## **Northern Mexican gartersnake (*Thamnophis eques megalops*)**

Status

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

Species Summary Table

|  |  |  |  |
| --- | --- | --- | --- |
|  | Feeding | Breeding | Sheltering |
| Juvenile | Adult | Adult | Juvenile | Adult |
| Habitat | Wetlands, large river riparian woodlands and streamside gallery forests | Wetlands, large river riparian woodlands and streamside gallery forests | Wetlands, large river riparian woodlands and streamside gallery forests | Wetlands, large river riparian woodlands and streamside gallery forests | Wetlands, large river riparian woodlands and streamside gallery forests |
| Prey | Earthworms and leeches | Aquatic vertebrates such as fish, frogs, larval salamanders, and leeches | Aquatic vertebrates such as fish, frogs, larval salamanders, and leeches | N/A | N/A |
| Perches | N/A | N/A | N/A | N/A | N/A |
| Cover | Low to high canopy cover depending on occupied habitat. Prefers dense ground cover. | Low to high canopy cover depending on occupied habitat. Prefers dense ground cover. | Low to high canopy cover depending on occupied habitat. Prefers dense ground cover. | Underground in burrow, under rocks or vegetation. Will use rock piles and debris jams as hibernacula | Underground in burrow or under rocks or vegetation. Will use rock piles and debris jams as hibernacula |
| Temperature | Surface-active at 71 to 91 degrees Fahrenheit | Surface-active at 71 to 91 degrees Fahrenheit | Surface-active at 71 to 91 degrees Fahrenheit | Underground at temperatures outside of the surface-active range. | Underground at temperatures outside of the surface-active range. |
| Lighting | Diurnal  | Diurnal  | Day light hours | dark conditions underground | dark conditions underground |
| Moisture | N/A | N/A | N/A | N/A | N/A |
| Sound | N/A | N/A | N/A | N/A | N/A |
| Water | Lotic and lentic water systems with aquatic prey base | Lotic and lentic water systems with aquatic prey base | Lotic and lentic water systems with aquatic prey base | In proximity to lotic or lentic water systems | In proximity to lotic or lentic water systems |
| Dispersal | Home range is 1.7 to 10.4 acres and may travel up to 0.4 miles in one day | Home range is 1.7 to 10.4 acres and may travel up to 0.4 miles in one day | Home range is 1.7 to 10.4 acres and may travel up to 0.4 miles in one day | N/A | N/A |
| Seasonal Activity | Active during spring and summer when ambient temperatures are within the surface-active range. | Active during spring and summer when ambient temperatures are within the surface-active range. | Breeding occurs in April and May. and young are born in July and August | Hibernates during cold months in hibernacula up to 600 feet from water.  | Hibernates during cold months in hibernacula up to 600 feet from water. |

Life History

*Species Description and Ecology*

The Northern Mexican gartersnake (NMGS) is a stout bodied snake reaching 44 inches in length. Its background color ranges from olive to olive-brown to olive-gray. Three stripes run the length of the body with a yellow stripe down the back that darkens toward the tail. Paired black spots extend along the dorsolateral fields and a light colored crescent extends behind the corners of the mouth. A portion of the lateral stripe occurs on the fourth scale row which distinguishes the NMGS from other gartersnake species (AGFD 2012 and USFWS 2014b).

The NMGS forages along vegetated banklines, hunting prey in water and on land. Field observations of Mexican gartersnakes have shown that larger gartersnakes primarily fed on aquatic vertebrates such as fish, frogs, larval salamanders, and leeches; while smaller gartersnakes fed primarily on earthworms and leeches. NMGSs are surface-active at ambient temperatures ranging from 71 degree to 91 degrees Fahrenheit. Outside of surface-active temperature ranges the gartersnakes will take shelter underground. During cold months they hibernate within 600 feet of water using sites such as debris jams and rock piles as hibernacula, only coming out to bask occasionally. During warm months when NMGS are active they may travel up to 0.4 mile in one day within their home range, which ranges in size from 1.7 acres to 10.4 acres along riparian corridors (USFWS 2013 and 2014a).

*Reproduction*

Male NMGS reach sexual maturity at 2 years, while females which grow larger than males, reach sexual maturity at 2 to 3 years. NMGS are ovoviviparous giving birth to 7-26 live young. In Arizona, mating occurs in April and May, and young are born in July and August. Females may only reproduce every other year and only half of the sexually mature females within a population reproduce in any one season (AGFD 2012 and USFWS 2008).

*Suitable Habitat*

NMGSs are riparian obligates that occupy densely vegetated, lotic and lentic water systems. Although considered highly aquatic, the species will use terrestrial upland habitats during dispersal and hibernation. The species may occur at elevations up to 8,500 feet, but is more frequently found at elevations between 3,000 and 5,000 feet. In Arizona, three general habitat types are used: small, often isolated cienegas or stock tanks (southern Arizona); large-river riparian woodlands and forests; and streamside gallery forests. In source-area wetlands such as cienegas, vegetation often consists of dense grasses and includes emergent wetland vegetation (cattail, bulrush, etc.). Overstory species may consist of cottonwood, willow, and mesquite. In riparian woodlands and gallery forests, vegetation consists of mixed grasses along banks with an overstory of cottonwood and willow or mixed broadleaf deciduous trees (sycamore, walnut, ash etc.) (AGFD 2012 and USFWS 2006).

Primary Constituent Elements (PCEs) for NMGS 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. Aquatic or riparian habitat that includes:
	1. Perennial or spatially intermittent streams of low to moderate gradient that possess appropriate amounts of in-channel pools, off-channel pools, or backwater habitat, and that possess a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads.
	2. Lentic wetlands such as livestock tanks, springs, and cienegas.
	3. Shoreline habitat with adequate organic and inorganic structural complexity, to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities (e.g., boulders, rocks, organic debris such as downed trees or logs, debris jams, small mammal burrows, or leaf litter).
	4. Aquatic habitat with characteristics that support a native amphibian prey base, such as salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and pollutants absent or minimally present at levels that do not affect survival of any age class of the NMGS or maintenance of prey populations.
2. Adequate terrestrial space (600 feet lateral extent to either side of bankfull stage) adjacent to designated streams systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation (extended inactivity).
3. Prey base consisting of viable populations of native amphibian and native fish species.
4. An absence of nonnative fish species of the families *Centrarchidae* and *Ictaluridae*, bullfrogs (*Lithobates catesbeianus*), and/or crayfish (*Orconectes virilis*, *Procambarus clarki etc.*), or occurrence of these nonnative species at low enough levels such that recruitment of NMGS and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring.

Threats

The primary threats to the species include predation by nonnative species such as bullfrogs, warm water sportfish, and crayfish as well as significant reductions in its native prey base from predation and competition associations with nonnative species. Additionally, large-scale wildfires and land uses that divert, dry, or significantly pollute aquatic habitats have been found to be significant threats to the species. Other threats include destruction and modification of its habitat and genetic effects from fragmentation of populations (USFWS 2014a and USFWS 2014b).

Range and Survey History

In Arizona, the species occurs in fragmented populations within the middle and upper Verde River drainage (including Oak Creek and the Verde River), middle and lower Tonto Creek, and the Cienega Creek drainage, as well as a small number of isolated wetland habitats in southeastern portions of the state (AGFD 2012 and USFWS 2014b). Currently, populations at the Page Springs and Bubbling Ponds Fish Hatcheries along Oak Creek, lower Tonto Creek, upper Santa Cruz River in the San Rafael Valley, the Bill Williams River, and the upper and middle Verde River are the only remaining NMGS populations in the U.S. where the subspecies continues to be reliably detected and considered viable (USFWS 2014a).

Recent surveys have been conducted at various sites in Arizona where this species was historically present. Numerous surveys conducted at Scotia Canyon between 1980 and 2008 and Las Cienegas National Conservation Area (Cienega Creek and Empire Cienega) from 2002 to 2008 showed significant declines in the population numbers throughout the duration of the surveys. Results from these surveys indicate that these locales no longer represent stable populations. A separate survey effort recently documented that the population of NMGS within Tonto Creek (first detected in 1995) is the only known population that remains in the Salt River Basin. Surveys conducted in 2004 to 2005 suggested the species persists in Tonto Creek in low densities and that recruitment may be in decline. Another recent survey conducted in 2007 along the Verde River within the Verde Valley of Yavapai County, resulted in no observations; however, this location is presumed to remain as a low-density population (USFWS 2008). The most recent survey effort occurred from 2012 to 2015 at 6 sites along the upper Verde River watershed. Among the 6 sites focused on during the survey periods, the Dead Horse Ranch State Park and SRP Camp Verde Riparian Preserve produced the majority of NMGS detections. The number of detections made at these sites were comparable to other sites with known robust population sizes. Survey locations at Page Springs Cellars and Tavasci Marsh only resulted in a small number of NMGS detections. Overall, results from the various surveys conducted throughout Arizona have shown significant population declines throughout their current range as well as extirpations from many historically occupied localities.

Include information in this section to establish an environmental baseline (i.e. survey data, local status, etc) for NMGS 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.

|  |
| --- |
| US Fish and Wildlife Service |
| Jeff Servoss | Species Lead |  | Jeff\_Servoss@fws.gov |

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. Northern Mexican Gartersnake (*Thamnophis eques megalops*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.

Emmons, I. and E. Nowak. 2016. Northern Mexican Garternsake (*Thamnophis eques megalops*) Habitat Use and Ecology: Monitoring Surveys and Radiotelemetry in the Verde Valley, Arizona. Final Report. 73 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. Northern Mexican Gartersnake (*Thamnophis eques megalops*). Unpublished species abstract compiled and edited by the Arizona Ecological Services Field Office. Phoenix, Arizona.

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

USFWS. 2008. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Northern Mexican Gartersnake (Thamnophis eques megalops) as Threatened or Endangered With Critical Habitat; Proposed Rule. *Federal Register* 73 (228): 71788-71826.

USFWS. 2006. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Northern Mexican Gartersnake (Thamnophis eques megalops) as Threatened or Endangered With Critical Habitat; Proposed Rule. *Federal Register* 71 (186): 56228-56256.