Chapter 19
Natural Resources

19.1 Ecological Significance of the Roanoke River Basin

The Roanoke River basin is ecologically significant and diverse in numerous ways, and contains habitat for over 140 rare plant and animal species. The character of the basin is somewhat montane as it enters North Carolina, where some natural communities are often associated with mountains, including Canada Hemlock Forest, Rich Cove Forest, Low Elevation Rocky Summit, Spray Cliff and Carolina Hemlock Bluff. The Roanoke then flows about 100 miles through the Piedmont and the Coastal Plain. In the Piedmont, it provides habitat for a number of rare fish and mussels, as well as small-anthered bittercress (*Cardamine micranthera*), a species only known to Stokes County and adjacent Hentry County, Virginia. This endemic plant requires small or intermittent streams and seepage areas and is found in the wet soil and rocks along small stream banks, and in hardwood forest with intact forest cover. This species had been presumed extinct however it was rediscovered in 1985, nearly 30 years after it had last been seen. The Coastal Plain section of the Roanoke River contains high-quality examples of wetland communities such as Coastal Plain Bottomland Hardwoods and Cypress-Gum Swamps. Some of these natural communities are extensive, and the large blocks of habitat are excellent for wildlife. Finally, the Roanoke River is the major contributor of freshwater to Albemarle Sound.

19.2 Rare Aquatic and Wetland-Dwelling Animal Species

Table 20 lists the rare fish, mollusks, insects, amphibians, and reptiles found throughout the Roanoke River basin. For information on any of the species listed in Table 20, visit the NC Natural Heritage Program (NHP) website at www.ncnhp.org.

Rare Species Listing Criteria

E =	Endangered (those species in danger of becoming extinct)
T =	Threatened (considered likely to become endangered within the foreseeable future)
SR =	Significantly Rare (those whose numbers are small and whose populations need monitoring)
SC =	Species of Special Concern
FSC =	Federal Species of Concern (those under consideration for listing under the Federal Endangered Species Act)
T(S/A) =	Threatened due to similarity of appearance
EX =	Extirpated
(PSC) =	Proposed Species of Concern (This is a proposed status, not yet adopted by Wildlife Resource Commission)

Table 20 - Rare aquatic animal species in the Roanoke River Basin (Source: NC Natural Heritage Program, July 2005)

Scientific Name	Major Group	Common Name	State Status	Federal Status
Lasmigona subviridis	Mollusk	Green floater	E	FSC
Ligumia nasuta	Mollusk	Eastern pondmussel	T	
Strophitus undulatus	Mollusk	Creeper	T	
Alasmidonta undulata	Mollusk	Triangle floater	T	
Leptodea ochracea	Mollusk	Tidewater mucket	T	
Pleurobema collina	Mollusk	James spinymussel	SR	E
Fusconaia masoni	Mollusk	Atlantic pigtoe	E	FSC
Lampsilis radiata	Mollusk	Eastern lampmussel	T	
Anodonta implicata	Mollusk	Alewife floater	T	
Elliptio roanokensis	Mollusk	Roanoke slabshell	T	
Alasmidonta varicosa	Mollusk	Brook floater	E	FSC
Orconectes virginiensis	Crustacean	Chowanoke crayfish	SC	FSC
Etheostoma collis pop. 2	Fish	Carolina darter - Eastern Piedmont population	SC	FSC
Etheostoma podostemone	Fish	Riverweed darter	SC	
Acipenser brevirostrum	Fish	Shortnose sturgeon	E	E
Noturus gilberti	Fish	Orangefin madtom	E	FSC
Hypentelium roanokense	Fish	Roanoke hog sucker	SR	
Exoglossum maxillingua	Fish	Cutlips minnow	E (PSC)	
Cottus caeruleomentum	Fish	Blue ridge sculpin	SR (PSC)	
Thoburnia hamiltoni	Fish	Rustyside sucker	E	FSC
Scartomyzon ariommus	Fish	Bigeye jumprock	T	
Diplectrona metaqui	Insect	A diplectronan caddisfly	SR	
Micrasema sprulesi	Insect	A caddisfly	SR	
Ceraclea mentiea	Insect	A caddisfly	SR	
Ephemerella berneri	Insect	A mayfly	SR	
Ceraclea cancellata	Insect	A caddisfly	SR	
Hemidactylium scutatum	Amphibian	Four-toed salamander	SC	
Ambystoma talpoideum	Amphibian	Mole salamander	SC	
Glyptemys muhlenbergii	Reptile	Bog turtle	T	T(S/A)

19.3 Significant Natural Heritage Areas in the Roanoke River Basin

The North Carolina Natural Heritage Program (NHP) compiles a list of Significant Natural Heritage Areas as required by the Nature Preserves Act. The list is based on the program's inventory of natural diversity in the state. Natural areas are evaluated on the basis of the occurrences of rare plant and animal species, rare or high-quality natural communities, and special animal habitats. The global and statewide rarity of these elements and the quality of their occurrence at a site relative to other occurrences determines a site's significance. The sites included on this list are the best representatives of the natural diversity of the state, and therefore have priority for protection. Inclusion on the list does not imply that any protection or public access exists.

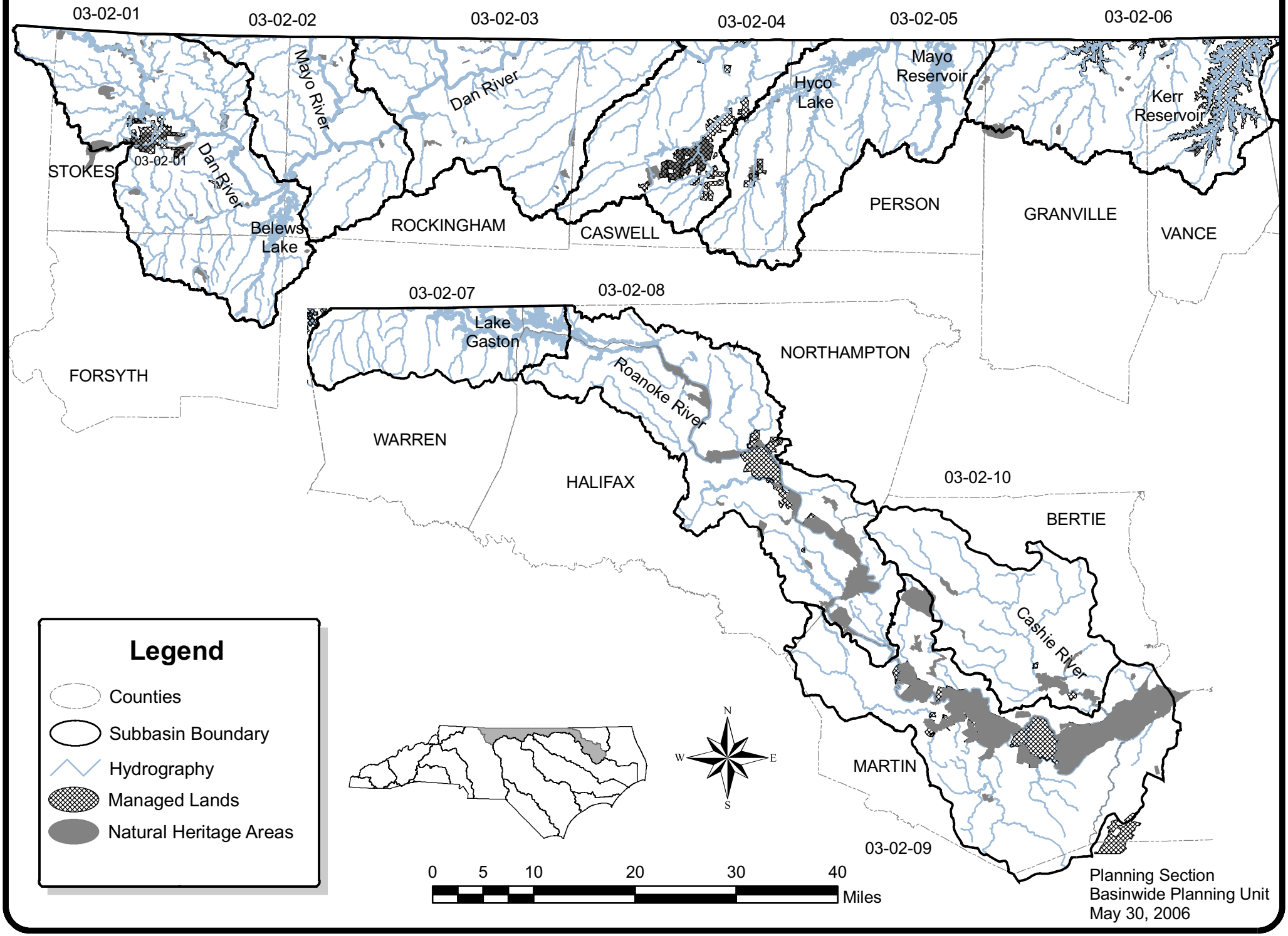
Figure 26 is a map of the Significant Natural Heritage Areas of the Roanoke River Basin. Sites that directly contribute to the maintenance of water quality in the Roanoke River basin are highlighted on the map and in the following text. The Natural Heritage Program has identified over 145 individual natural areas in the Roanoke River Basin. Because of this large number a some of the more important are discussed below:

Hanging Rock State Park is situated among the Sauratown Mountains, an isolated group of low mountains. The most prominent feature of the park is its series of steep, quartzite-capped ridges dissected by Cascades and Indian Creeks. Among the several rare plant species in the park are Greenland sandwort (*Minuartia groenlandica*), Bradley's spleenwort (*Asplenium bradleyi*), and a substantial population of bear oak (*Quercus ilicifolia*) on xeric slopes of Cooks Wall and Moores Knob.

Several important aquatic habitats are located in the Roanoke River Basin. Many of these are discussed below, but two of the more notable are the Dan River in Stokes County and the Mayo River. The Dan River Aquatic Habitat (Stokes County) is considered of national significance. As the Dan and Little Dan Rivers flow from Virginia, the waters maintain several fish species found nowhere else in North Carolina. The rarest of these fish is orangefin madtom, found in North Carolina only in these two waterways. This section of the river also contains populations of the federally endangered James River spinymussel. Other rare species that the Stokes County stretch of the Dan River provides habitat for include rare fish (Blue Ridge sculpin, cutlips minnow, Roanoke hog sucker, rustyside sucker, bigeye jumprock, and riverweed darter), mussels (James spinymussel, green floater, notched rainbow), and one rare plant, the Federally Endangered small-anthered bittercress. The Mayo River Aquatic Habitat is also nationally significant, and contains one of the best populations in the nation of James River spinymussel. Other rare species known from the Mayo include green floater, notched rainbow, riverweed darter, Roanoke hog sucker, bigeye jumprock, and three insects: *Ceraclea mentiea* (a caddisfly), *Ephemerella berneri* (a mayfly), *Micrasema sprulesi* (a caddisfly).

Jessups Mill/Georges Mill Corridor (Dan River) is a large, forested area of slopes along the Dan River, with examples of Mesic Mixed Hardwood Forest, Dry-Mesic Oak--Hickory Forest, Piedmont/Coastal Plain Heath Bluff, Rocky Bar and Shore, and Sand and Mud Bar communities. Four intermittent tributaries support populations of small-anthered bittercress, one of which is the largest known in the state. The site surrounds a portion of the nationally significant Dan River Aquatic Habitat (Stokes Section).

Figure 26 Roanoke River Basin Managed Lands and Significant Heritage Areas



The Caswell Game Land protects much of the one of the most extensive and high quality tracts of mature Piedmont second-growth upland hardwood forest in the state. Oak and hickory dominate the upper slopes. Also found here are beech slopes, successional pine stands, narrow zones of alluvial hardwoods. Flowing through part of the game lands is Country Line Creek, a significant aquatic habitat discussed below.

The Nationally Significant Goshen Gabbro Forest contains many rare plant species, one of which is the Federally Endangered smooth coneflower (*Echinacea laevigata*). Yet most significant are the high quality examples of rare natural communities, including an outstanding Basic Oak--Hickory Forest, plus Xeric Hardpan Forest, and Upland Depression Swamp Forest. In addition, these high quality and rare communities are adjacent to each other in a 3-square-mile continuous block of forest. Thus, the site should provide important breeding and feeding habitat for amphibians that lay eggs in the pools and wander overland for the remainder of the year. The topography is flatter than typical Piedmont topography, due to the gabbro, which underlies the site. This rock is also associated with many of the rare plants and natural communities, through its influence on soil chemistry.

The lower Roanoke River floodplain contains perhaps some of the best remaining brownwater river floodplain communities known in the southeastern United States. The floodplain extends along about 130 miles along the lower Roanoke River and varies in width from three to five miles. In 1990, the US Fish & Wildlife Service and the NC Wildlife Resources Commission began acquiring property within the floodplain. Together, the Roanoke River National Wildlife Refuge and the Roanoke River Wetlands Game Land now protect over 32,000 acres. In addition, The Nature Conservancy, a private conservation group, has a cooperative agreement to manage and protect about 21,000 acres of land within the floodplain owned by Georgia-Pacific.

The privately-owned Occoneechee Neck Floodplain Forest, contains some of the best remaining examples of mature floodplain forest along the upper Roanoke River valley. Particularly notable are the 10-15 pairs of nesting cerulean warblers, a disjunct breeding population over 200 km from the nearest mountain population. This area also contains several large beaver ponds, some of the oldest in the Roanoke floodplain, and excellent examples of this community type.

Camassia Slopes is nationally significant for outstanding cluster of elements, including one of the best examples of a Basic Mesic Forest (Alluvial Terrace Slope Variant) in the State. It also contains one of only two wild hyacinth (*Camassia scilloides*) populations in the state – a species disjunct from midwestern slopes and prairies. These disjunct species are probable remnants from the Pleistocene glaciation period. Part of the natural area is a Dedicated Nature Preserve belonging to The Nature Conservancy, with the remaining portion on Odum Correctional Institution land.

Partly within the Roanoke River Wetland Game Land, the Buzzard Point/Ventosa Plantation natural area is a large expanse of river floodplain with some of the best examples of the typical bottomland and swamp communities in the Roanoke system, including levee forests, backswamps, alluvial flats, sloughs, low and high ridges, and beaver ponds. Diverse, abundant wildlife includes breeding populations of Mississippi kite, cerulean warbler, black vulture, and red-shouldered hawk, as well as wild turkeys, turkey vultures, wood ducks, and other more common game and nongame species.

Part of the Roanoke River National Wildlife Refuge, Broadneck Swamp contains one of best mature natural levee forest communities in the Roanoke floodplain. A rare disjunct population of Virginia bluebells (*Mertensia virginica*) is located on the levee. The natural area also contains the largest swamp forest in the upper and middle portions of the floodplain of the Roanoke River. The swamp supports the second largest inland heron rookery in North Carolina, and provides important nesting and wintering habitat for ducks.

Conoho Neck Swamp is located along the lower reaches of Conoho Creek within the floodplain of the Roanoke River, and is protected as part of the Roanoke River Wetland Game Land. It is a classic example of a "backswamp," a swamp formed by the natural levees along the main channel of the river, which act as berms or dams, impeding drainage and holding water in the backswamps during the winter and spring months. The deeply flooded cypress-gum swamp forest is the dominant natural community on this site and is influenced by both the blackwater Conoho Creek and brownwater Roanoke River. Also found here is a fine example of a "yazoo" tributary, formed when a tributary is deflected by the levee bordering the main river and is forced to run parallel to the main trunk river for some distance.

Devil's Gut, a Nature Conservancy preserve, contains some of the best examples of old-growth alluvial forest communities in North Carolina. Located in the lower floodplain of the Roanoke River, it contains diverse alluvial features: filled river channels, point bars, and natural levees. Long, narrow sand or loamy ridges with levee forests of laurel oak, swamp chestnut oak, willow oak, and water oak alternate with parallel bands of bald cypress-water tupelo sloughs, forming a ridge and swale topography. On slightly higher terraces along Devil's Gut, an alluvial hardwood community containing green ash, sycamore, and silver maple. An old-growth (up to 160-year-old trees) loblolly pine/American beech community located on higher slopes in the southeastern section of this site support the only known stand of American beech in the North Carolina coastal Plain.

Jamesville Island is a large, contiguous Cypress--Gum Swamp Forest located on a bend in the lower Roanoke River floodplain. The site contains the largest expanse of contiguous cypress-water tupelo swamp forest in the Roanoke River floodplain and likely in North Carolina. It also supports extensive river frontage and several distributary streams, cypress-gum flats, and tidally influenced blackwater stream/bayou natural communities. The site is considered of national significance, as one of the most extensive and mature Brownwater Subtype Cypress--Gum Swamps in the nation. A portion of the natural area is within the Roanoke River National Wildlife Refuge, and another portion is protected by The Nature Conservancy.

Roanoke River Delta Islands contains a series of islands and distributary channels at river mouth. An extensive tract of mature bald cypress-water tupelo-Carolina water ash swamp forest is second in size only to the nearby Broad Creek Neck. It supports a high diversity of wildlife, including bear refuge, waterfowl, and nesting neo-tropical songbirds. It also protects important aquatic habitat for a diversity of fish. Much of the natural area is within the Roanoke River National Wildlife Refuge.

A large example of the rare Nonriverine Swamp Forest natural community is found in the Roanoke River basin at a site known as Roquist Pocosin. The canopy is mature to old, with trees averaging 17 inches in diameter and trees 24-30 inches in diameter are common. Much of this

area has been degraded by logging. On the north side is a small but very mature and excellent quality Nonriverine Wet Hardwood Forest, dominated by swamp chestnut oak, cherrybark oak, and laurel oak. This natural community is also globally rare, and many of the other known examples have been degraded. The NC Ecosystem Enhancement Program has acquired much of the natural area as mitigation.

19.4 Significant Aquatic Habitats in the Roanoke River Basin

The NHP also collaborates with other agencies and organizations to identify Significant Aquatic Habitats in North Carolina. These habitat areas often include stream segments or other bodies of water that contain significant natural resources, such as a high diversity of rare aquatic animal species. The impact from lands adjacent to and upstream of these stream reaches determines their water quality and the viability of their aquatic species. The identification of a natural area conveys no protection; these lands are the responsibility of the landowner. Significant Aquatic Habitats in the Roanoke River basin are described below and are shown on Figure 26.

Mayo River Aquatic Habitat is ranked nationally significant. See page 171.

Lower Roanoke River Aquatic Habitat is state significant, and provides habitat for rare species such as alewife floater, Tidewater mucket, Chowanoke crayfish, and the rare caddisfly, *Ceraclea cancellata***.**

Dan River (Rockingham) Aquatic Habitat is considered of state significance and provides habitat for several species, including three rare fish (Roanoke hog sucker, bigeye jumprock, and riverweed darter), as well as one mussel, the green floater.

Country Line Creek Aquatic Habitat is regionally significant as habitat for several mussels, including triangle floater, Atlantic pigtoe, and creeper, as well as the riverweed darter.

Middle Roanoke River Aquatic Habitat is regionally significant and contains populations of the rare species such as Roanoke slabshell and Chowanoke crayfish.

Cascade Creek/Indian Creek (Hanging Rock) Aquatic Habitat is regionally significant**,** and incorporates limited segments of Cascade Creek, Indian Creek and other significant tributaries in the vicinity of Hanging Rock State Park. A rare diplectronan caddisfly (*Diplectrona metaqui*) is known from these waters.

Dan River (Stokes) Aquatic Habitat is ranked nationally significant. See above for description.

Little Dan River Aquatic Habitat is considered regionally significant. This south-flowing river provides habitat for at least four rare species of fishes in North Carolina -- rustyside sucker, orangefin madtom, riverweed darter, and Blue Ridge sculpin.

Roanoke River Fall Zone Aquatic Habitat is state significant and contains an assemblage of seven rare mollusk species, including triangle floater, Alewife floater, Roanoke slabshell, Atlantic pigtoe, Eastern lampmussl, green Floater, and Tidewater mucket.

Aarons Creek Aquatic Habitat is regionally significant, and provides habitat for four rare mussels: brook floater, Atlantic pigtoe, creeper, and notched rainbow**.**

There are a number of Upland, Riparian and Wetland Significant Natural Heritage Areas not listed here that contribute to Roanoke River Water Quality. Please contact the NC Natural Heritage Program (NHP) to obtain information about these natural areas, or visit the NHP website at www.ncnhp.org.

19.5 Public Conservation Lands

Figure 26 also shows the land protected by public ownership in the Roanoke River basin. A number of significant natural areas, including some already mentioned, are located on public land (Hanging Rock State Park, Caswell Game Lands, Roanoke River Wetlands Game Land, Roanoke River National Wildlife Refuge). North Carolina State University's Sertoma 4-H Education Center is also in the Roanoke River basin, and a portion of it is the Moores Spring Dedicated Nature Preserve. These public lands are ecologically significant and provide water quality protection. Also on the map are some preserves or conservation easements held by private conservation organizations, many of which provide these same benefits, such as The Nature Conservancy's Camassia Slopes, Larkspur Ridge, and Roanoke River Preserves, and the Piedmont Land Conservancy's Dan River preserve near Hanging Rock State Park.

Some of the other lands noted on the map are important but not necessarily protected. Caledonia Correctional Institution and Odum Correctional Institution are large facilities (almost 9,000 acres combined) with about 13 miles of frontage on the Roanoke River. Portions of these facilities also provide important habitat for plants and animals, and qualify for Dedication as State Nature Preserves. There are numerous other conservation opportunities for partners to look at in the Roanoke River basin.

The contribution of private organizations to conservation in the Roanoke River basin has been irreplaceable. Although only partially shown on the map, these organizations have achieved significant protection in the Roanoke River basin. As noted, The Nature Conservancy owns and manages a number of Nationally Significant natural areas, and the Piedmont Land Conservancy and other local land trusts have also been working to protect the landscape of the Roanoke River basin from further fragmentation, benefiting wildlife and water quality. One of the more exciting projects involving a public private partnership is the Piedmont Land Conservancy's work with the Division of Park and Recreation's new Mayo River State Park. The Nature Conservancy works in a similar manner with the NC Wildlife Resources Commission on Roanoke River Wetlands Game Land. Using innovative tools such as conservation easements, these organizations work with private landowners as well, in a number of ways to protect important natural areas and water quality, as well as the "open space" of agricultural lands. The work that they do is helping to improve the quality of life for residents of the Roanoke River basin.

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