

**Wet Pine Savanna**  
**Mid-Atlantic Coastal Plain**

This habitat type includes Pine Savanna, Sandhill Seep, and Wet Pine Flatwoods communities, all of which are mineral wetlands that under natural conditions are subject to frequent burning. With fire, they are characterized by an open canopy dominated by longleaf pine or pond pine, an open midstory, and an understory comprised of some mixture of wiregrass, cane, herbs, and pocosin shrubs depending on soil moisture and fire frequency. Some of the herbaceous plant diversity in these systems, particularly in Pine Savannas, is the highest in temperate North America if burned on a consistent and frequent basis. When fire is suppressed, a dense shrub understory develops and herb diversity declines drastically. These pine communities are similar to dry longleaf pine communities in that they often grade into each other and can occur as a mosaic on the landscape. They may also grade into dry longleaf pine communities, pond pine woodlands, and pocosins.

Wet Pine Flatwoods are found on seasonally wet to usually wet sites on flat or nearly flat Coastal Plain sediments, and are widespread in the outer and Middle Coastal Plain and found occasionally in the Sandhills. These communities have a closed to open canopy of longleaf pine that is sometimes mixed with loblolly or pond pine, and have a low shrub and herb layer of varying density. These sites naturally experienced frequent, low to moderate intensity surface fires (Schafale and Weakley 1990).

Pine Savannas are found in the lower Coastal Plain on wet, flat areas, and occasionally low “islands” in peatlands or swamps, and are saturated at least part of the year (Schafale and Weakley 1990). These communities naturally experienced frequent fairly low intensity surface fires and with such conditions have a dense herb layer, a very high herb species diversity and an open to sparse pine canopy. In the absence of fire the canopy becomes denser, shrubs invade and herb diversity drops (Schafale and Weakley 1990). There are many rare plants associated with this community type.

Sandhill Seep communities are found on wet sands underlain by clays on slopes in sand ridges or sandhill areas primarily in the Sandhills region, but are also present in scarps and sand ridges in the Coastal Plain (Schafale and Weakley 1990). Community structure is strongly controlled by fire regime, and with fire these areas are open and herb dominated and somewhat resemble Pine Savannas but can quickly shift to shrub-dominated understory in the absence of fire (Schafale and Weakley 1990). Like other small natural communities in sandhill areas, nutrients mobilized by fire may be available to Sandhill Seeps even if they do not themselves burn (Schafale and Weakley 1990). Many of these Sandhill Seep areas are becoming overgrown with shrubs due to declining fire frequency. Table 1 provides a list of priority species associated with this habitat for which there is conservation concern.

**Table 1. Priority species associated with coastal plain wet pine savanna.**

<b>Group</b>	<b>Scientific name</b>	<b>Common name</b>	<b>State status* (Federal status)</b>
Birds	<i>Aimophila aestivalis</i>	Bachman's Sparrow	SC
	<i>Ammodramus henslowii</i>	Henslow's Sparrow	SR

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Group	Scientific name	Common name	State status* (Federal status)
	<i>Colaptes auratus</i>	Northern Flicker	
	<i>Colinus virginianus</i>	Northern Bobwhite	
	<i>Dendroica discolor</i>	Prairie Warbler	
	<i>Falco sparverius</i>	American Kestrel	
	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	
	<i>Picoides borealis</i>	Red-cockaded Woodpecker	E (E)
	<i>Sitta pusilla</i>	Brown-headed Nuthatch	
Mammals	<i>Mustela frenata</i>	Long-tailed Weasel	
Amphibians	<i>Ambystoma mabeei</i>	Mabee's Salamander	SR
	<i>Ambystoma tigrinum</i>	Eastern Tiger Salamander	T
	<i>Bufo quercicus</i>	Oak Toad	SR
	<i>Eurycea quadridigitata</i>	Dwarf Salamander	SC
	<i>Hyla andersonii</i>	Pine Barrens Treefrog	
	<i>Hyla gratiosa</i>	Barking Treefrog	
	<i>Plethodon glutinosus sensustricto</i>	Northern Slimy Salamander	
	<i>Pseudacris brimleyi</i>	Brimley's Chorus Frog	
	<i>Pseudacris nigrita nigrita</i>	Striped Southern Chorus Frog	
	<i>Pseudacris ornata</i>	Ornate Chorus Frog	SR
	<i>Rana capito</i>	Carolina Gopher Frog	T
	<i>Scaphiopus holbrookii</i>	Eastern Spadefoot	
Reptiles	<i>Elaphe guttata</i>	Corn Snake	
	<i>Eumeces laticeps</i>	Broad-headed Skink	
	<i>Heterodon platirhinos</i>	Eastern Hog-nosed Snake	
	<i>Lampropeltis calligaster rhombomaculata</i>	Mole Kingsnake	
	<i>Lampropeltis triangulum elapsoides</i>	Scarlet Kingsnake	
	<i>Ophisaurus attenuatus longicaudus</i>	Eastern Slender Glass Lizard	
	<i>Ophisaurus mimicus</i>	Mimic Glass Lizard	SC
	<i>Rhadinaea flavilata</i>	Pine Woods Littersnake	
	<i>Sistrurus miliarius</i>	Pigmy Rattlesnake	SC
*Abbreviations			
E Endangered			
SC Special Concern			
SR Significantly Rare			

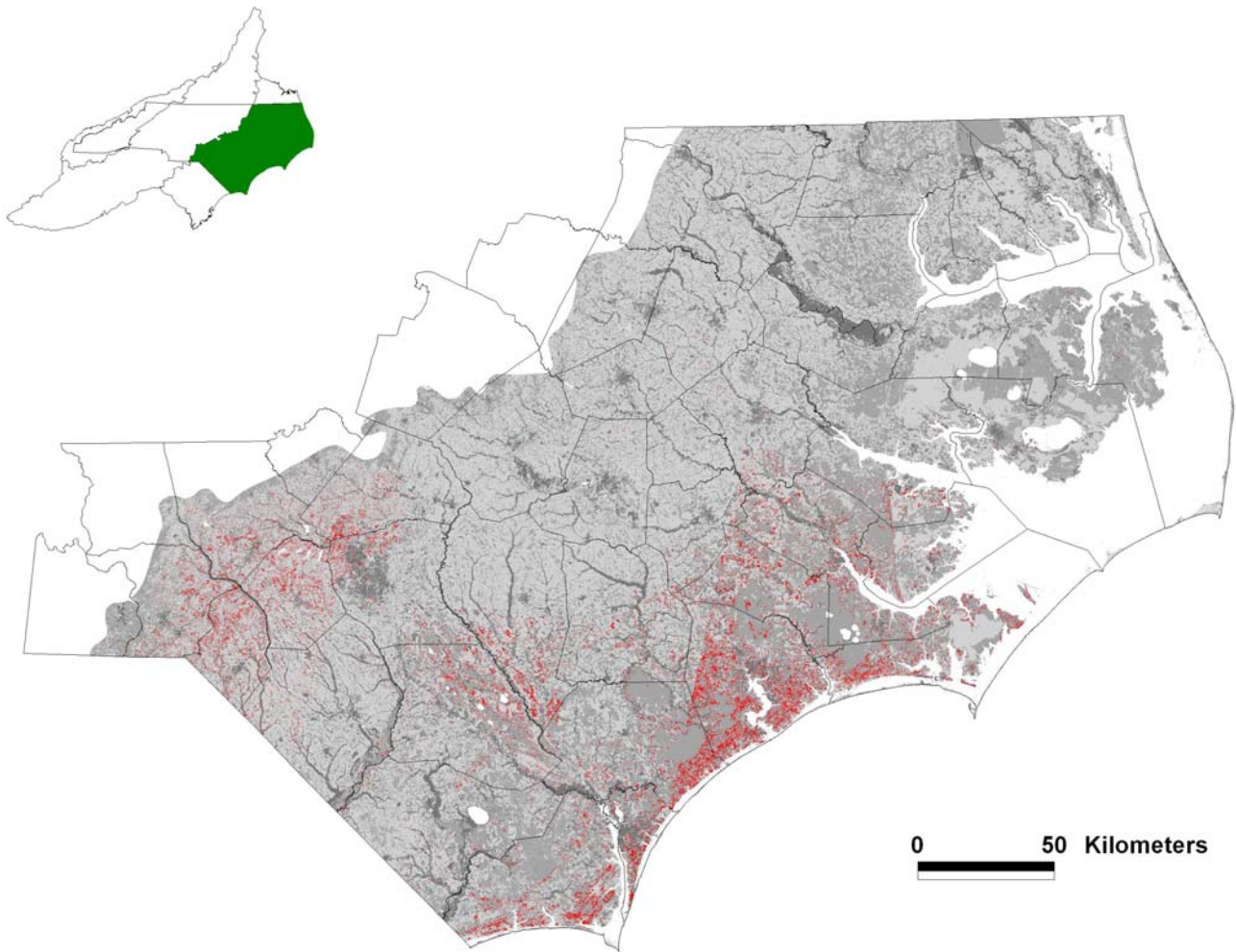
## **Location And Condition Of Habitat**

The condition of wet pine savanna communities in the Coastal Plain has been greatly reduced due to fire suppression. In the absence of fire, herb diversity and density greatly decline as shrubs present in the understory or surrounding habitat quickly invade and attain dominance. In many areas where fire has been used on adjacent stands, plow-lines at the edge of the wetland have caused a marked loss in transition habitat into these savannas where plant diversity would naturally be very high. Also, a lack of fire has allowed loblolly pines (which are less resistant to fire, especially when young) to invade some areas. This has resulted in a heavier canopy which reduces light to the forest floor, once again inhibiting plant diversity. The additional overstory also somewhat dries the site through transpiration. Ditching, draining and conversion to loblolly plantations has also reduced historic savanna habitat. Map 1 depicts locations of wet pine savanna habitats in the Mid-Atlantic Coastal Plain ecoregion.

A few good examples of these community types still do exist on lands managed by The Nature Conservancy (Green Swamp), the Commission (Holly Shelter Game Lands, Sandhills Game Land), and the US Forest Service (Croatan National Forest). Originally probably the nicest example of wet pine savanna was a 1500 acre site called the Big Savanna in Pender County. Although this site was converted to farmland in the late 1950's, a small (117 acre) but significant extension to the site called Pelham Savanna has been purchased by the North Carolina Coastal Land Trust. The Coastal Land Trust is now in the process of restoring some of the remaining habitat on Pelham Savanna with fire and midstory chipping. Fortunately, experience has shown that even after decades of fire suppression, chipping or burning the midstory in these fire-suppressed stands produces diverse herbaceous understory vegetation.

These habitats are particularly important for reptiles and amphibians where ponds are embedded in savannas or flatwoods; however, little is known about herpetofauna in these areas. Red-cockaded woodpeckers also use these habitats since they typically have a sparse overstory and open midstory that is preferred by the woodpeckers.

**Table 1. Wet pine savanna habitats in the Mid-Atlantic Coastal Plain ecoregion of North Carolina (in red).**



Data source: NC GAP, 1992.

### **Problems Affecting Species And Habitats**

Many of the problems affecting dry longleaf pine communities also affect wet pine savannas. Intensively managed pine plantations, urban development, a lack of fire, and subsequent habitat fragmentation continue to threaten these communities, and have caused a great deal of losses to wet pine savanna sites. Draining and clearing have altered hydrology and vegetative assemblages. Poor logging practices, especially on non-industrial forestlands, have severely rutted or high-graded many areas.

Fire suppression and a lack of growing-season prescribed burning has caused a thick shrubby understory to develop which shades out grasses and herbaceous ground vegetation and greatly reduces overall plant and animal diversity. The loss of a transition zone between uplands and savannas and between savannas and pocosins due to fireline construction is also a major

concern. Microhabitats and ecotones have been lost due to this practice, and a lack of woody debris particularly impacts reptiles, amphibians and small mammals. Many of the bird species of highest conservation concern inhabit these communities and depend on frequent fire to create suitable habitat conditions (e.g., red-cockaded woodpecker, Bachman's sparrow, Henslow's sparrow, brown-headed nuthatch, American kestrel, prairie warbler) according to Partners in Flight (Hunter et al. 2001b and Johns 2004).

### **Species And Habitat Conservation Actions and Priorities For Implementation**

Habitat restoration should primarily occur through growing season prescribed burning, to develop and maintain the herbaceous layer and open pine stands. Where growing season burns can not be administered, winter burns can be constructive. Burning should be accomplished without placing firelines in transition zones from uplands to wetlands and with the fire allowed to burn through transition zones.

Snags should be retained during logging operations to increase the numbers available for cavity-using wildlife species. Efforts need to be made to maintain sufficient levels of woody debris in stands for reptiles, amphibians and small mammals. In disturbed sites, consideration should be given to create barrow sites or ponds for breeding use by amphibians. Otherwise, amphibians are scarce in most flatwoods and savannas devoid of pools or open water.

Management, restoration, and protection of all wet pine savanna communities is needed to promote large, unfragmented tracts, which is especially important for reptiles and amphibians. We must begin to explore opportunities for hydrologic restoration of extensively drained sites. Education and financial or technical guidance incentives should be offered to persuade landowners not to log when soil moisture conditions are conducive to rutting.

Because of the great number of rare plants and animals in these habitats, protection of remaining sites is of utmost importance and urgency. Land acquisition and easements should be promoted through cooperation with land trusts and The Nature Conservancy. Opportunities exist to take advantage of existing initiatives and programs with the US Fish and Wildlife Service and the Natural Resources Conservation Service, such as the Forest Landbird Legacy Program, Partners for Fish and Wildlife, and Farm Bill programs, to improve forest habitat for birds and other wildlife on privately-owned lands. Regional landscape-level conservation initiatives such as those in the Sandhills and Onslow Bight regions for dry longleaf pine also apply to wet pine savanna communities. Identified funding sources for acquisition include the Clean Water Management Trust Fund, Coastal Wetlands Grants, Natural Heritage Trust Fund, Forest Legacy, and Recovery Land Acquisition Grants.

### **Priority Research, Survey, And Monitoring**

Surveys are needed to document the distribution, relative abundance and status of many wildlife species associated with these habitats. Priorities for conducting surveys need to focus on species believed to be declining, at risk or mainly dependent on these communities. Secondary priority for surveys should be for species for which current distribution information is already available or for species that are considered common. Many bird species associated

with these community types have experienced significant declines across North America over the past four decades according to BBS trend data.

Long term monitoring should be initiated once baseline surveys have been conducted. Focus should begin with herpetofauna and bird species in decline, or for which little is known about the population fluctuations and demographics.

- **Surveys**

- Conduct priority bird surveys for Bachman's sparrow, Henslow's sparrow, brown-headed nuthatch, American kestrel, nightjars, prairie warbler and red-cockaded woodpeckers (on nonfederal lands), then for other species.
- Determine the status and distribution of the long-tailed weasel, as well as small mammals and bats.
- Conduct amphibian surveys with focus on the Mabee's salamander, eastern tiger salamander, dwarf salamander, ornate chorus frog, Brimley's chorus frog, Carolina gopher frog and Pine Barrens treefrog (Taylor and Jones 2002).
- Determining the status and distribution of hard to find reptile species or species for which we have little information (e.g. pigmy rattlesnake, scarlet kingsnake, pine woods littersnake and glass lizards) (Taylor and Jones 2002).

- **Monitoring**

- Establish MAPS and bird migration banding stations.
- Establish long-term monitoring for all birds of high conservation concern.
- Establish long-term monitoring for all reptiles and amphibians in this habitat type (Taylor and Jones 2002).

- **Research**

*Genetics*

- Determine the sub-species status of the American kestrel.

*Habitat use*

- Initiate studies of cavity nesters' use of snags in these systems.
- Conduct habitat use research on pigmy rattlesnakes.

*Predator effects*

- Study predator effects (including fire ants) on ground nesting bird nest productivity, and productivity as related to cowbird parasitism (Dawson and Bollinger 2000).
- Study impacts of fire ants on herpetofaunal communities.

*Management practices*

- Document the response of birds, small mammals, amphibians and reptiles to burned vs. unburned wet savanna habitats.
- Determine habitat response to different seasons/timing of burns (e.g., winter burns vs. spring burns).

- Explore alternatives (herbicides or mechanical) to using fire for the initial restoration of severely fire-suppressed wet pine savannas.
- Explore hydrologic restoration of extensively drained sites.

### **Supporting References**

Bailey, M. A., J. N. Holmes, and K. A. Buhlmann. 2004. Habitat management guidelines for amphibians and reptiles of the southeastern United States (DRAFT). Partners in Amphibian and Reptile Conservation.

Dawson, W.B. and E. Bollinger. 2000. Predation rates on real and artificial nests of grassland birds. *The Auk* 117(1): 147-158.

Hunter, W. C., L. Peoples, and J. Collazo. 2001a. Partners in Flight bird conservation plan for the South Atlantic Coastal Plain. American Bird Conservancy.

Hunter, W.C. and D.A. Buehler, R.A. Canterbury, J.L. Confer and P.B. Hamel. 2001b. Conservation of disturbance-dependent birds in eastern North America. *Wildlife Society Bulletin* 29(2): 440-455.

Johns, M.E. 2004. North Carolina Bird Species Assessment. N.C. Partners in Flight.

Pashley, D.N., C.J. Beardmore, J.A. Fitzgerald, R.P. Ford, W.C. Hunter, M.S. Morrison, K.V. Rosenberg. 2000. Partners in Flight: Conservation of the land birds of the United States. American Bird Conservancy, The Plains, VA.

Rich, T.D., C.J. Beardmore, H. Berlanga, P.J. Blancher, M.S.W. Bradstreet, G.S. Butcher, D.W. Demarest, E.H. Dunn, W.C. Hunter, E.E. Inigo-Elias, J.A. Kennedy, A.M. Martell, A.O. Panajabi, D.N. Pashley, K.V. Rosenberg, C.M. Rustay, J.S. Wendt, T.C. Will. 2004. Partners in Flight North American landbird conservation plan. Cornell Lab of Ornithology. Ithaca, NY.

Schafale, M. P. and A. S. Weakley. 1990. Classification of the natural communities of North Carolina, third approximation. N.C. Department of Environment and Natural Resources, Natural Heritage Program, Raleigh, NC.

Taylor, J.D. and J.C. Jones. 2002. Quantifying amphibian richness in Southeastern forests. *Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies* 56: 301-311.