Florida Pine Snake

Pituophis melanoleucus mugitus

Photograph by Kevin Enge, FWC.

Species Overview

Status: Listed as state Threatened on Florida's Endangered and Threatened Species List.

Current Protections

- 68A-27.003(a), F.A.C. No person shall take, possess, or sell any of the endangered or threatened species included in this subsection, or parts thereof or their nests or eggs except as allowed by specific federal or state permit or authorization.
- 68A-25.002(10), F.A.C. No person shall buy, sell or possess for sale any Florida pine snake (Pituophis melanoleucus mugitus), nor shall any person possess more than one Florida pine snake, except that said restrictions shall not apply to amelanistic (albino) specimens.
- 68A-27.001(4), F.A.C. Take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. The term "harm" in the definition of take means an act which actually kills or injures fish or wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. The term "harass" in the definition of take means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering.

Cryptic Species

Cryptic species are those that may be difficult to detect due to behavior, habitat, or physical features, even when using standardized survey techniques in occupied habitat. Interpretation of when harm or harassment may occur is difficult without a clear understanding of essential behavioral patterns of the species or habitat features that may support those behavioral patterns. The documented difficulties in detecting cryptic species and the lack of a reliable detection methodology leads to different considerations for take due to harm.

- The policy on permitting standards for incidental take of cryptic species in Florida's Imperiled Species Management Plan identifies the Florida pine snake as a cryptic species. Due to low detectability, little is known about the full range wide distribution or life history of Florida pine snakes.
- Permitting standards for the Florida pine snake focus on cooperation and acquiring information, with the understanding that as information is gained, permitting standards may change.
- For Florida pine snakes, information on distribution and habitat use may constitute a scientific benefit. Even if surveys are conducted, detection is difficult because of the fossorial (adapted to dig and spend time underground) nature of this animal, therefore, surveys for Florida pine snakes are not recommended. Thorough and intensive surveys would be needed to determine Florida pine snake presence, and should be performed in coordination with FWC.

Biological Background

This section describes the biological background for this species and provides context for the following sections. It focuses on the habitats that support essential behaviors for the Florida pine snake, threats faced by the species, and what constitutes significant disruption of essential behaviors.

Florida pine snakes are 1 of 3 subspecies of pine snake (*P. melanoleucus*) found in the United States and occur from southern South Carolina, through peninsular Florida, and westward through the Florida panhandle to the Escambia River (see map). West of the Escambia River, Florida pine snakes may intergrade with black pine snakes (Pituophis m. lodingi) and will appear darker overall (Franz 1992). Black pine snakes occur from the extreme western Florida panhandle, through southern Alabama and Mississippi, and into eastern Louisiana. Florida pine snakes are large, non-venomous, heavy bodied snakes that can attain lengths nearing 228 cm (7.5 feet), although most average 122- to 168 cm (4-5.5 feet). These snakes occupy a variety of upland habitats (see Habitat Features that Support Essential Behavioral Patterns below), but prefer dry habitats with moderate to open canopy cover and well-drained sandy soils. Florida pine snakes are most active from March through October (Franz 1992), although they are a highly cryptic and fossorial (adapted to dig and spend time underground) species (Enge 1997, Franz 1992, Franz 2005, Miller et al. 2012). Here, cryptic is defined as those species not easily observed, tracked or surveyed due to camouflage or behavior rather than rarity. These adaptions include a modified rostral (nose) scale and a cone shaped head, which facilitate digging and excavating loose soil. When encountered, Florida pine snakes may vigorously vibrate their tail, inflate the body, hiss loudly, and exhibit bluff striking (Tuberville and Mason 2008).

Preferred landscapes have a moderate to mostly open canopy cover of primarily pine trees (*Pinus* spp.) and scrubby oaks (*Quercus* spp.; Franz 1992, Hipes et al. 2000, Bartlett and Bartlett 2003). Florida pine snakes spend a majority of their time in underground refugia and when available use southeastern pocket gopher (*Geomys pinetis*) burrows (Franz 1992, Miller et al. 2012). Females are believed to lay eggs inside the burrows of pocket gophers and other animals (Lee 1967, Franz 2005) in May and June (Franz 1992). Hatching occurs in September and October (Franz 1992). Florida pine snake prey generally consists of pocket gophers, small mammals including mice and rats, and ground dwelling birds and their eggs. Their estimated home range size is 70.1 ha (173 ac) for males and 37.5 ha (93 ac) for females (Franz 2005, Miller 2012).

Further background information pertaining to the Florida pine snake may be found in the Biological Status Review Report for the Florida Pine Snake (FWC 2011) and a Species Action Plan for the Florida Pine Snake (FWC 2013).

Habitat Features that Support Essential Behavioral Patterns

Florida pine snakes are typically found on large tracts of land comprised of sandhill, scrub or xeric pine savanna habitat that contain high densities of pocket gophers and gopher tortoises (Allen and Neill 1952, Franz 1992, Franz 2005, Miller et al. 2012). Uncompact xeric sandy soils are important landscape features for Florida pine snakes, although pine snakes will use wetlands during times of drought (Franz 1992). Florida pine snakes are sometimes also encountered in xeric hammock, scrubby flatwoods, mesic pine flatwoods, dry prairie with dry soils, and old fields and pastures (Allen and Neill 1952, Enge 1997, Ernst and Ernst 2003, Franz 1992, Hipes et al. 2000, Franz 2005).

Southeastern pocket gopher colonies are important to sustaining populations of Florida pine snakes. Florida pine snakes often prey on pocket gophers (Franz 1992, FWC 2011), primarily use pocket gopher burrows as refugia (Miller et al. 2012) and, where available, may use pocket gopher burrows as egg deposition sites (Franz 2005). Areas without pocket gophers also support pine snakes. In these areas, pine snakes may use gopher tortoise burrows, nine-banded armadillo (*Dasypus novemcinctus*) burrows, and stump holes as refugia (Means 2005, Smith 2011, Miller et al. 2012).

Figure 1. Pine upland habitat used by pine snakes. Photograph by FWC.

Florida pine snakes may spend over 75% of their time in underground refugia (Franz 1992, Miller et al. 2012).

Figure 2: Pocket gopher mounds in pine snake habitat. Photograph by Bradley O'Hanlon.

Threats

Population declines of Florida pine snakes have been suspected since the 1970s (Franz 1992). As habitat specialists, Florida pine snakes are dependent on habitat structure associated with the longleaf pine forest, such as an open forest canopy, a reduced midstory and understory, and robust groundcover. However, the current distribution of longleaf pine forest has been reduced to about 3% of its historic range (Ware et al. 1993), including significant losses of sandhill and scrub habitat within Florida (Kautz et al. 1993, Enge et al 2003). Because the Florida pine snake has specific habitat requirements, continued habitat loss due to land development and conversion may further imperil this species.

Because large tracts of intact uplands are important for pine snake conservation, proper fire management is essential. Although pine snakes may be tolerant to varying degrees of habitat degradation (Franz 2005, Miller 2008), insufficient fire management may render areas unsuitable. In addition to fire suppression, stump removal and soil compaction may negatively affect populations of Florida pine snakes.

Habitat fragmentation may also have negative effects on pine snake behavior. Miller et al. (2012) found that Florida pine snakes were sensitive to improved roads (i.e., paved and graded dirt), and no Florida pine snakes were detected on improved roads during surveys in appropriate habitat in southern Georgia (Stevenson et al. 2016). Habitat fragmentation may lead to isolation of pine snake populations and in turn, reduce range wide gene flow.

Florida pine snakes are dependent on underground refugia, and therefore are vulnerable to the decline and loss of southeastern pocket gophers and gopher tortoises. In Florida, gopher tortoise populations have declined by over 50% from the 1920's to 2005 (Enge et al. 2006), and populations of pocket gophers are suspected to be in decline as well (Georgia Department of Natural Resources 2008). These declines could be problematic as pocket gopher burrows are preferred refugia to pine snakes (Franz 1992, Franz 2005, Miller et al. 2012).

Figure 3. Using heavy machinery to excavate gopher tortoise burrows is an example of an activity that will compact soils and may take pine snakes. Photograph by Bradley O'Hanlon.

Snake fungal disease is an emergent threat to wild snakes, and has been documented in at least 10 states, including Florida (Sleeman 2013, Glorioso 2016). In New Hampshire, snake fungal disease may have been a factor in the 50% decline of an imperiled population of timber rattlesnakes (*Crotalus horridus*; Clark et al. 2010, Sleeman 2013). Because little is known about snake fungal disease, and pine snakes are difficult to monitor, any effects of snake fungal disease may be difficult to quantify. Providing any dead specimens to FWC will help monitor for this disease.

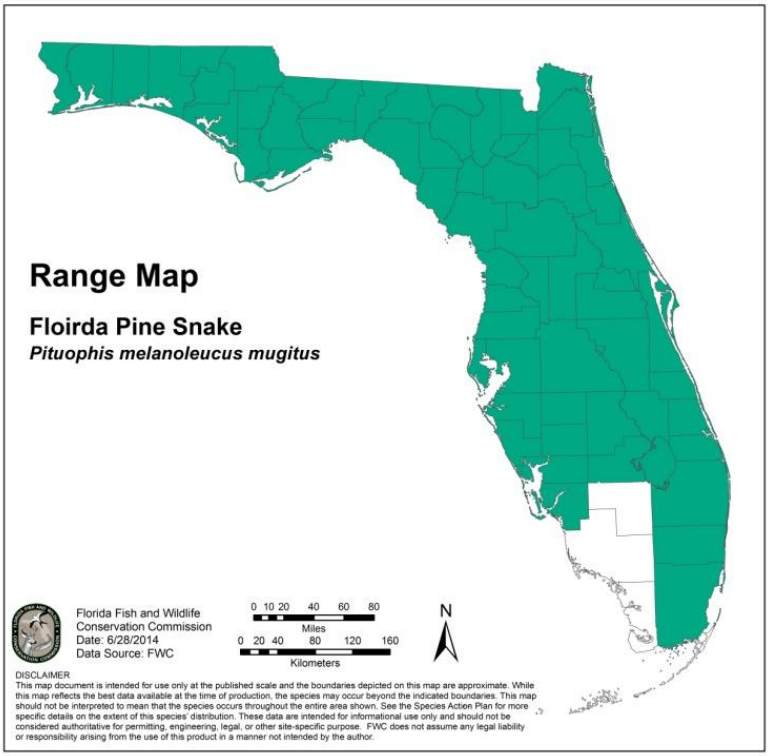
Potential to Significantly Impair Essential Behavioral Patterns

Florida pine snakes rely on intact tracts of properly managed uplands, thus actions that result in the loss,

degradation or fragmentation of those lands may impair or disrupt the essential behavioral patterns of Florida pine snakes (Hipes et al 2000, FWC 2011). Activities that may degrade or fragment pine snake habitat include land clearing, development, and road widening or improvement. Additionally, because burrows and underground refugia are essential for Florida pine snake nesting and sheltering, activities that would eliminate or impact habitat features such as stump removal, tortoise burrow excavation, subsurface root raking and soil compaction from heavy equipment have the potential to cause incidental take of pine snakes (Diemer and Moler 1982, Means 2005, Smith et al. 2015, Andelt and Case 2016).

Distribution and Survey Methodology

The range map (right) represents the principle geographic range of the Florida pine snake, including intervening areas of unoccupied habitat. This map is for informational purposes only and not for regulatory use.



Counties: All counties except for Monroe, Collier, and Hendry.

Recommended Survey Methodology

FWC does not recommend Florida pine snake surveys for most activities unless as a component of scientific benefit (see Scientific Benefit). Any surveys performed during the project planning phase should be coordinated with FWC. Because this is a cryptic species, surveys conducted in accordance with the methodology described below may not detect this species. Surveys are not required. Any activity that requires handling a Florida pine snake in any capacity requires a permit. Opportunistic encounters that require identification of an animal without handling it may prove difficult as the Florida pine snake may be confused with other species (e.g., gray rat snake (*Pantherophis spiloides*; Figure 4 below). Surveys that may disturb any gopher tortoise burrow (active or inactive) will require a permit.

- Florida pine snakes are cryptic and fossorial, thus traditional methods such as road-cruising surveys and opportunistic visual encounter surveys are not effective for this animal (e.g., Stevenson et al. [2016] drove over 6,000 km (3,728 miles) in suitable Florida pine snake habitat and did not observe a single animal).
- The most effective survey methodology is long term site monitoring using appropriate drift fence arrays for large snakes. Brief surveys using temporary drift fence arrays may not be effective at documenting Florida pine snakes (Stevenson et al. 2016). All trapping operations will require a scientific collecting permit. Burgdorf et al. (2005) contains methodology for long term monitoring and appropriate trap design.
- Long term monitoring using Burgdorf-style traps is the recommended survey protocol for Florida pine snakes, however, this methodology is labor intensive. Because surveys may be suspended after

the first snake is observed, FWC does not recommend Florida pine snake surveys for most activities unless as a component of scientific benefit (see Scientific Benefit).

- If long term trapping is used, traps should be checked minimally every 2-3 days. Here, long term trapping is defined as a minimum commitment of 6 months. Trapping should encompass the main Florida pine snake active season (May–October). For best results, multiple traps should be deployed within a site.
- There will be considerable bi-catch when using drift fence traps that target large snakes. Other potential snake species that may be captured include federally-threatened eastern indigo snakes (*Drymarchon couperi*) and numerous species of venomous snakes, including eastern diamondback (*Crotalus adamanteus*) and timber rattlesnakes. Therefore, drift fence operators should be trained and permitted to handle these species.

Figure 4: Gray rat snakes (top), typically found in the Florida panhandle, are similar in size and appearance to Florida pine snakes (bottom). Photographs by Michelina Dziadzio and Bradley O'Hanlon.

- Surveys for pocket gopher mounds and gopher tortoise burrows will provide an indication of potential Florida pine snake habitat and essential breeding locations. These surveys will help meet the guidelines for minimization of impacts and can help to identify conservation or scientific benefit (see Information Options under Mitigation). Surveys that will impact gopher tortoise burrows will require a Scientific Collecting permit or certification as an Authorized Agent (see gopher tortoise permitting guidelines; FWC 2008).
- Florida pine snakes may be opportunistically detected within gopher tortoise burrows when using a burrow scoping system. If this methodology is used, the applicant must have either a Scientific Collecting permit or certification as an Authorized Agent to scope burrows.
- If Florida pine snakes are detected on site, the applicant should coordinate with FWC.

A geographic information system (GIS) review of recent (post-2000) Florida pine snake sightings may aid in determining the presence of Florida pine snakes. Because the Florida pine snake is a cryptic species, GIS and/or crowdsourced databases may not have complete occurrence data and should not be solely relied on if there are no documented occurrences near a project. As Florida pine snakes have large home ranges and may persist in degraded habitat, care should be taken to not misinterpret GIS data. This GIS data may be available upon request from the FWC.

Recommended Conservation Practices

Recommendations are general measures that could benefit the species but are not required. No FWC permit is required to conduct these activities.

- Refrain from fragmenting upland habitats, such as sandhills, scrub, xeric hammock, scrubby

flatwoods, mesic pine flatwoods, pinewoods, and dry prairie with dry soils.

- Design projects to minimize loss of upland habitats containing well drained soils by minimizing the size of the project footprint where possible.
- Establish conservation easements that maximize the conservation of upland habitat.
- If road construction is necessary, use unimproved dirt roads to the maximum extent possible. Guidelines for minimizing erosion and runoff from roadways can be found in the State of Florida Best Management Practices (BMP's) for stormwater runoff and within the Florida Department of Agriculture Consumer Services (FDACS) silviculture BMP's.
- Develop a prescribed fire regime that promotes forests with an open canopy layer and diverse ground cover. Encourage regimes that maintain ecologically natural fire frequency, intensity, and seasonality.
- Avoid habitat management procedures that will compact or disturb soil, such as using roller choppers or roller drums in suitable habitat, except as needed for habitat restoration.
- Avoid or minimize soil compaction, especially in areas where southeastern pocket gophers or gopher tortoises are present.
- Avoid disruptive activities such as road construction and lot clearing during peak movement times and the breeding season (May–October).
- The FDACS BMP's for state imperiled species as they relate to the gopher tortoise would benefit the Florida pine snake. When using herbicides to control herbaceous ground cover (herbaceous weed control) for newly established pines, a banded application is preferable over broadcast applications.

Measures to Avoid Take

Avoidance Measures that Eliminate the Need for FWC Take Permitting

This section describes all measures that would avoid the need for an applicant to apply for an FWC take permit.

- Avoid conversion of upland habitats used by Florida pine snakes. Specifically, avoid fragmenting large tracts of land.

Examples of Activities Not Expected to Cause Take

This list is not an exhaustive list of exempt actions. Please contact the FWC if you are concerned that you could potentially cause take.

- Activities that occur in areas not consistent with Florida pine snake habitat.
- Activities that avoid compacting soils, and that do not crush or harm pocket gopher mounds, gopher tortoise burrows, and that allow tree stumps to remain in the ground.

Florida Forestry Wildlife BMP's and Florida Agricultural Wildlife BMP's

- The FDACS BMP's for State Imperiled Species does not include the Florida Pine Snake, however, the BMP's as they relate to the gopher tortoise would benefit the Florida pine snake.

Other authorizations for Take

- As described in Rule 68A-27.007(2)(c), F.A.C., land management activities (e.g., prescribed fire, mechanical removal of invasive species, and herbicide application) that benefit wildlife and are not inconsistent with FWC Management Plans are authorized and do not require a permit authorizing incidental take.
- When activities associated with normal and customary forestry and silvicultural practices are conducted in a manner where direct year-round contact with known and visibly apparent pocket gopher villages are avoided and and tree stumps are left, take is avoided. Normal and customary

practices are generally accepted agricultural (silvicultural) activities for the type of operation and the region, 5M-15.001 (2) F.A.C.

The Florida pine snake is listed as a priority commensal species of gopher tortoises within the Interim FWC Policy on the Relocation of Priority Commensals (FWC 2015). Take via harassment (i.e., non-lethal relocation) may occur when gopher tortoises are relocated and their burrows are collapsed. If applicants follow the guidance in Table 1, this take is authorized.

Table 1. Interim guidance for limited relocation of Florida pine snake based on post-development site characteristics.

Post Development Site Characteristics	If a gopher tortoise burrow will be impacted from development and some **habitat will remain on-site**	If a gopher tortoise burrow will be impacted from development activities and **adjacent habitat is available**	If a gopher tortoise burrow will be impacted/destroyed from development and **no habitat will remain**
Florida Pine Snake	Any incidentally captured pine snake should be released on-site or allowed to escape unharmed if some habitat will remain post-development activities.	Any incidentally captured pine snake should be released on-site or allowed to escape unharmed if some habitat will remain post-development activities.	Any incidentally captured pine snake should be allowed to escape unharmed or donated to a facility for educational or research purposes (permit required for receiving facility).

Coordination with Other State and Federal Agencies

The FWC participates in other state and federal regulatory programs as a review agency. During review, FWC identifies and recommends measures to address fish and wildlife resources to be incorporated into other agencies' regulatory processes. For example, the FWC commented on the Candidate Conservation Agreement with Assurances for Multiple At Risk Species in North Florida (CCAA) for the Camp Blanding Joint Training Center. This CCAA directly addresses the Florida pine snake and highlights the importance of conserving flatwoods, sandhill, and scrub habitat, as well as removing or reducing threats to other candidate and at-risk species.

FWC provides recommendations for addressing potential impacts to state listed species in permits issued by other agencies. If permits issued by other agencies adequately address all of the requirements for issuing a state-Threatened species take permit, FWC will consider those regulatory processes to fulfill the requirements of Chapter 68A-27, F.A.C., with no additional application process. This may be accomplished by issuing a concurrent take permit from FWC, by a memorandum of understanding with the cooperating agency, or by a programmatic permit issued by another agency. These permits would be issued based on the understanding that the implementation of project commitments will satisfy the requirements of 68A-27.003 and 68A-27.007, F.A.C.

Review of Land and Water Conversion projects with State-Listed Species Conditions for Avoidance, Minimization and Mitigation of Take

- FWC staff, in coordination with other state agencies, provides comments to federal agencies (e.g., the Army Corps of Engineers) on federal actions, such as projects initiated by a federal agency or permits being approved by a federal agency.
- FWC staff works with landowners, local jurisdictions, and state agencies such as the Department of Economic Opportunity on large-scale land use decisions, including long-term planning projects like

sector plans, projects in Areas of Critical State Concern, and large-scale comprehensive plan amendments.

- FWC staff coordinates with state agencies such as the Department of Environmental Protection (DEP) and the five Water Management Districts on the Environmental Resource Permitting (ERP) program, which regulates activities such as dredging and filling in wetlands, flood protection, stormwater management, site grading, building dams and reservoirs, waste facilities, power plant development, power and natural gas transmission projects, mining, oil and natural gas drilling projects, port facility expansion projects, some navigational dredging projects, some docking facilities, and single-family developments such as for homes, boat ramps, and artificial reefs.
- FWC staff provides technical assistance for early review of proposed projects.

FWC Permitting: Incidental Take

As defined in Rule 68A-27.001, F.A.C., incidental take is take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Activities that result in impacts to Florida pine snakes can require an Incidental Take Permit from the FWC (see above for actions that do not require a permit). Permits may be issued when there is a scientific or conservation benefit to the species and only upon showing by the applicant that that the permitted activity will not have a negative impact on the survival potential of the species. Scientific benefit, conservation benefit, and negative impacts are evaluated by considering the factors listed in Rule 68A-27.007(2)(b), F.A.C. These conditions are usually accomplished through a combination of avoiding take when practicable, minimizing take that will occur, and mitigating for the permitted take. This section describes the minimization measures and mitigation options available as part of the Incidental Take Permit process for take of this species. This list is not an exhaustive list of options.

Minimization Measure Options

The suite of options below can help to reduce or minimize take of the species, and lessen the mitigation necessary to counterbalance take. All of the options below assume that adhering to avoidance measures that eliminate the need for FWC permitting described above is not possible, and that some level of take may occur. These options can lessen the impact of activities, and ultimately may reduce what is needed to achieve a conservation or scientific benefit (see below). FWC does not recommend Florida pine snake surveys unless as a component of scientific benefit. Surveys for pocket gopher and gopher tortoise burrows will provide an indication of potential Florida pine snake habitat and essential breeding locations. These surveys will help identify actions to minimize impacts (see Scientific Benefit).

Seasonal, Temporal, and Buffer Measures

- Florida pine snakes nest and hatch from eggs from June-October. Destruction or disturbance of pocket gopher mounds or other underground refugia (such as gopher tortoise burrows) should be avoided during this period to prevent disturbance to potential nests and eggs. Activities such as land clearing and conversion during the peak movement season, May, June, July and October should be avoided.
- A 7.6 m (25-ft) buffer in all directions around the mouth of a gopher tortoise burrow (as described the Gopher Tortoise Permitting Guidelines; FWC 2008) can minimize impacts to Florida pine snakes.
- There are no recommendations for buffer zones around other refugia, including clusters of pocket gopher mounds, although a similar buffer to gopher tortoise burrows would be beneficial.

Design Modification

- Minimize loss and disturbance of suitable large tracts of uplands, including sandhill, scrub, xeric

hammock, scrubby flatwoods, mesic pine flatwoods and dry prairie with dry soils.

- Minimize fragmentation of habitat within suitable large tracts of land (i.e., maintain connectivity among upland habitats). Avoid sensitive areas with high densities of pocket gopher mounds and/or gopher tortoise burrows.
- Design projects that minimize soil compaction within pine snake habitat and for projects that occur near pocket gopher villages.
- Design projects that will not affect prescribed fire regimes, or the ability to use prescribed fire in adjacent habitat.
- Minimize the number of primary and upgraded roadways within suitable Florida pine snake habitat.

Method Modification

- When activities must occur within habitat occupied by the Florida pine snake, refer to the Seasonal and Temporal Restrictions above to minimize take.
- Allow animals observed during construction activities to move safely away from an area by ceasing activity until the animal has moved away. All sightings should be immediately reported to the FWC and accompanied by GPS coordinates and photographs for species verification.
- Provide identification information to project personnel and avoiding directly crushing the Florida Pine snake and other cryptic species found in similar habitats.
- Flagging of pocket gopher mounds and gopher tortoise burrows when feasible, and where possible avoid impacting those mounds and burrows to the maximum extent possible.

Mitigation Options

Mitigation is scalable depending on the impact, with mitigation options for significant impairment or disruption of essential behavioral patterns constituting take. The Florida pine snake is a cryptic species. Therefore, the permittee can satisfy mitigation requirements selecting options under scientific benefit. Potential options for mitigation are described below. References to specific actions within the Species Action Plan (Actions) are provided.

Scientific Benefit

This section describes research and monitoring activities that provide scientific benefit, per Rule 68A-27.007, F.A.C. Conducting or funding these activities can be the sole form of mitigation for a project. Since this species is cryptic and there is limited information available, the options provided below are subject to change as new information becomes available. Projects that help to improve existing survey methodology for the Florida pine snake would need to be conducted with FWC cooperation (Action 3).

- Sharing sightings data (live and dead observations) with FWC, including latitude and longitude and photographs (Action 5) by email to Imperiled@MyFWC.com.
- Scientific studies following established survey methods, projects to fill data gaps related to information on species reproduction including nest behavior and location, habitat requirements in different natural communities, diet and refuge use in areas without pocket gophers, relationships between Florida pine snake densities and gopher tortoise and pocket gopher abundance, impact of habitat fragmentation and patch size on population, and population demographic parameters (i.e., productivity, survivorship, and mortality rates; Actions 4, 5, 6). All scientific studies should be coordinated with input from FWC. It is possible that, through funding options, the FWC may provide support to scientific studies.
- Scientific studies (e.g., radio-telemetry studies) can help address life history questions. Collecting movement data and habitat use will help re-evaluate the Florida pine snake habitat suitability

model (Action 7), or evaluate the effects of translocation on Florida pine snakes (Action 9). These projects should be designed and conducted with input from FWC to ensure that they provide scientific benefit.

- Identifying causes and underlying issues of southeastern pocket gopher declines (Action 8).

Habitat

Habitat acquisition or management may be a mitigation option.

- Maintaining connectivity of contiguous upland habitats is preferred. Easements and/or land use agreements that would help to establish connectivity for upland habitats is a desired outcome (Action 1).
- Upland habitat restoration options could include application of prescribed fire, hardwood reduction in overgrown habitats, pine thinning and decreasing habitat fragmentation by eliminating or decreasing roads within Florida pine snake habitat (Action 2).
- Removal and treatment of non-native invasive plant species and replacement with native plant species may be a mitigation option (Action 3).

Funding

- No funding option has been identified at this time. However, funding options as part of mitigation will be considered on a case by case basis.

Information

- Sharing sightings data (live and dead observations) with FWC, including latitude and longitude and photographs (required for verification purposes; Action 5) by email to Imperiled@MyFWC.com.
- Providing dead specimens to FWC for location vouchers, snake fungal disease screening, and future genetics work (Action 6). Arrangements for the transport or shipping of vouchers may be arranged by contacting Imperiled@MyFWC.com.
- The information option for this cryptic species may rise to the level of scientific benefit for the Florida pine snake, and is based on the most current knowledge of the species distribution.

Programmatic Options

- FWC's landowner Assistance Program is a voluntary program that can offer financial assistance to landowners who implement conservation plans. This program would allow the FWC opportunities to gather information on private lands slated for development, and the FWC would provide assistance in evaluating development practices and create suitable avoidance, minimization and mitigation options for specific properties.

Multispecies Options

- Florida pine snake range overlaps that of several other sandhill and upland habitats. Measures that will benefit the Florida pine snake, particularly those focused on maintaining connectivity across the landscape, will also benefit other species. Multi-species sandhill habitat measures are being drafted (Actions 2 and 3).
- State and federally listed species, as well as species included in Florida's ISMP, that have overlapping ranges and habitat preferences with the Florida pine snake include but are not limited to: red-cockaded woodpecker (*Picoides borealis*), eastern indigo, Florida scrub jay, Southeastern American kestrel (*Falco sparverius paulus*), gopher tortoise, Florida mouse (*Podomys floridanus*), and gopher frog (*Lithobates capito*). Actions that benefit these species may have direct benefit to pine snakes.
- Other land management activities, for example safe harbor agreements for the red-cockaded woodpecker may benefit the Florida pine snake (Actions 2 and 3).

FWC Permitting: Intentional Take

Intentional take is not incidental to otherwise lawful activities. Per Rule 68A-27, F.A.C., intentional take is prohibited and requires a permit. For state-Threatened species, intentional take permits may only be considered for scientific or conservation purposes (defined as activities that further the conservation or survival of the species taken). Permits are issued for state-Threatened species following guidance in Rule 68A-27.007(2)(a), F.A.C.

Intentional take for human safety

- Permits will be issued only under limited and specific circumstances, in cases where there is an immediate danger to the public's health and/or safety, including imminent or existing power outages that threaten public safety, or in direct response to an official declaration of a state of emergency by the Governor of Florida or a local governmental entity. Applications submitted for this permit must include all information that is required from any other applicant seeking a permit, along with a copy of the official declaration of a state of emergency, if any. This permit process may be handled after the fact or at least after construction activities have already started. An intentional take permit may be issued for such purposes.

Aversive Conditioning

- Not applicable for the Florida pine snake.

Permits Issued for Harassment

- Not applicable for the Florida pine snake.

Scientific Collecting and Conservation Permits

- Scientific Collecting permits may be issued for the Florida pine snake using guidance found in Rule 68A-27.007(2)(a), F.A.C. Activities requiring a permit include any research that involves capturing, handling, or marking wildlife; conducting biological sampling; or other research that may cause take.
- A Scientific Collecting permit will not be issued for the sole purpose of removing a snake from the wild to use for education or outreach. Animals used for outreach may occasionally be available from wildlife rehabilitation facilities, or in scenarios where relocation is not an option. Florida pine snakes originating from the wild with a Scientific Collecting Permit used for educational and outreach purposes should be used for a minimum of 12 educational engagements equating to a minimum of 48 hours of contact time per year. Owners of pine snakes used for education and outreach must have a Class III Exhibition License and follow all caging requirements (68A-6.004, F.A.C.).

Considerations for Issuing a Scientific Collecting Permit

1) Is the purpose adequate to justify removing the species (if the project requires this)?
    - Permits will be issued if the identified project is consistent with the goal of the Species Action Plan for the Florida Pine Snake (i.e., improvement in status that leads to removal from Florida's Endangered and Threatened Species List), or addresses an identified data gap important for the conservation of the species.
2) Is there be a direct or indirect effect of issuing the permit on the wild population?
3) Will the permit conflict with program intended to enhance survival of species?
4) Will purpose of permit reduce likelihood of extinction?
    - Projects consistent with the goal of the Species Action Plan for the Florida Pine Snake or that fill identified data gaps in species life history or management may reduce the likelihood of

extinction. Applications should clearly explain how the proposed research will provide a scientific or conservation purpose for the species.

5) Have the opinions or views of other scientists or other persons or organizations having expertise concerning the species been sought?
6) Is applicant expertise sufficient?
    - Applicants must have prior documented experience with this or similar species; applicants should have met all conditions of previously issued permits; and applicants should have a letter of reference that supports their ability to handle the species.

Relevant to all Scientific Collecting Permits for Florida pine snakes

- Walking, visual encounter surveys, and opportunistic encounters that do not involve touching the animals, altering the microhabitat, or disturbing gopher tortoise burrows do not require a permit.
- Any activity that requires trapping or handling a Florida pine snake requires a permit. For example, these activities include taking a scale or tail clip for taxonomic analyses.
- Applications must include a proposal that clearly states the objectives and scope of work of the project, including a justification of how the project will result in a conservation benefit to the species. The proposal also must include a thorough description of the project's methods, time frame and final disposition of all individuals. Permit amendment and renewal applications must be "stand alone" (i.e., include all relevant information on objectives and methods).
- Permits may be issued to display a specimen if the specimen was obtained via rehabilitation facility or was encountered dead.
- Permits may be issued for captive possession (removal from the wild) if the individual is deemed non-releasable.
- Capturing and handling protocols, and a justification of methods, must be included in the permit application and should identify measures to lessen stress for captured snakes.
- Methodologies for any surgical procedures, including radio transmitter implantation, should be clearly spelled out, including measures taken to reduce stress and injury to the snakes. Surgical procedures should be performed by a qualified veterinarian.
- Methodologies for any collection of tissues such as blood and scale clips should be clearly spelled out, including measures taken to reduce stress and injury to the snakes.
- Disposition involving captive possession for any period of time must include a full explanation of whether the facility has appropriate resources for accomplishing the project objectives and for maintaining the animals in a safe and humane manner.
- Any mortality should be reported immediately to the FWC at the contact information below. The FWC will provide guidance on proper disposition of specimens.
- Geographical or visual data gathered must be provided to FWC in the specified format.
- A final report should be provided to the FWC in the format specified in the permit conditions.

Additional information

Information on Economic Assessment of this guideline can be found at http://myfwc.com/wildlifehabitats/imperiled/management-plans/

Contact

For more species-specific information or related permitting questions, contact the FWC at (850) 921-5990 or WildlifePermits@myfwc.com. For regional information, visit http://myfwc.com/contact/fwc-staff/regional-offices.

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