

**Louisiana Pinesnake
(*Pituophis ruthveni*)**

**5-Year Status Review:
Summary and Evaluation**



Photo by: LDWF/Charles Battaglia

**U.S. Fish and Wildlife Service
Southeast Region
Louisiana Ecological Services Office
Lafayette, Louisiana**

September 2023

STATUS REVIEW
Louisiana pinesnake (*Pituophis ruthveni*)

GENERAL INFORMATION

Current Classification: Threatened

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Cooperating Regional Office(s): Albuquerque Regional Office, Angela Anders, 505-218-3367.

Date of original listing: April 6, 2018 (83 FR 14958); Effective Date: May 7, 2018

Critical Habitat/4(d) rule: 4(d) rule final rule: February 27, 2020 ([85 FR 11297](#)); Critical habitat proposed rule: October 6, 2022 ([87 FR 60580](#))

Methodology used to complete the review:

In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the List of Threatened and Endangered Wildlife and Plants ([50 CFR 424.11](#)). The U.S. Fish and Wildlife Service (Service) evaluated the biology, habitat, and threats of the Louisiana pinesnake to inform this status review.

In conducting this 5-year review, the Service relied on the best available information pertaining to historical and current distributions, life history, ecology, and habitat of this species. Much of the information contained herein is taken from a Species Status Assessment (SSA, Service 2022) that was developed to inform the development of a draft Recovery Plan for Louisiana pinesnake, this 5-year review, and other Endangered Species Act documents. In addition to the Service, the core team responsible for the SSA included species experts from state and federal agencies such as Texas Parks and Wildlife, Texas A&M Natural Resources Institute, Louisiana Department of Wildlife and Fisheries, and U.S. Forest Service. The SSA represents our evaluation of the best available scientific information, including the resource needs and the current and future condition of the species. Independent peer

reviewers and partner representatives reviewed the SSA. Other sources for this status review include the final listing rule, published and unpublished reports and field observations, and personal communications from recognized experts in the field. We published an announcement in the Federal Register requesting information on this species on May 13, 2022 ([87 FR 29364](#)), and a 60-day comment period was opened. In response, we received comments from the National Council for Air and Stream Improvement, Inc. A completed draft of this 5-year review was sent to other affected Service offices in the species' range for review and comment. Comments received were evaluated and incorporated into this final document as appropriate.

The SSA is a peer-reviewed document that represents our evaluation of the best available scientific information regarding the biology, life history, and condition of the species. Because we have not received significant new information affecting the status of the species since the SSA was written, the level of public interest is low and non-controversial; thus, no peer review on this 5-year review was conducted.

FR Notice citation announcing the species is under active review: May 13, 2022 ([87 FR 29364](#))

Species' Recovery Priority Number at start of 5-year review ([48 FR 43098](#)): 8C. At the time of the listing, the Louisiana pinesnake was determined to be a species with a moderate degree of threat and a high recovery potential.

Review History: This is the first 5-year status review for this species.

REVIEW ANALYSIS

Listed Entity

Taxonomy and nomenclature

The Louisiana pinesnake is recognized as a valid taxon in the Integrated Taxonomic Information System (ITIS) database (ITIS 2023). We are not aware of any changes to the taxonomy of this entity, and it is still considered valid by the Service.

Distinct Population Segment (DPS) ([61 FR 4722](#))

The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This species was not listed as a DPS, and we have no new information that would indicate the species should be listed as a DPS under the Service's 1996 DPS Policy.

Recovery Criteria

Recovery Plan or Outline

Recovery Outline for the Louisiana pinesnake (*Pituophis ruthveni*), April 2018. (Service 2018c)

At the time of this review, recovery criteria for this species have not been finalized.

Biology and Habitat Summary

The Louisiana pinesnake is historically known to occur in portions of northwest and west-central Louisiana and extreme east-central Texas, an area coinciding with the most westerly occurrence of the historical longleaf pine (*Pinus palustris*) ecosystem situated west of the Mississippi River. Habitat requirements for the Louisiana pinesnake are ecologically tied to the presence of viable populations of their primary prey, the Baird's pocket gophers (*Geomys breviceps*; hereafter, pocket gophers). The Louisiana pinesnake is considered extirpated from significant portions of its historical range; however, the species is considered to occur in six natural populations located in four parishes in Louisiana and three counties in Texas, as well as a seventh introduced population in Louisiana founded from individuals produced from a captive propagation program. Those populations occur in seven distinct estimated occupied habitat areas (EOHAs), all which are small and isolated from each other (Figure 1).

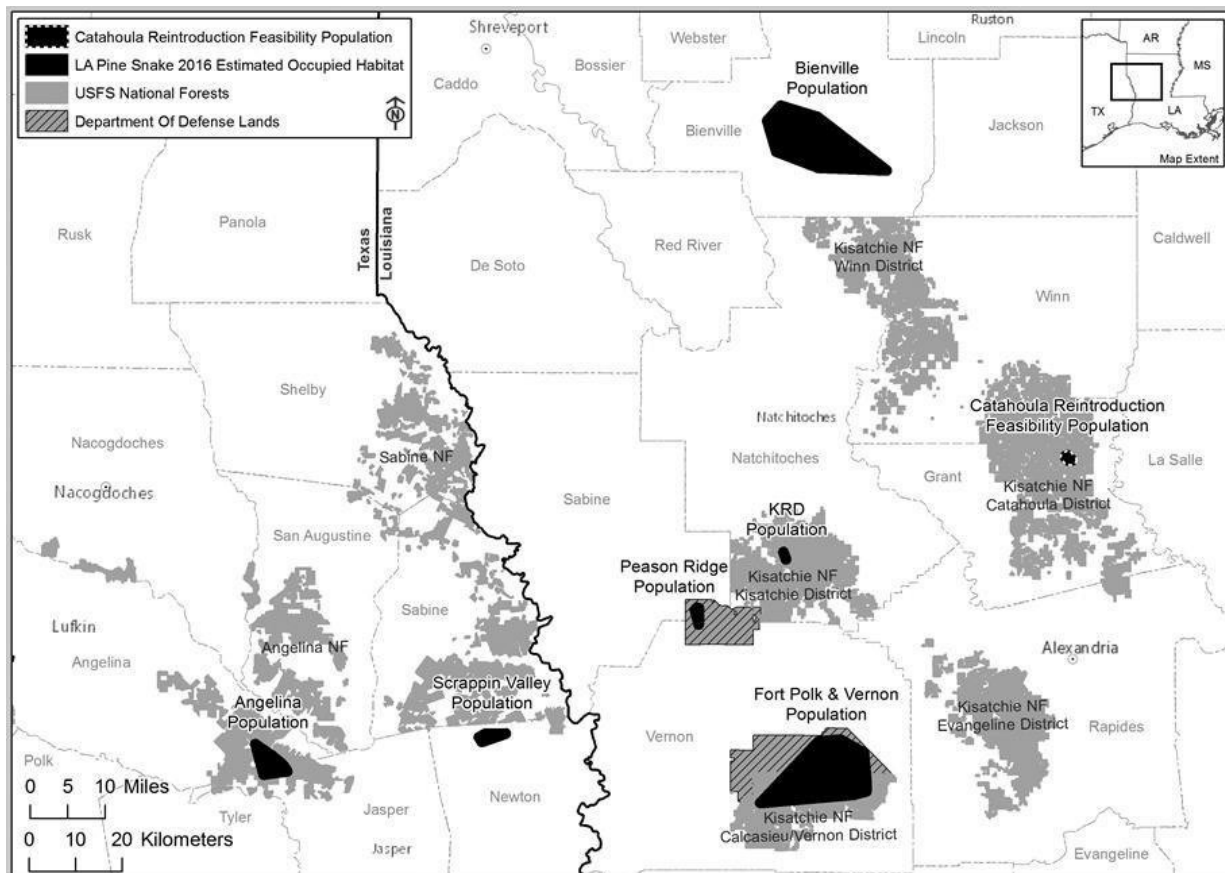


Figure 1. Estimated Occupied Habitat Areas for Louisiana pinesnake, 2016.

In the SSA, the current condition of each EOHA was assessed by examining Louisiana pinesnake presence/abundance, habitat quality, and habitat connectivity. The analysis resulted in a condition score for each EOHA that was used to evaluate the species based on three aspects of population ecology:

Resilience was assessed at the EOHA level and describes the ability of a species to withstand stochastic disturbance. Resilient populations are better able to withstand disturbances, such as random fluctuations in birth rates (demographic stochasticity), variations in rainfall

(environmental stochasticity), or the effects of anthropogenic activities. The SSA evaluated the Louisiana pinesnake using presence/abundance, habitat quality, and habitat connectivity to develop a resilience score for each EOHA (Service 2022, pp. 43-56). Based on these factors, there are three EOHAs with low resilience (Bienville, Fort Polk/Vernon, and Catahoula Reintroduction), four EOHAs with very low resilience (Kisatchie, Peason Ridge, Scrappin' Valley, and Angelina), and two EOHAs that are potentially extirpated (Table 1). The scores for the Land Management and Habitat factors show that current habitat quality for the species is not the leading limiting factor for the species. Also note that the Land Management score is calculated from the percentage of the EOHA that is under forest management considered beneficial to the species. In the case of the score of Poor for the Bienville EOHA, that does not mean that there are not relatively large areas under beneficial management (including private commercial timber lands enrolled in the Programmatic Candidate Conservation Agreement with Assurances for the Louisiana Pinesnake [Service 2018a]), but as a percentage of the entire EOHA it is inadequate. Occurrence data collected by the box trapping method used since trapping began in the 1990s has shown a decline in captures in three populations since the species was listed in 2018. However, we believe this was because of reduced trapping effort in those EOHAs during that time due to the Covid-19 pandemic, resource limitations, and other reasons. In contrast, detections by cameras deployed at the Bienville EOHA increased compared to box trap captures during the same period (2022, Louisiana Department of Wildlife and Fisheries unpublished data). Therefore, we believe that the abundance in most populations has remained similar to that at the time of listing, and the resiliency scores were not adjusted. The Catahoula Reintroduction population has been augmented through annual releases of captive-bred Louisiana pinesnakes since the species was listed for a total of approximately 300 individuals between 2019 and 2023 (2023, U.S. Forest Service unpublished data). Snake detections in the Catahoula Reintroduction population have been consistent and offspring of captive-bred parents have hatched in the wild. That population is still considered low abundance because we do not have a robust abundance estimate.

Representation describes the adaptive capacity, or ability of a species to adapt to changing environmental conditions over time and is characterized by the breadth of genetic and environmental diversity within and among populations. There is no evidence to suggest the differences in genetic structuring using the Red and Sabine rivers as boundaries are ecologically or functionally important; therefore, the SSA did not assess representative units (Service 2022). Regardless of the apparent lack of any major regional differences among populations, the representation of Louisiana pinesnakes has likely decreased greatly due to the reduction in numbers of wild individuals and the loss of populations, likely leading to loss of genetic diversity.

Redundancy describes the ability of a species to withstand catastrophic events (a rare destructive event or episode involving several populations or subpopulations). In the SSA, it is shown that the redundancy of the Louisiana pinesnake is likely greatly reduced from historical levels, with having only seven potential populations, all having low resiliency and two or three of which may have already been extirpated (Service 2022). Should a catastrophic disturbance occur, such as intense drought, high-severity wildfire, or a disease that could eliminate one or more of the seven populations, the species would be negatively impacted.

Table 1. Summary of the current status of each of the seven Louisiana pinesnake populations (Estimated Occupied Habitat Areas (EOHAs)), including overall resiliency score. Scores for each category are provided as numbers in brackets “[]” after the category. (EOHA abbreviations: B = Bienville, K = Kistachie, PR = Peason Ridge, FP/V = Fort Polk/Vernon, CR = Catahoula Reintroduction, SV = Scrappin’ Valley, and A = Angelina; Categories for the populations size of PE = Potentially Extirpated). Details related to species information can be found in the Species Status Assessment Report (Service 2022).

State	EOHA	EOHA size	Population Size/ Abundance	Land Management	Habitat	Connectivity	Fragmentation	Resiliency Score
LA	B	Large [3]	Low [1.0]	Poor [1]	Moderate [2]	None [0]	Good [3]	Low [1.86]
LA	K	Small [1]	PE [0.1]	Good [3]	Good [3]	None [0]	Good [3]	Very Low [0.20]
LA	PR	Small [1]	Very Low [0.5]	Moderate [2]	Moderate [2]	None [0]	Good [3]	Very Low [0.79]
LA	FP/V	Large [3]	Very Low [0.5]	Good [3]	Good-Mod [2.5]	None [0]	Moderate [2]	Low [1.18]
LA	CR	Small [1]	Low [1.0]	Good [3]	Good [3]	None [0]	Good [3]	Low [2.00]
TX	SV	Small [1]	Very Low, PE [0.3]	Moderate [2]	Mod-Low [1.5]	None [0]	Moderate [2]	Very Low [0.41]
TX	A	Moderate [2]	PE [0.1]	Good [3]	Moderate [2]	None [0]	Good [3]	Very Low [0.21]

Based on our evaluation of the resiliency, redundancy, and representation of the Louisiana pinesnake populations, the estimated viability of the species has remained relatively stable since the time of listing. To assess the future projected viability of the species, five future scenarios were assessed to consider the effects of the reintroduction program and potential habitat condition in and around each EOHA (Service 2022). Although the current condition is defined by low abundance and few natural populations that are all declining or likely to decline in the future, reintroduction or augmentation with captive snakes in unoccupied areas and existing populations is expected to increase resiliency for the species. Resiliency would be even more likely to increase when reintroduction/augmentation is combined with habitat improvement. The continuation of reintroduction, implementation of population augmentation, and increased habitat management will be necessary to increase the redundancy and resiliency of the species.

Threats (Five-Factor Analysis) Summary

The status of a species is determined from an assessment of factors specified in section 4 (a)(1) of the Act, including: Factor A: the present or threatened destruction, modification, or curtailment of its habitat or range; Factor B: overutilization for commercial, recreational, scientific, or educational purposes; Factor C: disease or predation; Factor D: the inadequacy of existing regulatory mechanisms; Factor E: other natural or manmade factors affecting its continued existence. A summary of this assessment is detailed below.

Habitat loss and fragmentation of the historical longleaf dominated forest (Factor A; Service 2018b) have contributed to the range-wide declines in the Louisiana pinesnake populations. Conversion to incompatible silviculture, exclusion of fire, and lack of adequate forest management in the historic range of the species has led to significant habitat declines including loss of herbaceous vegetation that supports pocket gophers, a food source for the species (Wagner et al. 2014, Service 2023). Currently, there are many areas of suitable forest available that could support Louisiana pinesnakes. While the amount of forest suitable and accessible to the species is still not comparable to pre-colonial times, it does not seem to be the major factor limiting populations at this point.

We have no indication at this time that overutilization for commercial, recreational, scientific, or educational purposes (Factor B) poses a significant threat for the species.

For Factor C, the SSA (Service 2022) discusses predation of Louisiana pinesnakes by native and introduced predators such as raccoons, hawks, other snakes, feral hogs, red fire ants, and persecution by humans. With the restricted distribution, low population sizes, and low reproductive potential of the species, predation is still expected to negatively affect Louisiana pinesnake populations. Certain populations of wild snakes are seeing an emergence of snake fungal disease, a disease that has been linked to morbidity and mortality for other species. Evidence of the disease has been documented on at least three individual Louisiana pinesnakes (Sperry 2017 pers. comm.; Sperry et al. 2021; Service 2022) This disease could potentially negatively affect populations of the Louisiana pinesnake, but so far effects have been limited to just a few individuals.

For Factor D, the final listing rule and recent SSA (Service 2018b, 2022) reviews the laws and regulations that are most relevant to the Louisiana pinesnake and its habitat. The State of Texas listed the species as threatened under 31 Texas Administrative Code (TAC) sections 65.171-176

and prohibits unauthorized collection, while the unpermitted killing or removal of the Louisiana pinesnake from the wild is prohibited under Louisiana Administrative Code, title 76, part XV, Reptiles and Amphibians, chapter 1, section 101.J.3(f). The collection or harassment of the species is specifically prohibited on U.S. Forest Service (USFS) properties in Louisiana. Without a special permit, the capture, removal, or killing of non-game wildlife from Fort Johnson (nee Fort Polk) and Peason Ridge (Department of Defense land) is prohibited. In 2003, a candidate conservation agreement for the Louisiana pinesnake, which includes the Service, USFS, Department of Defense, Texas Parks and Wildlife, and Louisiana Department of Wildlife and Fisheries (LDWF) was completed. This Agreement was revised in 2013 to also include the U.S. Department of Agriculture Natural Resources Conservation Service, and Association of Zoos and Aquariums. A candidate conservation agreement with Assurances was developed and finalized by the Service and LDWF in 2018 to facilitate conservation by giving non-Federal property owners incentives to implement conservation measures. Although the existing regulatory mechanisms are adequate in protecting individuals across the range and offer some protections to habitat on publicly and some privately owned land, they do not protect the Louisiana pinesnake from threats, including habitat loss and fragmentation.

For Factor E, the Louisiana pinesnake remains threatened by its small, genetically compromised, isolated populations that could be negatively affected by any mortality, including road and off-road vehicle strikes (Service 2018b, 2022a). Roads and rights-of-way construction also further increase habitat fragmentation. Erosion control blankets that cause entanglement placed in road and pipeline rights-of-way are additional potential threats. In addition to these threats, climate change has a potential to change habitat through increased temperatures and decreases in summer precipitation (Frankson et al. 2022, Runkle et al. 2022).

Synthesis

The Louisiana pinesnake is a large, short-tailed, non-venomous, constricting snake currently found in open canopy pine-dominated ecosystems in west-central Louisiana and East Texas. While the species is considered extirpated from a significant portion of its historical range, it continues to occupy six natural populations in four parishes in Louisiana and three counties in Texas, as well as a seventh population founded from individuals produced from a captive propagation program. The seven populations are represented by seven distinct Estimated Occupied Habitat Areas, which are small and isolated from each other and have low or very low resilience. Representative units for the Louisiana pinesnake were not assessed but is assumed that current representation is low because of earlier range contraction and loss of individuals. The redundancy of the species is greatly reduced from historical levels due to the Louisiana pinesnake only having seven potential populations, all of which have low resiliency and two or three which may have already been extirpated. Based on our evaluation of the resiliency, redundancy, and representation of the Louisiana pinesnake populations, the estimated viability of the species has remained approximately the same since the time of listing. The species continues to be subjected to habitat loss and fragmentation, predation, disease, and mortality associated with road and off-road vehicles. These threats and their effect on the Louisiana pinesnake are exacerbated by small, isolated populations which reduces resilience to any possible catastrophic events. Because of ongoing threats and the current condition of the species, this species continues to meet the definition of a threatened species.

RECOMMENDED FUTURE ACTIVITIES

This species does not have a final recovery plan. While completing this status review, we have identified the following potential recovery activities which are included below that should be prioritized for the recovery of the species.

Recovery Activities

- Protect and manage Louisiana pinesnake habitat in the following priority if possible:
 - (1) currently occupied or designated critical habitat,
 - (2) strategically located near existing populations and currently suitable but unoccupied,
 - (3) strategically located near existing populations and currently unsuitable, but potentially suitable if beneficial management applied.
- Support and expand the captive breeding program, including increasing novel genes and overall diversity in the captive population, reintroduction to create new populations, and population augmentation for the Louisiana pinesnake across its range according to the USFWS Controlled Propagation and Reintroduction Plan.
- Provide support and funding for longleaf pine restoration and prescribe burning in upland pine and associated habitats within and adjacent to the delineated EOHA on private and Federal lands.

Monitoring and Research Activities

- Conduct or fund research to aid recovery efforts for the Louisiana pinesnake and apply adaptive management where appropriate.
- Continue, refine, and expand a monitoring (presence, abundance, condition, health, etc.) protocol for the Louisiana pinesnake and its habitat to allow future assessment of population viability.
- Expand public outreach and education efforts for youth, hunters, and outdoors enthusiasts about all aspects of the recovery actions.
- Identify potential interpopulation habitat corridor locations and secure agreements to protect and restore suitable habitat in those areas.

REFERENCES

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RESULTS / SIGNATURES

U.S. Fish and Wildlife Service Status Review of Louisiana Pinesnake

Status Recommendation:

On the basis of this review, we recommend the following status for this species. A 5-year review presents a recommendation of the species status. Any change to the status requires a separate rulemaking process that includes public review and comment, as defined in the Act.

- Downlist to Threatened
- Uplist to Endangered
- Delist:
 - The species is extinct*
 - The species does not meet the definition of an endangered or threatened species*
 - The listed entity does not meet the statutory definition of a species*
- No change needed

FIELD OFFICE APPROVAL:

Field Supervisor, Louisiana Ecological Services Field Office, Fish and Wildlife Service

Approve _____

LEAD REGIONAL OFFICE APPROVAL:

Acting for Assistant Regional Director – Ecological Services, Fish and Wildlife Service

Approve _____

COOPERATING REGIONAL OFFICE APPROVAL:

We emailed this 5-year review to the Southwest Regional Office for their concurrence prior to finalizing the document. We will retain any comments that we received, as well as verification of concurrence from other regions, in the administrative record for this 5-year review.