

Florida Pine Snake
Pituophis melanoleucus mugitus

Listing status: USFWS = Not listed
FWC = Species of Special Concern

Trend: Population levels are not well known but at least one author (Franz 1992) indicates that Florida pine snake numbers have seriously declined.

Threats: Like many other upland-dependent species, the primary threat to this species is the loss and fragmentation of suitable habitat from conversion to development, agriculture, or off-site pine plantations. Reductions in the amount and frequency of prescribed fire in upland communities greatly reduce the suitability of habitat for Florida pine snakes.

Prioritization information:

PLCP PVA proportion of pops modeled to persist on public lands = **0.31**

PLCP PVA probability of a 50% decline on public lands = 0.00

Millsap biological score = 23.7

Millsap supplemental score = **15**

Legacy population trend = **Declining**

Legacy population status = Medium

Summary: This species triggers three of the prioritization parameters, and is considered to be a medium priority species. However the modeled rate of decline in the PVA is likely optimistic (see PVA Summary below). Because it occupies upland habitats associated with frequent fire, it is a species that will benefit from management for other species like gopher tortoises and red-cockaded woodpeckers.

Life History: The Florida pine snake is one of four subspecies of pine snake and is found from southeastern South Carolina, west to Mobile Bay, Alabama, and south through peninsular Florida. The ecology of this species is poorly known, but it is closely tied to the upland pine and sandhill communities of the Coastal Plain. It typically occupies sites with sandy soil (for burrowing) and dominated by pines and a well-developed herbaceous understory dominated by grasses. Home ranges for pine snakes are not well known but are documented to range from 11 to 93 ha (27 to 230 ac.; Franz 1986; 1992). They will utilize gopher tortoise burrows and appear to use open habitats surrounding wetlands (Franz 1992).

Female pine snakes have an annual breeding cycle that extends from April through the winter in Florida. Eggs are laid between June and August into burrows excavated by the female. Clutch size can range from 3 to 24 eggs with Florida pine snakes having a mean of 5.6 eggs (Franz 1992). Incubation takes 50 to 100 days with hatchlings emerging in late August – September.

Pine snakes feed heavily on pocket gophers, but are also known to eat other rodents, birds and bird eggs, lizards, other small snakes and their eggs, and insects (Ernst and Barbour 1989; Franz 1992). Florida pine snakes appear to

actively locate mounds of pocket gophers and burrow in to capture individual gophers.

Minimum Habitat Requirement:

From PVA: Populations with at least 16 females

From Literature: Moler (1992) suggested that habitat requirements for indigo snakes, which have similar home ranges to Florida pine snake, should focus on large tracts of at least 1,000 ha (2,471 ac.).

Best Management Practices:

- Management regimes that create suitable habitat for red-cockaded woodpeckers should be beneficial for Florida pine snake. This should focus on frequent fire (2-3 year intervals), control of midstory hardwoods, and restoration of longleaf pine to suitable sites.
- Pine snakes utilize forest openings with well-drained sandy soils and little shrub cover. This, however, may be a reflection of the herbaceous community where pocket gophers build mounds, which pine snakes use for nesting and hibernation sites. Mature pine communities are not the only habitat utilized by pine snakes; a mosaic of natural communities, including bottomland forest, should be managed as well.
- Low intensity site-preparation techniques like burning should be used whenever possible; actions like root raking and chopping can interfere with the snake's fossorial nature. Heavy equipment should be kept at least 25 feet from known breeding burrow sites (Jordan 1998).

Monitoring Protocol:

- Systematic searches and long-term monitoring of populations are required to determine actual status of the pine snake across an area.
- The primary method for censusing pine snakes consists of walking transects, or driving unpaved roads through suitable habitat. Pine snakes are large and conspicuous and are often encountered on relatively open habitats and along roadways.
- One author (Burgdorf et al. 2005) has created a trap design that has good potential to capture pine snakes and could be used to document presence/absence, or possibly population information from a site.
- Visiting pocket gopher colonies in the morning during peak activity periods (April – August) may turn up basking individuals (K. Enge, FWC, per. obs).

For more information on monitoring see Jordan 1998 or Burgdorf et al 2005.

PVA Summary: The PVA analysis for this species was modeled twice; once under a scenario that included all potential habitat and once under a scenario that only considered managed (i.e., public) lands. Initial carrying capacity was hard to estimate because density information is lacking; a conservative value of 0.25 individuals/ha was used. Initial abundance was set at 0.2 individuals/ha. Because pine snakes have large home ranges, a distance of 1.2 km was set to identify

discrete populations, which produced an all potential habitat model with 343 populations and 495 populations in the managed lands model.

Information on survival and fecundity in Florida pine snakes is limited, so demographics were estimated from related taxa in the same species. Use of data, however, from other species, or even subspecies in this genus, should be considered suspect (P. Moler, FWC, per. obs.). Juvenile survival was set at 50%, while adult survival was estimated at 65%. Juveniles do not reproduce, and fecundity for adults was set at 0.83. This is ½ of the average clutch size (5.6 eggs) multiplied 85% of the female population breeding annually, multiplied by a 35% survival rate of eggs to year one. This information produced a population growth rate of 1.0465.

Under both baseline scenarios, there was no probability (0%) of extinction or a significant population decline (i.e., 20% decline) in the next 100 years. Reductions in adult survival by 10% increased the likelihood of a significant population decline from 0% to 74%. Reducing fecundity by 10% increased the risk of a population decline to 9.8%. Based on these results, future research should focus on factors that influence the survival of adults.

As this model assumed all modeled potential habitat to be equal, and no loss in potential habitat, the modeled rate of decline is likely optimistic.

2003 Landcover used for model:

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|----------------------------|--|
| Sandhill | Dry Prairie (with dry soils) |
| Xeric Oak Scrub | Shrub and Brushland (with dry soils) |
| Sand Pine Scrub | Unimproved/improved pasture (with dry soils) |
| Coastal Strand | |
| Pinelands (with dry soils) | |

FNAI Natural Communities used:

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|----------|-------------------|
| Sandhill | Scrubby Flatwoods |
| Scrub | Xeric Hammock |

FNAI field guide description of habitat: Habitats with relatively open canopies and dry sandy soils, in which it burrows. Especially sandhill and former sandhill, including old fields and pastures, but also sand pine scrub and scrubby flatwoods. Often coexists with pocket gophers and gopher tortoises.

Important Links:

FNAI field guide:

http://www.fnai.org/FieldGuide/pdf/Pituophis_melanoleucus_mugitus.pdf

FL museum of Natural History species page:

<http://www.flmnh.ufl.edu/herpetology/FL-GUIDE/Pituophismmugitus.htm>

University of Georgia's species page:

<http://www.uga.edu/srelherp/snakes/pitmel.htm>

Pertinent Documents/Literature:

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