowly distributed but locally common in 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 be extirpated from British Colombia, 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 2001). The largest remaining breeding areas are in southern and central California, Arizona, along the Rio Grande in New Mexico, and in northwestern Mexico (USFWS 2013). 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 2013).
Yellow-billed cuckoos spend the winter in South America, east of the Andes, primarily south of the Amazon Basin in southern Brazil, Paraguay, Uruguay, eastern Bolivia, and northern Argentina (Ehrlich et al. 1992, AOU 1998, Johnson et al. 2008a). The species as a whole winters in woody vegetation bordering fresh water in the lowlands to 1,500 m (4,921 ft), including dense scrub, deciduous broadleaf forest, gallery forest, secondary forest, subhumid and scrub forest, and arid and semiarid forest edges (Hughes 1999). Wintering habitat of the western yellow-billed cuckoo is poorly known.

Little is known about migratory habitat for the western yellow-billed cuckoo. 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 m (8,125 ft) (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 forage primarily by gleaning insects from vegetation, but they may also capture flying insects or small vertebrates such as tree frogs and lizards (Hughes 1999). They specialize on relatively large invertebrate prey, including caterpillars (Lepidoptera sp.), katydids (Tettigoniidae sp.), cicadas (Cicadidae sp.), and grasshoppers (Caelifera sp.) (Laymon et al. 1997). Minor prey include beetles (Coleoptera sp.), dragonflies (Odonata sp.), praying mantis (Mantidae sp.), spiders (Araneae sp.), butterflies (Lepidoptera sp.), caddis flies (Trichoptera sp.), crickets (Gryllidae sp.), wild berries, and bird eggs and young (Laymon et al. 1997, Hughes 1999). Prey species composition varies geographically. Their breeding season may be timed to coincide with outbreaks of insect species, particularly tent caterpillars (Hughes 1999, USFWS 2001) or cicadas (Johnson et al. 2007, Halterman 2009). In Arizona, fledging occurred at the peak emergence of cicadas (Rosenberg et al. 1982).

In the arid West, these conditions are usually found in cottonwood-willow riparian associations along water courses. The arrival of birds and the timing of nesting are geared to take advantage of any short-term abundance of prey. In years of high insect abundance, western yellow-billed cuckoos lay larger clutches (three-five eggs rather than two), a larger percentage of eggs produce fledged young, and they breed multiple times (2-3 nesting attempts rather than one) (Laymon et al. 1997). Western yellow-billed cuckoo food availability is largely influenced by the health, density, and species of vegetation. Desiccated riparian sites produce fewer suitable insects than healthy moist sites.

Western populations of yellow-billed cuckoos breed in dense riparian woodlands, primarily of cottonwood (Populus fremontii), willow (Salix spp.), and mesquite (Prosopis spp.), along riparian corridors in otherwise arid areas (Laymon and Halterman 1989, Hughes 1999). Dense undergrowth may be an important factor in selection of nest sites. Surveys conducted by the Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005) reported 68 percent of the yellow-billed cuckoo observations were in lowland riparian woodlands, often containing a variable combination of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk (Corman and Wise-Gervais 2005). Narrow bands of riparian woodland can contribute
to the overall extent of suitable habitat. Adjacent habitat on terraces or in the upland (such as mesquite) can enhance the value of these narrow bands of riparian woodland.

Throughout the western yellow-billed cuckoo range, a large majority of nests are placed in willow trees, but alder (\textit{Alnus} spp.), cottonwood, mesquite, walnut (\textit{Juglans} spp.), box elder, sycamore, netleaf hackberry (\textit{Celtis laevigata} var. \textit{reticulata}), soapberry (\textit{Sapindus saponaria}), and tamarisk are also used (Laymon 1980, Hughes 1999, Corman and Magill 2000, Corman and Wise-Gervais 2005, Holmes et al. 2008). Tamarisk is also a riparian species that may be associated with breeding under limited conditions; western yellow-billed cuckoo will sometimes build their nests and forage in tamarisk, but there is usually a native riparian tree component within the occupied habitat (Gaines and Laymon 1984, Johnson et al. 2008b).

Western yellow-billed cuckoos reach their breeding range later than most other migratory breeders, often in June (Rosenberg et al. 1982). They construct an unkempt stick nest on a horizontal limb in a tree or large shrub. Nest height ranges from 4 ft to (rarely) 100 ft, but most are typically below 30 ft (Hughes 1999). The incubation period for the western yellow-billed cuckoo is nine to 11 days, and young leave the nest at seven to nine days old. Although other species of cuckoos are often or always brood parasites of other birds, yellow-billed cuckoos do so only infrequently, possibly in response to high food resources that allow rapid egg production (Fleischer et al. 1985). Nesting usually occurs between late June and late July, but can begin as early as late May and continue until late September (Hughes 1999). In a study on the lower Colorado River, three nests were estimated to have first fledged young during August 25 to 28 had they not failed. If these nests had successfully fledged young, the birds may still have been present at their respective breeding sites at least until September 15 to 18 (previously discussed in McNeil et al. 2012).

The optimal size of habitat patches for the species are generally greater than 200 ac (81 ha) and have dense canopy closure and high foliage volume of willows and cottonwoods (Laymon and Halterman 1987) and thus provide adequate space for foraging and nesting. Tamarisk, a nonnative tree species, may be a component of the habitat, especially in Arizona and New Mexico. Sites with a monoculture of tamarisk are unsuitable habitat for the species. The association of breeding with large tracts of suitable riparian habitat is likely related to home range size. Individual home ranges during the breeding season average over 100 ac (40 ha), and home ranges up to 500 ac (202 ha) have been recorded (Laymon and Halterman 1987, Halterman 2009, Sechrist et al. 2009, McNeil et al. 2011, McNeil et al. 2012).

In addition to the dense nesting grove, western yellow-billed cuckoos need adequate foraging areas near the nest. Foraging areas can be less dense or patchy with lower levels of canopy cover and often have a high proportion of cottonwoods in the canopy. Optimal breeding habitat contains groves with dense canopy closure and well-foliaged branches for nest building with nearby foraging areas consisting of a mixture of cottonwoods, willows, or mesquite with a high volume of healthy foliage (USFWS 2013).

The yellow-billed cuckoo was historically widespread and locally common in Arizona (Phillips et al. 1964, Groschupf 1987). Although Arizona probably contains the largest remaining western yellow-billed cuckoo population among states west of the Rocky Mountains, (as low as 170 pairs
and probably not exceeding 250 pairs) the population has reportedly declined significantly in distribution and abundance over the past 80 years (Corman and Wise-Gervais 2005). During Arizona Breeding Bird Atlas surveys, nesting birds were found to be concentrated in western, central, and southeastern Arizona. According to Corman and Wise-Gervais (2005), western yellow-billed cuckoos were found along most of the 25 drainages where they were reported historically but they are now much more local in distribution. It is believed that the San Pedro River likely sustains the largest single remaining population of yellow-billed cuckoos (Brand et al. 2009).

A 1976 study based on existing habitat and known yellow-billed cuckoo population densities estimated 846 pairs were present on the lower Colorado River and its five major tributaries in Arizona (Groschupf 1987). In a statewide survey in 1999 that covered 265 mi (426 km) of river and creek bottoms, 172 yellow-billed cuckoo pairs and 81 single birds were located in Arizona (Corman and Magill 2000). The western yellow-billed cuckoo is primarily threatened by habitat loss; its existence as small, isolated populations; pesticide use; and climate change.

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). Within the three states with the highest historical number of yellow-billed cuckoo pairs, past riparian habitat losses are estimated to be about 90 to 95 percent in Arizona, 90 percent in New Mexico, and 90 to 99 percent in California (Ohmart 1994, USDI 1994, Noss et al. 1995, Greco 2008). 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, establishment of nonnative vegetation, drought, and prey scarcity due to pesticides (Ehrlich et al. 1992, Wiggins 2005, USFWS 2013). Drought and prey scarcity (especially the loss of sphinx moth caterpillars to pesticides in the West) appear to play a role in yellow-billed cuckoo declines even where suitable nesting habitat remains (Ehrlich et al. 1992). These factors also contribute to fragmentation and promote conversion to nonnative plant species and increased incidence of wildfire (USFWS 2001, 2013d). A potential factor contributing to declines across the species’ range in North America is the loss of forested habitat on its wintering grounds in South America where little is known of its ecology or distribution (Ehrlich et al. 1992). The threats affecting western yellow-billed cuckoo habitat are ongoing. Such a loss of riparian habitat leads not only to a direct reduction in yellow-billed cuckoo numbers but also leaves a highly fragmented landscape, which can reduce breeding success through increased predation rates and barriers to dispersal by juvenile and adult yellow-billed cuckoos (USFWS 2013).

In addition to habitat rarity, small, isolated populations of the western yellow-billed cuckoo, cause the remaining populations in western North America to be increasingly susceptible to further declines through lack of immigration, chance weather events, fluctuating availability of prey populations, pesticides, collisions with tall vertical structures during migration, spread of the introduced tamarisk leaf beetle (Diorhabda spp.) as a biocontrol agent in the Southwest, and climate change. The ongoing threat of small overall population size leads to an increased chance of local extirpations through random events (Thompson 1961, McGill 1975, Wilcove et al. 1986).
ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions that are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation. The environmental baseline descriptions provided below are a summary of the available information. A complete description of the environmental baseline for each species can be found in the administrative record for this consultation.

Description of the action area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR section 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment. The action area for this BO/CO is defined as all Forest Service-administered lands within the Prescott NF’s three ranger districts: Bradshaw, Chino Valley, and Verde. The action area also includes adjacent lands that the proposed action may directly or indirectly affect, including adjacent portions of the Coconino, Kaibab, and Tonto National Forests; Agua Fria National Monument; Arizona State Trust lands; and adjacent private lands as well as portions of several communities including Prescott, Camp Verde, and Cottonwood. Where the Verde River forms the eastern boundary of the Prescott NF, the entire width of the river is within the action area.

Gila chub

A. Status of the species and critical habitat within the action area

Gila chub occur in Sycamore Creek, Little Sycamore Creek, and Indian Creek in the Agua Fria River drainage on the Prescott NF (BA Table 11). The Sycamore Creek population is classified as unstable-threatened based on threats from fire, grazing, and nonnative species (USFWS 2005). The Little Sycamore Creek population is classified as stable-threatened and Indian Creek as unstable-threatened. All three populations have been adversely affected by the Cave Creek Complex Fire, which burned in parts of these watersheds in 2005. The Little Sycamore and Indian Creek populations occur in small spring sites that are excluded by fencing from livestock grazing. Gila chub distribution in Sycamore Creek is limited to a three mile reach between Double T Waterfall and the Rock Bottom Box and is protected from upstream and downstream movement of nonnative fish by rock barriers. Livestock grazing is limited in this reach of the creek due to the canyons and general inaccessibility to the stream. Gila chub and rainbow trout occur within this reach as well as nonnative crayfish (USFS 2010).
Critical habitat

A total of 13.1 miles of critical habitat occurs in Sycamore Creek, Little Sycamore Creek, and Indian Creek in the Agua Fria River drainage on the Prescott NF (critical habitat Area 7 – Agua Fria River). One known population and designated critical habitat is located on private lands downstream of the eastern boundary of the forest (west half) in Williamson Valley Wash. The greatest impact to the status of critical habitat on the forest has been the Cave Creek Complex Fire of 2005. The impacts from ash flow and debris made some of the habitat unsuitable, but the primary constituent elements are in sufficient condition to support small populations of Gila chub in these areas.

Critical habitat on and near the Prescott NF is in Area 7 – Agua Fria River:
- **Little Sycamore Creek** - 2.9 miles of creek extending from its confluence with Sycamore Creek upstream. Land ownership includes private lands and Prescott NF.
- **Sycamore Creek** - 11.4 miles of creek extending from its confluence with Little Sycamore Creek upstream to Nelson Place Spring. Land ownership includes private lands and Prescott NF.
- **Indian Creek** - 5.2 miles of creek extending from Upper Water Springs downstream into BLM lands. Land ownership includes private lands, BLM, and Prescott NF.
- **Williamson Valley Wash** - 4.4 miles of creek extending from the gauging station upstream to the crossing of the Williamson Valley Road. This critical habitat occurs entirely on private lands.

B. Factors affecting the species and critical habitat within the action area

Land ownership in the action area is primarily Prescott NF lands and other state or Federal lands, but there are private land inclusions along the streams. The main land use activities in the area include livestock grazing and dispersed recreation activities such as OHV use and hunting. Prescott NF has rated watershed conditions at-risk or impaired for several key watershed condition indicators (BA Table 13). These departures collectively are contributing to an altered hydrologic condition that is affecting aquatic habitat quality in Gila chub-occupied streams.

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 affects 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 from sedimentation due to the 2005 Cave Creek Complex wildfire. Nonnative fishes that are predatory and/or competitive with the native species occur in portions of Sycamore, Little Sycamore, Indian Creeks, and Williamson Valley Wash. Rainbow trout occur with Gila chub in Sycamore Creek and are having an unknown impact on the species. Portions of all streams have nonnative fish present that have reduced or eliminated Gila chub distribution and abundance. Additionally, the Cave Creek Complex Fire burned in portions of watersheds on the Prescott NF, reducing chub habitat and populations in Sycamore Creek, Little Sycamore Creek, and Indian Creek due to flooding and high sediment input. Gila chub were salvaged from these creeks to avoid loss of these populations and were repatriated post-fire.
There are also threats to water quantity for Gila chub from water withdrawals in several streams. Water withdrawals in Indian Creek occur on private lands downstream of the Prescott NF and do not affect the sites on the forest. Off of the Forest, housing developments and associated water withdrawals near Williamson Valley Wash, combined with drought, may be reducing or eliminating Gila chub habitat in this system (USFWS 2005).

Roads, and to a lesser extent trails, are the most significant source of increased sediments into stream channels on the Prescott NF. Many roads and trails on the Prescott NF are located in proximity to surface water and concentrate runoff into these drainages, increasing sediment transport and reducing infiltration rates. There are several stream crossings that occur in all three streams on both forest and private lands. Although these low water stream crossings do not pose a barrier to aquatic passage, all the subwatersheds were rated as Impaired for this indicator, meaning there is a higher probability that the hydrologic conditions have been substantially altered by roads and trails.

Livestock grazing occurs throughout suitable rangelands in all subwatersheds where Gila chub and its habitat occur. Authorized livestock grazing on Prescott NF allotments follow grazing rotations, riparian utilization levels, and other standards and guidelines to minimize impacts to riparian and aquatic resources. In 2003, Prescott NF constructed riparian exclosures around occupied sites in Indian Creek. Annual monitoring and maintenance of the exclosures are completed to exclude livestock grazing. Areas of suitable habitat for Gila chub (outside of occupied habitat) within Sycamore Creek are accessible to livestock grazing, which may affect the aquatic/riparian zone due to livestock use and movement along occupied habitat, and may also input waste deposits into or near habitat and impair water quality. We completed a formal consultation with the forest regarding the impacts of livestock grazing in the Sycamore Allotment on Gila chub in 2010 (AESO file number 22410-2008-F-0934). No formal consultations have been conducted with the Prescott NF since the last reinitiation of the 1987 LRMP was completed in March 30, 2012 (Region 2 file number 2012-F-0009).

Juniper treatments followed by slash pile burning have been ongoing for pronghorn habitat improvement within the Indian Creek subwatershed. This project, with the implementation of resource protection measures, has improved vegetation and soil conditions in the area.

Gila topminnow

A. Status of the species and critical habitat within the action area

Historically, there were no documented occurrences of Gila topminnow within the Forest (USFWS 1999). Topminnows were introduced at twenty-four sites on the Prescott NF in the early 1980s (USFWS 1985), but none of the sites maintain surviving populations (Voeltz and Bettaso 2003). Reasons for failure included drying of sites, flooding impacts, reduction of suitable habitat due to vegetation overgrowth, and cold temperatures. Potential habitats have been identified on the forest, but sites that meet habitat criteria need to be assessed further for possible reintroduction. Prescott NF conducted site evaluations for reintroductions with FWS and AGFD in 2008. Sites that have been considered include those occupied by Gila chub in
Sycamore, Little Sycamore, and Indian creeks, and springs including Reimer, Government, and Campbell Flat.

**B. Factors affecting the species and critical habitat within the action area:**

Potential habitat for the Gila topminnow occurs within the Sycamore, Little Sycamore, and Indian Creek subwatersheds discussed for the Gila chub, and topminnow habitat is affected by similar activities within these watersheds. The main factors directly affecting potential reintroduction sites are livestock grazing impacts at unfenced sites, drought effects that periodically reduce water availability, and flash flooding that can alter stream habitat.

**Gila trout**

**A. Status of the species and critical habitat within the action area**

The historical distribution of Gila trout is not known with certainty (Behnke 2002), but there are no known historical populations on the Prescott NF. Currently, Gila trout only occur in Grapevine Creek on the forest (BA Table 14). Trout were introduced into Gap Creek, a tributary to the Verde River, in 1974. This population persisted until 1990 but was extirpated, presumably due to drought (AGFD 1992). AGFD, in conjunction with Prescott NF and FWS, stocked Grapevine Creek with the South Diamond lineage in 2009 (AGFD 2009) and augmented the population in 2012 along with speckled dace. No reproduction has yet been documented. Sycamore Creek in the Agua Fria River drainage near Pine Mountain Wilderness contains suitable habitat for Gila trout. Currently, the creek is occupied by a self-sustaining population of rainbow trout originally stocked in the 1940s (Bettaso et al. 1995).

**B. Factors affecting the species and critical habitat within the action area**

The majority of Big Bug Creek subwatershed (which includes the Grapevine Creek population) is in Federal and State ownership (BA Table 15). There is one mile of perennial water within the Grapevine Creek drainage area; this reach is entirely within the Prescott NF and occurs within the Grapevine Botanical Area. The main forest activities in the subwatershed are livestock grazing and dispersed recreation. Livestock grazing is excluded from the Grapevine Botanical Area. Additional management direction does not allow motorized or mountain bike use of trails within the botanical area and limits recreation use to day use only. Forest Trail #4 accesses Grapevine Botanical Area and parallels the creek for about 0.5 mile but receives little use. The area does not have potential for timber harvest or use of prescribed fire. Wildfire remains a threat to this area. No formal consultations have been conducted with the Prescott NF since the last reinitiation of the 1987 LRMP was completed in March 30, 2012.

Suitable habitat for Gila trout also occurs along 2.5 miles in Sycamore Creek. Most of the Sycamore Creek subwatershed is in Federal ownership; two private land parcels are also along Sycamore Creek, one developed and the other undeveloped with limited potential for development. The main factors affecting conditions in this subwatershed are roads and trails, nonnative species, livestock grazing, dispersed recreation, an altered fire regime (BA Table 16). The Cave Creek Fire Complex in 2005 burned within the lower half of the subwatershed,
resulting in high sediment and ash flows. Access to upper Sycamore Creek is only available at two points along Forest Road 68 to the Pine Mountain Wilderness trailhead, which also serves as a dispersed recreation site with picnic tables and fire rings. The upper 0.75 mile of creek is easily accessible to recreational use and livestock grazing, and Forest Trail #159 parallels the creek. There is a one-mile livestock exclosure fence along the creek from the trailhead downstream to the Double T Ranch, including part of the suitable habitat area. Outside of the exclosure, livestock grazing is managed under the Sycamore Allotment Management Plan and follows annual operating plans to minimize impacts to the aquatic and riparian resources. The 0.25 mile of creek below the ranch has no road or trail access. The area does not have potential for timber harvest. Wildfire remains a threat to this area.

**Spikedace**

**A. Status of the species and critical habitat within the action area**

Historically, spikedace were first collected in the upper Verde River in the 1890s (ASU 2002). Subsequent collections were in the Verde River above Camp Verde and the lower ends of Beaver Creek and West Clear Creek in 1938, and in the Verde River above Camp Verde in 1950 (Minckley 1993). Currently, the upper Verde River is presumed to be occupied by spikedace, but based on extensive surveys, they are considered to be extremely rare (AGFD 2000a-b, 2001, 2005a-c; Bahm and Robinson 2009; Robinson and Crowder 2009; USFWS 2005). The last capture of a spikedace was documented during surveys in 1999 (Brouder 2002).

**Critical habitat**

A total of about 106 miles of designated critical habitat for spikedace occurs along the Verde River from its confluence with Fossil Creek upstream to Sullivan Dam. The upper six miles of critical habitat from Sullivan Dam downstream to the Prescott NF boundary is on The Nature Conservancy and State lands. The uppermost 37 miles of river from the Forest boundary downstream to Clarkdale are within Forest Service ownership except for a few private land parcels in this reach. The next 45 miles of river in the Verde Valley is primarily within private ownership. The last 15.5 miles are on the Prescott NF within the Verde WSR. Critical habitat has also been designated along Granite Creek off-forest, but is potentially impacted by Prescott NF management actions in the Granite Creek watershed that drains into this area.

Critical habitat on and near the Prescott NF is in the Verde River Subbasin:

- **Verde River** - Approximately 106 miles, extending from the confluence with Fossil Creek upstream to Sullivan Dam.
- **Granite Creek** - Approximately 2.0 miles, extending from the confluence with the Verde River in T 17 N, R 2 W, section 14, NE1/4 upstream to a spring in T17N, R2W, section 13, SW1/4SW1/4, Gila and Salt River Meridian (GRSM).

**B. Factors affecting the species and critical habitat within the action area**

Spikedace and its critical habitat on Prescott NF are affected by actions within eight watersheds (BA Table 19). The major communities in these watersheds include Prescott and Chino Valley.
in the upper Verde River and Big Chino subbasins and Jerome, Clarkdale, Cottonwood, Cornville, and Camp Verde in the Verde Valley. In addition to municipal and rural development, primary land uses throughout the watersheds include livestock grazing, irrigated agriculture, recreation, and some mining and silviculture. No formal consultations have been conducted with the Prescott NF since the last reinitiation of the 1987 LRMP was completed in March 30, 2012.

The primary threats in the Verde River include nonnative fishes that are predatory and/or competitive with the native species, and reduced habitat quantity and quality from water withdrawals in the Big Chino Aquifer and in the Verde Valley. In addition, watershed conditions are At-Risk or Impaired for several key watershed condition indicators such as roads and trails, soils, vegetation, and fire regimes (BA Table 20). These departures collectively are contributing to an altered hydrologic condition that is affecting aquatic habitat quality in the Verde River.

The departure of the pinyon-juniper and grassland PNVTs in these watersheds contributes to increased erosion due to higher canopy cover and less herbaceous ground cover to hold soils and moisture in place. Access to the upper Verde River is limited, but elsewhere, roads are a source of increased sediments and potential pollutants into stream channels due to their poor condition from irregular maintenance and their proximity to stream drainages. In addition, there are unquantified miles of unauthorized routes from OHV users that are also contributing increased sediments to stream drainages.

Water withdrawals from both surface water and groundwater are affecting streamflow in the Verde River (Blasch et al. 2006, Garner et al. 2013). More than 67 river diversions in the Verde Valley deliver surface water to agricultural fields and residential customers (Garner and Bills 2012) and dewater portions of the river through the Verde Valley during summer. The Big Chino aquifer has been shown to contribute at least 80 percent to the upper Verde River baseflow (Wirt et al. 2005). Current and future groundwater withdrawals from the Big Chino aquifer have the potential to decrease perennial flow in the upper Verde River, which would reduce the amount of habitat for spikedace. Population growth is expected to continue both in the Big Chino subbasin and the Verde Valley, increasing impacts to watershed integrity as well as groundwater resources.

Native fish species within the Verde River have been negatively affected by the introduction and establishment of nonnative aquatic species. Nonnative fish species dominate the fish community throughout the Verde River and are a major limiting factor in native aquatic species occurrence because of predation and competition (Hendrickson 1993; Rinne and Stefferud 1998; Bonar et al. 2004). In planning efforts to reduce nonnative fish impacts to native fish species, the Prescott NF, AGFD, and the Bureau of Reclamation completed site feasibility visits in 2006 along the upper Verde River for potential fish barrier locations and subsequent stream renovation. A final appraisal report was completed in 2010 (Riley and Clarkson 2010). During 2006, 2007, and 2008 the Forest and partners removed nonnative fish along three miles of the upper Verde River to test the effectiveness of mechanical removals to reduce nonnative fish populations.
Livestock grazing occurs throughout suitable rangelands in all watersheds that contain spikedace habitat. Livestock grazing has not been authorized in the river corridor on the six allotments along the Verde River on the Prescott NF since 1998. Livestock grazing has not been authorized in the river corridor for the two allotments in the middle Verde River since 2005, but there are three watering access points to the river. Two other allotments in the Verde Valley are also excluded from grazing. Grazing rotations, riparian utilization levels, and other standards and guidelines are followed to minimize impacts to riparian and aquatic resources. Site-specific NEPA analysis and section 7 consultation would be required to authorize future grazing use along the river corridor.

Demand for outdoor recreation is also expected to grow concurrently with increasing populations and more visitor use of the forest, especially along the Verde River, which is a draw for water-based recreational activities. To control impacts from roads, the Forest completed barrier and sign maintenance at three river access points in 2008 to prevent illegal vehicle access to the upper Verde River, and decommissioned or closed about five miles of roads within watersheds of the upper Verde River in 2009.

The Verde Wild and Scenic River Comprehensive River Management Plan (USFS 2004) provides guidance for the conservation of native fishes in the 41-mile designated WSR reach. The Prescott NF has secured instream flow water rights for this reach of the Verde WSR and has filed an application for instream flow water rights for the upper Verde River.

The Forest has been treating noxious and invasive plants along the Verde River to improve riparian conditions under guidance of the Integrated Treatment of Noxious or Invasive Weeds EIS (USFS 2005).

The Prescott NF cooperates with partners to determine the status of spikedace in the upper Verde River. The forest monitors seven sites along the upper Verde River to document fish community structure and habitat conditions. AGFD has also completed species-specific surveys for portions of the upper Verde River.

Loach minnow

A. Status of the species and critical habitat within the action area

Loach minnow historically occurred on the Prescott NF within the upper Verde River. The loach minnow was collected in the Verde River above Camp Verde and from Beaver Creek near its confluence with the Verde River in 1938 (Minckley 1993). The loach minnow is extirpated from the mainstem Verde River (USFWS 2000) (BA Table 22).

Critical habitat

A total of about 74 miles of designated critical habitat for loach minnow occurs along the Verde River from its confluence with Beaver Creek upstream to Sullivan Dam. The upper six miles of critical habitat from Sullivan Dam downstream to the forest boundary is on The Nature Conservancy and State lands. The uppermost 37 miles of river from the Forest boundary
downstream to Clarkdale are within Forest Service ownership except for a few private land parcels in this reach. The next 31 miles of river in the Verde Valley is primarily within private ownership. Critical habitat has also been designated along Granite Creek off-forest, but is potentially impacted by Prescott NF management actions in the Granite Creek watershed that drains into this area.

Critical habitat on and near the Prescott NF is in the Verde River Subbasin:

- **Verde River** - Approximately 74 miles, extending from the confluence with Beaver and Wet Beaver Creek in T14N, R5E, section 30, SE1/4 upstream to Sullivan Dam in T17N, R2W, section 15, NW1/4 (GRSM).
- **Granite Creek** - Approximately 2.0 miles, extending from the confluence with the Verde River in T17N, R2W, section 14, NE1/4 upstream to a spring in T17N, R2W, section 13, SW1/4 (GRSM).

**B. Factors affecting the species and critical habitat within the action area**

Loach minnow critical habitat occurs in the same areas on Prescott NF as spikedace critical habitat, except that the Verde River through the Verde Valley below the confluence with Beaver and Wet Beaver creeks has not been designated as loach minnow critical habitat. Similar to the spikedace, loach minnow critical habitat on Prescott NF is affected by land uses including municipal and rural development, livestock grazing, recreation, and some mining and silviculture. Impacts from use of the river for irrigated agriculture are primarily focused in the Verde Valley, so do not affect loach minnow critical habitat on the Forest. Please see the discussion for spikedace under “Factors affecting the species and critical habitat in the action area” for similar effects to loach minnow and its critical habitat.

**Razorback sucker**

**A. Status of the species and critical habitat within the action area**

Razorback suckers historically occurred in portions of the Verde River as far upstream as Perkinsville on the Prescott NF (Miller 1961). Between 1981 and 1990, razorback sucker fry were introduced into main channel habitats of the Verde River but had low survival and no documented recruitment (Hendrickson 1993; Hyatt 2004). Since 1994, almost all reintroductions have occurred in the Verde WSR below Camp Verde; over 17,000 razorback suckers over 12 inches in length have been stocked into the Verde River at Beasley Flat and Childs river access points (Jahrke and Clark 1999). Numerous fish have been recaptured, and survival up to two years has been documented. In addition, ripe males have been encountered in the Verde River, but no evidence of reproduction or recruitment has been found. (USFWS 2002) (BA Table 24).

Under the Horseshoe-Bartlett HCP, the Salt River Project (SRP) funds the stocking of razorback sucker into the Verde River. Stocking was initiated in 2010 and has continued through 2012:

- 2010: 1498 stocked near Camp Verde (SRP 2011)
- 2011: 1796 stocked near Camp Verde (SRP 2011)
- 2012: 1352 stocked near Beasley Flat (SRP 2013)
Critical habitat

Razorback sucker critical habitat has been designated for about 122 miles of the Verde River and its 100-year floodplain from the Prescott NF boundary in T18N, R2E, section 31 to Horseshoe Dam in T7N, R6E, section 2 (GRSM), including Horseshoe Lake to the full pool elevation. About 70 miles of critical habitat occurs within the action area on and adjacent to the Prescott NF from Perkinsville downstream to the forest boundary below Camp Verde. The uppermost 15 miles of river are within Forest Service ownership. The next 40-mile reach of river in the Verde Valley is primarily within private ownership. The lowermost 15 miles are again in Forest Service ownership.

B. Factors affecting the species and critical habitat within the action area

There is considerable overlap between habitat and critical habitat for the razorback sucker and that for spikedace. Information on watershed conditions, land uses, threats to the species, and ongoing management and conservation actions taken on the Prescott NF are the same as for spikedace. Please refer to the discussion for spikedace under “Factors affecting the species and critical habitat in the action area”.

Northern Mexican gartersnake

A. Status of the species and proposed critical habitat within the action area

Little Ash Creek—There are no museum records of the northern Mexican gartersnake from Little Ash Creek, but a specimen was reported found in this stream in 1984 and was retained as a captive (Rosen and Schwalbe 1988; Holycross et al. 2006). Intensive survey efforts have been conducted in Little Ash Creek, but no snakes have been found (Emmons and Nowak 2012). Although no snakes were found during survey efforts, the presence of abundant bankside vegetation in areas, presence of a robust nonnative, soft-rayed fish population (potential prey items), and previous records indicate that the species may still be present (Emmons and Nowak 2012).

Upper Verde River—Above Horseshoe Dam, several historical and current records exist for northern Mexican gartersnakes. Rosen and Schwalbe (1988) document records from 1986 at Cottonwood (just below Dead Horse Ranch State Park), Camp Verde, the Houston Creek confluence, and one mile above the Verde River in Horse Creek (a tributary to Horseshoe Reservoir). Two individuals were observed at the adjacent Tuzigoot National Monument in 2003 (Schmidt et al. 2005). This effort documented one northern Mexican gartersnake referenced below (Holycross et al. 2006). Another survey effort was made in the Verde River within the Verde Valley (including Dead Horse Ranch State Park) in 2007 with no detections of northern Mexican gartersnakes (GCWG 2007). In 2009, Nowak (2009) conducted surveys in the upper Verde River above Clarkdale and at the confluence with Sycamore Creek, but had no detections of northern Mexican gartersnakes. Recent records include two northern Mexican gartersnake neonates from Tuzigoot National Monument in 2009 and 2010 (Nowak, 2011; Nowak et al. 2011), an adult female and juvenile male from the Verde River just downstream of
the Interstate 17 crossing in 2012 (Emmons 2012, pers. comm.), and several records from Dead Horse Ranch State Park in 2004 and 2012 (Holycross et al. 2006; Nowak 2012, pers. comm.). The uppermost historical record from the Verde River appears to be in the proximity of Sycamore Creek, but less survey effort has been made in the reach upstream of there. The Verde River represents a large, complex, and difficult area to survey for a secretive species such as the northern Mexican gartersnake, but these records document that at least a low-density, but reproducing and potentially viable, northern Mexican gartersnake population occurs within the upper Verde River.

_Sycamore Creek_—Two historical records dated 1954 for the northern Mexican gartersnake from Sycamore Creek, approximately 1.5 river miles (2.4 km) upstream from its confluence with the Verde River, are referenced in Holycross et al. (2006). A survey for the species in 2004 failed to detect any northern Mexican gartersnakes. Northern Mexican gartersnakes have not been detected in Sycamore Creek in approximately 50 years; therefore, we consider the species extirpated from this drainage.

**Proposed critical habitat**

Proposed critical habitat within the action area includes portions of the Verde River and Little Ash Creek (USFWS 2013). Along the upper Verde River, 103 miles of proposed critical habitat occurs on or adjacent to the Prescott NF and overlaps all or portions of designated critical habitat for spikedace, loach minnow, razorback sucker, and southwestern willow flycatcher. The upper 6 miles of critical habitat from Sullivan Dam downstream to the forest boundary is on The Nature Conservancy and State lands. The uppermost 37 miles of river from the forest boundary downstream to Clarkdale are primarily within Forest Service ownership with a few private land parcels occurring in this reach. The next 45 miles of river in the Verde Valley is primarily within private ownership. The last 15.5 miles are on the Forest within the Verde WSR. Along Little Ash Creek, the first 3.7 miles are primarily on BLM lands with some State and private land ownership, and the last 3 miles are on Prescott NF lands.

Proposed critical habitat on and near the Prescott NF:

- **Upper Verde River Subunit** - A total of 20,526 acres along 140 miles of the Verde River, extending from the confluence with Horseshoe Reservoir upstream to the confluence with Sullivan Lake.

- **Little Ash Creek Subunit** - A total of 957 acres along 6.7 stream miles of Little Ash Creek from the confluence with Ash Creek upstream to the confluence with Yellow Jacket Creek near Dugas.

**B. Factors affecting the species and proposed critical habitat within the action area**

The northern Mexican gartersnake and its proposed critical habitat are affected by activities within nine watersheds that encompass portions of the Prescott NF (BA Table 30). These are the same watersheds and factors discussed under spikedace “Factors affecting the species and its critical habitat within the action area”, with the addition of the Ash Creek and Sycamore Creek.
watersheds. Please see that section for information about factors affecting the northern Mexican gartersnake within the Verde River subbasin.

Most of the Ash Creek and Sycamore Creek watershed is within the Prescott NF. Three miles of Little Ash Creek are on the forest, all with perennial streamflow. Water quality within this watershed is considered to be functional; watershed conditions are rated as Impaired or At-Risk primarily due to the influence of roads and trails, the presence of nonnative species, the condition of soils and riparian vegetation, and effects of livestock grazing (BA Table 31).

Road conditions in the Ash Creek and Sycamore Creek watershed are similar to that of the Verde River watersheds. Little Ash Creek currently receives a high amount of recreational use as a dispersed camping area with noticeable impacts to soil and riparian conditions.

Livestock grazing is authorized along Little Ash Creek on three allotments. Grazing rotations, riparian utilization levels, and other standards and guidelines are followed to minimize impacts to riparian and aquatic resources.

Nonnative aquatic species are the primary factor affecting gartersnakes within the Verde River and Little Ash Creek. Nonnative fish species dominate the fish community throughout the Verde River and are a major limiting factor in native aquatic species occurrence because of predation and competition (Hendrickson 1993; Rinne and Stefferud 1998; Bonar et al. 2004). Based on data from 1987 to 2003, nonnative fish species generally comprised 70 to 80 percent of the fish community in the upper Verde River (Rinne 2005). Nonnative fish, bullfrogs, and crayfish are also well established in Little Ash Creek (Bettaso et al. 1995; Sillas 2003).

Narrow-headed gartersnake

A. Status of the species and proposed critical habitat within the action area

*Upper/Middle Verde River*—Above Horseshoe Dam, there are several, recent and vouchered records of the narrow-headed gartersnakes in the upper Verde River. The first was from 2001 at Mormon Pocket, between Perkinsville and the confluence with Sycamore Creek, followed by a 2005 record from the confluence of Fossil Creek (Hanna 2005). Prior to that time, several reliable, but unvouched records for the species were reported from the upper Verde River: near Bear Siding (1986 and 2000), near Childs (1986), and near Clarkdale (1988 and 1995) (Holycross et al. 2006). Surveys for the narrow-headed gartersnake in 2004 and 2005, above Clarkdale and at the confluence with Sycamore Creek, resulted in no detections of narrow-headed gartersnakes (Holycross et al. 2006). In 2009, Nowak (2009) surveyed this same area and also had no detections of narrow-headed gartersnakes. Another survey effort was conducted in the Verde River within the Verde Valley (including Dead Horse Ranch State Park) in 2007, with no detections of narrow-headed gartersnakes (Gartersnake Conservation Working Group 2007). In 2010, a neonatal narrow-headed gartersnake was observed near Prospect Point and another (age not specified) was possibly seen (Emmons et al. 2011; Emmons and Nowak 2012a; Emmons and Nowak 2012b). Two additional records (neonate and sub-adult) were reported in this same area in 2012 (Emmons 2012, pers. comm.). In 2012, Emmons and Nowak (2013) conducted intensive surveys for the northern Mexican gartersnake at the Verde River at the Salt
River Project property east of the Interstate 17 bridge and the Verde River Greenway adjacent to Deadhorse Ranch State Park. No narrow-headed gartersnakes were detected in this effort, although trap locations likely focused on the habitat preferences of the northern Mexican gartersnake. The Verde River represents a large, complex, and difficult area to survey, but recent records document that at least a low-density, but reproducing, population of narrow-headed gartersnakes occurs within this reach of the Verde River.

**Proposed critical habitat**

A total of 103 miles of proposed critical habitat for narrow-headed gartersnake along the Verde River occurs on or adjacent to the Prescott NF (USFWS 2013). The upper 6 miles of critical habitat from Sullivan Dam downstream to the forest boundary is on The Nature Conservancy and State lands. The uppermost 37 miles of river from the forest boundary downstream to Clarkdale are primarily within Forest Service ownership with a few private land parcels occurring in this reach. The next 45 miles of river in the Verde Valley is primarily within private ownership. The last 15.5 miles are on the forest within the Verde WSR. These segments along the Verde River overlap critical habitat proposed for the northern Mexican gartersnake.

Proposed critical habitat on and near the Prescott NF:

- **Upper Verde River Subunit** - A total of 18,721 acres along 127.5 miles of the Verde River, extending from the confluence with Red Creek upstream to the confluence with Sullivan Lake.

**B. Factors affecting the species and proposed critical habitat within the action area**

The narrow-headed gartersnake and its proposed critical habitat are affected by activities within four watersheds that encompass portions of the Prescott NF (BA Table 33). These are the same watersheds and factors discussed under spikedace “Factors affecting the species and its critical habitat within the action area”. Please see that section for more information about factors affecting the northern Mexican gartersnake within the Verde River subbasin.

As with the northern Mexican gartersnake, nonnative aquatic species are the primary factor affecting gartersnakes within the Verde River. Nonnative fish species dominate the fish community throughout the Verde River and are a major limiting factor in native aquatic species occurrence because of predation and competition (Hendrickson 1993; Rinne and Stefferud 1998; Bonar et al. 2004). Based on data from 1987 to 2003, nonnative fish species generally comprised 70 to 80 percent of the fish community in the the upper Verde River (Rinne 2005).

**Mexican spotted owl**

**A. Status of the species and critical habitat within the action area**

The Prescott NF is located within the Basin and Range West (BRW) Ecological Management Units (EMU) with a small portion of the forest occurring in the Upper Gila Mountain (UGM) EMU. Mexican spotted owls are known to occur on the Bradshaw and Verde Ranger Districts of the Prescott NF. They are found in ponderosa pine-Gambel oak forests with large trees, dense
overstory, and woody debris including snags and downed logs. Existing habitat on the Prescott NF totals 26,448 acres. As of 2014, 15 Mexican spotted owl PACs have been designated within the boundaries of the Prescott NF. All Mexican spotted owl PACs on the Forest occur within the BRW EMU.

**Critical Habitat**

Within the action area, designated critical habitat is limited to areas that meet the definition of protected and recovery habitat in the recovery plan and is within the established critical habitat units (USFWS 2004). On the Prescott NF, these areas are found in the ponderosa pine-Gamble oak forest type.

There are three Mexican spotted owl critical habitat units (CHU) associated with the Prescott NF. A small portion of UGM-13 (Upper Gila Mountain) spans the boundary between the Prescott NF and the neighboring Kaibab NF in Sycamore Canyon Wilderness. None of the acres on the Prescott NF within that critical habitat unit meet the definition of recovery or protected habitat and therefore, no critical habitat on the Prescott NF within the UGM-13 CHU.

CHU BRW-2 (Basin and Range-West) is on the Bradshaw Ranger District in the Prescott Basin and CHU BRW-3 is on the Bradshaw Ranger District near Crown King. In CHUs BRW-2 and BRW-3, the Boundary WUI project area and the Crown King/Ash Creek WUI project area were excluded from designation (USFWS 2004). The total area of National Forest System (NFS) lands within critical habitat units on the forest is 44,814 acres. Within designated critical habitat on the forest, the total area of protected habitat is 4,058 acres, and the total area of forested recovery habitat is 6,231 acres. The acres of riparian recovery habitat within the critical habitat have not been estimated at this time.

**B. Factors affecting the species and critical habitat within the action area**

The action area consists primarily of NFS lands, and there are few State, tribal, or private actions impacting the Mexican spotted owl or its critical habitat. Key factors that have affected the owl within the action area are vegetation removal activities associated with fire and fuels management and maintenance of vegetation along utility corridors. No formal consultations have been conducted with the Prescott NF since the last reinitiation of the 1987 LRMP was completed in March 30, 2012.

The primary factor affecting Mexican spotted owl habitat and critical habitat within the action area over the last decade has been vegetation removal along utility corridors to remove hazardous vegetation. Approximately 1,543 acres of Mexican spotted owl critical habitat occurred within the action area of utility corridor projects. This acreage total includes both protected and restricted/recovery habitat composed of forested mixed conifer and pine-oak habitat. 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.

Southwestern willow flycatcher

A. Status of the species and critical habitat within the action area

On and near the Prescott NF, southwestern willow flycatchers are known to migrate and nest along the Verde River, from the upper part of the Verde Valley near Tavasci Marsh and Tuzigoot National Monument down through the Prescott and Tonto NFs along the middle and lower Verde River to just below Horseshoe Dam. Because of the checkerboard land ownership through the Verde Valley and the absence of thorough flycatcher surveys, it is difficult to know how flycatchers may use specific properties, including Forest Service lands. Flycatchers are likely to migrate and disperse along the Verde River riparian corridor through the Forest. No southwestern willow flycatcher breeding territories have been documented on Prescott NF lands; however, since flycatchers are known to nest in areas upstream and downstream of Prescott NF lands in the Verde Valley, it is reasonable to expect that breeding activity may occur on some Prescott NF parcels during the 15-year period of this consultation. The extent of flycatcher range on the Prescott NF is considered to be within the current designated critical habitat along the Verde River.

Critical habitat

Designated critical habitat for southwestern willow flycatcher on Prescott NF is within the Verde Management Unit in two segments located along the upper and middle Verde River. There are 556 acres of critical habitat for the southwestern willow flycatcher from the upper Verde River confluence with S.O.B. Canyon to about one mile downstream of Beasley Flat.

B. Factors affecting the species and critical habitat within the action area

There is limited suitable and potential breeding habitat for southwestern willow flycatchers on the forest. Dispersed recreation occurs along the Verde River, such as kayaking and hiking, but there are no designated trails, access points, or recreation sites within critical habitat on the Forest. Grazing allotments are not currently open to livestock grazing along the riparian corridor. The main factors affecting the flycatcher within critical habitat are the spread of nonnative invasive plants and agricultural diversions in the Verde Valley that impede development and maintenance of dense stands of riparian vegetation. No formal consultations have been conducted with the Prescott NF since the last reinitiation of the 1987 LRMP was completed in March 30, 2012.
Yellow-billed cuckoo

A. Status of the species within the action area

On the Prescott NF, yellow-billed cuckoos have been documented along the Verde River, Sycamore Creek, and Little Sycamore Creek. Cuckoos have also been documented breeding on the adjacent Important Bird Areas, the Aqua Fria National Monument and the upper Verde River.

B. Factors affecting the species in the action area

Similar to the other riparian-obligate and aquatic species, the primary factors affecting the yellow-billed cuckoo include effects resulting from municipal and rural development, livestock grazing, irrigated agriculture, recreation, and mining.

The departure of the pinyon-juniper and grassland PNVTs from desired conditions in these watersheds contributes to erosion due to the higher canopy cover and less herbaceous ground cover that function to hold soils and moisture in place. Access to the upper Verde River is limited, but elsewhere, roads impact soil stability and contribute to erosion along stream channels, reducing the development of riparian woodland vegetation. Unauthorized OHV use along stream channels also contributes to degradation of riparian habitat in some areas.

Water withdrawals from both surface water and groundwater are affecting streamflow in the Verde River (Blasch et al. 2006, Garner et al. 2013), which in turn hinders the development and maintenance of dense riparian habitat. Diversions in the Verde Valley for irrigation water dewater portions of the river during summer and may reduce development and maintenance of riparian habitat along the river. Current and future groundwater withdrawals from the Big Chino aquifer have the potential to decrease perennial flow in the upper Verde River, which may also reduce the availability of riparian habitat for cuckoos. Continued population growth in the Big Chino subbasin and the Verde Valley is expected to increase impacts to watershed integrity as well as groundwater resources.

Livestock grazing occurs within suitable rangelands in all watersheds that contain cuckoo habitat. Livestock grazing has not been authorized in the river corridor on the six allotments along the Verde River on the Prescott NF since 1998. The allotments within the Verde Valley are fenced off from livestock grazing. Grazing rotations, riparian utilization levels, and other standards and guidelines are followed to minimize impacts to riparian and aquatic resources. Site-specific NEPA analysis and ESA section 7 consultation would be required to authorize grazing use along the river corridor.

Demand for outdoor recreation is expected to grow concurrently with increasing population and more visitor use of the forest, especially along the Verde River, which is a draw for water-based recreational activities. To control impacts from roads, the forest completed about five miles of road decommissioning/closures within watersheds of the upper Verde River in 2009. Barrier and sign maintenance was completed at three river access points in 2008 to prevent illegal vehicle access to the upper Verde River. The Verde Wild and Scenic River Comprehensive River
Management Plan (USFS 2004) provides guidance for the conservation of the southwestern willow flycatcher and other federally-listed species in the 41-mile designated WSR reach, which also benefits the cuckoo. The Prescott NF has secured instream flow water rights for this reach of the Verde WSR and has filed an application for instream flow water rights for the upper Verde River.

The Prescott NF has been treating noxious and invasive plants along the Verde River to improve riparian conditions under guidance of the Integrated Treatment of Noxious or Invasive Weeds EIS (USFS 2005).

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 and many site-specific actions have not yet been planned, we will only discuss adverse effects in terms of the general effects we anticipate will occur to each species and its critical habitat. We provide a more specific analysis of effects to the primary constituent elements of critical habitat for the Mexican spotted owl because of the known potential effects from vegetation management projects. Detailed effects discussions will occur as each site-specific project is developed, and these projects will be consulted on separately, as required.

Gila chub, Gila topminnow, Gila trout, spikedace, loach minnow, razorback sucker and their designated critical habitat

Adverse effects to all listed fishes and their critical habitat could occur as a result of watershed improvement projects, wildlife-related projects, transportation projects, and range management projects; these effects are discussed below.

Projects related to improving watershed and soils include direction to implement projects to counter up to three critical threats to riparian functionality during the 10 to 15 years following plan approval. Activities 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 fencing. In most cases, projects would be limited in extent and amount of ground disturbance. 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. All activities would implement standards and guidelines and best management practices as described 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/riparian habitats move towards desired conditions. Projects in the riparian areas would
improve aquatic and riparian conditions and are expected to reduce sedimentation to aquatic habitats, which would maintain or improve water quality and healthy macroinvertebrate populations. They would also promote recruitment and maintenance of native invertebrate vegetation, which would maintain suitable water temperature for listed fishes in the streams.

The Prescott NF is proposing to work with FWS and AGFD to restore native fish species to two to three stream reaches during the 10 to 15 years following plan approval, which may include Gila chub as well as Gila topminnow, Gila trout, spikedace, loach minnow, and razorback sucker. Prescott NF management actions needed to support native 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 would have localized, short-term adverse effects to the species and their habitat from implementation and maintenance of structures such as streamflow and streambank alteration, sedimentation, and possible disturbance to any individuals that might occur in the area. Streambank alteration and increased sedimentation could alter water quality for Gila chub, Gila topminnow, Gila trout, spikedace, loach minnow, and razorback sucker; however, we would expect the effects of streambank alteration and sedimentation from barrier construction to be very short in duration and intensity. Actions resulting in disturbance to the fish can alter their breeding or feeding behaviors as well as potentially result in direct fatality. Project activities would be mitigated by implementation of guidelines listed in the proposed action, the BA, and additional actions FWS and AGFD typically conduct with fish restoration projects, such as salvaging fish prior to the action occurring. 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.

Transportation projects could have localized, short-term adverse effects to listed fish in the project area and their habitat from actions taken near or in-stream but would maintain or improve watershed condition indicators related to water quality, soils, riparian vegetation, roads and trails, and rangeland vegetation by reducing the long-term impacts associated with travel on roads in or near listed fish habitat. Projects would improve soil and vegetation condition in the uplands and would improve or minimize impacts to aquatic and riparian conditions along streams. Implementation of the standards and guidelines described above and in the BA is expected to mitigate the effects of the projects in the uplands and aquatic/riparian areas.

Livestock grazing would continue throughout suitable rangelands on forest lands within the analysis area. Segments of listed and sensitive fish species habitat are protected from livestock grazing by exclosure fences along most streams or have limited accessibility due to rough terrain. Effects to fishes from livestock management would mainly be indirect effects associated with habitat disturbance. Accessible areas of habitat, such as along Sycamore Creek, may result in short term adverse effects to streambanks, riparian vegetation and water quality from waste deposits into or near habitat. A detailed description of the effects of livestock grazing on Gila chub can be found in our 2010 Biological Opinion for livestock grazing on the Sycamore Grazing Allotment (USFWS 2010).
Gila chub, spikedace, loach minnow, and razorback sucker critical habitat

There may be localized, short-term adverse effects to the primary constituent elements of critical habitat from watershed improvement projects in riparian zones such as streambank disturbance, vegetation reduction, and sediment input to the streams. Projects related to springs and seeps within critical habitat would have similar effects to the primary constituent elements. These projects may temporarily reduce the function of critical habitat through diminished water quality, breeding habitat, and prey base; however, we anticipate that these primary constituent elements of critical habitat would be maintained or improved in the long-term. We do not anticipate that these activities would diminish the ability of critical habitat to contribute to the conservation and recovery of the species.

As described above, the Prescott NF is proposing to work with FWS and AGFD to restore native fish species to two to three stream reaches during the 10 to 15 years following plan approval. Prescott NF management actions needed to support native fish restoration could include construction and maintenance of fish barriers and other projects to improve aquatic habitat for the species. These projects could have localized, short-term adverse effects to the primary constituent elements of critical habitat, including streamflow and streambank alteration, decreased water quality from sedimentation, and disruption of prey base from implementation and maintenance of structures such as. Project activities would be minimized by implementation of guidelines listed above and in the BA. Overall, the Wildlife/Fish/Rare Plants program plan components are positive for critical habitat in the long-term and would maintain or improve watershed condition indicators related to the primary constituent elements of water quality, nonnative species, breeding habitat, and prey base. We do not anticipate that these activities will diminish the ability of critical habitat to contribute to the conservation and recovery of Gila chub, spikedace, loach minnow, and razorback sucker.

Localized short-term adverse effects to critical habitat from roads and trails in and adjacent to critical habitat that affect water quality, food base, and riparian vegetation and streambanks are likely to occur as a result of transportation-related projects. 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 ongoing roads and trail maintenance and future projects in the subwatersheds. Despite the short-term adverse effects that may result from transportation-related projects, we expect that over the long-term, the function of critical habitat for the species will be retained. We do not anticipate that these activities will diminish the ability of critical habitat to contribute to the conservation and recovery of Gila chub, spikedace, loach minnow, and razorback sucker.

Segments of critical habitat are protected from livestock grazing by exclosure fences, pasture closures, or have limited accessibility due to rough terrain. 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. Overall, the Rangeland Program plan components could result in short-term adverse effects to water quality critical habitat from livestock grazing, 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. We do not anticipate that these activities will diminish the ability of critical habitat to contribute to the conservation and recovery of the species. A detailed description of the effects of livestock grazing on habitat, and specifically Gila chub critical habitat, can be found in our 2010 Biological Opinion for livestock grazing on the Sycamore Grazing Allotment (USFWS 2010).

**Northern Mexican gartersnake and proposed critical habitat**

Adverse effects to the northern Mexican gartersnake and its proposed critical habitat could occur as a result of watershed improvement projects, wildlife-related projects, and range management projects.

Watershed improvement projects within riparian areas could have adverse effects to northern Mexican gartersnakes along the Verde River and Little Ash Creek. Projects are expected to occur in all watersheds within the gartersnake analysis area. Vegetation treatments and stream improvement projects would have localized, short-term effects including soil disturbance, vegetation reduction, sedimentation in the stream zone, and species disturbance. Other projects could include road or trail relocation or closure, obliteration of unauthorized routes, livestock grazing management, and fencing. Instream improvement projects would have localized, short-term adverse effects to northern Mexican gartersnakes and their habitat, but would have long-term benefits to the species. Projects would be designed to maintain or enhance groundwater dependent ecosystem sites. Standards and guidelines for watershed and soils would be similar to those described above for the Gila chub and are anticipated to be beneficial to maintaining long-term watershed conditions and with implementation are expected to minimize the adverse effects of projects from all Forest program areas.

Native fish restoration projects are expected to benefit the northern Mexican gartersnake in the long-term; however, they could also result in short-term adverse effects. Prescott NF management actions needed to support native fish restoration could include approval of construction and maintenance of a fish barrier and other projects to improve aquatic habitat for the species. These projects would have localized, short-term adverse effects to the species from barrier construction and maintenance such as streamflow alteration, sedimentation, and disturbance to individual gartersnakes. Project implementation would follow appropriate standards and guidelines to minimize impacts to the species and aquatic habitat. These native fish restoration projects are expected to have long-term benefits by improving existing habitat for the snake, providing new habitat, and potentially providing increased prey availability.

Livestock grazing would continue throughout suitable rangelands on forest lands within the analysis area. Livestock grazing can affect the species directly due to disturbance and possible trampling of individuals. Additionally, indirect effects to northern Mexican gartersnakes can occur from livestock use as a result of movement along the streams temporarily reducing hiding cover, trampling streambanks, potential sedimentation, and waste deposits that can impair water quality. Impacts to water quality would be greatest during seasonal low flow periods and during droughts. Implementation of Rangeland Management standards and guidelines, as described above and in the BA, provide guidance to reduce livestock grazing impacts to riparian areas.
Critical habitat

Watershed improvement projects that involve instream improvement projects are expected to have short-term adverse effects to the primary constituent elements of critical habitat related to habitat components, water quality, and prey base. There may be localized, short-term adverse effects from projects in riparian zones such as localized sediment input to the streams, temporary disturbance of habitat, and temporary disruption of prey base; 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.

Direct effects to the primary constituent elements of northern Mexican gartersnake critical habitat resulting from native fish restoration projects are expected to be similar to the indirect effects to the species through habitat modification as described above. Prescott NF management actions needed to support native fish restoration could include construction and maintenance of a fish barrier and other projects that would result in improvement of aquatic habitat for the species. These projects would have localized, short-term adverse effects to the primary constituent elements of critical habitat from barrier construction and maintenance such as streamflow alteration, sedimentation, and disturbance to the gartersnake’s prey base. Project implementation would follow appropriate standards and guidelines, as described above, to minimize impacts to the primary constituent elements of critical habitat. These native fish restoration projects are expected to have long-term benefits to gartersnake critical habitat by improving existing or increasing available habitat, increasing water quality, and potentially providing increased prey availability. We do not anticipate that these activities will diminish the ability of critical habitat to contribute to the conservation and recovery of the species.

Similar to native fish restoration projects, direct effects to the primary constituent elements of critical habitat resulting from livestock grazing are expected to be similar to the indirect effects to northern Mexican gartersnake through habitat modification as described above. Livestock grazing can affect the primary constituent elements 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. Impacts to water quality would be greatest during seasonal low flow periods and during droughts. Additionally, livestock grazing can alter prey availability for the snakes through reduced cover for prey, reduced water quality for prey, and direct trampling of prey. Implementation of Rangeland Management standards and guidelines, as described above and in the BA, provide guidance to reduce livestock grazing impacts to riparian areas. We do not anticipate that these activities will diminish the ability of critical habitat to contribute to the conservation and recovery of the species.

Narrow-headed gartersnake and proposed critical habitat

The historical, current, and possible future distribution of the narrow-headed gartersnake on the Prescott NF is very similar to that of the northern Mexican gartersnake. While there are
differences in the specific habitats used by each species, the effects to the narrow-headed
gartersnake and its proposed critical habitat would result from the same actions and would be
essentially the same as those described above for the northern Mexican gartersnake. Similarly,
the primary constituent elements of critical habitat are very similar for both species; therefore,
the effects to the primary constituent elements of critical habitat for the narrow-headed
gartersnake are the same as those described for the northern Mexican gartersnake. We do not
anticipate that these activities would diminish the ability of critical habitat to contribute to the
conservation and recovery of the species. Please refer to the effects analysis for the northern
Mexican gartersnake above for a description of the effects to the narrow-headed gartersnake and
its critical habitat.

**Mexican spotted owl and critical habitat**

The Forest Service’s mission, briefly, is to achieve quality land management under the
sustainable multiple-use management concept to meet the diverse needs of people. The revised
LRMP is the plan the Forest Service will use to guide this mission on the Prescott NF. Although
the LMRP is not a project-specific document, it does provide the direction and guidance for
designing and planning specific projects. Mexican spotted owls occur on the Bradshaw and
Verde Ranger Districts, and Mexican spotted owl habitat and critical habitat occur on these
districts within pine-oak forests. We understand that the Prescott NF will integrate habitat
management objectives and species protection measures in the Recovery Plan (USDI FWS 2012)
in order to conserve and manage for the Mexican spotted owl and its critical habitat. However,
multiple-use management can result in conflicting resource objectives in order to meet the
diverse needs of people. In addition, active spotted owl habitat management and forest
restoration implemented under the LRMP may result in short-term adverse effects to individuals.
Because of this, we expect that there will likely be adverse effects to Mexican spotted owls, their
habitat, and/or designated critical habitat over the life of this consultation.

These adverse effects may occur as a result of actions implemented under the following
programs: Watershed and Soils, Wildland Fire and Fuels Management, Recreation,
Transportation, Lands and Special Uses, Minerals Management, Rangeland Management, and
Forestry and Forest Health. The Wildland Fire and Fuels Management Program combine
elements of fire prevention, prescribed fire, wildland fire, and fire suppression. However,
responses to wildland fire, including fire suppression and management to meet resource
objectives, are not included in the proposed action. As needed, consultation on these actions will
continue to be handled under emergency section 7 consultation procedures. Therefore, we only
discuss the potential effects of prescribed fire on the Mexican spotted owl, its habitat, and critical
habitat.

**Effects of the action on the Mexican spotted owl**

**Forestry, Forest Health and Fuels Program, and Fire Management**
Forestry, forest health, and fuels activities planned under the revised LRMP emphasize the
restoration of forests and the reduction of active crown fire in ponderosa pine and mixed conifer
forests. In general, the Prescott NF expects that for most forest, forest health, and fuels projects
implemented under the revised LRMP in PACs and recovery habitat, they will follow the
Recovery Plan (USDI FWS 2012). 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 LRMP may result in short-term adverse effects to the species and its habitat; however, we also expect that implementation of the revised LRMP would reduce the potential for severe wildfire and provide increased protection to existing and future Mexican spotted owl habitat.

For ponderosa pine, the revised LRMP emphasizes restoration, as these areas are thought to be 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 LRMP 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 (USDI FWS 2012).

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 habitat components. Mechanical treatments designed to meet fuels reduction objectives in PACs could result in reduced canopy cover, removal of large trees, loss of multi-layered canopy structure, and potentially significant reductions in snags and coarse woody debris.

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 spotted owl and its habitat may include disturbance (from noise and/or smoke for early entry burns) 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, Forest Health, and Fuels Program would result in short-term adverse effects to Mexicans spotted owls and their habitat.

Lands and Minerals Program, Special Uses
The lands and minerals program manages the identification and maintenance of land line locations on NFS lands, rights-of-way, utility corridors, mineral extraction, roads to access
private property, and other non-recreational uses. The objective of the program is to allow for appropriate uses of NFS 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 Mexican spotted owl during the breeding season. For example, management of utility corridors on the Prescott NF 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 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.

At this time, we cannot predict what might occur in the Lands and Special Use programs that 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 Prescott NF.

Rangeland Management Program
Grazing allotment plans, as developed under the revised LRMP, provide guidance for managing and monitoring public lands range use by livestock on the Prescott NF. Grazing can adversely affect the Mexican spotted owl primarily through four indirect effects: 1) diminished prey availability and abundance; 2) increased susceptibility of habitat to destructive fires, 3) degradation of riparian and meadow plant communities; and, 4) impaired ability of plant communities to recover or develop into more suitable Mexican spotted owl habitat (USDI FWS 2012). Although the Forest Service strives to manage livestock allotments to maintain habitat for the owl and its prey, multiple factors (such as yearly precipitation) may determine the specific influences of livestock on Mexican spotted owl habitat. Poorly managed livestock grazing has the potential for removing habitat for Mexican spotted owl prey species. However, the desired conditions for livestock grazing in the revised LRMP should promote understory vegetation production in forested and grassland habitat. The objectives identified in the revised LRMP should aid in improving habitat conditions for prey species across the Prescott NF. The desired conditions and guidelines for livestock grazing in montane meadows/openings would help maintain habitat for prey species in these areas. Ponderosa pine-Gambel oak forest would be managed such that there are grasses and needle cast to provide the fine flashy fuels needed to maintain the natural fire regime.

Livestock grazing may result in minimal effects to PACs on the Prescott NF because of the steep, forested areas where they occur. We also expect that the revised LRMP desired conditions and guidelines would result in insignificant effects to prey availability in recovery habitat in ponderosa pine-Gambel oak.

Recreation 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. Development of new recreational facilities
(e.g., trailheads, mountain bike trails, etc.) and expansion of existing facilities (e.g., campgrounds and hiking trails) may alter owl habitat. The nature of the recreation program can come into conflict with Mexican spotted owl management across the forest and does 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 revised LRMP includes measures that would reduce the impacts to Mexican spotted owls from recreation activities; however, there is also direction in the LRMP to increase and/or improve recreational opportunities. Over the life of the LRMP, this could result in impacts to Mexican spotted owls and their habitat.

**Transportation**

Construction of roads and trails can indirectly affect Mexican spotted owls through loss and fragmentation of habitat. 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.

The Forest Service typically implements measures to minimize effects to the owl and habitat components from the construction of roads and trails (such as avoiding road maintenance activities near PACs during the breeding season, avoiding construction of new roads in PAC habitat, etc.). 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 – 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 Transportation program include the operation and maintenance of the transportation system on the Prescott NF, 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-term adverse effects to Mexican spotted owls and their habitat.

**Summary**

In summary, since 2012, there have been no new formal consultations beyond what was reported in our 2012 LRMP BO/CO (USFWS 2012). Since 2005 (the prior LRMP consultation), we completed five formal consultations for the Prescott NF that were implemented under the 1988 LRMP, as amended. These actions included a combination of short- and long-term harm and harassment that resulted in the anticipated take of owls associated with one PAC. The revised
LRMP would strive to implement the Recovery Plan (USDI FWS 2012) and guidelines that would minimize impacts to the Mexican spotted owl and its habitat. However, due to the Forest Service’s multiple use mission, restoration of forested habitats, and active management of spotted owl habitat, we anticipate that over the life of this consultation (15 years) there will be activities implemented under this plan that could result in adverse effects to the owl and its habitat. Project activities associated with forest management (e.g., fuels reduction projects, forest restoration, salvage logging, fire management) would likely be the predominant activities occurring within and adjacent to Mexican spotted owls and their habitat. These activities can result in disturbance during the breeding season (such as mechanized logging, hauling routes, smoke), habitat modification (short-term reductions in large logs, snags, and other key habitat components), and habitat degradation (such as long-term loss of old-growth, pre-settlement trees to create openings for regeneration). Other actions, such as those conducted under the Lands or Special Uses Program (based upon recent site-specific consultations), Recreation, or other programs identified above, could also result in adverse effects to Mexican spotted owls from modification of prey species habitat due to disturbance related to construction of infrastructure near occupied areas.

**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.

Below, we describe the PCEs related to forest structure and maintenance of adequate prey species and the effects from implementation of the LRMP. The PCEs for steep-walled rocky canyonlands are not analyzed in this BO because this habitat does not occur within the action area.

**Primary Constituent Elements related to forest structure:**

**PCE:** 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 dbh of 12 inches or more.

**Effect:** Actions implemented under the revised LRMP are expected to retain the range of tree species (i.e., conifers and hardwoods associated with Mexican spotted owl habitat) and would not reduce the range of tree sizes needed to create the diverse forest and multi-layered forest canopy preferred by owls. Some loss of trees of all types and dbh size classes would occur from
actions such as hazard tree removal, prescribed fire, and forest thinning (as implemented under the Fire Management and Forestry Programs). However, actions implemented under the revised LRMP are expected to maintain a range of tree species and sizes needed to maintain this PCE in PACs and recovery habitat across the Prescott NF because the Forest Service is implementing the Recovery Plan guidelines that strive to retain large trees, canopy cover appropriate for owl habitat, and a diverse range of tree species (such as Gambel oak in pine-oak forests). Removal of trees and various tree species may also occur as part of the Recreation (development of recreation sites) and Transportation Programs (creation, maintenance of roads); but these effects should be small in extent and intensity. Therefore, the function and conservation role of this PCE would not be compromised by the proposed action.

**PCE:** A shade canopy created by the tree branches covering 40 percent or more of the ground.  
**Effect:** We expect that tree shade canopy would be reduced following thinning and burning treatments implemented under the revised LRMP in the Fire Management and Forestry Programs. However, we do not expect reduction of canopy cover in Mexican spotted owl forested habitat to be reduced below 40 percent because the Forest Service has adopted the Recovery Plan recommendations that include managing for higher basal area and increased canopy cover in Mexican spotted owl habitat versus pure ponderosa pine or other forest and woodland habitats. Previous treatments under the previous LRMP were not expected to reduce the shaded canopy below 40 percent. 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 could benefit Mexican spotted owl prey species. The function and conservation role of this PCE would not be compromised by the proposed action.

**PCE:** 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 Forestry Programs (and possibly other programs as well). Currently, large snags are rare across the action area, and any loss of this habitat component may be significant in terms of maintaining Mexican spotted owl and prey habitat. Some snags would be created through prescribed burning, which could benefit the Mexican spotted owl. However, snags currently used by Mexican spotted owls for nesting are typically very old, large dbh, highly decayed snags with cavities. Snags with these characteristics tend to be limited in ponderosa pine and mixed conifer forests in northern Arizona (Ganey and Vojta 2004). In individual burning projects, the Forest Service would attempt to minimize loss of these large snags through conservation measures (such as lining or using lighting techniques to avoid snags). Research has indicated that following burning treatments, upwards of 30 percent of these existing snags may be lost within treated (i.e., burned) forests, resulting in short-term adverse effects to this PCE (Randall-Parker and Miller 2000). However, the study design did not include active protective measures for large snags. This is why conservation measures that the Forest Service implements to protect the largest and oldest snags (particularly those with nest cavities) are so important. Therefore, though we anticipate there would be a measurable loss of snags due to implementation of the revised LRMP, efforts to protect this rare resource would be made as part of any forest or fuels management project. 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:

**PCE:** 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 are expected to be reduced by approximately 30 percent within protected and recovery Mexican spotted owl habitat (Randall-Parker and Miller 2000). This loss of large logs would result in short-term adverse effects to this primary constituent element and could result in localized impacts to prey species habitat. Furthermore, across the Prescott NF, it is likely that hazard tree removal and prescribed burning would also create fallen trees and woody debris as trees are felled (i.e., cut) and left on the ground or are killed post-burn and fall. However, based upon current data for many of these areas, there is an excess supply of coarse woody debris due to the exclusion of frequent, low-severity fire, which can increase the likelihood of high-severity fire within recovery habitat. Therefore, some removal of woody debris would result in an overall benefit to the function and conservation role of this PCE, though short-term adverse effects would likely occur within some project areas.

**PCE:** A wide range of tree and plant species, including hardwoods.  
**Effect:** We expect this PCE would be positively affected by the actions taken under the Fire Management and Forestry Programs. Plant species richness would increase following thinning and/or burning treatments that result in small, localized canopy gaps. Individual projects conducted under the revised LRMP typically would include conservation measures 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:** Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.  
**Effect:** Short-term decreases in plant cover would result from prescribed burning conducted under the Fire Management Program, and possibly some limited reductions from livestock managed under the Rangeland Program (see discussion in Recovery Plan, pgs. 42-3). We expect long-term increases in residual plant cover because fire 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 (Jameson 1967, Moore et al. 1999, Springer et al. 2001) and, in turn, assist in the production and maintenance of the Mexican spotted owl prey base. The combination of low-intensity prescribed burns and thinning during restoration projects would most likely result in only short-term effects to the Mexican spotted owls with regard to modifying prey habitat within treatment areas. In frequent-fire landscapes, herbaceous understory response and plant regeneration tends to be positive following tree removal and prescribed fire (Springer et al. 2001). There is the potential for the Rangeland Program to have adverse effects on the production of plant cover post-burning if livestock were allowed to graze burned areas too soon following fire. However, the revised LRMP includes desired conditions and guidelines to maintain healthy levels of forage and managing livestock following prescribed fire. Therefore,
the function and conservation role of this PCE across the Prescott NF would not be compromised by the proposed action.

Effects of the action on the role of critical habitat in recovery

Adverse effects and associated incidental take from the revised LRMP are not expected to negatively affect Mexican spotted owl recovery and/or further diminish the conservation contribution of critical habitat to the recovery of the Mexican spotted owl.

The revised LRMP includes a guideline to integrate habitat management objectives and species protection measures in accordance with the Recovery Plan (USDI FWS 2012). These actions were identified by the Recovery Team as being necessary to recover the Mexican spotted owl and the Prescott NF is implementing these actions in designated critical habitat. Designated critical habitat includes all protected (PACs) and recovery habitat (unoccupied MSO habitat) within CHUs. These actions include the following:

- The Prescott NF has and continues to designate 600 acres surrounding known Mexican spotted owl nesting and roosting sites. PACs are established around owl sites and are intended to protect and maintain occupied nest/roost habitat. Nesting and roosting habitat is rare across the range of the Mexican spotted owl, and by identifying these areas for increased protection, the Forest Service is aiding in recovery.

- The Prescott NF has identified and is managing pine-oak forests that have potential for becoming Mexican spotted owl replacement nest-roost habitat, or are currently providing habitat for foraging, dispersal, or wintering habitats. As stated above, nesting and roosting habitat is a limiting factor for the owl throughout its range. By managing critical habitat for future replacement nest/roost habitat, the Forest Service is aiding in recovery.

- The population monitoring scheme within the 1995 Recovery Plan has proven to be not feasible due to logistics and expense. A new population monitoring protocol was developed within the current Recovery Plan based on Mexican spotted owl occupancy (i.e., presence/absence). The Forest Service Regional Office is currently working with the FWS to implement the pilot study (ongoing now).

- The Prescott NF’s intent is to integrate the best available recovery habitat management objectives where possible into forest restoration and/or fuels reduction projects with the overall goal to protect owl PACs from high-severity wildland fire, and to 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.

These actions should increase the sustainability and resiliency of Mexican spotted owl habitat (particularly through fuels management and forest restoration actions). Therefore, implementation of the Prescott NF’s LRMP is not expected to further diminish the conservation contribution of critical habitat to the recovery of the Mexican spotted owl.
Southwestern willow flycatcher and critical habitat

With the exception of the Wildlife, Fish, and Rare Plants program, Wilderness and Special Areas program, Fire and Fuels program, and Recreation program, all other Prescott NF programs associated with this plan are expected to result in some adverse effects to the southwestern willow flycatcher and its critical habitat. Most of these programs are anticipated to have short-term adverse effects that result in long-term benefits to both the species and its critical habitat.

Watershed improvement projects are proposed to improve overall watershed integrity and health. Watershed improvement activities that could result in adverse effects to the flycatcher include, but are not limited to, vegetation reestablishment, nonnative invasive plant treatments, erosion control, and instream habitat improvements. Activities that occur during the migration or breeding season could directly affect the species by displacing individuals or disrupting their breeding or feeding activities. Watershed improvement activities occurring outside of the migration period or breeding season are not anticipated to have direct effects on the species. Activities involving vegetation management (removal and restoration) and erosion control are likely to have short-term indirect effects to the species through habitat manipulation. The standards and guidelines described above and in the BA are expected to minimize the short-term effects to the species. Furthermore, we anticipate that watershed improvement projects will result in long-term benefits to the species through improving habitat quality and quantity.

In general, the Transportation Program on the Prescott NF is not expected to have adverse effects to the southwestern willow flycatcher; however, if a road in flycatcher habitat is required, adverse effects could occur. A road constructed in flycatcher habitat would result in the permanent loss of habitat that could be used for perching or nesting. This loss of habitat would not be considered short-term since the area would remain devoid of vegetation in perpetuity. Additionally, if a road is constructed or subsequently maintained during the migration period or breeding season, flycatchers could be displaced by construction activities.

Under the Lands and Special Uses program, as access across private parcels to Prescott NF lands is acquired, disturbance to flycatchers and their habitat could increase from increased access to flycatcher habitat. Dispersed camping, hiking, and other recreation activities could result in disturbance to flycatchers in these areas as well as through vegetation manipulation. Similarly, flycatcher habitat could be adversely affected and, potentially, flycatchers displaced by utility construction or maintenance, right-of-way issuance, or easement issuance in flycatcher habitat. Standards and guidelines as previously described will be implemented to minimize the effects to flycatchers and their habitat from these activities.

No mining related activities are currently planned for flycatcher habitat on the Prescott NF; however, it is possible that mining activities could occur in flycatcher habitat within the 10- to 15-year life of this plan. Mining activities would likely result in the loss of habitat in those areas as well as disturbance of birds that might be using those areas. Mining plans of operation will likely require restoration of habitat upon completion of mining activities; however, those areas will be devoid of habitat throughout the life of the mining activities.
Livestock grazing does not currently occur in flycatcher habitat on the Prescott NF; however, it could potentially occur within the 10- to 15-year life of this plan. If livestock grazing in flycatcher habitat is authorized and breeding season restrictions are implemented, direct effects to flycatchers would likely be avoided. Livestock grazing in flycatcher habitat outside of the breeding season would likely result in indirect adverse effects to the species through habitat manipulation. Livestock are known to consume vegetation that flycatchers use for perching and nesting as well as trample vegetation. Reduction in or manipulation of flycatcher habitat, even outside of the breeding season, can result in long-term adverse effects to the species. Proper management of livestock grazing including, but not limited to, rest-rotation of allotments and the standard and guides described above and in the BA are anticipated to minimize the long-term adverse effects to the species.

Forest health projects that could result in adverse effects to flycatchers include fuelwood sales that result from the objective of treating at least 50 percent of nonnative invasive plant species. Although these activities are mainly expected to occur in the uplands outside of flycatcher habitat, it is possible that some nonnative invasive trees could be removed from riparian areas for fuelwood sales. If these activities occur during the migration period and breeding season, direct effects to flycatcher could occur through disruption of activities of individuals. Indirect effects could occur through habitat manipulation. As with other plan activities, standards and guides described above and in the BA are anticipated to minimize the effects of these activities.

Critical habitat

Watershed improvement projects that involve instream improvement projects are expected to have short-term adverse effects to the primary constituent elements of southwestern willow flycatcher critical habitat related to habitat components and prey base. There may be localized, short-term adverse effects from projects in riparian zones such as temporary disturbance of habitat through vegetation removal and possible temporary disruption of prey base; 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. We do not anticipate that these activities will diminish the ability of critical habitat to contribute to the conservation and recovery of the species.

Similar to the effects to the species described above, the Transportation Program on the Prescott NF is generally not expected to have adverse effects to flycatcher critical habitat; however, if a road in flycatcher critical habitat is required, adverse effects could occur. 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 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.

Under the Lands and Special Uses program, as access across private parcels to Prescott NF lands is acquired, adverse effects to the primary constituent elements of flycatcher critical habitat could increase from increased access to flycatcher habitat. Dispersed camping, hiking, and other recreation activities could result in diminished riparian habitat through vegetation manipulation. Similarly, the riparian habitat component of flycatcher critical habitat could be adversely affected by utility construction or maintenance, right-of-way issuance, or easement issuance in flycatcher habitat. Standards and guidelines as previously described will be implemented to minimize the effects to the primary constituent elements of flycatcher critical habitat from these activities. Overall, we do not anticipate that these activities will diminish the ability of critical habitat to contribute to the conservation and recovery of the species.

Although no mining related activities are currently planned for flycatcher critical habitat on the Prescott NF, it is possible that some mining activities could occur in flycatcher critical habitat within the 10- to 15-year life of this plan. Mining 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 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. Mining activities in critical habitat are not anticipated to be extensive throughout the Prescott NF; therefore, we do not anticipate that these activities will diminish the ability of critical habitat to contribute to the conservation and recovery of the species.

Livestock grazing does not currently occur in flycatcher critical habitat on the Prescott NF; however, it could potentially occur within the 10- to 15-year life of this plan. If livestock grazing in flycatcher critical habitat is authorized, we expect that there would likely be some level of diminished capacity of the primary constituent elements of critical habitat. Livestock are known to trample vegetation, as well as consume the riparian vegetation that flycatchers use for perching and nesting. Reduction in or manipulation of riparian habitat can result in long-term adverse effects to the species. Proper management of livestock grazing including, but not limited to, rest-rotation of allotments and the standard and guides described above and in the BA is anticipated to minimize the long-term adverse effects to the primary constituent elements of critical habitat and not diminish the overall ability of critical habitat to contribute to the conservation and recovery of the species.

Forest health projects that could result in adverse effects to the primary constituent elements of flycatcher critical habitat include fuelwood sales that result from the objective of treating at least 50 percent of nonnative invasive plant species. Although these activities are mainly expected to occur in the uplands outside of critical habitat, it is possible that some nonnative invasive trees could be removed from riparian areas for fuelwood sales. This could result in the removal of part of the riparian habitat-related primary constituent element of critical habitat. As with other plan activities, standards and guidelines described above and in the BA are anticipated to
minimize the effects of these activities and not diminish the ability of critical habitat to contribute to the conservation and recovery of the species.

**Yellow-billed cuckoo**

Similar to the southwestern willow flycatcher, the Wildlife, Fish, and Rare Plants program, Wilderness and Special Areas program, Fire and Fuels program, and Recreation program are not expected to have adverse effects to the yellow-billed cuckoo. All other Prescott NF programs associated with this plan are expected to result in adverse effects to the yellow-billed cuckoo. Most of these programs are anticipated to have short-term adverse effects that result in long-term benefits to the species.

The effects to cuckoo would result from the same actions and, therefore, would be the same as for the flycatcher since these species’ historical, current, and possible future distribution is very similar. While there are differences in the habitats used by each species, the effects to each species are similar; therefore, we anticipated that the effects to yellow-billed cuckoo are the same as they are for the flycatcher. Please refer to the effects analysis above for the flycatcher for a complete description of the anticipated effects to the yellow-billed cuckoo.

**CUMULATIVE EFFECTS**

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action 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.

Climate change, in combination with drought cycles, is likely to exacerbate existing threats to all these species’ habitats in the Southwestern U.S., now and into the foreseeable future. Increased and prolonged drought associated with changing climatic patterns will adversely affect streams and riparian habitat by reducing water availability and altering food availability and predation rates. Drying or warming of streams is of particular concern because native fishes and gartersnakes depend on permanent water of appropriate water quality for survival. Development and maintenance of riparian habitat for riparian-obligate species also will be affected by reduction in baseflows and altered hydrologic regimes. The continued warming and drying of forested habitats will likely alter vegetation structure and composition and reduce the amount and quality of nesting and roosting habitat for Mexican spotted owls in the action area.

**Gila chub and critical habitat**

The majority of the Sycamore, Little Sycamore, and Indian Creek subwatersheds are in Forest Service and BLM ownership, but private land parcels are located along all of the creeks. The majority of Williamson Valley Wash watershed is in Forest Service and State trust ownership. Cumulative effects that could adversely affect the Gila chub, its critical habitat, and other threatened and endangered fish species include continued residential development on lands within watersheds containing habitat for these species. There is one large private land parcel located near Dugas on Sycamore Creek that is zoned for residential development with the potential for 80 homes.
Currently, the prospect of this parcel being built out is low, but with any development there would likely be an increase in recreational use on the Forest that would have some impact to Gila chub and its habitat. Increasing recreational or residential use of the non-Federal lands near the riparian areas would likely result in additional cumulative effects to occupied, as well as potentially-occupied Gila chub habitat through increased water use, increased pollution, and increased alteration of the streambanks through riparian vegetation suppression, bank trampling, and erosion.

Other cumulative effects to Gila chub and its critical habitat include ongoing activities in these watersheds such as livestock grazing and associated activities outside of federally-managed allotments, irrigated agriculture, groundwater pumping, stream diversions, bank stabilization, and channelization that can reduce stream flows and degrade riparian and aquatic habitats.

**Gila topminnow**

Cumulative effects to Gila topminnow from the revised LRMP would be the same as for Gila chub related to these subwatersheds.

**Gila trout**

The reach of Grapevine Creek occupied by Gila trout is entirely within Prescott NF ownership. There would be no non-Federal activities in the Grapevine Botanical Area. The majority of the upper Sycamore Creek subwatershed and three miles of Sycamore Creek are within Prescott NF with two private land parcels within this area. Although these private lands have limited development, ranching operations and water withdrawals are expected to continue to impact stream flows and water quality in Sycamore Creek.

**Spikedace and critical habitat**

Cumulative effects to spikedace and its critical habitat include ongoing residential and commercial development and associated activities in the watersheds in which the species and its critical habitat occur. These impacts would be greatest in the Lower Big Chino Wash, Williamson Valley Wash, and Cherry Creek watersheds that contain larger amounts of privately-owned lands. These activities 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.

**Loach minnow and critical habitat**

The cumulative effects to loach minnow and to its designated critical habitat would be the same as for spikedace since these species’ historical, current, and possible future distribution is similar.
Razorback sucker and critical habitat

Population growth in the area surrounding the Forest, including razorback sucker habitat and critical habitat, is expected to continue. Residential home and commercial development are expected to continue on private lands and increase impacts to watershed integrity. Impacts would be greatest in the Lower Big Chino, Williamson Valley Wash, Granite Creek-Upper Verde River, and Cherry Creek-Upper Verde River watersheds where the greatest amount of privately-owned land occurs.

Groundwater pumping and surface water diversions are affecting streamflows on the Forest, especially to the Verde River, and as population and water demands continue to increase, are expected to have a greater impact on baseflow of the river into the future. Demand for outdoor recreation is also expected to grow concurrently with increasing population and more visitor use of the forest. Aquatic and riparian resources are major attractants for recreational activities and would receive increasing use with resulting impacts to those resources. Other land uses such as livestock grazing, mining, and vegetation treatments are expected to continue across these watersheds on State, private, and tribal lands and could degrade riparian and aquatic habitats.

Northern Mexican gartersnake and proposed critical habitat

Cumulative effects to the northern Mexican gartersnake and proposed critical habitat include residential home and commercial development on private lands and the resulting impacts to watershed integrity. Off-forest water uses are affecting streamflows on the Forest, especially to the Verde River, and are expected to have a greater impact with increasing population and groundwater demands. Continued use of ground and surface water will result in altered hydrologic regimes and increased sedimentation and pollutant to stream systems.

Demand for outdoor recreation is also expected to grow concurrently with increasing population and more visitor use of the Forest. Aquatic and riparian resources are major attractants for recreational activities, and increased recreation in these areas is likely to result in impacts that remove or alter some stream-side habitat. Other land uses such as livestock grazing, mining, and vegetation treatments are occurring on State, private, and tribal lands; these land uses also.

Narrow-headed gartersnake and proposed critical habitat

Cumulative effects to narrow-headed gartersnake are similar to the northern Mexican gartersnake since habitat and distribution of the two taxa are similar.

Mexican spotted owl and critical habitat

The main non-Federal activities that may impact the Mexican spotted owl habitat are loss of habitat through development of private inholdings for home sites and related disturbance at these properties. Within these private lands, there is the potential for activities that create disturbance or removal of Mexican spotted owl habitat components on private lands, such as roads, grazing, mining, recreation activities, and fuel treatments. Mexican spotted owl critical habitat has not
been designated on non-Federal lands; there are no anticipated cumulative effects to Mexican spotted owl critical habitat from non-Federal actions.

**Southwestern willow flycatcher and critical habitat**

Non-Federal activities contributing to cumulative effects may include displacement of southwestern willow flycatchers from habitat by actions occurring on private land that result in disturbance to nesting flycatchers 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 flycatcher nesting. Livestock and other farm animals, corrals, and associated structures can increase the parasitism rate by cowbirds and decrease flycatcher productivity. Increased recreation, camping, off-road vehicle use, and river access developments may result in disturbance to breeding birds and fragmentation of nesting habitat, as well as increase the risk of wildfire. Water developments and diversions will likely continue to reduce surface water and flood regimes necessary to develop and maintain suitable riparian woodland habitat for flycatcher nesting.

Some private landowners are also actively working to control nonnative vegetation and reestablish native riparian species. These efforts should benefit flycatchers through habitat restoration and protection.

**Yellow-billed cuckoo**

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**

This biological opinion does not rely on the regulatory definition of “destruction or adverse modification” of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.¹

**Gila chub and critical habitat**

After reviewing the current status of the Gila chub and its critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Prescott NF’s revised LRMP will not jeopardize the continued existence of the Gila chub, and will not destroy or adversely modify its designated critical habitat. We base our conclusion on the following:

¹ See December 27, 2004, memo from Acting Director Fish and Wildlife Service. This analysis is also consistent with our proposed definition of “destruction or adverse modification of critical habitat” published in the Federal Register on May 12, 2014 (79 FR 27060).
1. Watershed improvement and transportation projects are anticipated to maintain or improve the ecological condition of Gila chub habitat during the 10- to 15-year life of the plan. These projects will aid in improving hydrologic conditions within the watershed and maintain or improve the primary constituent elements of critical habitat over the long-term.

2. Native fish restoration projects are anticipated to result in the reduction or removal of nonnative fish in Gila chub habitat. Reducing nonnative fish is a primary constituent element of critical habitat and will allow critical habitat to continue to contribute to the conservation and recovery of the species.

3. Livestock access to occupied pool habitat is limited due to rough terrain, steep walls on most of the pools, and exposed bedrock surrounding most pools. These terrain features will minimize the impacts to pool habitat, maintain suitable habitat conditions, and limit direct impacts to Gila chub.

4. Based on the discussion provided in the effects to Gila chub critical habitat section above, the critical habitat affected by the revised LRMP will continue to serve the function and conservation role of critical habitat for the Gila chub.

Gila topminnow

After reviewing the current status of the Gila topminnow, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Prescott NF’s revised LRMP will not jeopardize the continued existence of the Gila topminnow. No critical habitat has been designated for this species, therefore, none will be affected. We base our conclusion on the following:

1. Watershed improvement and transportation projects are anticipated to maintain or improve the ecological condition of Gila topminnow habitat during the 10- to 15-year life of the plan. These projects will aid in improving hydrologic conditions within the watershed and maintain or improve water quality in the long-term.

2. Native fish restoration projects are anticipated to result in the reduction or removal of nonnative fish in future Gila topminnow habitat. Reducing nonnative fish is an essential part in maintaining established populations and will aid in those populations persisting into the future.

3. If Gila topminnow are established on the Prescott NF, livestock access to occupied pool habitat is limited due to rough terrain, steep walls on most of the pools, and exposed bedrock surrounding most pools. These terrain features will minimize the impacts to pool habitat, maintain suitable habitat conditions, and limit direct impacts to Gila topminnow.
Gila trout

After reviewing the current status of the Gila trout, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Prescott NF’s revised LRMP will not jeopardize the continued existence of the Gila trout. No critical habitat has been designated for this species, therefore, none will be affected. We base our conclusion on the following:

1. Watershed improvement and transportation projects are anticipated to maintain or improve the ecological condition of Gila trout habitat during the 10- to 15-year life of the plan. These projects will aid in improving hydrologic conditions within the watershed and maintain or improve water quality in the long-term.

2. Native fish restoration projects are anticipated to result in the reduction or removal of nonnative fish in future Gila trout habitat. Reducing nonnative fish is an essential part in maintaining established populations and will aid in those populations persisting into the future.

3. If Gila trout are established in Sycamore Creek the Prescott NF, livestock access to occupied pool habitat is limited due to rough terrain, steep walls on most of the pools, and exposed bedrock surrounding most pools in the lower portion of the creek. These terrain features will minimize the impacts to pool habitat, maintain suitable habitat conditions, and limit direct impacts to Gila trout. While livestock have more open access to Sycamore Creek in the upper reaches, there is a large area where livestock are excluded by fencing; further ensuring that habitat the effects of livestock grazing will be minimized.

Spikedace and critical habitat

After reviewing the current status of the spikedace and its critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Prescott NF’s revised LRMP will not jeopardize the continued existence of the spikedace, and will not destroy or adversely modify its designated critical habitat. We base our conclusion on the following:

1. Watershed improvement and transportation projects are anticipated to maintain or improve the ecological condition of spikedace habitat and the primary constituent elements of critical habitat during the 10- to 15-year life of the plan. These projects will aid in improving hydrologic conditions within the watershed and maintain or improve the primary constituent elements of critical habitat in the long-term.

2. Native fish restoration projects are anticipated to result in the reduction or removal of nonnative fish in spikedace habitat and critical habitat. Reducing nonnative fish is a primary constituent element of critical habitat and will allow critical habitat to continue to contribute to the conservation and recovery of the species.
3. Livestock grazing is not currently authorized along the Verde River on the Prescott NF where spikedace and its critical habitat occur, and there are no specific plans identified in the LRMP for grazing in this area in the future. If livestock grazing is authorized during the life of this plan, we will work with the Prescott NF to ensure that effects to spikedace and its critical habitat are minimized.

4. Based on the discussion provided in the effects to spikedace critical habitat section above, the critical habitat affected by the revised LRMP will continue to serve the function and conservation role of critical habitat for the spikedace.

**Loach minnow and critical habitat**

After reviewing the current status of the loach minnow and its critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Prescott NF’s revised LRMP will not jeopardize the continued existence of the loach minnow, and will not destroy or adversely modify its designated critical habitat. We base our conclusion on the following:

1. Watershed improvement and transportation projects are anticipated to maintain or improve the ecological condition of loach minnow habitat and the primary constituent elements of critical habitat during the 10- to 15-year life of the plan. These projects will aid in improving hydrologic conditions within the watershed and maintain or improve the primary constituent elements of critical habitat in the long-term.

2. Native fish restoration projects are anticipated to result in the reduction or removal of nonnative fish in loach minnow habitat and critical habitat. Reducing nonnative fish is a primary constituent element of critical habitat and will allow critical habitat to continue to contribute to the conservation and recovery of the species.

3. Livestock grazing is not currently authorized along the Verde River on the Prescott NF, and loach minnow do not currently occur in the Verde River on the Forest. There are no specific plans identified in the LRMP for grazing in this area in the future. If livestock grazing is authorized during the life of this plan, we will work with the Prescott NF to ensure that any effects to loach minnow and its critical habitat are minimized.

4. Based on the discussion provided in the effects to loach minnow critical habitat section above, the critical habitat affected by the revised LRMP will continue to serve the function and conservation role of critical habitat for the loach minnow.

**Razorback sucker and critical habitat**

After reviewing the current status of the razorback sucker and its critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Prescott NF’s revised LRMP will not jeopardize the continued existence of the razorback sucker, and will not destroy or adversely modify its designated critical habitat. We base our conclusion on the following:
1. Watershed improvement and transportation projects are anticipated to maintain or improve the ecological condition of razorback sucker habitat and the primary constituent elements of critical habitat during the 10- to 15-year life of the plan. These projects will aid in improving hydrologic conditions within the watershed and maintain or improve the primary constituent elements of critical habitat in the long-term.

2. Native fish restoration projects are anticipated to result in the reduction or removal of nonnative fish in razorback sucker habitat and critical habitat. Reducing nonnative fish is a primary constituent element of critical habitat and will allow critical habitat to continue to contribute to the conservation and recovery of the species.

3. Livestock grazing is not currently authorized along the Verde River on the Prescott NF where razorback sucker and its critical habitat occur, and there are no specific plans identified in the LRMP for grazing in this area in the future. If livestock grazing is authorized during the life of this plan, we will work with the Prescott NF to ensure that effects to razorback sucker and its critical habitat are minimized.

4. Based on the discussion provided in the effects to razorback sucker critical habitat section above, the critical habitat affected by the revised LRMP will continue to serve the function and conservation role of critical habitat for the razorback sucker.

Northern Mexican gartersnake and proposed critical habitat

After reviewing the current status of the northern Mexican gartersnake and its proposed critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Prescott NF’s revised LRMP will not jeopardize the continued existence of the northern Mexican gartersnake, and will not destroy or adversely modify its proposed critical habitat. We base our conclusion on the following:

1. Watershed improvement projects are anticipated to maintain or improve the ecological condition of northern Mexican gartersnake habitat and the primary constituent elements of proposed critical habitat during the 10- to 15-year life of the plan. These projects will aid in improving hydrologic conditions within the watershed and maintain or improve the primary constituent elements of proposed critical habitat in the long-term.

2. Native fish restoration projects are anticipated to result in the reduction or removal of nonnative fish in northern Mexican gartersnake habitat and proposed critical habitat. Reducing nonnative fish is a primary constituent element of proposed critical habitat and will allow this habitat to continue to contribute to the conservation and recovery of the species. Additionally, increasing the presence of native fish and amphibians will promote prey items for the gartersnake.

3. Livestock grazing will be managed to maintain or improve aquatic and riparian habitat conditions and manage riparian areas towards properly functioning condition. The
Prescott NF has committed to work with us to ensure that effects from grazing to the gartersnake and its proposed critical habitat are minimized.

4. Based on the discussion provided in the effects to northern Mexican gartersnake proposed critical habitat section above, the proposed critical habitat affected by the revised LRMP will continue to serve its function and conservation role for the gartersnake.

**Narrow-headed gartersnake and proposed critical habitat**

After reviewing the current status of the narrow-headed gartersnake and its proposed critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Prescott NF’s revised LRMP will not jeopardize the continued existence of the narrow-headed gartersnake, and will not destroy or adversely modify its proposed critical habitat. We base our conclusion on the following:

1. Watershed improvement projects are anticipated to maintain or improve the ecological condition of narrow-headed gartersnake habitat and the primary constituent elements of proposed critical 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 proposed critical habitat in the long-term.

2. Native fish restoration projects are anticipated to result in the reduction or removal of nonnative fish in narrow-headed gartersnake habitat and critical habitat. Reducing nonnative fish is a primary constituent element of proposed critical habitat and will allow this habitat to continue to contribute to the conservation and recovery of the species. Additionally, increasing the presence of native fish and amphibians will promote prey items for the gartersnake.

3. Livestock grazing will be managed to maintain or improve aquatic and riparian habitat conditions and manage riparian areas towards properly functioning condition. The Prescott NF has committed to work with us to ensure that effects from grazing to the gartersnake and its proposed critical habitat are minimized.

4. Based on the discussion provided in the effects to narrow-headed gartersnake proposed critical habitat section above, the proposed critical habitat affected by the revised LRMP will continue to serve its function and conservation role for the gartersnake.

**Mexican spotted owl and critical habitat**

After reviewing the current status of the Mexican spotted owl and its critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Prescott NF’s revised LRMP will not jeopardize the continued existence of the Mexican spotted owl, and will not destroy or adversely modify its designated critical habitat. We base our conclusion on the following:
1. The revised LRMP will strive to implement the Recovery Plan (USDI FWS 2012) and manage for Mexican spotted owl recovery on the Prescott NF.

2. Desired conditions and guidelines in the revised LMRP recognize the need to reduce the potential for landscape level, stand-replacing fire in ponderosa pine-Gambel oak forests that the Mexican spotted owl occupies. These efforts to improve forest condition and sustainability should reduce the risk of high severity fire and subsequently, reduce the loss of owl habitat.

3. Based on the discussion provided in the Effects to Mexican Spotted Owl Critical Habitat section above, the CHUs (BRW-2, BRW-3) affected by the revised LRMP will continue to serve the function and conservation role of critical habitat for 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 (USDI FWS 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 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.

Southwestern willow flycatcher and critical habitat

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

1. Southwestern willow flycatchers are not currently known to breed on Prescott NF lands; therefore, projects carried out under this plan will not affect them directly.

2. Watershed improvement projects are anticipated to maintain or improve the ecological condition of flycatcher habitat and the primary constituent elements of critical 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.

3. Projects related to the Transportation, Lands, Minerals, and Forest Health programs are expected to be limited in nature and frequency. Because of this, the amount of habitat
expected to be removed, including primary constituent elements of critical habitat, is anticipated to be negligible compared to the amount of both habitat and critical habitat available to the species rangewide. Projects associated with these programs are not anticipated to diminish the ability of critical habitat to contribute to the conservation and recovery of the species.

4. Livestock grazing is not currently authorized along the Verde River on the Prescott NF where the southwestern willow flycatcher and its critical habitat occur, and there are no specific plans identified in the LRMP for grazing in this area in the future. If livestock grazing is authorized during the life of this plan, we will work with the Prescott NF to ensure that effects to southwestern willow flycatcher and its critical habitat are minimized.

Yellow-billed cuckoo

After reviewing the current status of the yellow-billed cuckoo, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Prescott NF’s revised LRMP will not jeopardize the continued existence of the yellow-billed cuckoo. We base our conclusion on the following:

1. Watershed improvement projects are anticipated to maintain or improve the ecological condition of yellow-billed cuckoo 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 water quality and, therefore, cuckoo habitat in the long-term.

2. Projects related to the Transportation, Lands, Minerals, and Forest Health programs are expected to be limited in nature and frequency. Because of this, the amount of habitat expected to be removed is anticipated to be negligible compared to the amount of habitat available to the species both throughout the Prescott NF and rangewide.

3. Livestock grazing will be managed to maintain or improve aquatic and riparian habitat conditions and manage riparian areas towards properly functioning condition. The Prescott NF has committed to work with us to ensure that effects from grazing to the cuckoo are minimized.

The conclusions of this BO/CO are based on full implementation of the project as summarized in the “Description of the Proposed Action” section of this document, including the standards and guidelines that apply to the action and serve as conservation measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

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 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. 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 FWS as specified in the incidental take statement [see 50 CFR 402.14(i)(3)].

Gila chub

The FWS anticipates Gila chub will be taken as a result of this proposed action; however, the incidental take has previously been accounted for in our July 2010 BO for livestock grazing activities in the Sycamore Allotment (AESO file number 22410-2008-F-0934), which was also carried forward in our March 2012 BO for reinitiation of formal consultation on the previous Prescott NF LRMP (Region 2 file number 2012-F-0009). We do not anticipate take beyond what we described in those Biological Opinions. Please refer to our July 2010 BO for livestock grazing activities in the Sycamore Allotment for a complete description of incidental take for the Gila chub since that BO has the most detailed description of the incidental take we anticipate.

Mexican spotted owl

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 Mexican spotted owls. However, it is difficult to quantify the number of individual owls
potentially 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 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 1996). Actions outside PACs will generally not result in incidental take because we are not reasonably certain that Mexican 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 are present.

The reasonable and prudent measures described below are non-discretionary and must be undertaken by the Prescott NF 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 Prescott NF has a continuing duty to regulate the activity covered by this incidental take statement. If the Prescott NF (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 Prescott NF, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Prescott NF or appropriate entity must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement (see 50 CFR §402.14(i)(3)).

**Amount of Take**

Based upon analyses of the effects of Forest Service projects within previous BOs, we anticipate the majority of incidental take for future projects implemented under the Prescott NF LRMP will be in the form of short-term harassment. Owls experiencing short-term harassment may fail to successfully rear young in one or more breeding seasons, but will not likely desert the area because of a short-term disturbance (Delaney et al. 1999). Incidental take in the form of harm is also anticipated, albeit at a lesser amount (i.e., the number of owls) than take from harassment. Harm would be either the direct fatality of individual birds or the alteration of habitat that affects behavior (e.g. breeding or foraging) of birds to such a degree that the birds desert the area and are considered lost as viable members of the population.

There are 15 known PACs on the Prescott NF. Based upon the potential for incidental take to occur as part of implementation of the LRMP, we anticipate the following incidental take for the proposed action, which is in addition to previously authorized take resulting from ongoing projects or projects that have yet to be implemented:

- Harassment of owls associated with up to two PAC per year due to a single or short-term disturbance. Incidental take is exceeded if owls associated with an individual PAC are harassed over the course of more than three breeding seasons.
• Harm and/or harassment of owls associated with one PAC due to long-term or chronic disturbance, or habitat degradation or loss over the life of the project. Incidental take is exceeded if such long-term harm and/or harassment are associated with more than one PAC. We expect that actions that could result in this type of harm or harassment would be very rare under the revised LRMP due to the protective guidelines and other conservation measures included in the LRMP for the Mexican spotted owl.

**Gila topminnow, Gila trout, spikedace, loach minnow, razorback sucker, northern Mexican gartersnake, narrow-headed gartersnake, southwestern willow flycatcher, and yellow-billed cuckoo**

The FWS does not anticipate the proposed action will incidentally take any Gila topminnow, Gila trout, spikedace, loach minnow, razorback sucker, northern Mexican gartersnake, narrow-headed gartersnake, southwestern willow flycatcher, or the yellow-bill cuckoo for the following reasons:

1. Gila topminnow do not currently occur on the Prescott NF. If populations of topminnow are established, the effects of ongoing actions and, therefore, any incidental take associated with those actions will be addressed through a site-specific consultation.

2. Adverse effects will not occur in Grapevine Creek where Gila trout currently occur on the Prescott NF. If populations of Gila trout are established in areas where adverse effects could occur (i.e., Sycamore Creek), the effects of ongoing actions and, therefore, any incidental take associated with those actions will be addressed through a site-specific consultation.

3. Loach minnow do not currently occur on the Prescott NF. If populations of loach minnow are established, the effects of ongoing actions, and, therefore, any incidental take associated with those actions will be addressed through a site-specific consultation.

4. Spikedace are present only in low numbers within the Verde River, resulting in a low likelihood that individual fish will be impacted by these activities. 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 a site-specific consultation, and standards and guidelines applied to the activity to avoid the likelihood of take.

5. Razorback sucker are present only in low numbers within the Verde River, resulting in a low likelihood that individual fish will be impacted by these activities. 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 a site-specific consultation, and standards and guidelines applied to the activity to avoid the likelihood of take.

6. Both northern Mexican and narrow-headed gartersnakes are presumed to occur on Prescott NF in low densities. As site-specific projects are developed, the potential for
adverse effects associated with those projects to northern Mexican and narrow-headed gartersnakes, including incidental take, will be addressed at that time through a site-specific consultation, and standards and guidelines applied to the activity to avoid the likelihood of take.

7. Southwestern willow flycatchers are not currently known to breed on the Prescott NF, although they likely use areas on the Prescott NF for migration. The watershed improvement projects are anticipated to improve water availability and quality, which may promote the development of flycatcher habitat. Standards and guidelines such as incorporating measures from the flycatcher recovery plan and timing restrictions would be sufficient to avoid take of the flycatcher, should nesting occur on the Forest during the life of this plan.

8. Yellow-billed cuckoos currently nest in portions of the Prescott NF. As site-specific projects are developed, the potential for adverse effects associated with those projects to cuckoos, including incidental take, will be addressed at that time through a site-specific consultation, and standards and guidelines applied to the activity to avoid the likelihood of take.

**EFFECT OF THE TAKE**

**Gila chub**

In this BO, the FWS determines that this level of anticipated take is not likely to result in jeopardy to the Gila chub. We have based the number of Gila chub populations with anticipated take on the potential future and ongoing projects to be implemented under the revised LRMP that could have short-term adverse effects, but long-term benefits to the Gila chub (such as, but not limited to livestock grazing, watershed improvement projects, and native fish restoration projects).

**Mexican spotted owl**

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

**REASONABLE AND PRUDENT MEASURES**

**Gila chub**

The FWS carries forward the reasonable and prudent measures with terms and conditions that have been previously provided in our July 2010 BO for livestock grazing activities in the Sycamore Allotment and our March 2012 BO for reinitiation of formal consultation on the previous Prescott NF LRMP, which also includes livestock grazing activities in the Sycamore
Allotment. The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of Gila chub:

1. Minimize or eliminate take of Gila chub on the Prescott NF lands due to LRMP activities.
2. Minimize or eliminate adverse effects to Gila chub habitat on the Prescott NF lands due to LRMP activities.
3. Monitor the impacts of site-specific projects implemented on the Gila chub.

**Mexican spotted owl**

The FWS 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 Prescott NF.
2. Eliminate or minimize adverse effects to Mexican spotted owl habitat on the Prescott NF.
3. Monitor the impacts of site-specific projects implemented on the Mexican spotted owl.

**TERMS AND CONDITIONS**

In order to be exempt from the prohibitions of section 9 of the ESA, the Prescott NF must comply with the following terms and conditions, which implement the reasonable and prudent measures listed above and outline reporting/monitoring requirements. These terms and conditions are non-discretionary. The FWS may approve deviation from these terms and conditions 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 Prescott NF lacks discretionary authority to implement the condition; or, deviation from the condition is needed to meet the purpose and need of a project.

**Gila chub**

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

1.1 Manage riparian areas adjacent to and upstream of Gila chub populations for conditions to minimize direct and indirect effects to Gila chub and its habitat.
1.2 Develop and implement projects in LRMP programs within the Prescott NF with the goal of minimizing or eliminating adverse effects to the Gila chub.

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

2.1 Develop and implement projects (i.e., watershed or riparian restoration) in occupied Gila chub habitat with the goal of minimizing or eliminating adverse effects to Gila chub habitat.
The following terms and conditions will implement reasonable and prudent measure 3:

3.1 The Prescott NF shall monitor incidental take resulting from the proposed action and report their findings to the FWS. 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), breeding season(s) over which the project occurred, relevant Gila chub survey information, and any other pertinent information about the project’s effects on the species.

3.2 Annual reports, which will include this species, shall be sent to the appropriate local FWS Ecological Services field office by March 1st 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 reinitiation of consultation and review of the reasonable and prudent measures provided. The USFS must immediately provide an explanation of the causes of the taking and review with the FWS the need for possible modification of the reasonable and prudent measures.

Mexican spotted owl

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

1.1 The Prescott NF 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 Forest Service 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 Prescott NF will work with FWS staff to identify additional measures, specific to the project, to minimize effects to owls.

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

2.1 Forest Service management activities within PACs and recovery habitat will maintain adequate amounts of important habitat features for owls (such as large trees, large snags, and large logs). The Prescott NF will work with the FWS during project-specific consultations to define “adequate” based upon site-specific conditions.

2.2 On site-specific projects, the Prescott NF will work with FWS staff to identify additional 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 Prescott NF shall monitor the impacts of incidental take resulting from implementation of the proposed action and report these findings to the FWS.
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), breeding season(s) over which the project occurred, relevant owl survey information, and any other pertinent information about the project’s effects on the species.

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 Flagstaff FWS Ecological Services field office and the Mexican spotted owl species lead by March 1st of each year.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Forest Service must immediately provide an explanation of the causes of the taking and review with the AESO the need for possible modification of the reasonable and prudent measures.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 4901 Paseo del Norte NE, Suite D, Albuquerque, NM 87113; 505-248-7889) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve the biological material in the best possible state.

Certain project activities may also affect species that are protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. sec. 703-712) and/or bald and golden eagles protected under the Bald and Golden Eagle Protection Act (BGEPA). The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the FWS. BGEPA prohibits anyone, without a permit issued by the FWS, from taking (including disturbing) eagles, and including their parts, nests, or eggs. If you believe migratory birds will be affected by the project, we recommend you contact our Migratory Bird Permit Office, P.O. Box709, Albuquerque, NM 87103, (505) 248-7882, or permitsR2mb@fws.gov. For more information regarding the MBTA, please visit the following websites: http://www.fws.gov/migratorybirds and http://www.fws.gov/migratorybirds/mbpermits.html.

For information on protections for bald eagles under the BGEPA, please refer to the FWS's National Bald Eagle Management Guidelines (72 FR 31156) and regulatory definition of the term "disturb" (72 FR 31132) that were published in the Federal Register on June 5, 2007. Existing take authorizations for bald eagles issued under the ESA became covered under
the BGEPA via a final rule published in the Federal Register on May 20, 2008 (73 FR 29075). Our office is also available to provide technical assistance to help you with compliance.

**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. We recommend that you pursue opportunities to restore Gila chub habitat that has been adversely affected by sedimentation as result of the Cave Creek Complex Wildfire.

2. We recommend that the Prescott NF work with the FWS and other partners to develop a monitoring strategy to determine the existing aquatic and riparian habitat condition of the Verde River, the ongoing effects of land management activities, and how we might collectively work to maintain, enhance, and/or improve aquatic and riparian species habitat on the Verde River.

3. We recommend that the Prescott NF work with the FWS to assist in the evaluation and completion of future discussions of a Verde River fish barrier.

4. We recommend that the Prescott NF work with the FWS to carry out or assist in completion of recovery tasks, as identified in the revised recovery plans for spikedace and loach minnow upon completion of those plans.

5. We recommend that the Prescott NF work with the FWS to conduct Mexican 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 in the BRW EMU.

6. We recommend that the Prescott NF work with the FWS 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 Mexican 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.

7. Implement actions to protect PACs from high-severity fire and improve the resiliency of fire-adapted forested habitats. Annual reports will provide information to assist the FWS in determining whether these long-term activities are occurring in such a way as to reduce fire risk to existing PACs and replacement nest/roost habitat (nest/roost replacement recovery habitat).
In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

**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 northern Mexican gartersnake and narrow-headed gartersnake, and for the yellow-billed cuckoo. You may ask the FWS to confirm the conference opinion as a biological opinion issued through formal consultation if critical habitat is designated for the gartersnakes or the yellow-billed cuckoo is listed. The request must be in writing. If the FWS 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 FWS 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.
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 Brian Wooldridge (928-556-2106), Shaula Hedwall (928-556-2118) or Brenda Smith (928-556-2157). Please refer to the consultation number, 02EAAZ00-2013-F-0019, in future correspondence concerning this project.

Sincerely,

/s/ Brenda Smith for Steven L. Spangle
Field Supervisor

cc (electronic):
District Ranger, Verde Ranger District, Prescott National Forest, Camp Verde, AZ
District Ranger, Bradshaw Ranger District, Prescott National Forest, Prescott, AZ
District Ranger, Chino Valley Ranger District, Prescott National Forest, Chino Valley, AZ

Assistant Field Supervisor, Flagstaff, AZ (Attn: Shaula Hedwall)
Assistant Field Supervisor, Tucson, AZ (Attn: Jeff Servoss, Susan Sferra, Doug Duncan)
Fish and Wildlife Biologist, Phoenix, AZ (Attn: Mary Richardson, Ryan Gordon, Dave Smith, Lesley Fitzpatrick)

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Kingman, AZ
Regional Supervisor, Arizona Game and Fish Department, Mesa, AZ

cc (electronic):
Director, Hopi Cultural Preservation Office, Kykotsmovi, AZ
Director, Cultural Resources Department, Hualapai Tribe, Peach Springs, AZ
Assistant Attorney General, Pascua Yaqui Tribe, Tucson, AZ
Director, Apache Cultural Program, Yavapai-Apache Nation, Camp Verde, AZ
Director, Yavapai Cultural Program, Yavapai-Apache Nation, Camp Verde, AZ
Director, Cultural Research Program, Yavapai-Prescott Indian Tribe, Prescott, AZ
Environmental Specialist, Environmental Services, Western Regional Office, Bureau of Indian Affairs, Phoenix, AZ
LITERATURE CITED

Proposed action


Gila chub


Ms. Teresa A. Chase, Forest Supervisor


**Gila topminnow**


**Gila trout**

Arizona Game and Fish Department. 1992. Gap Creek, Yavapai County Fish Investigation Progress Report. Mesa, AZ: Region VI.
Arizona Game and Fish Department. 2009. Gila Trout and Gila Chub Introduction into Grapevine Creek, Prescott National Forest, Yavapai County, Arizona. Phoenix, AZ.

Arizona Game and Fish Department. 2011. Correspondence regarding the 5-year review for Gila trout in Arizona. Arizona Game and Fish Department, Phoenix, Arizona.


____. 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 71:40,657–40,674.

**Spikedace**


Hendrickson, D.A. 1993. Evaluation of the razorback sucker (Xyrauchen texanus) and Colorado squawfish (Ptychocheilus lucius) reintroduction programs in central Arizona based on surveys of fish populations in the Salt and Verde rivers from 1986 to 1990. Phoenix, AZ: Arizona Game and Fish Department.


New Mexico Department of Game and Fish (NMDGF). 2008. Gila rare species collections database. Provided by Y. Paroz, New Mexico Department of Game and Fish to M. Richardson, U.S. Fish and Wildlife Service.


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.


Robinson, T. 2008b. September 18, 2008, email transmission from T. Robinson, Arizona Game and Fish Department, to R. Clarkson, U.S. Bureau of Reclamation, and others, re: congratulations on the second successful Muleshoe Ecosystem native fish stockings.


Robinson, T.  2011b. October 13, 2011, email transmission to fossilcreek@nativefishlab.net and others re: Fossil Creek native fish stockings – October 12, 2011.


Ms. Teresa A. Chase, Forest Supervisor


**Loach minnow**


Miller, D. 1998. Fishery survey report, Negrito Creek within the Gila National Forest New Mexico, 29 and 30 June 1998. Western New Mexico University, Biology Department, for the Gila National Forest. Silver City, New Mexico. 6 pages.


Robinson, A. 2009a. Acquisition of loach minnow from Blue River on June 1, 2009. Arizona Game and Fish Department, Research Branch. Phoenix, Arizona. 5 pages.


Robinson, T. 2011b. October 13, 2011, email transmission to fossilcreek@nativefishlab.net and others re: Fossil Creek native fish stockings – October 12, 2011.


Razorback Sucker


Hendrickson, D.A. 1993. Evaluation of the razorback sucker (Xyrauchen texanus) and Colorado squawfish (Ptychocheilus lucius) reintroduction programs in central Arizona based on surveys of fish populations in the Salt and Verde rivers from 1986 to 1990. Phoenix, AZ: Arizona Game and Fish Department.


_____ 2013. Horseshoe-Bartlett HCP Annual Implementation Report. 56 pp


Northern Mexican gartersnake


Emmons, I. 2012. E-mail correspondence from Iain Emmons (June 5, 2012; 1616 hrs).


Ms. Teresa A. Chase, Forest Supervisor

_____. 2013. 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.

Narrow-headed gartersnake


Fitzgerald, L. A. 1986. A preliminary status survey of *Thamnophis rufipunctatus* and *Thamnophis eques* in New Mexico. Unpubl. report to New Mexico Department of Game and Fish, Albuquerque, New Mexico.


_____ 2013. 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.

**Mexican spotted owl**


Southwestern willow flycatcher


Yellow-billed cuckoo


_____. 2013. Proposed rule to list the yellow-billed cuckoo (Coccyzus americanus) as a threatened species in the western continental United States. 78 FR 61622.


FIGURES

Figure 1. Prescott National Forest Vicinity Map
Figure 2. Ecological Management Units for the Mexican spotted owl in the southwestern United States.
APPENDIX A – CONFERENCE REPORT

In your correspondence requesting consultation on the effects of the revised programmatic “Land and Resource Management Plan for the Prescott National Forest” (LRMP) for lands located in Coconino and Yavapai Counties, Arizona (January 2014) on federally-listed and proposed species and their critical habitat, you concluded that the proposed action would not jeopardize the continued existence of the non-essential experimental population (10j) of Colorado pikeminnow. 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 and Sonoran desert tortoise. 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 Sonoran desert tortoise and/or 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 LRMP on the Prescott NF. The LRMP directs how future activities will be implemented for the programs operated by the Prescott NF, including Watersheds and Soils; Wildlife, Fish and Rare Plants; Wildland Fire and Fuels Management; Recreation; Transportation; Wilderness and Special Areas; Land and Special Uses; Minerals Management; Rangeland Management; and Forestry and Forest Health. 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.

Colorado pikeminnow

Colorado pikeminnow populations in the Verde River have decreased from historical levels because of the introduction and establishment of nonnative aquatic species that are predatory and/or competitive with the native species, and reduced habitat quantity and quality due to water diversions, nutrient enrichment from agricultural practices, excess sedimentation from land development in the watersheds, and introduction and establishment of noxious plant species. The species was considered to be gone from the Verde River by 1950 (Minckley and Marsh 2009. FWS established non-essential experimental population areas under section 10(j) of the ESA on July 24, 1985, for pikeminnow along the Salt and Verde rivers, Arizona, to facilitate reintroductions (USFWS 1985). Pikeminnow have been stocked into main channel habitats of the Verde River from 1985-1999 and 2002 to the present by the AGFD and FWS (unpublished data, AGFD). Since 1994, almost all reintroductions have occurred in the Verde Wild and Scenic River segment below Camp Verde. Although survival has been documented, it has been low and recruitment has not been documented (Hendrickson, 1993; Hyatt, 2004). Stockings into
the Verde River were halted in 2011 after largemouth bass virus was detected at Dexter National Fish Hatchery and Technology Center in New Mexico and the station could not supply pikeminnow to Arizona for grow-out and stocking. With the resolution of this issue, future stockings above into the Verde River from Childs to above Horseshoe Dam are expected.

Conservation measures

In addition to the standards and guidelines applied to activities under each program, the Prescott NF listed a number of actions that they are implementing that provide conservation for the species and its habitat.

- The Verde Wild and Scenic River Comprehensive River Management Plan (USFS 2004) includes guidance for the conservation of native fishes in the 41-mile designated reach. Additionally, the Prescott NF has not authorized livestock grazing use along the Verde Wild and Scenic River segment within occupied pikeminnow habitat since 2005. Site-specific NEPA analysis would be required to authorize future grazing use.

- The Prescott NF has secured instream flow water rights for the 41-mile reach of the Verde Wild and Scenic River and has application for instream flow water rights for the upper Verde River.

- The Prescott NF has been treating noxious and invasive plants along the Verde River to improve riparian conditions under guidance of the Integrated Treatment of Noxious or Invasive Weeds EIS (USFS 2005).

DETERMINATION

We agree with your determination that the proposed action will not jeopardize the continued existence of the Colorado pikeminnow for the following reasons:

- The Verde River population of Colorado pikeminnow is designated as “non-essential” to the continued existence of the species and is not afforded protection under section 7(a)(2) of the ESA (USFWS 1985). This means that the species is not dependent on survival of this population for its continued existence, and loss of this population would not result in jeopardy to the species.

- The implementation of actions under the LRMP will have limited effects to the lower Verde River, where stocking of pikeminnow has occurred. Management 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; and maintaining a diversity of instream habitats and organic materials that support fish and aquatic invertebrates.
ADVISORY RECOMMENDATIONS

We recommend that the Prescott NF continue to work with us and AGFD to explore opportunities to conserve Colorado pikeminnow in the Verde River, including planning through the Verde River Fisheries Management Team.

Roundtail chub

Roundtail chub are found in the Verde River mainstem throughout the forest (Voeltz 2002), and have been reintroduced into Fossil Creek, just below the Forest boundary and into Sullivan Lake. They also occur in Sycamore Creek. Roundtail chub were introduced in Gap Creek within the Cedar Bench Wilderness on the Prescott NF in 2012. Please refer to Table 25 in the BA for the current distribution and status of the roundtail chub on the Forest. The Horseshoe-Bartlett HCP also stocks roundtail chub in various locations within the Verde River watershed (SRP 2011, 2013) including the mainstem within the Forest.

Conservation measures

In addition to the standards and guidelines applied to activities under each program, the Prescott NF listed a number of actions that they are implementing that provide conservation for the species and its habitat.

- The Prescott NF collaborated with AGFD to stock roundtail chub into Gap Creek on the Cedar Bench Wilderness in 2012. A second stocking of 520 fish was completed in March, 2014 (Jaeger 2014).

- The Prescott NF has secured instream flow water rights for the 41-mile reach of the Verde Wild and Scenic River and has application for instream flow water rights for the upper Verde River.

- The Prescott NF has not authorized livestock grazing use along the upper Verde River within occupied habitat since 1998. Site-specific NEPA analysis would be required to authorize future grazing use.

- The Prescott NF continues to have road closures in place for the upper Verde River. The Forest completed about 5 miles of road decommissioning/closures within watersheds of the upper Verde River in 2009. Barrier and sign maintenance was completed at three river access points in 2008 to prevent illegal vehicle access to the upper Verde River.

- The Verde Wild and Scenic River Comprehensive River Management Plan (USFS 2004) includes guidance for the conservation of native fishes in the 41-mile designated reach. The Forest has not authorized livestock grazing use along the Verde Wild and Scenic River segment within occupied habitat since 2005. Site-specific NEPA analysis would be required to authorize future grazing use.
Tamarisk treatments have been completed along the Verde River as part of the Noxious Weed Treatment Plan (USFS 2005) in recent years to improve riparian and aquatic conditions.

The Prescott NF, along with the FWS, AGFD, and the BOR, completed site feasibility visits in 2006 along the upper Verde River for potential fish barrier locations.

DETERMINATION

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 LRMP 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; and maintaining a diversity of instream habitats and organic materials that support fish and aquatic invertebrates.

- The Watershed and Soils Program and the effects of this program could potentially have short term adverse effects on the roundtail chub. Projects that occur for instream improvements could have short term adverse effects to the chub and their habitat, with an overall beneficial effect. The standards and guidelines detailed in the BA are expected to mitigate the effects in the program areas.

- The Wildlife/Fish/Rare Plants Program and its effects on the roundtail chub would be localized, and have short term adverse effects with overall beneficial effects; particularly in regards to barrier construction and maintenance. The standards and guidelines that are described in the BA are expected to minimize impacts to the species and the habitat.

- The extent of fuels management and wildfire treatments within areas with roundtail chub are expected to be at low to moderate levels. Mitigation of effects would be implemented through the Wildland Fire guidelines, best management practices, and the standards and guidelines that are applicable.

- 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 wildlife. Site-specific consultation will be required to ensure that aquatic habitats and species are adequately maintained under any grazing regime.

- Implementation of the Recreation, Transportation, Wilderness and Special Areas, Lands and Special Uses, Minerals Management, and Forestry and Forest Health Programs are expected to have insignificant and discountable effects due to the standards and guidelines that are outlined for each program. Site-specific projects will still consulted on.
ADVISORY RECOMMENDATIONS

- We recommend that the Prescott NF work with the FWS and AGFD to identify potential habitat to stock and/or reintroduce roundtail chub on the forest (e.g., Cottonwood Creek).

- We recommend that the Prescott NF continue to work to improve the proper functioning condition of perennial and ephemeral waters in order to improve existing and potential roundtail chub habitat and connectivity of habitats.

We recommend that the Prescott NF continue to work with us and AGFD to explore opportunities to conserve roundtail chub populations on the Forest, including planning through the Verde River Fisheries Management Team and participating in conservation actions under the Statewide Candidate Conservation Agreement.

Sonoran desert tortoise

According to the AGFD HDMS range map for the Sonoran desert tortoise, there are no known locations for this species on the Prescott NF. Suitable tortoise habitat occurs on the southern portions of the Forest near Cleator and is within the range of known locations of the species near Black Canyon City. With few known locations nearby and no populations documented within the action area, it is difficult to determine the status of the species. The potential habitat for the species is the steep rocky slopes of the desert communities PNVT, and the existing condition is considered to be a low departure from reference conditions and consequently similar to historic conditions.

Conservation measures

The Prescott NF has not detailed any conservation measures specifically for the Sonoran desert tortoise.

DETERMINATION

We agree with your determination that the proposed action will not jeopardize the continued existence of the Sonoran desert tortoise for the following reasons:

- Standards and guidelines applied to each program under the LRMP would function to minimize habitat disturbance by limiting or guiding Forest uses and activities.

- Guidelines under the Wildlife/Fish/Rare Plants program would ensure that the needs of tortoises are considered in any project design and implementation, ensuring that Forest Service actions do not impede recovery of the species and include species-specific design features, such as breeding season timing restrictions, drift fences, surveys, and escape ramps.

- Sonoran desert tortoise habitat within the Prescott NF is very limited, and no occurrences of the species have been documented in the Forest. Although it is important to conserve
any habitat for the species, this limited habitat area does not significantly contribute to the recovery of the species.

ADVISORY RECOMMENDATIONS

- We recommend continued coordination with the FWS and other agencies/entities that administer adjacent lands that contain current or potential habitat to better understand Sonoran desert tortoise populations and habitat use on the Prescott NF.

- We recommend that surveys be conducted in areas of suitable habitat prior to potential projects, and apply best management practices to avoid disturbance to the species and minimize potential habitat loss. For livestock grazing, these best management practices can include, but are not limited to, seasonal use restrictions, lower utilization rates in tortoise habitat, and rest-rotation pasture uses. To minimize impacts of other projects, see http://www.azgfd.gov/pdfs/w_c/turtle/MitigationMeasures.pdf

- We recommend that the Forest continue efforts to restore disturbed habitat and maintain corridors for these species.

LITERATURE CITED

Hendrickson, D.A. 1993. Evaluation of the razorback sucker (Xyrauchen texanus) and Colorado squawfish (Ptychocheilus lucius) reintroduction programs in central Arizona based on surveys of fish populations in the Salt and Verde rivers from 1986 to 1990. Phoenix, AZ. Arizona Game and Fish Department.


