



Recovery of the San Francisco Garter Snake

The Importance: *The future of the strikingly colorful endangered San Francisco garter snake is threatened by loss of habitat and prey species, as well as the introduction of non-native bullfrogs.*

The San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) has been dubbed “the most beautiful serpent in North America,” and it’s arguably one of the most endangered species, too. This colorful snake has a burnt orange head, greenish-yellow dorsal stripe edged in black, bordered by a red stripe with black blotches, and a black stripe. The belly color varies from greenish-blue to blue. Large adults can reach three feet or more in length.



San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)

With its entire historical range entirely within the bounds of San Mateo County, this species represents a part of an ecosystem that is truly special and unique to this area. The snakes are currently confined to small, disconnected patches within this already very limited historical range.

Many of the threats that led to the listing of the San Francisco garter snake as an endangered species in 1967 are still present today. These include loss of habitat from agricultural, commercial and urban development, as well as collection by reptile fanciers and breeders. While these historical threats remain, there are newer threats to the snake’s survival as well. The decline of the California red-legged frog (*Rana draytonii*), an essential prey species for the snakes, and the introduction of bullfrogs (*Rana catesbeiana*) have both contributed significantly to the population decline in recent decades. Bullfrogs are capable of preying on both San Francisco garter snakes and California red-legged frogs.

The Project: *The San Francisco Garter Snake Recovery Plan— a collaborative effort of the U.S. Fish and Wildlife Service and several other organizations—addresses the threat of increasing urban development while researchers continue to develop new protection strategies in an ongoing effort to assure the survival of this species.*

The initial recovery plan focused on the protection of six “significant” existing populations and the creation of four new populations at undefined sites. If 200 or more individuals can be maintained at a 1:1 sex ratio at each of the six existing locations for five consecutive years, the species can be considered for downlisting from endangered to threatened. If these numbers can be maintained at each of the ten locations for 15 consecutive years, then the species will be eligible for delisting.

In 2004, the Sacramento Fish and Wildlife office established a San Francisco garter snake working group comprised of biologists familiar with the issues facing this species. The group’s purpose is to



Volunteers restore habitat for San Francisco garter snakes and other species at Mori Point

prey species. The acquisition, restoration, and preservation of suitable habitat will be essential to this species' survival.

design and implement specific conservation actions that can be performed prior to, and concurrent with, updating the recovery plan.

The Results: *Although the San Francisco garter snake remains listed as a federally endangered species, researchers have taken several important strides to protect the species and its habitat.*

Mitigation for negative impacts on the snake and its habitat from various development and maintenance projects has resulted in acquisition and protection of suitable habitat, and the enhancement of existing degraded habitat. One mitigation step is to use managed grazing to increase the amount of grassland habitat available for the snakes.

Since the initial recovery plan was published, wildlife managers have learned that the snake's upland habitat may be essential to its survival. On-going urbanization, combined with an increase in intensive agricultural operations, has contributed to the rapid loss and fragmentation of the snake's habitat and their primary

Future Actions: *The U.S. Fish and Wildlife Service has recommended several actions to help avoid driving the San Francisco garter snake to extinction.*

1. Develop an updated recovery plan and an expanded San Francisco garter snake working group
2. Encourage conservation among private landowners
3. Continue ongoing habitat restoration and enhancement for wild populations
4. Complete captive holding facilities for use in head starting programs , the restoration of world-wide zoo populations, and as temporary lodging during habitat maintenance
5. Increase research of population trends, demography, and genetics
6. Increase enforcement of protective regulations at vulnerable locations

Private landowners can help by creating frog ponds, providing native vegetation for cover and to connect adjacent habitat areas, properly disposing of garbage to help control racoon populations, and leaving gopher burrows (important snake habitat) intact.

Additional Resources:

To learn more about the San Francisco garter snake see the U.S. Fish and Wildlife Service Species Profile <http://ecos.fws.gov> (enter "San Francisco garter snake" where it says "Search for an endangered species by name").

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