

## Chapter 33

# Significant Ecological Resources and Endangered Species

### 33.1 Ecological Significance of the Cape Fear River Basin

The Cape Fear River basin is the largest of North Carolina’s river basins, and because of its size it contains a wide variety of aquatic systems. The Cape Fear River itself has the character of three or more rivers including: the clearwater Piedmont stream that rises at the confluence of the Deep River and the Haw River; a meandering coastal “brownwater” river draining farmlands at its mid-section; and a 30-mile long brackish estuary at its lower end. Also in the basin are “blackwater” tributaries such as the Black, South and Northeast Cape Fear Rivers. Not only is the Cape Fear River basin high in natural diversity, it also has a high rate of endemism. Among the many rare mussels and fish known from the basin are species found nowhere else.

### 33.2 Rare Aquatic and Wetland-Dwelling Animal Species

For information on any of the species listed in Table 35, visit the NC Natural Heritage Program website at [www.ncsparks.net/nhp](http://www.ncsparks.net/nhp).

Table 35 List of Rare Species associated with Aquatic Habitats in the Cape Fear River Basin

Group	Scientific Name	Common Name	State Status	Federal Status
Crustacean	<i>Cambarus catagius</i>	Greensboro burrowing crayfish	SC	
Crustacean	<i>Cambarus davidi</i>	Carolina ladle crayfish	SR	
Fish	<i>Evorthodus lyricus</i>	Lyre goby	SR	
Fish	<i>Acipenser brevirostrum</i>	Shortnose sturgeon	E	E
Fish	<i>Fundulus luciae</i>	Spotfin killifish	SR	
Fish	<i>Etheostoma collis pop 2</i>	Carolina darter - eastern piedmont population	SC	FSC
Fish	<i>Carpionodes velifer</i>	Highfin carpsucker	SC	
Fish	<i>Lucania goodei</i>	Bluefin killifish	SC	
Fish	<i>Heterandria formosa</i>	Least killifish	SC	
Fish	<i>Notropis mekistocholas</i>	Cape Fear shiner	E	E
Fish	<i>Hypsoblennius ionthas</i>	Freckled blenny	SR	
Fish	<i>Microphis brachyurus</i>	Opossum pipefish	SR	
Fish	<i>Poecilia latipinna</i>	Sailfin molly	SR	
Fish	<i>Noturus sp. 1</i>	Broadtail madtom	SC	
Fish	<i>Eleotris pisonis</i>	Spinycheek sleeper	SR	

Fish	<i>Elassoma boehlkei</i>	Carolina pygmy sunfish	T	FSC
Fish	<i>Cyprinella zanema pop 2</i>	Santee chub - Coastal Plain population	SC	
Fish	<i>Semotilus lumbee</i>	Sandhills chub	SC	
Fish	<i>Gobionellus stigmaticus</i>	Marked goby	SR	
Fish	<i>Moxostoma sp. 2</i>	Carolina redbhorse	SR	FSC
Fish	<i>Ambloplites cavifrons</i>	Roanoke bass	SR	
Insect	<i>Ephemera argo</i>	Argo ephemerellan mayfly	SR	FSC
Insect	<i>Tricorythodes robacki</i>	A mayfly	SR	
Insect	<i>Gomphus septima</i>	Septima's clubtail	SR	FSC
Insect	<i>Trienodes marginata</i>	A trienode caddisfly	SR	
Insect	<i>Dolania americana</i>	American sand burrowing mayfly	SR	FSC
Insect	<i>Progomphus bellei</i>	Belle's sanddragon	SR	FSC
Insect	<i>Choroterpes basalis</i>	A mayfly	SR	
Insect	<i>Ceraclea cancellata</i>	A caddisfly	SR	
Mollusk	<i>Villosa vaughaniana</i>	Carolina creekshell	E	FSC
Mollusk	<i>Fusconaia masoni</i>	Atlantic pigtoe	E	FSC
Mollusk	<i>Planorbella magnifica</i>	Magnificent rams-horn	E	FSC
Mollusk	<i>Anodonta couperiana</i>	Barrel floater	E	
Reptile	<i>Alligator mississippiensis</i>	American alligator	T	T(S/A)
Reptile	<i>Caretta caretta</i>	Loggerhead seaturtle	T	T
Reptile	<i>Malaclemys terrapin centrata</i>	Carolina diamond-backed terrapin	SC	

<b>Rare Species Listing Criteria</b>	
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

### 33.3 Significant Natural Heritage Areas in the Cape Fear River Basin

Figure 42 is a map of the Significant Natural Heritage Areas of the Cape Fear River basin. The Natural Heritage Program identifies sites (terrestrial or aquatic) that have particular biodiversity significance. A site's significance may be due to the presence of rare species, rare or high quality natural communities, or other important ecological features. The accompanying map shows the Significant Natural Heritage Areas identified in the Cape Fear River basin. Over 450 individual natural areas have been identified in the Cape Fear River basin, too large a number to discuss in detail here, so only the most important of these areas are discussed below.

### 33.3.1 Cape Fear Shiner Aquatic Habitats

Sections of three Piedmont rivers form the primary population centers for the very rare and endangered Cape Fear shiner (*Notropis mekistocholas*), a fish endemic to a small part of the Cape Fear River basin. Because of this, stretches of these rivers have been designated by the US Fish and Wildlife Service as critical habitat. These rivers, the Deep, Rocky and Haw, also support a number of other rare aquatic animals, including fish such as the Carolina redhorse (*Moxostoma sp.*) and the Roanoke bass (*Ambloplites cavifrons*); freshwater mussels such as the brook floater (*Alasmidonta varicosa*), triangle floater (*Alasmidonta undulata*), Atlantic pigtoe (*Fusconaia masoni*), yellow lampmussel (*Lampsilis cariosa*), squawfoot (*Strophitus undulatus*), notched rainbow (*Villosa constricta*), and eastern creekshell (*Villosa delumbis*); and dragonflies such as Septima's clubtail (*Gomphus septima*). Also found here is one of just two North Carolina populations of the endangered plant harperella (*Ptilimnium nodosum*), found on an island in the Deep River in Chatham County.

### 33.3.2 Sandhills Megasite

The diverse natural communities of the sandhills region, such as hillside seeps, upland longleaf pine forests, streamhead pocosins, and mixed hardwood-Atlantic white cedar swamps, provide habitat for many rare and endemic species including perhaps the largest remaining concentration of the endangered red-cockaded woodpecker (*Picoides borealis*) in the state. Endangered plants include Michaux's sumac (*Rhus michauxii*), chaffseed (*Schwalbea americana*), and rough-leaf loosestrife (*Lysimachia asperulifolia*). The publicly-owned Sandhills Game Land, Camp MacKall and Fort Bragg contain some of the largest remnants of the sandhills in natural condition in North Carolina.

### 33.3.3 Bladen Lakes Megasite

Occurring on ancient terraces of the Cape Fear River, the Bladen Lakes area contains the greatest concentration of relatively unaltered Carolina bays in North Carolina. The bays contain lakes and a diversity of peatland communities. The surrounding landscape is an irregular mosaic of shallow peatlands and sand longleaf pine communities. Many of the significant natural areas are in public ownership, either as game lands, state forest or state parks.

### 33.3.4 Black and South Rivers

The Black and South Rivers contain significant aquatic communities with two rare fish species – the broadtail madtom (*Noturus sp.*) and the Santee chub (*Cyprinella zanema*); and several rare mussels – pod lance (*Elliptio folliculata*), Cape Fear spike (*E. marsupiobesa*), Atlantic pigtoe (*Fusconaia masoni*), and yellow lampmussel (*Lampsilis cariosa*). The Black River is also one of the best remaining examples of a blackwater river system in the southeast coastal plain. Particularly notable is an ancient cypress-gum swamp, which contains the oldest stand of trees east of the Rocky Mountains; some cypress trees in this swamp have been core-dated to 364 AD. The swamp forest of the Black River supports several colonies of the rare Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), a bat that is dependent on large hollow trees found in old-growth forests.

### 33.3.5 Lower Cape Fear River

The lower reach of the Cape Fear River is brackish and supports numerous rare marine fishes, including the endangered shortnose sturgeon (*Acipenser brevirostrum*), as well as freckled blennies (*Hypsoblennius ionthas*), marked gobies (*Gobionellus stigmaticus*), spinycheek sleepers (*Eleotris pisonis*), and opossum pipefish (*Microphis brachyurus*). The endangered manatee (*Trichechus manatus*) is an occasional visitor, especially in summer.

### 33.3.6 Northeast Cape Fear River Floodplain

The Northeast Cape Fear River floodplain is a drowned blackwater river corridor characterized by Tidal Freshwater Marshes at the lower end and extensive Tidal Cypress--Gum Swamp communities upstream. Encompassing more than 22,000 acres, the Northeast Cape Fear River floodplain contains some very high quality natural communities, including rare types such as Peatland Atlantic White Cedar Forest and longleaf pine forests. At least one portion of the site contains old-growth longleaf pine communities and mature examples of nonriverine wetland communities. Though not thoroughly explored, a number of rare plant and animal species have been found here. The southeastern myotis (*Myotis austroriparius*) – a bat that roosts in hollow trees near water – is widespread along the upper portion, and alligators are present throughout. The rare estuarine fishes lyre goby (*Evorthodus lyricus*) and spinycheek sleeper (*Eleotris pisonis*) have been found in the marshes at the lower end. The site is a major forested connector between other large sites.

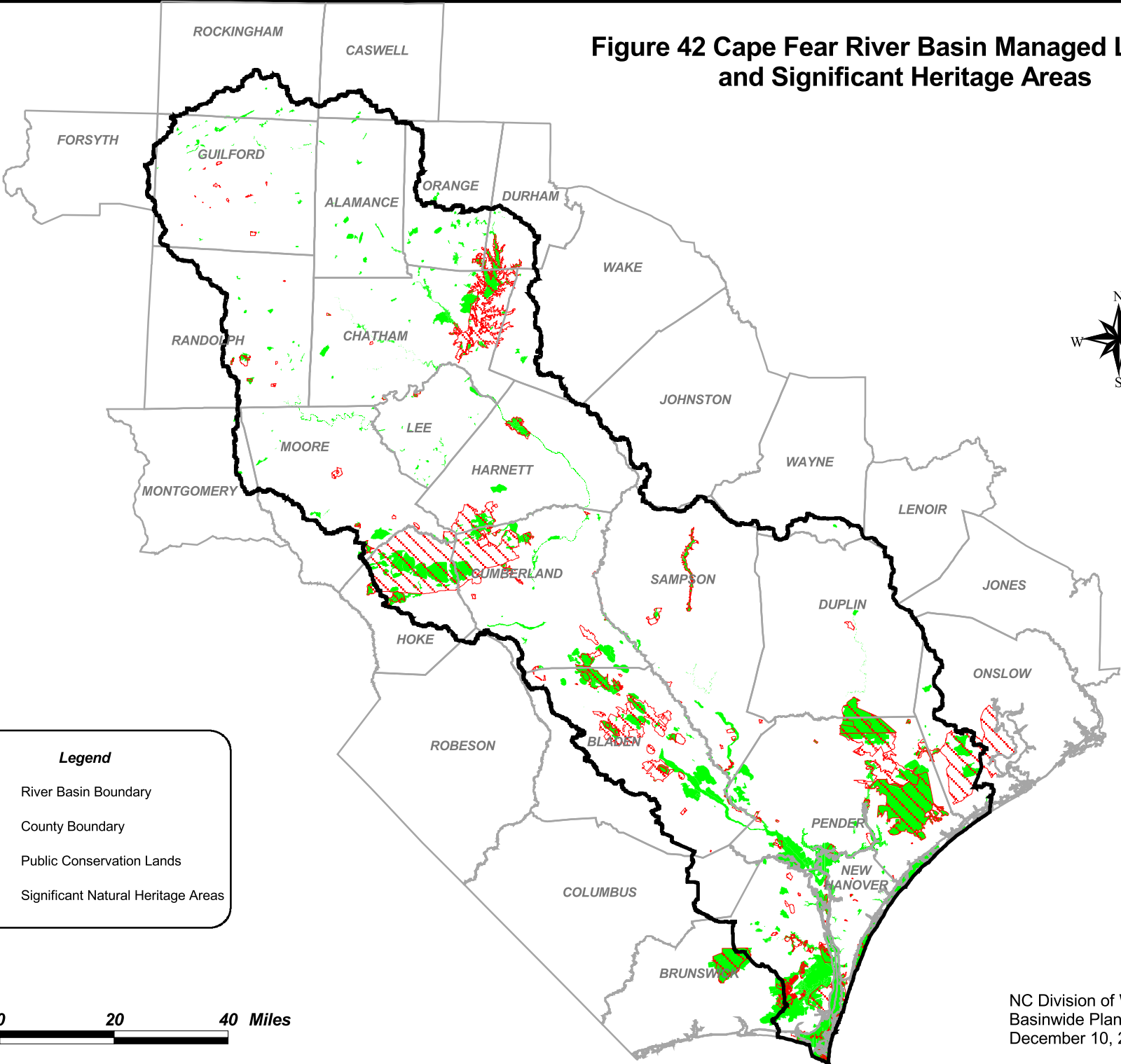
### 33.3.7 Pine Savannas

The Cape Fear River basin contains a high concentration of savanna habitats. These wet, generally flat areas have an open to sparse tree canopy, with few shrubs and a dense herb layer. The pine savannas of southeastern North Carolina have among the highest species diversity of any natural community in temperate North America, and more rare species are associated with the pine savanna than any other natural community type in the state. Only a few examples of this natural community are protected through public ownership or conservation easement.





### 33.3.8 Holly Shelter/Angola Bay Megasite

The Holly Shelter/Angola Bay region is one of the largest, nearly contiguous natural areas in the state. The Holly Shelter Game Land has a large domed peatland in its center that supports one of the largest pocosin community complexes in the state. On the southeast side of the Game Land is an extensive relict beach ridge system with associated longleaf pine communities and great concentrations of rare species, including one of the largest populations of Venus flytrap (*Dionaea muscipula*) in the state and several dozen red-cockaded woodpecker colonies. To the north is Angola Bay, one of states most inaccessible interior wetlands. The bay has a diameter of more than ten miles with no roads or trails. Most of the area is low pocosin with scattered pond pine in an otherwise near-treeless expanse of evergreen shrubbery.

**Figure 42 Cape Fear River Basin Managed Lands and Significant Heritage Areas**



**Legend**

-  River Basin Boundary
-  County Boundary
-  Public Conservation Lands
-  Significant Natural Heritage Areas

20 0 20 40 Miles

NC Division of Water Quality  
 Basinwide Planning Program  
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### 33.3.9 Boiling Spring Lakes Wetland Complex

The Boiling Spring Lakes Wetland Complex is another large, hydrologically intact complex of relict beach ridges and swales interspersed with Carolina bays. The extensive pine flatwoods, pine savannas, pond pine woodlands, and pocosin communities of this area support a number of rare plant species. This ecologically significant natural area was until recently the largest unprotected natural longleaf pine/pocosin landscape complex in the state. However, the NC Department of Agriculture and The Nature Conservancy are currently focusing protection efforts in this area.

### 33.4 Significant Aquatic Habitats in Cape Fear River Basin

The Natural Heritage Program collaborates with a number of freshwater ecologists in other agencies and organizations to identify Significant Aquatic Habitats in North Carolina. Significant Aquatic Habitats are 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 and upstream of these stream reaches will determine their water quality and the viability of their aquatic species. The Significant Aquatic Habitats of the Cape Fear River basin include:

Bear Creek Aquatic Habitat - A regionally-significant creek that adjoins the Rocky River-Lower Deep River Aquatic Habitat at its downstream end. This medium-sized stream supports a diverse mussel fauna, including the brook floater (*Alasmidonta varicosa*) and Atlantic elktoe (*Fusconaia masoni*).

Black River Aquatic Habitat - A state-significant aquatic habitat containing four rare mussels: Cape Fear Spike (*Elliptio marsupiobesa*), Atlantic pigtoe (*Fusconaia masoni*), yellow lampmussel (*Lampsilis cariosa*), and pod lance (*Elliptio folliculata*). Other rare aquatic animals known from the Black River include river frog (*Rana hecksheri*), American alligator, and the American sand burrowing mayfly (*Dolania americana*). The American sand burrowing mayfly is a predaceous mayfly that is able to dig rapidly into sandy substrates. It is known from only a few places in the southeast, and in North Carolina has only been found in one location – the Black River.

Deep River (Moore/Randolph) Aquatic Habitat - Considered to be nationally significant, it is home to a population of the Cape Fear Shiner (*Notropis mekistocholas*), as well as the Carolina redbreast (*Moxostoma sp. 2*), Roanoke bass (*Ambloplites cavifrons*), and a number of mussels, including triangle floater (*Alasmidonta undulata*), brook floater (*Alasmidonta varicosa*), Atlantic pigtoe (*Fusconia masoni*), yellow lampmussel (*Lampsilis cariosa*), squawfoot (*Strophitus undulatus*), and notched rainbow (*Villosa constricta*).

Haw River Aquatic Habitat - The nationally significant stretch of the Haw River contains one of just a few known sites for the endemic and Federally Endangered Cape Fear shiner (*Notropis mekistocholas*). The globally rare Septima's clubtail (*Gomphus septima*) is also found here.

Lower Cape Fear River Aquatic Habitat - The state significant lower Cape Fear River is brackish and contains numerous rare animals. Records of the shortnose sturgeon indicate that it occurs here rarely, while manatees are found more occasionally, especially in summer. Alligators are

present mainly in tributary streams. Freckled blenny and spinycheek sleeper are rare marine fishes of this section of the river.

Rocky River/Lower Deep River Aquatic Habitat - This nationally-significant habitat is separated from the Upper Rocky River Aquatic Habitat (see below) by an impoundment. The federally endangered Cape Fear (*Notropis mekistocholas*) shiner has its primary population center in this area. The aquatic plant harperella (*Ptilimnium nodosum*) only has two known populations in North Carolina, one of which occurs on an island in the Deep River.

South River Aquatic Habitat - A state-significant site discussed above in association with the Black River. This high quality blackwater river contains two undescribed and rare fish species, *Noturus sp.* and *Hybopsis sp.*, and diversity of other aquatic biota.

Town Creek Aquatic Habitat - This nationally-significant site is a short creek that flows eastward in eastern Brunswick County and empties into the Cape Fear River. Despite its short length, it contains the only known population of the Greenfield ramshorn snail (*Helisoma eucosmium*), a globally rare and imperiled mollusk, as well as several other rare animals and plants.

University Lake Aquatic Habitat - This state-significant site contains the largest population in the state, by far, of the rare mussel Savannah lilliput (*Toxolasma pullus*).

Upper Cape Fear River Aquatic Habitat - This state-significant site passes through Harnett, Chatham and Lee counties. This site contains seven rare mussels and two rare fishes: the Carolina redhorse (*Moxostoma sp. 2*) and occasional reports of the federally endangered Cape Fear shiner (*Notropis mekistocholas*).

Upper Rocky River Aquatic Habitat - This state-significant site is separated from the Rocky River/Lower Deep River Aquatic Habitat (see above) by the Reeves Lake impoundment. The site has a population of the federally endangered Cape Fear shiner (*Notropis mekistocholas*), along with two rare mollusks and one rare stream insect.

Upper Black River Aquatic Habitat - This site contains lower portions of Six Runs and Great Coharie and Little Coharie Creeks, where biologists have found three rare mussels: eastern creekshell (*Villosa delumbis*), eastern lampmussel (*Lampsilis radiata radiata*), and pod lance (*Elliptio folliculata*), as well as two rare fishes: Santee chub (*Cyprinella zanema*) and broadtail madtom (*Noturus sp. 1*).

There are a number of Significant Natural Heritage Areas not listed here that contribute to Cape Fear River water quality. Please contact the NC Natural Heritage Program to obtain information about these natural areas. Significant Natural Heritage Areas are identified by the Natural Heritage Program, but the identification of a natural area conveys no protection. Protection comes from the landowner. For details about any of the Significant Natural Heritage Areas, please contact the North Carolina Natural Heritage Program.

### 33.5 Public Lands

The accompanying map shows the land protected by public ownership in the Cape Fear River basin. Many significant natural areas, including some already mentioned, are located on public land. Also on the map are some preserves or conservation easements held by private conservation organizations.

Some notable public lands within the Cape Fear River basin include the military lands – Fort Bragg, Pope Air Force Base, Military Ocean Terminal Sunny Point, and part of Camp Lejeune – substantial areas which balance conservation with military training missions. Another large piece of land in the Cape Fear River basin is Jordan Lake (about 40,000 acres). The Army Corps of Engineers own the lands under and around Jordan Lake, but state agencies manage most of the upland areas. Notable state-owned lands within Cape Fear River basin include: a number of State Parks (Raven Rock, Bay Tree Lake, Bushy Lake State Natural Area, Bald Head Island State Natural Area, Weymouth Woods, Singletary Lake, Carolina Beach); Wildlife Resources Commission Game Lands (Holly Shelter Angola Bay, Cape Fear River Wetlands, Suggs Mill Pond); the Department of Agriculture’s Boiling Springs Lakes Preserve (a joint project with The Nature Conservancy); the North Carolina Zoo; and the Division of Forest Resources’ Bladen Lakes State Forest. Also, the Department of Transportation has acquired several properties in the basin to mitigate for wetlands impacted during highway construction. This property is permanently protected, and hopefully will be restored to provide a number of ecological benefits.

Local efforts to protect land within the Cape Fear River basin have yielded a great deal of benefit to water quality. For instance, the City of Fayetteville has protected land along Cross Creek – land that is an important natural area, a tributary of the Cape Fear, and part of the water supply for Fayetteville. Also, the North Carolina Botanical Garden Foundation has dedicated as State Nature Preserves some of the land they own near Chapel Hill, protecting natural diversity and the water quality of Morgan Creek.

While federal, state and local agencies are important players in land protection efforts within the Cape Fear River basin, key partners in these efforts are private conservation organizations such as the North Carolina Coastal Land Trust, Triangle Land Conservancy, Sandhills Area Land Trust, and the North Carolina Chapter of The Nature Conservancy. Although only partially shown on the map, these organizations have achieved significant protection in the Cape Fear River basin. Using innovative tools such as conservation easements, these organizations work with landowners 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 Cape Fear River basin.