

Ecosystem Description

These communities have vegetation fairly similar to that in peatland pocosins, but the physical setting is very different. They occur in ravines in dissected, sandy Coastal Plain terrain. The soils, kept essentially permanently saturated primarily by acidic seepage from adjacent sandhills, are mucky, very acidic, and infertile. The vegetative composition and structure depends on management history, particularly the use of fire. There are two types in this ecosystem group: streamhead pocosin and streamhead Atlantic white cedar forests.

Streamhead Pocosins are patchy, with some parts being dense shrub thickets, some being savanna-like with sparse trees over ferns, and some being treeless canebrakes. Streamhead pocosins managed with fire tend to have an open tree canopy usually dominated by pond pine, a reduced midstory, and an understory dominated by switchcane, low shrubs, and a diversity of forbs. In the absence of fire or other similar disturbance there is a closed canopy of pond and loblolly pines and a variety of hardwoods. The understory is dominated by a dense evergreen shrub layer including several members of the laurel and holly families and is frequently tangled with laurel-leaf greenbrier. Herbs are nearly absent except in the edge (ecotone) with neighboring sandhill communities. These ecotones often support a high diversity of herb and shrub species including many rare ones.

In the few remaining places where fire is frequent, streamhead Atlantic white cedar forests are dominated by Atlantic white cedar, though any of the species of the streamhead pocosin type may be present in small numbers. The canopy is often dense enough that the shrub layer is fairly open. Atlantic white cedars are sensitive to fire, but depend on fire to prepare a seedbed for regeneration. These communities probably can persist only where fire is infrequent.

Mid-Atlantic Coastal Plain Pocosin habitats are described as a priority habitat in the 2005 Wildlife Action Plan (see Chapter 5A) (NCWRC 2005). These peatland communities include low pocosin, high pocosin, pond pine woodlands, peatland Atlantic white cedar forest, bay forest, streamhead pocosin, and streamhead Atlantic white cedar forest. Examples of fire-managed streamhead pocosin can be found on Sandhills Game Land, Fort Bragg, Croatan National Forest, and Camp Lejeune Marine Corps Base. The Croatan National Forest, Dare Bombing Range, Camp Lejeune, and Holly Shelter Game Land do conduct some pocosin burns, but all other fire introduced into pocosin habitats tends to be on small acreages (<100 acres).

Table 1 at the end of this report provides a summary of expected climate change impacts to these natural communities.

Predicted Effects to Wildlife Species

Tables 2 through 6 at the end of this report identify the species of conservation concern and priority species that use habitats in this ecosystem.

In general, little detailed information exists for many wildlife species that use pocosin habitats because of the impenetrable nature of these habitats. Pocosins are particularly important for wintering birds because of the high amount of soft mast available. Greenbrier (*Smilax* spp.), red bay, sweet bay, and many ericaceous shrubs produce large quantities of berries that are persistent through much of the winter.

We also lack detailed information about populations of small mammals, bats, reptiles and amphibians in pocosin habitats (Mitchell 1994). Sandhills salamander (*Eurycea* n. sp. 9) is endemic to this habitat and is the species most at risk to alterations of hydrology and fire frequency due to climate change. Other species associated with this ecosystem include pinebarrens treefrog (*Hyla andersonii*), a species with strong associations to Sandhill streamheads. These species occur in other types of habitat and are not as confined to the Sandhills ecoregion.

Pocosin habitats are important for a variety of shrub-scrub birds though we are lacking status and distribution data (Karriker 1993). Red-cockaded woodpeckers exist in some of these pond pine-dominated sites where suitable habitat also occurs in the uplands. A study by NCWRC in the Sandhills demonstrated a high territory density of shrub nesting birds in fire-managed streamhead pocosin, including common yellowthroat, indigo bunting, eastern towhee, and yellow-breasted chat. This same study found a relatively high density of cavity nesters such as brown-headed nuthatch, red-headed woodpecker and Carolina wren. Loss of this fire maintained habitat has caused fragmentation of red-cockaded woodpecker habitat across the landscape. Fire-suppressed streamhead pocosins supported significantly lower densities of nine bird species but had higher numbers of Carolina chickadee, hooded warbler, and red-eye vireo.

Climate Change Compared to Other Threats

Streamhead Pocosins are not likely to be severely impacted by climate change. Changes caused by climate change are expected to be less than ongoing changes caused by fire suppression and landscape alterations. The most significant effect of climate change on streamhead pocosins is likely to come from rainfall extremes, both drought and heavy rains. Heavy rains may create more overland runoff and cause stream flooding where it is now rare. Because of the permeability of the sandy soil and the buffering effect of the dense vegetation, such effects are likely to be mild in natural systems. They may be more significant in areas with impermeable surfaces or cleared land.

Table 7 compares climate change with other existing threats.

Table 7. Comparison Of Climate Change With Other Threats

Threat	Rank Order	Comments
Fire	1	Natural fire suppression has the most drastic ecological effects on these communities. If increased drought makes prescribed burning more difficult, the effects of fire suppression would be exacerbated.
Logging/Exploitation	2	Some unprotected examples are logged, altering canopy composition and structure and sometimes damaging the soil. Conversions for development, agricultural and forestry interests contribute to habitat destruction. When properly applied, forestry operations can play a positive role in restoring fire-suppressed streamhead pocosin.
Flood Regime Alteration	2	Ditching and draining alters hydrology. Affects examples near developed or cleared land, through sediment input and channel cutting.
Development	2	These wet communities are seldom developed but are sometimes logged or affected indirectly by development or disturbance on adjacent uplands. Direct effects from stream crossings can be significant.
Climate Change	3	These systems are naturally buffered from drought by the storage capacity of the sands. However droughts, if prolonged more than at present, could be significant. They could allow upland species to invade, and could allow more intense fire behavior, both of which might change composition and structure.
Impoundments	3	A few examples are impounded. Climate change (prolonged drought) may create more incentive for impoundments.

Summary and Recommendations

The most important management needed for these systems is restoration of fire, which will over time reverse the alteration in natural composition and structure. While of general ecological benefit, burning will also reduce the risk of uncontrollable or damaging wild fires during droughts caused by climate change, and the more robust natural vegetation will be better able to withstand all kinds of climate-related stress.

Recommended Actions

- Surveys
- Determine status and distribution for Wayne’s black-throated green warbler, worm-eating warbler, Swainson’s warbler, black-billed cuckoo (may warrant further documentation) and other neotropical migrants. (NCWRC 2005).
 - Surveys are needed to document the distribution, relative abundance and status of many wildlife species associated with pocosin habitats. Priorities for conducting surveys need to focus on species believed to be declining, at risk or mainly dependent on pocosin communities. (NCWRC 2005).

- Monitoring
- Initiate long-term monitoring of breeding and wintering birds, mammal populations (especially bats), and reptiles and amphibians in pocosin habitats on public lands and industrial forestland (Karriker 1993, Mitchell 1994, Watts 2002, NCWRC 2005).
 - Monitoring systems need to be expanded and/or targeted to be able to assess current population status and trend information for all wildlife species associated with pocosin habitats. (NCWRC 2005).
- Research
- Conduct studies to obtain basic demographic information on priority birds, small mammals, amphibians and reptiles (NCWRC 2005).
 - Determine the best ways to burn these sites, or alternative management that will mimic the effects of fire at sites where birds, mammals, reptiles and amphibians are being monitored (NCWRC 2005).
 - Determine how the use of chipping (using a hydro-ax or other heavy chipping machinery) midstory and understory vegetation affects the plant and animal communities (NCWRC 2005).
- Management Practices
- Support control of stormwater, especially where surrounding uplands are developed or disturbed, especially near roads and areas where erosion is a problem.
 - Institute a prescribed fire regime, especially on conserved lands. Burning can often be accomplished on uplands without the use of fire-lines in transition zones between upland sites and pocosin habitats (especially in winter). This promotes a healthy transition zone between the two habitats that is critical for many plant species and allows for nutrient flow to some pocosin habitats (NCWRC 2005).
 - Establish examples of well-maintained and burned savannas as demonstration sites for landowners to emulate.
- Land Protection
- Though extensive amounts of pocosin lands are already protected, some specialized types require more protection, such as Carolina bays (Bladen Lakes area) and white cedar stands (NCWRC 2005).
 - Land acquisition should focus on consolidating these areas into larger holdings so that they may be managed through fire.

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References

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Table 1. Predicted Impacts of Climate Change

Climate Change Factor	Comments
Flow Regime	Most streamhead pocosins have small streams flowing through them, with a steady flow maintained by seepage. Increased intensity of rainfall events might lead to more channel flow and possible increase in channel size. Intense rainfall might lead to more stream flooding.
Compositional Change	Fire-suppressed stands may be invaded by species such as red maple; maples are reaching the canopies of some cedar stands in the long absence of fire (NCWRC 2005). Increased fire or drought might change composition. Warmer temperatures might allow a few southern species to enter.
Structural Change	Streamhead pocosins have a substantial tree canopy, and an increase in severe winds will create more canopy gaps. This may alter the structure of the forest, increasing the area of gaps and reducing the average age of canopy trees.
Wind Damage	Atlantic white cedar is particularly susceptible to wind throw, and an increase in severe storms may have a significant effect.
Fire	Streamhead pocosins naturally burn, often at high intensity. Drying related to drought would increase their susceptibility to fire. However, fire frequency is partly driven by fire in the surrounding uplands. Because wild fires are easy to control in Sandhills uplands, an increase in wild fire in the streamheads is unlikely, even in drought.
Drought	Drying would make them more susceptible to fire and potentially to invasion by upland species or oxidation of soil organic matter.
Fragmentation	Habitat fragmentation (as a result of land use conversion and urbanization) threatens the integrity of pocosin and peatland communities since these communities typically occur as mosaics on the landscape and fire plays an important role in determining the structure of that landscape. As the landscape becomes fragmented, prescribed fire becomes more difficult to use as a management tool because of smoke management concerns and safety issues around urban areas (NCWRC 2005).

Table 2. Bird Species Utilizing Streamhead Pocosins

Species	Common Name	Element Rank	Endemic	Major Disjunct	Extinction/Extirpation Prone	US/NC/WAP*	Comments
BIRDS							
<i>Colaptes auratus</i>	Northern Flicker					//P	
<i>Colinus virginianus</i>	Northern bobwhite					//P	favors streamhead pocosin in Sandhills
<i>Dendroica discolor</i>	Prairie Warbler					//P	
<i>Dendroica virens waynei</i>	Wayne's Black-throated Green Warbler					//P	
<i>Helmitheros vermivorous</i>	Worm-eating Warbler					//P	
<i>Limnothlypis swainsonii</i>	Swainson's Warbler					//P	
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker					//P	
<i>Picoides borealis</i>	Red-cockaded Woodpecker					E/E/P	
<i>Sitta pusilla</i>	Brown-headed nuthatch					//P	uses fire-managed streamhead pocosin
<i>Wilsonia citrina</i>	Hooded Warbler					//P	

Table 3. Mammal Species Utilizing Streamhead Pocosins

Species	Common Name	Element Rank:	Endemic	Major Disjunct	Extinction/Extirpation Prone	US/NC/WAP*	Comments
MAMMALS							
<i>Condylura cristata</i>	Star-nosed Mole					/SC/P	
<i>Mustela frenata</i>	Long-tailed Weasel					//P	
<i>Peromyscus gossypinus</i>	Cotton Mouse					//P	
<i>Sylvilagus palustris</i>	Marsh Rabbit					//P	
<i>Synaptomys cooperi helaletes</i>	Southern Bog Lemming					/SR/P	

Table 4. Reptile Species Utilizing Streamhead Pocosins

Species	Common Name	Element Rank	Endemic	Major Disjunct	Extinction/Extirpation Prone	US/NC/WAP*	Comments
REPTILES							
<i>Terrapene Carolina</i>	Eastern Box Turtle					//P	

Table 5. Amphibian Species Utilizing Streamhead Pocosins

Species	Common Name	Element Rank:	Endemic	Major Disjunct	Extinction/Extirpation Prone	US/NC/WAP*	Comments
AMPHIBIANS							
<i>Bufo quercicus</i>	Oak Toad					/SR/P	
<i>Desmognathus auriculatus</i>	Southern Dusky Salamander					/ /P	
<i>Eurycea sp. 9</i>	Sandhills salamander	G3?Q/S3?	YES		YES	/W3/P	
<i>Hyla andersonii</i>	Pine Barrens treefrog	G4/S3		YES		/SR/P	
<i>Stereochilus marginatus</i>	Many-lined Salamander					/ /P	

Table 6. Invertebrate Species Utilizing Streamhead Pocosins

Species	Common Name	Element Rank	Endemic	Major Disjunct	Extinction/Extirpation Prone	US/NC/WAP*	Comments
INVERTEBRATES							
<i>Callophrys hesseli</i>	Hessel's hairstreak	G3G4/S3		YES		/SR/	
<i>Callosamia securifera</i>	Sweetbay silkmoth	G4/S2S3				/SR/	
<i>Cleora projecta</i>	Projecta gray (moth)	G4/S3?				/W3/	
<i>Hypagyrtis brendae</i>	Brenda's hypagyrtis	G4/S2S3		YES		/SR/	
<i>Lithophane lemmeri</i>	Lemmer's pinion	G3G4/S1S3				/SR/	

*** US/ NC/ WAP Abbreviations (species are subject to reclassification by USFWS, NHP, or WRC).**

E	Endangered	SC	Special Concern	P	WAP Priority Species
T	Threatened	SR	Significantly Rare		
FSC	Federal Species of Concern	W	Watch Category		
T(S/A)	Threatened due to Similarity of Appearance				

NatureServe Element Rank: <http://www.natureserve.org/explorer/ranking.htm>

USFWS Endangered Species Listing Status: http://www.fws.gov/raleigh/es_tes.html

NC Natural Heritage Program Status:
<http://www.ncnhp.org/Images/2010%20Rare%20Animal%20List.pdf>

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