Small Wetland Communities

Mid-Atlantic Coastal Plain

These communities include vernal pools, cypress savanna, small depression ponds, beaver ponds, small depression pocosin, interdune ponds, clay-based Carolina bays and limesink depressions. They are often mimicked by barrow sites along small dirt roads. These depressions may hold water for a significant portion of the year and most are important habitat for many rare or poorly understood reptiles and amphibians. A single small North Carolina vernal pool can contain several species of frogs. Across the landscape, these habitats are widely scattered but provide key breeding sites for amphibians. Small wetlands can also be important breeding habitat for crayfishes (*for more about crayfishes and other aquatic taxa, see the individual river basin sections*).

Vernal Pools are small sites that flood seasonally and occur throughout the Coastal Plain and Sandhills (Schafale and Weakley 1990). They are dominated by a dense to sparse herb layer and when dry are subject to fires spreading from adjacent uplands. These Vernal Pools are almost always key amphibian breeding sites because they contain no fish.

Small Depression Ponds are on sites with permanently flooded (at least in the center) sinkholes, Carolina bays and other upland depressions that have complex and irregular zones of vegetation (Schafale and Weakley 1990). Most occur in the lower coastal plain, over limestone formations. Scattered trees (pond cypress and swamp blackgum) may be present in both deep and shallow water zones and most ponds are surrounded by a dense shrub layer. These shrubby zones provide breeding habitat for shrub-scrub-nesting birds (Hunter *et al*. 2000 and Johns 2004) and these sites are used by wading birds for foraging/nesting. The main value of these sites, however, is that they provide critical habitat for reptiles and breeding amphibians.

Cypress Savannas are rare sites and are found in the southern part of the inner Coastal Plain on wetland soils with a clay hardpan, and include clay-based Carolina bays and other wet clay-like depressions (Schafale and Weakley 1990). They typically dry up during summer, and usually have an open canopy of cypress. Small Depression Pocosin sites are small depressions found throughout the Coastal Plain and seldom distinguished on soil maps. Historically, portions of these depressions likely burned from fires spreading from adjacent uplands (Schafale and Weakley 1990). These are also important amphibian breeding sites since they rarely contain fish. 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 small wetland communities.

Group	Scientific name	Common name	State status* (Federal status)
Mammals	*Condylura cristata*	Star-nosed Mole	SC
	Synaptomys cooperi helaletes	Southern Bog Lemming	SR
Amphibians	*Ambystoma mabeei*	Mabee's Salamander	SR
	Ambystoma maculatum	Spotted Salamander	
	Ambystoma opacum	Marbled Salamander	
	Ambystoma tigrinum	Eastern Tiger Salamander	T

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Group	Scientific name	Common name	State status* (Federal status)
	Bufo quercicus	Oak Toad	SR
	Eurycea quadridigitata	Dwarf Salamander	SC
	Hemidactylium scutatum	Four-toed Salamander	SC
	Hyla andersonii	Pine Barrens Treefrog	
	Hyla gratiosa	Barking Treefrog	
	Pseudacris brimleyi	Brimley's Chorus Frog	
	Pseudacris nigrita nigrita	Striped Southern Chorus Frog	
	Pseudacris ornata	Ornate Chorus Frog	SR
	Rana capito	Carolina Gopher Frog	T
	Scaphiopus holbrookii	Eastern Spadefoot	
	Siren intermedia intermedia	Eastern Lesser Siren	
Reptiles	*Clemmys guttata*	Spotted Turtle	
	Deirochelys reticularia	Eastern Chicken Turtle	SR
	Farancia abacura abacura	Eastern Mudsnake	
	Regina rigida	Glossy Crayfish Snake	SR
	Seminatrix pygaea	Black Swamp Snake	SR
	Thamnophis sauritus sauritus	Common Ribbonsnake	

*Abbreviations
T Threatened
SC Special Concern
SR Significantly Rare

Location And Condition Of Habitat

Clay-based Carolina bays are particularly abundant in Robeson, Hoke, and Scotland counties; most feature cypress savannas. Small Depression Pocosin examples are found on Croatan National Forest and on Sandhills Game Land, and good examples of Vernal Pools are found on Sandhills Game Land and at Carolina Beach State Park. Small Depression Ponds are primarily found in Brunswick, New Hanover, Onslow, and Carteret counties. All depression habitats have been greatly reduced by development and drainage. A map of this habitat is not provided due to scale and sensitivity issues.

Beaver ponds are a natural community, but result from modification of other community types, and thus there is the potential for human action to mimic them effectively. Beaver ponds vary with age, water depth and disturbance history; the isolation of these ponds may make "accidents of dispersal" important factors in the flora and fauna present (Schafale and Weakley 1990). With stable beaver populations, beaver ponds can be maintained for decades, but dam destruction can shorten their lifespan. A reduction of beaver ponds will place more importance on man-made ponds as the primary habitat for many lentic aquatic species. Dead trees in beaver ponds are important foraging and nesting habitat for woodpeckers (such as the red-headed woodpecker) and for wood duck nesting.

Problems Affecting Species And Habitats

Development and fragmentation has reduced the availability of small wetland communities, impacting breeding amphibians. Increased road densities are correlated with declines in amphibian diversity and abundance (Vos and Chardon 1998, Findlay *et al*. 2001, Fahrig et al. 1995). Roads can cause heavy mortality for reptiles and amphibians and can effectively isolate breeding populations, or separate wetland habitats from upland habitats that are used during non-breeding portions of amphibian and reptile life cycles.

Many of these habitats are inherently small and are easily impacted by nearby development or drainage. Cutting ditches through wetlands can alter their hydrology and habitat quality. Drainage of many Coastal Plain depressions has occurred, primarily for agricultural or development purposes. Most amphibians are highly sensitive to changes in water quality. Pollution associated with these land uses has altered water quality at some sites. An increase in impervious surfaces due to Coastal Plain development has caused excess stormwater runoff into adjacent seasonal wetlands. Long-term drought and possibly excessive pumping of ground water has caused lowered water tables and lowered pond levels in some areas.

Ephemeral and isolated wetlands are very valuable to amphibians because they typically do not naturally support fish and other predators of amphibian eggs. The introduction of fish, bullfrogs, and other predatory species can devastate the breeding effort of amphibians in small wetlands.

Lastly, the use of all terrain vehicles (ATVs) and other recreational vehicles can cause significant damage around wetland communities. ATVs cause soil disturbance, increase erosion and sedimentation, elevate vehicle related mortality rates, and cause noise-related disruptions of faunal activities.

Species And Habitat Conservation Actions and Priorities For Implementation

Protection of sites and surrounding areas through land acquisition or easements and cooperation with land trusts is the most critical conservation need in Coastal Plain small wetland sites. Quite a large number of lime sink (small depression) ponds still remain in private, unprotected status. Regional land trusts and The Nature Conservancy can be valuable partners in these efforts. The maintenance of contiguous gradients between wetland and adjacent upland sites is critical for seasonal migration and dispersal of amphibians; roads, agriculture, or other land use operations between complimentary sites may still render them ineffective at supporting amphibian and reptile populations. However, research has shown that with proper management, herpetofaunal communities can succeed on managed forestland (Leiden *et al*. 1999; Russell *et al*. 2002a, Russell *et al*. 2002b, Ryan *et al*. 2001). In instances where natural wetlands have been lost or degraded, the construction of artificial wetlands may assist in facilitating dispersal and recolonization of sites (Bailey *et al*. 2004). Recommendations on how to construct borrow pits during private road construction to benefit amphibians should also be developed.

Wetland restoration efforts should focus on restoring natural hydrology, water quality, and plant communities. The Natural Resources Conservation Service's Wetlands Reserve Program provides a good tool for promoting wetland conservation on private lands. Strategies for the effective removal of introduced aquatic predators need to be developed, and a mechanism for identifying and prioritizing sites for removal should be worked out.

There is a need to promote the adoption of agricultural and forestry best management practices that reduce run-off, erosion, and pollution of small wetland communities. The federal Farm Bill and other cost share programs provide incentives for land stewards to adopt these practices. Technical guidance manpower is needed to proactively promote and facilitate participation in these programs. Allowing prescribed fire in uplands to burn into and/or through depression wetlands during dry seasons or dry years is recommended.

Another critical aspect of small wetland conservation involves the development of outreach materials for the general public, developers, and land-use planners that describe the importance of vernal pools and depression sites for amphibians and reptiles. Better understanding of these seemingly isolated and insignificant sites as critical amphibian breeding areas may lead to more significant consideration of their protection during site design and planning.

Priority Research, Survey, And Monitoring

- **Surveys**
  - Conduct surveys on all amphibian species associated with small wetland communities, especially Mabee's salamander, spotted salamander, eastern tiger salamander, oak toad, dwarf salamander, four-toed salamander, ornate chorus frog, Pine Barrens treefrog, and Carolina gopher frog.
  - Determine the status and distribution of the eastern chicken turtle, eastern mudsnake, black swamp snake, and glossy crayfish snake.
  - Initiate frog call surveys (potentially coordinated through NC Partners in Amphibian and Reptile Conservation).
  - Expand cooperative survey efforts for amphibians and reptiles with industrial forest landowners such as Weyerhaeuser and International Paper (small wetlands may be a matrix habitat within larger stands of upland forest).
- **Monitoring**
  - Establish long-term breeding amphibian monitoring in these habitat types.
  - Monitor the long-term quality and quantity of beaver pond habitats in the region.
- **Research**
  - Investigate movements of amphibians and reptiles between small wetlands within a complex and use of adjoining uplands.
  - Investigate the potential to create vernal ponds for the benefit of wildlife, particularly amphibians.

- Examine small wetlands to determine the importance of foraging and nesting areas for wading birds.
- Determine the importance of beaver ponds to birds, reptiles and amphibians and document populations of basking turtles in areas with beaver ponds as compared to areas with few or no ponds.

Supporting References

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