United States Department of the Interior
Fish and Wildlife Service
Arizona Ecological Services Office
9828 North 31st Avenue, Suite C3
Phoenix, Arizona 85051
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to:
AESO/SE
02EAAZ00-2014-F-0313-R001

February 15, 2018

Mr. Neil Bosworth, Forest Supervisor
Tonto National Forest
2324 East McDowell Road
Phoenix, Arizona 85006

RE: Reinitiation of Consultation on 1985 Tonto National Forest Land and Resource Management Plan

Dear Mr. Bosworth:

Thank you for your request to reinitiate formal consultation and conferencing with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. § 1531-1544), as amended (ESA). We received your letter and Biological Assessment (BA) dated August 1, 2017, on the same day. At issue are impacts that may result from the continued implementation of the 1985 Tonto National Forest (TNF) Land and Resource Management Plan, as amended (LRMP), located Gila, Maricopa, Yavapai, and Pinal Counties, Arizona. The proposed action may affect, and is likely to adversely affect the threatened yellow billed-cuckoo (*Coccyzus americanus occidentalis*) and its proposed critical habitat, the threatened narrow-headed gartersnake (*Thamnophis rufipunctatus*) and its proposed critical habitat, and the threatened northern Mexican gartersnake *(Thamnophis eques megalops)* and its proposed critical habitat.

In your letter, you also requested our concurrence that the proposed action may affect, and is not likely to adversely affect the threatened Gila trout (*Oncorhynchus gilae*). After discussion, a determination of may affect, likely to adversely affect was agreed to, based on the recent reintroduction of Gila trout into Dude Creek and the planned reintroduction into Haigler Creek in the near future.

In addition, you asked us to concur with your determination that the proposed action is not likely to jeopardize the 10(j) nonessential experimental population of the Mexican gray wolf (*Canis lupus baileyi*). We provide our rational for our concurrence in Appendix A of this programmatic biological opinion and conference opinion (PBO/PCO).

INTRODUCTION

This PBO/PCO is based on information provided in the August 1, 2017 BA (USFS 2017), the 1985 LRMP, as amended (USFS 1985), meetings, telephone conversations, field investigations, and other sources of information. Literature cited in this biological and conference opinion 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

August 17, 2016	The FWS participated in a meeting with the Forest Service to discuss species to be addressed in Biological Assessment.
August 1, 2017	The FWS received the final Biological Assessment from TNF.
February 6, 2018	The FWS sent a draft PBO/PCO to the Forest Service.
February 15, 2018	The FWS received comments from the Forest Service on the draft PBO/PCO

BIOLOGICAL AND CONFERENCE OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action being analyzed in this PBO/PCO is the continued implementation of the TNF LRMP. This consultation will be in place until the Tonto NF completes a revised LRMP, at which time they will re-consult with the FWS.

The LRMP directs how current and future activities will be carried out in the following Programs: Engineering; Fire Management; Forestry/Forest Health; Lands and Minerals; Rangeland Management; Recreation, Heritage and Wilderness; Watershed Management; and Wildlife, Fish, and Rare Plants (USFS 2011). The goals, objectives and standards and guidelines (S&Gs) related to these Programs are discussed in the **Effects of the Action** section of this PBO/PCO.

The LRMP and the 1996 Regional LRMP Amendment describe long-range management strategies for the TNF. They provide a programmatic framework for future activities and emphasize the application of certain S&Gs in the undertaking of those activities on the land. The LRMP does not, however, 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 (S&Gs) and they must meet site-specific National Environmental Policy Act (NEPA) and ESA requirements.

This consultation on the LRMP does not eliminate the requirement for site-specific BAs and the need for site-specific informal or formal ESA § 7 consultation with the FWS for individual projects implemented under the LRMP. Furthermore, it should be noted that amendment (i.e., deleting/changing S&Gs) to the LRMP for a site specific project is allowed and can and does occur, although rarely. In this situation, the action would be considered outside of the scope of this consultation and would require its own site specific ESA § 7(a)(2) consultation to address the effects of that particular proposed action. Furthermore, wildfire and wildland fire use are not discussed in this PBO/PCO as they will be covered under separate emergency ESA § 7(a)(2) consultation.

The proposed action described below is a "framework programmatic action" as defined in 50 CFR 402.02, where framework programmatic action only establishes a framework for the development of specific future action(s) but does not authorize any future action(s). The effects to listed species and designated critical habitat of future actions that are subsequently authorized, funded, or carried out under this program will be addressed in subsequent section 7 consultation, as appropriate.

The proposed action as identified in the BA (USFS 2017) includes the following types of direction.

Description of the Proposed Action by Plan Section

The following is a summary of the management on the TNF for each plan section by program area. Each program area is analyzed under each species to determine if that program will have any effect on the species. Additional information on each program area can be found in the BA and is incorporated by reference.

Engineering

The Engineering Program is responsible for managing and maintaining the roads, bridges, dams, towers, buildings, water systems, wastewater systems, and infrastructure necessary for use and management of the Forest. Activities include construction, reconstruction, decommissioning, maintenance, and improvement of the infrastructure. The Engineering Program is also responsible for implementing the Forest's Environmental Management System, the Environmental Compliance and Protection Program, and for mitigating safety hazards at open and abandoned mines.

The Forest Service Travel Management Rule (TMR) calls for a managed system of roads, trails, and areas designated for motor vehicle use on NFS lands which will better protect natural and cultural resources, address use conflicts, and secure sustainable opportunities for public enjoyment of national forests and grasslands. Effects of the TMR on listed, proposed, or candidate species on the TNF were subject to a separate Section 7(a)(2) consultation completed in 2016 (AESO file number 02EAAZ00-2014-F-0463), therefore, management of roads, trails, and motor vehicle use is not analyzed in detail in this BA.

Fire Management
The Fire Management Program combines elements of hazardous fuels reduction (prescribed fire and mechanical treatments), wildfire management, aviation, prevention, planning, and monitoring. This program is designed to protect communities, watersheds, and species at risk and to restore and maintain resilient ecosystems. The program combines elements of fire prevention, prescribed fire, wildland fire, and fire suppression. Fire suppression and wildland fire use are covered under ESA section 7(a)(2) emergency procedure and are thus, are not included in the proposed action for this consultation.

Forestry and Forest Health
The Forestry and Forest Health Program includes timber harvest, forest product extraction, and forest health. Timber harvest includes clear-cutting, shelterwood harvesting (progression of cuts that promote seedling establishment), selection cutting, pre-commercial thinning, and fuel reduction thinning. Clear cutting has historically been limited to aspen regeneration or in forested stands severely infected with mistletoe. Shelterwood cutting includes shelterwood seed cuts and removal cuts. Selection cutting includes mainly commercial thinning treatments, as well as individual tree selection, group selection cutting, and in more recent years, sanitation/salvage cutting.

Forest products include fire wood, Christmas trees, greenery, poles, posts, medicinal plants, and native species for transplanting. The Forest Health component of this program provides technical and financial assistance on insect and disease issues to the national forests as well as other federal agencies.

Lands and Minerals
The Land and Minerals Program is responsible for land ownership and adjustments including purchases, withdrawals; land exchanges; mining; oil, gas and geothermal leases; and the issuance of non-recreational special use authorizations, including water use authorizations and utility and transportation rights-of-way and easements.

Locatable minerals include gold, copper, silver, zinc, etc., as well as uncommon variety minerals such as pearlite, high-grade limestone and others. Approved mining includes any anticipated surface disturbance associated with underground mining operations and all surface mining activity, and can involve exploration drill holes, small scale prospecting, active mining from surface quarries and pits, and mill sites.

Rangeland Management
The Rangeland Management Program manages for grazing of domestic livestock on forest lands. The TNF has a long history of grazing use, and domestic livestock grazing activities are important uses of land throughout the Forest. National forest grazing is an integral part of the tradition, culture, and social fabric.

Program activities include administering livestock grazing, implementation and effectiveness monitoring, development of structural and non-structural improvements, control of invasive weeds, and the authorization of grazing.

Recreation, Heritage, and Wilderness

The Recreation, Heritage, Wilderness Program is focused on achieving the Forest Service's mission of sustaining the health, diversity and productivity to meet the needs of present and future generations. Program components include but are not limited to administration and management of developed recreation sites, dispersed recreation settings, partnerships and tourism, interpretive services, recreation special use permits, congressionally designated areas, scenery management, trail management, and scenic byways.

Objectives in the LRMP include reconstruction or rehabilitation of existing recreation sites and construction of new sites such as campgrounds, parking areas, trailheads, picnic sites, and boating sites. S&Gs include habitat protection; trail construction, operation, and maintenance; river recreation; off-road vehicle use; and camping.

Watershed Management

The Watershed Management Program works to maintain and improve the condition of watersheds. Methods to meet 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 NFS management; improving and maintaining water quality through the use of best management practices (BMPs); improving and protecting riparian areas and other and other groundwater dependent ecosystems; protecting floodplains; setting and protecting air quality related values; planning and implementing burned area emergency rehabilitation activities; and assisting in setting resource management actions that will attain Forest Plan goals for meeting identified watershed conditions.

Wildlife, Fish, and Rare Plants

The Wildlife, Fish, and Rare Plants Program involves a variety of activities conducted by the TNF 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.

This program aims to manage habitats for all existing native and desired non-native wildlife, fish, and plant species in order to maintain viable populations. Goals include the prevention of destruction or adverse modification of critical habitat for threatened and endangered species and managing for increased population levels that will remove these species from threatened or endangered status.

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 § 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 addressed in this PBO/PCO includes all lands under the jurisdiction of the TNF and all adjacent lands that could be directly or indirectly affected by decisions or actions implemented under the direction of the LRMP. The TNF is divided into six Ranger Districts (RDs): Cave Creek, Globe, Mesa, Payson, Pleasant Valley, and Tonto Basin (USFS 2017). The action area is further described in the BA (USFS 2017), and incorporated by reference.

ANALYTICAL FRAMEWORK FOR DETERMINATIONS

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this PBO/PCO relies on four components in our evaluation for each species: (1) the *Status of the Species*, which evaluates the yellow-billed cuckoo, narrow-headed gartersnake, northern Mexican gartersnake, and Gila trout range-wide conditions, the factors responsible for those conditions, and their survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the yellow-billed cuckoo, narrow-headed gartersnake and northern Mexican gartersnake 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 PBO/PCO considers the range-wide survival and recovery needs of the species and the role of the action area in the survival and recovery 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

This PBO/PCO relies on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02[1]. In accordance with policy and regulation, the adverse modification analysis in this Biological Opinion relies on four components: 1) the *Status of Critical Habitat*, which evaluates the range-wide condition of proposed critical habitat for the yellow-billed cuckoo, narrow-headed gartersnake and northern Mexican gartersnake in terms of physical and biological features[2], the factors responsible for that condition, and the intended

[1] See 81 FR 7214

[2] The term "primary constituent elements" was introduced in critical habitat designation regulations (50 CFR 424.12) to describe aspects of "physical or biological features", which are referenced in the statutory definition of critical habitat. The Services have removed the term "primary constituent elements" and returned to using the statutory term "physical or biological features" (81 FR 7414). Existing critical habitat designations will not be republished to reflect this change; however, in future rules we will discontinue using the term "primary constituent elements" and instead will use "physical and biological features".

value of the critical habitat for conservation of the species; 2) the *Environmental Baseline*, which evaluates the condition of the proposed critical habitat in the action area, the factors responsible for that condition, and the value of the critical habitat for conservation of the species 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 physical and biological features and how that will influence the value of affected critical habitat units for conservation of the species; and 4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the physical and biological features and how that will influence the value of affected critical habitat units for conservation of the species.

For purposes of the adverse modification determination, the effects of the Federal action on the species' proposed 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 not preclude or significantly delay the current ability for the physical and biological features to be functionally established in areas of currently unsuitable but capable habitat) such that the value of critical habitat for the conservation of the species is not appreciably diminished.

STATUS OF THE SPECIES AND CRITICAL HABITAT

The information in this section summarizes the range-wide status of each species that is considered in this PBO/PCO. Further information on the status of these species can be found in documents on our web page (Arizona Ecological Services Species Documents), and in other references cited in each summary below.

Western Yellow-Billed Cuckoo and Proposed Critical Habitat

Additional details on the status of this species and proposed critical habitat are found in the final rule to list the species as threatened (USFWS 2014b, 79 FR 59992) and the proposed rule to designate critical habitat (USFWS 2014a, 79 FR 48548). The discussions of the status of this species in these documents are incorporated herein by reference.

Legal Status and Description

The Western Distinct Population Segment (DPS) of the yellow-billed cuckoo was listed as a threatened species on October 3, 2014 (USFWS 2014b, 79 FR 59992). Critical habitat was proposed on August 15, 2014 (USFWS 2014a, 79 FR 48548) and has not been finalized. Proposed critical habitat encompasses 546,335 acres across the western United States.

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 was listed as a threatened species (USFWS 2014b). Yellow-billed cuckoos in the west arrive on the breeding grounds 4 to 8 weeks later than eastern yellow-billed cuckoos at similar latitude (Franzreb and Laymon 1993, Hughes 1999).

Life History and Habitat

Western populations of yellow-billed cuckoos are most commonly found in dense riparian woodlands, consisting 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). Tamarisk (*Tamarix* spp.) may be a component of breeding habitat, but there is usually a native riparian tree component within the occupied habitat (Gaines and Laymon 1984, Johnson *et al*. 2008, McNeil *et al*. 2013a and b, Carstensen *et al*. 2015). Although tamarisk is an exotic species, it fills in for native habitat and makes habitat more suitable for cuckoos if they are currently not utilizing the habitat (Sferra, USFWS, 2017, pers. comm.). Cuckoos are most commonly found in gallery riparian forest, in Arizona they may also use narrow bands of riparian woodland (AGFD 2015, Cornell Lab of Ornithology 2016). Adjacent habitat on terraces or in the upland (such as mesquite) can enhance the value of these narrow bands of riparian woodland.

In most of the range, western yellow-billed cuckoos primarily breed in riparian habitat along low-gradient (surface slope less than 3%) rivers and streams, and in open riverine valleys that provide wide floodplain conditions (greater than 325 feet). However, in the Southwest, cuckoos can also breed in higher gradient drainages, and narrower and drier reaches of riparian habitat. Western yellow-billed cuckoos in Arizona will also use areas of mesquite and oak woodlands some distance from riparian gallery forests, including in the mountains of southeastern Arizona. Recent surveys found yellow-billed cuckoos with some regularity in these non-traditional habitats (Corman and Magill 2000; WestLand Resources, Inc. 2011, 2013a, 2013b, 2015a, 2015b, 2015c; Tucson Audubon 2015; MacFarland and Horst 2015, 2016, Cornell Lab of Ornithology 2017).

Habitat for the western yellow-billed cuckoo in much of its range is largely associated with perennial rivers and streams that support the expanse of vegetation characteristics needed by breeding western yellow-billed cuckoos. Cuckoos may move from one area to another within and between years in response to hydrological conditions. They may also nest at more than one location in a year. Some individuals also roam widely (several hundred miles), apparently assessing food resources before selecting a nest site (Sechrist *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 may be a mix of shrubs, ground cover, and scattered trees (Carstensen *et al*. 2015, Sechrist *et al*. 2009, USFWS, unpubl. data). Cuckoos often forage in open areas, woodlands, orchards and adjacent streams (Hughes 1999), which include stands of smaller mesquite trees and even tamarisk (Rosenberg *et al*. 1991). In Arizona, adjacent habitat is usually more arid than occupied nesting habitat. This adjacent habitat can be used for foraging where large insects are produced. Habitat types include Sonoran desertscrub, Mojave desertscrub, Chihuahuan desertscrub, chaparral, semidesert grassland, plains grassland, and Great Basin grasslands (Brown and Lowe 1982, Brown 1994, Brown *et al*. 2007).

Distribution, Abundance, Population Trends

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, non-breeding birds most likely to occur (USFWS 2014a, 2014b). The largest remaining breeding areas are in southern and central California, Arizona, along the Rio Grande in New Mexico, and in northwestern Mexico (USFWS 2014b).

In Arizona, the species was a common resident in the (chiefly lower) Sonoran zones of southern, central, and western Arizona (Phillips *et al*. 1964). The yellow-billed cuckoo now nests primarily in the central and southern parts of the state.

Yellow-billed cuckoos spend the winter in South America, east of the Andes, mainly south of the Amazon Basin in southern Brazil, Paraguay, Uruguay, eastern Bolivia, and northern Argentina (Ehrlich *et al*. 1992, AOU 1998). Wintering yellow-billed cuckoos generally use woody lowland vegetation near fresh water. However, wintering habitat of the western yellow-billed cuckoo is poorly known.

Threats

Loss of riparian nesting habitat

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, USFWS 2014a, 2014b). Habitat loss and degradation results from several interrelated factors, including alteration of flows in rivers and streams, mining, encroachment into suitable habitat from agricultural and other development activities on breeding and wintering grounds, stream channelization and stabilization, diversion of surface and ground water for agricultural and municipal purposes, poorly managed livestock grazing, wildfire, establishment of non-native vegetation, drought, and prey scarcity due to pesticides (Ehrlich *et al*. 1992, USFWS 2014b).

Pesticide impacts

Pesticide use is widespread in agricultural areas in the western yellow-billed cuckoo breeding range in the United States and northern Mexico. Yellow-billed cuckoos have also been exposed to the effects of pesticides on their wintering grounds, as evidenced by DDT found in their eggs and eggshell thinning in the United States (Grocki and Johnston 1974, Laymon and Halterman 1987, Hughes 1999, Cantu-Soto *et al*. 2011). Because much of the species' habitat is in proximity to agriculture, the potential exists for direct and indirect effects to a large portion of the species in these areas through altered physiological functioning, prey availability, and, therefore, reproductive success, which ultimately results in lower population abundance and curtailment of the occupied range (Laymon 1980, Laymon 1998, Hughes 1999, Colyer 2001, Mineau and Whiteside 2013, Hopwood *et al*. 2013, Mineau and Palmer 2013, USFWS 2014b).

Fragmentation

The ongoing threats, including small isolated populations, cause the remaining populations to be increasingly susceptible to further declines and local extirpations through increased predation rates, barriers to dispersal by juvenile and adult yellow-billed cuckoos, chance weather events, fluctuating availability of prey populations, collisions with tall vertical structures during

migration, defoliation of tamarisk by the introduced tamarisk leaf beetle (*Diorhabda* spp.), increased fire risk, and climate change events (Thompson 1961, McGill 1975, Wilcove *et al*. 1986).

Climate change
The warmer temperatures already occurring in the southwestern United States may alter the plant species composition of riparian forests over time. An altered climate may also disrupt and change food availability for the western yellow-billed cuckoo if the timing of peak insect emergence changes in relation to when the cuckoos arrive on their breeding grounds to feed on this critical food source.

Proposed Critical Habitat
The FWS has proposed to designate approximately 546,335 acres of critical habitat in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, and Wyoming (USFWS 2014a).

Primary Constituent Elements of Proposed Critical Habitat
The primary constituent elements (PCEs) of proposed critical habitat are based on riparian plant species, structure and quality of habitat, and an adequate prey base. It must be noted that the PCEs in the proposed rule describe only a subset of habitat occupied by western yellow-billed cuckoos. The following PCEs do not describe the more arid, narrower, and patchier xeroriparian habitat in intermittent and ephemeral drainages or hydrological processes that have been altered or are not dependent on dynamic riverine processes.

- PCE 1: *Riparian woodlands.* Riparian woodlands with mixed willow-cottonwood vegetation, mesquite-thorn forest vegetation, or a combination of these that contain habitat for nesting and foraging in contiguous or nearly contiguous patches that are generally greater than 325 feet in width and 200 acres or more in extent. These habitat patches contain one or more nesting groves, which are generally willow-dominated, have above average canopy closure (greater than 70 percent), and have a cooler, more humid environment than the surround riparian and upland habitats;
- PCE 2: *Adequate prey base*. Presence of a prey base consisting of large insect fauna (for example, cicadas, caterpillars, katydids, grasshoppers, large beetles, dragonflies) and frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas; and
- PCE 3: *Dynamic riverine processes*. River systems that are dynamic and provide hydrologic processes that encourage sediment movement and deposits that allow seedling germination and promote plant growth, maintenance, health, and vigor (e.g. lower gradient streams and broad floodplains, elevated subsurface groundwater table, and perennial rivers and streams). This allows habitat to regenerate at regular intervals, leading to riparian vegetation with variously aged patches from young to old.

The physical and biological features of yellow-billed cuckoo proposed critical habitat are the principal biological or physical elements essential to yellow-billed cuckoo conservation which may require special management considerations or protection (USFWS 2014b). The proposed critical habitat rule identifies the following physical or biological features of yellow-billed cuckoo habitat to include (USFWS 2014b):

- Rivers and streams of lower gradient and more open valleys with a broad floodplain;
- Presence of abundant, large insect fauna (for example, cicadas, caterpillars, katydids, grasshoppers, large beetles, and dragonflies) and frogs during nesting season;
- Flowing rivers and streams, elevated subsurface groundwater tables, and high humidity;
- Flowing perennial rivers and streams and deposited fine sediments;
- Riparian trees including willow, cottonwood, alder (*Alnus* sp.), walnut (*Juglans* sp.), sycamore (*Platanus* sp.), boxelder (*Acer* sp.), ash (*Fraxinus* sp.), mesquite, and tamarisk that provide cover and shelter for foraging and dispersing yellow-billed cuckoos; and
- Blocks of riparian habitat greater than 200 acres in extent and greater than 325 feet in width, with one or more densely foliaged, willow-dominated nesting sites and cottonwood dominated foraging sites.

Narrow-Headed Gartersnake and Proposed Critical Habitat

Additional details on the status of this species and proposed critical habitat are found in the final rule to list the species as threatened (USFWS 2014), the proposed rule to designate critical habitat (USFWS 2013), and the Status of the Species – THRU (10-25-2017) (USFWS 2017b) on file in the office. The discussions of the status of this species in these documents are incorporated herein by reference.

Legal Status and Description

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

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

Life History and Habitat

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

The narrow-headed gartersnake is generally surface-active between March and November (Nowak 2006) but surface activity varies by elevation and weather patterns. Narrow-headed gartersnakes have a lower preferred temperature for activity as compared to other species of gartersnakes (Fleharty 1967), which may facilitate their ability to forage in cold streams.

Narrow-headed gartersnakes specialize on fish as their primary prey item (Rosen and Schwalbe 1988, Nowak 2006).

Distribution, Abundance, Population Trends

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

Population densities have noticeably declined in many populations, as compared to previous survey efforts (Holycross *et al*. 2006a and b). Narrow-headed gartersnakes were detected in only 5 of 16 historical localities in Arizona and New Mexico surveyed by Holycross *et al*. (2006a and b) in 2004 and 2005. As many as 43 of 51 (80 percent) of known narrow-headed populations are thought to exist at low densities which could be threatened with extirpation. Another four populations may already be extirpated. Please see Table 1 below.

Table 1. Current predicted population status of the narrow-headed gartersnake.

Row	Location	Last Record	Suitable Physical Habitat Present	Native Prey Species Present	Harmful Nonnative Species Present	Predicted Population Status
1	West Fork Gila River (NM)	2014	Yes	Yes	Yes	Likely low density
2	Middle Fork Gila River (NM)	2017	Yes	Yes	Yes	Likely viable
3	East Fork Gila River (NM)	2006	Yes	Yes	Yes	Likely low density
4	Gila River (AZ, NM)	2009	Yes	Yes	Yes	Likely low density
5	Snow Creek/Snow Lake (NM)	2012	Yes	No	Yes	Likely low density
6	Gilita Creek (NM)	2017	Yes	Yes	No	Likely low density
7	Iron Creek (NM)	2009	Yes	Yes	No	Likely low density
8	Little Creek (NM)	2017	Yes	Possible	Yes	Likely low density
9	Turkey Creek (NM)	1986	Yes	Yes	Possible	Likely low density
10	Beaver Creek (NM)	1949	Yes	Possible	Yes	Likely extirpated
11	Black Canyon (NM)	2010	Yes	Yes	Yes	Likely low density
12	Taylor Creek/Wall Lake (NM)	1960	Yes	No	Yes	Likely extirpated
13	Diamond Creek (NM)	2016	Yes	Yes	Yes	Likely viable
14	Tularosa River (NM)	2017	Yes	Yes	Yes	Likely viable
15	Whitewater Creek (NM)	2012	Yes	Yes	Yes	Likely low density
16	San Francisco River (NM)	2011	Yes	Yes	Yes	Likely low density
17	Negrito Creek (NM)	1977	Yes	Yes	Yes	Likely extirpated
18	South Fork Negrito Creek (NM)	2010	Yes	Possible	Yes	Likely low density
19	Blue River (AZ)	2017	Yes	Yes	Yes	Likely low density
20	Dry Blue Creek (AZ, NM)	2010	Yes	Possible	Yes	Likely low density
21	Campbell Blue Creek (AZ, NM)	2016	Yes	Possible	Yes	Likely low density
22	Coleman Creek (AZ)	1989	Yes	Possible	No	Likely low density
23	Saliz Creek (NM)	2015	Yes	Possible	Yes	Likely low density
24	Eagle Creek (AZ)	2013	Yes	Possible	Yes	Likely low density
25	Black River (AZ)	2017	Yes	Yes	Yes	Likely low density
26	East Fork Black River (AZ)	2004	Yes	Possible	Yes	Likely low density
27	West Fork Black River (AZ)	1991	Yes	Yes	Possible	Likely low density
28	Fish Creek (Tributary to East Fork Black River; AZ)	2004	Yes	Yes	Possible	Likely viable

Row	Location	Last Record	Suitable Physical Habitat Present	Native Prey Species Present	Harmful Nonnative Species Present	Predicted Population Status
29	Bear Wallow Creek (Tributary to Black River)	2003	Yes	Yes	Possible	Likely viable
30	North Fork Bear Wallow Creek (Tributary to Black River)	2004	Yes	Yes	Possible	Likely viable
31	Reservation Creek (Tributary to Black River)	2016	Yes	Yes	Yes	Likely low density
32	White River (AZ)	1967	Yes	Possible	Possible	Likely low density
33	East Fork White River (AZ)	1964	Yes	Possible	Possible	Likely low density
34	North Fork White River (AZ)	1986	Yes	Yes	Possible	Likely low density
35	Diamond Creek (AZ)	1986	Yes	Possible	Possible	Likely low density
36	Tonto Creek (tributary to Big Bonita Creek, AZ)	1915	Yes	Possible	Possible	Likely low density
37	Canyon Creek (AZ)	2017	Yes	Yes	Yes	Likely low density
38	Ash Creek (Tributary to Salt River)	2016	Yes	Yes	No	Likely low density
39	Upper Salt River (AZ)	1985	Yes	Yes	Yes	Likely low density
40	Cibeque Creek (AZ)	1991	Yes	Yes	Possible	Likely low density
41	Carrizo Creek (AZ)	1997	Yes	Yes	Possible	Likely low density
42	Big Bonito Creek (AZ)	1986	Yes	Yes	Yes	Likely low density
43	Haigler Creek (AZ)	2014	Yes	Yes	Yes	Likely low density
44	Houston Creek (AZ)	2005	Yes	Yes	Yes	Likely low density
45	Tonto Creek (tributary to Salt River, AZ)	2005	Yes	Yes	Yes	Likely low density
46	Christopher Creek	1993	Yes	Yes	Yes	Likely low density
47	Deer Creek (AZ)	1995	No	No	No	Likely extirpated
48	Upper Verde River (AZ)	2012	Yes	Yes	Yes	Likely low density
49	Oak Creek (AZ)	2016	Yes	No	No	Likely viable
50	West Fork Oak Creek (AZ)	2016	Yes	No	No	Likely viable
51	East Verde River (AZ)	1992	Yes	Yes	Yes	Likely low density

Notes: "Possible" means there were no conclusive data found. "Likely extirpated" means the last record for an area pre-dated 1980, and existing threats suggest the species is likely extirpated. "Likely low density" means there is a post-1980 record for the species, it is not reliably found with minimal to moderate survey effort, and threats exist which suggest the population may be low density or could be extirpated, but there is insufficient evidence to support extirpation. "Likely viable" means that the species is reliably found with minimal to moderate survey effort, and the population is generally considered to be somewhat resilient.

Threats

The occurrence of harmful non-native species, such as the crayfish (*Orconectes virilis*, *Procambarus clarki*), numerous species of non-native fish, and to a lesser extent, bullfrogs (*Lithobates catesbeinanus*), have contributed to rangewide declines in the narrow-headed gartersnake, and continues to be the most significant threat to this species (USFWS 2014a). Additional primary threats to narrow-headed gartersnake populations include dewatering of streams, as well as catastrophic fires and their associated effects (i.e., siltation, fish kills) (USFWS 2014a).

Conservation, Consultation and Recovery Planning

Several Federal actions affect this species every year and require formal section 7 consultation. As of 2017, there have been eight biological opinions that have included the narrow-headed

gartersnake. A complete list of all consultations affecting this species can be found here: Arizona Ecological Services Office Biological Opinions. Survey work and recovery projects also occur periodically, and are summarized in the listing document (USFWS 2014b).

Proposed Critical Habitat

Critical habitat for narrow-headed gartersnake was proposed in six units in Arizona and New Mexico on July 10, 2013 (USFWS 2013). All proposed critical habitat units are considered occupied. Critical habitat units occur in Greenlee, Graham, Apache, Yavapai, Navajo, Gila, and Coconino Counties in Arizona, as well as in Grant, Hidalgo, Sierra, and Catron Counties in New Mexico. Sheep's Crossing is located within the Verde River Subbasin and the Verde River Subunit CHU.

Primary Constituent Elements of Proposed Critical Habitat

Within these areas, the PCEs of the physical or biological features essential to the conservation of the narrow-headed gartersnake consist of the following four components:

- PCE 1: Stream habitat, which includes:
    a. Perennial or spatially intermittent streams with sand, cobble, and boulder substrate and low or moderate amounts of fine sediment and substrate embeddedness, and that possess appropriate amounts of pool, riffle, and run habitat to sustain native fish populations;
    b. A natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads;
    c. Shoreline habitat with adequate organic and inorganic structural complexity (e.g., boulders, cobble bars, vegetation, and organic debris such as downed trees or logs, debris jams), with appropriate amounts of shrub-and sapling-sized plants to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities; and
    d. Aquatic habitat with no pollutants or, if pollutants are present, levels that do not affect survival of any age class of the narrow-headed gartersnake or the maintenance of prey populations.
- PCE 2: Adequate terrestrial space (600 ft.) lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation;
- PCE 3: A prey base consisting of viable populations of native fish species or soft-rayed non-native fish species; and
- PCE 4: An absence of nonnative fish species of the families Centrarchidae and lctaluridae, 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 softrayed nonnative fish populations (prey) is still occurring.

Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on the effective date of this rule.

Northern Mexican Gartersnake and Proposed Critical Habitat

Additional details on the status of this species and proposed critical habitat are found in the final rule to list the species as threatened (USFWS 2014a), the proposed rule to designate critical habitat (USFWS 2013), and the Status of the Species – THEQ (9-15-2017) (USFWS 2017a) on file in the office. The discussions of the status of this species in these documents are incorporated herein by reference.

Legal Status and Description

The northern Mexican gartersnake was designated a threatened species under the Act on July 8, 2014 (USFWS 2014a, 79 FR 38678). Please refer to this rule for more in-depth information on the ecology and threats to the species, including references. Critical habitat was proposed on July 10, 2013 (USFWS 2013, 78 FR 41500) and has not yet been designated. Details on proposed critical habitat are provided below. The final listing and proposed critical habitat rules are incorporated herein by reference.

The northern Mexican gartersnake, which reaches up to 44 inches total length, 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 similarity of appearance to other native gartersnake species.

Life History and Habitat

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 stream banks, searching for prey in water and on land, using different strategies (Alfaro 2002). Primarily, 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 non-native species, including larval and juvenile bullfrogs, western mosquitofish (Holycross *et al.* 2006, Emmons and Nowak 2013), or other non-native fishes. In northern Mexican gartersnake populations where the prey base is skewed heavily towards harmful non-native species, recruitment of gartersnakes can be diminished or nearly absent.

Throughout its rangewide distribution, the northern Mexican gartersnake occurs at elevations from 130 to 8,497 feet (Rossman *et al.* 1996). Within Arizona and New Mexico, records generally come from elevations ranging from 130 to 6,200 ft. This gartersnake is considered a "terrestrial-aquatic generalist" by Drummond and Marcías-García (1983). The northern Mexican gartersnake is often found in riparian habitat, but has also been found hiding under cover in grassland habitat up to a mile away from any surface water (Cogan 2015). The subspecies has historically been associated with three general 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).

Distribution, Abundance, Population Trends

The northern Mexican gartersnake historically occurred in every county and nearly every subbasin within Arizona, from perennial or intermittent creeks, streams, and rivers as well as lentic wetlands such as cienegas, ponds, or stock tanks (Rosen and Schwalbe 1988, Rosen *et al.* 2001; Holycross *et al.* 2006a and b, 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.* 2006a, b). 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 middle/upper Verde River. In New Mexico and elsewhere in Arizona, the northern Mexican gartersnake may occur in extremely low population densities within its historical distribution; limited survey effort is inconclusive to determine extirpation of this highly secretive species. 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 understood. 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 23 of 33 known localities in the United States (70 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 (USFWS files). Only five populations of northern Mexican gartersnakes in the United States are considered likely viable where the species remains reliably detected. Please see Table 2 below.

Table 2: Current predicted population status of the northern Mexican gartersnake in the United States.

Row	Location	Last Record	Suitable Physical Habitat Present	Native Prey Species Present	Harmful Nonnative Species Present	Predicted Population Status
1	Gila River (NM, AZ)	2015	Yes	Yes	Yes	Likely low density
2	Spring Canyon (NM)	1937	Yes	Possible	Likely	Likely extirpated
3	Mule Creek (NM)	1983	Yes	Yes	Yes	Likely low density
4	Mimbres River (NM)	Likely early 1900s	Yes	Yes	Yes	Likely extirpated
5	Lower Colorado River (AZ)	2015	Yes	Yes	Yes	Likely low density
6	Bill Williams River (AZ)	2012	Yes	Yes	Yes	Likely viable
7	Big Sandy River (AZ)	2016	Yes	Yes	Likely	Likely low density
8	Santa Maria River (AZ)	2016	Yes	Yes	Likely	Likely low density
9	Agua Fria River (AZ)	1985	Yes	Yes	Yes	Likely low density
10	Little Ash Creek (AZ)	1993	Yes	Yes	Yes	Likely low density
11	Lower Salt River (AZ)	1968	Yes	Yes	Yes	Likely extirpated

Row	Location	Last Record	Suitable Physical Habitat Present	Native Prey Species Present	Harmful Nonnative Species Present	Predicted Population Status
12	Black River (AZ)	1982	Yes	Yes	Yes	Likely low density
13	Big Bonito Creek (AZ)	1986	Yes	Yes	Yes	Likely low density
14	Tonto Creek (AZ)	2016	Yes	Yes	Yes	Likely viable
15	Upper /Middle Verde River (AZ)	2016	Yes	Yes	Yes	Likely viable
16	Oak Creek (AZ) (Aquatic Research and Conservation Center formerly known as the Page Springs and Bubbling Ponds State Fish Hatcheries)	2016	Yes	Yes	Yes	Likely viable
17	Spring Creek (AZ)	2014	Yes	Yes	Yes	Likely low density
18	Sycamore Creek (Yavapai/Coconino Co., AZ)	1954	Yes	Possible	Yes	Likely extirpated
19	Upper Santa Cruz River/San Rafael Valley (AZ)	2017	Yes	Yes	Yes	Likely viable
20	Redrock Canyon/Cott Drainage (AZ)	2008	Yes	Yes	Yes	Likely low density
21	Sonoita Creek (AZ)	2013	Yes	Possible	Yes	Likely low density
22	Scotia Canyon (AZ)	2016	Yes	Yes	No	Likely low density
23	Parker Canyon (AZ)	1986	Yes	Possible	Yes	Likely low density
24	Las Cienegas National Conservation Area and Cienega Creek Natural Preserve (AZ)	2017	Yes	Yes	No	Likely low density
25	Lower Santa Cruz River (AZ)	1960 2015?	Yes	Yes	Yes	Likely extirpated
26	Buenos Aires National Wildlife Refuge (AZ)	2000	Yes	Yes	Yes	Likely low density
27	Bear Creek (AZ)	1987	Yes	Yes	Yes	Likely low density
28	Brown Canyon (AZ)	2014	Yes	Yes	No	Likely low density
29	Fort Huachuca (AZ)	1994	Yes	Yes	Yes	Likely low density
30	San Pedro River (AZ)	2006	Yes	Yes	Yes	Likely low density
31	Babocomari River and Cienega (AZ)	2009	Yes	Possible	Yes	Likely low density
32	Canelo Hills-Sonoita Grasslands Area (AZ)	2015	Yes	Yes	Yes	Likely low density
33	San Bernardino National Wildlife Refuge (AZ)	2005	Yes	Yes	Yes	Likely low density

Notes: "Possible" means there were no conclusive data found. "Likely extirpated" means the last record for an area pre-dated 1980, and existing threats suggest the species is likely extirpated. "Likely low density" means there is a post-1980 record for the species, it is not reliably found with minimal to moderate survey effort, and threats exist which suggest the population may be low density or could be extirpated, but there is insufficient evidence to support extirpation. "Likely viable" means that the species is reliably found with minimal to moderate survey effort, and the population is generally considered to be somewhat resilient.

Areas with protected backwaters, braided side channels and beaver ponds, isolated pools near the river mainstem, and edges of dense emergent vegetation that offer cover and foraging opportunities are important for acquisition of primary prey which includes native fish and amphibians.

Threats

Harmful non-native species are a significant concern in almost every northern Mexican gartersnake locality in the United States and the most significant reason for their decline. Non-native species can contribute to starvation of gartersnake populations through competitive mechanisms, and may reduce or eliminate recruitment of young gartersnakes through predation. 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 non-native species; and effects from climate change and drought (USFWS 2014a, 79 FR 38678).

Conservation, Consultation and Recovery Planning

Several Federal actions affect this species every year that require formal section 7 consultation. There have been 21 biological opinions that have included the northern Mexican gartersnake. A complete list of all consultations affecting this species can be found here: Arizona Ecological Services Office Biological Opinions. Survey work and recovery projects also occur periodically and are summarized in the listing document (USFWS 2014b).

Proposed Critical Habitat

Critical habitat for northern Mexican gartersnake was proposed in 14 sub-basin and national wildlife refuge units in Arizona and New Mexico on July 10, 2013 (USFWS 2013) and totals 421,423 acres. 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. Sheep's Crossing is located within the Verde River Subbasin and the Upper Verde River Subunit Critical Habitat Unit (CHU).

Primary Constituent Elements of Proposed Critical Habitat

The primary constituent elements of the physical and biological features essential to northern Mexican gartersnake conservation are:

- PCE 1: Aquatic or riparian habitat that includes:
    a. Perennial or spatially intermittent streams of low to moderate gradient that possess appropriate amounts of in-channel pools, off-channel pools, or backwater habitat, and that possess a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads; or
    b. Lentic wetlands such as livestock tanks, springs, and cienegas; 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.

- PCE 2: Adequate terrestrial space (600 feet 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).
- PCE 3: A prey base consisting of viable populations of native amphibian and native fish species.
- PCE 4: An absence of non-native fish species of the families Centrarchidae and Ictaluridae, bullfrogs, and/or crayfish (*O. virilis, P. clarki*, etc.), or occurrence of these non-native species at low enough levels such that recruitment of northern Mexican gartersnakes and maintenance of viable native fish or soft-rayed, non-native fish populations (prey) is still occurring.

Gila Trout

The natural history and distribution of the Gila trout is fully described in the Gila Trout Recovery Plan (USFWS 2003). The discussions of the status of this species in these documents are incorporated herein by reference.

Legal Status and Description

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

The Gila Trout Recovery Plan was completed in 1979 in collaboration with the FWS, FS, Arizona Game and Fish Department (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 2006).

Life History and Habitat

Gila trout require well-oxygenated and cool water (below 77^{o} F), coarse sand, gravel and cobble substrate; stable streambanks, and abundant overhanging banks, pools and cover for optimal habitat (Propst and Stefferud 1997, USFWS 2003). Spawning occurs mainly in April when temperatures are 43 to 46 °F (Rinne 1980). More detailed life history and biology information can be found in USFWS (2003 and 2006), and is included herein by reference.

Distribution, Abundance, Population Trends

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

Arizona: The Arizona Gila trout populations were believed to have been extirpated by the time the species was described in 1950 (Propst *et al*. 1992). There have been several introductions efforts made with varying success in Gap Creek, Dude Creek, Raspberry Creek, Grapevine Spring, and the Pinaleno Mountains.

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

Threats

A complete description of threats to the Gila trout is found in the Gila Trout Recovery Plan (USFWS 2003). Current limiting factors for Gila trout recovery include impacts of wildfire; continued impacts from predation, competition and hybridization with nonnative trout; limited range of the species; and other habitat impacts. Populations have declined due to a combination of habitat loss and degradation related to dams, diversions, groundwater pumping, mining, development, recreation, improper livestock grazing, and competition and predation from non-native fishes. Global climate change is anticipated to worsen the effects of these threats.

Predation and competition with non-native aquatic species and dewatering of the habitats are significant threats to Gila trout populations. Non-native aquatic species are a threat with the possible exception of recent transplants into streams with low levels of occurrence of nonnatives and presence of natural or manmade fish barriers.

Population growth in areas surrounding the TNF is expected to continue with residential home and commercial development on private lands and increase impacts to watershed integrity. Expected impacts are increases in altered hydrological conditions leading to increased runoff and erosion and increased water withdrawals. Demand for outdoor recreation is also expected to grow concurrently with increasing population and more visitor use of the TNF.

Conservation, Consultation and Recovery Planning

Recovery activities designed to achieve conservation objectives include establishing additional populations of Gila trout, protecting existing populations and habitat, continuing to obtain information needed to address conservation issues, and continuing to provide information and coordinating recovery of this species.

Since listing in 1973, at least 20 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. A complete list of all consultations

affecting this species can be found here: Arizona Ecological Services Office Biological Opinions.

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.

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 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment. As stated previously, the action area for this PBO/PCO is defined as all Forest Service-administered lands within the TNF's ranger districts: Cave Creek, Globe, Mesa, Payson, Pleasant Valley, and Tonto Basin, as well as all adjacent lands that could be directly or indirectly affected by the actions.

Population Growth

Arizona had the second fastest population growth rate by growing more than 20 percent between 2000 and 2010 (Pollard and Mather 2010). The U.S. Census predicts that Arizona will be the second fastest growing state in the country through 2030, adding an additional 5.6 million people (U.S. Census 2005). If this prediction holds true, listed species and their habitats will be affected, due to habitat fragmentation from continued rural development and infrastructure, and increased human demand for surface and ground water and decreased supply. Use of water for agriculture is Arizona's largest water demand. Groundwater surrounding most of Arizona's developed areas is pumped out faster than the aquifer can recharge, resulting in more dependence on freshwater sources from nearby rivers (U.S. Environmental Protection Agency 2011). Continued groundwater pumping will further stress water supply that supports surface water in rivers, creeks, springs, and seeps.

Climate Change

Several climate-related trends have been detected since the 1970s in the southwestern U.S. including increases in surface temperatures, rainfall intensity, drought, heat waves, extreme high temperatures, and average low temperatures (Overpeck 2008). Annual precipitation amounts in the southwestern U.S. may decrease by 10 percent by the year 2100 (Overpeck 2008).

Kundzewicz *et al*. (2007) state that of all ecosystems, freshwater ecosystems will have the highest proportion of species threatened with extinction due to climate change. High temperatures suppress appetite and growth, foster disease, can influence behavioral interactions with other fish (Schrank *et al*. 2003), or be lethal (McCullough 1999). Increased stress from

elevated temperatures could lead to greater susceptibility to disease, as well as reduced reproductive success and lower oxygen levels.

Streamflow is predicted to decrease in the Southwest even if precipitation were to increase moderately (Nash and Gleick 1993, State of New Mexico 2005, Hoerling and Eischeid 2007). Winter and spring warming causes an increased fraction of precipitation to fall as rain, resulting in a reduced snow pack, an earlier snowmelt, and decreased summer base flow (Christensen *et al*. 2004, Stewart *et al*. 2005, Regonda *et al*. 2005). The effect of decreased streamflow is that streams become smaller, intermittent or dry, and thereby reduce the amount of habitat available for aquatic species. A smaller stream is affected more by air temperature than a larger one, exacerbating the effects of warm and cold air temperatures (Smith and Lavis 1975). Based upon climate change models, nonnative species biology, and ecological observations, Rahel *et al.* (2008) concluded that climate change could foster the expansion of nonnative aquatic species into new areas, magnify the effects of existing aquatic nonnative species where they currently occur, increase nonnative predation rates, and heighten the virulence of disease outbreaks in North America. For example, native aquatic vertebrates isolated in pools may be subject to increased predation from harmful nonnative predators as well as native terrestrial predators.

Another documented effect of climate change is a shift of the timing of spring snowmelt. Stewart *et al.* (2005) show that timing of spring streamflow in the western U.S. during the last five decades has shifted so that the major peak now arrives one to four weeks earlier, resulting in less flow in the spring and summer. Rauscher *et al*. (2008) suggest that with air temperature increases from 37 to 41 °F, snowmelt driven runoff in the western U.S. could occur as much as two months earlier than present. Changes in the hydrograph could potentially alter fish assemblages.

Extreme events such as drought, fires, and floods are predicted to occur more frequently because of climate change (IPCC 2007). It is anticipated that an increase in extreme events will most likely affect populations living at the edge of their physiological tolerances. The predicted increases in extreme temperature and precipitation events may lead to dramatic changes in the distribution of species or to their extirpation or extinction (Parmesan and Matthews 2006).

Current predictions of drought and/or higher winter low temperatures may also stress ponderosa pine forests in which many of the listed species discussed in this consultation occurs. Ganey and Vojta (2010) studied tree mortality in mixed conifer and ponderosa pine forests in Arizona from 1997-2007, a period of extreme drought. They found the mortality of trees to be severe; the number of trees dying over a five-year period increased by over 200 percent in mixed conifer forest and by 74 percent in ponderosa pine forest during this time frame (Ganey and Vojta 2010). Ganey and Vojta (2010) attributed drought and subsequent insect (bark beetle) infestation for the die-offs in trees.

Drought stress and a subsequent high degree of tree mortality from bark beetles make high elevation forests more susceptible to unnaturally intense wildfires. Warming trends and fuel load accumulations will support larger, frequent severe wildfires in the Southwest. Severity will also be influenced by a predicted reduction in snowpack and an earlier snowmelt (Fulé 2010). Wildfires are expected to reduce vegetative cover, increase soil erosion from increased droplet

splash-erosion, and reduce infiltration capacity, subsequently resulting in changes to terrestrial habitat conditions and increased sediment flows in streams (Fulé 2010).

Western Yellow-Billed Cuckoo and Proposed Critical Habitat

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

Approximately 9,637 acres of proposed critical habitat for western yellow-billed cuckoos can be found on the Cave Creek, Globe, Payson and Tonto Basin RDs. Detections have been documented within proposed critical habitat and other suitable habitat on the TNF along the Verde and Salt Rivers, and creeks including Campaign, Cherry, Coon, Pinal, Pinto, Rye, and Tonto. Less than 0.01% of potential cuckoo habitat is located in the Hellsgate and Mazatzal wilderness areas. In most perennial streams on the TNF, breeding yellow-billed cuckoo are found in riparian habitat.

In support of their Habitat Conservation Plan (HCP) for Roosevelt Lake, Salt River Project (SRP) contracted with the Colorado Plateau Field Station at Northern Arizona University to conduct cuckoo monitoring at Roosevelt Lake and other SRP properties during the breeding season from 2003 to 2006. Surveys were conducted at several sites on Tonto Creek and Salt River arms of Roosevelt Lake. Cuckoos were documented at several sites, including A-Cross Road South, Old Salt, Orange Peel Campground, Lakeshore, Northshore and Shangri-la. Not all of these sites were surveyed during consecutive years due to fluctuating water levels at Roosevelt Lake. Based on the survey results during these years, there were 22 cuckoo detections at 6 of 8 sites in 2003, 25 detections at 7 sites in 2004, and 29 detections at 5 sites in 2005. Surveys were not completed in 2006 because the reservoir filled to near water capacity and most of the suitable cuckoo breeding habitat was inundated.

Cuckoo surveys and incidental detection data provide evidence of occupancy and likely breeding within the action area. Yellow-billed cuckoo numbers are difficult to determine without intensive surveying and monitoring. The yellow-billed cuckoo survey protocol is designed to document presence/absence during the breeding season, but is not designed to determine the number of breeding cuckoos (Halterman *et al*. 2011, 2016). Additional visits would be needed to determine cuckoo home ranges, occupancy throughout the breeding season, and to observe cuckoo nesting behavior. Because cuckoos have a very short nesting cycle, a pair may not remain in the area for the entire breeding season. However, we can infer breeding from observed behavioral cues. These include vocalizations between individuals, copulation, carrying food repeatedly to the same location, and feeding fledglings. If cuckoos are detected on more than one of the four required surveys, breeding season occupancy is assumed (Halterman *et al*. 2016).

Additional yellow-billed cuckoo surveys have been completed by EcoPlan Associates, Inc. (2015), WestLand Resources (2015 and 2016), Archaeological Consulting Services, Ltd. (2016 and 2017), AtoZec (2017), Audubon Arizona, and others. They detected cuckoos at Whitlow Ranch Dam, Haunted Canyon, Coon Creek, Horseshoe Reservoir, upper and lower Pinto Creek, and Pinal Creek.

Presence in Tonto National Forest
The discovery of breeding season cuckoos throughout TNF is relatively new, and it is expected that additional drainages and locations will be found in future years. Cuckoos have been detected within or just outside the boundaries of the TNF during the breeding season in the following locations (WestLand Resources, Inc. 2015, 2016; American Birding Association 2014; AGFD 2016; Cornell Laboratory of Ornithology 2016): Cougar Canyon, Horseshoe Reservoir, Verde River, Mullen Mesa, Cave Creek, Agua Fria River, Bushnell Tanks, Mesquite Wash, Box Canyon, Boyce Thompson Arboretum, Cherry Creek, Cordes Lakes, Tonto Creek, Roosevelt Lake, Russell Gulch, Kellner Canyon, Pinto Creek, Rye Creek, Quartz Ledge, Campaign Creek, and Salt River.

Habitat Descriptions within Tonto National Forest
Information below describes site specific habitat descriptions for known occupied locations within TNF:

Horseshoe Dam; Yavapai County
This location includes a segment of the Verde River immediately upstream and downstream of Horseshoe Dam, with the majority in USFS ownership. Breeding habitat contains at least one physical or biological feature essential to the conservation of the species (PBF 1) and has been occupied by western yellow-billed cuckoos during the breeding season for multiple years. This unit also provides a movement corridor as well as migratory stop-over habitat for western yellow-billed cuckoos. This unit includes part of the Salt and Verde Riparian Ecosystem Important Birding Area (IBA), with western yellow-billed cuckoos identified as a breeding bird (National Audubon Society 2016c). Western yellow-billed cuckoos were also documented during the breeding season downstream of Horseshoe Dam in the mixed mesquite and cottonwood-willow woodland at Mesquite Campground on the Tonto National Forest in 2009 and 2011 (AGFD 2016). Riparian cottonwood-willow galleries and mixed riparian stands exist both above and below Horseshoe Dam, although some of these stands occur as narrow strands along the Verde River (Salt River Project 2008). Habitat consists of contiguous to patchy cottonwood, willow, tamarisk, and mesquite. Altered hydrology has contributed to the establishment of tamarisk. Although tamarisk is not as desirable as native habitat, it contributes toward habitat suitability in areas where the native tree density can no longer be sustained.

Tonto Creek; Gila County
This location includes that portion of Tonto Creek upstream from the lakebed at Theodore Roosevelt Lake, with approximately 69 percent owned by USFS and the remainder privately owned. Numerous western yellow-billed cuckoos have consistently bred in this area. The site also provides a movement corridor and migratory stopover habitat for western yellow-billed cuckoos moving farther north. Tamarisk, a nonnative species that reduces the habitat's value, is a minor to major component of habitat in this unit.

Pinal Creek; Gila County
This segment runs north of the Town of Globe. Approximately 93 percent is privately owned, with the remainder in Federal ownership. The site also provides a movement corridor between larger habitat patches. Tamarisk, a nonnative species that reduces the habitat's value, is a minor to major component of habitat in this unit.

Salt River; Gila County
This segment of the Salt River is upstream from the lakebed at Theodore Roosevelt Lake. The site also provides a movement corridor between larger habitat patches. Tamarisk, a non-native species that reduces the habitat's value, is a minor to major component of habitat in this unit.

Pinto Creek; Gila County
Habitat along Pinto Creek consists of Arizona sycamore and cottonwood. However there is a lack of significant amounts of willow, a lack the multi-storied canopy that cuckoos prefer, and little understory vegetation. Tamarisk, a non-native species that reduces the habitat's value, is a component of habitat in this unit.

Lower Verde River; Maricopa County
Habitat along lower Verde River consists of cottonwood, willow and other riparian trees. Tamarisk, a non-native species that reduces the habitat's value, is a component of the habitat along the lower Verde River.

Upper Tonto Creek, Gila County
Formal surveys have not been conducted, but western yellow-billed cuckoos were detected at the southern end of Gisela and in Rye Creek during breeding seasons 2009–2013 and 2015 (Madara-Yagla and Torrence 2009, p. 6; Madara-Yagla 2010, pp. 5, 9; Madara-Yagla 2011, pp. 5–6; Cornell Lab of Ornithology 2016 (eBird data)). The majority of upper Tonto Creek is owned by the USFS. The site also provides a movement corridor and migratory stop-over habitat for western yellow-billed cuckoos. This unit contains at least one of the physical or biological features essential to the conservation of the species (PBF 1) within the geographical area occupied by the species at the time of listing, including areas of riparian vegetation that are suitable as western yellow-billed cuckoo breeding habitat and connected areas of riparian vegetation that are suitable as foraging habitat. This reach, from Gisela to Rye Creek, consists of scattered mature and young Goodding's willow, cottonwood, sycamore, and tamarisk (Madara-Yagla 2010, p. 9).

Cherry Creek, Gila County
Formal surveys have not been conducted, but western yellow-billed cuckoos were detected during other surveys during the breeding season in 2007, 2009, 2010, 2011, and 2015 (Janssen *et al*. 2007, pp. 11, 29; Madara-Yagla and Torrence 2009, pp. 3, 6; Madara-Yagla 2010, pp. 6, 8, 22; Madera-Yagla 2011, pp. 5–6; Cornell Lab of Ornithology 2015 (eBird data)). The majority of this location is owned by the USFS. The site also provides a movement corridor and migratory stop-over habitat for western yellow-billed cuckoos. This unit contains at least one of the physical or biological features essential to the conservation of the species (PBF 1) within the geographical area occupied by the species at the time of listing, including areas of riparian vegetation that are suitable as western yellow-billed cuckoo breeding habitat and connected areas of riparian vegetation that are suitable as foraging habitat. Habitat consists of primarily of Goodding's willow, with dense blackberry thickets, cottonwoods, sycamore, and a few tamarisk. Some beaver activity is evident on cottonwoods in lower Cherry Creek (Madara-Yagla 2009, p. 7; Madara-Yagla 2010, pp. 8, 22).

Proposed Critical Habitat
There are 9,714 acres of proposed critical habitat for the western yellow-billed cuckoo in the action area (USFWS 2014a), on Cave Creek, Globe, and Tonto Basin RDs and includes portions of seven units. The amount of proposed critical habitat in the action area is 1.8 percent of total proposed cuckoo critical habitat range-wide.

- Proposed critical habitat unit 21 (Horseshoe Dam) is 626 acres in extent and is a 3-mile long segment of the Verde River immediately upstream of Horseshoe Dam. No state or county roads or road crossings occur within this proposed unit. Western yellow-billed cuckoos have consistently bred within this unit. This site also provides migratory stopover habitat for western yellow-billed cuckoos moving farther north. In addition to native cottonwood, willow, and other riparian trees, tamarisk, a non-native species, is a component of the habitat in this unit.
- Proposed critical habitat unit 22 (Tonto Creek) is 3,670 acres in extent and a 6-mile long segment of Tonto Creek upstream from the lakebed at Roosevelt Lake. Approximately 1,141 acres, or 31 percent is privately owned, with the remainder in federal ownership managed by TNF. This site has consistently been occupied by yellow-billed cuckoos during the breeding season. This site also provides a movement corridor and migratory stopover habitat for western yellow-billed cuckoos moving farther north. In addition to native cottonwood, willow, and other riparian trees, tamarisk is a component of the habitat in this unit.
- Proposed critical habitat unit 23 (Pinal Creek) is 419 acres in extent and is a 3-mile-long segment of Pinal Creek, located north of the Town of Globe in Gila County, Arizona. Approximately 389 acres or 93 percent is privately owned, with the remainder in federal ownership, the managed by TNF. This site has consistently been occupied by yellow-billed cuckoos during the breeding season. This site also provides a movement corridor between larger habitat patches. In addition to native cottonwood, willow, and other riparian trees, tamarisk is a minor to major component of the habitat in this unit.
- Proposed critical habitat unit 37 (Salt River) is 2,590 acres in extent and is a 5-mile long segment of Salt Creek upstream from the lakebed at Roosevelt Lake, in Gila County, Arizona. Approximately 2,469 acres or 95% are managed by TNF, with the remaining 121 acres or 5% privately owned. This site is consistently occupied by yellow-billed cuckoos during the breeding season. This site also provides a movement corridor between larger habitat patches. In addition to native cottonwood, willow, and other riparian trees, tamarisk is a component of the habitat in this unit.
- Proposed critical habitat unit 40 (Pinto Creek South) is 373 acres in extent and a 4-mile long segment of Pinto Creek in Gila County, Arizona. Approximately 368 acres, or 99% are managed by TNF, with the remaining 5 acres or 1% privately owned. This site also provides a migratory stopover habitat for western yellow-billed cuckoo. Western yellow-billed cuckoos have been found in Pinto Creek during the breeding season, although intermittently. In addition to native cottonwood, willow, and other riparian trees, tamarisk is component of the habitat in this unit.
- Proposed critical habitat unit 42 (Lower Verde River) is 1,079 acres in extent and a 6-mile long segment of the Lower Verde River downstream from Bartlett Dam in Maricopa County, Arizona. Approximately 1,063 acres, or 99% are managed by TNF, with the remaining 16 acres or 1% privately owned. Western yellow-billed cuckoos have been

found in this unit during the breeding season, although intermittently. This site also provides a movement corridor. In addition to native cottonwood, willow, and other riparian trees, tamarisk is a component of the habitat in this unit.

- Proposed critical habitat unit 44 (Pinto Creek North) is 427 acres in extent and a 6-mile long segment of Pinto Creek in Gila County, Arizona. Approximately 415 acres, or 97% are managed by TNF, with the remaining 12 acres or 3% privately owned. This site is consistently occupied by yellow-billed cuckoos during the breeding season. This site also provides a migratory stopover habitat for western yellow-billed cuckoo. Western yellow-billed cuckoos have been found in this site during the breeding season, although intermittently. In addition to native cottonwood, willow, and other riparian trees, tamarisk is a component of the habitat in this unit.

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

Actions on and off the TNF have influenced the condition of cuckoo habitat and the population distribution and abundance of cuckoos within the forest. Actions such as water diversion, groundwater pumping, habitat clearing, flood control, urban/agricultural development, dam building, and dam operations have changed surface and subsurface stream flows, and in combination with historical and current land uses such as livestock grazing, road developments, heavy off-road vehicle use, recreation, and mining have altered the quality distribution, abundance and longevity or riparian and evergreen woodland vegetation (USFWS 2002).

The primary factors affecting the yellow-billed cuckoo include effects resulting from municipal and rural development, livestock grazing, irrigated agriculture, recreation, and mining.

Narrow-headed Gartersnake and Proposed Critical Habitat

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

The narrow-headed gartersnake occurs in the East Verde, Salt, and Verde Rivers and Canyon, Haigler, Houston, and Tonto Creeks on the Cave Creek, Globe, Payson, Pleasant Valley, and Tonto Basin RDs. Approximately 29,931 acres of habitat occur on the TNF with 14,219 acres (48%) located in the Hellsgate, Mazatzal, and Salt River Canyon wilderness areas. Populations of narrow-headed gartersnakes on the TNF are considered “likely low density”, meaning there is a post-1980 record for the species, it is not reliably found with minimal to moderate survey effort, and threats exist that suggest the population may be low density or could be extirpated, but there is insufficient evidence to support extirpation of the areas (USFWS 2014b).

In the East Verde River, we are aware of a single historical museum record in 1981 (Holycross *et al.* 2006a) of narrow-headed gartersnakes, but numerous observation records are reported from 1985–1986 (n=12) (Rosen and Schwalbe 1988) and 1992 (n=1) (Sredl *et al.* 1995). These records indicate the species once occurred in the East Verde River, but has apparently declined. Native fish species persist (Voeltz 2002) in the presence of non-native, spiny-rayed fish and abundant crayfish. Turner and List (2007) reported that at least six species of native fish are known from the East Verde. Narrow-headed gartersnakes may disperse into the East Verde from the occupied Verde River to augment the population. This population likely occurs as a low to very low density population.

In the upper Salt River, narrow-headed gartersnakes were historically seen in "large numbers" along Gleason Flat, upstream of the Arizona State Highway 288 crossing. Rosen and Schwalbe (1988) surveyed the upper Salt River in 1986 and did not detect any narrow-headed gartersnakes. Holycross *et al*. (2006b) surveyed the upper Salt River during 2004 and 2005, but had no detections of the species. The Salt River represents a large, complex, and difficult area to survey, which makes detections difficult and population status difficult to confirm. Native fish and lowland leopard frogs occur, as do non-native, predatory fish species and crayfish. Populations in the White River, Black River, Carrizo Creel, and Canyon Creek may contribute individuals to the upper Salt River population through dispersal mechanisms.

In the upper/middle Verde River, above Horseshoe Dam, there are several recent and vouchered records of the narrow-headed gartersnake, as well as several unvouchered records. All of these records of narrow-headed gartersnake are outside of the action area. The Verde River represents a large, complex, and difficult area to survey. The recent records document that at least a low-density, but reproducing population of narrow-headed gartersnakes occurs within the upper and middle reaches of the Verde River, but we are unable to conclude the population is currently viable. It is likely that a small population occurs in the lower Verde River near its confluence with the East Verde River, but is likely also not viable.

In Canyon Creek, the first historical record for the narrow-headed gartersnake appears to be in 1986, from approximately 2.25 miles upstream of the confluence with the Salt River on White Mountain Apache Tribal lands (Rosen and Schwalbe 1988). Additional reports to the AGFD's Heritage Database document the species in upper and lower Canyon Creek during the 1980s, and as late as 1991 (Holycross *et al.* 2006). Holycross *et al*. (2006) conducted three surveys of Canyon Creek, upstream of White Mountain Apache Tribal lands in 2004-2005, with no detections of narrow-headed gartersnakes. Native fish were detected, as were non-native trout (Holycross *et al.* 2006), which serve as prey species. No non-native, spiny-rayed fish, crayfish, or bullfrogs were detected in these surveys efforts (Holycross *et al.* 2006). The physical habitat looked "ideal" for narrow-headed gartersnakes, with cobble stream substrates and adequate streamside vegetation that included watercress and willow (Holycross *et al.* 2006). In 2015, AGFD successfully caught/detected eight individual narrow-headed gartersnakes in Canyon Creek for the first time in over 20 years (Burger 2015). In 2016, six narrow-headed gartersnakes were detected in Canyon Creek (AGFD 2017). Individuals from the Salt River may disperse into Canyon Creek and augment that population.

In Haigler Creek, there are three unvouchered, but reliable, observation records of narrow-headed gartersnakes from Haigler Creek during the early 1990s (Holycross *et al.* 2006). In 2008, surveys of Haigler Creek resulted in a photo voucher, with the hand-capture of an adult male narrow-headed gartersnake (Kern and Burger 2008). The fish community in Haigler Creek consists of both native fish and non-native trout, which indicates a prey base for the narrow-headed gartersnake is present, but crayfish were also present in numbers (Kern and Burger 2008). No non-native, spiny-rayed fish or bullfrogs were detected by Holycross *et al.* (2006). In 2014 three juvenile narrow-headed gartersnakes on Haigler Creek were the first verified records of the species since 2008 (Goode and Parker 2015). Narrow-headed gartersnakes may disperse into Haigler Creek from occupied Tonto Creek and augment the population. It is likely that the

narrow-headed gartersnake is still present along Haigler Creek, likely as a low-density population.

Houston Creek has one photo-vouchered record for narrow-headed gartersnakes from 2005, according to Holycross *et al.* (2006). Houston Creek was surveyed in 2004 and 2005 by Holycross *et al.* (2006) with no narrow-headed gartersnakes detected, but native fish, crayfish, and nonnative, spiny-rayed fish were observed. Survey conditions were poor in 2004, with limited visibility in the water due to recent flooding. Houston Creek is largely dry above Gibson Creek, but presents physically suitable narrow-headed gartersnake habitat below that point (Holycross *et al.* 2006). Narrow-headed gartersnakes may disperse into Houston Creek from occupied Tonto Creek and augment the population.

In Tonto Creek (tributary of Salt River), one neonate narrow-headed gartersnake was captured approximately 4.5 stream miles downstream of the Rye Creek confluence (2005), with two historical records from the area of Kayler Butte (1988) (Holycross *et al.* 2006). Holycross *et al.* (2006) surveyed Tonto Creek from the headwaters to approximately Gisela, Arizona in 2004 and 2005 that resulted in the detection of a single neonatal narrow-headed gartersnake (Rye Creek confluence record). In 2008, Burger (2008) surveyed for narrow-headed gartersnakes in Tonto Creek from Bear Flat Campground to the confluence with Haigler Creek, but did not detect any narrow-headed gartersnakes. Tonto Creek is known to be heavily occupied by a suite of non-native species including bullfrogs, crayfish, and a host of non-native fishes (Holycross *et al.* 2006, Burger 2008, Wallace *et al.* 2008), but native fish species still occur and, in some reaches, are well-represented (Voeltz 2002, Burger 2008). Structurally, the habitat was considered generally suitable for narrow-headed gartersnakes by the surveyors, and Holycross *et al.* (2006) suggested that significant declines in the narrow-headed gartersnake population have occurred in Tonto Creek since the 1980s; demonstrated by their significant survey effort and limited captures.

Ash Creek had narrow-headed gartersnakes reintroducted in 2016 and again in 2017 on private property. Most of Ash Creek fall within Forest Service jurisdiction. Some of the gartersnakes have radio telemetry attached. It is hoped that the gartersnakes will eventually move onto the TNF.

Proposed critical habitat

Approximately 29,976 acres in seven subunits of critical habitat are proposed in the action area. These subunits are considered to be occupies at the time the species was listed.

- *East Verde River Subunit*—from its confluence with the Verde River upstream for approximately 53.3 stream miles (7,354 acres) to its origin south of Rim Road along the Mogollon Rim, in Gila County.
- *Salt River Subunit*—from the intersection with State Highway 288, upstream for approximately 33.0 stream miles (5,369 acres) to the TNF boundary.
- *Verde River Subunit*—from its confluence with Red Creek southwest of Wet Bottom Mesa, upstream for approximately 27.0 stream miles (3,436 acres) to the TNF boundary with Coconino and Prescott National Forests.

- *Canyon Creek Subunit*—from the TNF boundary with the White Mountain Apache Tribe near Hells Canyon, upstream for approximately 7.0 stream miles (1,026 acres) to the boundary with Apache-Sitgreaves National Forests.
- *Haigler Creek Subunit*—from its confluence with Tonto Creek upstream for approximately 21.8 stream miles (3,035 acres) to its origin at the east end of Naeglin Canyon, west of Cherry Creek.
- *Houston Creek Subunit*—from its confluence with Tonto Creek upstream for approximately 14.7 stream miles (2,044 acres) to its origin below Walnut Flat north of the town of Star Valley.
- *Tonto Creek Subunit*—from its confluence with an unnamed tributary northeast of Punkin Center upstream for approximately 54.1 stream miles (7,712 acres) to the TNF boundary with Coconino and Apache-Sitgreaves National Forests.

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

The primary factors affecting the narrow-headed gartersnake and its proposed critical habitat on the TNF are the presence and introduction of harmful non-native aquatic species (bullfrogs, brown trout, crayfish and predatory warm water fish) that compete with and prey upon both the narrow-headed gartersnake and its native prey species, and the decline of the native fishes that are the gartersnake's primary prey. Other factors include but are not limited to: water diversions or other water-related actions that decrease water quantity and quality that would limit native fish needed in gartersnake diets, development or construction activities that trample, remove or degrade suitable stream bank habitat, drought, improper livestock grazing levels if it reduces habitat quality for native fish or riparian habitat structure needed by gartersnakes, catastrophic fires and associated effects, unauthorized off road vehicle use in riparian corridors, and intentional or unintentional killing of snakes by forest visitors.

Northern Mexican Gartersnake and Proposed Critical Habitat

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

There are approximately 14,129 acres of northern Mexican gartersnake habitat on the TNF, with 7,425 acres (53%) located in Hellsgate and Mazatzal wilderness areas. The northern Mexican gartersnake occurs in portions of the upper Verde River on the Cave Creek RD and in portions of Tonto Creek on the Payson and Tonto Basin RDs. Its population on the TNF is considered "likely viable", meaning the species is reliably found in the lower Salt River but is now believed to be extirpated (USFWS 2014).

The first record for northern Mexican gartersnakes from Tonto Creek was from 1995 in the vicinity of Kayler Butte at the Arizona State Highway 188 crossing (Holycross *et al.* 2006). Surveys in 2004 and 2005 resulted in the capture of 17 northern Mexican gartersnakes (Holycross *et al.* 2006). Burger (2010) documented an additional three records from July, 2010, along Tonto Creek from Gisela south to near Roosevelt Lake at the A-Cross road crossing. Northern Mexican gartersnakes were observed in 2010, 2011, and 2012 near the A-Cross Road crossing. Native fish species persist in Tonto Creek, but bullfrogs, crayfish, and nonnative, spiny-rayed fish are also present, with crayfish noted as abundant in one segment (Voeltz 2002,

Holycross *et al.* 2006, Wallace *et al.* 2008). Recent records confirm the northern Mexican gartersnake as extant in TNF.

Above Horseshoe Dam, several historical and current records exist for northern Mexican gartersnakes. Rosen and Schwalbe (1988) document records from 1986 at the Houston Creek confluence, one mile above the Verde River in Horse Creek (a tributary to Horseshoe Reservoir), and outside the action area at Cottonwood (just below Dead Horse Ranch State Park) and Camp Verde. The AGFD staff were contracted to perform herptofaunal surveys along the Verde River from Childs downstream to Sheep's Bridge in 2012, but these surveys yielded no detection of northern Mexican gartersnakes (SRP 2012). Emmons and Nowak (2012) conducted a sampling effort for northern Mexican gartersnakes outside of the action area in the upper Verde River area from May-September 2012. This survey effort resulted in the combined capture of 47 individual northern Mexican gartersnakes. 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. We expect that the northern Mexican gartersnake also occurs within the action area but in small numbers.

Proposed critical habitat
Proposed critical habitat includes areas along the Verde River on the Cave Creek RD, and areas along Tonto Creek on the Payson, Pleasant Valley, and Tonto Basin RDs.

The Tonto Creek proposed critical habitat subunit includes 65.1 stream miles (8,936 acres), from its confluence with Roosevelt Lake upstream to its origin northeast of Tonto Spring, south of Rim Road, in Gila County, Arizona. Tonto Creek occurs predominately on lands managed by the TNF. Some reaches along Tonto Creek experience seasonal drying as a result of regional groundwater pumping, while others are affected by diversions or existing or planned flood control projects. Development along private reaches of Tonto Creek may also affect terrestrial characteristics of northern Mexican gartersnake habitat. Mercury has been detected in fish samples within Tonto Creek, and further research is necessary to determine if mercury is bioaccumulating in the resident food chain.

The Upper/Middle Verde River proposed critical habitat subunit includes approximately 139.8 stream miles (5,192 acres), from its confluence with Horseshoe Reservoir, upstream to the TNF boundary. All of the land in this portion of proposed critical habitat on the Verde River is managed by TNF.

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

The primary factors affecting the northern Mexican gartersnake on the TNF are the presence and introduction of non-native aquatic species (bullfrogs, crayfish, green sunfish, and other warm water sport fish) that compete with and prey upon both the northern Mexican gartersnake and its native prey species; as well as the loss and/or the decline of the gartersnake's primary prey species. Native prey species for the gartersnake include the lowland leopard frog (*Lithobates yavapaiensis*), Chiricahua leopard frog, juvenile and adult Gila topminnow, desert pupfish, roundtail chub and Gila chub. Several of its prey species are also endangered or threatened, and

have declined in waterways occupied by the gartersnake, contributing to its decline in distribution and density.

Other factors affecting the gartersnake include but are not limited to: heavy recreation such as unauthorized off-road vehicle use in riparian corridors along Tonto Creek or Haigler Creek; development or construction activities that trample, remove or degrade suitable stream bank habitat; drought that may exacerbate potential impacts of non-native species on native fish species, particularly in the portion of Tonto Creek (Gisela to Roosevelt Lake) due to its proximity to Roosevelt Lake; water diversions or other water-related actions that decrease water quantity and quality that would limit native fish needed in gartersnake diets; and improper livestock grazing levels if they reduce habitat quality for native fish or riparian habitat structure needed by gartersnakes.

Factors that may affect proposed critical habitat are competition with harmful non-native species, water diversions, flood-control projects, and development of areas adjacent to and within Tonto Creek proposed critical habitat. In the Verde River, proposed groundwater pumping of the Big Chino Aquifer may adversely affect future base flow in the Verde River, reducing habitat and prey for the gartersnake. In addition, the elimination or reduction of crayfish, bullfrogs, and non-native fish is needed as well as ensuring adequate flow is retained in the Verde River.

Gila Trout

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

Although the historical distribution of Gila trout is not known with certainty (Behnke 2002), based on the location of remnant populations, the Gila River drainage represents the core of the historical distribution. Dude Creek currently has Gila trout within the action area. Dude Creek was stocked with Whiskey Springs lineage in October 2015 (1,000 fish), and again in December 2016 (200 fish). In addition, Ash Creek was also stocked with Spruce Creek fish a few times. FWS and AGFD are planning additional restocking work at Dude and Haigler Creeks, and East Verde River in the future.

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

The primary factor affecting Gila trout in the planning area is hybridization, competition, or predation by with non-native trout.

On the TNF, past and present federal, state, private, and other human activities that may affect Gila trout and their habitat include: livestock grazing, timber harvest, wildfire, recreational activities, and any other habitat alterations. In addition, the stocking of non-native trout by AGFD and private citizens in the early to mid-1900s is also included in the environmental baseline.

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 table with objectives, standards, and guidelines that are specifically referred to in this consultation in Appendix B of this PBO/PCO. Detailed effects discussions will occur as each site-specific project is developed, and these projects will be consulted on separately, as required.

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 critical habitat units (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.

We have previously consulted on the TNF compliance with the Travel Management Rule (TMR) (BO 02EAAZ00-2014-F-0463, USFWS 2016) on the effects of the proposed designation of motorized roads, trails, areas, zones and corridors, and, therefore, is part of the baseline. This consultation covering the current TNF Plan will only include the maintenance, reconstruction and new construction of motorized roads, trails and other areas.

Western Yellow-Billed Cuckoo and Proposed Critical Habitat

Engineering Program

The Engineering program includes managing and maintaining roads and infrastructure on the TNF. Engineering projects could have localized and short-term adverse effects to the yellow-billed cuckoo from noise and disturbance during the breeding season from actions taken in or near riparian areas. Infrastructure projects, such as recreation buildings, if within or near suitable or occupied cuckoo habitat, may concentrate visitor use in these areas and cause habitat damage. Designated roads, trails, and motorized recreation areas could impact the yellow-billed cuckoo and its habitat by removing riparian vegetation, degrading watershed function and integrity, habitat fragmentation, and disturbing individuals during maintenance activities. Roads crossing or adjacent to streams and riparian areas can remove and alter riparian vegetation. Activities can result in disturbance from loss or alteration of vegetation which may impact the species.

Standards and guidelines help minimize potential impacts for the roads and facilities program. There are three relevant guidelines that help minimize these impacts to the cuckoo and its habitat:

- Guideline 1362 would locate roads (where possible) on natural benches, ridges, flat slopes near ridges or valley bottoms, and away from stream channels. This would limit impacts from motorized vehicle use in riparian, floodplain, and adjacent upland areas that contain yellow-billed cuckoo habitat.
- Guideline 1363 would locate roads on well-drained and stable ground, avoiding seeps and other unstable areas. This would also limit impacts from vehicles in riparian, floodplain, and adjacent upland areas that contain cuckoo habitat.
- Guideline 1368 avoids channel changes or disturbance of stream channels and minimizes impacts to riparian vegetation.

Although there will be short-term impacts to the species from realignment, construction and maintenance of roads, implementing BMPs would help reduce the impacts and result in reduced long-term impacts. Direction for roads and facilities is expected to minimize effects to the yellow-billed cuckoo, its occupied habitat, and its proposed critical habitat, as well as suitable habitat. Any potential effects are expected to be of small magnitude, given the limited amount of roads within suitable, occupied and critical habitats.

Fire Management

Project activities under the fire management program could include mechanical treatments, fuels reduction, and prescribed fires, along with construction of temporary roads, fire lines and trails to access treatment areas. Fuel reduction treatments in the uplands could result in some amount of increased runoff and sediment movement from vegetative cover removal during treatments. Fire related impacts include visual and noise disturbance if occurring within occupied habitat during the breeding season. Although limited spatially and temporally, there may still be short-term adverse effects to suitable and occupied habitat before adequate vegetation cover has returned. Long-term effects from prescribed fire and forest products activities would potentially be positive for this species and its habitat as activities reduce the changes wrought by uncharacteristic wildfires, which could impact riparian areas. Watershed improvement through vegetation treatments including wildland fire use (planned and unplanned) may reduce the likelihood of wildfire entering riparian habitats and future post-fire runoff.

Standards and guidelines 1376a and 1376d integrate habitat needs and use prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement. Prescribed fire treatments reduce vegetative cover and increase ash and nutrients. Mechanical treatment projects reduce vegetative cover and result in soil disturbance from the use of heavy equipment. These standards and guidelines reduce impacts to the yellow-billed cuckoo and its habitat to help ensure habitat needs are maintained. However, vegetation treatments using wildland fire in or adjacent to cuckoo habitat may result in short-term adverse effects from post fire flooding or habitat loss. These adverse effects may include direct removal of important habitat structure from burning or post-fire flood events.

Forestry and Forest Health

Project activities under the forestry and forest health program could include mechanical and silvicultural treatments, along with construction of temporary roads to access treatment areas. Timber activities in the uplands could result in some amount of increased runoff and sediment movement from vegetative cover removal during treatments. Forestry and forest health related activities could result in visual and noise disturbance if occurring within occupied habitat during breeding season. Although limited spatially and temporally, there may still be short-term adverse effects before adequate vegetation cover has returned. Long-term effects from forestry products activities may also potentially be positive for the cuckoo and its habitat as these activities reduce the changes wrought by uncharacteristic wildfires, which could impact riparian areas.

There are no standards and guidelines within this program that are directly relevant to the yellow-billed cuckoo.

Lands and Minerals

The Land and Minerals Program is responsible for land ownership and adjustments including purchases, withdrawals; land exchanges; mining; oil, gas and geothermal leases; and the issuance of non-recreational special use authorizations, including water use authorizations and utility and transportation rights-of-way and easements. Issuance of special use permits may adversely affect yellow-billed cuckoos, their habitats, and their prey if the authorized activities occur in or near riparian areas or affect watersheds.

Land exchanges can result in a mix of long-term beneficial effects through USFS management that may support the yellow-billed cuckoo, as well as long-term adverse effects from increased public and recreational use within suitable and occupied cuckoo habitat, as well as from visual and noise disturbance to cuckoos during the breeding season.

Mineral activities could result in short- and long-term adverse effects if roads, utilities, facilities, or mines are located in or near riparian areas that support suitable and occupied habitat for the yellow-billed cuckoo (e.g., Rosemont mine on the Coronado NF will affect an entire watershed through slow dewatering). If the mining activities occur within suitable or occupied habitat, this and related activities could result in visual and noise disturbance if occurring within occupied habitat during the breeding season. The TNF Forest Plan's goal to confine right-of-way grants to designated corridors to the extent practicable minimizes new impacts to riparian habitats that may support this species.

There are no lands, special uses, or minerals standards and guidelines that are directly relevant to the yellow-billed cuckoo.

Rangeland Management

Range program activities include administering livestock grazing, implementation and effectiveness monitoring, development of structural and non-structural improvements, control of invasive weeds, and the authorization of grazing on the TNF, including within riparian areas. This program area has the potential through grazing activities to impact the yellow-billed cuckoo

and its suitable and occupied habitat, often through riparian vegetation removal. Livestock grazing could occur within riparian areas on the TNF.

Effects to yellow-billed cuckoos from livestock management would mainly be indirect effects associated with habitat disturbance. The extent to which grazing-related activities could affect yellow-billed cuckoos depends on the density, season and duration of the grazing. There are seven proposed critical habitat subunits located across eight grazing allotments on the TNF. Riparian livestock accessible areas may experience grazing effects to streambanks and riparian vegetation, which if occurring during yellow-billed cuckoo breeding season, could result in adverse effects to the bird.
There are no standards and guidelines that prohibit grazing within allotments on the TNF, and it is possible that proposed projects may include some grazing within or near riparian habitat. Six standards and guidelines protect or restore riparian or wetland habitats and the uplands that may influence yellow-billed cuckoo habitat, which helps minimize adverse effects to yellow-billed cuckoos and their habitat by limiting riparian access.

- Standard and guideline 1370a directs the preparation of grazing allotment management plans, updated every 5 to 10 years, which include objectives and management strategies for the improvement of wildlife habitat. Therefore the extent of impacts from grazing and associated activities is expected to be fairly low, but there is potential for site-specific adverse impacts to cuckoo habitat.
- Standard and guideline 1370c assures grazing permittee maintenance of structural improvements on an annual basis, which may include maintenance of fencing that prevents livestock access to riparian areas.
- Standard and guideline 1370d prescribes that forage use by grazing ungulates be maintained at or above a condition which assures recovery and continued existence of threatened and endangered species. This standard and guideline helps minimize adverse effects to yellow-billed cuckoo.
- Standard and Guideline 1375 emphasizes management strategies that develop boundaries and essential interior division fences that may be beneficial to yellow-billed cuckoos by fencing areas to prevent livestock from entering and using riparian areas if needed. Some segments of yellow-billed cuckoo habitat are protected from livestock grazing by exclosure fences along most streams or have limited accessibility due to steep terrain.
- Standards and Guidelines 1404 and 1420 manage suitable rangelands to ensure quality and overall health of certain areas.

Authorized livestock grazing can affect habitat for the yellow-billed cuckoo by disturbing the riparian zone through livestock use and movement along the streams, reducing vegetation and cover. Riparian exclosures, limited pasture use, or timing restrictions for livestock use in riparian areas help minimize adverse effects to yellow-billed cuckoo and its suitable and occupied habitat. The standards and guidelines listed above are expected to minimize, but may not eliminate, adverse effects. Therefore, over the life of this consultation, we expect that implementation of the Rangeland Program could result in adverse effects to the yellow-billed cuckoo and its habitat.

Recreation, Heritage, and Wilderness

Recreation, heritage, and wilderness components include administration and management of developed recreation sites, dispersed recreation settings, partnerships and tourism, interpretive services, recreation special use permits, congressionally designated areas, scenery management, trail management, and scenic byways. Recreation sites and developments, and their associated uses and areas receive high levels of recreation activities than can alter vegetation in the riparian areas, while presenting threats to maintaining and restoring yellow-billed cuckoo habitats. Recreational activities within and adjacent to riparian areas can also increase the risk of introductions and spread of invasive or undesirable plants and animals.

The TNF LRMP includes objectives for the reconstruction or rehabilitation of existing recreation sites, construction of new recreation sites, and construction or reconstruction of trails. Locations include several known yellow-billed cuckoo occupied areas, including sites along the lower Salt River, Verde River, Coon Creek, and Arnett Creek (USFS 2017). Development or rehabilitation of recreation sites may cause some short- and long-term adverse effects if sites are located in or near suitable habitat for the yellow-billed cuckoo. Where vegetation is sparse, even light use can prevent further development of new growth of vegetative species important for yellow-billed cuckoo habitat.

There is also direction in the LRMP to increase and/or improve recreational opportunities. Over the life of the LRMP, this could result in adverse impacts to yellow-billed cuckoos and their habitat from soil compaction and reduced riparian vegetation, as well as noise and visual disturbance to the cuckoos if occurring during the breeding season.

There are no recreation, heritage or wilderness standards and guidelines that are directly relevant to the yellow-billed cuckoo.

Watershed Management

Watershed improvement projects include, but are not limited to, maintaining or improving watershed condition, including improving and maintaining water quality, improving and protecting riparian areas, and protecting floodplains. In most cases, projects would be limited in extent and amount of ground disturbance. Projects and activities in the riparian areas would improve riparian conditions, which would maintain or improve riparian vegetation needed by the yellow-billed cuckoo. These projects would also promote recruitment and maintenance of native riparian vegetation.

Projects in yellow-billed cuckoo suitable and occupied habitat could have localized, short-term effects through riparian vegetation reduction and disturbance to individual cuckoos if occurring during the breeding season. All activities would implement best management practices as described in the BA (USFS 2017). Projects would have short-term adverse effects to the species and habitat, but would have long-term beneficial effects as watersheds, aquatic, and riparian habitats move towards desired conditions. A challenge for the TNF along the upper Verde River is the small amount of habitat they manage compared to non-federal lands. Impacts such as private diversions, groundwater pumping, etc. will likely continue to affect the condition of these TNF-managed riparian areas.

The BA does not specify the watersheds or riparian or stream areas that would be treated under the LRMP. However, activities would be expected to have long-term beneficial impacts, if implemented in watersheds suitable or occupied by yellow-billed cuckoo. Short-term impacts associated with project implementation could result in increases in sedimentation, soil compaction, and reduced vegetation.

While watershed program activities would benefit the yellow-billed cuckoo, their prey and their habitats, we expect short-term adverse effects may occur during project implementation.

- Standard and Guideline 1350 ensures that at least 80% of the potential shrub cover in riparian areas is rehabilitated through the use of appropriate grazing systems and methods, which will provide for needed habitat for the cuckoo.
- Standard and Guideline 1371should benefit yellow-billed cuckoo suitable and occupied habitat by preserving the free-flowing condition of the Verde Wild and Scenic River in Management Area 1C. Direction for the Verde Wild and Scenic River also includes protection and enhancement of outstandingly remarkable values and meeting or exceeding State of Arizona water quality standards, which may indirectly benefit the yellow-billed cuckoo, its suitable and occupied habitat, and its prey and habitat.

There may be localized, short-term adverse effects from projects in and adjacent to riparian zones such as localized sediment input into habitat, soil and vegetation disturbance, and temporary disruption of prey base. However, these effects would be minimized by guidelines as previously described. Furthermore, while projects related to habitat improvements would likely have short-term adverse effects, we anticipate that long-term benefits to PCEs of critical habitat will occur by maintaining and possibly improving their ability to contribute to the conservation and recovery of the species. Long-term benefits of these projects would reduce sedimentation effects into riparian habitats, improve water quality, and retain vegetative cover.

Wildlife, Fish, and Rare Plants

This program area includes inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, conservation strategy development, administrative studies, research collaboration, and information and education. The most important activities implemented under this program that would affect yellow-billed cuckoos are those that restore riparian habitat.

Actions resulting in noise and visual disturbance to individual yellow-billed cuckoos can alter their breeding or feeding behaviors. Adverse effects from implementing activities would be minimized by the TNF LRMP standards and guidelines. Overall, the Wildlife, Fish, and Rare Plants program plan components are positive for yellow-billed cuckoos and their habitats in the long-term and would maintain or improve watershed condition indicators related to nonnative species, soils, riparian vegetation, and rangeland vegetation.

Seven standards and guidelines address potential impacts of habitat improvement projects on yellow-billed cuckoos and their prey:

- Standard 1343 provides for the protection of newly listed species, which includes the yellow-billed cuckoo.

- Standards 1345, 1391, and 1410 give precedence to threatened, endangered and sensitive species over other species.
- Standard and Guideline 1353 directs that any surface or vegetation disturbing projects in riparian areas will be coordinated and will specify protection or rehabilitation of riparian-dependent resources.
- Standard 1356 reestablishes riparian vegetation in severely degraded, but potentially productive riparian areas.
- Guideline 1361 manages riparian areas to the level needed to provide protection and improvement.

These standards and guidelines would improve yellow-billed cuckoo suitable and occupied habitat by minimizing soil disturbance, reducing sedimentation, improving vegetation that protects and stabilizes streambanks, and reducing negative impacts to riparian areas. Wildlife, fish and rare plant projects may have localized, short-term adverse effects such as streamflow and streambank alteration, and vegetation reduction. These adverse effects could alter riparian vegetation; however; we would expect them to be short in duration and intensity. Furthermore, through site-specific project planning and consultations, TNF may include specific conservation measures that minimize disturbance effects to cuckoo nesting and breeding activity where warranted.

Proposed PCEs for the Western Yellow-billed Cuckoo

PCE 1 and 2: Riparian vegetation and adequate prey base.
EFFECT: Livestock grazing in yellow-billed cuckoo proposed critical habitat could result in indirect adverse effects through habitat manipulation. Livestock consume young age-class riparian woody vegetation that cuckoos could eventually use for breeding. Continued forage use on young riparian vegetation can result in long-term adverse effects to these PCEs if suitable breeding and prey habitat is not permitted to develop. Insects that the yellow-billed cuckoo feeds upon may also be affected by those actions that affect riparian vegetation.

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

The engineering program area may have adverse effects if a road is constructed in cuckoo proposed critical habitat. A road constructed in proposed critical habitat would result in the permanent loss of the PCEs of critical habitat associated with riparian areas. This loss of riparian habitat-related PCEs would be considered long-term since the area would remain devoid of vegetation in perpetuity. Additionally, if road maintenance activities are required at any time, PCEs 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.

Minerals activities could result in the loss of both the riparian habitat and insect prey base PCEs of critical habitat in those areas in the long-term. Mining plans of operation could likely result in dewatering of riparian habitat with the areas remaining devoid of the PCEs of critical habitat, especially the riparian habitat components, throughout the life of the mining activities and possibly into perpetuity.

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

PCE 3: Dynamic riverine processes.
EFFECT: Actions implemented under the TNF LRMP are expected to retain and protect this PCE. There are standards and guidelines to ensure that areas supporting listed species are not dewatered or impaired to the point that they cannot support riparian and aquatic species and the habitats they require. There are objectives, standards and guidelines that would enhance or restore stream and riparian habitat. Actions implemented under the LRMP have required standards and guidelines to protect instream flow, consistent with existing water rights and laws, that are expected to retain and protect this PCE.

Erosion resulting from wildland fire, watershed improvements, recreation use, road improvements, mineral activities, and grazing could cause erosion impacts to streams and rivers. In riparian areas, soil erosion may eliminate existing vegetation and limit recovery of vegetation that has been disturbed. In addition to their direct contribution to erosion, these activities may result in additional disturbance from future activities and recreation. A number of standards and guidelines would reduce erosion effects within proposed critical habitat and other occupied territories, thus protect this PCE.

In summary, although there could be long-term effects to the PCEs of proposed critical habitat from vegetation removal, loss of prey base, and possibly increased erosion affecting recovery of riparian habitat particularly from mining activities.

Narrow-Headed Gartersnake and its Proposed Critical Habitat

Engineering

The TNF engineering program includes managing and maintaining roads, bridges, dams, buildings, water systems, wastewater systems, and infrastructure (USFS 2017). Localized short- and long-term adverse effects to the narrow-headed gartersnake, its prey, and its proposed critical habitat could result from construction, reconstruction, decommissioning, maintenance, and improvement of the infrastructure if activities are located in or near occupied streams.

Future projects would be designed to minimize potential harm, and potentially improve watershed conditions and would employ BMPs and guidelines to minimize effects and protect watershed resources. We would expect that over the life of the forest plan, there could be additional new and temporary road construction to help support forest activities and provide access to inholdings. However, existing roads on the landscape are part of the environmental baseline and not considered in the effects analysis.

Engineering activities within or close to riparian areas can remove and alter riparian vegetation, impact stream channel function and structure, create attractive nuisances by inadvertently creating artificial coversites adjacent to roads, and alter and degrade aquatic habitat through changes in water quality and increases in sediment deposition. Long-term effects to the species include disturbance, loss/fragmentation of habitat, and erosion from roads that deposit sediment or concentrate runoff into streams. Potential downstream effects of this program area could result in increased sedimentation from forest roads in narrow-headed gartersnake habitat and its critical habitat. Gartersnakes, like many other snake species, have been known to show little, if any, road-avoidance behavior, such as noise avoidance, surface avoidance, or vehicle avoidance. Jaeger *et al.* (2005) found that populations of species exhibiting a lack of road avoidance behavior to small or large roads, regardless of traffic volume, could be at elevated risk; particularly in the case of remote populations subject to environmental stochasticity with limited immigration of individuals (Jaeger *et al.* 2005).

Projects could include new installation, maintenance, or improvements to culverts, low-water crossings, and drainage ditches. Depending on the project location and season of year, more significant effects are likely associated with use of heavy machinery and disturbance of potential coversites used by snakes. Where roads cross streams, there may be ancillary structures in place to reduce erosion such as rock gabions and riprap. Gartersnakes will use these structures as cover for both short- and longer periods of time. The presence of such structures could be considered an attractive force for gartersnakes that could increase the likelihood of take. If these structures are being added or enhanced as part of the action, we should consider that they could attract gartersnakes to the crossing and potentially increase the number of individuals killed or injured over time. Any time medium to large-sized rocks are piled as part of the road structure, there may be a higher likelihood that gartersnakes may occur along the road.

Engineering projects improving soil and vegetation condition in the uplands could improve or minimize this program's impacts to aquatic and riparian conditions along streams. Controlling erosion from earth-disturbing activities and construction-related projects is generally a best management practice and part of most, if not all, project designs. Structures used to control erosion include mulch control netting, erosion control blankets, fiber rolls (wattles), and reinforced silt fences (California Coastal Commission 2012). These products use stitching or net-like mesh products to hold absorbent media together; these have been shown to entangle snakes and lead to injury or death from predation or exposure (Stuart *et al.* 2001, Barton and Kinkead 2005, Kapfer and Paloski 2011).

There are several relevant standards and guidelines that would affect narrow-headed gartersnake and its habitat:

- Guideline 1362 would locate roads (where possible) on natural benches, ridges, flat slopes near ridges or valley bottoms, and away from stream channels. This may limit impacts from motorized vehicle use in riparian, floodplain, and adjacent upland areas that contain narrow-headed gartersnake habitat.
- Guideline 1363 would locate roads on well-drained and stable ground, avoiding seeps and other unstable areas. This may reduce impacts from vehicles in riparian, floodplain, and adjacent upland areas that contain narrow-headed gartersnake habitat.
- Guideline 1364 states that stream crossing approaches should avoid steep pitches and grades in order to prevent sedimentation, which would help reduce the contribution of sediment from roads, from entering streams such as those where narrow-headed gartersnake occur.
- Guideline 1365 locates necessary channel crossings where the channel is straight and cross the channel at right angles. This reduces the length of vehicular travel within streams and therefore reduces sedimentation.
- Guideline 1368 avoids channel changes or disturbance of stream channels and minimizes impacts to riparian vegetation.
- Standard and guideline 1398 calls for designing timber sale road systems to minimize impacts on stream channels and water quality. Roads should be located on slopes less than 60%, and should have sustained gradients of less than 8%. Roads should not be located on unstable slopes where mass movement is likely to occur. This helps prevent or reduce road impacts to stream habitat.

These standards and guidelines would help minimize adverse impacts to the narrow-headed gartersnake habitat by minimizing soil disturbance, reducing sedimentation, improving vegetation that protects and stabilizes streambanks, and reducing negative impacts to riparian areas. These adverse effects could alter riparian vegetation; however; we would expect them to be short in duration and for the most part, of low intensity.

Fire Management

This program area includes elements of hazardous fuels reduction (prescribed fire and mechanical treatments), aviation, prevention, planning, and monitoring, designed to protect communities, watersheds, and species at risk and to restore and maintain resilient ecosystems. Fuels reduction can result in short-term impacts to the narrow-headed gartersnake by burning its habitat or from post-fire flooding. Prescribed fire and mechanical treatments may reduce the likelihood of wildfire entering riparian habitats and future post-fire runoff.

Mechanical treatments and prescribed fire may reduce the risk of high-severity wildfire entering riparian habitats and future post-fire runoff. When properly applied, mechanical treatments and prescribed fires should have long-term benefits to narrow-headed gartersnake populations by reducing the likelihood of uncharacteristic wildfire. Perhaps the most dangerous and significant effect of mechanical treatments on gartersnakes is the generation and management of slash piles, particularly when slash piles are created, left in place for weeks, months, or even years, and subsequently burned. Slash piles, commonly generated through mechanical treatments, are an attractive nuisance for gartersnakes (because they provide shelter, potential prey, and varied thermoregulatory opportunities) and can lead to elevated risk of adverse effects to gartersnakes

depending on the size and location of slash piles, how long they are left in place to cure, and when they are burned.

Short-term adverse effects from these activities may include increased sedimentation and runoff into adjacent and downstream aquatic communities. There may be adverse effects from implementing this program if there is inadequate ground cover to prevent excessive sediment from being transported into their aquatic habitats, above what is tolerable to listed fish at different life stages. Reducing vegetation within watersheds could increase runoff from floodwaters, deposition of debris, and sediment from burned areas. However, there would also be long-term beneficial effects as watersheds, and aquatic and riparian habitats move towards desired conditions and a natural fire regime.

Projects could have short-term adverse effects to the species and the PCEs associated with designated critical habitats, including short-term indirect effects (i.e., increased sedimentation) in habitats downstream, including off the Forest, where this species occur. However, there would also be long-term beneficial effects as watersheds, aquatic, and riparian habitats move towards desired conditions and a natural fire regime.

This program area has standards and guidelines to reduce impacts to narrow-headed gartersnakes and their fish prey. Standards and guidelines 1376a and 1376d integrate habitat needs and use prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement. Prescribed fire treatments reduce vegetative cover and increase ash and nutrients. These adverse effects may include excessive sediment deposited into important fish prey habitats and direct removal of important habitat structure along occupied streams from burning or post-fire flood events. Mechanical treatment projects reduce vegetative cover and result in soil disturbance from the use of heavy equipment. Both types of treatments may result in short-term adverse effects on water quality. Long-term effects result in reduction of the effects of fire suppression impacts from this program on the gartersnake.

Forestry and Forest Health

The Forestry and Forest Health Program includes vegetation treatments such as timber harvest, forest product extraction, and forest health. Many plan decisions may also affect native fish that narrow-headed gartersnakes depend upon for food by degrading stream channels and water quality as a result of road construction, operation of equipment and vehicles, skidding, slash/debris deposition, and soil compaction.

Vegetation treatments implemented under this program may cause short-term increases in flood runoff, scouring and sediment deposition into narrow-headed gartersnake and its fish prey habitats. If the fish community is adversely affected, narrow-headed gartersnakes are affected. The standards and guidelines described above are intended to reduce this impact on both narrow-headed gartersnakes and their prey.

There are several relevant standards and guidelines that would affect narrow-headed gartersnake and its habitat:

- Standard and guideline 1342 requires clearance of all projects for all listed, proposed, and candidate species through section 7 consultation.

- Standard and guideline 1398 calls for designing timber sale road systems to minimize impacts on stream channels and water quality. Roads should be located on slopes less than 60%, and should have sustained gradients of less than 8%. Roads should not be located on unstable slopes where mass movement is likely to occur. This helps prevent or reduce road impacts to stream habitat.
- Standard and guideline 1399 requires evaluation of the need for buffer strips adjacent to water bodies to protect aquatic and riparian resources. This reduces sediment from entering riparian areas and streams.
- Standard and guideline 1400 restricts skidding to areas with lower slopes, while standard and guideline 1401 restricts skidding and hauling to soil moisture conditions that prevent excessive soil compaction, displacement, or puddling. These also reduce sedimentation into streams and riparian areas.
- Standard and guideline 1402 directs the placement of slash piles and debris outside protected stream channels, providing cover for the gartersnake.
- Standard and guideline 1403 directs skidding operations in manners to prevent watershed damage and prescribes rehabilitation for areas affected by logging, in turn minimizing compaction within gartersnake habitat.

All of these standards and guidelines reduce and minimize potential effects on riparian and aquatic areas that may serve as hibernacula and foraging habitat for this species. Overall, activities under the Forestry and Forest Health Program may result in short-term adverse effects on the narrow-headed gartersnake, but are expected to result in long-term beneficial effects by maintaining or improving watershed conditions related to water quality, soils, fire regime, and rangeland vegetation.

Lands and Minerals

The Land and Minerals Program is responsible for land ownership and adjustments including purchases; withdrawals; land exchanges; mining; oil, gas, and geothermal leases; and the issuance of non-recreational special use authorizations, including water use authorizations and utility and transportation rights-of-way and easements. These program areas may adversely affect narrow-headed gartersnakes and their habitats and their native fish prey if the authorized activities affect water quality or impact stream bodies (e.g., Rosemont mine on the Coronado NF will affect an entire watershed by slowly dewatering it).

Land exchanges can result in long-term beneficial effects, through USFS management that may support the narrow-headed gartersnake, its prey habitat, and its critical habitat. However, land exchanges could also result in increased recreation activities, especially in or near riparian areas, which leads to increased soil compaction and reduced hiding cover for the gartersnakes.

Mineral activities could result in short- and long-term adverse effects if roads, utilities, facilities, or mines are located in or near riparian areas that support habitat for the narrow-headed gartersnake. The TNF Forest Plan's goal to confine rights-of-way grants to designated corridors to the extent practicable minimizes new impacts to aquatic and riparian habitats that may support this species.

There are no lands, special uses, or minerals standards and guidelines that are directly relevant to the narrow-headed gartersnake.

Rangeland Management

Program activities include administering livestock grazing, implementation and effectiveness monitoring, development of structural and non-structural improvements, control of invasive weeds, and the authorization of grazing. Authorized livestock grazing can affect narrow-headed gartersnake and prey habitat by disturbing streams and the riparian areas. Livestock use and movement along the streams reduces hiding cover, tramples streambanks, and increases potential sedimentation and waste deposits, which impair water quality. Impacts to water quality would be greatest during seasonally low flow periods and during periods of droughts.

Effects to narrow-headed gartersnakes from livestock management would mainly be indirect effects associated with important native fish prey species, the ability to evade harmful nonnatives through the use of vegetation cover, and, to a lesser degree, habitat disturbance. However, direct effects could occur from trampling of gartersnakes by livestock grazing within occupied gartersnake habitat. The extent to which grazing-related activities could affect narrow-headed gartersnakes depends on whether there are harmful non-native species present, and if so, what their relative densities are. The more predation and competition from harmful non-native species, the more sensitive narrow-headed gartersnakes are to actions that affect their habitat. Some segments of narrow-headed gartersnake habitat are protected from livestock grazing by exclosure fences along most streams, limited pasture use, timing restrictions for livestock use in riparian areas where they are known to occur, or have limited accessibility due to steep terrain. There may be unknown narrow-headed gartersnake populations in areas that may not receive the previously mentioned protections from livestock grazing.

There are no standards and guidelines that prohibit grazing within allotments on the TNF, however it is possible that proposed projects may include some grazing within or near riparian habitat. Three standards and guidelines protect or restore riparian or wetland habitats and the uplands that may influence narrow-headed gartersnake habitat:

- Standard and guideline 1370a directs the preparation of grazing allotment management plans, updated every 5 to 10 years, which include objectives and management strategies to minimize effects to wildlife habitat.
- Standard and guideline 1370c assures grazing permittee maintenance of structural improvements on an annual basis, which may include maintenance of fencing that prevents livestock access to riparian areas.
- Standard and guideline 1370d prescribes that forage use by grazing ungulates be maintained at or above a condition that assures recovery and continued existence of threatened and endangered species. These standards and guidelines minimize adverse effects to narrow-headed gartersnake by limiting riparian access.

The standards and guidelines under this program are expected to minimize, but may not eliminate adverse effects. Therefore, over the life of this consultation, we expect that implementation of the Rangeland Program could result in adverse effects to the narrow-headed gartersnake and their habitat.

Recreation, Heritage, and Wilderness

Program components include administration and management of developed recreation sites, dispersed recreation settings, partnerships and tourism, interpretive services, recreation special use permits, congressionally designated areas, scenery management, trail management, and scenic byways. Recration sites and developments near reservoirs, streams and adjacent areas receive high levels of recreation that can alter vegetation, riparian areas, water quality, and aquatic habitat, and result in threats to maintaining, restoring and recovering narrow-headed gartersnake habitats. Recreational sites and activities can degrade upland and watershed conditions and function, alter riparian vegetation and function, reduce water quality, and increase sediment in streams, affecting fish communities that narrow-headed gartersnakes feed upon. Recreational activities within and adjacent to riparian areas and streams can increase the risk of introductions and spread of invasive or undesirable plants and animals, as well as increase the risk of human-gartersnake interactions, often leading to intentional killing or injuring of gartersnakes due to the public's general fear or dislike of snakes.

The TNF LRMP includes objectives for the reconstruction or rehabilitation of existing recreation sites, construction of new recreation sites, and construction or reconstruction of trails, including locations with known narrow-headed gartersnake populations. Development or rehabilitation of recreation sites may cause some short- and long-term adverse effects if sites are located in or near suitable or occupied habitat for the narrow-headed gartersnake.
There is also direction in the LRMP to increase and/or improve recreational opportunities. Over the life of the LRMP, this could result in adverse impacts to narrow-headed gartersnakes and their habitat from soil compaction and reduced hiding cover through trampling of streamside vegetation.

There are no recreation, heritage or wilderness standards and guidelines that are directly relevant to the narrow-headed gartersnake.

Watershed Management

Watershed improvement projects include maintaining or improving watershed condition, including improving and maintaining water quality, improving and protecting riparian areas, and protecting floodplains. In most cases, projects would be limited in extent and amount of ground disturbance, and therefore would have the localized, short-term effects of streambank disturbance, riparian vegetation reduction, sediment deposition into the stream, and disturbance to individual snakes.

Projects and activities in the riparian areas would improve aquatic and riparian conditions and are expected to reduce sediment deposition into aquatic habitats, which would maintain or improve water quality and benefit the fish community. If the fish community is largely native, the benefits from these activities for narrow-headed gartersnakes would be markedly beneficial. If the fish communities are largely nonnative, these activities may ultimately harm narrow-headed gartersnakes by improving the conditions for harmful nonnative species which prey upon and compete with narrow-headed gartersnakes. These projects would also promote recruitment and maintenance of native riparian vegetation, which provides cover for narrow-headed gartersnakes and maintains suitable water temperature for native fish in the streams. Standard 1350 ensures that at least 80% of the potential shrub cover in riparian areas is rehabilitated

through the use of appropriate grazing systems and methods, which will provide for narrow-headed gartersnake cover. All activities would implement best management practices as described in the BA (USFS 2017). Projects would have short-term adverse effects to the species and habitat but would have long-term beneficial effects as watersheds, aquatic, and riparian habitats move towards desired conditions.

The BA does not specify the watersheds or riparian or stream areas that would be treated under the LRMP. However, activities are targeted at maintaining or improving watershed condition, including improving and maintaining water quality, improving and protecting riparian areas, and protecting floodplains. These activities would be expected to have long-term beneficial impacts if implemented in streams or watersheds occupied by narrow-headed gartersnakes with wholly native aquatic communities, through restoration of hydrologic conditions and functions.

Wildlife, Fish, and Rare Plants

This program area includes inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, conservation strategy development, administrative studies, research collaboration, and information and education. The most important activities implemented under this program that would affect narrow-headed gartersnakes are those that restore federally-listed native fish to identified recovery streams. These could include application of piscicides, as well as other projects to improve aquatic habitat for native fish. The use of piscicides is intended to eliminate entire fish communities and therefore, eliminate the entire prey base for resident narrow-headed gartersnakes. These potential effects to gartersnakes are severe and can lead to extirpoation of narrow-headed gartersnake populations. Therefore, robust and very early coordintation between the Tonto National Forest, the Fish and Wildlife Service, and other state, federal, tribal, and/or local partners is required to immediately reestablish the fish community after treatment, through hatchery production and release of native fish in adequate densitis to ensure these effects do not occur.

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

Actions resulting in disturbance to individual narrow-headed gartersnakes can alter their breeding or feeding behaviors and increase their risk of predation. Seven standards and guidelines help minimize potential impacts of these habitat improvement projects on narrow-headed gartersnakes, their habitat, and their prey. These standards and guidelines would improve narrow-headed gartersnake and native fish habitat by minimizing soil disturbance, reducing sedimentation, improving vegetation that protects and stabilizes streambanks, and reduces negative impacts to riparian areas.

- Standard 1343 provides for the protection of newly listed species, which includes the narrow-headed gartersnake.
- Standards 1345, 1391, and 1410 give precedence to threatened, endangered and sensitive species over other species.

- Standard and Guideline 1353 directs that any surface or vegetation disturbing projects in riparian areas will be coordinated and will specify protection or rehabilitation of riparian-dependent resources.
- Standard 1356 reestablishes riparian vegetation in severely degraded, but potentially productive riparian areas.
- Guideline 1361 manages riparian areas to the level needed to provide protection and improvement.

Overall, the Wildlife/Fish/Rare Plants program plan components are positive for narrow-headed gartersnakes and their habitats in the long-term and would maintain or improve watershed condition indicators related to water quality, nonnative species, soils, riparian vegetation, and rangeland vegetation.

Proposed PCEs for the Narrow-Headed Gartersnake

Watershed improvement projects that involve instream improvements are expected to have short-term adverse effects to the PCEs of proposed 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 PCEs 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 PCEs of narrow-headed gartersnake proposed 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. TNF program area management actions needed to support native fish restoration could include construction and maintenance of fish barriers to restrict non-native fish from inhabiting areas currently occupied by only native species, 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 PCEs of critical habitat from barrier construction and maintenance such as streamflow alteration, sedimentation, and disturbance to the gartersnakes prey base. Project implementation would follow appropriate standards and guidelines, as described above, to minimize impacts to the PCEs 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, improving 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 PCEs of proposed critical habitat resulting from livestock grazing are expected to be similar to the indirect effects to narrow-headed gartersnake through habitat modification as described above. Livestock grazing can affect the PCEs of critical habitat as a result of movement along the streams, temporarily reducing shelter cover, trampling streambanks, contributing to sedimentation, and adding nitrogenous waste that can impair water quality. Impacts to water quality would be greatest during warmer months, 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 grazing guidelines, as described above and in the BA, would 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.

PCE l. 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.

EFFECT: There may be localized, short-term adverse effects to this PCE from watershed improvement projects, engineering, livestock grazing, and lands and minerals projects in aquatic habitats such as streambank disturbance and sediment input that may be deposited in important fish prey habitats. These projects may temporarily reduce the function of critical habitat through diminished prey base; however, we anticipate that this PCE would be maintained or improved in the long-term. In the long-term, projects are expected to improve soil and vegetation condition in the uplands and will likely improve or at least minimize impacts to aquatic and riparian conditions along streams. Implementation of standards and guidelines previously described are anticipated to reduce the effects of forest programs in the sub-watersheds occupied by narrow-headed gartersnakes and their prey.
There are seven proposed critical habitat subunits located across 24 grazing allotments on the TNF. Accessible areas may experience livestock grazing effects to streambanks, riparian vegetation, and water quality.

Maintenance activities conducted within and near narrow-headed gartersnake proposed critical habitat could temporarily increase turbidity of surface water within and downstream of the maintenance area. However, impacts on water quality should be localized and temporary, and BMPs will be implemented to reduce sedimentation and runoff from roads and other infrastructure. With the exception of these potential effects to water quality, activities implemented under the proposed action are expected to retain this PCE for the narrow-headed gartersnake as explained under 1.a. and l.b.

PCE 2. Adequate terrestrial space (600 feet 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.

EFFECT: The Engineering Program may have adverse effects if a road is constructed in gartersnake proposed critical habitat. A road constructed in gartersnake habitat would result in the permanent loss of the PCEs of critical habitat associated with terrestrial space adjacent to stream systems. Additionally, if road maintenance activities are required at any time, PCEs related to riparian habitat that have regrown could be diminished.

The Recreation, Heritage and Wilderness Program authorizes activities such as dispersed camping, hiking, and other recreation activities that may adversely impact adjacent terrestrial habitat through vegetation manipulation and disturbance. There are numerous plan decisions that address potential impacts of recreation to riparian and adjacent areas, which would include those proposed as critical habitat. The LRMP includes standards and guidelines to reduce the impacts to riparian habitats, including those inhabited by narrow-headed gartersnakes; 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 gartersnake proposed critical habitat.

There are objectives that would enhance or restore stream and riparian habitat that would connect existing habitats and allow movement of riparian obligate species, such as the narrow-headed gartersnake, between them. Roads and motorized trails would be designed and located so as to not impede terrestrial and aquatic species movement and connectivity.

PCE 3. A prey base consisting of viable populations of native fish species or soft-rayed non-native fish species.
EFFECT: Program actions that involve ground disturbing projects in the uplands and within riparian and aquatic habitats are expected to have short-term adverse effects to the PCEs of proposed critical habitat related to prey base. There may be localized, short-term adverse effects from projects in watersheds and riparian zones such as sediment input to the streams, temporary disturbance of habitat, and temporary disruption of prey base. Long-term adverse effects may occur when roads, trails, or other heavy use areas are located within proposed critical habitat. However, these effects would be minimized by standards and guidelines as previously described under the listed aquatic species discussion above.

The construction and maintenance of fish barriers is generally accompanied by the implementation of chemical fish removals using piscicides. Fish community renovations that promote the long-term viability of native fish species are greatly beneficial to narrow-headed gartersnakes. However, during implementation of chemical treatments, the narrow-headed gartersnakes' entire prey base is completely removed. The duration of time required to replenish the prey base ultimately determines whether the gartersnake population is threatened with extirpation or instead experiences only minor, short-term effects. A lengthy pre-project planning period and thorough coordination with species experts is required to ensure effects to gartersnake populations are minimal during chemical fish community renovations.

PCE 4. An absence of non-native fish species of the families Centrarchidae and Ictaluridae, bullfrogs (*Lithobates catesbeianus)*, and/or crayfish *(Orconectes. virilis*, *Procambarus clarki*, etc.), or occurrence of these non-native species at low enough levels such that recruitment of narrow-headed gartersnakes and maintenance of viable native fish or soft-rayed, non-native fish populations (prey) is still occurring.

EFFECT: The TNF is implementing measures to ensure that actions implemented under the LRMP, particularly movement of water under the Fire Management and Rangeland Management programs, do not result in the incidental movement of non-native species into critical habitat. Conservation measures that are designed for future projects implemented under this programmatic review should always strive to include the removal of harmful nonnative species whenever possible to improve the status of narrow-headed gartersnakes so the species can become more tolerant to future stressors such as the effect of climate change on their rangewide habitat.

Northern Mexican Gartersnake, and its Proposed Critical Habitat

Engineering

The TNF engineering program consists of managing and maintaining roads, bridges, dams, towers, buildings, water systems, wastewater systems, and infrastructure (USFS 2017). Effects to northern Mexican gartersnakes, their prey, and their habitat from activities under the engineering program are similar to those described for narrow-headed gartersnakes and include short- and long-term adverse effects from construction and maintenance of roads, trails, and administrative buildings. Although engineering projects could occur across the entire forest for the length of the plan, these projects could have localized, as well as short- and long-term adverse effects to northern Mexican gartersnakes from actions taken near aquatic habitat. Roads crossing or adjacent to aquatic habitat can remove and alter riparian vegetation, impact stream channel function and structure, and alter and degrade aquatic habitat through changes in water quality and increases in sediment deposition, resulting in adverse impacts to the gartersnake, its prey, and its habitat. Northern Mexican gartersnakes may also be injured or killed by vehicle traffic when crossing roads adjacent to their habitat.

Standards and guidelines designed for road projects improving soil and vegetation condition are the same as those identified and discussed above for the narrow-headed gartersnake.

Fire Management

This program area includes elements of hazardous fuels reduction (prescribed fire and mechanical treatments), aviation, prevention, planning, and monitoring, designed to protect communities, watersheds, and species at risk and to restore and maintain resilient ecosystems. Short-term adverse effects from these fire management activities may include increased sedimentation and runoff into adjacent and downstream aquatic communities. Construction of roads through areas occupied by listed species could have adverse effects. There may be adverse effects from implementing this program if there is inadequate ground cover to prevent excessive sediment from being transported into aquatic habitats. Reducing vegetation within watersheds could increase runoff from floodwaters, deposition of debris, and sediment from burned areas. By improving overall watershed conditions and reducing the potential for large-scale catastrophic wildfires and associated effects on water quality, activities under this program would benefit the northern Mexican gartersnake and its habitat.

When properly applied, prescribed fires should have long-term benefits to northern Mexican gartersnake populations by reducing the likelihood of uncharacteristic wildfire. Mechanical

treatments and prescribed fire may reduce the risk of high-severity wildfire entering riparian habitats and post-fire runoff. Perhaps the most dangerous and significant effect of mechanical treatments on gartersnakes is the generation and management of slash piles, particularly when slash piles are created, left in place for weeks, months, or even years, and subsequently burned. Slash piles, commonly generated through mechanical treatments, are an attractive nuisance for gartersnakes (because they provide shelter, potential prey, and varied thermoregulatory opportunities) and can lead to elevated risk of adverse effects to gartersnakes depending on their size and location, how long they are left in place to cure, and when they are burned.

Fire treatment includes thinning, removal of fuels from the landscape, or altering the fuel profile to reduce the potential for loss of private property. Projects could have short-term adverse effects to the species and the PCEs associated with designated critical habitats, including short-term indirect effects (i.e., increased sedimentation) in habitats downstream, including off the Forest, where these species occur. However, there would also be long-term beneficial effects as watersheds, aquatic, and riparian habitats move towards desired conditions.

This program area has standards and guidelines to reduce impacts to narrow-headed gartersnakes and their prey. Standards and guidelines 1376a and 1376d integrate habitat needs and use prescribed fire to treat vegetation to improve water yield, forage, and wildlife habitat. Prescribed fire treatments reduce vegetative cover and increase ash and nutrients. Mechanical treatment projects reduce vegetative cover and result in soil disturbance from the use of heavy equipment. Both types of treatments may result in short-term adverse effects on water quality. Over the long-term, these treatments would reduce the effects of wildfire and associated suppression impacts on the gartersnake.

Forestry and Forest Health

Project activities under the Forestry and Forest Health program could include mechanical and silvicultural treatments, creation of slash piles, along with construction of temporary roads to access treatment areas. Activities under this program generally do not affect the northern Mexican gartersnake and its habitat, which mainly occurs outside forested areas on the TNF. Any activities in lower elevation riparian areas such as debris removal and tamarisk control may result in short-term adverse effects from increased sedimentation and loss of vegetation, but are likely to result in long-term beneficial effects by improving the habitat.

Upland vegetation treatments implemented under this program may cause short-term increases in flood runoff, scouring, and sediment deposition into northern Mexican gartersnake and their fish and amphibian prey habitats. If these treatments decrease prey density, they would be expected to affect northern Mexican gartersnakes due to reduced available prey.

There are several relevant standards and guidelines that would affect northern Mexican gartersnake and its habitat:

- Standard and guideline 1342 requires clearance of all projects for all listed, proposed, and candidate species through section 7 consultation.
- Standard and guideline 1398 calls for designing timber sale road systems to minimize impacts on stream channels and water quality. Roads should be located on slopes less than 60%, and should have sustained gradients of less than 8%. Roads should not be

located on unstable slopes where mass movement is likely to occur. This helps prevent or reduce road impacts to stream habitat.

- Standard and guideline 1399 requires evaluation of the need for buffer strips adjacent to water bodies to protect aquatic and riparian resources. This reduces sediment from entering riparian areas and streams.
- Standard and guideline 1400 restricts skidding to areas with lower slopes, while standard and guideline 1401 restricts skidding and hauling to soil moisture conditions that prevent excessive soil compaction, displacement, or puddling. These also reduce sedimentation into streams and riparian areas.
- Standard and guideline 1402 directs the placement of slash piles and debris outside protected stream channels, providing cover for the gartersnake.
- Standard and guideline 1403 directs skidding operations in manners to prevent watershed damage and prescribes rehabilitation for areas affected by logging, in turn minimizing compaction within gartersnake habitat.

All of these standards and guidelines reduce and minimize potential effects on riparian and aquatic areas that may serve as hibernacula and foraging habitat for this species. Overall, activities under the Forestry and Forest Health Program may result in short-term adverse effects on the northern Mexican gartersnake, but are expected to result in long-term beneficial effects by maintaining or improving watershed conditions related to water quality, soils, fire regime, and rangeland vegetation.

Lands and Minerals

The Land and Minerals Program is responsible for land ownership and adjustments including purchases, withdrawals; land exchanges; mining; oil, gas, and geothermal leases; and the issuance of non-recreational special use authorizations. Effects of this program on the northern Mexican gartersnake are similar to those described for the narrow-headed gartersnake. There are no standards and guidelines that are directly relevant to the northern Mexican gartersnake under the Land and Minerals Program. Land exchanges can result in a mix of long-term beneficial effects, through USFS management that may support the northern Mexican gartersnake, as well as long-term adverse effects, from increased public and recreational use of these areas. The TNF Forest Plan's goal to confine right-of-way grants to designated corridors to the extent practicable minimizes new impacts to aquatic and riparian habitats that may support this species.

Mineral activities could result in short- and long-term adverse effects if roads, utilities, facilities, or mines are located in or near riparian areas that support habitat for the northern Mexican gartersnake (e.g., Rosemont mine on the Coronado NF will affect an entire watershed by slowly dewatering it).

Rangeland Management

Program activities under the rangeland management program include administering livestock grazing, implementation and effectiveness monitoring, development of structural and non-structural improvements, and control of invasive weeds.

Effects to northern Mexican gartersnakes from livestock management would mainly be indirect, associated with trampling of vegetation, soil compaction, and increased sedimentation. The

extent to which grazing-related activities could affect northern Mexican gartersnakes depends on whether there are harmful non-native species present, and if so, what their relative densities are. The more predation and competition from harmful non-native species, the more sensitive northern Mexican gartersnakes are to actions that affect their habitat, in particular, the removal of dense vegetation near the gartersnake's foraging areas that provides valuable protective cover and lowers the predation pressure from harmful nonnative species. Many segments of northern Mexican gartersnake habitat are protected from livestock grazing by exclosure fences along most streams or have limited accessibility due to steep terrain. There are two proposed critical habitat subunits located across 15 grazing allotments on the TNF.

There are no standards and guidelines that prohibit grazing within allotments on the TNF and it is possible that proposed projects may include some grazing within or near riparian habitat. However, three standards and guidelines protect or restore riparian or wetland habitats and the uplands that may influence northern Mexican gartersnake habitat.

- Standard and guideline 1370a directs the preparation of grazing allotment management plans, updated every 5 to 10 years, which include objectives and management strategies for the improvement of wildlife habitat.
- Standard and guideline 1370c assures grazing permittee maintenance of structural improvements on an annual basis, which may include maintenance of fencing that prevents livestock access to riparian areas.
- Standard and guideline 1370d prescribes that forage use by grazing ungulates be maintained at or above a condition that assures recovery and continued existence of threatened and endangered species.

These standards and guidelines minimize adverse effects to northern Mexican gartersnakes by limiting riparian access by livestock.

Livestock grazing may have minimal effects to northern Mexican gartersnake habitat due to riparian exclosures, limited pasture use, or timing restrictions for livestock use in riparian areas where they are known to occur. Authorized livestock grazing can affect habitat for the northern Mexican gartersnake by disturbing the aquatic/riparian zone through livestock use and movement along the streams, temporarily reducing hiding cover, trampling streambanks, and increasing potential sedimentation and waste deposits that can impair water quality. The standards and guidelines under this program are expected to minimize but may not eliminate adverse effects. Therefore, over the life of this consultation, we expect that implementation of the Rangeland Program could result in adverse effects to the northern Mexican gartersnake and its habitat.

Recreation, Heritage, and Wilderness

Program components include management of developed recreation sites, dispersed recreation settings, interpretive services, recreation special use permits, congressionally designated areas, scenery management, trail management, and scenic byways. Effects to the northern Mexican gartersnake, its prey, and habitat from activities under this program area are similar to those described for the narrow-headed gartersnake and include short- and long-term adverse effects from recreation sites and developments and their associated uses and activities.

The TNF LRMP includes standards and guidelines for the reconstruction or rehabilitation of existing recreation sites, construction of new recreation sites, and construction or reconstruction of trails; which include several known northern Mexican gartersnake locations. These standards and guidelines are the same as those identified for the narrow-headed gartersnake and are incorporated by reference.

There is also direction in the LRMP to increase and/or improve recreational opportunities. Over the life of the LRMP, this could result in adverse impacts to northern Mexican gartersnakes and their habitat from soil compaction and reduced hiding cover by trampling of streamside vegetation.

Watershed Management

Watershed improvement projects include maintaining or improving watershed condition, including improving and maintaining water quality, improving and protecting riparian areas, and protecting floodplains. Projects and activities would improve aquatic and riparian conditions and are expected to reduce sediment deposition into aquatic habitats, which would maintain or improve water quality and healthy native fish and amphibian populations needed by the northern Mexican gartersnake. In most cases, projects would be limited in extent and amount of ground disturbance. These projects would also promote recruitment and maintenance of native riparian vegetation, which provide cover for northern Mexican gartersnakes and maintain suitable water temperature for native fish in the streams.

Standard 1350 ensures that at least 80% of the potential shrub cover in riparian areas is rehabilitated through the use of appropriate grazing systems and methods, which will provide for northern Mexican gartersnake cover. All activities would implement best management practices as described in the BA (USFS 2017). Projects would have short-term adverse effects to the species and habitat, but would have long-term beneficial effects as watersheds, aquatic, and riparian habitats move towards desired conditions.

The BA does not specify the watersheds or riparian or stream areas that would be treated under the LRMP. However, activities are targeted at maintaining or improving watershed condition, including improving and maintaining water quality, improving and protecting riparian areas, and protecting floodplains. These would be expected to have long-term beneficial impacts, if implemented in streams or watersheds occupied by northern Mexican gartersnakes and their prey, through restoration of hydrologic conditions and functions.

Wildlife, Fish, and Rare Plants

This program area includes habitat improvements through land treatments and structures, and species reintroductions. The most important activities implemented under this program that would affect northern Mexican gartersnakes are those that restore federally-listed native fish to identified recovery streams. These would include approval of the construction and maintenance of fish barriers to improve native fish habitat, as well as other projects to improve aquatic habitat for native fish.

The construction and maintenance of fish barriers is generally accompanied by the implementation of chemical fish removals using piscicides. Fish community renovations that

promote the long-term viability of native fish species are greatly beneficial to northern Mexican gartersnakes. However, during application of chemical treatments, a proportion of the northern Mexican gartersnakes' prey base would be completely removed. The duration of time required to replenish the fish component of their prey base ultimately determines rather the gartersnake population is threatened with extirpation or instead experiences minor, short-term effects. A lengthy pre-project planning period and thorough coordination with species experts is required to ensure effects to gartersnake populations are minimal during chemical fish community renovations.

Actions resulting in disturbance to individual northern Mexican gartersnakes can alter their breeding or feeding behaviors and increase their risk of predation. Project activities would be mitigated by the guidelines described above. Standards and guidelines that address potential impacts of habitat improvement projects are the same as those identified for the narrow-headed gartersnake and are incorporated by reference. These standards and guidelines would improve northern Mexican gartersnake and native fish habitat by minimizing soil disturbance, reducing sedimentation, improving vegetation that protects and stabilizes streambanks, and reduces negative impacts to riparian areas. These projects may have localized, short-term adverse effects such as streamflow and streambank alteration, and excess sediment erosion or deposition. These adverse effects could alter water quality; however; we would expect them to be short in duration and of low intensity.

Overall, the Wildlife, Fish, and Rare Plants program plan components are positive for northern Mexican gartersnakes and their habitat in the long-term and would maintain or improve watershed condition indicators related to water quality, non-native species, soils, riparian vegetation, and rangeland vegetation.

Northern Mexican Gartersnake Proposed Critical Habitat

The historical, current, and possible future distribution of the northern Mexican gartersnake on the TNF occurs in the Verde River and Tonto Creek. The PCEs of critical habitat are very similar for both the northern Mexican and narrow-headed gartersnake species; therefore, the effects to the PCEs of critical habitat for the northern Mexican gartersnake are the same as those described for the narrow-headed 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 narrow-headed gartersnake above for a description of the effects to northern Mexican gartersnake proposed critical habitat.

Gila Trout

Invasive fish species threaten Gila trout with predation, competition, and hybridization (especially rainbow trout). Management activities that have contributed to habitat degradation on the TNF include road construction and maintenance, timber management, fire suppression and subsequent stand-replacing fires, and permitted livestock grazing (USFS 2017). Management needs for the Gila trout include continuation of delineation and restoration (including removal of non-native fishes) of specific conservation waters and stocking for recovery, as well as recreational fishing opportunities (USFS 2017).

Engineering

Ongoing activities within the engineering program include the operation and maintenance of the transportation system on the TNF, which consists of roads and trails that provide access to areas on the forest including: private land, structures and improvements under special use permits, recreational opportunities, and facilities that support land and resource management activities. We would expect that over the life of the LRMP, there could be additional new and temporary road construction to help support forest activities and provide access to inholdings, which may result in both short- and long-term adverse effects to the Gila trout and its habitat.

Construction, reconstruction or maintenance of roads that cross or are adjacent to Gila trout streams can remove and alter riparian vegetation, impact stream channel function and structure, and alter and degrade aquatic habitat through changes in water quality and increases in sediment deposition. Improperly designed culverts can create barriers to fish movement and affect habitat by causing downstream erosion during high flow events.

Long-term effects to the species include disturbance and erosion from roads that deposit sediment or concentrate runoff into streams. Road projects improving soil and vegetation condition in the uplands could improve or minimize this program's impacts to aquatic conditions. There are several relevant standards and guidelines that help minimize impacts to the Gila trout and its habitat if the project occurs within or near occupied habitat.

- Guideline 1362 would locate roads (where possible) on natural benches, ridges, flat slopes near ridges or valley bottoms, and away from stream channels. This would limit impacts from motorized vehicle use in riparian, floodplain, and adjacent upland areas that contain Gila trout habitat.
- Guideline 1363 would locate roads on well-drained and stable ground, avoiding seeps and other unstable areas. This would also limit impacts from vehicles in riparian, floodplain, and adjacent upland areas that contain Gila trout habitat, thus reducing sediment input to streams.
- Guideline 1364 states that stream crossing approaches should avoid steep pitches and grades in order to prevent sedimentation, which would limit sediment-carrying flows from entering streams such as those where Gila trout occur.
- Guideline 1365 locates necessary channel crossings where the channel is straight and cross the channel at right angles. This also reduces sedimentation into streams;
- Guideline 1368 avoids channel changes or disturbance to stream channels and minimizes impacts to riparian vegetation.
- Standard and guideline 1398 calls for designing timber sale road systems to minimize impacts on stream channels and water quality. Roads should be located on slopes less than 60% and should have sustained gradients of less than 8%. Roads should not be located on unstable slopes where mass soil movement is likely to occur. This helps prevent or reduce road impacts to stream habitat.

Fire Management

Activities within this program area include prescribed burning and mechanical treatments to reduce hazardous fuels, reduce the likelihood of future unplanned wildfires from entering riparian habitats, and limit post-fire runoff into current Gila trout habitat and future reintroduction sites. Fire management treatments include thinning, removal of fuels from the

landscape, or altering the fuel profile to reduce the potential for loss of private property. Projects could have short-term adverse effects to the Gila trout, including short-term indirect effects (i.e., increased sedimentation) in habitats downstream, especially if followed by a heavy rainfall event. However, there would also be long-term beneficial effects as watersheds, aquatic, and riparian habitats move towards desired conditions.

This program does not have standards or guidelines that specifically address Gila trout or its habitat. However, standards and guidelines 1376a and 1376d integrate habitat needs and use prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement. Prescribed fire treatments increase ash and nutrients, but not to the extent that a wildfire would. Mechanical treatment projects reduce vegetative cover and result in soil disturbance from the use of heavy equipment. Both types of treatments may result in short-term adverse effects on water quality, including increased water temperatures. Long-term effects result in reduction of the effects of fire suppression impacts from this program on the Gila trout.

Forestry and Forest Health

This program area includes timber harvest, forest product extraction, and forest health activities. Upland project impacts would include increased runoff and sediment movement from the removal of vegetative cover during treatments. Projects in the uplands would be limited spatially and temporarily to reduce these watershed impacts. However, there may still be short-term adverse effects to Gila trout before adequate vegetation cover has returned, if projects occur within occupied watersheds. Projects in the riparian and stream zones would have localized, short-term effects including streambank disturbance, vegetation reduction, sedimentation into streams, and disturbance to individuals. Vegetation treatments implemented under this program may cause short-term increases in flood runoff, scouring, and sediment deposition if occurring in Gila trout habitat.

There are several relevant standards and guidelines that would help minimize effects to the Gila trout and its habitat.

- Standard and guideline 1398 would design timber sale road systems to minimize impacts on stream channels and water quality. Roads should be located on slopes less than 60% and should have sustained gradients of less than 8%. Roads should not be located on unstable slopes where mass soil movement is likely to occur. This would limit impacts from motorized vehicle use in riparian, floodplain, and adjacent upland areas that contain Gila trout habitat, and would help prevent or reduce road impacts to stream habitat.
- Standard and guideline 1399 would ensure an Interdisciplinary team evaluates the need for buffer strips adjacent to water bodies within proposed commercial sawtimber sale areas. Where a buffer strip is deemed necessary, the team will recommend the width of strip needed to achieve adequate protection of aquatic and riparian resources. The width of the buffer strip will depend upon such factors as channel stability, side-slope steepness, erodibility of soils, existing ground cover conditions, and existing aquatic conditions. Logging vehicles will not be allowed to operate within any such designated buffer strips, except at designated crossings. This would also limit impacts from vehicles in riparian, floodplain, and adjacent upland areas that contain Gila trout habitat, thus reducing sediment into streams.

- Standard and guideline 1400 would restrict tractor skidding to those areas that have sustained slopes of 40% or less.
- Standard and guideline 1401 restricts skidding and hauling to soil moisture conditions which do not cause excessive soil compaction, displacement, or puddling.
- Standard and guideline 1402 restricts slash and debris from being put into protected stream channels.
- Standard and guideline 1403 requires the lead end of logs to be raised when skidding to minimize gouging, restricts skidding during wet weather if necessary to prevent watershed damage, and rehabilitates skid trails and landings when logging is completed. This helps minimize compaction and ground disturbance.

The standards and guidelines described above would reduce adverse impacts on the Gila trout and its habitat.

Lands and Minerals

This program area is responsible for land ownership and adjustments, the issuance of special use permits for numerous authorized forest activities, and approval of mining activities. Issuance of special use permits may adversely affect Gila trout and/or its habitat if the authorized activities affect water quality or impact stream bodies where the Gila trout exists. Land exchanges can result in a mix of long-term beneficial effects, through USFS management that may support the Gila trout, as well as long-term adverse effects, from increased public and recreational use of these areas.

Mineral activities could result in short- and long-term adverse effects if roads, utilities, facilities, or mines are located in or near riparian areas that support habitat for Gila trout (e.g., Rosemont mine on the Coronado NF will affect an entire watershed by slowly dewatering it). The TNF Forest Plan's goal to confine right-of-way grants to designated corridors to the extent practicable minimizes new impacts to aquatic and riparian habitats that may support this species.

There are no standards and guidelines that are directly relevant to the Gila trout under the Lands and Minerals Program.

Rangeland Management

Rangeland management program activities include implementation and effectiveness monitoring of individual allotments, and development of structural and non-structural improvements to facilitate better livestock management and to improve wildlife habitat and watershed conditions. Livestock grazing would continue throughout suitable rangelands on forest lands within the planning area. Some segments of Gila trout habitat are protected from livestock grazing by exclosure fences along most streams or have limited accessibility due to steep terrain. Adverse livestock management effects to Gila trout and its habitat would primarily be indirect effects associated with habitat disturbance in upland areas. Accessible grazing areas within Gila trout habitat may experience effects to streambanks, riparian vegetation, and water quality from trampling, grazing vegetation, and erosion.

The BA did not provide riparian or aquatic habitat condition information for Gila trout-occupied streams. There are no standards and guidelines that prohibit grazing within allotments on the

TNF, and it is possible that proposed projects may include some grazing within or near riparian areas in occupied habitat. Three standards and guidelines protect or restore riparian or wetland habitats and the uplands that may influence Gila trout habitat:

- Standard and guideline 1370a directs the preparation of grazing allotment management plans, updated every 5 to 10 years that include objectives and management strategies for the improvement of wildlife habitat. This would require consultation to determine whether the implementation would have adverse effects to the listed species.
- Standard and guideline 1370c assures grazing permittee maintenance of structural improvements on an annual basis, which may include maintenance of fencing that prevents livestock access to riparian areas.
- Standard and guideline 1370d prescribes that forage use by grazing ungulates be maintained at or above a condition that assures recovery and continued existence of threatened and endangered species.

These standards and guidelines minimize adverse effects to Gila trout by limiting riparian access by grazing animals, limiting grazing intensity, maintaining riparian vegetation, reducing sedimentation, and maintaining riparian functions. Livestock grazing contributes to both direct and indirect effects to Gila trout habitat; however these effects are minimized by use of riparian exclosures, limited pasture use, or timing restrictions for livestock use in riparian areas where it occurs, as addressed in grazing allotment management plans. Livestock grazing may still adversely affect important habitats needed by Gila trout outside of these protected areas. However, over the life of this consultation, we expect that implementation of the Rangeland Program could result in adverse effects to the Gila trout and its habitat.

Recreation, Heritage, and Wilderness

Program components include administration and management of developed recreation sites, dispersed recreation settings, recreation special use permits, congressionally designated areas, scenery management, trail management, and scenic byways. Recreation sites and developments and their associated uses and activities can present threats to maintaining, restoring and recovering Gila trout habitats by degrading upland and watershed conditions and function, altering riparian vegetation and function, and reducing water quality and increasing sediment into streams, which could affect Gila trout habitat. Recreational activities within and adjacent to occupied Gila trout habitat can also increase the risk of introductions and spread of invasive or undesirable plants and animals.

The TNF LRMP includes objectives for the reconstruction or rehabilitation of existing recreation sites, construction of new recreation sites, and construction or reconstruction of trails. Development or rehabilitation of recreation sites may cause some short- and long-term adverse effects if sites are located in or near suitable habitat for the Gila trout. There is also direction in the LRMP to increase and/or improve recreational opportunities. Over the life of the LRMP, this could result in adverse impacts to Gila trout and its habitat from soil compaction and reduced hiding cover by trampling of streamside vegetation.

Watershed Management

Projects and activities in the riparian areas would improve aquatic and riparian conditions and are expected to reduce sediment deposition into aquatic habitats, which would maintain or improve water quality and healthy native fish populations needed by the Gila trout. In most cases, projects would be limited in extent and amount of ground disturbance. These projects would also promote recruitment and maintenance of native riparian vegetation, which provide cover for Gila trout and maintain suitable water temperature in streams.

Projects in Gila trout habitat would have the localized, short-term effects of streambank disturbance, riparian vegetation reduction, sediment deposition into streams, and disturbance to Gila trout. Short-term impacts associated with project implementation could result in increases in sedimentation, soil compaction, alterations in hydrologic conditions and functions, and changes in water quality. Projects would have short-term adverse effects to the species and habitat but would have long-term beneficial effects as watersheds, aquatic, and riparian habitats move towards desired conditions.

The BA does not specify the watersheds or riparian or stream areas that would be treated under the LRMP. However, activities are targeted at maintaining or improving watershed condition, including improving and maintaining water quality, improving and protecting riparian areas, and protecting floodplains, which would be expected to have long-term beneficial impacts, if implemented in streams or watersheds occupied by Gila trout, through restoration of hydrologic conditions and functions.

Actions resulting in disturbance to individual fish can alter their breeding, sheltering, or feeding behaviors and increase their risk of predation. There are no standards and guidelines that are directly relevant to the Gila trout, however, project activities would be minimized by BMPs and additional actions Service and AGFD typically conduct with fish restoration projects.

Wildlife, Fish, and Rare Plants

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

Actions resulting in disturbance to individual Gila trout can alter their breeding or feeding behaviors and increase their risk of predation. Standards and guidelines that address potential impacts of habitat improvement projects are the same as those identified for the narrow-headed gartersnake and are discussed above. These standards and guidelines would improve Gila trout and native fish habitat by minimizing soil disturbance, reducing sedimentation, improving vegetation that protects and stabilizes streambanks, and reducing negative impacts to riparian areas. Projects may have localized, short-term adverse effects such as streamflow and streambank alteration, and excess sediment erosion or deposition. These adverse effects could alter water quality; however; we would expect them to be short in duration and of low intensity.

Overall, the Wildlife, Fish, and Rare Plants program plan components are positive for the Gila trout and its habitat in the long-term and would maintain or improve watershed condition indicators related to water quality, non-native species, soils, riparian vegetation, and rangeland vegetation.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the 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 under section 7 of the Act.

Many lands within the action area are managed by Federal agencies; thus, many activities that could potentially affect these listed species are Federal activities that are subject to additional section 7 consultation. However, a portion of the action area for these species also occurs on state and private lands. Residential and commercial development, road construction, farming, livestock grazing, mining, off-highway vehicle use, and other activities occur on these lands and are expected to continue into the foreseeable future. These activities may affect the species and their habitats, similar to the effects from the same type of actions described for the proposed action.

Western Yellow-billed Cuckoo and Proposed Critical Habitat

Future non-Federal activities contributing cumulative effects to western yellow-billed cuckoo and its proposed critical habitat may include displacement from habitat by actions occurring on state, tribal, or private lands that result in disturbance to nesting birds or loss of riparian and woodland drainage habitats. These activities include livestock grazing (including trespass livestock grazing), irrigated agriculture, groundwater pumping, stream diversions, bank stabilization, channelization, right-of-way vegetation maintenance activities, unleashed and feral dogs and cats, off-road vehicle use, illegal introduction of non-indigenous aquatic species, land development, intentional or accidental wildfire, and recreation. Continued and future conversion of floodplains and riparian habitats reduce the habitat available for yellow-billed cuckoo nesting. Water developments and diversions on private lands will likely continue to reduce surface water and influence flood regimes necessary to develop and maintain suitable riparian woodland habitat for yellow-billed cuckoo nesting. The primary cumulative effects to the riparian vegetation and woodland drainages (including within proposed critical habitat) where yellow-billed cuckoos occur are the stresses associated with decreases in water availability due to non-Federal actions.

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

Narrow-headed Gartersnake, Northern Mexican Gartersnake, and Proposed Critical Habitats

Cumulative effects to the narrow-headed gartersnake, northern Mexican gartersnake and their proposed critical habitats would involve impacts to riparian and terrestrial habitat and the prey bases that these gartersnakes depend on for food. Cumulative effects would 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 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 pollutants to stream systems.

Demand for outdoor recreation is also expected to grow concurrently with increasing human population and more visitor use of the Forest. Aquatic and riparian resources are major attractants for recreational activities, and increased recreation areas around water 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.

Additionally, the sport fisheries management actions of AGFD that benefit harmful non-native species is a very significant effect to all listed aquatic species, including the gartersnakes. Some of these activities were subject to section 7 consultation (AESO file number 22410-2008-F-0486); however, individual decisions to take no action to remove harmful non-native species affects the future recovery potential of listed aquatic-dependent species in some locations on the TNF, particularly the larger perennial streams that are required for the recovery of many listed aquatic vertebrates and designated or proposed critical habitat.

Gila Trout

The one watershed occupied by Gila trout occurs entirely within the TNF. The reach of Dude Creek occupied by Gila trout is entirely within TNF ownership. There would be no non-Federal activities in the area. As such, no cumulative effects were identified.

CONCLUSION

After reviewing the current status of the species and their critical habitats, the environmental baseline for the action area, the effects of the TNF LRMP, and the cumulative effects, it is our biological opinion that the continued implementation of the TNF Land and Resource Management Plan located in Gila, Maricopa, Pinal, and Yavapai Counties, Arizona, is not likely to jeopardize the continued existence of the western yellow-billed cuckoo, narrow-headed gartersnake, northern Mexican gartersnake, and Gila trout. The action is also not likely to destroy or adversely modify proposed critical habitat for the western yellow billed cuckoo, narrow-headed gartersnake, and northern Mexican gartersnake. Our conclusions are based on the rationales provided below.

Yellow-billed cuckoo and proposed critical habitat

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 TNF's revised LRMP will not jeopardize the continued existence of the yellow-billed cuckoo, 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 yellow-billed cuckoo habitat during the remaining 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 and proposed critical habitat in the long-term.
2. While some adverse effects may occur as part of the proposed action or under site specific actions carried out under the LRMP, the desired conditions, standards, guidelines, and objectives will help to minimize those effects.
3. Livestock grazing under Rangeland Management will be managed to maintain or improve aquatic and riparian habitat conditions and manage riparian areas towards properly functioning condition. The TNF has committed to work with us to ensure that effects from grazing to the cuckoo, its habitat, and its proposed critical habitat are minimized.

Narrow-headed gartersnake, northern Mexican gartersnake and proposed critical habitats

After reviewing the current status of the narrow-headed gartersnake, northern Mexican gartersnake and their proposed critical habitats, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that continued implementation of the TNF LRMP will not jeopardize the continued existence of the narrow-headed gartersnake and northern Mexican gartersnake, and will not destroy or adversely modify their proposed critical habitats. We base our conclusion on the following:

1. Watershed improvement projects are anticipated to maintain or improve the ecological condition of narrow-headed gartersnake and northern Mexican gartersnake habitats and the PCEs of proposed critical habitats during the life of the plan. These projects are likely to aid in improving hydrologic conditions within the watershed and maintain or improve the PCEs of proposed critical habitat in the long-term.
2. Native fish restoration projects are anticipated to result in the reduction or removal of harmful non-native fish in narrow-headed gartersnake and northern Mexican gartersnake habitats and proposed critical habitats. A concerted effort to manage against harmful nonnative species Forest-wide will improve the ability of proposed critical habitat to contribute to the conservation and recovery of the species. Additionally, increasing the presence of native fish and amphibians will increase prey items for the gartersnakes and secure their long-term population viability.
3. Livestock grazing will be managed to not further degrade aquatic and riparian habitat conditions and manage riparian areas towards properly functioning condition. The TNF has committed to work with us to ensure that effects from grazing to the gartersnakes and their proposed critical habitat are minimized.
4. Based on the discussions provided in the effects to narrow-headed gartersnake and northern Mexican gartersnake proposed critical habitat sections above, the proposed

critical habitat affected by the LRMP will continue to serve its function and conservation role for the gartersnakes.

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 continued implementation of the TNF LRMP will not jeopardize the continued existence of the Gila trout. Critical habitat for this species has not been designated; thus none will be affected. We base our conclusion on the following:

1. Watershed improvement and engineering projects are anticipated to maintain or improve the ecological condition of the Gila trout 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 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 non-native fish is an essential part in maintaining established populations and will aid in those populations persisting into the future.

The conclusions of this PBO/PCO 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 Act and Federal regulations pursuant to section 4(d) of the Act 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 proposed action described above is a "framework programmatic action" as defined in 50 CFR 402.02. In accordance with 50 CFR 402.14(i)(6), an incidental take statement is not required at the programmatic level for a framework that does not authorize future actions; incidental take resulting from any action subsequently authorized, funded, or carried out under the program will be addressed in subsequent section 7 consultation, as appropriate. This biological opinion provides a broad-scale examination of the proposed action's potential impacts

on western yellow-billed cuckoo, narrow-headed gartersnake, northern Mexican gartersnake, and Gila trout, but we lack reasonable certainty of where, when, and how much incidental take may occur. Therefore we have not quantified the amount and extent of incidental take that may result from the proposed action and have not exempted such take in this biological opinion.

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.

Western Yellow-Billed Cuckoo

1. We recommend the Forest Service work with FWS and AGFD to implement specific actions to assist in recovery of the yellow-billed cuckoo throughout the TNF.
2. We recommend the Forest Service conduct or continue to fund yellow-billed cuckoo surveys (per Halterman *et al.* 2016 or subsequent protocols) to assess and better determine cuckoo distribution on the TNF.
3. We recommend the Forest Service avoid grazing activities in the action area that reduce the suitability or regeneration of woody riparian or upland species (especially in woodland drainages) necessary to maintain yellow-billed cuckoo breeding and foraging habitat.
4. We recommend the Forest Service avoid noise-producing and habitat-altering activities that may affect cuckoo habitat during the breeding season (May 15 – September 30).
5. We recommend the Forest Service avoid grazing activities that do not comply with the descriptions provided in Table 2, Appendix G of the 2002 U.S. Fish and Wildlife Service Southwestern Willow Flycatcher Final Recovery Plan (Appendix A). The guidelines for the southwestern willow flycatcher are used as a surrogate for the yellow-billed cuckoo until such guidelines are developed for this species.

Narrow-Headed Gartersnake and Northern Mexican Gartersnake

1. Many standards and guidelines call for watershed, range, and/or habitat improvements, but do not include a timeline. We recommend the Forest Service work with FWS to prioritize the projects that will allow for the greatest benefit to these species.
2. We recommend the Forest Service work with FWS to implement recovery actions as described within the narrow-headed gartersnake and northern Mexican gartersnake recovery plans when they are completed.
3. We recommend the Forest Service work with FWS and AGFD to not only prevent the introduction or movement of non-native aquatic species, but also to implement removal programs Forest-wide for harmful non-native aquatic species over the long term that reduces the distribution and density of harmful nonnative species in their predatory size classes on NFS lands.

4. We recommend the Forest Service work with FWS and AGFD to conduct surveys to better determine the distribution, abundance, and trends of species populations on the TNF.
5. We recommend the Forest Service maintain active participation in the Gartersnake Conservation Working Group, by ensuring forest biologists and other appropriate staff participate in meetings and coordinate in monitoring and recovery planning.
6. We recommend the Forest Service work with the FWS, AGFD, and the Arizona Department of Environmental Quality, or other appropriate partners to improve water quality across the forest.

Gila Trout

1. We recommend the Forest Service continue to assist in implementing recovery actions identified in the recovery plan for the Gila trout.
2. We recommend that the Forest Service acquire instream flow water rights to ensure perennial flow in streams throughout the historic range of the Gila trout.
3. We recommend that the Forest Service continue with the FWS and AGFD to remove non-native species and reestablish the Gila trout throughout their historical range on the Forest.
4. We recommend the Forest Service continue to identify factors that limit the recovery of Gila trout on NFS lands and work to correct them.

In order that we are kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where 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 the TNF Land and Resource Management Plan. You may ask us to confirm the conference opinion as a biological opinion issued through formal consultation if the proposed species is listed or critical habitat is designated. The request must be in writing. If we review the proposed action and find there have been no significant changes in the action as planned or in the information used during the conference, we 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 Forest Service 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 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.

Certain project activities may also affect species 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 (Eagle Act). The MBTA prohibits the intentional taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when authorized by the FWS. The Eagle Act prohibits anyone, without a FWS permit, from taking (including disturbing) eagles, and including their parts, nests, or eggs. If you think migratory birds and/or eagles will be affected by this project, we recommend seeking our Technical Assistance to identify available conservation measures that you may be able to incorporate into your project.

For more information regarding the MBTA and Eagle Act, please visit the following websites. More information on the MBTA and available permits can be retrieved from FWS Migratory Bird Program web page and FWS Permits Application Forms. For information on protections for bald eagles, please refer to the FWS's National Bald Eagle Management Guidelines (72 FR 31156) and regulatory definition of the term "disturb" (72 FR 31132) published in the Federal Register on June 5, as well at the Conservation Assessment and Strategy for the Bald Eagle in Arizona (Southwestern Bald Eagle Management Committee website).

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 AGFD.

We appreciate the Forest Service's efforts to identify and minimize effects to listed species from this project. Please refer to the consultation number, 02EAAZ00-2014-F-0313-R001, in future correspondence concerning this project. Should you require further assistance or if you have any questions please contact Mary Lane (501-321-5201), Greg Beatty (602-242-0210) or Brenda Smith (928-556-2157).

Sincerely,

BRENDA SMITH Digitally signed by BRENDA SMITH
Date: 2018.02.15 15:25:48 -07'00'

Steven L. Spangle
Field Supervisor

Neil Bosworth, Forest Supervisor

cc (electronic):
Field Supervisor, U.S. Fish and Wildlife Service, Phoenix, Arizona
Assistant Field Supervisor, U.S. Fish and Wildlife Service, Flagstaff, AZ
Assistant Field Supervisor, U.S. Fish and Wildlife Service, Tucson, AZ
Ecosystem Staff Officer, U.S. Forest Service, Tonto National Forest, Phoenix, AZ (michaelmartinez@fs.fed.us)
Forest Wildlife Biologist, U.S. Forest Service, Tonto National Forest, Phoenix, AZ (jholderman@fs.fed.us)
Deputy Director, Wildlife, Fish, and Rare Plants Program, U.S. Forest Service, Albuquerque, NM (blbarrera@fs.fed.us)

Chief, Terrestrial Branch, Arizona Game and Fish Department, Phoenix, AZ
Environmental Program Manager, Ak-Chin Indian Community, Maricopa, AZ (Attn: Cheyenne Garcia)
Cultural Resources Manager, Ak-Chin Indian Community, Maricopa, AZ (Attn: Caroline Antone)
Acting Manager, Environmental Department, Fort McDowell Yavapai Nation, Fountain Hills, AZ (Attn: Mark Frank)
Cultural Resources Manager, Fort McDowell Yavapai Nation, Fountain Hills, AZ (Attn: Karen Ray)
Tribal Historic Preservation Officer, Gila River Indian Community, Sacaton, AZ (Attn: Barnaby Lewis)
Director, Natural Resources Department, Hopi Tribe, Kykotsmovi, AZ (Attn: Clayton Honyumptewa)
Cultural Preservation Office, Hopi Tribe, Kykotsmovi, AZ (Attn: Leigh Kuwanwisiwma)
Director, Cultural Resources Department, Salt River Pima-Maricopa Indian Community, Scottsdale, AZ (Attn: Kelly Washington)
Historic Preservation and Archaeology Director, San Carlos Apache Tribe, San Carlos, AZ (Attn: Vernelda Grant)
Botanist, San Carlos Apache Tribe, San Carlos, AZ (Attn: Seth Pilsk)
Director, Cultural Resource Department, Tonto Apache Tribe, Payson, AZ (Attn: Wally Davis, Jr.)
Director, Cultural Resources, White Mountain Apache Tribe, Whiteriver, AZ (Attn: Ramon Riley)

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APPENDIX A

CONFERENCE REPORT

You also concluded that the proposed action *will not jeopardize* the continued existence of the 10(j) nonessential experimental population of the endangered Mexican gray wolf (*Canis lupus baileyi*). For the purposes of section 7(a)(2) of the Act, 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. We concur with your determination and provide our rationale below.

Mexican Gray Wolf

The Mexican gray wolf (*Canis lupus baileyi*) was listed as an endangered species in April, 1976 (41 FR 24062, USFWS 1976). A detailed account of the taxonomy, biology, and reproductive characteristics of the Mexican gray wolf is found in the Mexican Wolf Conservation Assessment (USFWS 2010), as well as the Mexican Wolf Recovery Plan (USFWS 1982). This information is incorporated herein via reference. There are no known wolves occurring within the action area. FWS reintroduced the endangered Mexican gray wolf into the Blue Range Wolf Recovery Area, a designated area within the subspecies' probable historic range in 1998. The Blue Range Wolf Recovery Area consists of the entire Apache and Gila National Forests in east-central Arizona and west-central New Mexico (USFWS 1998).

The FWS concurs with your determination that the proposed action is *not likely to jeopardize* the nonessential experimental population of Mexican gray wolves. No critical habitat will be affected because none has been designated. Our concurrence is based on the following:

- Because of the Mexican wolf's status as a nonessential experimental population, wolves found in Arizona are treated as though they are proposed for listing for section 7 consultation purposes. By definition, a nonessential experimental population is not essential to the continued existence of the species. Thus, no proposed action impacting a population so designated under the Act §10(j) could lead to a jeopardy determination for the entire species.

LITERATURE CITED

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APPENDIX B

Forest Land Management Plan Decisions specifically-referred to in this Biological Opinion (Standards and Guidelines) [1].

Code	Consultation Resource Program	LRMP Resource Program	Management Area	Standards and Guidelines
1341	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Standard Identify, survey, map, and analyze habitat for all Federally-listed species. Identify management conflicts and enhancement opportunities. Correct any management conflicts or problems.
1342	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Standard Continue to clear all projects for threatened, endangered, proposed, and candidate plant and animal species. Clearances will be done by Wildlife Biologist and reviewed by Forest Biologist.
1343	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Standard New additions of listed, proposed, or candidate species by the US Fish and Wildlife Service will be protected.
1345, 1391, 1410	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide , 4D, 5D	Standard Habitat requirements for endangered species will have precedence over threatened species. Habitat requirements for threatened, endangered, and sensitive species will take precedence over requirements for other species and habitat requirements for sensitive species will take precedence over nonsensitive species.
1350	Watershed		Forest-Wide	Standard Rehabilitate at least 80% of the potential shrub cover in riparian areas through the use of appropriate grazing systems and methods.
1353	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Any surface or vegetation disturbing projects in riparian areas will be coordinated and will specify protection or rehabilitation of riparian-dependent resources. For example, the required planting of large cottonwood poles in 7 Mile Wash by Arizona Department of Transportation (ADOT).
1356	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Standard Re-establish riparian vegetation in severely degraded but potentially productive riparian areas. Natural regeneration is anticipated to achieve this goal, but artificial regeneration may be necessary in some areas.
1361	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Guideline Manage riparian areas to the level needed to provide protection and improvement.

Code	Consultation Resource Program	LRMP Resource Program	Management Area	Standards and Guidelines
1362	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Guideline Where possible, locate roads on natural benches, ridges, flat slopes near ridges J02, L04, F01 or valley bottoms, and away from stream channels.
1363	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Guideline Roads should be located on well-drained and stable ground, avoiding seeps and other unstable areas.
1364	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Guideline Stream crossing approaches should avoid steep pitches and grades in order to prevent sedimentation.
1365	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Guideline Where channel crossings are necessary, select an area where the channel is straight and cross the channel at right angles.
1368	Fish, Wildlife, Rare Plants	1996 Amendment	Forest-Wide	Guideline Avoid channel changes or disturbance of stream channels and minimize impacts to riparian vegetation.
1370	Range Management	Range	Forest-Wide	Pesticide proposals will be handled through additional environmental analysis and documentation to ensure project objectivity and public safety (pg 43).
1371a	Watershed		1C, 1D	Preserve the free-flowing condition of this river (free-flowing is defined by law as: existing or flowing in a natural condition without impoundment, diversion, straightening, rip-rapping, or other modifications of waterway). Retention of minor structures which existed at the time of designation may be permitted (pg 56, 59).
1371c	Range Management	Range	1C	Manage suitable rangelands at Level B. Rangeland in less than satisfactory condition will be treated with improved grazing management. Projected changes in range condition acreages: Satisfactory range condition - 0 acres (current) to 615 acres (decade 1); Unsatisfactory - 6,148 acres (current to 5,533 acres (decade 1) (pg 57).

Code	Consultation Resource Program	LRMP Resource Program	Management Area	Standards and Guidelines
1371d	Watershed	Watershed	1C	Cooperate fully with the State Department of Health Services (Division of Environmental Health), and with the Arizona Water Quality Control Council to reduce or eliminate pollution of the river (pg 57, 60).
1375	Range Management	Wilderness	2A, 2B, 3B, 3C, 3D, 3F, 4A, 4B, 4C,5A, 6G, 6H, 6I	Minimal range improvements, i.e., boundary and essential interior division fences deemed necessary for Level B management. Rangeland in less than satisfactory condition will be treated with improved grazing management.
1376a	Fire Management	Fire	1F, 4F, 5G	Integrate habitat needs through prescribed fires within fire suppression objectives (pg 68-1, 140-1, 166).
1376d	Fire Management	Fire	1F, 4D, 4F	Use prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement (pg 71, 136, 143).
1388c, 1404	Recreation, Heritage, Wilderness	Recreation	4D, 4F, 5D	ORV use allowed (except as noted above) unless posted as closed (pg 129).
1391	Fish, Wildlife, Rare Plants		4D, 5D	Habitat requirements for threatened, endangered, and sensitive species will take precedence over requirements for other species (131, 155).
1398	Forest Health		4D, 5D	Timber sale road systems should be designed to minimize impacts on stream channels and water quality. Roads should be located on slopes less than 60%, and should have sustained gradients of less than 8%. Roads should not be located on unstable slopes where mass movement is likely to occur (pg 134, 158).

Code	Consultation Resource Program	LRMP Resource Program	Management Area	Standards and Guidelines
1399	Forest Health		4D, 5D	An Interdisciplinary (I.D.) team will evaluate the need for buffer strips adjacent to water bodies within proposed commercial sawtimber sale areas. Where a buffer strip is deemed necessary, the I.D. team will recommend the width of strip needed to achieve adequate protection of aquatic and riparian resources. The width of the buffer strip will depend upon such factors as channel stability, side-slope steepness, erodibility of soils, existing ground cover conditions, and existing aquatic conditions. Logging vehicles will not be allowed to operate within any such designated buffer strips, except at designated crossings (pg 135, 158).
1400	Forest Health		4D	Restrict tractor skidding to those areas that have sustained slopes of 40% or less (pg 135).
1401	Forest Health		4D, 5D	Skidding and hauling should be restricted to soil moisture conditions which do not cause excessive soil compaction, displacement, or puddling (pg 135, 158).
1402	Forest Health		4D, 5D	Slash and debris should be kept out of protected stream channels (pg 135, 159).
1403	Forest Health		4D	Raise lead end of logs when skidding to minimize gouging. Restrict skidding during wet weather if necessary to prevent watershed damage. Rehabilitate skid trails and landings when logging is completed (provide drainage, repair ruts and gullies, and seed if necessary) (pg 135).
1404	Range Management		4E	Manage suitable rangeland at Level A. Little change in Range condition will occur during the first decade (PG 137).
1404	Recreation, Heritage, Wilderness	Recreation	4F	Manage the East Verde River and Tonto Creek to assure that their river recreation attributes are maintained (pg 139).
1404	Recreation, Heritage, Wilderness	Recreation	4F, 5D	ORV use allowed unless posted as closed (pg 140, 153).

Code	Consultation Resource Program	LRMP Resource Program	Management Area	Standards and Guidelines
1410	Fish, Wildlife, Rare Plants		5D	Habitat requirements for threatened, endangered, and sensitive species will take precedence over requirements for other species.
1420	Range Management		6F	Manage suitable rangelands at Level C except: Three-Bar Wildlife/Watershed Area Windy Hill Recreation Area Burnt Corral Campgrounds Apache Lake Watershed bounded by Apache Lake on the north, the Tonto Basin District Boundary and SR 88 on the south, and the Roosevelt Allotment Boundary fence on the east side of Davis Wash. That portion of Roosevelt Wildlife Area bounded by Roosevelt Lake on the east, Theodore Roosevelt Dam on the south, SR 188 on the west, and Bumblebee Creek on the north. Manage these at Level A.
1422	Recreation, Heritage, Wilderness	Recreation	1E, 6J	ORV use is prohibited unless posted as open (pg 194).

[1] Not all plan decisions in the LRMP are relevant to this biological opinion.