

**Recovery Outline  
for  
Black Pinesnake (*Pituophis melanoleucus lodingi*)**

**2017**



Black pinesnake (Jim Lee, The Nature Conservancy)

## **I. INTRODUCTION**

This document outlines a preliminary course of action for the recovery of the black pinesnake (*Pituophis melanoleucus lodingi*) until a comprehensive recovery plan for the species is approved. The black pinesnake is a large, non-venomous snake; one of three subspecies of pinesnakes in the Southeastern United States. These snakes are typically all black and may reach up to 6 feet in length. They are also known as gopher snakes, due to their overlapping range with the gopher tortoise and tendency to use and modify underground stump holes and tunnels.

Black pinesnakes are native to the upland longleaf pine forests of south Mississippi and southwestern Alabama. Populations of the black pinesnake are currently known in nine counties in Mississippi (Forrest, George, Greene, Harrison, Jones, Marion, Perry, Stone, and Wayne) and three counties in Alabama (Clarke, Mobile, and Washington), with additional individual records in Jackson, Lamar, and Lawrence counties in Mississippi. The black pinesnake historically occurred in Louisiana, but has not been seen there in 40 years, and is considered to be gone from the State.

This snake was listed as a threatened species in the *Federal Register* on [10/06/2015; 80 FR 60468]. The primary threats to the black pinesnake are the loss and degradation of the longleaf pine ecosystem due to habitat fragmentation, fire suppression, conversion of natural pine forests to densely stocked pine plantations, and agricultural and urban development. Other threats to the snake's survival include road mortality and intentional harm from people.

Listing and Contact Information:

Listing Classification: Threatened range-wide  
Effective Listing Date: [November 5, 2015]  
Lead Agency, Region: U.S. Fish and Wildlife Service, Southeast Region  
Lead Field Office: Mississippi Ecological Services Field Office  
Lead Biologist: Matt Hinderliter, 601-321-1132  
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Cooperating Office: Alabama Ecological Services Field Office

**II. RECOVERY STATUS ASSESSMENT**

**A. BIOLOGY, LIFE HISTORY, HABITAT, AND THREATS ASSESSMENT**

[Note: For a more detailed description of this subspecies' biology, life history, distribution, habitat, and an assessment of the listing factors as they relate to the black pinesnake, please see the final listing rule (10/6/2015; 80 FR 60648).]

Pinesnakes (genus *Pituophis*) are large, non-venomous, oviparous (egg-laying) constricting snakes with keeled scales, pointed snouts, and disproportionately small heads. There are three recognized subspecies of *P. melanoleucus* distributed across the eastern United States: the northern pinesnake (*P. m. melanoleucus*); black pinesnake (*P. m. lodingi*); and Florida pinesnake (*P. m. mugitus*). The black pinesnake was originally described by Blanchard in 1924, and is geographically isolated from all other pinesnakes. Black pinesnakes are distinguished from other pinesnakes by being dark brown to black both on the upper and lower surfaces of their bodies. They may also have white scales on their throat and ventral surface, and a vague pattern of blotches on the end of the body approaching the tail. Adult black pinesnakes range from 48 to 76 inches long, and young black pinesnakes often have a blotched pattern which darkens with age.

Black pinesnakes are primarily active during the day, and are accomplished burrowers capable of tunneling in loose soil; potentially for digging nests or excavating rodents for food. Principal prey of black pinesnakes are hispid cotton rats (*Sigmodon hispidus*), various species of mice (*Peromyscus* spp.), and to a lesser extent eastern fox squirrels (*Sciurus niger*). Potential predators of black pinesnakes include red-tailed hawks (*Buteo jamaicensis*), raccoons (*Procyon lotor*), skunks (*Mephitis mephitis*), red foxes (*Vulpes vulpes*), feral cats (*Felis catus*), and domestic dogs (*Canis familiaris*).

Black pinesnakes are native to the longleaf pine ecosystem that once covered the southeastern United States. Optimal habitat for these snakes consists of sandy, well-drained soils with an open-canopied overstory of pine, a reduced shrub layer, and a dense herbaceous ground cover. Radio-telemetry studies (Duran 1998, Yager et al. 2005, Baxley and Qualls 2009) have shown that black pinesnakes are typically found on well-drained, sandy-loam soils on hilltops, on ridges, and toward the tops of slopes in areas dominated by longleaf pine. Home range estimates from these studies ranged from 61 to 979 acres. They were located below ground 53 to 70 percent of the time, usually in the trunks or root channels of rotting or burned-out pine stumps (stump holes). Pinesnakes repeatedly returned to core areas in the longleaf pine uplands and used the same stump holes from year to year, indicating considerable site fidelity. These stump holes have been identified as a crucial habitat feature in black pinesnake ecology, and presence of stump holes is a positive indicator of suitable pinesnake habitat.

The primary threat to the black pinesnake is loss and degradation of the southern pine ecosystem, especially the decline of the longleaf pine ecosystem. The original longleaf pine habitat has been reduced to less than 4 percent of its original extent. Factors influencing this threat include increases in road density, which cause habitat fragmentation as well as direct mortality of pinesnakes; loss of open pine habitat conditions due to the suppression of fire; and conversion of natural pine forests to densely-stocked pine plantations, agriculture, and urban areas.

Individual records indicate that black pinesnakes remain in all historical counties in Alabama (Clarke, Mobile, and Washington) and likely in 13 counties in Mississippi (Forrest, George, Greene, Harrison, Jackson, Jones, Lamar, Lawrence, Marion, Pearl River, Perry, Stone, and Wayne). The distribution of populations within its range has become highly restricted due to the fragmentation of the remaining longleaf pine habitat. Populations of black pinesnakes (a population being at least 2 or more recent records) are currently known in nine counties in Mississippi (Forrest, George, Greene, Harrison, Jones, Marion, Perry, Stone, and Wayne) and three counties in Alabama (Clarke, Mobile, and Washington). In seven Mississippi counties, populations are concentrated on the De Soto National Forest (DNF) and Camp Shelby Joint Forces Training Center (Camp Shelby). Black pinesnake populations outside of the DNF in both Mississippi and Alabama are often found on Wildlife Management Areas (WMAs), but for the most part appear to be small and isolated on islands of suitable longleaf pine habitat.

## **B. CONSERVATION ACTIONS**

The black pinesnake benefits from pine ecosystem restoration efforts, including prescribed fire, implemented by the U.S. Forest Service on the DNF in accordance with its Forest Plan, in habitats for other federally-listed species such as the gopher tortoise, dusky gopher frog, and red-cockaded woodpecker.

The Mississippi Army National Guard (MSARNG) updated their Integrated Natural Resources Management Plan (INRMP) in 2014 and outlined conservation measures to be implemented specifically for the black pinesnake on lands owned by the Department of Defense and the state of Mississippi on Camp Shelby (outside DNF boundaries). These updates included specific language regarding monitoring of black pinesnake populations on the installation, and habitat management guidelines specifically protecting stump holes. The INRMP addresses integrative management and conservation measures on lands encompassing approximately 5,000 acres on one of the largest known black pinesnake populations.

Longleaf pine habitat restoration projects conducted on selected private lands, as well as restoration projects on WMAs within the range currently or historically occupied by the black pinesnake, provide benefits to the species. There are many programs in place that are contributing to on-the-ground longleaf pine conservation on private lands, illustrating the power and potential of public/private partnerships, including the Service's Partners for Fish and Wildlife Program, the Sustainable Forestry Initiative, America's Longleaf Restoration Initiative, and Environmental Quality Incentives Programs. These programs help private landowners meet habitat objectives on their properties by providing financial and technical assistance, and are often used to plant trees, conduct prescribed burns, conduct overstory and mid-story treatments, control invasive species, establish native understory plants, and acquire land and easements. Additionally, management efforts are ongoing with industrial forest

landowners to determine how to effectively balance planted pine plantations with a mixture of more open conditions compatible with good pinesnake habitat.

### **III. PRELIMINARY RECOVERY STRATEGY**

#### **A. RECOVERY PRIORITY NUMBER WITH RATIONALE**

The black pinesnake is assigned a recovery priority of 12, based on the moderate degree of threats to this subspecies and the low recovery potential. While the overall assessment is that black pinesnake habitat is still diminishing and degrading due to fragmentation and fire suppression, there are restoration efforts underway that have slowed down habitat loss from previously reported rates, reducing the high magnitude of this threat. However, the success of such restoration efforts has yet to be realized in regards to a positive response by black pinesnake populations, and converting habitat to a condition where a pinesnake population can thrive takes time. This snake is a large, powerful constricting snake that can grow up to 7 feet in length. Many of these efforts do not prioritize the objectives of creating and maintaining large, unfragmented tracts of suitable habitat (that may need to be as large as 5,000 acres to sustain a viable population) or minimizing subsurface disturbance that could potentially destroy the pinesnakes' underground refugia. Viable populations of black pinesnakes (that would be needed for recovery) need quite large, primarily unfragmented tracts of suitable habitat for eating, mating, and hibernation. Restoration of individual parcels is great and we will continue to pursue this opportunities because we believe a viable population of this very large snake may need thousands of acres. Therefore, the recovery potential is considered low for the black pinesnake at the present time because specific threats such as habitat degradation and road mortality are difficult to alleviate quickly, and endeavors undertaken to address these threats have an uncertain probability of success.

#### **B. RECOVERY STRATEGY**

Identify and monitor remaining suitable (or potentially suitable) habitat within the subspecies' range. Using available programs, in particular the Partners for Fish and Wildlife program, restore and maintain those habitats to the levels capable of maintaining a viable population of pinesnakes long-term. Monitor populations of black pinesnakes wherever possible within these habitats to track population status. Engage in conversations with partners, landowners and stakeholders to reduce and alleviate species' threats. Increase coordination with partners like NRCS and our States to specifically, work with partners to expand efforts of implementing recovery actions, and increasing public awareness and appreciation of rare snake species that need protection.

#### **C. INITIAL ACTION PLAN**

Initial recovery actions for the black pinesnake will primarily focus on protection of existing known habitat and monitoring. The black pinesnake requires multiple (redundancy), self-sustaining (resiliency) populations distributed across its gradient of genetic and ecological diversity (representation). Out of the gates, we do not know these parameters. Therefore, recovery actions to get to those aspects include:

- Evaluate with the research community what defines a viable black pinesnake population and what the minimum reserve size is to support a viable population.
- Investigate the necessary number and distribution of viable black pinesnake populations in suitable habitat such that the species would be considered secure.
- Identify, prioritize, protect, and manage viable black pinesnake populations and best remaining habitat. Increase the size and/or carrying capacity of those viable population areas (and areas with pinesnake populations just below the “viable” threshold) through applied land management, land acquisition, or incentives to adjacent landowners.
- Establish a well-documented, statistically robust method of evaluating black pinesnake populations, through road and pedestrian surveys and trapping methodology.
- Provide information and incentives to private landowners to manage their land for pinesnakes, possibly working with partners like NRCS (including all of their applicable programs) to offer higher cost-sharing for more aggressive habitat management.
- Working with partners/land managers, maximize the amount of acreage appropriately maintained by prescribed fire.
- Encourage the development and implementation of a model Safe Harbor Agreement or HCP (preferably one that is state-wide and programmatic) that details effective, measurable conservation objectives and habitat management goals.
- Quantify the benefits provided to this species by longleaf restoration efforts (both public and private) to carefully assess what is beneficial to the recovery of this species.
- Work with land managers and engineers to find erosion control alternatives to using the polypropylene mesh “blankets” known to entangle many species of snakes, causing lacerations and mortality.
- Work cooperatively with all appropriate partners including primarily the Alabama Department of Conservation and Natural Resources, and Mississippi Department of Wildlife, Fisheries, and Parks and also our State Forestry Commissions to restore pinesnake habitat and monitor pinesnake populations range-wide.
- Investigate the potential use of captive-reared or head-started black pinesnakes to augment a population or re-populate a previously occupied area to increase viability of the general population.

#### **IV. PRE-PLANNING PROCESS**

##### **A. PLANNING APPROACH**

First, a Species Status Assessment (SSA; [https://www.fws.gov/endangered/improving\\_ESA/ssa.html](https://www.fws.gov/endangered/improving_ESA/ssa.html)) will be prepared and then a recovery plan will be prepared for the black pinesnake. An SSA begins with a compilation of the best available information on the species (taxonomy, life history, and habitat) and its ecological needs at the individual, population, and/or species levels based on how environmental factors are understood to act on the species and its habitat. Next, an SSA describes the current condition of the species' habitat and demographics, and the probable explanations for past and ongoing changes in abundance and distribution within the species' ecological settings (i.e., areas representative of geographic, genetic, or life history variation across the range of the species). Lastly, an SSA forecasts the species' response to probable future scenarios of environmental conditions and conservation efforts. Overall, an SSA uses the conservation biology principles of resiliency, redundancy, and representation (collectively known as the "3Rs") as a lens to evaluate the current and future condition of the species. As a result, the SSA characterizes a species' ability to sustain populations in the wild over time based on the best scientific understanding of current and future abundance and distribution within the species' ecological settings. An SSA is in essence a biological risk assessment to aid decision makers who must use the best available scientific information to make policy decisions.

The recovery plan will include objective and measurable criteria which, when met, will ensure the conservation of the species. Recovery criteria will address all meaningful threats to the species, as well as estimate the time and the cost to achieve recovery. The SSA and the recovery plan will be coordinated by the Mississippi Ecological Services Field Office as the lead field office, with review by the Alabama Ecological Services Field Office. The draft recovery plan should be finalized and sent to the Regional Office for review in FY18, with the final recovery plan finalized and sent to the Regional Office for review by FY19. These timelines may be affected by available resources and regional priorities.

**B. STAKEHOLDER COMMENT**

During the recovery planning process, input, comments and review will be sought from multiple stakeholders within Mississippi and Alabama. These will include State and Federal agencies, industrial and agricultural groups, research universities, and conservation organizations.

Approve:  \_\_\_\_\_  
Assistant Regional Director, Region 4

Date: 4/11/17

### REFERENCES CITED

- Baxley, D.L. and C.P. Qualls. 2009. Black pine snake (*Pituophis melanoleucus lodingi*): Spatial ecology and associations between habitat use and prey dynamics. *Journal of Herpetology* 43:284-293.
- Duran, C.M. 1998. Radio-telemetric study of the black pine snake (*Pituophis melanoleucus lodingi*) on the Camp Shelby Training site. Report to the Mississippi Natural Heritage Program and the Mississippi National Guard. 44 pp.
- Yager, L., J. Lee, M. Hinderliter, and S. Leonard. 2005. 2005 Annual Report. The Nature Conservancy, Camp Shelby Field Office, Mississippi. 43 pp.