

Riverine Aquatic Communities

Mid-Atlantic Coastal Plain

Coastal Plain riverine habitats (including streams) are important for a number of wildlife species, especially to herpetofauna that utilize aquatic habitats during part or all of their life cycle, and to aquatic mammals such as the manatee. Examples of birds that utilize river and streams include the Louisiana waterthrush, prothonotary warbler, many waterfowl species, wading birds and some shorebirds. These habitats are also important for a variety of common mammals that are semi-aquatic and/or that have an aquatic food base (e.g., beavers, river otters, certain bats). Many of the issues identified in the floodplain forest section will also have relevance for these taxa (Weller and Stegman 1977).

Coastal Plain rivers and streams provide a number of important habitat, life cycle, or prey components to a vast assemblage of terrestrial, semi-aquatic, and aquatic wildlife. In addition, the importance of maintaining water quality of riverine habitats cannot be overstated, both in terms of the species that rely upon rivers and streams for habitat, as well as those species which rely indirectly upon the habitat by virtue of provision of habitat for their prey.

Table 1. Priority species associated with coastal plain riverine aquatic communities.

Group	Scientific name	Common name	State status* (Federal status)
Birds	<i>Anhinga anhinga</i>	Anhinga	SR
Mammals	<i>Trichechus manatus</i>	Manatee	E (E)
Amphibians	<i>Eurycea guttolineata</i>	Three-lined Salamander	
	<i>Eurycea sp 1</i>	Sandhills Salamander	
	<i>Necturus lewisi</i>	Neuse River Waterdog	SC
	<i>Rana heckscheri</i>	River Frog	SC
	<i>Siren lacertina</i>	Greater Siren	
Reptiles	<i>Stereochilus marginatus</i>	Many-lined Salamander	
	<i>Alligator mississippiensis</i>	American Alligator	T (T)
	<i>Apalone spinifera aspera</i>	Gulf Coast Spiny Softshell	
	<i>Deirochelys reticularia</i>	Eastern Chicken Turtle	SR
	<i>Farancia abacura abacura</i>	Eastern Mudsnake	
	<i>Farancia erytrogramma erytrogramma</i>	Common Rainbow Snake	
	<i>Kinosternon baurii</i>	Striped Mud Turtle	
	<i>Regina rigida</i>	Glossy Crayfish Snake	SR
	<i>Seminatrix pygaea</i>	Black Swamp Snake	SR
	<i>Thamnophis sauritus sauritus</i>	Common Ribbonsnake	
*Abbreviations E Endangered T Threatened SC Special Concern SR Significantly Rare			

Other fully aquatic taxa (fish, mussels, crayfish, and snails) are referenced in the river basins descriptions. See the Roanoke, Tar-Pamlico, Neuse, Cape Fear, Lumber, White Oak, Chowan, and Pasquotank River basin sections or Chapter 5B of the Wildlife Action Plan for more detailed information on aquatic species and habitats, by basin.

Location And Condition Of Habitat

Riverine aquatic communities are found alongside and within all coastal plain rivers. Human-influenced alterations have affected much of the Coastal Plain's riverine and floodplain habitats. Water quality and quantity have been impacted by run-off from municipalities, road construction and poorly managed agricultural operations (originating in the coastal plain, and/or from upstream sources in the Piedmont). Dam construction has altered flows and river hydrology and morphology. Removing woody debris from streams after storms has influenced in-stream habitat structure and food webs. The condition of some coastal plain rivers is greatly reduced due to these impacts. However, some sections are designated High Quality Water and Outstanding Resource Water Management Zones and provide excellent opportunities for maintaining relatively pristine waterways. Map 1 depicts locations of riverine aquatic habitats in the Mid-Atlantic Coastal Plain ecoregion. *(Also see Chowan, Pasquotank, Roanoke, Tar-Pamlico, Neuse, White Oak, Cape Fear, and Lumber River basin sections).*

Problems Affecting Species And Habitats

Water quality is a primary concern, especially for fully aquatic species. Dams have altered hydrology and stream flows, and have created barriers for movement for species that depend on the rivers and streams for their primary mode of travel. Irregular flooding during the growing and nesting seasons can affect the reproductive success and survival of species that depend on this habitat type. Dams buffer against peak flows that disperse seeds of plants to maintain habitats. Many streams and rivers are heavily laden with sediment, which has disturbed the food webs on which these species depend. Exotic species like *Corbicula* impact nutrient flow and outcompete many native aquatic invertebrates.

Water quality deterioration and loss of habitat are two of the most serious problems affecting wildlife that utilize riverine habitat. Water quality concerns, originating from both point and non-point sources have had, and continue to pose a threat directly to species that occur in riverine habitat, and indirectly through alteration of the food base or habitat. Direct and indirect impacts of decreased water quality upon wildlife associated with riverine habitat are difficult to quantify, and have not been as fully explored as have impacts upon fully aquatic species. However, there is little doubt that clean water is critical to a host of species that live in rivers and streams for a portion of their lives, and that sedimentation, channel scour, and other alterations of the physical habitat can lead to both deterioration of the habitat quality and negative impacts upon aquatic flora and fauna, which form the base of the food web for numerous wildlife species.

A condition with historic roots that still affects riverine habitat and its wildlife is the impoundment of rivers and streams for a variety of purposes including hydroelectric power generation, flood control, water supply, and recreation/aesthetics. Again, the effects have been

both direct and indirect, in that lotic habitat has been lost and the food web has shifted, at least in portions of former riverine habitat, to species that do not depend upon flowing water. Other than measuring the direct impact of this habitat conversion, we do not know the secondary impacts upon the wildlife species present from the indirect effects of river or stream impoundment.

Another impact upon riverine habitat that can be construed as habitat loss, at least for some species, is the development of floodplains or riparian areas. River or stream-front development may or may not have a direct negative impact upon water or habitat quality in the stream or river, however in most instances it does. The impacts of development adjacent to rivers and streams includes potential problems associated with direct input of contaminants and sediment, alteration of hydrologic patterns and processes, temperature regimes, and loss of critical habitat adjacent to aquatic habitat that may be of equal importance to species that only spend a portion of their lives in the water, like some amphibians.

Most of the listed priority amphibian and reptile species associated with riverine habitat have limited distributions, unknown distributions or widely dispersed but small populations. Isolation or fragmentation of particular habitat stretches occupied by those species could have significant long-term effects upon the sustainability of those populations in the Coastal Plain of North Carolina.

Species And Habitat Conservation Actions and Priorities For Implementation

The biggest need in coastal plain riverine aquatic communities is to increase buffer widths to mitigate impacts from pollution into river systems, and to maintain habitat at the edge of these aquatic communities that will provide cover and foraging areas for many wildlife species using riverine habitat. Immediate and continuing efforts need to be undertaken to limit water quality deterioration from point sources of pollution as well as non-point sources. Toxic chemicals and sediment are entering waterways and having a direct negative impact upon the species in the rivers and streams, but also having significant negative impacts upon the quality of the habitat itself.

Measures to address these issues, some of which are in practice currently, such as regulation of point and non-point sources of pollution, need to be enacted and enforced. Mandatory and incentive-based practices to improve water quality need to be actively pursued with cooperation from agencies and organizations at local, state and federal levels. River and stream ecosystem enhancement and restoration efforts and programs need to be enhanced and supported as well. And finally, within the frameworks afforded by state, local, federal, and private initiatives, riverine habitats need to be permanently protected from the negative impacts of development through conservation ownership (fee title or easement) of as much habitat as possible. Fee title (linear length protection) and easements acquisition through partnerships with land trusts is essential. Where possible forest patches should be connected along river systems to provide connectivity. The Clean Water Management Trust Fund is an important funding organization for riverine aquatic sites. *Also see the appropriate river basin sections for more detailed conservation recommendations regarding fully aquatic species.*

Priority Research, Survey, And Monitoring

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

Monitoring systems need to be expanded and/or targeted to be able to assess current population status and trend information for the wildlife species associated with riverine habitats. Long-term monitoring for amphibians and reptiles needs to be developed or enhanced (Taylor and Jones 2002) and there is a decided lack of long-term monitoring information on most bat species associated with riverine habitat (Ellis *et al.* 2002).

- **Surveys**

- Determine the status and distribution of manatees in coastal rivers.
- Determine the components of foraging bat communities along rivers.
- Determine the status and distribution for priority herpetofauna associated with coastal plain riverine aquatic communities (e.g. river frog, many-lined salamander, sandhills salamander, greater siren, Neuse River waterdog, Gulf Coast spiny softshell, eastern chicken turtle, striped mud turtle, common rainbow snake, eastern mudsnake, glossy crayfish snake, black swamp snake) and secondarily for other reptiles and amphibians using riverine habitat.
- Better determine the status and distribution of the American alligator.

- **Monitoring**

- Establish long-term efforts to monitor the northward range expansion of the manatee.
- Establish long-term monitoring of bats using riverine habitat for foraging.
- Establish long-term monitoring for priority amphibian and reptiles.

- **Research**

- Genetics*

- Verify the genetic makeup of the sandhills salamander, which has yet to be formally described.

- Population demographics*

- Collect basic demographics information on riverine-associated reptiles, amphibians and bats.

- Management practices*

- Determine the effect of buffer widths on amphibian and reptile species diversity and productivity.
 - Determine the impacts of “snagging” (removing woody debris after storms) on wildlife populations.

- Examine the extent and impact of exotic species introductions; conduct research on effective control measures for the most problematic exotics.
- Investigate the effect of beaver ponds on downstream movement of pollutants (toxins and sediment).

Habitat use

- Examine foraging and habitat use patterns of bats, using telemetry.
- Examine habitat-use patterns of the eastern mudsnake, common rainbow snake, glossy crayfish snake, black swamp snake and eastern chicken turtle, using telemetry.

Supporting References

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