

Frosted Flatwoods Salamander, Listed as Threatened with Critical Habitat:

When the USFWS proposes an animal or plant for listing as endangered or threatened under the ESA, specific areas that contain the physical or biological features essential to its conservation can be identified. This is the species' critical habitat. The ESA requires the USFWS to designate critical habitat when it is both "prudent and determinable." Critical habitat is a tool that supports the continued conservation of imperiled species by guiding cooperation within the Federal government. Designations affect only federal agency actions or federally funded or permitted activities. For the frosted flatwoods salamander, critical habitat was designated in 2009. That habitat includes a minimum of 1500 feet zone around known salamander breeding ponds (including the connecting land between ponds that are less than 2 miles apart) <https://www.fws.gov/policy/library/2009/E9-2403.pdf>.

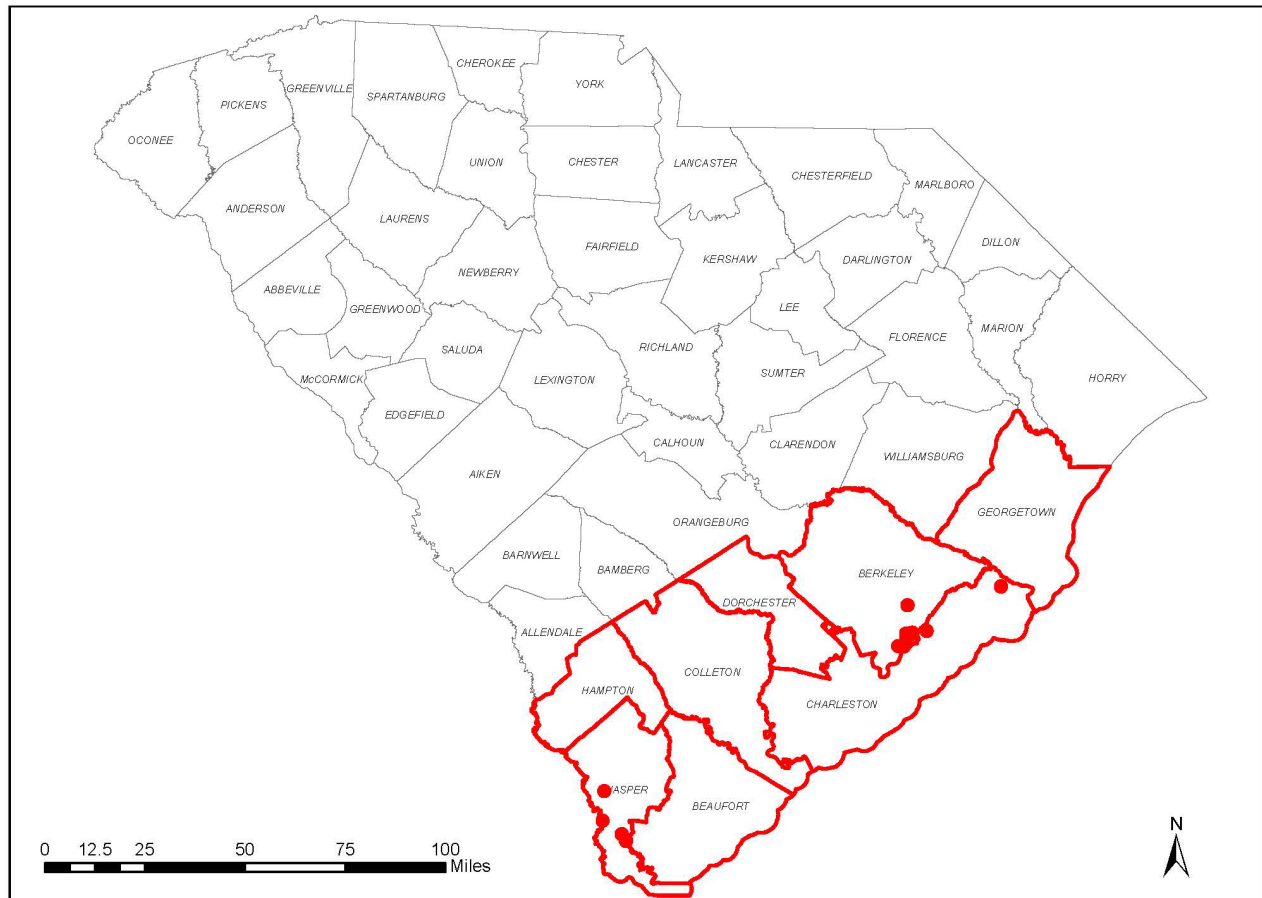
Frosted Flatwoods Salamander Range in North America:

This map shows the frosted flatwoods salamander range in the United States.

Frosted Flatwoods Salamander Range in South Carolina:

This map shows the frosted flatwoods salamander range and breeding ponds tracked by the South Carolina Department of Natural Resources (SCDNR).

Distribution and Range of Frosted Flatwoods Salamander Ponds in South Carolina, 2020



Primary Conservation Provision, Forest Management within FFSA Range:

Frosted flatwoods salamanders are fossorial, meaning that they live underground, for most of the year in upland sites in historically pine-dominated flatwoods and savannas near their breeding ponds. In fall, they travel back to these seasonally inundated ponds to lay eggs which hatch as the ponds begin to fill. If the habitat around such a seasonally inundated pond is intact and suitable, the pond may be used for many years. Check the T&E database in Desktop and work with an NRCS biologist to determine if your project area might contain FFSA.

Therefore, if a frosted flatwoods salamander breeding pond is possible and the project is located within the above county range:

- Do not conduct any activities within a 1500 ft zone of known, occupied *breeding ponds* including ground disturbing practices such as road construction, discing, plowing, bedding, or firebreaks at any time of the year;
- Do not alter *breeding ponds* by activities such as ditching, draining, filling or by cutting trees and removing native vegetation.
- No prescribed fire within the 1500 ft zone during the winter period, unless necessary and documented in the conservation plan to control encroaching woody vegetation.

Practices That Can Help:

Maintain pine flatwoods and savanna habitat where the species currently occurs through application of forestry techniques that are compatible with flatwoods salamander conservation.

- a. Maintain the integrity of native groundcover and soil through application of prescribed fire and minimal use of soil disturbing techniques near breeding ponds. Pine stands should be thinned by burning or tree removal to provide the open canopy needed to permit an herbaceous understory. Thinning and harvest should avoid activities that significantly disturb soil layers and subsurface hydrology, or cause soil compaction. As determined, replace stands with native, expected overstory species, which may be thinned by burning or tree removal as the stands mature.
- b. Apply growing season fire in preference to dormant season for maintenance of native groundcover and hardwood reduction. However, application of fire in any season, given appropriate moisture regime, is preferable to not burning.
- c. Avoid poisoning of salamanders and their habitat by using only herbicides and other chemicals labeled for use in and around wetlands or evaluated for effects to amphibians and that have a low toxicity for fish and wildlife (including avoiding use of surfactants and adjuvants). Foliar spraying, broadcast application, and banded treatments of herbicides should not be used within 1 mile of known breeding ponds.
- d. Promote fire in wetlands by avoiding disturbance of the wetland-upland ecotone.

Restore pine flatwoods and savanna habitat, including native groundcover and wetland breeding sites, through habitat restoration, especially through use of growing-season burns (May - September), in areas where flatwoods salamanders used to occur but do not now.

- a. Restore integrity of native groundcover and soil through application of fire and minimal use of soil disturbing techniques. Apply growing season fire in preference to dormant season to restore and maintain native groundcover and reduce hardwood encroachment. In fire suppressed or shrub-dominated sites, frequent dormant season burns should be conducted to reduce fuel loads before placing into lighting/growing season rotation. This may require a short-term increase in fire frequency. However, application of fire in any season, given appropriate moisture regime, is preferable to not burning. When existing seedbed and use of fire and other techniques are insufficient to restore native groundcover, seeds or other stock from local areas and similar soil types should be used to hasten restoration.
- b. Burn through wetlands during lightning season when they are dry or nearly dry, to promote a graminaceous ecotone, better larval habitat, and reduce acidity from increasing buildup of peat. Although growing season burns are essential to maintain the natural character of the breeding ponds, initial and occasional winter burning may be required to reduce fuel loads in some areas. Effective restoration may also require the limited use of herbicides (labeled for use in wetlands) or machinery to knock down invading woody shrubs in a manner that will not disrupt the soil structure.
- c. Plant native, expected species of pine (typically longleaf) in preference to off-site slash pine or other species at each site. Maintenance of groundcover and soil is probably more important to salamanders than identity of overstory tree species, but it is important that dominant canopy species be able to carry fire essential to the habitat's maintenance.
- d. Restore the natural hydrology to disturbed wetlands by removing berms, filling drainage ditches, and eliminating extensive drainage and ditching within 1 square mile of potential breeding sites. No such restoration should be attempted for active breeding ponds that are successful but "unnatural" (i.e., the wetland has an appropriate hydroperiod due to the presence of ditches and dikes), as long as they continue to be used by flatwoods salamanders.

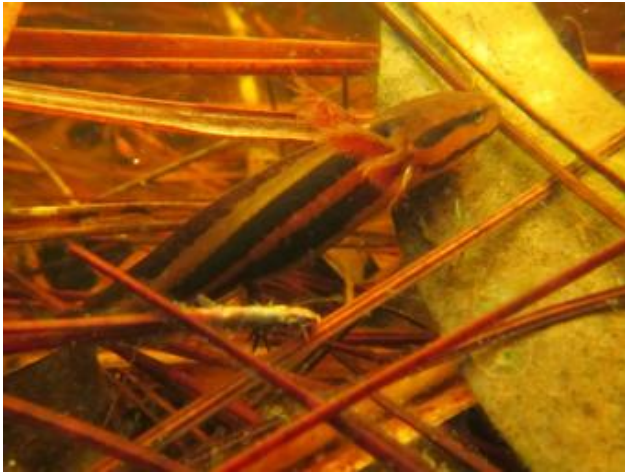
Maintain or restore the landscape-level features that encourage natural metapopulation processes and genetic diversity and increase the likelihood of long-term survival of flatwoods salamander populations.

- a. Maintain or restore the integrity of natural vegetation and associated habitats in terrestrial buffer zones to protect breeding sites (ephemeral isolated wetlands).
- b. Protect the integrity of ecological connectivity (i.e., stepping stone ponds with corridors of natural vegetation) among wetlands with a diverse array of hydroperiods in the landscape.
- c. Protect ephemeral isolated wetlands of all sizes important for amphibian reproduction. Persistence of wetlands as small as 0.1 ha or less are critical to long-term survival of flatwoods salamanders and other species.
- d. Re-establish historic connections among known flatwoods salamander areas with corridors of appropriate habitat to facilitate gene exchange among populations.

Practices summarized from: <https://myfwc.com/media/2026/flatwoods-salamander-management-plan.pdf>



https://www.usgs.gov/science/adaptive-habitat-conservation-flatwoods-salamanders?qt-science_center_objects=0#qt-science_center_objects



Larval flatwoods salamander



Scientists at St. Marks National Wildlife Refuge check minnow traps for Flatwoods salamanders (Credit: Chris Burney. Public domain.)



Flatwoods salamander habitat prescribed burn



<https://www.natureserve.org/connect/stories/species-risk-spotlight-frosted-flatwoods-salamander>



<https://www.fws.gov/panamacity/flatwoods-salamander.html>