

# Pine Barrens Treefrog

*Hyla andersonii*



Photograph by Kevin Enge, FWC.

## Species Overview

**Status:** Removed from Florida's Endangered and Threatened Species List.

### Current Protections

- 68A-4.001, F.A.C., General Prohibitions and Requirement – Prohibits the take, transport, sale, and possession of wildlife.
- 68A-1.004, F.A.C., Take – The term take shall include taking, attempting to take, pursuing, hunting, molesting, capturing, or killing any wildlife or freshwater fish, or their nests or eggs by any means whether or not such actions result in obtaining possession of such wildlife or freshwater fish or their nests or eggs.
- 68A-26.002, F.A.C., Regulations relating to the Taking of Amphibians – No intentional take by any means or possession is allowed of ... the Pine Barrens treefrog (*Hyla andersonii*) except as authorized by permit from the Executive Director as provided in rule [68A-9.002, F.A.C.](#), relating to the permitting to take wildlife or freshwater fish for justifiable purposes.

## 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 Pine Barrens treefrogs, and the threats faced by the species.

Adult Pine Barrens treefrogs have bright green dorsal skin and white-to-gray ventral coloration. A plum-to-brown line separating the dorsal and ventral surfaces begins at the nostril and extends through the eye to the animal's feet. Yellow spots are present behind the forearms, hind legs, and on the groin. Males have a darker throat than females. In Florida, adults average 3.1 to 4.1 cm (1.3 to 1.6 in; Moler 2019), with females being slightly larger than males. Males call from February through September (Means 1992, Moler 2019). The species call resembles a series of quick "quacks". Pine Barrens treefrogs have a long breeding season that spans the spring and summer. Females will disperse 200 (Florida estimate; Means and Longden 1976) to 1,000 (non-Florida estimate; Wright and Wright 1949) eggs on the bottom of isolated bog pools. Eggs hatch in 3 to 4 days. Larvae a drab olive color with dark spotting above and have cream-greenish-yellow bellies. There is a dark stripe along the top of the tail musculature. In Florida, larvae complete metamorphosis by the end of September (Means 1992). Adults can migrate over 100 m (328 ft; maximum known distance 105 m, 344 ft) from seasonal breeding pools to surrounding habitats (Freda and Gonzalez 1986).

Pine Barrens treefrogs occur in three disjunct groups within the eastern United States. The northernmost group is restricted to the central New Jersey Pine Barrens, a second group is restricted to the North Carolina Coastal Plain and Fall Line sandhills of North and South Carolina, and the southernmost group is restricted to the western Florida Panhandle and adjacent counties in Alabama ([see map](#)). The species has been recorded at about 200 sites in Florida. Sites in this context are defined as 88 locations, or geographically distinct areas, in which a single threatening event can rapidly affect all individuals of the species (FWC 2013). Pine Barrens treefrogs in Florida are found in Holmes, Okaloosa, Santa Rosa, and Walton counties in the Florida Panhandle (Moler 1981). This species occurs on two major conservation areas, Eglin Air Force Base and Blackwater River

State Forest, as well as limited private lands. In Florida, the Pine Barrens treefrog is restricted to acidic bogs and seepage slopes within sandhills and upland pine forests. Suitable bogs are characterized by carnivorous plant growth including sundews (*Drosera* spp.) and pitcher plants (*Sarracenia* spp.; Means 1992). Black titi (*Cliftonia monophylla*) and swamp titi (*Cyrtilla racemiflora*) are the most common native shrubs in their habitat (Means and Longden 1976). Fire is important to this ecosystem as a natural disturbance mechanism that reduces and removes hardwood encroachment (Means and Moler 1978). Further background information pertaining to the Pine Barrens treefrog may be found in the [Pine Barrens Treefrog Biological Status Review Report](#) (FWC 2011) and [A Species Action Plan for the Pine Barrens Treefrog](#) (FWC 2013).



*Pine Barrens treefrogs are found in acidic bogs and seepage slopes in Florida. Photograph by Kevin Enge, FWC.*

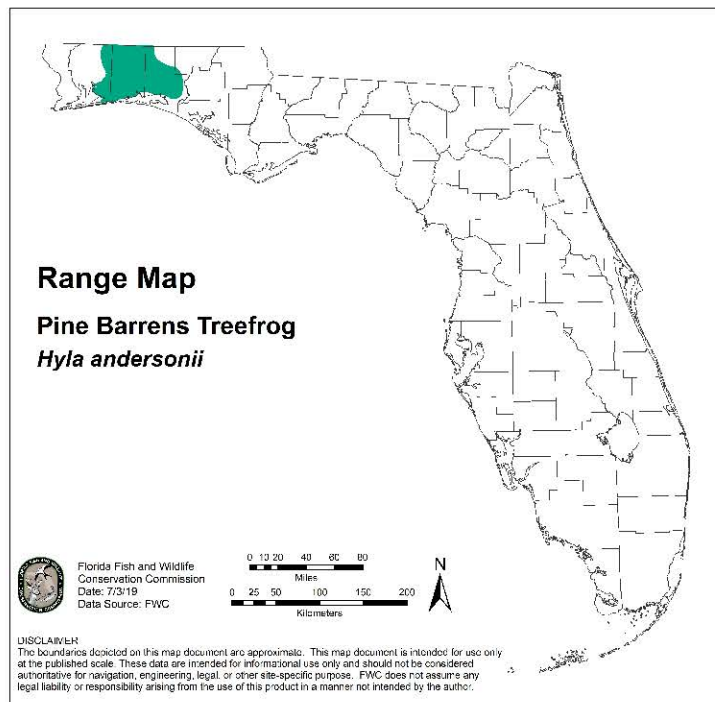
### Threats

Amphibians face many complex challenges threatening their survival, including habitat loss, climate change, emergence of invasive species, overexploitation for the pet trade, and diseases. The chief threat to the Pine Barrens treefrog in Florida is habitat conversion, either from anthropogenic development, or transition to unsuitable hardwood forest habitat due to fire suppression or improper fire management (FWC 2011). Improper fire management, such as burning during conditions that are cooler and wetter than those that compliment historically occurring natural fires, may lack the intensity to adequately suppress vegetative succession. Encroachment of hardwood vegetation into seepage bogs can reduce available moisture through increased evapotranspiration. Altered stream hydrology, including changes to water flow by the creation of impoundments, can inundate streamside breeding habitats. Pine Barrens treefrogs are sensitive to changes in water chemistry and levels of acidity. Activities that create increased sediment loads or increase runoff into streams can directly harm the species and will degrade habitat.

### Distribution and Survey Methodology

The range map (right) represents the principal geographic range of the Pine Barrens treefrog, including intervening areas of unoccupied habitat. This map is for information purposes only and not for regulatory use.

**Counties:** Holmes, Okaloosa, Santa Rosa, Walton.



## Recommended Survey Methodology

Surveys, though not required, can be used to determine if Pine Barrens treefrogs are present in an area. The presence of Pine Barrens treefrogs is most easily determined by detecting calling males during the breeding season (March through late-September). Examples of Pine Barrens treefrog calls may be found on the [USGS Patuxent Wildlife Research Center webpage](#). In Florida, the species calls most reliably from April through July. Calls can be detected by simple pedestrian or driving surveys, or by using electronic recording devices (e.g., frog call loggers). Given that the goal of surveys is to detect the species, the Florida Fish and Wildlife Conservation Commission (FWC) recommends auditory surveys during appropriate weather conditions (see below) to determine presence. The objective of the surveys is to document the occurrence of the Pine Barrens treefrog; thus, if frogs are detected on the first survey date, there is no need to continue surveys. Call-based detection surveys are most often non-invasive and typically do not require a permit from FWC. However, surveys that require handling of the species (e.g., trapping, dip netting) will require a permit and should be conducted in coordination with FWC. Suggested Pine Barrens treefrog survey protocol, including a sample data sheet, are included in Appendix 2 of [A Species Action Plan for the Pine Barrens Treefrog](#) (FWC 2013).

- All surveys should follow standard amphibian disinfection protocols. A list of suitable procedures can be found at [salamanderfungus.org](#).
- Surveys should be conducted:
  - Within earshot of suitable Pine Barrens treefrog habitat.
  - At least 3 times during suitable survey conditions within peak breeding season (April through July) to maximize the chance of hearing calling males.
  - At least 30 minutes after sunset and be completed by 1:00 A.M.
- Surveys may be conducted in light rain.
- Surveys should not be conducted:
  - During periods of heavy rain, wind (> 10 mph), or cool temperatures (< 65° F).
  - During periods with prolonged or loud noises (e.g., low flying aircraft) which can cause frogs to momentarily stop calling.

Visual surveys for adults, tadpoles, and egg masses can also document species presence. Surveys for actual frogs are typically performed in conjunction with scientific studies. These surveys should be designed in coordination with FWC; see Permits for Justifiable Purposes and [scientific collecting](#).

## Recommended Conservation Practices

Recommended Conservation Practices are general measures that could benefit the Pine Barrens treefrog but are not required. No FWC permit is required to conduct these activities. Because few studies have examined specific land management strategies for the Pine Barrens treefrog, general methodology has been adapted from Florida bog frog guidelines written by Jackson (2004).

- Develop and implement a prescribed fire regime in suitable or occupied habitat and surrounding uplands during the growing season (Enge and Moler 2016).
  - Growing season burns (May through September) conducted at least every 4 years are ideal because they mimic historical fire regimes and are more effective than winter burns at controlling woody vegetation (Means 2006).
  - If growing season burns are not feasible due to high fuel loads, biannual dormant-season burns can be used to reduce fuel loads before implementing the recommended burn schedule.

- Fire breaks should not be installed through sites where Pine Barrens treefrogs occur, or between breeding sites and adjacent uplands because they would prevent fires originating in the uplands from burning downslope into seepage areas (FWC 2013).
- Thin dense pine forests; this reduces evapotranspiration and increases seepage flow.
- Establish and manage conservation easements that maximize the conservation of suitable or occupied habitat on private lands, including an upland buffer around wetlands and seeps.
- Avoid installing impoundments in or immediately adjacent to suitable or occupied habitat.
- Avoid building road crossings through suitable or occupied habitat.
- If road crossings are needed, use techniques to reduce sedimentation entering habitat (e.g., bridges, bank stabilization). Guidelines for minimizing erosion and runoff from roadways can be found in the [State of Florida Best Maintenance Practices \(BMPs\) for stormwater runoff](#) (FDOT 2015).
- Implement nonnative plant and animal controls in and around suitable or occupied habitat.
- Prior to using herbicides or pesticides in or around suitable or occupied habitat, review labels for potential effects on non-target organisms (Jackson 2004). Use only herbicides that are labeled for aquatic use and check that any adjuvants are aquatic compatible.
- Report trespass and illegal dumping occurring around suitable or occupied habitat to FWC.
- Conduct activities such as debris management, tree removal and planting, or vegetation trimming and maintenance using techniques that avoid permanent alteration of habitat.

## Prohibitions and Permitting

Pine Barrens treefrogs are protected by the general prohibitions outlined in Rule 68A-4.001, F.A.C.: no wildlife or freshwater fish or their nests, eggs, young, homes, or dens shall be taken, transported, stored, served, bought, sold or possessed in any manner or quantity at any time except as specifically permitted by these rules nor shall anyone take, poison, store, buy, sell, possess or wantonly or willfully waste the same except as specifically permitted these rules. Take is defined in Rule 68A-1.004, F.A.C., as pursuing, hunting, molesting, capturing, or killing (or attempting to do those things). A permit is required for any other activity that involves the possession, capture, sell, purchase, transport, hunting or killing of Pine Barrens treefrogs. These permits are issued for justifiable purposes as outlined in Rule 68A-9.002, F.A.C. Justifiable purposes are scientific, educational, exhibition, propagation, management or other justifiable purposes. Collection (taking) of amphibians is controlled by rules of Chapter 68A-26.002, F.A.C., which specify devices and methods that may be used to take amphibians, excluding Pine Barrens treefrogs for which there is no authorized intentional take or possession except as authorized by permit from the executive director as provided in Rule 68A-9.002, F.A.C.

### No Permit Needed

The following activities could cause take, but are authorized to be conducted without an FWC-issued permit:

- Vegetation removal or trimming in the linear right of way for power restoration. This applies only 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 government entity), and only to non-routine removal or trimming of vegetation within the linear right of way, in accordance with a vegetation management plan that meets applicable federal and state standards. If conducted under these circumstances, no FWC take permit is required.

## Permits for Justifiable Purposes

### Scientific Collecting and Educational Use

Scientific collecting permits may be issued for the Pine Barrens treefrog. Activities requiring a permit include any research that involves capturing, handling, or marking wildlife; conducting biological sampling, including collecting blood or genetic material for taxonomic analyses; or other research that may cause take. Visual encounter or auditory surveys that do not involve handling animals do not require a permit. A scientific collecting permit is required to use Pine Barrens treefrogs for education and outreach events. A scientific collecting permit will not be issued for the sole purpose of removing a frog from the wild to use as an educational or outreach animal. Pine Barrens treefrogs permitted 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.

- Scientific collecting and educational use permits are no-fee permits. Applications must be submitted using the information provided in the [Applicant Guidance for Scientific Collecting Permits](#).
- 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 should also include a thorough description of the project's methods, timeframe, 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 frogs.
- Methodologies for any procedures should be clearly described, including measures taken to reduce stress and injury to frogs.
- Methodologies for any collection of tissues (such as blood) should be clearly spelled out, including measures taken to reduce stress and injury to frogs.
- Disposition involving captive possession for any period 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 FWC at the contact information below. FWC will provide guidance on proper disposition of specimens.
- Geographical or visual data gathered must be provided to FWC in the specified format in the permit conditions.
- A final report should be provided to FWC in the format specified in the permit conditions.

### Other Permits

For any other justifiable purpose permit that does not fall under scientific collecting or educational use, please submit your request to [WildlifePermits@myfwc.com](mailto:WildlifePermits@myfwc.com).

## 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 FWC at (850) 921-5990 or [WildlifePermits@myfwc.com](mailto:WildlifePermits@myfwc.com). For regional information, visit <http://myfwc.com/contact>.

## Literature Cited

- Enge, K. M., and P. E. Moler. 2016. Population assessment of the Pine Barrens treefrog. Final Report, Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Wildlife Research Section, Gainesville, Florida.
- Florida Department of Transportation. 2015. Best maintenance practices for stormwater runoff designer and reviewer manual. State of Florida, Tallahassee, Florida.
- Florida Fish and Wildlife Conservation Commission. 2011. Pine Barrens treefrog biological status review report. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida.
- Florida Fish and Wildlife Conservation Commission. 2013. A Species Action Plan for the Pine Barrens Treefrog *Hyla andersonii*. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida.
- Freda, J. and R. J. Gonzalez. 1986. Daily movements of the treefrog, *Hyla andersonii*. *Journal of Herpetology* 20:469-471.
- Jackson, D. R. 2004. Florida bog frog: management guidelines for a species at risk on Department of Defense Installations. NatureServe, Arlington, Virginia.
- Means, D. B. 1992. Pine Barrens treefrog. Pages 20-25 in P. E. Moler, ed. Rare and endangered biota of Florida, Vol. III: Amphibians and reptiles. University Press of Florida, Gainesville, Florida.
- Means, D. B. 2006. Vertebrate faunal diversity of longleaf pine ecosystems. Pages 157 – 203 in S. Jose, E. J. Jokela, and D. L. Miller, eds. *The Longleaf Pine Ecosystem, Ecology, Silviculture, and Restoration*. Springer, New York.
- Means, D. B. and C. J. Longden. 1976. Aspects of the biology and zoogeography of the Pine Barrens treefrog (*Hyla andersonii*) in northern Florida. *Herpetologica* 32:117-130.
- Means, D. B. and P. E. Moler. 1978. The Pine Barrens Treefrog: fire, seepage bogs, and management implications. Pages 77 – 83 in R. R. Odum and L. Landers eds. *Proceedings of the rare and endangered wildlife symposium*. Technical Bulletin WL 4. Georgia Department of Natural Resources, Game and Fish Division, Social Circle.
- Moler, P. E. 1981. Notes on *Hyla andersonii* in Florida and Alabama. *Journal of Herpetology* 15:441-444.
- Moler, P. E. 2019. Pine Barrens Treefrog. Pages 154 – 156 in K. L. Krysko, K. M. Enge, and P. E. Moler, eds. *Amphibians and reptiles of Florida*. University of Florida Press, Gainesville, Florida.
- Wright, A. H. and A. A. Wright. 1949. *Handbook of frogs and toads of the United States and Canada*. Third edition. Comstock Publishing Associates, Ithaca, New York.