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In Reply Refer To:  
AESO/SE  
22410-2010-CPA-0041  
22410-2010-F-0392-R001

September 5, 2014

Ms. Karla S. Petty, Division Administrator  
Federal Highway Administration  
4000 North Central Avenue, Suite 1500  
Phoenix, Arizona 85012-3500

RE: Oak Creek Bank Protection Project

Dear Ms. Petty:

Thank you for your request for formal consultation 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 and biological evaluation (BE) were dated August 19, 2014, and received by us on August 19, 2014. The Federal Highway Administration (FHWA), in cooperation with the Arizona Department of Transportation (ADOT), has requested formal consultation for potential effects resulting from a stream bank protection project between the Oak Creek Canyon flow channel and State Route (SR) 89A at milepost (MP) 385.1, Coconino County, Arizona. The objective of the project is to repair the existing embankment and/or provide new bank protection, and to mitigate the erosion caused by storm water flows and local overland flows. The FHWA has determined that the proposed action may affect the threatened narrow-headed gartersnake (*Thamnophis rufipunctatus*).

Your letter also requested our concurrence that the proposed action may affect, but is not likely to adversely affect the Mexican spotted owl (*Strix occidentalis lucida*). We concur with your determination. The basis for our concurrence is found in Appendix B.

You also determined that the action would result in “no effect” to narrow-headed gartersnake proposed critical habitat and Mexican spotted owl critical habitat. “No effect” determinations do not require review from the FWS, and are not addressed further.

This biological opinion is based on information provided in the August 19, 2014, BE, conversations and electronic correspondence with your staff, and other sources of information found in the administrative record supporting this biological opinion. In addition, we have discussed the project with ADOT, the Forest Service, and Northern Arizona University (NAU) and Arizona Game and Fish Department (AGFD) species experts. Literature cited in this

biological opinion is not a complete bibliography of all literature available on the species of concern or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

### Consultation History

Details of the consultation history are summarized in Table 1.

**Table 1.** Summary of Consultation History

Date	Event
January 22, 2010	We received a letter dated January 20, 2010, requesting comments on the project.
February 12, 2010	We provided comments on the proposed project, specific to the Mexican spotted owl, narrow-headed gartersnake, and native fish within the project area.
May 10, 2010	We received your May 7, 2010, request for informal consultation for possible effects to the Mexican spotted owl from the proposed action.
June 11, 2010	We concurred with your request. In addition, we provided information regarding the narrow-headed gartersnake, at the time an AGFD species of greatest conservation need, in order to ensure the project considered this species.
June 2014 to Present	We discussed the project with ADOT's Environmental Planning Group and exchanged electronic mail regarding this project.
July 8, 2014	We published the final rule listing the narrow-headed gartersnake as threatened (effective August 7, 2014).
July 17, 2014	We attended a site visit with FHWA, ADOT, and Forest Service staff to discuss the revised proposed action and opportunities to minimize effects to the narrow-headed gartersnake and its habitat.
July 30, 2014	We met with ADOT to discuss possible conservation measures for the project.
August 13, 2014	We provided an updated species list, via electronic mail, to ADOT.
August 19, 2014	We received your August 19, 2014, request for formal consultation and the BE.
September 2, 2014	We issued a thirty-day letter initiating formal consultation.
September 2, 2014	We provided a draft biological opinion for your review.
September 3, 2014	We received your comments and incorporated your edits into the biological opinion.

## DESCRIPTION OF THE PROPOSED ACTION

FHWA in association with ADOT is planning a bank protection project along SR 89A at MP 385.1, within Oak Creek Canyon, approximately 10 miles north of Sedona, Coconino County, Arizona (Township 19 North, Range 6 East, Section 34). See Appendix A for photos of the project area. Adjacent lands are primarily under the jurisdiction of the Coconino National Forest; however, a private in-holding is located at the south edge of the approximately 0.2 acre project area.

In August 1981, gabion baskets were installed by ADOT along SR 89A east of the Oak Creek embankment slope at MP 385.1, from the approximate midpoint of the slope to the toe of slope (approximately 30 feet). At the southern end of the project, there is a large rock cliff, which forms the creek bank and extends to the level of the roadway surface, and forces water in Oak Creek to make an abrupt 90 degree turn. Local reports indicate that high-water flows during the winter storms of 2004-2005 overtopped the existing gabions causing eddies that undermined the existing soil and contributed to a significant amount of erosion of the roadway embankment in the vicinity of the rock wall. An existing culvert in the project area conveying runoff from east of SR 89A into Oak Creek was damaged at this time as well, but still exists within the eroded area.

The objective of this project is to repair the existing embankment and/or provide new bank protection and to mitigate the erosion caused by stormwater flows and local overland flows. The area of temporary and permanent disturbance of the project is approximately 0.20 acre. The scope of work for this project includes:

- Fortifying the existing gabions for the full height of the east embankment slope of Oak Creek Canyon along approximately 150 feet of the creek length (baskets in good condition will have new baskets of the same design, size, and material fastened to them to fortify them);
- Constructing rail banks on top of the failed gabions at the downstream end of the bank and enclosing the rock from the failed gabions with galvanized wire mesh;
- Placing rock and cobble on the downstream end of the currently stable gabions to act as a transition between existing gabions and the rail bank;
- Repairing the corrugated metal pipe at the south end of the project; and,
- Removing the existing concrete spillway at the edge of the roadway and replacing it with a concrete slab with wire mesh reinforcement.

The rail bank will consist of nine long metal vertical rails (approximately 16 feet in length) spaced 7.5 feet apart and five short metal vertical rails (approximately 11 feet in length) spaced 15 feet apart, onto which two sets of metal cross-rails will be fastened. The vertical rails will be driven (hydraulically pounded) into the affected substrate where possible. If this method is not possible due to the hardness of soil and rock conditions of the bank, vertical rails will be inserted into pre-drilled holes and stabilized with grout. A small bench may be graded into the bank just below the road to allow appropriate access for drilling equipment. Rock and cobble will be placed over currently stable gabions above the rail bank to provide a transition between the stable gabions and the rail bank.

No work will occur within surface water or in wetlands. No channel diversions will be used or constructed in Oak Creek, and no dewatering will be necessary. Materials used to support the upstream end of the rail bank and to fill the gabion baskets will be collected off-site and will match the 4- to 8-inch-diameter range of cobbles in the existing baskets. Construction will begin in October 2014, will occur during daytime hours, and is anticipated to last 60 days.

Although some plants will be disturbed during construction, a maximum of six trees between 6 and 8 inches in diameter at breast height (dbh) will be removed. The trees to be removed are bigtooth maple (*Acer grandidentatum*), boxelder (*Acer negundo*), and Arizona alder (*Alnus oblongifolia*). Because the project will occur within and immediately adjacent to Oak Creek, a Clean Water Act Section 404 permit and Section 401 certification will be required.

### Conservation Measures

The following measures will be implemented by ADOT and the Contractor as a part of the proposed action.

#### *Design Responsibility*

- All disturbed soils that will not be landscaped or otherwise permanently stabilized by construction will be seeded using species native to the project vicinity.

#### *ADOT Flagstaff District Responsibilities*

- At least 14 calendar days prior to initiation of construction, the Engineer will contact ADOT Environmental Planning Group biologist Joshua Fife (602-622-9622 or 602-712-6819) to arrange for two qualified biologists with a FWS Recovery Permit for handling narrow-headed gartersnakes to be present onsite to monitor environmental effects during activities within Oak Creek.
- No construction, including ground-disturbing activities, shall occur unless at least one qualified biologist with a FWS Recovery Permit for handling narrow-headed gartersnakes is present onsite to monitor environmental effects within the Oak Creek Bank Protection job site.
- The biology monitors will follow an established protocol when handling, relocating and processing any narrow-headed gartersnakes located within the project limits.
- Any narrow-headed gartersnake fatalities related to project activities will be thoroughly documented by the on-site biology monitor. Any fatalities will be immediately reported to US Fish and Wildlife Service Supervisory Fish and Wildlife Biologist Shaula Headwall (928-556-2118 or 928-266-9066) and ADOT Environmental Planning Group biologist Joshua Fife (602-622-9622 or 602-712-6819).
- At least 14 calendar days prior to construction, including ground-disturbing activities, the Engineer will contact ADOT Environmental Planning Group biologist Joshua Fife (602-622-9622 or 602-712-6819) to arrange for a biologist to present an environmental

awareness program to all personnel who will be on-site, including, but not limited to, contactors, contractor's employees, supervisors, inspectors, and subcontractors working at the State Route 89A Oak Creek Bank Protection site. This program will provide information concerning the biology and distribution of the narrow-headed gartersnake, legal status and occurrence in the project area, measures to avoid impacts to narrow-headed gartersnakes, and procedures to be implemented in case of narrow-headed gartersnake encounters. This training program will also include information on the Mexican spotted owl and what measures are to be taken if these species are encountered.

- No construction work, including ground-disturbing activities, will begin prior to presentation of the environmental awareness program to all personnel who will be on-site, including, but not limited to, contractors, contractor's employees, supervisors, inspectors, and subcontractors working at the State Route 89A Oak Creek Bank Protection job site.
- At least 14 calendar days prior to the start of construction, the Engineer will contact ADOT Environmental Planning Group biologist Joshua Fife (602-622-9622 or 602-712-6819) to arrange for a qualified biologist with the necessary scientific collecting permit(s) to conduct a preconstruction survey for narrow-headed gartersnake. The survey will take place no more than 24 hours prior to the start of construction.
- No products that contain netting with an opening of ¼ inch or greater will be used for erosion control.
- If injured narrow-headed gartersnakes are located within the project area, they will be captured and transported to the Northern Arizona University Biological Sciences Department for potential rehabilitation and inclusion in a captive breeding program. Final decisions regarding the fate of these gartersnakes will be determined by the FWS.
- Any active bird nests (i.e., containing eggs or young) identified during preconstruction surveys or during construction will be avoided to comply with the Migratory Bird Treaty Act. Active nest locations will be marked in the field with a temporary fence or T-posts with flagging. Since the project is planned to occur October-November 2014, finding active bird nests is unlikely.

#### *Contractor Responsibilities*

- No construction, including ground-disturbing activities, shall begin until a qualified biologist has presented an environmental awareness program to all personnel who will be on-site, including, but not limited to, contactors, contractor's employees, supervisors, inspectors, and subcontractors working at the State Route 89A Oak Creek Bank Protection site. This program will contain information concerning the biology and distribution of the narrow-headed gartersnake, legal status and occurrence in the project area, measures to avoid impacts to narrow-headed gartersnakes, and procedures to be implemented in case of narrow-headed gartersnake encounters. This training program will also include information on the Mexican spotted owl and what measures are to be taken if these species are encountered.

- No construction, including ground-disturbing activities, shall occur unless at least one qualified biologist with a FWS Recovery Permit for handling narrow-headed gartersnakes is present onsite to monitor environmental effects during activities within Oak Creek Bank Protection job site.
- No products that contain netting with an opening of ¼ inch or greater shall be used for erosion control.

## **STATUS OF THE SPECIES**

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

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

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

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

The narrow-headed gartersnake is surface-active generally between March and November (Nowak 2006). Little information on suitable temperatures for surface activity of the narrow-headed gartersnake exists; however, it is presumed to be rather cold-tolerant based on its natural history and foraging behavior that often involves clear, cold streams at higher elevations. Along Oak Creek in Arizona, Nowak (2006) found the species to be active in air temperatures ranging from 52 to 89 °F (11 to 32 °C) and water temperatures ranging from 54 to 72 °F (12 to 22 °C). Jennings and Christman (2011) found body temperatures of narrow-headed gartersnakes along the Tularosa River averaged approximately 68 °F (20 °C) during the mid-morning hours and 81 °F (27 °C) in the late afternoon during the period from late July and August. Variables that affect their body temperature include the temperature of the microhabitat used and water temperature (most predictive), but slope aspect and the surface area of cover used also influenced body temperatures (Jennings and Christman 2011). Narrow-headed gartersnakes have a lower preferred temperature for activity as compared to other species of gartersnakes (Fleharty 1967), which may facilitate their highly aquatic nature in cold streams.

Narrow-headed gartersnakes specialize on fish as their primary prey item (Rosen and Schwalbe 1988; Degenhardt et al. 1996; Rossman et al. 1996; Nowak and Santana-Bendix 2002; Nowak 2006) and are thought to be mainly visual hunters, heavily dependent on visual cues when foraging based on comparative analyses among other species of gartersnakes (de Queiroz 2003). Unlike many other species of gartersnakes that are active predators (actively crawl about in search of prey), narrow-headed gartersnakes are considered to be ambush predators (sit-and-wait method) (Brennan and Holycross 2006; Pierce 2007). Native fish species most often associated as prey items for the narrow-headed gartersnake include Sonora sucker (*Catostomus insignis*), desert sucker (*Pantosteus clarki*), speckled dace (*Rhinichthys osculus*), roundtail chub (*Gila robusta*), Gila chub (*Gila intermedia*), and headwater chub (*Gila nigra*) (Rosen and Schwalbe 1988; Degenhardt et al. 1996). Nonnative species used as prey by narrow-headed gartersnakes are most often salmonid species (trout); most commonly brown (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*), as these species are commonly stocked in, or near, occupied narrow-headed gartersnake habitat (Rosen and Schwalbe 1988; Nowak 2006). Fleharty (1967) reported narrow-headed gartersnakes eating green sunfish (*Lepomis cyanellus*). However, due to their sharp dorsal fin green sunfish are not considered by species' experts to be a suitable prey item due to the risk of injury to the gartersnake during ingestion (Nowak and Santana-Bendix 2002).

The narrow-headed gartersnake will also prey upon frogs, tadpoles, and salamanders (Stebbins 1985; Deganhardt et al. 1996; Ernst and Ernst 2003). Fitzgerald (1986) referenced the Stebbins (1985) account as the only substantiated account of the species accepting something other than fish as prey, apparently as the result of finding a small salamander larva in the stomach of an

individual in Durango, Mexico. Despite several studies focusing on the ecology of narrow-headed gartersnakes in recent times, there are no other records of narrow-headed gartersnakes, under current taxonomic recognition, feeding on prey items other than fish.

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

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

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

Population status information suggests that the narrow-headed gartersnake has experienced significant declines in population density and distribution along streams and rivers where it was formerly well-documented and reliably detected. Many areas where the species may occur likely rely on emigration of individuals from occupied habitat into those areas to maintain the species, provided there are no barriers to movement. Holycross et al. (2006) represents the most recent, comprehensive survey effort for narrow-headed gartersnakes in Arizona. Our most current information on the species' status in New Mexico comes from a species expert who is completing a graduate degree focused on the relationship between narrow-headed gartersnake populations and fish communities in the upper Gila and San Francisco river drainages (Helleckson 2012, pers. comm.). Narrow-headed gartersnakes were detected in only 5 of 16 historical localities in Arizona and New Mexico surveyed by Holycross et al. (2006) in 2004 and 2005. Population densities have noticeably declined in many populations, as compared to previous survey efforts (Holycross et al. 2006, and significantly more effort is required to detect this species in areas where it was formerly robust, such as along Eagle Creek (AZ), the East



Verde River (AZ), the San Francisco River (NM), the Black River (AZ), and the Blue River (AZ).

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

## **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 which 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.

### **Status of the Narrow-headed gartersnake within the Action Area**

The area of upper Oak Creek (Coconino County, Arizona) between Slide Rock State Park and Cave Springs Campground, which includes the project area, has long been recognized as containing critically important habitat for narrow-headed gartersnakes (Rosen and Schwalbe 1988, Nowak and Santana-Bendix 2002, Nowak 2006, USFWS 2014). This section of Oak Creek currently contains one of the healthiest (if not the most viable remaining) populations of the species left in the United States (USFWS 2014). The population in this area does not appear to have suffered the same serious declines as have been noted elsewhere in the range, as well as in downstream sections of Oak Creek (e.g. Rosen and Schwalbe 1988, Nowak and Santana-Bendix 2002, Nowak 2006, USFWS 2014).

In the upper reaches of Oak Creek, occupied narrow-headed gartersnake habitat is found in steep-walled, confined canyons with shallow, braided stream segments, minimal silt, and good canopy coverage, vegetated islands and significant amounts of aquatic vegetation (Nowak and Santana-Bendix 2002). Subadult and adult narrow-headed garter snakes appear to favor sections of Oak Creek Canyon with overhanging vegetation and/or vegetated islands for protection from predators and neonate narrow-headed garter snakes appear to favor shallow backwaters or edges (with less current) with abundant aquatic vegetation, especially watercress (Nowak and Santana-Bendix 2002). Although the project area is small (approximately 0.2 acre), these habitat

conditions are present within this reach and individual narrow-headed gartersnakes have been detected within the project area. In addition to the instream and natural riparian habitat, the existing gabion baskets likely function as substrates where narrow-headed gartersnakes bask on sun-heated rocks, provide shelter sites within the cobbles for adult and neonate gartersnakes, and provide aestivation sites during the winter dormancy period.

### **Factors Affecting the Narrow-headed gartersnake within the Action Area**

Upper Oak Creek and the surrounding watershed were impacted significantly from late May through mid-June 2014 by the Slide Fire. Although the fire did not burn much of the riparian area within upper Oak Creek, the fire burned with high-severity on the slopes above the creek. Summer monsoon storms began in early July and since that time there have been consistent ash and debris flows that have increased sediment loads in portions of Oak Creek. Monitoring of post-fire effects has shown that narrow-headed gartersnakes and their fish (prey) are still present throughout Oak Creek, but gartersnakes and their habitat will likely be impacted for some time to come. Post-fire monitoring after the Brins Fire in 2006, which primarily affected tributary canyons and uplands rather than Oak Creek Canyon proper, documented substantial post-fire sedimentation and debris flows, resulting in the local loss of habitat for fish and foraging habitat for snakes, as well as longer-term downstream changes to habitat (S. Hedwall, pers. comm.). Short-term decreases in the abundance of narrow-headed gartersnakes attributed to post-fire sedimentation effects at a long-term monitoring site south of Manzanita Campground were also documented (P. Rosen, E. Nowak and T. Brennan, unpubl. data reported to AGFD 2011).

Recreational activities in the Southwest are often heavily tied to water bodies and riparian areas, due to the general lack of surface water on the landscape. Oak Creek Canyon is a well-known example of an area with very high recreation levels (Nowak and Santana-Bendix 2002). In 1995, 1.3 million people visited the Red Rock Ranger District, which includes Oak Creek Canyon and the Sedona, Arizona area; that figure climbed to six million visitors by 1999 (Nowak and Santana-Bendix 2002). Increased recreational impacts on the quantity and quality of water, as well as the adjacent vegetation, negatively affect narrow-headed gartersnakes. The impacts to riparian habitat from recreation can include alteration, trampling, and loss of vegetation. Demand for outdoor recreation is also expected to grow concurrently with increasing population and more visitor use of the Coconino National Forest.

In addition to habitat impacts, adverse human interactions with snakes may be largely responsible for highly localized extirpations in narrow-headed gartersnakes. Based on the collection history of narrow-headed gartersnakes at Slide Rock State Park along Oak Creek (located several miles downstream of the project area), high recreation use is strongly suspected to result in direct fatality of snakes by humans (Nowak and Santana-Bendix 2002).

### **EFFECTS OF THE ACTION**

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

The project limits overlap occupied suitable narrow-headed gartersnake habitat and individual gartersnakes occur within the project limits. Project-related activities are expected to impact suitable gartersnake habitat temporarily and permanently. Temporary effects to habitat may include loss of vegetation along the bank as the new gabion baskets are placed on the bank. Permanent habitat effects are likely to be beneficial over the long term with the addition of 283 gabion baskets—substrate that could be used by gartersnakes for hiding cover and/or hibernation. The project will add 8,343 cubic feet of potentially functional gartersnake shelter site habitat.

The direct and indirect effects of the proposed action include potential direct adverse effects to individual snakes. Although biological monitors will be on-site during construction-related activities to reduce the potential for direct impacts to individual snakes, not all direct impacts are avoidable. At a minimum, temporary direct impacts through displacement will occur as snakes leave the area on their own in response to prolonged project ground disturbances such as vibrations and/or drilling, or are relocated by the biological monitor out of the project limits. Individual gartersnakes not observed or that cannot be captured by the biological monitor may be injured or killed as a result of construction vehicle strikes, installation of the rail banks, or during placement of the new gabion baskets. Direct impacts will be reduced by the timing of construction activities, which are scheduled to occur from October 1 to November 30, 2014, effectively avoiding the birthing season, the time when neonates are most vulnerable (August through September), and most of the aestivation period. Depending upon weather conditions, gartersnakes may be attempting to aestivate within the project area in November. Ongoing project activities at this time could also result in reduced opportunities for aestivation sites in this stream reach as snakes may be forced to find wintering habitat elsewhere.

## **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.

The Oak Creek Watershed is predominately managed by the Coconino National Forest. Future non-federal actions within the project area that are reasonably certain to occur include the potential development and/or modification (e.g., tree removal, alteration of streamside habitat) of private property in-holdings. These activities may reduce the quality and quantity of narrow-headed gartersnake habitat; result in disturbance and/or injury or death to gartersnakes; and contribute as cumulative effects to the proposed action. These actions may also result in increased sedimentation into gartersnake habitat and the potential for further non-native aquatic species introductions. Residential home and commercial development on private lands adjacent to Oak Creek has and will continue to result in impacts to watershed integrity. Private water uses (i.e., diversions) and septic tanks are likely affecting streamflows and water quality in Oak Creek, and are expected to have a greater impact with as the human population within the Oak Creek watershed increases. Continued use of ground and surface water may result in altered hydrologic regimes and increased sedimentation and pollutant to stream systems.

## CONCLUSION

After reviewing the current status of the narrow-headed gartersnake, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the proposed Oak Creek Bank Protection Project will not jeopardize the continued existence of the narrow-headed gartersnake. We present this conclusion for the following reasons:

- Upper Oak Creek and West Fork Oak Creek contain viable populations of narrow-headed gartersnakes. The proposed action will occur within a very small portion of this area (approximately 0.2 acre). Although a small number of individual gartersnakes may be affected by the proposed action, this project will not result in population level impacts to narrow-headed gartersnakes in the Oak Creek Watershed.
- The project will not affect the long-term suitability of narrow-headed gartersnake habitat or the gartersnakes ability to use this habitat in the future.

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

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

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

### **Amount or Extent of Take Anticipated**

We anticipate that the proposed action is reasonably certain to result in incidental take of narrow-headed gartersnakes. We anticipate that the total number of narrow-headed gartersnakes taken as a result of this action will be difficult to predict because finding a dead or impaired specimen will be difficult, even with biologists' present to monitor project activities. However the level of incidental take can be anticipated by the information we have regarding the potential for narrow-headed gartersnakes to be harassed as snakes are captured and moved to new locations, or are injured or killed as a result of the proposed action.

We anticipate the incidental take of up to four narrow-headed gartersnakes in the form of short-term harassment as snakes are captured and moved out of the project footprint; and two narrow-headed gartersnakes in the form of direct mortality or injury as a result of construction vehicle strikes, installation of the rail banks, or during placement of the new gabion baskets. If more than four narrow-headed gartersnakes are moved or more than two narrow-headed gartersnakes are injured or killed as a result of the project, then as provided in 50 CFR Section 402.16, reinitiation of formal consultation would be required as the amount or extent of incidental take would be exceeded.

### **EFFECT OF THE TAKE**

In this biological opinion we determine that this level of anticipated take is not likely to result in jeopardy to the narrow-headed gartersnake.

### **REASONABLE AND PRUDENT MEASURES**

We determine that the proposed action incorporates sufficient measures that reasonably and prudently minimize the effects of incidental take of narrow-headed gartersnakes. All reasonable measures to minimize take have been incorporated into the project description. Thus, no reasonable and prudent measures are included in this incidental take statement.

### **Disposition of Dead or Injured Listed Species**

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

Certain project activities may also affect species that are protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. sec. 703-712) and/or bald and golden

eagles protected under the Bald and Golden Eagle Protection Act (BGEPA). The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the FWS. BGEPA prohibits anyone, without a permit issued by the FWS, from taking (including disturbing) eagles, and including their parts, nests, or eggs. If you believe migratory birds will be affected by the project, we recommend you contact our Migratory Bird Permit Office, P.O. Box 709, Albuquerque, NM 87103, (505) 248-7882, or [permitsR2mb@fws.gov](mailto:permitsR2mb@fws.gov). For more information regarding the MBTA, please visit the following websites: <http://www.fws.gov/migratorybirds> and <http://www.fws.gov/migratorybirds/mbpermits.html>.

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

### **CONSERVATION RECOMMENDATIONS**

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

1. We recommend that FHWA work with FWS, AGFD, ADOT, NAU, and the Forest Service to reduce effects to narrow-headed gartersnake by reducing opportunities for uncontrolled access to Oak Creek from SR 89A.
2. We recommend that FHWA work with FWS, AGFD, ADOT, NAU, and the Forest Service to continue to monitor narrow-headed gartersnakes in the Oak Creek Watershed.

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

### REINITIATION NOTICE

This concludes formal consultation on the action outlined in this biological opinion. As provided in 50 CFR Section 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 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. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your continued coordination. In all future correspondence on this project, please refer to the consultation number 22410-2010-F-0392-R001. We also encourage you to coordinate the review of this project with the AGFD. Should you require further assistance or if you have any questions, please contact Shaula Hedwall at (928) 556-2118 or Brenda Smith at (928) 556-2157.

Sincerely,

/s/ Steven L. Spangle  
Field Supervisor

cc (electronic copy):

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ  
Regional Supervisor, Arizona Game and Fish Department, Flagstaff, AZ  
ADOT Environmental Planning Group, Phoenix, AZ (Attn: Joshua Fife)  
District Ranger, Coconino National Forest, Red Rock Ranger District, Sedona AZ  
District Biologist, Coconino National Forest, Red Rock Ranger District, Sedona, AZ  
Forest Biologist, Coconino National Forest, Flagstaff, AZ  
Wildlife Biologist, Fish and Wildlife Service, Tucson, AZ (Attn: Jeff Servoss)

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**APPENDIX A – FIGURES**

**Figure 1.** Project area, looking upstream.



**Figure 2.** Project area, looking downstream.



## **APPENDIX B – CONCURRENCE**

This appendix contains our concurrence with your “may affect, not likely to adversely affect” determination for the threatened Mexican spotted owl.

### Mexican spotted owl

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the threatened Mexican spotted owl. We base this concurrence on the following:

- All known Mexican spotted owl nest, roosts, observations, and protected activity center (PAC) boundaries are located  $\geq 0.75$  mile from the project location and the work is expected to occur outside the owl breeding season. Therefore, potential disturbance to Mexican spotted owls during project construction will be insignificant and discountable due to the distance and topographic features that occur between the project site and known nest/roost habitat and owl observations.
- Although some plants and six trees between 6 and 8 inches dbh will be removed, this will result in insignificant and discountable effects to key habitat components of the riparian habitat within Oak Creek Canyon.