

Interim Core Map Documentation for Black Pinesnake

Version 1

Review Completed: April 2026

Core Map Developer: U.S. Environmental Protection Agency (EPA), Office of Pesticide Programs

Species Summary

The black pinesnake (*Pituophis melanoleucus lodingi*, Entity ID 6097) is an egg-laying, non-venomous constrictor that is endemic to the upland longleaf pine (*Pinus palustris*) forests that once covered southern Mississippi, southern Alabama, and southeastern Louisiana. The U.S. Fish and Wildlife Service (FWS) has designated a critical habitat for the black pinesnake. This species is typically found in sandy, well-drained soils with an open-canopied overstory of longleaf pine, a reduced shrub layer, and abundant herbaceous groundcover of southern Mississippi and southwest Alabama. Currently, 19 populations of the black pinesnake exist in Mississippi (13) and Alabama (6). Additional information on the species is provided in **Appendix 1**.

Description of Core Map

The core map for the black pinesnake is based on biological information. EPA created this core map using the critical habitat and the locations of known populations from FWS documents to encapsulate areas where the black pinesnake may occur.

Figure 1 depicts the resulting interim core map for the black pinesnake. The size of this core map is approximately 376,354 acres. Landcover categories within the core map area are included in **Table 1**. Landcover is predominantly evergreen forests.

The core map developed for the black pinesnake is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the black pinesnake. This core map incorporates information developed by FWS and made available to the public; however, the core map has not been formally reviewed by FWS. This interim core map may be revised in the future to incorporate species expert feedback from FWS. This interim core map has an “average” (3) best professional judgment classification to describe major uncertainties/limitations. The map is based on critical habitat and known locations described by FWS, and EPA removed some additional areas based on biological needs of the species.

This interim core map does not replace or revise any range or designated critical habitat developed by FWS for this species.

Table 1. Percentage of Interim Core Map Represented by NLCD¹ Land Covers and Associated Example Pesticide Use Sites/Types.

Example pesticide use sites/types	NLCD Landcover (Value)	% of core map represented by landcover
Forestry	Deciduous Forest (41)	0%
Forestry	Evergreen Forest (42)	61%
Forestry	Mixed Forest (43)	7%
Agriculture	Pasture/Hay (81)	3%
Agriculture	Cultivated Crops (82)	0%
Mosquito adulticide, residential	Open space, developed (21)	3%
Mosquito adulticide, residential	Developed, Low intensity (22)	1%
Mosquito adulticide, residential	Developed, Medium intensity (23)	0%
Mosquito adulticide, residential	Developed, High intensity (24)	0%
Invasive species control	Woody Wetlands (90)	15%
Invasive species control	Emergent Herbaceous Wetlands (95)	0%
Invasive species control	Open water (11)	1%
Invasive species control	Grassland/herbaceous (71)	3%
Invasive species control	Scrub/shrub (52)	5%
Invasive species control	Barren land (rock/sand/clay; 31)	0%
Total Acres	Interim Core Map Acres	376,354 Acres

Evaluation of Known Location Information

There are four datasets with known location information:

- Descriptions of locations provided by FWS
- Occurrence locations in iNaturalist
- Occurrence locations in NatureServe
- Occurrence locations in the Global Biodiversity Information Facility (GBIF)

EPA evaluated these sets of data before selecting the type of and developing the core map. FWS appeared to have the finest resolution of the location information, providing figures and a table of the 19 populations from 14 counties in southern Mississippi and 3 counties in southwestern Alabama (**Figure A1-3, Appendix 1**). The remaining occurrences in iNaturalist, GBIF, and NatureServe did not support further expanding the core map. **Appendix 1** includes more information on the available known location information.

¹ Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, <https://doi.org/10.5066/P9JZ7AO3>

Approach Used to Create Core Map

The core map was developed using the “Process EPA Uses to Develop Core Maps for Draft Pesticide Use Limitation Areas for Species Listed by the U.S. Fish & Wildlife Service (FWS) and their Designated Critical Habitats”² (referred to as “the process”). EPA developed the core map using the four steps described in the process document:

1. Compile available information for a species
2. Identify core map type
3. Develop the core map for the species
4. Document the core map

For step 1, EPA compiled available information for the black pinesnake from FWS, as well as observation information available from various publicly available sources (including iNaturalist, NatureServe, and GBIF). The information compiled for the black pinesnake is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- The critical habitat for the black pinesnake incorporates "open-canopied pineforest habitat, historically dominated by longleaf pine and maintained by frequent fires, a reduced midstory (<10 percent), and a diverse and abundant native herbaceous groundcover (>40 percent)" into its designated area.
- The critical habitat is inclusive of the FWS high to moderate resilience populations.
- The critical habitat excludes FWS low resilience populations.

For Step 2, EPA used the compiled information to identify the core map type including species range, critical habitat, and known location information. The extant populations are located within the species range, but not all extant populations are located within the critical habitat designation. Therefore, EPA based the core map on critical habitat and extant populations identified by FWS. Since the critical habitat was inclusive of the FWS high to medium resilience populations but not low resilience populations, Figure 3 from the FWS Five Year Review (2022) for the black pinesnake was georeferenced to apply buffered polygons to the populations outside the critical habitat. The entire range of the species was not used as the core map because the range contains habitats where the species does not occur.

For step 3, EPA used the best available data sources to generate the core map. Data sources are discussed in the process document. For this core map, EPA used the critical habitat and FWS known populations. **Appendix 2** provides more details on the GIS analysis and data used to generate the core map.

Discussion of Approaches and Data that were Considered but not Included in Core Map

The critical habitat alone was considered but was not selected as the core map because the critical habitat map did not include some known populations.

² Dated 2024, available online at: <https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas>

EPA also considered refining the core map by the Geographic Information System ([GIS layer for Longleaf Pine \(2019\)](#)). However, this refinement was not used in the creation of the black pinesnake core map because the critical habitat map already accounts for pine habitats. Further refinement by the Longleaf Pine layer would also not substantially decrease the acreage of the map because of its dense coverage in southern Alabama and Mississippi.

Appendix 1. Information Compiled for the Black Pinesnake

1. Recent FWS documents/links and other data sources

- Five Year Review (2022) - https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3884.pdf
- Recovery Plan (2023) - https://ecos.fws.gov/docs/recovery_plan/079681%2020230907_Black%20Pinesnake_Recovery%20Plan.pdf
- Critical Habitat Designation- <https://www.govinfo.gov/content/pkg/FR-2020-02-26/pdf/2020-02281.pdf#page=1>
- Species Status Assessments (SSAs; 2022) - <https://iris.fws.gov/APPS/ServCat/DownloadFile/231574>
- Threatened Species Status for Black Pinesnake With 4(d) Rule; Final Rule (2015)

2. Background information

- **Status:** Federally listed as threatened in 2015
- **Resiliency, redundancy, and representation** (the 3Rs)
 - **Resiliency:** “Although some black pinesnake populations had more recent records, they had a lower overall resilience due to a high degree of fragmentation and low availability of suitable habitat. Generally poor habitat conditions at many sites combined with small population sizes and low connectivity resulted in overall lower resilience ranks” (Five Year Review, 2022).
 - **Redundancy:** “Data suggest that the black pinesnake was once more broadly distributed; however, several factors including fire suppression, habitat conversion, and habitat degradation have resulted in loss and fragmentation of habitat and, presumably, populations. The distribution of resilient populations has become clustered as evidenced in the location of the post-1990 observation records of black pinesnakes (Figure 2). Resilient populations are primarily on protected public lands, leaving large portions of the range fragmented and unoccupied... Because most of the black pinesnake populations display low to moderate resilience and distribution is limited, current redundancy for the species is low” (Five Year Review, 2022).
 - **Representation:** “Current representation, as measured by the number and distribution of resilient populations across the current geographic range has decreased from historical conditions. To have high representation, the species should have highly resilient populations maximizing the species’ latitudinal and longitudinal extent... With few resilient populations across a contracted range, overall representation of the black pinesnake is currently low” (Five Year Review, 2022).
- **Habitat**
 - “Black pinesnakes are endemic to the upland longleaf pine (*Pinus palustris*) forests that once covered southern Mississippi, southern Alabama, and southeastern Louisiana. Habitat for these snakes historically consisted of sandy, well-drained soils with an open-canopied overstory of longleaf pine, a reduced shrub layer, and abundant herbaceous groundcover” (Recovery Plan, 2023).

- **Pollinator/reproduction**
 - Oviparous (lays eggs)
- **Taxonomy**
 - FWS Category: Reptile, *Colubridae* family
- **Relevant Pesticide Use Sites**
 - Pesticide use information was not mentioned within the FWS sources available at the time of documentation.
- **Recovery Criteria/Objectives** (Delisting criteria from Recovery Plan, 2023)
 - Recovery Priority Number: 12
 - At least nine geographically distinct black pinesnake populations occur across the species' range, with at least six in Mississippi and at least three in Alabama.
 - Monitoring demonstrates that these populations are viable, as evidenced by:
 - A population estimate of at least 50 black pinesnakes (or 25 female black pinesnakes)
 - Having stable or increasing population growth rates
 - Occurring on tracts of at least 5,000 acres (2,023.4 hectares) of mostly unfragmented upland pine forest habitat
 - Threats of habitat loss, degradation, and fragmentation are managed. Populations are protected via long-term conservation mechanisms and managed to promote open canopied upland pine habitat, native plant community integrity, and growth of black pinesnake populations.
- **Recovery Actions** (Recovery Plan, 2023)
 - Develop and implement survey and monitoring strategy for all populations
 - Obtain protections and/or conservation commitments and land acquisitions (when appropriate) for populations on privately-owned lands
 - Develop and implement management plans for all populations
 - Expand and prioritize prescribed fire programs, emphasizing recommendations on fire intensity, size, frequency, and seasonality
 - Facilitate and support surveys to identify new populations
 - Conduct and aid research to support population viability models, habitat suitability models, improved management strategies, radio-telemetry studies, and species/habitat distribution models
 - Identify potential interpopulation habitat corridor locations and secure agreements to protect and restore suitable habitat in those areas
 - Expand outreach efforts and identify innovative ways to increase public awareness of the need to protect this species and its habitat

3. Description of Species Range

- Figure A1-1 depicts the FWS range. The range was last updated on 3/4/2022.

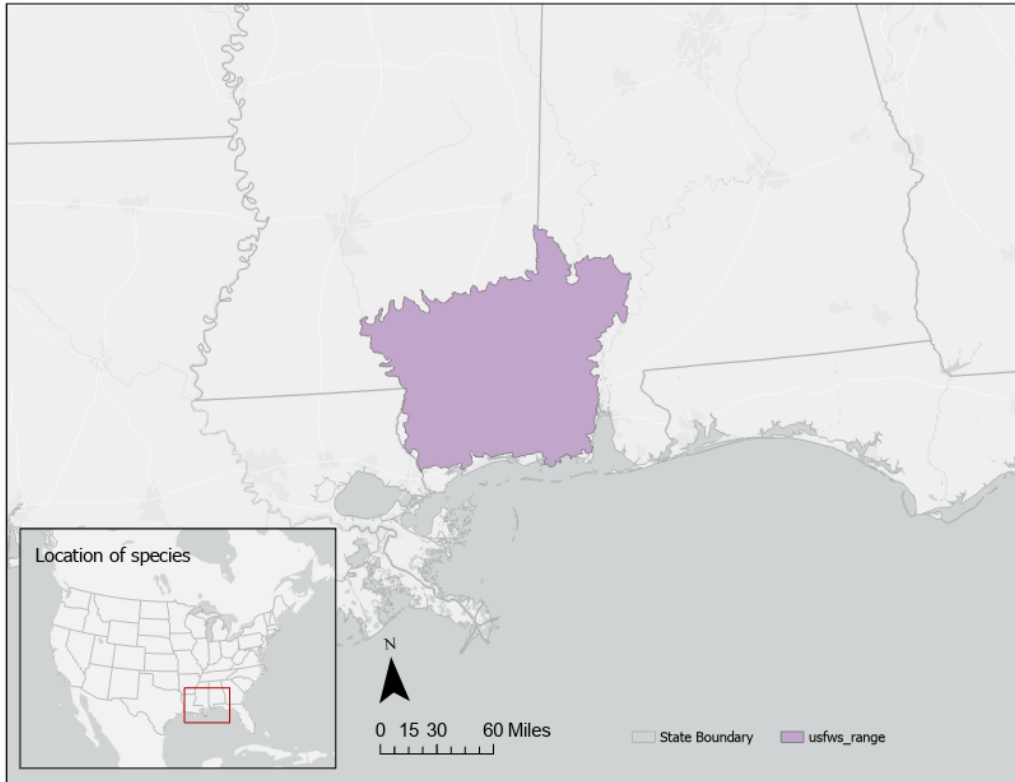


Figure A1-1. FWS range for the black pinesnake. The total acreage is around 6,890,015 acres.

4. Critical Habitat

- “Approximately 324,679 acres (131,393 hectares) in Forrest, George, Greene, Harrison, Jones, Marion, Perry, Stone, and Wayne Counties, Mississippi, and in Clarke County, Alabama, fall within the boundaries of the critical habitat designation” (Critical Habitat Designation, 2020).
- The Physical or Biological Features (PBFs) essential to the conservation of the species:
 - “1) A pine forest, historically dominated by longleaf pine and maintained by frequent fire, primarily having an open canopy that sustains a reduced woody mid-story and abundant, diverse, native herbaceous groundcover;
 - 2) Tracts of at least 5,000 acres (2,023.4 hectares) of mostly unfragmented forested habitat to support the large home ranges and long-range movements of black pinesnakes;
 - 3) Naturally burned-out or rotted-out pine stump holes and their associated root system tunnels, which represent their primary shelter; and
 - 4) Deep, sandy, well-drained soils with characteristics such as low flooding potential, low gravel composition, deep seasonal water table, and low clay content” (Recovery Plan, 2023).

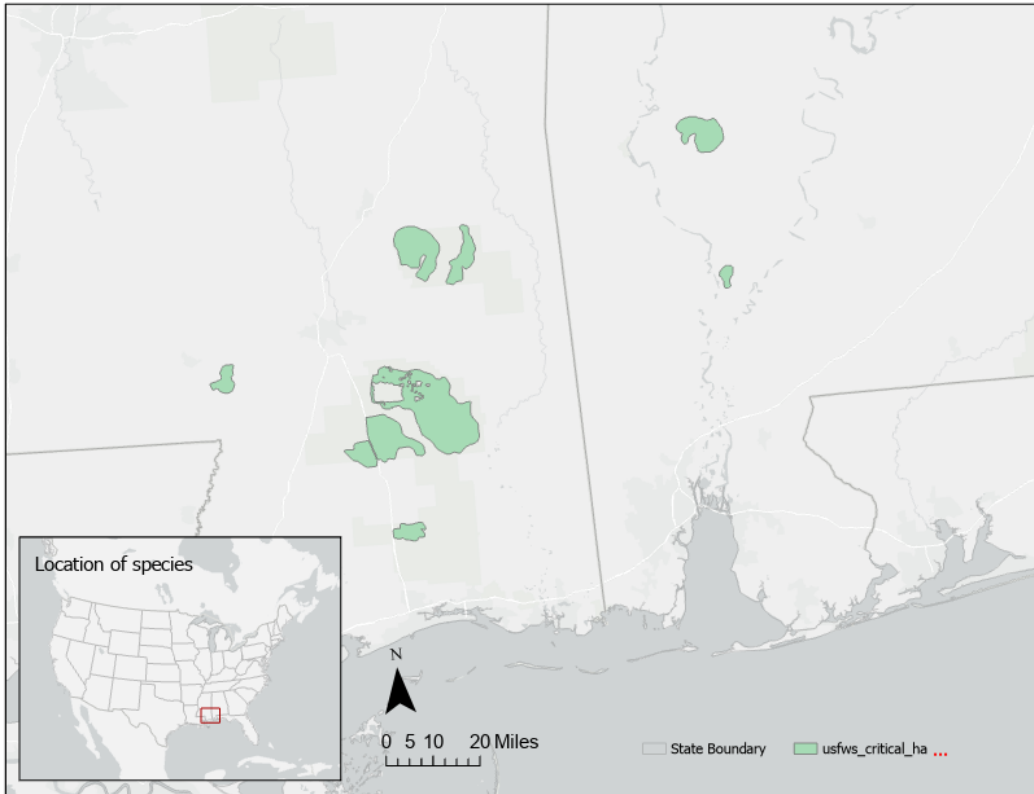


Figure A1-2. FWS critical habitat for the black pinesnake. The total acreage is around 324,679 acres.

5. Known Locations

- **Occurrences in FWS Five Year Review (2022)**

- “There are 19 extant black pinesnake populations [post-1990 records] across the current range: 13 in Mississippi and 6 in Alabama”. This species has been extirpated from Louisiana.
- “Populations extended across the geographic range of the species, occurring in 12 of the 16 counties known to have black pinesnake records”.
- “Data sources for black pinesnake locations included the Alabama Department of Conservation and Natural Resources; Alabama Natural Heritage Program; Mississippi Department of Wildlife, Fisheries, and Parks Natural Heritage Program; verifiable online species tracking websites (www.inaturalist.org); and peer reviewed scientific literature”.

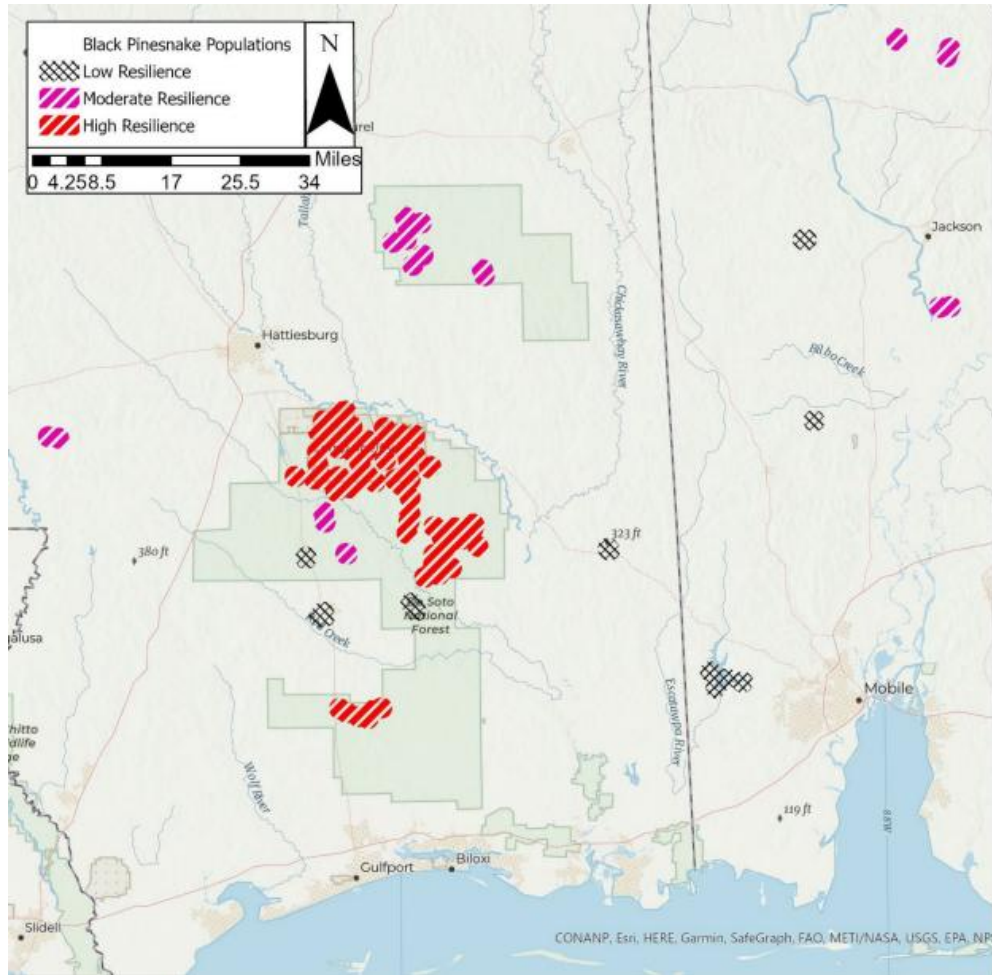


Figure A1-3. 19 extant black pinesnake populations distributed by low, moderate, and high resilience (Figure 3 in FWS Five Year Review, 2022).

- **Occurrences Included in Public Databases** (EPA queried iNaturalist, GBIF, and NatureServe on 09/30/2025)
 - iNaturalist (available [here](#)) had 42 research grade observations from 1995-2025 for this species. 34 of these results included coordinates within the species range when accounting for positional accuracy, the other 8 results were marked as private.
 - GBIF (available [here](#)) included 107 present human observations and occurrences from 1932-2025 in the USA. Only 19 of these results included coordinates. All 19 observations were within the species range when accounting for positional accuracy and were documented from 2003-2025. These 19 occurrences are also in iNaturalist.
 - Occurrences in NatureServe (linked [here](#)) were consistent with other occurrence data.

Appendix 2. GIS Data Review and Method to Develop Core Map

This core map was created based on biological information, including occupied location and species habitat.

1. Dataset References and Software

- FWS Species Range from Environmental Conservation Online System (ECOS) (available [here](#)) - last updated on 3/4/2022
- FWS Species Critical Habitat from ECOS (download available [here](#)) - last updated on 2/26/2020
- FWS Five Year Review 2022 (available [here](#))
- Modified Cultivated Layer by OCSPP's Office of Pesticide Program (available [here](#))- last updated 12/16/2024
- National Land Cover Database (NLCD) 2021 (available [here](#))
- Software used: ArcGIS Pro 3.5.3

2. Datasets Used in Core Map Development

All datasets used in core map development are described in EPA's process document.

3. Core Map Development

EPA started with the designated critical habitat compared to FWS extant populations and other occurrence data sources including iNaturalist, GBIF and NatureServe. Since the critical habitat was inclusive of the FWS-identified high to medium resilience populations but not low resilience populations, Figure 3 from the FWS black pinesnake Five Year Review (2022) was georeferenced to apply buffered polygons to the populations outside the critical habitat.

- Add the FWS critical habitat shapefile.
- Georeference FWS Five Year Review (2022) Figure 3 using critical habitat, roads, and water bodies.
- Draw polygons around the low resilience populations in FWS Figure 3. Apply a 200 m buffer to these polygons to account for misalignments.
- Remove cultivate lands because cultivated areas fragment the black pinesnake's habitat.

This area is also representative of other occurrence data sources including iNaturalist, GBIF and NatureServe when accounting for location uncertainty/positional accuracy. The core map files are in "BlackPinesnake_CoreMap.ppkx".