## **Narrow-headed gartersnake (*Thamnophis rufipunctatus*)**

Status

Threatened (79 FR 38677; July 08, 2014) with Proposed Critical Habitat (78 FR 41549; July 10, 2013).

Species Summary Table

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|  | Feeding | Breeding | Sheltering |
| Juvenile | Adult | Adult | Juvenile | Adult |
| Habitat | Clear, rocky perennial streams in pool and riffle habitat | Clear, rocky perennial streams in pool and riffle habitat | Upland and streamside habitat adjacent to perennial streams | Within perennial streams or their adjacent streamside and upland habitat. | Within perennial streams or their adjacent streamside and upland habitat. |
| Prey | Fish | Fish | Fish | N/A | N/A |
| Perches | N/A | N/A | N/A | N/A | N/A |
| Cover | Water and aquatic vegetation | Water and aquatic vegetation | Uses boulders and rocks in floodplain during gestation. | Vegetation, boulders, rocks, logs, and debris piles on banks and in the water. Hibernate in rock outcroppings.  | Vegetation, boulders, rocks, logs, and debris piles on banks and in the water. Hibernate in rock outcroppings. |
| Temperature | Active in air temperatures from 52 to 89o F and water temperatures from 54 to 72oF. | Active in air temperatures from 52 to 89o F and water temperatures from 54 to 72oF | Active in air temperatures from 52 to 89o F and water temperatures from 54 to 72oF | Underground at temperatures outside of the surface-active range. | Underground at temperatures outside of the surface-active range. |
| Lighting | Diurnal and crepuscular | Diurnal and crepuscular | Day light hours | Dark conditions underground or in cover | Dark conditions underground or in cover |
| Moisture | N/A | N/A | N/A | N/A | N/A |
| Sound | N/A | N/A | N/A | N/A | N/A |
| Water | Permanently flowing streams | Permanently flowing streams | Permanently flowing streams | In proximity to permanently flowing streams. | In proximity to permanently flowing streams. |
| Dispersal | Home range size can be up to 5.5 acres along a stream | Home range size can be up to 5.5 acres along a stream | Home range size can be up to 5.5 acres along a stream | N/A | N/A |
| Seasonal Activity | Surface-active between March and November | Surface-active between March and November | In July to early August | Hibernation during late fall and winter up to 200 meters from active stream channels. | Hibernation during late fall and winter up to 200 meters from active stream channels. |

Life History

*Species Description and Ecology*

The narrow-headed gartersnake (NHGS) is a medium-sized snake that reaches an average length of 44 inches. Coloring can range from olive to brown or tan, with distinctive blackish, dark brown, dull brick red, or orange paired spots on the back and sides of its body. Scales are keeled, usually 21 rows at mid-body and the anal plate is usually single, but may be divided. Distinguishing characteristics of the species are high-set eyes on an elongated head that narrows to the snout (AGFD 2012 and USFWS 2014a).

NHGSs are highly aquatic and feed primarily on native fish species such as Sonora suckers, desert suckers, speckled dace, roundtail chub, headwater chub, and gila chub; though nonnative soft-rayed fish are occasionally included in their diet. The species is diurnal and evening crepuscular, and employs ambush tactics to capture prey underwater. NHGSs are presumed to be cold-tolerant due to their presence in high elevation, cold streams. They will become surface-active between March and November at ambient temperatures ranging from 52 to 89 degrees Fahrenheit and when water temperatures range from 54 to 72 degrees Fahrenheit.

The NHGS home range tends to occur on a long axis, paralleling the stream they occupy, and may reach up to 5.5 acres in size (Jennings and Christman 2010). These gartersnakes are highly aquatic, though they have been shown to use terrestrial habitats away from water that are suitable for life history processes such as gestation, thermoregulation, and hibernation. Terrestrial habitat away from water may represent sites that provide low predation risk and are thermally advantageous for snakes during gestation, after a large meal, or when snakes become vulnerable during pre-molt. Upland habitat within 100 meters of water may be used during spring through early fall for thermoregulation and gestation; with the species being strongly associated with boulders in the floodplain in summer months. During the cold months (between November and February), the snakes will hibernate in rock outcroppings on dry land above the floodline within 200 meters of active stream channels (USFWS 2014a).

*Reproduction*

Male NHGS reach sexual maturity at 2.5 years, while females reach sexual maturity at 2 years. Females will breed annually and are ovoviviparous, giving birth to 4 to 17 live young from late July to early august (possibly earlier at low elevations) (USFWS 2014a).

*Suitable Habitat*

The NHGS can be found at elevations from approximately 2,300 to 8,000 feet, but more commonly occur between 4,000 and 6,000 feet. The species is found in Petran Montane Conifer Forest, Great Basin Conifer Woodland, Interior Chaparral, and the Arizona Upland subdivision of Sonoran Desertscrub biotic communities. NHGSs are strongly associated with clear, rocky, perennial streams; using primarily pool and riffle habitat that includes cobbles and boulders. Terrestrial habitat is also an important factor for NHGS survival and includes the presence of cobbles, boulders, and bankside shrub vegetation for basking and foraging. The species will use rocks, logs or stumps, and debris jams as cover; while bankside vegetation composed of shrub- and sapling-sized plants such as Arizona alder (*Alnus oblongifolia*), velvet ash (*Fraxinus velutina*), willows (*Salix spp*.), and canyon grape (*Vitis arizonica*) is used for thermoregulation at the water’s edge (USFWS 2014a).

Primary Constituent Elements (PCEs) for NHGS habitat were identified for both aquatic and terrestrial habitat types. The PCEs that were identified in the 2013 Proposed Rule Designation of Critical Habitat for the species include:

1. Stream habitat including:
	1. Perennial or intermittent streams with sand, cobble, and boulder substrate and low or moderate amounts of fine sediment and substrate embeddedness, and that possess pool, riffle and run habitats.
	2. 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.
	3. Shoreline habitat with adequate organic and inorganic structural complexity, with shrub- and sapling-sized plants.
	4. Aquatic habitat with no pollutants or, if pollutants are present, levels that do not affect survival of any age class or the maintenance of prey populations.
2. A lateral extent of 600 feet of terrestrial space to either side of the bankfull stage adjacent to designated stream systems with sufficient structural characteristics.
3. Prey base of viable populations of native fish species or soft-rayed, nonnative fish species.
4. An absence of nonnative fish species (*Centrarchidae* and *Ictaluridae*), bullfrogs, and/or crayfish, or occurrence of these nonnative species at low enough levels that do not affect recruitment or prey populations.

Threats

Primary threats to the NHGS is competition with and predation from nonnative species such as bullfrogs, warm water fish, brown trout, and. Other threats include lowering of the water table, habitat modification and fragmentation, grazing along streambeds, and increased recreational use in riparian areas (AGFD 2012 and USFWS 2014b).

Range and Survey History

In Arizona, the species exists in upland drainages from central and eastern Arizona from the White Mountains along the Mogollon Rim into Oak Creek Canyon (AGFD 2012). Historical records of NHGS occurring in the Upper Gila, Middle Gila, San Francisco, Salt River, Tonto Creek, and Verde River sub-basins were documented during the mid-1980s. Recent survey efforts were conducted from 2001 to 2012 within the Upper Gila River, San Francisco, Upper Salt River, and Verde River sub-basins have shown that the populations at a majority of the drainages within the sub-basins have been extirpated, or the locations now only hold low-density populations of the species (USFWS 2014c). In 2004 and 2005, another comprehensive survey effort of historical localities was conducted in Arizona and New Mexico and resulted in detections at only 5 of 16 previously occupied sites. Within Arizona, NHGS were detected at 4 localities including along the Black River and Tonto Creek within the Salt River Watershed, and along the Blue River and Whitewater Creek in the Gila River Watershed. However, population densities at these 4 locations have noticeably declined and require significantly more effort in order to detect the species (Holycross et. al. 2006). Currently, the most healthy and well-studied population is found in Oak Creek with the highest density of NHGS in the upper reaches of Oak Creek Canyon (USFWS 2013b).

Include information in this section to establish an environmental baseline (i.e. survey data, local status, etc) for NHGS within your projects vicinity. The following references and resources may assist in establishing an environmental baseline. Always obtain permission from the ADOT biologist prior to contacting outside agencies about an ADOT project.

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Notes: 1Consultants are NOT to discuss potential effect findings with outside agencies.

2Red text is to be removed prior to placing this evaluation into a Biological Evaluation.

References

Arizona Game and Fish Department (AGFD). 2012. Narrow-headed gartersnake (*Thamnophis rufipunctatus*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.

Holycross, A.T., W.P. Burger, E.J. Nigro, and T.C. Brennan. 2006. Surveys for *Thamnophis eques* and *Thamnophis rufipunctatus* in the Gila River Watershed of Arizona and New Mexico. A Report Submitted to the Arizona Game and fish Department. 105 pp.

Jennings, R. and B. Christman. 2010. Pre-monsoonal and post monsoonal habitat use of the narrow-headed gartersnake, (*Thamnopis rufipunctatus*), along the Tularosa River. Final Report. 26 pp.

US Fish and Wildlife Service (USFWS). 2014a. Endangered and Threatened Wildlife and Plants; Threatened Status for the Northern Mexican Gartersnake and Narrow-headed Gartersnake. *Federal Register* 79 (130): 38678-38745.

USFWS. 2014b. Narrow-headed gartersnake (*Thamnophis rufipunctatus*). Unpublished species abstract compiled and edited by the Arizona Ecological Services Field Office. Phoenix, Arizona.

USFWS. 2014c. Appendix A to Final Listing Rule: Current Population Status of the Northern Mexican and Narrow-headed Gartersnakes in the United States. 34 pp.

USFWS 2013a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Northern Mexican Gartersnake and Narrow-headed Gartersnake; Proposed Rule. *Federal Register* 78(132): 41550 – 41608.

USFWS 2013b. Endangered and Threatened Wildlife and Plants; Threatened Status for the Northern Mexican Gartersnake and Narrow-headed Gartersnake; Proposed Rule. *Federal Register* 78(132): 41500 – 41547.