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
02EAAZ00-2018-F-0701

October 31, 2018

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

RE: East Verde River Restoration Project Biological Opinion

Dear Mr. Bosworth:

Thank you for your request for formal consultation/conference 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 (Act). Your request was dated March 23, 2018, and was received on March 27, 2018. At issue are effects that may result from the proposed East Verde River Restoration Project located in Gila County, Arizona.

You determined the proposed project "may affect, and is likely to adversely affect" the threatened narrow-headed gartersnake (gartersnake) (*Thamnophis rufipunctatus*) and its proposed critical habitat and threatened Gila trout (*Oncorhynchus gilae*). Because critical habitat is proposed for the gartersnake, this document represents a conference opinion that may be converted to a biological opinion if gartersnake critical habitat is designated.

You also requested our concurrence that the proposed action is "not likely to adversely affect" the threatened Chiricahua leopard frog (CLF) (*Lithobates chiricahuensis*) and Mexican spotted owl (spotted owl) (*Strix occidentalis lucida*), and their designated critical habitat. We concur with your determinations and include our rationale in Appendix A.

This biological opinion and conference opinion is based on information provided in the May 23, 2018, biological assessment (BA), 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, and its effects, or on

other subjects considered in this opinion. A complete record of this consultation is on file at this office.

Consultation History

- March 27, 2018: The Tonto National Forest (TNF) initiated formal consultation.
- August 28, 2018: We requested and received an extension from the TNF for a draft biological opinion.
- September 20, 2018: We sent the draft biological opinion to the TNF.
- October 17, 2018: We received and incorporated the TNF's comments into our biological opinion

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The East Verde Restoration Project will occur on the Payson Ranger District, TNF, at four separate locations along the East Verde River: Washington Park, 2nd Crossing, 3rd Crossing, and Flowing Springs (Figure 1). Project implementation is anticipated to occur between October 1, 2018, and February 28, 2019, over a one- to four-week period, but could potentially be delayed until the winter of 2019-2020. The Washington Park site is located about 450 feet east of the Washington Park trailhead. The site at 2nd crossing is 10.8 miles from Payson, Arizona, beginning at a bedrock controlled bend 900 feet upstream of the new Houston Mesa Road Bridge and terminating just upstream of the bridge. The site at 3rd crossing, along Houston Mesa Road, is 11.5 miles from Payson, Arizona, and begins upstream of a new bridge, at the location of an old low water crossing. The Flowing Springs site is located between the East Verde River and Flowing Springs road, 1.8 miles from the turn off from Highway 87. The project sites are all in riparian habitat which consists primarily of Ponderosa pine (*Pinus ponderosa*), willows (*Salix spp.),* Fremont cottonwood (*Populus fremontii),* and deer grass (*Muhlenbergia rigens*) (an important bank-stabilizing species).

The primary purposes of the East Verde Restoration Project is to create and improve rainbow (and possibly Gila) trout habitat. The realignment and restructuring (reducing width to depth ratio) of the stream channel will address areas previously damaged by low water crossings. In order to address recreation impacts, riparian trees and grasses will be planted to improve streambank stability, reduce erosion, and reduce water temperature. Lastly, at the Flowing Springs site, sediment input to the system will be reduced to assist with riparian vegetation recovery.

Natural Channel Design, Inc. completed a habitat enhancement assessment in 2012 (NCD 2012), followed by a final enhancement design report (NCD 2016a) with associated engineering plans (NCD 2016b; Appendix A). The proposed project will implement the enhancements detailed in the final design and plan documents. This project is very similar to other restoration projects previously consulted on and completed on TNF, both informally (Christopher Creek 02EAAZ00-2012-I-0128-R001) and formally (Haigler Creek 002EAAZ00-2012-F-0167-R1; Canyon Creek 22410-2012-F-0167-R1). This project uses the same engineering firm for project design, and incorporates similar habitat improvements used in these previous projects.

The Washington Park site design includes log weir installation within a portion of the stream that has been incised to bedrock. The logs will help to form regular pool drop structures, capture and retain sediment, and provide additional fish cover. This will to be accomplished by hand crews with local materials.

The 2nd and 3rd Crossing sites will use boulders and logs to create cross vein weirs, rock vanes, boulder clusters and log vanes to create deeper fish cover, introduce more heterogeneity, and train the stream to a slightly narrower width to depth ratio. These structures combined with riparian tree and grass re-vegetation will improve stream habitat and streambank stability, and help improve long-term sediment transport in these areas.

The Flowing Springs Road site management effort will improve sediment reduction goals by addressing multiple trails and poor road/parking area drainage. The parking area will be re-surfaced and a rail fence installed with a single opening. A 180-foot walking path from the rail fence will funnel visitors to the river and limit impacts to surrounding riparian vegetation. Two areas with heavy erosion will be modified; a 75-foot rock chute will be installed below a road culvert 230 feet to the south of the parking lot and a 55-foot rock chute will be constructed from the edge of the parking area. This area will also have single net erosion control fabric installed along the slope and native seed application.

Equipment staging areas will be located in previously disturbed areas, consisting of paved parking lots in established recreation areas (2nd and 3rd Crossing), dirt parking areas denuded of vegetation at established trailheads (Washington Park), or heavily-used recreation areas with user-created pullouts (Flowing Springs). All equipment used in construction activities will be in good working order and checked for leaks prior to staging to reduce the possibility of pollutants entering habitat. Contractors will also ensure any equipment used on the project is weed free before staging.

Some stream enhancement features require heavy machinery/equipment (mini-excavator). Mini-excavator use will be restricted to the active and bank full river channel. Access corridors from staging areas to the river channel are designed to minimize habitat disturbance. At the 3rd Crossing project site, the footprint of the C.C. Cragin water pipeline (a heavily disturbed and denuded area) will be the access route from the parking lot staging area to the river channel. At 2nd crossing, the mini-excavator will use a corridor that crosses approximately 11 to16 yards of upland habitat between the parking lot and the river channel. No access corridor is necessary at the Flowing Springs project area, because the stream is adjacent to the road. Work at the Washington Park project site will be done by hand crews and no heavy equipment will be involved.

To implement the proposed actions, material for construction of stream enhancement features may include relocating existing boulders and/or logs from the active stream channel or within a 100-foot distance from the center of the active stream channel. Structural methods that may be used include installation of boulder clusters, cross-vane weirs, log weirs, log barbs, and rock vanes. Stream bank stabilization measures may include bank sloping, single net erosion control fabric, rock-lined chutes, and fencing. Vegetative improvements may include planting of willow, cottonwood, deer grass, and spreading of native seeds. Specific plans include use of these methods at the following project sites:

- Washington Park: 4 log weirs and native seed mix in any disturbed areas.
- 3rd Crossing: 2 cross vane weirs, 1 boulder cluster, willow planting, deer grass plugs, and native seed mix in any disturbed areas.
- 2nd Crossing: 2 rock vanes, 2 cross vane weirs, 4 log barbs, 2 boulder clusters, willow planting, deer grass plugs, and native seed mix in any disturbed areas.
- Flowing Springs: 2 rock chutes (one from road culvert, one from parking lot); installing split rail fence and repairing existing barb wire fencing; installing a walking path; installing 6 informational signs (e.g. stay on path); re-grading the parking lot; bank

sloping and installation of single net erosion control fabric on steep banks; and native seed mix in any disturbed areas.

Conservation Measures

Soil and Water Conservation Measures
The following conservation measures would be used to protect the soil and water resources within the project areas of the four reaches and thus reduce construction related impacts to the watershed and biological resources.

- Follow TNF guidelines for felling and using ponderosa pine trees, including:
    - When possible trees that have fallen naturally and are still suitable for use would be used instead of felling living trees;
    - No trees greater than 18 inches diameter at breast height (dbh) would be felled (larger trees can be used if they fell naturally);
    - Tree removal would focus on trees that are suppressed or subordinate in growth form and/or diseased, when possible;
    - Only living trees would be felled;
    - Slash would be lopped and scattered in such a manner so that no slash pile is over 3 feet high and is not in contact with living trees;
    - Slash would be used to cover disturbed areas when possible;
    - Only trees that would be used for the project are allowed to be felled;
    - No Douglas fir or riparian obligate trees would be felled;
    - No trees would be felled from a goshawk post fledging area (PFA); and,
    - No trees with a raptor nest that has been active in the past year would be felled.
- Use soil raking, distribution of slash from felled trees, and ground litter replacement to return the terrain to a natural condition immediately after ground disturbing activities such as, but not limited to:
    - Heavy equipment use--trucks, trailers, tractors, back hoes, front end loaders, etc.;
    - Skid marks (drag marks) caused by dragging felled trees into place;
    - Divots caused by removing boulders from the uplands and moving into place; and,
    - Any other ground disturbing activities associated with securing logs or boulders into place.
- Take willow and cottonwood pole cuttings during the dormant season; after leaf fall and before bud burst.
    - No more than two-thirds of the willow or cottonwood pole source tree would be harvested.
    - Pole planting on freshly worked banks will be accompanied by seeding with a mix of local native grasses.
- No construction of enhancement features within the active channel during high flows.
- Stage equipment in established recreation areas and limit access corridors to construction sites to reduce impact to upland and stream habitat.
- TNF biologists will inspect proposed access corridors at each project site prior to commencement of construction activities.

- Equipment used in this project must be in good working order, with no fluid leaks, and be weed free before being staged or used in the project area.
- Project related construction activities would only occur between October 1 and February 28. Restricting construction activities to the autumn/winter will reduce or eliminate impacts to federally listed species, nesting migratory birds, nesting goshawk, and other sensitive avian species and limit impacts to recreational users of the river.

Narrow-Headed Gartersnake and Chiricahua Leopard Frog Conservation Measures

- Use soil raking, distribution of slash from felled trees, and ground litter replacement to return terrain to a natural condition immediately after ground disturbing activities such as, but not limited to:
    - Heavy equipment use--trucks, trailers, tractors, back hoes, front end loaders, etc.;
    - Skid marks (drag marks) caused by dragging felled trees into place;
    - Divots caused by removing boulders from the uplands and moving into place; and,
    - Any other ground disturbing activities associated with securing logs or boulders into place.
- Limit harvest to no more than two-thirds of the willow or cottonwood pole source tree to leave potential existing native habitat on site.
- Accompany pole planting on freshly worked banks with seeding with a mix of local native grasses to rehabilitate heavily impacted areas of habitat.
- Restrict construction of enhancement features within the active channel during high flows such as during heavy local storms to reduce additional sedimentation into the stream potentially affecting narrow-headed gartersnakes.
- Implement the project between the months of October and February, during brumation periods for narrow-headed gartersnakes, to reduce incidence of encounter during construction and planting activities as individuals of this species are more likely to be away from the main river channel, and thus the active construction zone.
- Stage equipment in established recreation areas and limit access corridors to construction sites to reduce impact to upland and stream habitat and accidental injury to narrow-headed gartersnakes.
- Avoid establishing boulder or brush/debris piles between the staging and active construction area to reduce the possibility of harassing, injuring, or killing any narrow-headed gartersnakes that might be using these features as brumation sites.
- Ensure that an Arizona Game and Fish Department (AGFD) bio-monitor conducts a visual encounter survey of the active construction area (both active stream and terrestrial work areas) every morning prior to the work beginning and during construction breaks to capture and relocate any surface-active snakes observed. The monitor will remain on site for the remainder of the day and will investigate (turn or flip-over any logs or rocks) the site and relocate any snakes that might otherwise be harmed from subsequent ground disturbance. If a snake is located, construction will temporarily stop while the snake is relocated (if possible) to a safe area where work associated with this project is no longer expected to occur.
- Collect documentation including photos of the gartersnake (adequate in quality for verification) and the habitat in the immediate area where observed, as well as date, time, and GPS coordinates of the observation site. Inform the TNF and the FWS project lead

of the snake's presence within 24 hours and provide relevant data.

- If live narrow-headed gartersnakes or Chiricahua leopard frogs are detected during project implementation, the TNF will call AGFD and the FWS project lead within 24 hours to discuss and evaluate the project's risk to these animals. If it is determined these species are at-risk from incidental take to an extent not authorized, then possible outcomes may be (but are not necessarily limited to) implementing additional conservation measures to prevent additional or unauthorized incidental take; changing project implementation or design to prevent additional or unauthorized incidental take; or ceasing work and reinitiating consultation.

Gila Trout Conservation Measures

- If Gila trout are introduced prior to implementation of the project, biologists will construct temporary check dams above and below in-stream construction areas and all Gila trout will be removed prior to commencement of construction activities. Check dams will remain in place until work at a particular location has concluded and all machinery, etc. has been removed from the active stream channel.

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.

We expect the action area for the East Verde River Restoration Project will extend beyond the project footprint, both downstream from the project site and outside the main channel. The stream management/habitat creation project will occur at four separate locations along the East Verde River. Acquisition of material for the project (logs, boulders, vegetation, etc.) is planned to occur within 100 feet of the stream's centerline (on either side of the river). We anticipate that using heavy machinery within the channel will temporarily increase sedimentation that will flow downstream from the work sites for some distance until it dissipates. Because it is uncertain exactly how far sediment may travel from a work site, we conservatively estimate that distance as 1.0 mile downstream from each of the four separate work areas.

STATUS OF THE SPECIES AND CRITICAL HABITAT

The information in this section summarizes the rangewide status of each species that is considered in this BO. Further information on the status of these species can be found in the administrative record for this project, documents on our web page (Arizona Ecological Services Office Documents by Species), and in other references cited in each summary below.

Narrow-headed gartersnake

Legal Status

The narrow-headed gartersnake was listed as threatened on July 8, 2014 (79 FR 38678). Critical habitat was proposed on July 10, 2013 (78 FR 41550).

Physical Description

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 distinguishes its appearance from other gartersnake species with which it could co-occur (Rosen and Schwalbe 1988). The base color is usually tan or grey-brown (but may darken) with conspicuous brown, black, or reddish spots that become indistinct towards the tail (Rosen and Schwalbe 1988; Boundy 1994). The scales are keeled. Degenhardt *et al.* (1996), Rossman *et al.* (1996), and Ernst and Ernst (2003) further describe the species.

Habitat and Natural History

The narrow-headed gartersnake is distributed across the Mogollon Rim of Arizona and New Mexico, at elevations from approximately 2,300 to 8,000 feet. The species inhabits Petran Montane Conifer Forest, Great Basin Conifer Woodland, Interior Chaparral, and Arizona Upland Sonoran Desertscrub communities (Rosen and Schwalbe 1988; Brennan and Holycross 2006). The species is widely considered to be one of the most aquatic gartersnakes (Drummond and Macias Garcia 1983; Rossman *et al.* 1996). It is strongly associated with clear, rocky streams, using predominantly pool and riffle habitat that includes cobbles and boulders (Rosen and Schwalbe 1988; Degenhardt *et al.* 1996; Rossman *et al.* 1996; Nowak and Santana-Bendix 2002; Ernst and Ernst 2003). Narrow-headed gartersnakes have also been observed using reservoir shoreline habitat in New Mexico (Fleharty 1967; Rossman et al. 1996, L. Hellekson 2012, pers. comm.). Although often considered highly aquatic, narrow-headed gartersnakes found in water represented less than 10 percent of total observations according to a multi-year telemetry study in New Mexico, with slightly more females found in water compared to males (Jennings and Christman 2012). These data suggest that this species may spend a relatively small percentage of its time in the water and only enters the water to hunt for fish, but compared to other native gartersnakes in Arizona, it is still the most aquatic.

Narrow-headed gartersnakes also use terrestrial, upland habitat during periods of cold-season dormancy, for gestation of young in pregnant females, for bask to aid digestion and for healing from injury or illness, and to escape flood events. Nowak (2006) found narrow-headed gartersnakes used upland habitat that was 328 feet away from the stream during early fall and spring months and may strongly associate with boulders in the floodplain during summer months. During cold-season dormancy periods, narrow-headed gartersnakes may use upland habitat up to 656 feet or farther out of the floodplain (Nowak 2006).

Narrow-headed gartersnakes eat fish primarily (Rosen and Schwalbe 1988; Degenhardt *et al.* 1996; Rossman *et al.* 1996; Nowak and Santana-Bendix 2002; Nowak 2006) and are considered specialists in this regard. This species is an underwater ambush hunter that is believed to be heavily dependent on visual cues when foraging (de Queiroz 2003; Hibbitts and Fitzgerald 2005). Therefore, sediment and turbidity levels within the water column may affect foraging

success. Native fish species considered as prey for the narrow-headed gartersnake include Sonora sucker (*Catostomus insignis*), desert sucker (*C. clarki*), speckled dace (*Rhinichthys osculus*), and roundtail chub (*Gila robusta*) (Rosen and Schwalbe 1988; Degenhardt *et al.* 1996). Nonnative predatory fish species in their fingerling size classes are also used as prey by narrow-headed gartersnakes, including brown trout (*Salmo trutta*) (Rosen and Schwalbe 1988; Nowak and Santana-Bendix 2002; Nowak 2006), green sunfish (*Lepomis cyanellus*) (Fleharty 1967), smallmouth bass (*Micropterus dolomieu*) (M. Lopez, 2010, pers. comm.), and rock bass (*Ambloplites rupestris*) (J. Wilcox 2015, pers. comm.). Reports suggest that brown trout are consumed more frequently than smallmouth bass. Nonnative fish with spiny dorsal fins are not generally considered suitable prey items due to the risk of injury to the gartersnake during ingestion and because of where they tend to occur in the water column (Nowak and Santana-Bendix 2002).

Native predators of the narrow-headed gartersnake include birds of prey, such as black-hawks (Etzel *et al*. 2014), other snakes such as regal ring-necked snakes (Brennan *et al.* 2009), wading birds, mergansers, belted kingfishers, raccoons (Rosen and Schwalbe 1988), and possibly other generalist mammalian predators. Historically, large, highly predatory native fish species such as Colorado pikeminnow may have preyed upon narrow-headed gartersnakes where the species co-occurred. Native chubs (*Gila* sp.) in their adult size class may also prey on neonatal gartersnakes.

Sexual maturity in narrow-headed gartersnakes occurs at 2.5 years of age in males and at 2 years of age in females (Degenhardt *et al.* 1996). Narrow-headed gartersnakes are viviparous. Narrow-headed gartersnakes breed annually and females give birth from late July into early August, perhaps earlier at lower elevations (Rosen and Schwalbe 1988). Longevity in this species may be as long as 10 years in the wild (Rosen and Schwalbe 1988).

Historical Distribution

The historical distribution of the narrow-headed gartersnake ranged across the Mogollon Rim and along associated perennial stream drainages from central and eastern Arizona, southeast to southwestern New Mexico at elevations ranging from 2,300 to 8,000 feet (Rosen and Schwalbe 1988; Rossman *et al.* 1996; Holycross *et al.* 2006). The species was historically distributed in headwater streams of the Gila River subbasin that drain the Mogollon Rim and White Mountains in Arizona, and the Gila Wilderness in New Mexico. Major subbasins in its historical distribution included the Salt and Verde River subbasins in Arizona, and the San Francisco and Gila River subbasins in New Mexico (Holycross *et al.* 2006). Despite the 2,300 feet low elevation record for narrow-headed gartersnakes at Horseshoe Bend along the Salt River (Rosen and Schwalbe 1988, Appendix II), Holycross *et al.* (2006) suspect the species was likely not historically present in the lowest reaches of the Salt, Verde, and Gila Rivers, even where perennial flow persists. Numerous records for the narrow-headed gartersnake (through 1996) in Arizona are maintained in the AGFD's Heritage Database.

Current Distribution and Population Status

In 2011, the only remaining narrow-headed gartersnake populations where the species could

reliably be found were located at: (1) Whitewater Creek (NM), (2) Tularosa River (NM), (3) Diamond Creek (NM), (4) Middle Fork Gila River (NM), and (5) Oak Creek Canyon (AZ). However, in 2012, New Mexico's largest wildfire in state history occurred, the Whitewater-Baldy Complex Fire. Narrow-headed gartersnake populations in Whitewater Creek and the Middle Fork Gila River were significantly affected by ash and sediment flows and the resultant fish kills, which decimated the narrow-headed gartersnake prey base. The narrow-headed gartersnake population in the Middle Fork Gila River appears to be stabilizing with the return of native fish (Christman 2016), but the Whitewater Creek population remains at very low population density or may be extirpated, based on sampling results from 2015 (Christman 2016). However, a robust and long-term sampling program is required to consider the species officially "extirpated" from an area and would be considered a temporary state, depending on its ecological condition. Based on the most recent capture rates and survey results from Diamond Creek, New Mexico, (GCWG 2016) the crayfish population has reached a high density and the narrow-headed gartersnake population may be in a potentially sharp decline. Nowak (2006, p. 10) demonstrates population reductions in narrow-headed gartersnakes and fewer snakes per person-search hour effort, as compared to that of Rosen and Schwalbe (1988, Appendix II) in this same area; a trend which may be continuing according to VES detection rates at repeated transects in Oak Creek and West Fork Oak Creek (E. Nowak 2016, pers. comm.).

As of 2016, as many as 41 of 51 (80 percent) known narrow-headed populations may exist at low densities and could be threatened with extirpation. Another four of the populations may already be extirpated.

Factors Associated with Population Declines and Range Retractions

The best available commercial and scientific information confirms that harmful nonnative species such as bass (*Micropterus* sp.), flathead catfish (*Pylodictis* sp.), channel catfish (*Ictalurus* sp.), bullheads (*Ameiurus* sp.), sunfish (*Lepomis* sp.), crappie (*Pomoxis* sp.), brown trout, American bullfrogs (*Lithobates catesbeiana*), northern (virile) crayfish (*Orconectes virilis*), and red swamp crayfish (*Procambarus clarkii*) are the most significant threat to narrow-headed gartersnakes and their prey bases, and have had a profound role in their rangewide decline (79 FR 38678). For example, in 2014, Timmons *et al*. (2015, entire) conducted fish surveys at 65 different sites within the Gila River basin and concluded that at approximately 46 of the sites sampled, nonnative fish were a primary threat to the native fish community; often followed by drought or crayfish. Complex ecological interactions between these harmful nonnative species and the native aquatic community have resulted in direct predation on gartersnakes; shifts in biotic community structure from largely native to largely nonnative; and competition for a diminished gartersnake prey base that can ultimately result in the injury, starvation, or death of individual narrow-headed gartersnakes followed by reduced recruitment within populations, subsequent population declines, and ultimately local and regional extirpations. The native fish communities that serve as a prey base for narrow-headed gartersnakes have been severely affected by harmful nonnative species such that native aquatic ecosystems are on the verge of collapse in many regions, as documented by multiple listings of native fish species of the Southwestern United States and by a large body of literature over several decades (Meffe 1985; Propst *et al.* 1986; 1988; 2009; Rosen and Schwalbe 1988; Douglas *et al.* 1994; Degenhardt *et al.* 1996; Fernandez and Rosen 1996; Richter *et al.* 1997; Inman *et al.* 1998; Rinne *et al.* 1998;

Nowak and Santana-Bendix 2002; Propst 2002; Desert Fishes Team 2003; 2004; Bonar *et al.* 2004; Rinne 2004; Clarkson *et al.* 2005; Fagan *et al.* 2005; Knapp 2005; Olden and Poff 2005; Holycross *et al.* 2006, Turner 2007; Brennan 2007; Propst *et al.* 2008; Brennan and Rosen 2009; Minckley and Marsh 2009; Pilger *et al.* 2010; Stefferud *et al.* 2011).

Activities that reduce flows or dewater habitat, such as dams and diversions (Ligon *et al.* 1995; Turner and List 2007), flood-control projects, and groundwater pumping (Stromberg *et al.* 1996; Rinne *et al.* 1998; Voeltz 2002; Haney *et al.* 2009; USGS 2013), seriously threaten the physical habitat of the gartersnakes and are second only to harmful nonnative species in their scope and magnitude of effect on the narrow-headed gartersnake because fish must have water to survive and without this prey base, narrow-headed gartersnakes will not persist. These structures alter the timing, duration, intensity, and frequency of flood events which favors harmful nonnative species and leads to shifts in entire fish communities (Rinne *et al.* 1998; 2005; Propst *et al.* 2008) which compounds their effect on narrow-headed gartersnake populations. Human population growth has resulted in increased water demands and exacerbated the magnitude and scope of these effects on narrow-headed gartersnake populations.

High intensity wildfires lead to excessive sedimentation and ash flows, which can, in turn, result in sharp declines in fish communities downstream and even complete fish kills. In 2011 and 2012, both Arizona (2011 Wallow Fire) and New Mexico (2012 Whitewater-Baldy Complex Fire) experienced the largest wildfires in their respective State histories, indicative of the last decade that has been punctuated by wildfires of massive proportion. The 2011 Wallow Fire affected (to various degrees) approximately 540,000 acres of Apache-Sitgreaves National Forest, White Mountain Apache Indian Tribe, and San Carlos Apache Indian Reservation lands in Apache, Navajo, Graham, and Greenlee counties in Arizona as well as Catron County, New Mexico (InciWeb 2011). The 2011 Wallow Fire impacted 97 percent of perennial streams in the Black River subbasin, 70 percent of perennial streams in the Gila River subbasin, and 78 percent of the San Francisco River subbasin and resulted in confirmed fish kills in each subbasin (Meyer 2011); each of these streams is known to support populations of narrow-headed gartersnakes.

Post-fire flooding with significant ash and sediment loads can result in significant declines, or even the collapse, of resident fish communities, which poses significant concern for the persistence of resident gartersnake populations in affected areas. Sedimentation can adversely affect fish populations used as prey by narrow-headed gartersnakes by: (1) Interfering with respiration; (2) reducing the effectiveness of fish's visually based hunting behaviors; and (3) filling in interstitial (spaces between cobbles, etc., on the stream floor) spaces of the substrate, which reduces reproduction and foraging success of fish (Wheeler *et al.* 2005). Siltation of the rocky interstitial spaces along stream bottoms decreases the dissolved oxygen content where fish lay their eggs, resulting in depressed recruitment of fish and a subsequent reduction in prey abundance for narrow-headed gartersnakes through the loss of prey microhabitat (Nowak and Santana-Bendix 2002). The underwater foraging ability of narrow-headed gartersnakes (de Queiroz 2003) is largely based on vision and is also directly compromised by excessive turbidity caused by sedimentation of water bodies. Suspended sediment in the water column may reduce the narrow-headed gartersnake's visual hunting efficiency from effects to water clarity, based on research conducted by de Queiroz (2003) that concluded the species relied heavily on visual cues during underwater striking behaviors.

The presence of adequate interstitial spaces along stream floors may be particularly important for narrow-headed gartersnakes. Hibbitts *et al.* (2009) reported the precipitous decline of narrow-headed gartersnakes in a formerly robust population in the San Francisco River at San Francisco Hot Springs from 1996 to 2004. The exact cause for this decline is uncertain, but the investigators suspected that a reduction in interstitial spaces along the stream floor from an apparent conglomerate, cementation process may have affected the narrow-headed gartersnake's ability to successfully anchor themselves to the stream bottom when seeking refuge or foraging for fish (Hibbitts *et al.* 2009). These circumstances would likely result in low predation success and eventually starvation.

Many other factors have contributed to the decline of the narrow-headed gartersnake, and in some cases, continue to present a significant threat to low-density populations through synergistic mechanisms, including: climate change and drought (IPCC 2007; Seager *et al.* 2007; Overpeck 2008); development and recreation within riparian corridors (Briggs 1996, Ernst and Zug 1996, Green 1997, Wheeler *et al.* 2005, Paradzick *et al.* 2006); indirect effects from fisheries management activities (Dawson and Kolar 2003, Carpenter and Terrell 2005, Holycross *et al.* 2006, Finlayson *et al.* 2010); road construction, use, and maintenance (Klauber 1956, Waters 1995, Shine *et al.* 2004, Ouren *et al.* 2007, Breininger *et al.* 2012); adverse human interactions with gartersnakes (Fleharty 1967, Green 1997, Nowak and Santana-Bendix 2002, Hibbitts and Fitzgerald 2005); environmental contaminants (Hopkins *et al.* 1999, Campbell *et al.* 2005, Rainwater *et al.* 2005, Wylie *et al.* 2009); and mortality from entanglement hazards such as erosion control products (Stuart *et al.* 2001, Barton and Kinkead 2005, Kapfer and Paloski 2011, Barragán-Ramírez and Ascencio-Arrayga 2013, NMDGF 2013).

For a detailed analysis on the status of and threats to the narrow-headed gartersnake, please review the proposed listing rule (78 FR 41550) which is incorporated herein by reference.

Proposed Critical Habitat

In July 2013 (78 FR 41550), we proposed six narrow-headed gartersnake critical habitat units. The six units we proposed as narrow-headed gartersnake critical habitat are: (1) Upper Gila River Subbasin; (2) Middle Gila River Subbasin; (3) San Francisco River Subbasin; (4) Salt River Subbasin; (5) Tonto Creek Subbasin; and (6) Verde River Subbasin. All proposed critical habitat units are considered occupied by the narrow-headed gartersnake.

The proposed primary constituent elements for the narrow-headed gartersnake are below.

(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.

(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.

(3) A prey base consisting of viable populations of native fish species or soft-rayed, nonnative fish species.

(4) An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs, and/or crayfish, or occurrence of these nonnative species at low enough levels such that recruitment of narrow-headed gartersnakes and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring.

Previous Consultations

Given the range of this species across Arizona and New Mexico and its relatively recent listing, new and ongoing Federal actions are being reviewed for their affects to this species. Additional survey work is occurring to better understand the distribution of this secretive snake (including monitoring while implementing projects) and recovery projects are beginning to be designed and implemented. A complete list of all formal consultations affecting this species can be provided upon request.

Gila trout

Legal Status

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

Physical Description

The Gila trout is a moderate-sized (200 to 250-millimeter or 8 to10-inches) salmonid. Gila trout were formally described by Miller (1950) using trout collected from Main Diamond Creek, Sierra County, New Mexico, in 1939.

Life History

Gila trout generally spawn in April (Rinne 1980) when water temperatures are 6 to 8 °Celsius (43 to 46 °Fahrenheit). Streamflow is apparently of secondary importance in triggering spawning activity (Rinne 1980).

Gila trout primarily feed on aquatic insects: adult flies (Diptera), caddisfly larvae (Trichoptera), mayfly nymphs (Ephemeroptera), and aquatic beetles (Coleoptera) Regan (1966). Large Gila trout occasionally consume speckled dace and may cannibalize smaller Gila trout (Van Eimeren 1988; Propst and Stefferud 1997).

Distribution and Abundance

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 (Behnke 2002).

Initial efforts to conserve Gila trout began in the 1920s with attempts to propagate Gila trout in hatchery settings (USFWS 2003). By the late 1940s, the hatchery efforts were abandoned and the New Mexico Department of Game and Fish (NMDGF) implemented a policy of not stocking nonnative trout into known Gila trout streams. In the 1960s, study of Gila trout ecology began (Regan 1966). In the 1970s, taxonomic analyses (David 1976; Beamish and Miller 1977) and population and habitat evaluations were conducted (Rinne 1978), along with comprehensive distribution assessments (Mello and Turner 1980). In the 1980s, the focus was on stream renovation and barrier construction, along with the establishment of new populations by direct transfer from both wild and hatchery populations. Further studies on ecology and systematics were also conducted (Rinne 1980; Loudenslager et al. 1986; Pittenger 1986; Nankervis 1988; Van Eimeren 1988).

The Gila Trout Recovery Plan was completed in 1979 in collaboration with the FWS, Forest Service, AGFD, NMDGF, and academic institutions. The Recovery Plan was most recently revised in 2003 (USFWS 2003). In 2001, the Gila Trout Recovery Team recommended to the Service that the Gila trout be down-listed from endangered to threatened, based in part on successful reestablishments of the species in New Mexico and Arizona. By 2003, Gila trout were reported to be found in 14 populations in the wild (USFWS 2003). The species was down-listed to threatened status in 2006 (USFWS 2005, 2006). The Recovery Plan is currently going through review for its fourth revision.

Since the 1990s and up through 2017, there have been several Gila trout translocation efforts with varying success in Arizona and New Mexico. Stockings have occurred on the Prescott,

Apache-Sitgreaves, Tonto, and Coconino National Forests in Arizona, and the Gila National Forest in New Mexico. Currently, there are 16 Gila trout populations; one in Arizona and 15 in New Mexico. The only current population known to occur in Arizona is within Dude Creek. In New Mexico, known existing Gila trout populations occur within Grant, Catron, and Sierra counties.

Gila trout have been stocked twice, 2009 and 2013, in Grapevine Springs on the Prescott National Forest. In summer 2017, the Chase Fire burned the Grapevine Springs Canyon watershed. Post-fire flooding occurred after the fire. Gila trout may have been eliminated by the excessive sediment movement and deposition in pool habitats. The Prescott National Forest, AGFD, and the FWS started monitoring pool habitats in June 2018 to determine when Gila trout re-stocking may be resumed.

Raspberry Creek, on the Apache-Sitgreaves National Forest, was originally stocked with Spruce Creek lineage in 2000. In May 2004, Gila trout were evacuated from Raspberry Creek due to the threat of ash flow from the KP Fire in May 2004. In November 2004, 14 fish were restocked into the uppermost portions. Raspberry Creek, heavily impacted by post-fire flooding and ash flows from the Wallow Fire in 2011, is currently considered fishless (Brooks 2012). There are no current plans to stock Gila trout back into Raspberry Creek. There are no other Gila trout populations on this forest.

The AGFD started stocking Gila trout into the West Fork of Oak Creek (Coconino National Forest) in October 2015. This population is managed as a recreational fishery. The West Fork of Oak Creek and Oak Creek cannot be managed as Gila trout recovery streams due to rainbow trout presence. AGFD stocked additional Gila trout in this water in October 2017. Gila trout were initially stocked into Dude Creek (TNF) in 1999. This population was immediately eliminated by flooding on the watershed still recovering from the 1989 Dude Fire. Gila trout were stocked again in 2000, but were again eliminated by flooding in 2005. Dude Creek was stocked again with Gila trout in October 2015, December 2016, and October 2017 when it was determined that habitat conditions had improved to allow trout to persist. Gila trout have been observed in Dude Creek as recently as summer 2018. Gila trout were stocked into Frye Creek, located in the Pinaleño Mountains in Graham County, Arizona, in October 2009. Gila trout were stocked into Ash Creek after they were salvaged from Spruce Creek which had been impacted by the Whitewater baldy Fire in the Gila Mountains in New Mexico in July 2012. In July 2017, the Frye Fire burned the watersheds of both Frye and Ash creeks. AGFD and FWS personnel salvage Gila trout from both creeks prior to post-fire flooding and transported them to the Mora National Fish Hatchery in New Mexico. Not all trout were salvaged. AGFD did not detect any Gila trout in Frye and Ash creeks during surveys in September 2017. Both streams are now considered fishless.

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 in New Mexico: Iron, McKenna, Spruce, Main Diamond, and South Diamond Creeks. Beginning in 1970, Gila trout from each of the five relict populations were translocated into 16 other streams. There are four confirmed relict populations known today (Main Diamond, South Diamond, Spruce, and Whiskey Creeks).

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

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

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 East Verde River is a tributary of the Verde River, with its headwaters originating along the Mogollon River above the Town of Payson. The TNF manages most of the land surrounding the East Verde River as it travels southwest until it meets the Verde River between the Verde Valley and Horseshoe Reservoir.

Diverse land management practices over the past century have contributed cumulatively to the degradation of the East Verde River. Historically, grazing by livestock during the 19th and early 20th century along with the concurrent century of fire suppression practices led to soil compaction, increased erosion, impairment of riparian and stream habitat, reduction in water quality, and overgrown and decadent forests at higher risk of large catastrophic fires. Large, often stand replacing, fires over the past 25 to 30 years in this watershed have resulted in high amounts of sediment input into the system. High flood events, exacerbated by denuded headwaters and hydrophobic soils resulting from large fires, heavily scoured much of the East Verde River, in many places down to bedrock.

The 1990 Dude Fire (24,000 acres) and other fires (2002 Pack Rat Fire - 3000 acres; 2006 February Fire - 4200 acres; 2009 Rim Fire - 2500 acres; and 2009 Waterwheel Fire – 770 acres) have impacted the East Verde Watershed and forest cover. Post-fire flooding, channel instability, and sediment contributions to the East Verde River are evident at several locations along the stream. For example, East Verde River pools between Waterwheel Day Use Area and the bridge at First Crossing are filled with two to three feet of sand and small gravel. It is anticipated that increased sedimentation due to the Waterwheel Fire will impact the East Verde River downstream for many years unless sediment reduction measures are taken.

Several East Verde River low water crossings have contributed to stream impairment. These crossings can widen and reduce the depth of the river resulting in higher water temperatures and a reduction in the system's effectiveness transporting sediment. In addition, low water crossings themselves are a major source of sediment into aquatic systems. Historically, the East Verde River has had very low base flows during the dry months, which only exacerbates the effects of the low water crossings.

There are higher recreation levels along portions of the East Verde River that negatively affect riparian and aquatic habitat. Thousands of visitors annually frequent East Verde day use and campsites throughout the spring and summer. Due to the heavy and constant recreation during the growing season, riparian tree and bank stabilizing grass and sedge can influence recruitment. In dispersed recreation areas, the heavy soil compaction at parking areas and access trails to the river has led to heavy erosion and high levels of sediment input to the system. These recreation areas typically possess degraded riparian vegetation and overbank flow areas with limited vegetation.

The East Verde River is managed by AGFD as a rainbow trout sport fishery (with plans to create a native Gila trout sport fishery in the future that may or may not occur prior to implementation of this project). Impacts from the stocking of rainbow trout on the narrow-headed gartersnake and its prey species were analyzed under the AGFD's Statewide and Urban Fisheries Stocking Program for 2011-2021 biological opinion (USFWS 2011) (FWS file number 22410-2008-F-0486). The AGFD, FWS, and the Wildlife and Sport Fish Restoration Program developed a Conservation and Mitigation Program (CAMP) to reduce and offset impacts of the stocking program on listed species such as the narrow-headed gartersnake, which is a priority species for the program. Among the mandatory conservation measures for the narrow-headed gartersnake in CAMP was a requirement for AGFD to develop outreach material on gartersnakes to attempt to reduce the deliberate killing or injuring of gartersnakes by the public; inform the public about the capture, use, and proper disposal of live bait species; and reduce or prevent inadvertent transport of nonnative species (sportfish. baitfish, other fish species, amphibians, invertebrates, and plants).

Throughout most East Verde River reaches, sport fish habitat is poor. Classic salmonid preferred pool and riffle habitat, and pockets created by boulders, logs, and banks, are either not present or in a degraded state. With some exceptions, the East Verde River lacks larger pools with depth great enough to support fish because they have been filled in with 2 to 3 feet of sand and gravel due to the system's inability to transport sediment. Within the project area, riverbed elevations are at or near bedrock, limiting the depth of natural pools and habitat in portions of each reach. Several recent East Verde River improvements have occurred for both aquatic species and recreationists. The Arizona Department of Transportation constructed bridges at many of the low water crossing areas, moving traffic out of the stream channel, greatly reducing sediment inputs and returning some of the natural stream function. Additionally, the East Verde River now receives more consistent flow levels throughout the year due to releases from C.C. Cragin reservoir.

Aquatic species composition and distribution varies throughout the four East Verde River stream

management areas associated with this project and are influenced by topographical features and management actions. The upper regions near the Washington Park project area has supported only a wild rainbow trout population (but may have recently been affected by post-fire flows and no longer occur). The mid-section at the 2nd and 3rd Crossing project areas are composed of speckled dace, desert sucker, and rainbow trout, while the most downstream section at Flowing Springs contain green sunfish, speckled dace, rainbow trout, yellow bullhead, and desert sucker. There is also a higher density of crayfish throughout the downstream project sites. Rainbow trout are stocked within the Flowing Springs, 2nd and 3rd crossing stream management areas. Topographical barriers appear to be helping to prevent movement of smallmouth bass into the entire project area, and for movement of other exotic harmful fish species (sunfish and catfish) from Flowing Springs area upstream to the 2nd and 3rd crossing and Washington Park areas (A. Bush 2018, pers. comm.).

Status of the narrow-headed gartersnake and critical habitat within the action area

Narrow-Headed Gartersnake Status

Visual encounter surveys conducted in 1985 and 1986 in the action area (totaling 20 person-search hours) found 12 individual narrow-headed gartersnakes (indicating a robust population; Rosen and Schwalbe 1988). Since then, the most recent narrow-headed gartersnake reported along the East Verde River was in 1992 below its confluence with Sycamore Canyon (approximately 1.5 miles downstream of the Flowing Springs project area).

A focused species-specific, narrow-headed gartersnake survey along the East Verde River totaling over 20,000 trap hours found no individuals of this species in 2004 and 2005 (Holycross et al. 2006). Between 1985 and 2018 the total gartersnake survey effort therefore includes 20 person-search hours and 20,000 traps hours, with the last survey effort occurring 13 years ago. While not specific to gartersnakes, numerous surveys for both native and non-native fish have occurred in the project area using multiple capture methods including hoop nets, minnow traps, seine, electrofishing equipment etc. throughout the past 10 years without detecting narrow-headed gartersnakes (Gill 2009, Gill 2010, Makinster et al. 2011, Jaeger 2014, Jaeger 2016, Lashway 2016).

Due to synergistic effects from multiple land uses and fisheries management policies, it is likely that the narrow-headed gartersnake population habitat along the East Verde River has declined (USFWS 2011). Even with species-specific surveys, it is difficult to determine the presence, absence, distribution, and abundance of this highly cryptic and elusive species. However, based upon the changes to prey species and presence of nonnative predators, combined with the lack of gartersnake detections, the East Verde River narrow-headed gartersnake population may exist at a low density.

The most recent confirmed extant populations of narrow-headed gartersnakes are located outside the project area in Haigler and Canyon creeks. Several snakes were reported in 2014 in Haigler Creek near Alderwoods Campground (Goode 2014). These observations are approximately 20 miles (direct line) from the closest project area location. In 2015, AGFD found eight individual snakes (and seven at a return trip) along Canyon Creek below Valentine Ridge (approximately

30 miles east of the action) with evidence of reproduction. In 2016, AGFD's trap survey effort in Canyon Creek resulted in the capture of nine snakes with an additional observation made during a fisheries survey.

Proposed Narrow-Headed Gartersnake Critical Habitat

FWS has proposed critical habitat for the narrow-headed gartersnake throughout the project's action area within the Verde River Subbasin Unit. The Verde River Subbasin Unit is located southwest of Paulden, Arizona, and northwest of Payson, Arizona, in Coconino, Gila, and Yavapai counties. This Unit includes a total of 35,586 acres along 248 stream miles within the Verde River, Oak Creek, West Fork Oak Creek, and East Verde River Subunits. The East Verde River Subunit, where the proposed action is occurring, contains approximately 7,360 acres along 53.3 stream miles from its confluence with Verde River upstream to its origin south of Rim Road along the Mogollon Rim. All but 678 acres of the 7,360 acre East Verde River Subunit occur on TNF land (78 FR 41550).

Status of the Gila trout within the action area

Currently, there are no Gila trout within the East Verde River, an East Verde River tributary, or the project footprint. However, AGFD plans on beginning releases of Gila trout into the East Verde River as an Endangered Species Act section 4(d) recreational fishery. The East Verde River is not considered a trout recovery stream. If Gila trout are stocked into the East Verde River in the summer of 2018, Gila trout could be present in the action area during stream restoration activities occurring during project implementation. No critical habitat has been proposed or designated for Gila trout.

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, which 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.

Effects Overview for Narrow-Headed Gartersnakes and Gila Trout

We anticipate adverse effects to both narrow-headed gartersnake and Gila trout (if Gila trout are translocated to the East Verde River prior to project implementation) from the proposed action, and short-term adverse effects to proposed gartersnake critical habitat. Heavy machinery used to re-shape and contour the stream and move logs/boulders is anticipated to cause gartersnake harassment, injury, or fatality. The stream manipulation activities are also likely to affect narrow-headed gartersnake proposed critical habitat within the project footprint through stream and vegetation modification, and incrementally decreasing terrestrial sheltering habitat

(removing upland boulders/logs). Due to the existing baseline of various fish assemblages throughout the project and the small size of the project area, we determine that the overall change to fish species composition will likely be insignificant for gartersnakes. Heavy machinery use within and adjacent to the stream could also cause injury or death to any Gila trout, should they be translocated to the project area prior to construction.

We also anticipate that the proposed project will have some beneficial effects at the four East Verde River stream segments by improving the structural complexity of the stream, and therefore habitat for narrow-headed gartersnakes and any Gila trout translocated in the future. Improving stream channel function, changing its shape (i.e., deepening pools), and improving bank vegetation is expected to reduce sedimentation and water temperatures over the long term that can benefit translocated Gila and rainbow trout. The habitat modifications are also expected to improve habitat for some native fish, including Gila trout, as well as rainbow trout, which are important prey species for resident narrow-headed gartersnakes.

Narrow-Headed Gartersnakes

Direct effects

We anticipate that direct effects may occur to the narrow-headed gartersnake from the collection of materials (logs, boulders) adjacent (within 100 feet) to the stream for various stream management structures. During periods of greater dormancy (late winter to early spring), gartersnakes are more likely to use off channel or upland areas to hibernate, possibly under boulders, downed wood, debris, or rock clusters. These are the same materials that are expected to be removed and relocated adjacent and within the stream channel for use as enhancement structures. Individual narrow-headed gartersnakes may be unearthed, crushed, and/or trapped during the excavation and movement of these materials, resulting in harassment, injury or death.

Directs effects to the narrow-headed gartersnake may also occur from heavy machinery working next to the stream bank and other landscape manipulation activities. Because the project would be implemented during winter months, narrow-headed gartersnakes are more likely to be less active or dormant, reducing the likelihood for impacts to surface-active snakes. However, narrow-headed gartersnakes can still be surface active within areas where heavy machinery is working alongside the stream especially if flushed when cover objects they are using are removed or disturbed. Therefore, if narrow-headed gartersnakes are using the areas targeted for stream enhancement and landscape manipulation features, individuals can be harassed, injured, or killed by machinery and earth moving activities if they are unable to escape from the construction area.

Having an experienced and appropriately permitted narrow-headed gartersnake biologist on-site during heavy equipment use provides an opportunity for capturing and relocating the snakes, thereby reducing the chances of injury or death associated with project implementation. However, we anticipate that due the narrow-headed gartersnake's small size, secretive nature, and cryptic coloring, opportunities for relocation will be rare.

Indirect effects

The proposed action is anticipated to result in adverse indirect effects to narrow-headed gartersnakes from a short-term alteration of its behavior, prey, and habitat, along with beneficial effects to stream quality, adjacent vegetation, and site-specific fish community assemblages. Because of the small size of the four project sites, the existing fish assemblages and natural fish barriers present along the river, we anticipate an overall insignificant change in gartersnake habitat and prey.

Construction activities adjacent to and within the stream may displace narrow-headed gartersnakes from any given work area. Unexpected narrow-headed gartersnake habitat alteration and harassment at the work sites can increase exposure to predators or movement into less preferable/productive/suitable habitat causing decreased productivity/survival, injury, or death.

The proposed project will also provide both incremental indirect beneficial and adverse effects to narrow-headed gartersnakes and their habitat. Over the long-term, improved on-site recreation management and revegetation (tree and herbaceous vegetation plantings) of existing disturbed areas will help stabilize the banks, reduce sheet erosion and sedimentation, and eventually provide stream bank gartersnake protective cover. The proposed project will remove upland narrow-headed gartersnake protective cover (boulders and logs) for use in stream improvements, however narrow-headed gartersnakes may be able to take advantage of these structures along the stream for protective cover, basking, and hunting during their surface-active season. We expect the planned stream alterations (such as deepening pools) plus channel and riparian vegetation improvements will improve water quality, slow stream velocity, and reduce erosion, sedimentation, and water temperatures. These factors can be expected to benefit aquatic species within the footprint that are harmful to narrow-headed gartersnakes (i.e., sunfish, bullhead catfish, and crayfish) and those that narrow-headed gartersnakes may prey upon (rainbow and possibly introduced Gila trout). At the most downstream management site (Flowing Springs) where existing harmful nonnative aquatic species occur, we can expect stream changes will benefit these harmful species persistence. At the three most upstream project sites (2nd and 3rd Crossings and Washington Park), where native species and rainbow trout have recently occurred and stream features provide a natural barrier for upstream movement of harmful nonnative fish species (A. Bush, TNF, 2018, pers. comm.), stream improvements can help to maintain fish species available for narrow-headed gartersnake prey.

How this proposed action will ultimately indirectly affect narrow-headed gartersnakes and its prey within the East Verde River and the action area is difficult to predict with certainty. The East Verde River is similar to many other streams within the narrow-headed gartersnake's range, where the aquatic community has shifted in species composition, from one of primarily native fauna, to being increasingly dominated by an expanding assemblage of nonnative animal species (USFWS 2013). The expansion and occurrence of harmful nonnative species contributed to narrow-headed gartersnake rangewide decline and continues to be the most significant threat to its prey base, due to direct predation, competition, and modification of habitat (USFWS 2013). However, due to the existing natural barriers limiting harmful exotic species expansion into three quarters of the project area and the overall small area being manipulated, we anticipate that

without further management (such as removal of harmful nonnative aquatic species), the project will likely not appreciably change existing conditions for gartersnakes and its prey.

Narrow-Headed Gartersnake Proposed Critical Habitat

Components of each of the four primary constituent elements for proposed narrow-headed gartersnake critical habitat (stream, streamside characteristics, and fish species composition) are anticipated to be affected by the project (improving stream habitat for sport fish). The combined size of the project footprint is approximately seven acres (974 yards total stream length for the four stream improvement areas) (A. Bush 2018, pers. comm.). While the long-term benefits of stream improvements (PCE 1 and 2) are expected to outweigh the short-term construction impacts, the purpose of improving existing sport fish populations (comprised of harmful predatory nonnative aquatic species, stocked/wild rainbow trout, and possibly future stocked Gila trout) is anticipated to have an overall insignificant impact to narrow-headed gartersnake prey (PCE 3 and 4).

Construction activities will result in alteration of aquatic and upland narrow-headed gartersnake habitat (PCE 1 and 2). Alteration of stream substrates such as sand, cobble and boulders (PCE 1a) during structure placement/stream manipulation activities should result in a short-term adverse impact. However, the long-term project goal should improve stream function at the four locations, reduce excessive sedimentation, and generate pools for fish (PCE 1a). The project will remove shoreline and immediate upland logs and boulders for instream structures, reducing organic and inorganic structural narrow-headed gartersnake habitat complexity, but will enhance shoreline herbaceous vegetation and trees with plantings and help protect them with improved recreation management (PCE 1c and 2). Movement of upland boulders and logs to the shoreline, while reducing cover and habitat complexity in one area, could enhance those attributes along the shoreline. Impacts to terrestrial areas (soil compaction and ground disturbances) adjacent to the stream (PCE 2) by machinery gaining access to the stream will be minimized by using existing disturbed areas for staging and travel corridors, but can't be avoided at the 2nd Crossing project area (where about 30-50 feet of overland crossing is needed). With the proposed conservation measures, we do not anticipate introducing pollutants to the stream, nor do we expect the natural stream flow will be altered (PCE 1b and 1d).

The goal of the proposed action to improve aquatic habitat for rainbow trout (and possibly native Gila trout) may benefit the gartersnake's prey base at the three most upstream management sites (PCE 3). However, this may also improve habitat for the suite of existing harmful predatory nonnative aquatic species (sunfish, bullhead catfish, crayfish), particularly at the most downstream management site (Flowing Springs) (PCE 4). There is doubt, due to the presence, abundance, and resilience of harmful predatory exotic aquatic species (PCE 4), how stream improvements at the Flowing Springs sites will influence gartersnake prey species. Rainbow trout (and possibly translocated Gila trout) populations may be enhanced by the changes to stream habitat at the upstream management area (PCE 3), but trout will share habitat with these harmful exotic predatory aquatic species and may also be adversely effected (PCE 4). It is also less than certain how or whether Gila trout will persist in the East Verde River. Gila trout have yet to be translocated to the stream and as a result, if/when they are translocated, factors such as the impact of harmful predatory exotic fish, angling pressure, stocking schedules, and others

environmental/habitat effects can be anticipated to influence their availability, existence, or continuity for narrow-headed gartersnake prey. Similar influences may also adversely impact rainbow trout, however in the past, they have persisted as a wild population at the most upstream site, and at the three downstream sites (likely due to continuous stocking). Due to the overall small size of the four stream management areas, the existing baseline mixture of exotic harmful aquatic species and fish species accessible to narrow-headed gartersnakes, and natural barriers, we anticipate an overall insignificant change to narrow-headed gartersnake prey (PCE 3) and harmful exotic aquatic species (PCE 4) within the action area.

Gila Trout

If Gila trout are present in the stream prior to project implementation, we anticipate that not all Gila trout will be captured and relocated from each project site, thus leaving any remaining trout vulnerable to direct and indirect effects from stream improvement activities. Installation of block nets, collection of fish within the netted area, and release of fish outside of each work site will minimize the likelihood of direct and indirect adverse effects to any Gila trout that may have been released within the East Verde River and occurring within the project's footprint. Because AGFD has a section 6 conservation/work plan that includes Gila trout, they are exempt from needing purposeful take coverage associated with capture and transportation activities for this threatened species as described under sec. 10 (FR 17.31). Any Gila trout remaining in the project footprint will be susceptible to direct injury or death from heavy machinery working within the stream channel or indirect fatality from increased sedimentation, turbidity, lack of oxygen, or other similar impacts. We note that no heavy machinery will be used at the Washington Park work site, likely preventing any incidental take of Gila trout at that specific site.

Because the project will improve sport fish habitat, we anticipate there could be long-term benefits to Gila trout habitat from the proposed action, but there are uncertainties. Overall, the channel and stream improvements should improve water quality, slow stream velocity, reduce erosion, deepen pools, and reduce water temperature. Revegetation of degraded and disturbed areas will help to speed up bank stabilization, reduce sheet erosion and sedimentation, and provide stream bank cover. These improvements should all help Gila trout success. However, there is always uncertainty with translocations. Improvements will address a relatively small overall area (7 acres) and unrelated stream function factors such as the impact of harmful predatory exotic fish, angling pressure, or other unknown environmental/habitat effects may also influence Gila trout persistence.

CUMULATIVE EFFECTS

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

Since the TNF manages the land within the action area, most activities that could potentially affect these species are Federal activities and would be subject to additional section 7 consultation.

Future State actions that are reasonably certain to occur are the continued stocking of rainbow trout into the East Verde River. Any adverse effects on the narrow-headed gartersnake that may result from future stocking has been considered in the Statewide and Urban Fisheries Stocking Program consultation and CAMP, which is described in the Environmental Baseline section.

There is a history in Arizona of humans killing snakes. "Ophidiophobia" refers to the act of humans directly injuring or killing snakes out of a sense of fear or anxiety, or for no obvious reason whatsoever. Rosen and Schwalbe (1988) documented human-caused mortality on narrow-headed gartersnakes at Oak Creek Canyon, a site used heavily by recreationists. Nowak and Santana-Bendix (2002) also reported direct fatality on narrow-headed gartersnakes at sites within Oak Creek that receive high recreational use (e.g., Slide Rock State Park), but they did not consider the overall impact of recreation on the population to be large. If the habitat improvement project succeeds in meeting its objectives, angling as well as general visitation (i.e., non-angler use) is likely to increase, which could increase the risk for adverse human interactions with narrow-headed gartersnakes.

JEOPARDY AND ADVERSE MODIFICATION ANALYSIS

Section 7(a)(2) of the ESA requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

Jeopardy Analysis Framework

Our jeopardy analysis relies on the following:

"Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). The following analysis relies on four components: (1) Status of the Species, which evaluates the range-wide condition of the listed species addressed, the factors responsible for that condition, and the species' survival and recovery needs; (2) Environmental Baseline, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) Effects of the Action (including those from conservation measures), 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. The jeopardy analysis in this biological opinion emphasizes the range-wide survival and recovery needs of the listed species and the role of the action area in providing for those needs. We

evaluate the significance of the proposed Federal action within this context, taken together with cumulative effects, for the purpose of making the jeopardy determination.

Destruction/Adverse Modification Analysis Framework

Past designations of CH have used the terms PCEs, PBFs or "essential features" to characterize the key components of CH that provide for the conservation of the listed species. The new CH regulations (79 FR 27066) discontinue use of the terms "PCEs" or "essential features," and rely exclusively on use of the term "PBFs" for that purpose because that term is contained in the statute. However, the shift in terminology does not change the approach used in conducting a destruction or adverse modification analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. For those reasons, references to PCEs or essential features should be viewed as synonymous with PBFs. All of these terms characterize the key components of CH that provide for the conservation of the listed species.

The final rule revising the regulatory definition of "destruction or adverse modification of critical habitat" became effective on March 14, 2016 (81 FR 7214). The revised definition states: "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features."

Similar to our jeopardy analysis, our adverse modification analysis of critical habitat relies on the following four components: (1) the Status of Critical Habitat, which evaluates the range-wide condition of designated critical habitat in terms of [PCEs/PBFs], the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the Environmental Baseline, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the Effects of the Action, which determine the direct and indirect impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the [PCEs/PBFs] and how they will influence the recovery role of affected critical habitat units; and (4) Cumulative Effects, which evaluate the effects of future, non-federal activities in the action area on the [PCEs/PBFs] and how they will influence the recovery role of affected critical habitat units.

CONCLUSION

After review the current status of the narrow-headed gartersnake and its proposed critical habitat and Gila trout, the environmental baseline for the action area, the effects of the proposed East Verde River Stream Improvement Project, and the cumulative effects, it is our biological opinion that the construction and installation of the aquatic enhancements, as proposed, are not likely to jeopardize the continued existence of these two species. In addition, it is our conference opinion that the proposed action is not likely to destroy or adversely modify narrow-headed gartersnake proposed critical habitat. We base our conclusion on the following:

- The proposed stream improvement activities will occur at four relatively small stream sections (about seven acres total) and be completed over a short time period resulting in temporary ground and stream disturbance.
- The impact to narrow-headed gartersnake populations is expected to be small due to the short-term nature and overall small terrestrial and stream area affected by the project. The presence of an AGFD biologist during ground disturbing activities provides an opportunity to reduce or minimize impacts to any observed narrow-headed gartersnakes.
- The proposed project will provide long-term indirect benefits to narrow-headed gartersnake stream habitat, including creating new habitat features and improving streamside vegetation, protective cover, and site management, and potentially enhancing habitat for its prey base.
- Implementation of the proposed project would not permanently alter any of the physical and biological features or PCEs to a degree that would prevent these features from being re-established or preclude narrow-headed gartersnake recovery in this subunit or rangewide.
- Due to the overall small area of stream habitat being altered, natural barriers, and existing fish assemblage baseline, we anticipate the fish habitat alterations will not noticeably change the overall existing fish populations occurring within the action area for narrow-headed gartersnakes.
- The proposed project will improve Gila trout habitat. However, we note that if fish were reintroduced to the East Verde River, it would occur under the special 4(d) provision of the Act, with Gila trout managed as a recreational fishery and not as a population for recovery.

The conclusions of this biological opinion are based on full implementation of the project as presented in the Description of the Proposed Action section of this document, including any 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 measures described below are non-discretionary, and must be undertaken by the TNF so that they become binding conditions of any grant or permit issued to the contractor, as appropriate,

for the exemption in section 7(o)(2) to apply. The TNF has a continuing duty to regulate the activity covered by this incidental take statement. If the TNF (1) fails to assume and implement the terms and conditions or (2) fails to require the contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the TNF must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Narrow-headed gartersnake

We anticipate that the proposed action is reasonably certain to result in the incidental take of narrow-headed gartersnakes. Based upon the size of the overall project area, season of work, and type of work implemented, we anticipate the incidental take of up to three narrow-headed gartersnakes in the form of harassment, harm, injury, or death from construction activities occurring within its habitat at the stream's edge and immediate upland areas.

Because narrow-headed gartersnakes are difficult to detect, cryptically colored, secretive, and use subsurface retreats and protective cover, more narrow-headed gartersnakes may be incidentally taken by the project than can be observed. Therefore, if narrow-headed gartersnakes are being observed during heavy equipment operation, there is a possibility narrow-headed gartersnakes are being incidentally taken and incidental take exceeded. As the proposed conservation measures identify, the TNF will contact this office as soon as possible if narrow-headed gartersnakes are detected to discuss project activities and whether consultation reinitiation or additional protective measures are necessary. Due to the gartersnake's secretive nature, if two narrow-headed gartersnakes are observed injured or killed as a result of the East Verde Stream Improvement Project, we will consider the amount or extent of incidental take of three snakes has been reached.

Gila trout

We anticipate that the proposed action is reasonably certain to result in incidental take of Gila trout (if translocated Gila trout occur in the stream prior to construction activities) within the footprint of the action area (between block nets). Because fish removal activities prior to project implementation are not likely to capture all fish, we expect direct and indirect incidental take of Gila trout occurring within the stream in the form of injury or death from construction activities. It is not practical to express the amount or extent of anticipated incidental take in terms of individual Gila trout because any amount of Gila trout remaining within the project footprint will be small and difficult to detect. We anticipate most Gila trout that may occur within each blocked stream segment will be salvaged prior to construction activities, and any remaining fish incidentally taken will be difficult to detect or quantify. Therefore, the amount of incidental take authorized under this incidental take statement is equal to all unsalvaged Gila trout in each blocked stream segment. As a result of all non-salvaged Gila trout being incidentally taken from the proposed action, the amount of incidental take occurring between blocked stream segments due to construction activities cannot be exceeded.

EFFECT OF THE TAKE

In this biological opinion, we determine that these levels of anticipated take are not likely to result in jeopardy to the narrow-headed gartersnake or Gila trout, or destruction or adverse modification of gartersnake proposed critical habitat for the reasons stated in the Conclusions section.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

Because all appropriate measures to reduce and minimize effects and monitoring/reporting strategies to assess when the amount or extent of incidental are part of the proposed action's conservation measures, we have not identified any additional Reasonable and Prudent Measures and Terms and Conditions.

Disposition of Dead or Injured Listed Species

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

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.

- We recommend the TNF work with the AGFD and FWS to improve the diversity, abundance, continuity, and availability of native prey species for the narrow-headed gartersnake along East Verde River and elsewhere throughout the TNF.
- We recommend that the TNF and AGFD, in coordination with FWS, seek out opportunities to educate recreationists and pursue their assistance in protecting the narrow-headed gartersnake and its habitat along the East Verde River and elsewhere throughout the TNF. We recommend collaborative opportunities to educate TNF visitors (possibly with campground hosts, signage, maps, brochures, etc.) on narrow-headed gartersnake natural history, habitat, conservation, threats, and protection of stream improvements.
- We recommend the TNF work with AGFD and the FWS to develop and implement a monitoring plan to better determine the distribution, abundance, and trends of narrow-headed gartersnake populations on the TNF.

- We recommend the TNF collaborate with AGFD and the FWS in reducing populations of harmful nonnative aquatic organisms in the East Verde River that prey upon and compete with the narrow-headed gartersnake, particularly bullfrogs, spiny-rayed fish, brown trout, and crayfish.
- We recommend the TNF participate in the Gartersnake Conservation Working Group by ensuring TNF biologists attend meetings and coordinate in monitoring and recovery planning.
- We recommend the TNF consider implementing the Erosion Control Fabric Recommendations (Appendix B) to reduce the potential of entanglements of narrow-headed gartersnakes.

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

REINITIATION NOTICE

This concludes formal consultation on the narrow-headed gartersnake and Gila trout for the East Verde River Restoration project. 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 narrow-headed gartersnake proposed critical habitat related to effects from the proposed East Verde River Restoration project. You may ask us to confirm the conference opinion as a biological opinion issued through formal consultation if 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 the designation of final critical habitat and subsequent adoption of this conference opinion, the TNF shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect the species in a manner or to an extent not considered in the conference opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the species that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

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, 2007, 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 the Tonto Apache Tribe of its completion. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

We appreciate the TNF's efforts to identify and minimize effects to listed species from this project. Please refer to the consultation number, 02EAAZ00-2018-F-0701 in future correspondence concerning this project. Should you require further assistance or if you have any questions, please contact Greg Beatty (602-242-0210).

Sincerely,

Shaula J. Hedwall

Jeffrey A. Humphrey
Field Supervisor

cc (electronic):
Forest Biologist, Tonto National Forest, Phoenix, AZ (Attn. K. Kessler and A. Bush)
District Ranger, Payson Ranger District, Payson, AZ (Attn. C. Akins)
Supervisory Biologist, Fish and Wildlife Service, Phoenix, AZ (Attn. M. Richardson)
Assistant Field Supervisor, Fish and Wildlife Service, Tucson (Attn: C. Crawford, J. Servoss)
Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff (Attn: S. Hedwall)
Director, Environmental Programs, Bureau of Indian Affairs, Phoenix, AZ
Honorable Chairman, Jeri DeCola, Tonto Apache Tribe, Payson, AZ
Director, Cultural Resources, Tonto Apache Tribe, Payson, AZ
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

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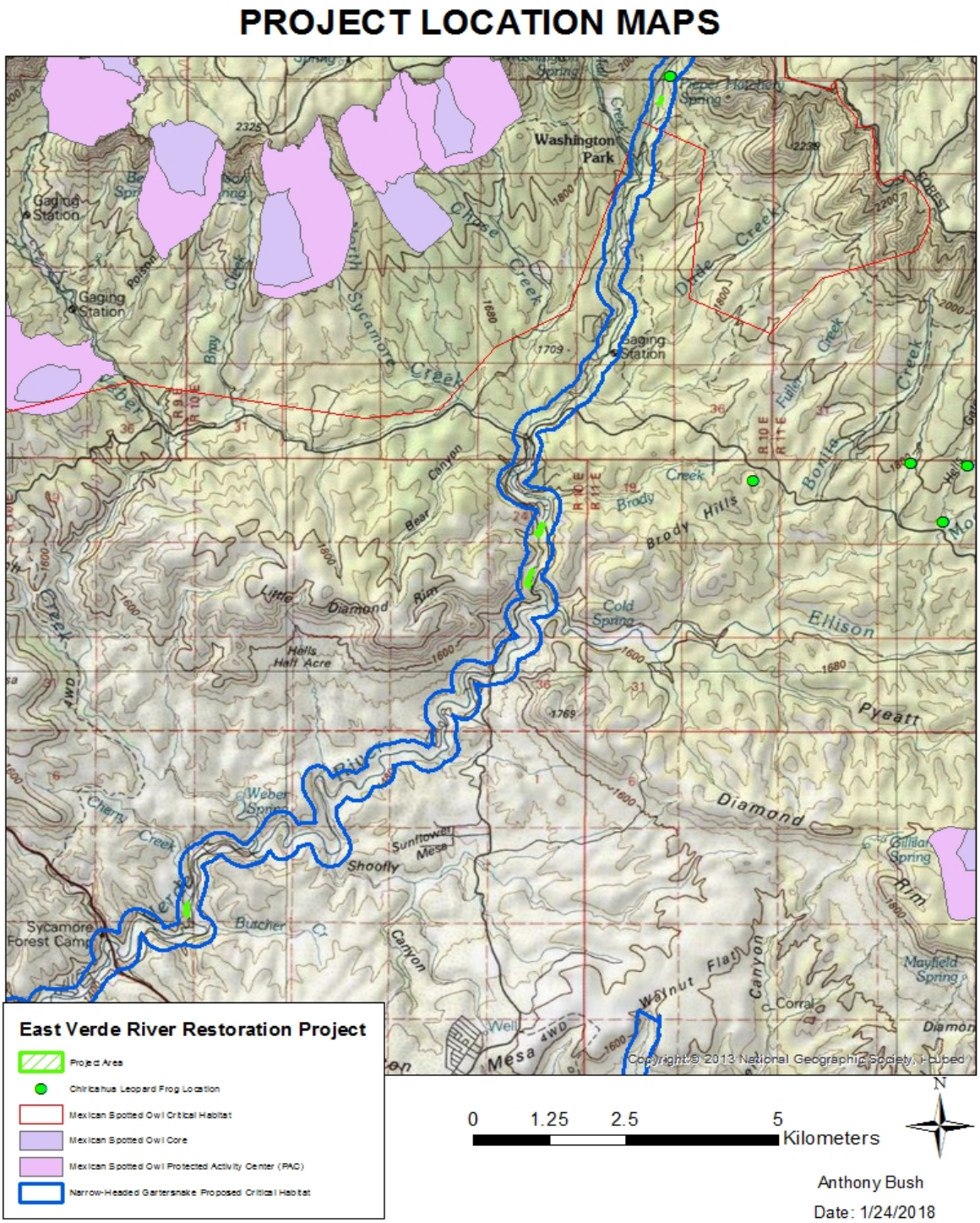
TABLES AND FIGURES

Figure 1. East Verde River and the four river restoration locations (USFS 2018).



APPENDIX A: CONCURRENCES

This appendix contains a description of conservation measures included in the proposed action, as well as our concurrences for your "may affect, not likely to adversely affect" determinations for the threatened Mexican spotted owl, Chiricahua leopard frog, and their designated critical habitats.

Mexican spotted owl

Mexican spotted owl conservation measures

- Project related construction activities would only occur between October 1 and February 28, outside of the Mexican spotted owl breeding season (March 1 through August 30).
- TNF has issued guidelines for felling and using ponderosa pine trees to protect Mexican spotted owls and its habitat:
    - When possible, trees that have fallen naturally and are still suitable for use would be used instead of felling living trees;
    - No trees greater than 18 inches dbh would be felled (larger trees can be used if they fell naturally);
    - Tree removal would focus on trees that are suppressed or subordinate in growth form and/ or diseased, when possible;
    - Only living trees, and not snags, would be felled;
    - Slash would be lopped and scattered in such a manner so that no slash pile is over 3 feet high and is not in contact with living trees;
    - Slash would be used to cover disturbed areas when possible;
    - Only trees that would be used for the project are allowed to be felled;
    - No Douglas fir or riparian obligate trees would be felled;
    - No trees would be felled in Mexican spotted owl protected activity centers (PAC);
    - A TNF Biologist will assist in the identification of trees (living or downed) to be used within recovery habitat or Mexican spotted owl designated critical habitat.

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the Mexican spotted owl or its critical habitat for the following reasons:

- The proposed project is 1.4 miles from the nearest known spotted owl PAC and will occur in the spotted owl non-breeding season. As a result, there would be no disturbance to breeding spotted owls.
- Within the upland riparian habitat and ponderosa pine designated critical habitat, the proposed action area is small (13 acres at the Washington Park site).
- The proposed action requires only a small number of downed logs or felled trees to create 4 log weirs. As a result, we anticipate any indirect effect to the overall forest structure or canopy would be insignificant to Mexican spotted owls and its habitat.
- Because of the small amount and short-duration of the work area, and therefore limited change to ground vegetation, downed vegetation, and coniferous trees, we anticipate any effects to the primary constituent elements (forest structure, tree species, canopy, prey

species, fallen trees, plant species, and plant cover) of critical habitat would be insignificant.

Chiricahua leopard frog

Chiricahua leopard frog conservation measures

- Project related construction activities would only occur between October 1 and February 28 when CLF are not active.
- Construction of enhancement features within the active channel would not occur during high flows such as during heavy local storms.
- If a CLF is observed (alive or dead) during project implementation, the TNF will call AGFD and the FWS project lead within 24 hours to discuss and evaluate the project's potential effects to leopard frogs. If it is determined that CLF could be affected, then possible outcomes may be (but are not necessarily limited to) implementing additional conservation measures to prevent adverse effects; changing project implementation or design to minimize effects; or ceasing work and reinitiating consultation.
- Biologists will construct temporary check dams above and below in-stream construction areas. Check dams will remain in place until work at a particular location has concluded and all machinery has been removed from the active stream channel to reduce sedimentation that could negatively affect CLF.

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the Mexican spotted owl or its critical habitat for the following reasons:

- Because no CLF designated critical habitat is within the East Verde River, there will be no effect to the primary constituent elements of CLF critical habitat from the proposed action.
- Because CLF are not known to breed within the action area, we do not anticipate any direct effects to breeding/resident CLF from the proposed action.
- Because the project will occur during the CLF dormant winter season, we do not anticipate any direct or indirect effects to dispersing CLFs.
- Because the four stream management areas are spread out, are individually relatively small areas (< 2 acres each), and the project will be of short duration during the CLF dormant season, we anticipate any long-term indirect effects associated with habitat alteration to dispersing CLFs will be insignificant.

APPENDIX B: RECOMMENDATIONS FOR USE OF EROSION CONTROL FABRIC IN GARTERNSNAKE HABITAT

Loose-weave netting - Use erosion control products which have movable (not fixed or welded) joints between the horizontal and vertical twines, thus allowing the twines to move independently which reduces the likelihood of a gartersnake becoming entangled. Netting designs with movable joints may be called loose weave, Jeno weave, or gauze weave.

Mesh Size - Avoid using products with a mesh size of 0.5 inch square; this mesh size have the highest likelihood of snake entanglement. Instead, consider larger mesh sizes (3 x 3, 3 x 4, or 1.7 x 0.8 inches), or rectangular meshes with a smaller, ¼-inch aperture in one direction (1.25 x 0.25 inches) which are less prone to snake entanglements.

Natural-Fiber Materials - Use biodegradable, natural-fiber products (including netting, filling, and thread) are more wildlife-friendly than synthetic plastic products which allow entangles snakes a better opportunity to escape because of their lower tensile strength.

Products without Netting-There are several choices of erosion and sediment control products that do not contain netting. These include net-less erosion control blankets (for example, made of excelsior), loose mulch, hydraulic mulch, soil binders, unreinforced silt fences, and straw bales. Net-less erosion control products do not risk entanglement of gartersnakes.

Prompt Removal of Products - Remove erosion control products promptly after they have served their purpose to lessen the risk of gartersnake entanglement.