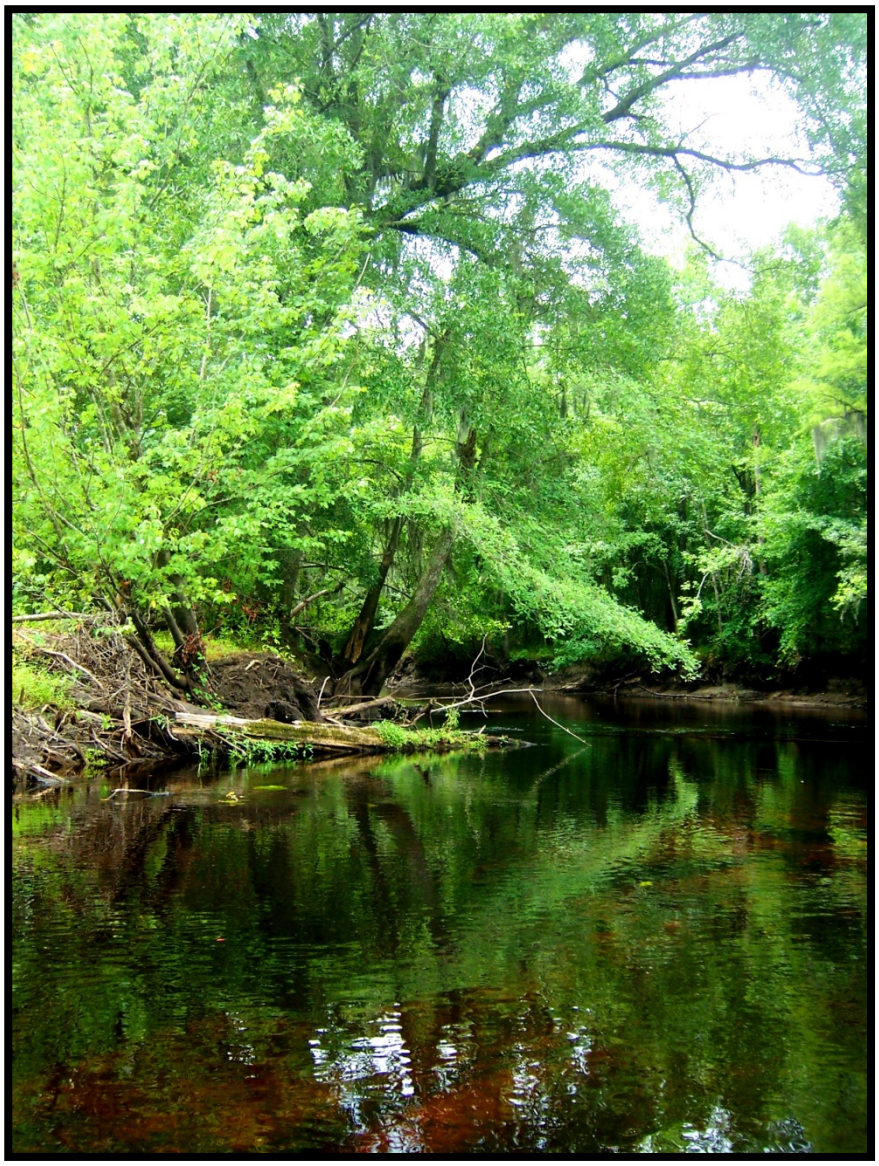
Little Pee Dee-Lumber Focus Area Conservation Plan



South Carolina Department of Natural Resources

February 2017

Little Pee Dee-Lumber Focus Area

Conservation Plan

Prepared by

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February 2017

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[1] South Carolina Department of Natural Resources, Office of Environmental Programs.

[2] South Carolina Department of Natural Resources, Geological Survey.

Little Pee Dee-Lumber Focus Area Conservation Plan

The goal of this conservation plan is to provide science-based guidance for future decisions to protect natural resource, riparian corridors and traditional landscape uses such as fish and wildlife management, hunting, fishing, agriculture and forestry. Such planning is valuable in the context of protecting Waters of the United States in accordance with the Clean Water Act, particularly when the interests of economic development and protection of natural and cultural resources collide. Such planning is vital in the absence of specific watershed planning. As additional information is gathered by the focus area partners, and as further landscape-scale conservation goals are achieved, this plan will be updated accordingly.

This document is available at http:www.dnr.sc.gov/

Little Pee Dee-Lumber Task Force Partners[3]

Ducks Unlimited

Natural Resources Conservation Service

Pee Dee Land Trust

Private Landowners

South Carolina Department of Natural Resources

The Nature Conservancy

United State Fish & Wildlife Service

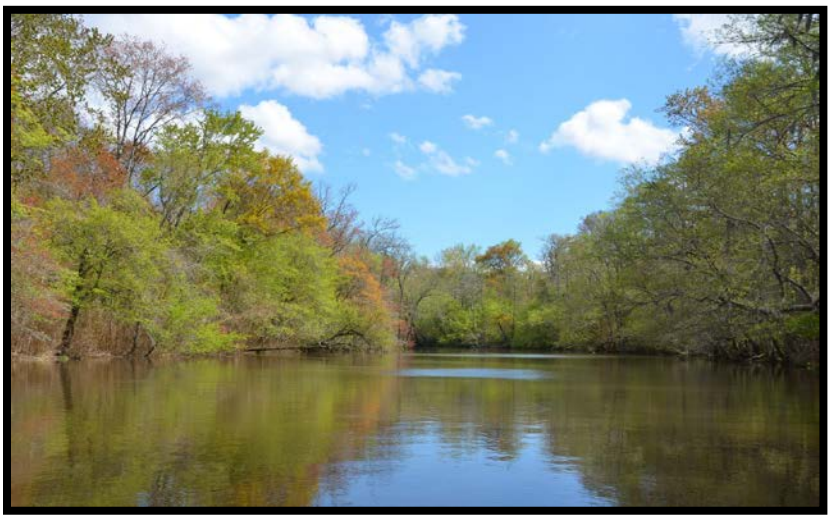
Wildlife Action, Inc.

Winyah Rivers Foundation, Inc.

[3] These conservation partners are listed as potential since the Little Pee Dee-Lumber Focus Area Task Force has not been formalized and does not yet meet as an active task force; however these potential task force partners are aware of and/or work actively on other focus area task force efforts in other areas of the state. The potential task force partners have reviewed this document and support its conclusions as noted in Appendix VII.

Table of Contents

1. Introduction



The Little Pee Dee, Lumber, Lynches, Black, Waccamaw and the Great Pee Dee rivers together form the Pee Dee River basin, the largest river basin in the state with 7,860 square miles or 25.3% of South Carolina's land area including 14 counties (Chesterfield, Clarendon, Darlington, Dillon, Florence, Georgetown, Horry, Kershaw, Lancaster, Lee, Marlboro, Marion, Sumter and Williamsburg). Beginning in the southeastern plains of North Carolina, the Little Pee Dee River flows approximately 74 miles through the Pee Dee-Southeastern Plains ecobasin before entering the Pee Dee Coastal Plain ecobasin of South Carolina where the Little Pee Dee flows for 65 more miles receiving input from the Lumber River, before merging with the Great Pee Dee River.

The Little Pee Dee-Lumber Focus Area begins in the most southeastern corner of Dillon County following the Lumber River to the confluence of the Little Pee Dee River down to US Highway 378 encompassing the blackwater system down the county line between Marion and Horry counties.

The Little Pee Dee-Lumber focus area boundaries are defined from the North Carolina-South Carolina state line surrounding the Little Pee Dee River southwest down US Highway 15 to the Town of McColl to the intersection of SC Highway 381, thence south to the Town of Clio to the intersection of SC Highway 9 south, thence southeast along Dunbar Highway to the intersection of SC Highway 38, then southeast to the intersection of SC Highway 917, thence to the second intersection with SC Highway 41, thence south on Highway 41 past Mullins to the intersection of US Highway 378, then east on US Highway 378 to SC Highway 49 to the end of Woodberry Road. The southern edge is defined from the end of Woodberry Road east across the Little Pee Dee and picks up along Gilbert Road to begin the eastern border at US Highway 701, thence north to the North Carolina-South Carolina state line and following the line back northwest to US Highway 15 at the Town of McColl (Appendix 1).

Protected lands in the Little Pee Dee-Lumber Basin include the Cartwheel Bay Heritage Preserve (591 acres), Little Pee Dee Heritage Preserve/Wildlife Management Area (10,406 acres), and Woodbury Wildlife Management Area (25,924 acres). Additionally, the Little Pee Dee-Lumber Focus Area contains numerous private properties protected under conservation easements (7,857).

2. Recognized Conservation Plans

In 1990, the South Carolina General Assembly designated 14 miles of the Little Pee Dee River from US Highway 378 to the confluence with the Great Pee Dee River as a State Scenic River. An additional 64 miles extending upstream from US Highway 378 were determined eligible for scenic river status in 1997 but have not yet been formally designated. The upper portion of the Little Pee Dee, a 46-mile segment in Dillon County from Parish Mill Bridge on County Road 363 (County Line Road) near the Marlboro County line southeasterly to the crossing of Allen Bridge Road near Marion County line, was designated as a State Scenic River in 2005. The South Carolina Department of Natural Resources (SCDNR) described and mapped this portion of the river to develop the Little Pee Dee Scenic River Trail.

The SCDNR Heritage Trust Program identified the Little Pee Dee River corridor as a high priority area for conservation, and as such, approximately 10,000 acres of the Little Pee Dee Heritage Preserve extends roughly 17 miles of the Little Pee Dee and Lumber rivers. Protected river corridors provide a travel byway for wildlife, filtration system for pollutants and sediments, and habitat for the endangered Sarvis holly (*Ilex amelanchier*). The natural communities of concern include cypress-gum swamps, bottomland hardwood forests and fluvial sand ridge communities.

The Little Pee Dee Basin is home to important migrating, wintering and breeding waterfowl habitat, shore and wading bird habitat, as well as habitat critical to neotropical migrant songbirds and a diverse group of bottomland forest bird species. Because of its importance to a broad group of bird species, the Little Pee Dee-Lumber Basin Focus Area is a step-down project under the umbrella of a number of national and regional conservation initiatives to include the North American Waterfowl Management Plan (NAWMP) and its Atlantic Coast Joint Venture (ACJV), the North American Bird Conservation Initiative, Partners in Flight (PIF), the United States Shorebird Conservation Plan (USSCP) and the National Bobwhite Conservation Initiative (NBCI).

The NAWMP was initiated in 1985 in response to plummeting numbers of migratory waterfowl across the continent. The central premise of the NAWMP is protection and enhancement of existing nesting, migrating and wintering waterfowl habitat. The ACJV is the implementation program of NAWMP in the Atlantic states.

PIF was launched in 1990 in response to growing concerns about declines in the populations of many land bird species that were not covered under other conservation initiatives, particularly neotropical migrant species. The focus of PIF is to combine, coordinate and increase resources in order to achieve the highest level of success in bird and habitat conservation in the Northern Hemisphere. The USSCP was originated in the mid-1990s and its goals were formalized in 2000 in order to provide a scientific framework to determine species, sites and habitats that most urgently need conservation action. The NBCI is the unified strategic effort of 25 state fish and wildlife agencies and various conservation organizations to restore wild populations of bobwhite quail in this country to levels comparable to 1980 through restoration and

maintenance of native grassland habitats to the benefit of a diverse assemblage of grassland-dependent species.

The forested wetlands provide important nesting and migration habitat for a large assemblage of passerines. SCDNR documented breeding of 15 species of neotropical migratory songbirds and 35 species of other land birds on the Little Pee Dee River Heritage Preserve. These forested wetlands also provide nesting and foraging habitat for bald eagle, swallow-tailed kite and wood stork. Several wading bird rookeries also occur in the vicinity of the Little Pee Dee River.

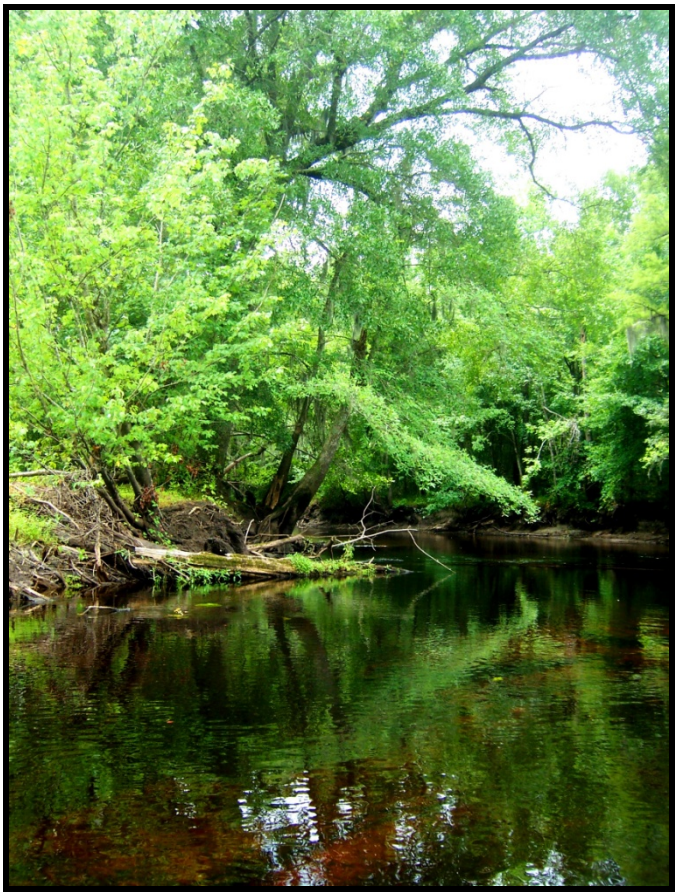
3. Threats

The abundant, unique and diverse resources of the Little Pee Dee-Lumber Focus Area are under threat from a variety of contemporary land use practices and changes including development, agriculture, sand mining, and other conversions of land to non-traditional uses and poor land use practices. Continued development along the US 378 and US 501 corridors typifies the types of land use changes that threaten fish and wildlife populations and water quality within the Basin. These land use changes and practices impact aquatic habitats by increasing silt and sediment loads, introducing excessive nutrients and chemical contaminants, and altering water availability (due to irrigation) and instream habitat (due to sand mining).

2015 Aerial photography from USDA National Agriculture Imagery Program of Dillon County and the Little Pee Dee River.

A notable threat to the Little Pee Dee-Lumber Focus Area includes the development of the Interstate-73 (I-73) corridor, which will impact and take an estimated 30 acres of the Little Pee Dee Heritage Preserve known as the Vaughn Tract at the crossing of the Little Pee Dee River

parallel to SC Highway 917 south of Mullins. Although this will impact the area near the Heritage Preserve directly, this chosen route will reduce the total amount of floodplain encroachment and wetland impacts of the overall I-73 project. Large scale road development can cause an array of problems including an increase in various pollution types, such as litter and runoff, and habitat fragmentation.



Habitat fragmentation negatively impacts wildlife population viability by reducing the amount or quality of available habitat, removing native vegetation and increasing opportunities for invasive species to become established. Fragmented habitats may not be large enough nor adequately connected to support species that need more territory in which to reproduce, rear young, forage for food resources and store healthy body reserves. The loss and fragmentation of habitat make it difficult for migratory species to utilize places to rest and feed along their migration routes. Smaller and disjoint patches of habitat support more tenuous populations of wildlife, increasing their vulnerabilities to disease and predation. Habitat fragmentation along with urbanization also renders it difficult to continue traditional habitat management efforts such maintenance of fire-based ecosystems due to concerns over smoke management. Along with reducing habitat fragmentation, the importance of maintaining riparian corridors and wetland buffers for aquatic organisms and herpetofauna also is critical. Negative impacts to riparian corridors and wetland buffers can degrade aquatic communities and decrease diversity with an increase in sedimentation and contaminated runoff from nearby urban areas. Efforts clearly are needed in the Little Pee Dee Basin to support and maintain large, well-connected corridors of specialized habitat needed for threatened and endangered species and those that are rare or of conservation concern.

The management of whole ecosystems represents an ideal in conservation that is often impractical or difficult to achieve. However, the Little Pee Dee-Lumber Basin Focus Area presents a unique opportunity to enhance landscape-scale conservation. The Basin contains the Little Pee Dee Heritage Preserve and is immediately upstream of the Winyah Bay Focus Area. The focus area concept encourages conservation of private land through voluntary conservation easements. The addition of privately owned conservation areas, particularly those adjacent to or in close proximity to larger or ecologically sensitive areas, serves

to protect and enhance the existing outstanding natural, cultural and recreational resources of the Little Pee Dee-Lumber Focus Area.

4. Objectives

The initial objective is to establish a network of partners comprised of private landowners, conservation organizations, land trusts and government agencies to oversee and maintain a landscape scale conservation initiative to protect and enhance the important lands, waters, rare and sensitive habitats, cultural sites and diverse natural resources of the Little Pee Dee-Lumber Basin while maintaining in perpetuity, the long-honored traditional uses of hunting, fishing, forest management and agriculture.

Since large public ownership within the Little Pee Dee-Lumber River focus area is limited through scarce agency funding and governmental appropriations, the partnership aims to primarily work with willing private landowners to promote stewardship using a variety of tools ranging from technical and financial assistance to conservation easements. The key for this initiative is to encourage the continuation of private ownership while ensuring long-term protection and enhancement of resource stewardship. Currently there are 36,921 acres of state protected property in the Little Pee Dee-Lumber River Basin and 7,856 acres of private land conservation which comprise approximately 4% of the entire focus area (estimated acreage 161,226) (Table 1).

Table 1. Protected Lands in the Little Pee Dee-Lumber Focus Area.*

State		**Property Manager**
Cartwheel Bay Heritage Preserve	591	S.C. Department of Natural Resources
Little Pee Dee Heritage Preserve	10,406	S.C. Department of Natural Resources
Woodbury Wildlife Management Area	25,924	S.C. Department of Natural Resources
Private		**Private Landowners**
Pee Dee Land Trust	3,169	
The Nature Conservancy	2,890	
U.S. Natural Resources Conservation Service	1,797	
Total Protected Lands in Acres	**44,777**	

**November 2015 GIS data*

5. Natural Resources

The Little Pee Dee and Lumber rivers are bounded by classic blackwater river floodplain forest with canopies of bald cypress (*Taxodium distichum)*, swamp tupelo (*Nyssa biflora*) and red maple (*Acer rubrum*). Other commonly associated species include tulip poplar (*Liriodendron tulipfera*), sweet gum (*Liquidambar styraciflua)*, pond pine (*Pinus serotina)*, loblolly pine (*Pinus taeda)* and laurel oak (*Quercus laurifolia)*. Floodplain forests are seasonally inundated by the river and represent the most deeply flooded of all southeastern United States forest types. The shrub layer in areas subjected to frequent flooding is open, whereas areas with infrequent flooding may be fairly dense and pocosin-like.

Banded water snake

Bottomland hardwood forests of the Little Pee Dee and Lumber rivers typically occur between the floodplain forest and drier upland sites. Unlike floodplain forests and longleaf pine (*Pinus palustris*) uplands, bottomland hardwoods are quite diverse in terms of the number of overstory species. This ecotype is dominated by a well-developed canopy of water oak (*Quercus nigra*), overcup oak (*Q. lyrata*), willow oak (*Q. phellos*), sweetgum, water hickory (*Carya aquatica*) and loblolly pine. Bottomland hardwood forests are inundated regularly by the river, but do not typically contain standing water for extended periods of time. The drier conditions result in a better developed herbaceous layer. Loose spangle grass (*Uniola laxa*) often develops thick stands in open areas. Some of the most significant resources are the geomorphic features, the oxbow lakes, sloughs, braided streams, sand ridges and other fluvial formations that have been created by the river within the floodplain. These features are not unusual on Coastal Plain blackwater rivers; however, the Little Pee Dee and Lumber rivers have an unusually numerous and well-developed array of fluvial formations. Many of these features can be directly accessed from the main river channel. Oxbow lakes are often associated with floodplain forests. Oxbow lakes are former sections of river channel that became isolated when the river changed course. There are several excellent examples of oxbow lakes along the Little Pee Dee River. Xeric, elevated sand ridges run parallel to the rivers throughout the floodplain. This ecosystem is associated with fluvial sand deposited by river currents. The soils are sandy and well drained. Longleaf (*Pinus palustris*) and sparse loblolly pines dominate the canopy. The mid-story consists primarily of turkey oak (*Quercus laevis*), sand live oak (*Q. virginiana* var. *germinata*) and persimmon (*Diospyros virginiana*). Common understory plants include wiregrass (*Aristida stricta*), dropseed (*Sporobolus* spp.), and prickly-pear (*Opuntia compressa*). The protection of these ridges is essential to the health of the overall aquatic system.

Isolated wetlands are also important habitats for a variety of species. Not only do they serve as potential water sources for wildlife, but they are also a critical habitat component for a number of reptile and

amphibian species, such as the tiger salamander (*Ambystoma tigrinim*) and upland chorus frog (*Pseudacris feriarum*). Some of the most imperiled herpetological species rely on isolated ephemeral wetlands for breeding, timing their reproduction to coincide with the filling of the ponds that provide fish-free environments for tadpoles and larvae to mature. Amphibians, an important component to overall biodiversity, serve as indicator species for water quality due to their reliance on water for portions of their life cycle. Healthy and diverse populations of amphibians are indicative of high-quality habitat, both terrestrial and aquatic. Isolated wetlands, especially those that are ephemeral or seasonally wet, are often overlooked as an integral landscape feature worthy of protection. However, these areas are essential for maintaining amphibian biodiversity and ecosystem function.

American Alligator

When exploring the splendor of these blackwater river systems, visitors may encounter river otter (*Lontra canadensis*); beaver (*Castor canadensis*); American alligator (*Alligator mississippiensis*); rat snake (*Elaphe [Pantherophis] obsoleta*); banded (*Nerodia fasciata*), brown (*N. taxispilota*) and red-bellied (*N. erythrogaster*) water snakes; Florida (*Pseudemys floridana*) and river (*P. concinna*) cooters; wood ducks (*Aix sponsa*); mink (*Neovison vison*); raccoons (*Procyon lotor*); gray fox (*Urocyon littoralis*) and the elusive bobcat (*Lynx rufus*).

Looking skyward through the canopy of towering trees, some of which are 80-100 years old, visitors may catch a glimpse or at least hear the sounds of yellow-billed cuckoo (*Coccyzus americanus*), prothonotary warbler (*Protonotaria citrea*), Acadian flycatcher (*Empidonax virescens*), northern parula (*Setophaga americana*); red (*Vireo olivaceus*) and white eyed vireos (*V. griseus*), bald eagle (*Haliaeetus leucocephalus*), swallow tailed kite (*Elanoides forficatus*) and wood stork (*Mycteria americana*). White-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*) and bobwhite quail (*Colinus virginianus*) are frequent inhabitants along the floodplain with the occasional black bear (*Ursus americanus*) making its appearance as it travels the river corridor. Venturing out after dark, one could spot several bat species including the Seminole bats (*Lasiurus seminolus*), Southeastern myotis (*Myotis austroriparius*), big brown bat (*Eptesicus fuscus*) and Tri-colored bat (*Perimyotis subflavus*) in search of moths and mosquitoes. The Little Pee Dee and Lumber river drainages contain several species of state or regional concern. Rare plant species include Sarvis holly (*Ilex amelanchier*), Well's pixie moss (*Pyxidanthera barbulata* var. *barbulata*), riverbank quillwort (*Isoetes riparia*) and Pickering's morning-

glory (*Stylisma pickeringii* var. *pickeringii*). Other rare species that may occur in these habitats are listed in Appendix 2 from the 2015 South Carolina State Wildlife Action Plan (2015 SC SWAP).

6. Aquatic Resources

The Little Pee Dee River meanders through a flat, broad flood plain composed largely of forests and swamplands interspersed with farms and pastures. Adjacent land use is predominately forestry and agriculture. Population centers nearby are Marion and Mullins in Marion County to the west, and Conway in Horry County to the east. Florence, approximately 35 miles west of the river, is the major market center in the Pee Dee area.

Top right: Flat bullhead; Bottom left: Blackbanded sunfish;

South Carolina's waterways contain 137 native fish species and 22 introduced species, 12 of which are sport fish in large impoundments. The Pee Dee River drainage contains 8,075 miles of stream, 15,984 acres of lake area, 102 native fish species and 10 introduced fish species. Relative to other drainages, the Pee Dee drainage supports among the highest species diversity on the Atlantic slope.

SCDNR Freshwater Fisheries staff sampled the Little Pee Dee River by electrofishing in the Spring (April-June) and Fall (October-November) of 2011 from Floydale Landing (34.33405, -79.32427) on the Little Pee Dee River downstream to Punch Bowl Landing (33.75683, -79.21903) just above the confluence of the Great Pee Dee River. Prior to these sampling efforts, the site had not been sampled by SCDNR since 1993. A total of 3,375 fish representing 15 families and 39 species were collected from the entire study area during spring 2011. Bluegill (*Lepomis macrochirus*), coastal shiner (*Notropis petersoni*) and spotted sunfish (*L. punctatus*) were the most abundant species accounting for 15.7%, 15.4%, and 8% of the total number of fish sampled, respectively. The percent contribution by weight showed that bowfin (*Amia calva*) account for 34.6% of the biomass sampled followed by longnose gar (*Lepisosteus osseus*) at 11.75% and flathead catfish (*Pylodictes olivaris*) *at* 8%. Redbreast sunfish (*L. auritus*) accounted for a mere 4.92 % of the species composition during the 2011 Spring sample. Ictalurid species collected during spring 2011 accounted for 1.57% of the total species composition by number, and only included blue catfish (*Ictalurus furcatus*), channel catfish (*I. punctatus*), flathead catfish and yellow bullhead (*Ameiurus natalis*).

In the Fall of 2011, 3,678 fish were collected representing 14 families and 33 species. The most abundant species were coastal shiner (33.3%), redbreast sunfish (15.6%), brook silverside (*Labidesthes sicculus*)

(11.2%), largemouth bass (*Mircopterus salmoides*) (6.5%) and bluegill (6.3%). However, the top five species by biomass included bowfin (28.1%), flathead catfish (28.0%), largemouth bass (9.7%), channel catfish (5.7%) and longnose gar (4.7%). Results show that bowfins and flathead catfish comprise the majority of biomass in the Little Pee Dee system.

Compared to the 1990-1993 study, the 2011 study demonstrated that relative abundance of most centrachid (sunfish) species declined, while cyprinid (carp and minnow) species increased. It is also worth noting the complete absence of native bullhead species (brown [*A. nebulosus*], flat [*A. platycephalus*] and snail [*A. brunneus*]), madtoms (tadpole [*Notorus gyrinus*] and margined [*N. insignus*]) and the white catfish (*A. catus*); all of which were present in the 1990-1993 study (Appendix 3). Two flathead catfish were collected in the 1990-1993 study, while 63 were collected in the 2011 studies. As the flathead catfish became more established in the system they preyed upon and outcompeted these smaller ictalurids (catfish). The white catfish, snail bullhead and flat bulhead are all listed as Conservation Priority Species in the 2015 SC SWAP. Recent studies, including the South Carolina Stream Assessment, also documented American eel (*Anguilla rostrata*) and banded sunfish (*Enneacanthus obesus*) within the focus area, both of which are also priority species in the 2015 SC SWAP. The absence of major dams and other barriers on the Pee Dee River system in South Carolina provides critical connectivity for migratory fishes including American eel. Data from the SCSA show that the Little Pee Dee Focus Area supports among the highest densities of American eels in South Carolina.

Top: Redbreast sunfish; Bottom: American eel

The Southeastern United States sustains the greatest diversity of freshwater crayfish and mussels, approximately 375 and 300 species respectively, in the world. Crayfish serve as a keystone species in the aquatic community as an important prey items and scavengers, whereas mussels function not only as a prey base, but also as a facilitator to improve water quality by filtering large volumes of water to reduce

excessive quantities of algae, nutrients, bacteria and organic material. There are 37 native mussel species in South Carolina, 28 of which are listed as priority conservation species in the 2015 SC SWAP.

Clearly, the variation in aquatic habitats from the main river to tributaries, sloughs, oxbow lakes and swamps provides a high diversity of aquatic life in South Carolina.

7. Hydrologic Resources

The Little Pee Dee and Lumber rivers are encompassed in the Little Pee Dee River Sub-basin as a part of the South Carolina State Water Assessment produced by SCDNR. This Sub-basin area includes Dillon, Marion, Horry and Marlboro counties, totaling approximately 1,100 square miles and 3.5% of the state's land area. Headwaters for the major rivers within the Sub-basin, the Little Pee Dee and Lumber, originate in the Sandhills ecoregion of North Carolina. Several small to moderately-sized tributary streams also drain the Sub-basin including Buck, Bear and Lake swamps. Typical of many Coastal Plain streams, extensive swamplands are associated with much of the main stem and tributary streams, resulting in meandering and often poorly-defined stream channels.

Data from the two gaging stations on the Little Pee Dee River suggest variable and potentially limited surface water availability. Flows are dependent predominantly on rainfall and direct runoff with lower streamflows partially supplemented by base flow from ground-water storage. Average flow of the Little Pee Dee River is almost 600 cubic feet per second (cfs) near Dillon and more than 3,000 cfs at Galivants Ferry. The lowest flows of record were 24 cfs near Dillon in 1954 and 73 cfs at Galivants Ferry in 2002. The flood flow of record occurred in 1964 at Galivants Ferry (27,600 cfs) due to runoff from tropical storm Hilda that produced localized flooding. Streamflow in the Little Pee Dee River is fairly reliable; however, surface-water storage would be needed to ensure adequate water supplies during periodic low-flow

conditions. Surface-water development in the Little Pee Dee River subbasin is not extensive. Pages Mill Pond, near Lake View in Dillon County, is the largest body of water, with a surface area of 200 acres and a volume of 640 acre-ft. The aggregate surface area of all lakes of 10 acres or more is 1,310 acres, and the total volume is about 4,300 acre-ft.

The waters of the Little Pee Dee Sub-basin provide water suitable for aquatic life, recreation, drinking water, fishing, industry and agriculture and are designated by the South Carolina Department of Health and Environmental Control (SCDHEC) as "Freshwater." Portions of the Little Pee Dee River and Cedar Creek boast the SCDHEC designation of an "Outstanding Resource Water," meaning these freshwater streams constitute outstanding recreational or ecological resources and are suitable as a drinking-water source with minimal treatment. As a part of SCDHEC's Watershed Water-Quality Assessment program, 29 surface-water sites were sampled in the Little Pee Dee River Sub-basin in 2003 in order to assess suitability for aquatic life and recreational use. Aquatic-life uses were fully supported at 21 sites, or 72% of the water bodies sampled in this Sub-basin; most of the impaired water exhibited dissolved oxygen levels below the concentrations needed to support aquatic life. Recreational use was fully supported in 78% of the sampled water bodies; the water bodies that did not support recreational use exhibited high levels of fecal-coliform bacteria (Table 2).

Table 2. Water quality impairments in the Little Pee Dee River Sub-basin from the SCDNR State Water Assessment.

Water Body Name	Station Number	Use	Status	Water Quality Indicator
Bear Swamp	PD-368	Aquatic Life	Nonsupporting	Dissolved oxygen
Little Pee Dee River	PD-365	Aquatic Life	Nonsupporting	pH
Buck Swamp	PD-031	Recreation	Partially supporting	Fecal coliform
Little Pee Dee River	PD-029E	Recreation	Partially supporting	Fecal coliform
	PD-030A	Aquatic Life	Nonsupporting	Dissolved oxygen
		Recreation	Partially supporting	Fecal coliform
	PD-348	Aquatic Life	Nonsupporting	pH
	PD-052	Aquatic Life	Partially supporting	Copper
Maple Swamp	PD-030	Recreation	Partially supporting	Fecal coliform
Loosing Swamp	RS-03513	Aquatic Life	Nonsupporting	Dissolved oxygen
Chinners Swamp	PD-352	Recreation	Partially supporting	Fecal coliform
White Oak Creek	PD-037	Aquatic Life	Partially supporting	Dissolved oxygen
		Recreation	Partially supporting	Fecal coliform
Little Pee Dee River	PD042	Aquatic Life	Nonsupporting	Dissolved oxygen and pH

According to SCDHEC's online Watershed Atlas tool, there are 20 National Pollutant Discharge Elimination System (NDPES) permits and five approved Total Maximum Daily Loads (TMDL) within the boundaries of the Little Pee Dee-Lumber Focus Area (Table 3). The five TMDLs, all due to fecal coliform, are located at the Little Pee Dee River at S-17-23, at Maple Swamp at SC Highway 57, at the Little Pee Dee River below the junction with Maple Swamp, at White Oak Creek at S-34-31 and at Chinners Swamp at Gunters Island

Road off S-26-99. SCDHEC has assigned fish consumption advisories on the Little Pee Dee and Lumber Rivers due to high mercury levels. There should be no consumption of blue catfish, flathead catfish, bowfin, chain pickerel (*Esox niger*) or largemouth bass in the Little Pee Dee from the NC-SC State Line to its confluence with the Great Pee Dee River and all other fish species should only be eaten once a week. On the Lumber River from the NC-SC State Line to the confluence with the Little Pee Dee, bowfin, channel catfish, flathead catfish or largemouth bass should not be eaten. Chain pickerel and redear sunfish should be eaten only once a week and bluegill once a month from the Lumber River. For more detail on the sites listed as a part of SCDHEC's Watershed-Water Quality Assessment, visit http://gis.dhec.sc.gov/watersheds/

Table 3. NPDES permits within the Little Pee Dee-Lumber Focus Area boundaries.

Permit #	Type	Name
SC0021776	Municipal	Dillon/Little Pee Dee
SC0022284	Municipal	Lake View Wastewater Treatment Facility
SC0025348	Municipal	GSW&SA/Loris Wastewater Treatment Facility
SC0025402	Municipal	Town of Latta
SC0029408	Municipal	Mullins/White Oak Creek Wastewater Treatment Facility
SC0031801	Domestic	South of the Border Motel
SC0041963	Municipal	McColl Waste Water Treatment Facility
SCG250256	Industrial	Baldor Electric Company
SCG570006	Municipal	GSW&SA/Town of Nichols
SCG646037	Industrial	Trico/Tanner Water Treatment Plant
SCG646038	Municipal	Trico/Bobby Byrd Water Treatment Plant
SCG646045	Municipal	Trico/Hamer Water Treatment Plant
SCG646056	Industrial	Trico Water Company Fairfield Plant
SCG646075	Municipal	Bucksport Water System Pauley Swamp
SCG731136	Industrial	GSWSA/Highway 917 Pit Mine
SCG730635	Industrial	Superior Sand/Black Creek Mine
SCG731235	Industrial	Inland Sand Mine
ND0080721	Domestic	Locust Tree Development
SCG730043	Industrial	Carolina Sand/Britton's Neck
SCG731082	Industrial	D&L/Pee Dee Crossroads Mine

The Little Pee Dee River Sub-basin is entirely in the Coastal Plain. The northwestern part of the Sub-basin obtains much of its ground-water supply from the Middendorf and Black Creek aquifers. The Black Creek is used almost exclusively as the ground-water source for large-capacity wells. In the upper reach of the Sub-basin, both aquifers are used, and the water of both is of good quality. Ground-water levels

are continuously monitored by SCDNR in six wells within the Little Pee Dee River Sub-basin, in Dillon County located in Little Pee Dee State Park. Although there are no known site-specific water-level problems in this Sub-basin, years of pumping from wells in this Sub-basin and in neighboring Sub-basins have resulted in a regional lowering of water levels in the Black Creek Aquifer throughout the southern half of the Sub-basin.

Water use in the Little Pee Dee River Sub-basin is summarized in Table 4. Offstream water use totaled 2,487 million gallons in 2006, ranking it fourteenth among the 15 Sub-basins. Groundwater sources contributed to 98% of water used with the remaining from surface water. Water-supply use accounted for almost 95 % of the total water use, followed by industry (3%), golf course use (2%), and irrigation (1%). Consumptive use in this Sub-basin is estimated to be 349 million gallons, or approximately 14% of the total offstream use.

Table 4. Reported water use in the Little Pee Dee River Sub-basin for the year 2006 from the SCDNR State Water Assessment.

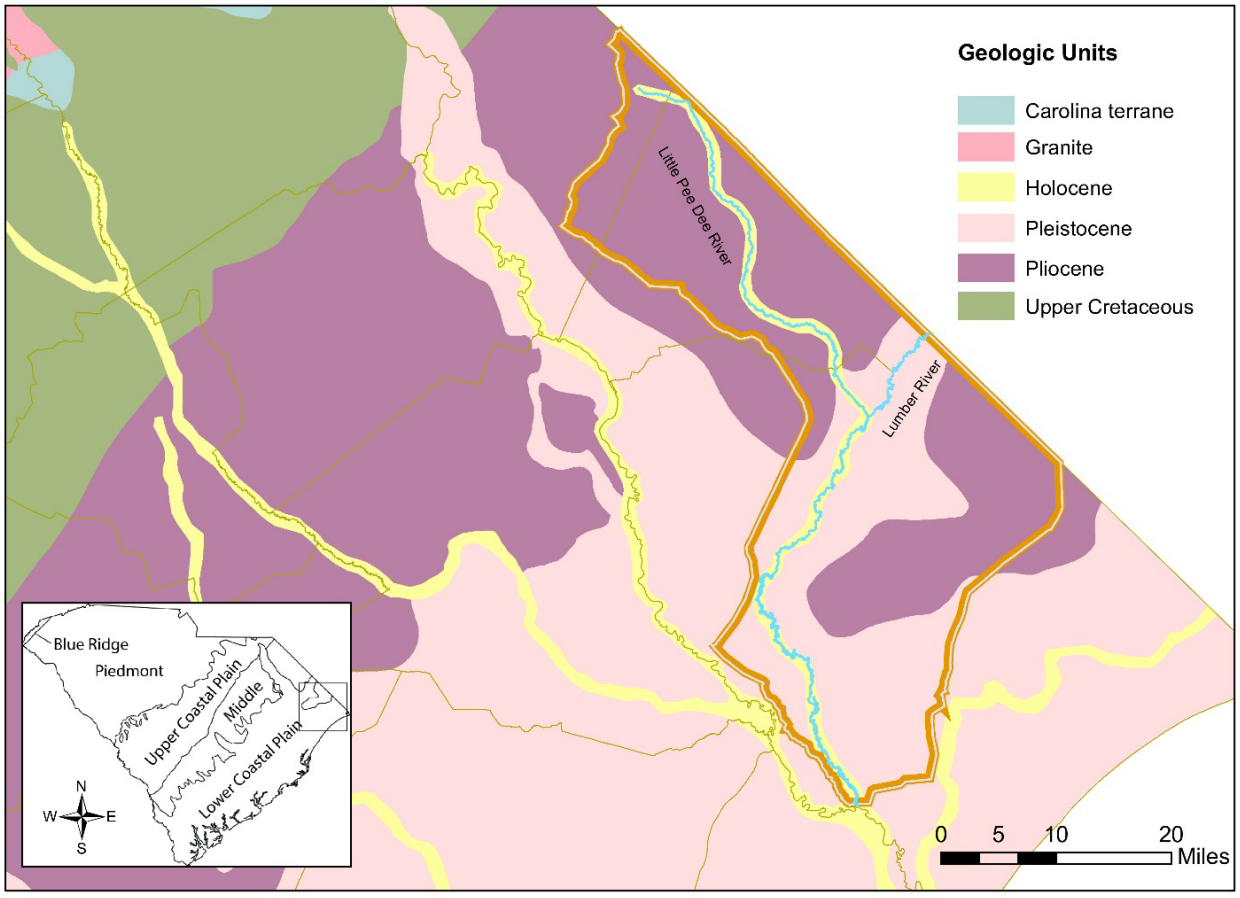
Water-use Category	Surface Water		Ground Water		Total Water	
	Million gallons	% of total surface water use	Million gallons	% of total ground water use	Million gallons	% of total water use
Aquaculture	0	0	0	0	0	0
Golf Course	37	75.1	0	0	37	1.5
Industry	0	0	69	2.8	69	2.8
Irrigation	12	24.9	16	0.7	29	1.2
Mining	0	0	0	0	0	0
Other	0	0	0	0	0	0
Thermoelectric Power	0	0	0	0	0	0
Water Supply	0	0	2,352	96.5	2,352	94.6
Total	49		2,437		2,487	

8. Geologic Resources

8.1 Basin location

The Little Pee Dee-Lumber Basin covers 252 square miles and is located east of Florence and north-northwest of Myrtle Beach. The Basin is almost entirely in the Lower Coastal Plain (Figure 1). Some of the higher elevations reach into the Middle Coastal Plain. These coastal plain areas trend roughly parallel to the modern coastline (southwest to northeast), and the Little Pee Dee-Lumber Basin also trends nearly parallel to the coastline.

Figure 1: Regional geologic map covering the Little Pee Dee-Lumber basin. Unit colors: Pliocene (purple), Pleistocene (pink), recent (yellow).



8.2 Topographic Relief

The Middle and Lower Coastal Plain are both geologically young, less than 5 million years old. Therefore, the surficial sediments are not heavily dissected by erosion except directly adjacent to the rivers. A majority of the topographic features result from earlier depositional processes, such as fluvial and coastal sediment transport or later shoreline erosion during sea-level rise.

8.3 Fluvial Systems

Both the Little Pee Dee and Lumber rivers have head waters in the Coastal Plain. Because the rivers flow slowly through forested swamps and wetlands, they generate tannin compounds from decaying plant material. The tannins impart a dark color to the water, hence the name “blackwater rivers.” These rivers originate on the south flank of the Cape Fear Arch, a bulge in the upper crust extending from the coast to the northwest along the Cape Fear River in North Carolina. The arch has slowly tilted the area downward

to the south-southwest, which is the general direction of river flow, and fairly symmetrical valleys are formed with bluffs on both sides and wide floodplains. At the south end of the basin, near the confluence with the Great Pee Dee River, the Great Pee Dee River floodplain and its sediments dominate the western portion of the Little Pee Dee River.

8.4 Younger Features

On level surfaces of the Middle and Lower Coastal Plain, there are several much younger features. The first are Carolina Bays. These are elliptical features recognizable on aerial photographs and LiDAR. They tend to be elongated northwest to southeast and are more common on Middle Coastal Plain surfaces. Many Carolina Bays pond water because of clayey layers just beneath the surface, and because of this effect they have been drained for agriculture or other development. Other younger features are Eolian sand sheets and dunes in area of Britton Neck. These produce a rippled land surface with very poor agricultural value owing to the very well-drained soils and low organic content.

8.5 Geology

The Lower Coastal Plain consists of Pleistocene and younger sediments at the surface that are less than 2.6 million years. The Middle Coastal Plain consists of Pliocene sediment at the surface that is 5.3-2.6 million years old. No detailed geological mapping (e.g. 1:24,000-scale) is available for the basin. There are several regional-scale maps (1:250,000-scale) that were published in the 1970s and 1980s, but advances in geological knowledge since then have brought the interpretation of those maps into question.

8.6 Scarps

The entire Pee Dee-Lumber basin is below 200 feet above mean sea level. The Surry Scarp at 90 feet above mean sea level separates the Middle and Lower Coastal Plain.

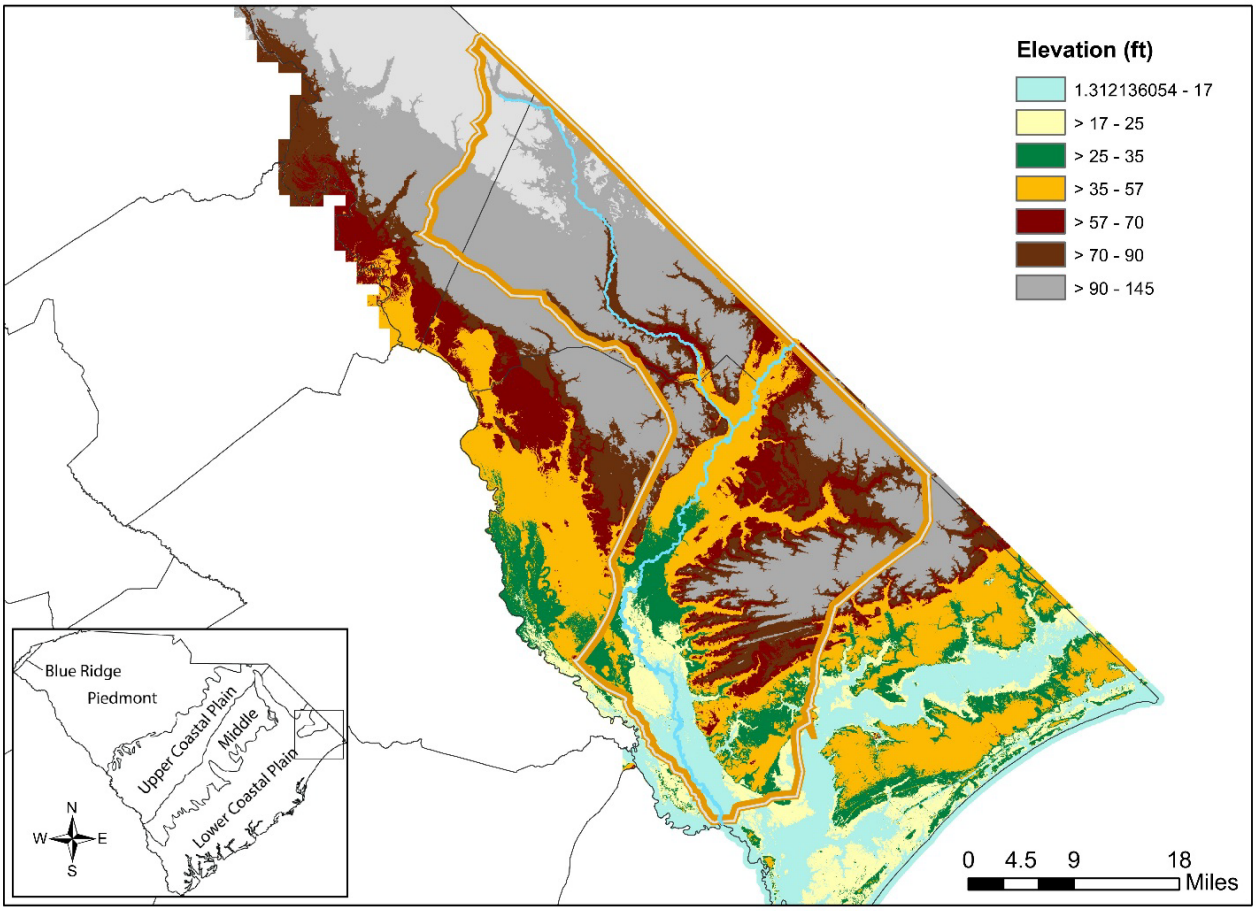
8.7 Sediments

Both the Middle and Lower Coastal Plain are underlain by siliceous and carbonate sediments of Cretaceous deposits. Not shown on Figure 1 are the exposures of the Cretaceous Pee Dee Formation along parts of the Little Pee Dee River. These are low banks exposed during typical or low water conditions. The Pee Dee Formation is composed of sand, silt and numerous fossils. One fossil to note is the belemnite, *Belemnitella americana,* a squid-like fossil.

At the surface, the Middle Coastal Plain is composed of gravel, sand, silt, clay, lime and limestone, and peat of Pliocene to Pleistocene age (5.3 million-12 thousand years). These deposits are mostly marine sediments with fluvial sediment along modern rivers. Subsequent changes in sea level often removed much of the previous sediments as far down as the Cretaceous. The sea-level events also reoccupied river valleys forming estuaries. Fluvial sediments are often preserved along the valley edges forming stepped terraces over time.

The Lower Coastal Plain sediments are Pleistocene to Recent (<2.6 million years). They are mostly fluvial-estuarine sediments consisting of fossil material, sand, silt and clay with recent fluvial sediments along modern rivers. Stream deposits occur in terraces along river valleys (Figure 2).

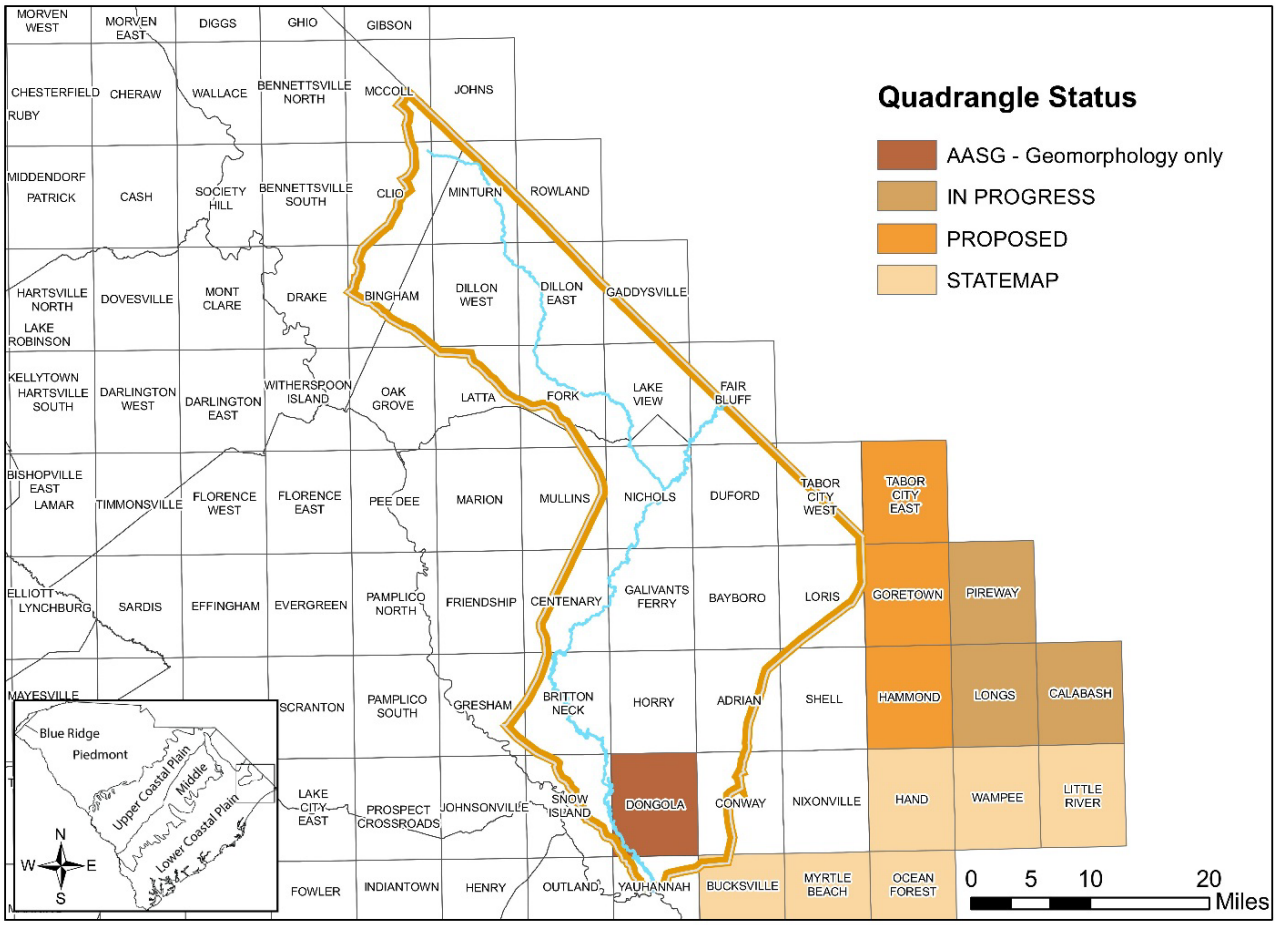
Figure 2: Topographic map of area surrounding Little Pee Dee-Lumber basin.



8.8 Geologic Resources

The various size and shape (texture) of the coastal plain sand is the source of large deposits useful for many industries from fill sand to industrial silica. Deposits of Fuller's earth have agricultural and industrial uses. If the clay content is high enough, it can be used as pond linings or local confining units. Some of the cemented or chemically altered rocks have been useful as dimension stone.

Figure 3: Available geologic maps in Little Pee Dee-Lumber basin. Color key: light red, mapping in progress, to be completed September 2015; dark red, mapping to commence October 2015; light brown, maps available in digital or paper format; dark brown, map available, paper format only. For quadrangle abbreviations see SCDNR GIS Data Clearinghouse.



9. Cultural Resources

Native Americans, primarily the Pee Dee Indians, made their living along the landscape of the Little Pee Dee-Lumber Focus Area. Early on, these Native American villages were located near the river, usually on a higher elevation bluff or river terrace. The rivers provided food and a means of transportation via dug-out canoes made of cypress. In 1685, the Little Pee Dee River became a part of Craven County in the province of Carolina, one of four counties ordered by the Lords' Proprietors to be used as election districts for the Assembly. At the time, most of the county was populated by Native Americans. To better settle the backcounty, in the 1730s, Governor Robert Johnson and Colonel John Barnwell proposed the township plan for orderly settlement along the major rivers of South Carolina, one of which was the Queensbourgh township located on the Pee Dee River. This township was settled by the Welsh Baptists from Wales, Great Britain and from Delaware and Pennsylvania. Later, the land adjacent to Queensbourgh along the Pee Dee River, Little Pee Dee River and Lynches Creek was known as the Welsh Tract or Neck. Settlers began moving into the Welsh Neck between the Great and Little Pee Dee Rivers. As the landscape filled, subsequent settlers moved into the Little Pee Dee River Basin with the river serving in the capacity of today's interstates to move goods and allow for travel to neighboring towns. Cultural and historic resources of the Little Pee Dee-Lumber Focus Area are exemplary, worthy of protection and additional documentation.

10. Recreation

The wetlands and waterways of the Little Pee Dee-Lumber Focus Area long have been known to sportsmen as providing unparalleled hunting, fishing and boating opportunities, but naturalists, birders, photographers, hikers and canoeists also have discovered the many scenic attributes of rivers, marshes and swamps. The area has a strong and enduring hunting and fishing culture. The extensive bottomland forests are a significant wood duck production and wintering ground, and the Focus Area is now a priority waterfowl restoration area where many partners are implementing research and management to improve waterfowl habitat and populations.

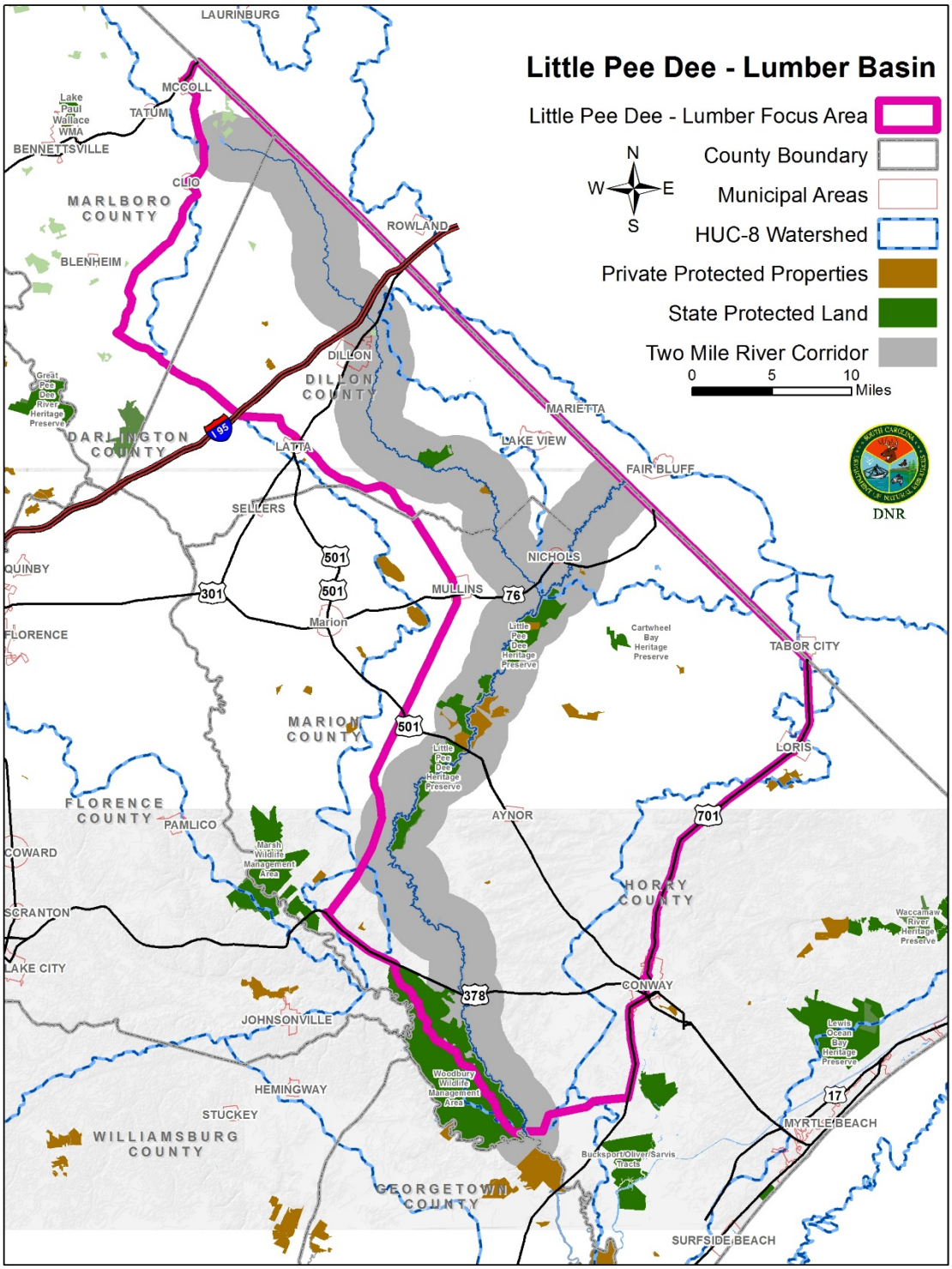
Abundant waters and wetlands provide for some of the finest freshwater fishing in the state. The rich waters of the Little Pee Dee are an outstanding fishery resource for catfish, sunfish and largemouth bass. From the most recent SCDNR creel survey data, anglers seek out bream the most and specifically target the redbreast sunfish. Recreational boating in canoes and small power boats is also popular year round and many camping spots are found on the sand beaches and ridges along the river. Outside enthusiasts, no matter their means of exploring the outdoors, can access the Little Pee Dee River via 13 boat ramps or through the Little Pee Dee Heritage Preserve within the Focus Area. The Lumber River can be accessed via 2 boat ramps (Table 5).

Table 5: Public boat ramps in the Little Pee Dee-Lumber Focus Area

Name	Waterbody	Latitude/Longitude
Causey	Lumber River	34.29273, -79.07422
Davis	Little Pee Dee River	34.02797, -79.30802
Fort Retch	Little Pee Dee River	34.18607, -79.17065
Gilcrest	Russ Creek	34.19885, -79.16842
Gunters Lake	Gunters Lake	33.9496, -79.31492
Huggins	Little Pee Dee River	34.04353, -79.27115
Hughes	Little Pee Dee River	33.89022, -79.26215
Joseph Holiday	Little Pee Dee River	34.05682, -79.2485
Knife Island	Little Pee Dee River	34.0357, -79.2949
Locust Tree	Little Pee Dee River	33.95667, -79.33373
Pitts	Little Pee Dee River	33.83175, -79.24908
Red Bluff	Little Pee Dee River	34.16993, -79.19715
Ricefield Cove	Lumber River	34.2222, -79.13
Sandy Bluff	Little Pee Dee River	34.14062, -79.20567

Appendices

Appendix 1. Little Pee Dee-Lumber Focus Area Map.



Appendix 2. Little Pee Dee-Lumber Focus Area Species of Concern. (Source: 2015 SC SWAP).

Table 1. Terrestrial priority species and their ecosystems: mammals.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Condylura cristata	Star-nosed Mole	G5	S3?	Of concern, State	High	swamps, marshes, bogs, streamsides; dense leaf litter
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	G3/G4	S2?	State Endangered	Highest	T-beam and I-beam bridges, abandoned buildings, old bunkers and tunnels, cavity trees, rock outcrops, mines, caves
Eptesicus fuscus	Big Brown Bat	G5	SNR		Highest	buildings, cavity trees, under bridges and in bat boxes; forage in open fields or forest gaps
Lasiurus borealis	Red Bat	G5	SNR		Highest	thinned stands; roost on smaller branches or twigs, often in the hardwood tree canopy; may roost in leaf litter
Lasiurus cinereus	Hoary Bat	G5	S?		Highest	tree cavities, trunks, tree foliage, squirrel nests, and Spanish moss
Lasiurus intermedius	Northern Yellow Bat	G4/G5	S?	Of concern, State	Highest	forage over open areas such as fields, pastures, golf courses, marshes, and along lake and forest edges; roost in clumps of Spanish moss or under old palm fronds
Lasiurus seminolus	Seminole Bat	G5	SNR		Highest	roost in large pines located near forested corridors; may roost in leaf litter
Mustela vison	Mink	G5	SNR		High	near swamps, streams, rivers, ponds, and saltwater marshes
Myotis austroriparius	Southeastern Bat	G3/G4	S1	State Threatened	Highest	caves (including limestone sinks), mines, abandoned buildings, and large hollow trees; prefers to feed and roost over water
Neotoma floridana	Eastern Woodrat	G5	S3/S4	Of concern, State	Moderate	wide variety of habitats
Perimyotis subflavus	Tri-colored Bat	G5	SNR		Highest	abandoned mines and caves, bridges, buildings
Sciurus niger niger	Southern Fox Squirrel	G5	S4	Of concern, State	Moderate	cavity trees
Ursus americanus	Black Bear	G5	S3?	Of concern, State	Moderate	early successional habitat and forest interior; den sites

Table 2. Terrestrial priority species and their ecosystems: reptiles & amphibians.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Alligator mississippiensis	American Alligator	G5	S5	Federal Threatened	Moderate	large river swamps, lakes, ponds, coastal impoundments, abandoned rice fields, brackish water marshes, and estuarine tidal creeks; juveniles will use Carolina bays and other seasonal wetlands; shallow waters preferred
Ambystoma tigrinum	Tiger Salamander	G5	S2/S3	Of Concern, State	Highest	isolated, temporary wetlands with no fish that have open canopy above and abundant grasses and sedges
Apalone ferox	Florida Softshell Turtle	G5	SNR	State Threatened	High	wetlands like rivers, ponds, and lakes with sandy banks and bars; soft substrate for burrowing
Apalone spinifera	Spiny Softshell Turtle	G5	SNR	State Threatened	Moderate	restricted to reservoirs and associated rivers with sandbars and sandy/soft substrates
Chelydra serpentina	Snapping Turtle (Common)	G5	SNR	State Threatened	Moderate	soft -bottomed wetlands like rivers, ponds, and lakes that have abundant aquatic vegetation
Clemmys guttata	Spotted Turtle	G5	S5	State Threatened	High	small ponds, streams, swamps, flooded bottomland hardwood forests, and other shallow water bodies with soft substrate for burrowing; aquatic vegetation
Crotalus horridus	Timber Rattlesnake	G4	SNR	Of Concern, State	High	dry, south-facing slopes at high elevations; rock outcrops or logs for den sites with south face exposed to sun
Deirochelys recticularia	Chicken Turtle	G5	SNR	State Threatened	Moderate	freshwater and wetland systems with still water; surrounding upland habitat of live oak/pine
Eurycea chamberlainii	Chamberlain's Dwarf Salamander	G4	SNR		Highest	wetland types like seepages near small streams; leaf litter and small debris
Hyla avivoca	Bird-voiced Treefrog	G5	S5	Of Concern, State	Moderate	large river bottom swamps
Kinosternon baurii	Striped Mud Turtle	G5	S?	Of Concern, State	Moderate	in and around the floodplain swamps of rivers; shallow water; soft substrates

Table 2. Continued.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Pseudacris feriarum	Upland Chorus Frog	G5	S3/S4	Of Concern, State	Moderate	isolated, temporary wetlands with no fish
Pseudemys concinna	River Cooter	G5	SNR	State Threatened	Moderate	Restricted to reservoirs and associated rivers with aquatic vegetation
Pseudemys floridana	Florida Cooter	G5	SNR	State Threatened	Moderate	slow-moving rivers and non-flowing wetlands like ponds and small lakes with soft bottoms, basking sites, and aquatic vegetation
Pseudotriton montanus flavissimus	Mud Salamander (Gulf Coast)	G5	S3/S4	Of Concern, State	High	fossorial; wetland areas such as cypress-tupelo ponds, floodplain forests, and seepage slopes
Rana palustris	Pickerel Frog	G5	SNR	Of Concern, State	High	standing water in late winter; moist habitat usually within hardwood forests; sphagnum bogs, meadows, and grassy fields near shaded streams
Seminatrix pygaea	Black Swamp Snake	G5	S?	Of Concern, State	High	wetlands with abundant aquatic vegetation; leaf litter; *Sphagnum* moss
Terrapene carolina	Eastern Box Turtle	G5	SNR		Moderate	moist woodlands; sandy or loamy soils in open for egg laying; loose soils and leaf litter for burrowing
Trachemys scripta	Yellow-bellied Slider	G5	SNR	State Threatened	High	non-flowing wetlands like ponds and small lakes with soft bottoms and abundant vegetation

Table 3. Terrestrial priority species and their ecosystems: birds.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Actitis macularia	Spotted Sandpiper	G5	SNA		Moderate	tidal to freshwater systems; primarily coastal but occurs inland
Aix sponsa	Wood Duck	G5	SNRB,SNRN ,SNRM		High	nest cavities near fresh water; emergent vegetation; ponds, lakes, rivers, swamps, BEAVER PONDS
Anas platyrhynchos	Mallard	G5	SNRB,SNRN		Highest	freshwater bodies for foraging; shallow water with accessible plants and invertebrates
Anas rubripes	American Black Duck	G5	SNRN		Highest	shallow open water with accessible plants and invertebrates
Anhinga anhinga	Anhinga	G5	SNRB,SNRN		Moderate	fresh or brackish water for foraging; trees over or surrounded by water for nesting
Ardea alba	Great Egret	G5	SNRB,SNRN		High	shallow water bodies or shorelines for foraging; trees over or surrounded by water for nesting
Ardea herodias	Great Blue Heron	G5	SNRB,SNRN		Moderate	shallow water bodies or shorelines for foraging; trees over or surrounded by water for nesting
Aythya collaris	Ring-necked Duck	G5	SNRN		Moderate	submerged aquatic vegetation and invertebrates such as mollusks
Botaurus lentiginosus	American Bittern	G4	SNRN	Of Concern, State	Highest	extensive freshwater marshes with grasses>3ft. Tall
Buteo lineatus	Red-shouldered Hawk	G5	SNR		Moderate	wet or moist hardwood forests for nesting and foraging
Buteo platypterus	Broad-winged Hawk	G5	S4		Moderate	upland hardwood or mixed forests; forage within woodlands; nests in tree crotches in canopy
Butorides virescens	Green Heron	G5	SNRB,SNRN		Highest	shallow water bodies and shorelines for foraging; dense shrubs and thickets near water for nesting
Calidris fuscicollis	White-rumped Sandpiper	G5	SNA		Moderate	most frequent in managed impoundments
Calidris himantopus	Stilt Sandpiper	G5	SNA		High	most frequent in fresh to brackish ponds/impoundments
Calidris melanotos	Pectoral Sandpiper	G5	SNA		Moderate	more common away from coast

Table 3. Continued.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Calidris minutilla	Least Sandpiper	G5	SNRN		High	forages in clumps of marine vegetation; common on coast
Caprimulgus carolinensis	Chuck-will's-widow	G5	S4		High	openings for nocturnal feeding; mixed forests with light to moderate understory
Ceryle alcyon	Belted Kingfisher	G5	SNR		High	sandy vertical banks for nesting burrows; perches near water for foraging
Cistothorus platensis	Sedge Wren	G5	SUB		Highest	favor brackish marshes
Coccyzus americanus	Yellow-billed Cuckoo	G5	S4		High	closed canopy deciduous forests with thick tangles
Contopus virens	Eastern Wood-Pewee	G5	S5		High	open forests with sparse midstory
Dryocopus pileatus	Pileated Woodpecker	G5	SNR		Moderate	extensive mature forests with dead snags for nest cavities; probably prefer riverbottom hardwoods
Egretta caerulea	Little Blue Heron	G5	SNRB,SNRN	Of Concern, State	Highest	shorelines, shallow water, or mudflats for foraging; shrubs or trees over or surrounded by water for colonial nesting
Egretta thula	Snowy Egret	G5	SNRB,SNRN		Moderate	shorelines, shallow water, or mudflats for foraging; shrubs or trees over or surrounded by water for colonial nesting
Egretta tricolor	Tricolored Heron	G5	SNRB,SNRN		High	shorelines, shallow water, or mudflats for foraging; shrubs or trees over or surrounded by water for colonial nesting
Elanoides forficatus	Swallow-tailed Kite	G5	S2	State Endangered	Highest	open savannahs for foraging; mature trees for nesting near swamps and marshes
Empidonax virescens	Acadian Flycatcher	G5	S4B		High	Riverbanks, streams, banks, alder zones
Eudocimus albus	White Ibis	G5	SNR		Highest	shallow water or mudflats for foraging on crustaceans; wet meadows or mudflats for probing; thickets or trees over or surrounded by fresh water for colonial nesting
Euphagus carolinus	Rusty Blackbird	G4	SNRN		Highest	swamps and margins; wet thickets near hardwoods

Table 3. Continued.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Fulica americana	American Coot	G5	SHB,SNRN		Moderate	open shallow fresh water such as lakes, ponds, and bays for foraging
Gallinago gallinagodelicata	Wilson's Snipe	G5	SNRN		High	boggy areas; wet meadows with short grass; along pond and marsh margins for probe foraging
Gallinula galeata	Common Gallinule	G5	SNR		Moderate	open freshwater with marsh vegetation for foraging and nesting
Haliaeetus leucocephalus	Bald Eagle	G5	S2	State Endangered	High	tall living trees, especially pines for nesting; perches near large open water where foraging occurs
Hylocichla mustelina	Wood Thrush	G5	S3?		High	moist understory of shrubs or saplings in deciduous woodlands; leaf litter
Ixobrychus exilis	Least Bittern	G5	SNRB,SNRN		Highest	shallow water bodies for foraging; marsh vegetation
Limnodromus scolopaceus	Long-billed Dowitcher	G5	SNRN		Moderate	most common in fresh coastal wetlands
Limnothlypis swainsonii	Swainson's Warbler	G4T4	S4		High	in mountains: deciduous or mixed forest ravines with thick understory of rhododendron or mountain laurel; at coast: cane stands in hardwoods
Melanerpes carolinus	Red-bellied Woodpecker	G5	SNR		Moderate	open, mature woods with dead snags for nest cavities; man-made poles with cavities
Melanerpes erythrocephalus	Red-headed Woodpecker	G5	SNR		Moderate	open, mature woods with dead snags for nest cavities; man-made poles with cavities
Mniotilta varia	Black-and-white Warbler	G5	SNRB,SNRN		High	mature hardwood forests; coves
Mycteria americana	Wood Stork	G4	S1S2	Federally Threatened and State Endangered	Highest	shallow water with concentrated prey (6-10 in. deep) for foraging; trees over or surrounded by water for colonial nesting, particularly cypress swamps and trees on small islands
Nyctanassa violacea	Yellow-crowned Night Heron	G5	SNRB,SNRN		Highest	shorelines of water bodies for foraging, especially for crustaceans; trees or thickets near water for colonial nesting, will nest in trees that are on dry lands

Table 3. Continued.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Nycticorax nycticorax	Black-crowned Night Heron	G5	SNRB,SNRN		Highest	shorelines of water bodies for foraging; shrubs or trees over or surrounded by water for colonial nesting
Oporornis formosus	Kentucky Warbler	G5	S4		High	moist hardwood forests with rich understory
Parula americana	Northern Parula	G5	SNRB		Moderate	mature, moist forests; hemlock forests in mountains and swamps or bottomlands with Spanish moss near coast
Picoides pubescens	Downy Woodpecker	G5	SNR		Moderate	middle-aged to mature woodlands; prefer hardwoods; dead snags for nest cavities
Pipilo erythrophthalmus	Eastern Towhee	G5	SNR		High	brushy areas; woodland margins and understory
Piranga olivacea	Scarlet Tanager	G5	SNRB		Moderate	mature deciduous forests
Piranga rubra	Summer Tanager	G5	S?		Moderate	dry, mixed woodlands
Platalea ajaja	Roseate Spoonbill	G5	SNR		Moderate	shallow water for tactile feeding; shrubs or trees over or surrounded by water for colonial nesting, particularly thickets of small trees on coastal islands
Plegadis falcinellus	Glossy Ibis	G5	SHB,SNRN		Moderate	shallow water, mudflats, or wet meadows for probing and foraging; shrubs or trees over or surrounded by water for colonial nesting, particularly dense thickets on coastal islands
Pluvialis dominica	American Golden Plover	G5	SNA		Highest	rare migrant
Pluvialis squatarola	Black-bellied Plover	G5	SNRN		High	common coastal migrant
Podiceps auritus	Horned Grebe	G5	SNRN,SNRM		Highest	small fish as prey
Podilymbus podiceps	Pied-billed Grebe	G5	SNRB,SNRN		Highest	fresh or slightly brackish water with emergent vegetation within used for nesting; open water in winter for foraging
Poecile carolinensis	Carolina Chickadee	G5	SNR		Moderate	mature woodlands with dead snags for nest cavities; will use bird boxes

Table 3. Continued.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Porphyrio martinica	Purple Gallinule	G5	S4	Of Concern, State	Highest	freshwater marshes with emergent and floating vegetation for foraging and nesting
Porzana carolina	Sora	G5	SNRN		High	freshwater marshes for foraging and nesting
Protonotaria citrea	Prothonotary Warbler	G5	S3B		Moderate	near standing water; open swamps with cavities for nesting; willow thickets near lakes and ponds; old stumps and other rotting logs
Rallus elegans	King Rail	G4	SNR		Highest	mudflats and shallow fresh or brackish water for foraging
Regulus satrapa	American Avocet	G5	SNRN		High	most frequent in managed impoundments
Scolopax minor	Golden-crowned Kinglet	G5	S4		Moderate	winter in coniferous or mixed woodlands
Seiurus motacilla	American Woodcock	G5	S4		Moderate	moist soils and leaf litter for probe foraging; woodlands for nesting; openings for mating displays
Setophaga dominica	Louisiana Waterthrush	G5	S4		High	deciduous or mixed forests with rocky streams
Setophaga virens waynei	Yellow-throated Warbler	G5	S3?		Moderate	moderately open, mature, moist forests; pines, mixed forests; Spanish moss
Thryothorus ludovicianus	Black-throated Green Warbler (Wayne's)	G5TU	SNR		Highest	coastal moist forests like swamps and bottomlands with cypress and white cedar
Toxostoma rufum	Carolina Wren	G5	SNR		Moderate	woodland thickets; leaf litter; cavities or ledges for nesting; will use bird boxes and many other human material
Tryngites subruficollis	Brown Thrasher	G5	SNR		High	moderate to dense brush and saplings
Vireo flavifrons	Buff-breasted Sandpiper	G4	SNA		Highest	may be seen in pastures and golf courses; rare migrant; most common in interior
Vireo griseus	Yellow-throated Vireo	G5	S3?B		Moderate	open, moist, mature, deciduous woodlands with tall trees; near water
Wilsonia citrina	White-eyed Vireo	G5	S4?B		Moderate	dense, moist thickets

Table 3. Continued.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Regulus satrapa	Hooded Warbler	G5	S4?B		Moderate	mature, moist deciduous forests; some mixed forests; rich understory layer

Table 4: Terrestrial priority species and their ecosystems: insects & leeches.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Acanthametropus pecatonica	"A Mayfly"					mesic forests near water
Dolania americana	American Sand Burrowing Mayfly	G4	S3			mesic forests near water
Homoeoneuria dolani	"A Mayfly"					mesic forests near water
Rhadinoceraea zigadenusae	Zigadenus Sawfly					dependent upon host plant: Death Camas (*Zigadenus densus*)
Siphlonurus decorus	"A Mayfly"					mesic forests near water
Somatochlora calverti	Calvert's Emerald	G3	SNR			boggy forest seepages for breeding; forest openings for foraging
Taeniopteryx robinae	Savannah Willowfly	G1	SNR			mesic forests near water
Toxorhynchites rutilus rutilus	"An Elephant (Tree Hole Mosquito)"					tree holes and artificial basins for breeding; nectar producing plants for foraging
Toxorhynchites rutilus septentionalis	"An Elephant (Tree Hole Mosquito)"					tree holes and artificial basins for breeding; nectar producing plants for foraging
Haemopis septagon	"A terrestrial leech"				High	moist areas near water sources; feeds on earthworms; only known from Georgetown County but probably more widespread in Pee Dee region of Coastal Plain

Table 5. Aquatic priority species and their ecosystems: freshwater & diadromous fishes.						
SCIENTIFIC NAME	**COMMON NAME**	**G-RANK**	**S-RANK**	**LEGAL STATUS**	**PRIORITY**	**SPECIFIC HABITAT REQUIREMENTS**
Acipenser brevirostrum	Shortnose Sturgeon	G3	S3	Federal and State Endangered	Highest	Moderate flows; sand or gravel substrates for spawning
Acipenser oxyrinchus	Atlantic Sturgeon	G3	S3	Federal and State Endangered	Highest	Moderate flows; sand or gravel substrates for spawning
Alosa aestivalis	Blueback Herring	G3	S3	Of Concern, State	Highest	
Alosa mediocris	Hickory Shad	G5	S4	Of Concern, State	Highest	
Alosa sapidissima	American Shad	G5	S5	Of Concern, State	Highest	
Ameiurus brunneus	Snail Bullhead					Rocky riffles, runs, shoals, and pools in streams and rivers
Anguilla rostrata	American Eel	G5	SNR	Of Concern, State	Highest	
Ameiurus catus	White Catfish					Warm ponds, reservoirs, and medium to large rivers in freshwater and brackish habitats
Ameriurus platycephalus	Flat Bullhead					Streams, rivers, and impoundments; slow-flowing water along banks and in pools; mud, sand, or rock substrates
Chologaster cornuta	Swampfish					Calm, acidic blackwater streams; organic matter and aquatic vegetation and woody debris
Cyprinella analostana	Satinfin Shiner					Pools and runs of creeks and small to medium weed-free rivers; sand to gravel/rubble substrates; branches, stumps, rock crevices, roots for spawning sites
Cyprinella pyrrhomelas	Fieryblack Shiner					Cool, clear creeks and small to moderately-sized rivers; rocky runs and pools below riffles; coarse substrate; logs and rocks for crevice spawning
Cyprinella sp.(c.f. zanema)	"Thinlip" Chub					Possibly small to medium-sized streams with sand and rocky runs or current-swept pools

Table 5. Continued.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Elassoma boehlkei	Carolina Pygmy Sunfish					Shallow, slow-moving, acidic water of ponds, ditches, and streams; abundant aquatic vegetation
Enneacanthus chaetodon	Blackbanded Sunfish					Shallow and densely vegetated margins of lakes, ponds, swamps, roadside ditches, streams; sand or mud substrate; stained, acidic water of 4-5pH; beaver ponds for spawning
Ennaecanthus obesus	Banded Sunfish					Sluggish streams and vegetated backwaters of lakes and ponds, often over silt or sand; very low current velocities
Etheostoma serrifer	Sawcheek Darter					Mud, sand, or organic substrate; aquatic vegetation; moderate current velocity
Fundulus diaphanus	Banded Killfish					Fresh water to estuaries over a wide range of salinities up to 20ppt; lakes, ponds, slow velocity streams; sand, gravel, or detritus-covered bottom with submerged aquatic plants
Morone saxatilis	Striped Bass					Medium to large rivers; clean, sandy substrate with fine gravel and rock; shallow rocky and gravely areas with strong current for spawning sites; 17-18 C optimal for egg development
Moxostoma collapsum	Notchlip Redhorse					Medium to large rivers of moderate gradient; pool-dweller in streams; also in natural and artificial lakes
Moxostoma robustum	Robust Redhorse					Riffles, runs, and pools of mainstream rivers; tree snags; deep water near shore; course gravel substrate for spawning; cooler waters preferred during summer; lenthic habitat during part of life cycle
Notropis chalybaeus	Ironcolor Shiner					Low-velocity blackwater streams and swamps; woody debris
Noturus spp. (c.f. insignis)	"Broadtail" Madtom					Middle of narrow and deep rivers; sand and gravel substrates with woody debris

Table 5. Continued.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Percina crassa	Piedmont Darter					Clean, moderate to large stream riffles; sand to cobble substrate; moderate currents
Pteronotropis stonei	Lowland Shiner					Small to medium-clear and blackwater streams; moderate flow-like slow riffles, runs, and flowing pools; clean sand substrate; aquatic vegetation

Table 6. Aquatic priority species and their ecosystems: mussels.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Anodonta couperiana	Barrel Floater	G4	S1	Of Concern, State	Highest	Ponds or slow-flowing streams; sand or deep, soft, unstable, mud substrates
Anodonta implicata	Alewife Floater	G5	S1 recom.		High	Streams, rivers, pools; silt, sand, gravel substrates; requires host fish, alewife (*Alosa pseudoharengus)*and possibly other clupeids
Elliptio angustata	Carolina Lance	G4	S3		Moderate	Sand and sandy gravel substrates; often at edge of aquatic vegetation
Elliptio complanata complex	Eastern Elliptio	G5	S5		Moderate	Large rivers, canals, reservoirs, and headwater streams; variety of fish hosts; no specific flow volume or substrate requirements
Elliptio congaraea	Carolina Elephantear	G3	S3	Of Concern, State	Moderate	Rivers and small streams with sandy substrates
Elliptio fisheriana/nasutilus	Northern Lance	G4	SNR		High	Soft sediments in shallow water near stream and river banks; stable banks with intact riparian zone
Elliptio folliculata	Pod Lance	G2/G3Q	S2/S3		High	Rapidly flowing rivers but also slow areas; depths greater than 1m sand or clay substrates
Elliptio icterina complex	Variable Spike	G5Q	S4		Moderate	Slow-flowing streams and swamps to faster flowing streams and rivers; clear or tannic water; sand, gravel, bedrock, mud, and detritus substrates
Elliptio producta	Atlantic Spike	G3Q	S3		High	Streams or rivers in mild current; sand, rock, and mud substrate
Elliptio roanokensis	Roanoke Slabshell	G3	S2		High	Large rivers or small creeks; variable flow rates and temperatures; host fish unknown
Elliptio waccamawensis	Waccamaw Spike	G2/G3Q	S1		Highest	Main channel of rivers; highly sensitive to acidification and turbidity; compact sand substrate
Fusconaia masoni	Atlantic Pigtoe	G2	SH	State Endangered	Highest	Course sand and gravel at downstream edge of riffles; fast-flowing, well-oxygenated, pristine streams
Lampsilis cariosa	Yellow Lampmussel	G3/G4	S2		Highest	Gravel bars, margins of the flowing portions of water bodies, and cracks in bedrock of large rivers and small streams

Table 6. Continued.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Lampsilis radiata	Eastern Lampmussel	G5	S2	Of Concern, State	High	Streams, rivers, and blackwater swamps; mud or sand substrates
Lampsilis splendida/radiata	Rayed Pink Fatmucket	G3	S2	Of Concern, State	High	Streams, rivers, and blackwater swamps; mud or sand substrates; Laregmouth Bass host fish
Leptodea ochracea	Tidewater Mucket	G3/G4	S2		High	Pristine freshwater rivers with tidal influence
Ligumia nasuta	Eastern Pondmussel	G4	S2		High	Lakes, ponds, streams, and rivers; muddy, sandy, or gravely substrates; very shallow water near river banks
Toxolasma pullus	Savannah Lilliput	G2	S1	Of Concern, State	Highest	Shallow water and the edges of streams, rivers, and lakes but also backwaters; mud or silty sand substrates; host fish sunfish *(Lepomis)* species
Villosa delumbis	Eastern Creekshell	G4	S4	Of Concern, State	Moderate	Deep muddy flock or in sand and boulder fields; near streambanks often among tree roots; Largemouth Bass host fish
Villosa modioliformis	Eastern Rainbow	G5Q	S2	Of Concern, State	Highest	Sandy runs of small to medium creeks and small rivers; moderate current; depths of less than 1m

Table 7: Aquatic priority species and their ecosystems: crayfish, shrimp & snails.						
SCIENTIFIC NAME	**COMMON NAME**	**G-RANK**	**S-RANK**	**LEGAL STATUS**	**PRIORITY**	**SPECIFIC HABITAT REQUIREMENTS**
Procambarus ancylus	Coastal Plain Crayfish	G4/G5	S4/S5		Moderate	Lentic and lotic waters and burrows
Procambarus braswelli	Waccamaw Crayfish	G2/G3	SNR		High	Clear streams with sand substrate flowing through swampy areas
Procambarus chacei	Cedar Creek Crayfish	G4	S4		Moderate	lentic and lotic habitats; swamps, ponds, lakes, roadside ditches, springs, and streams; primary burrower
Procambarus lepidodactylus	Pee Dee Lotic Crayfish	G4	S4		Moderate	Clear creeks of moderate gradient flowing through swampy areas often among tree roots; sandy substrate
Procambarus pearsei	Carolina Sandhills Crayfish	G4	S3		Moderate	Lentic waters and subterranean burrows; may be in streams too; secondary burrower
Macrobrachium ohione	Ohio River Shrimp	G4	SNR		Moderate	Low-velocity water but also open side channels; suspended particulate matter; saline for larval development
Gillia altilis	Buffalo Pebblesnail	G5	S1		High	Cold, clear lakes, streams, and rivers
Lioplax subcarinata	Ridged Lioplax	G5	S1		High	Burrower that prefers sandy substrates in rivers

Table 8. Aquatic priority species and their ecosystems: reptiles & amphibians.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Alligator mississippiensis	American Alligator	G5	S5	Federal Threatened	Moderate	large river swamps, lakes, ponds, coastal impoundments, abandoned rice fields, brackish water marshes, and estuarine tidal creeks; juveniles will use Carolina bays and other seasonal wetlands
Ambystoma cingulatum	Flatwoods Salamander	G2/G3	S1	Federal Threatened; State Endangered	Highest	isolated, temporary wetlands with no fish that have open canopy above and abundant grasses and sedges
Ambystoma tigrinum	Tiger Salamander	G5	S2/S3	Of Concern, State	Highest	isolated, temporary wetlands with no fish that have open canopy above and abundant grasses and sedges
Aneides aeneus	Green Salamander	G3/G4	S1	Of Concern, State	Highest	moist rocky cliffs with abundant crevices; arboreal so use trees adjacent to rock outcrops
Apalone ferox	Florida Softshell Turtle	G5	SNR	State Threatened	High	wetlands like rivers, ponds, and lakes
Apalone spinifera	Spiny Softshell Turtle	G5	SNR	State Threatened	Moderate	restricted to reservoirs and associated rivers with sandbars and sandy substrates
Chelydra serpentina	Snapping Turtle (Common)	G5	SNR	State Threatened	Moderate	wetlands like rivers, ponds, and lakes
Chrysemys picta picta	Painted Turtle (Eastern)	G5	S?	State Threatened	Moderate	water bodies with muddy substrates, abundant vegetation, and basking sites
Clemmys guttata	Spotted Turtle	G5	S5	State Threatened	High	small ponds, streams, swamps, flooded forests, and other shallow water bodies
Deirochelys recticularia	Chicken Turtle	G5	SNR	State Threatened	Moderate	and surrounding upland habitat of live oak/pine
Kinosternon baurii	Striped Mud Turtle	G5	S?	Of Concern, State	Moderate	in and around the floodplain swamps of rivers
Nerodia floridana	Florida Green Watersnake	G5	S2	Of Concern, State	Highest	open water Carolina bays, lakes, old rice fields, and reservoirs with "pad plants"
Pseudacris feriarum	Upland Chorus Frog	G5	S3/S4	Of Concern, State	Moderate	isolated, temporary wetlands with no fish
Pseudemys concinna	River Cooter	G5	SNR	State Threatened	Moderate	Restricted to reservoirs and associated rivers
Pseudemys floridana	Florida Cooter	G5	SNR	State Threatened	Moderate	Slow-flowing rivers and non-flowing wetlands like ponds and small lakes with soft bottoms, basking sites, and aquatic vegetation

Table 8. Continued.

SCIENTIFIC NAME	COMMON NAME	G-RANK	S-RANK	LEGAL STATUS	PRIORITY	SPECIFIC HABITAT REQUIREMENTS
Pseudobranchus striatus striatus	Broad-striped Dwarf Siren	G5	S2	State Threatened	Highest	isolated, temporary wetlands with no fish that have open canopy above and abundant grasses and sedges; small streams with no flow and muck bottoms sometimes
Rana capito capito	Gopher Frog (Carolina)	G3/G4	S1	Federal Threatened; State Endangered	Highest	isolated, temporary wetlands with no fish that have open canopy above and abundant grasses and sedges
Rana palustris	Pickerel Frog	G5	SNR	Of Concern, State	High	hardwood areas with sphagnum bogs, meadows, and grassy fields near shaded streams or standing water
Seminatrix pygaea	Black Swamp Snake	G5	S?	Of Concern, State	High	wetlands with abundant aquatic vegetation
Trachemys scripta	Yellow-bellied Slider	G5	SNR	State Threatened	High	non-flowing wetlands like ponds and small lakes

Appendix 3. SCDNR Freshwater Fisheries Little Pee Dee River Data.

Table 1: Fish species collected during electrofishing on the Little Pee Dee River, May and June 2011, presented by abundance, biomass, length and weight.

Species	Number	%Composition	Total Weight (g)	% Biomass
American Eel	69	2.04	16,102	2.23
Blue Catfish	19	.56	55,581	7.70
Bowfin	112	3.32	249,416	34.58
Black Crappie	3	.09	673	.09
Bluegill	531	15.73	33,529	4.65
Bluespotted Sunfish	7	.21	35	.05
Brook Silverside	102	3.02	146	.02
Channel Catfish	20	.59	19,863	2.75
Creek Chubsucker	19	.56	2103	.29
Chain Pickerel	55	1.63	5580	.77
Carp	4	.12	28,550	3.96
Coastal Shiner	519	15.38	1,258	.17
Dusky Shiner	3	.09	6	0.0
Dollar Sunfish	247	7.32	2,806	.39
Flathead Catfish	12	.36	57,747	8.01
Grass Carp	2	.06	22,100	3.06
Golden Shiner	12	.36	101	.01
Hogchoker	11	.33	57	.01
Ironcolor Shiner	70	2.07	78	.01
Largemouth Bass	138	4.09	51,796	7.18
Longnose Gar	225	6.67	84,784	11.75
Mosquitofish	4	.12	2.5	0.0

Species	Number	%Composition	Total Weight (g)	% Biomass
Pirate Perch	64	1.90	347.5	0.05
Pumpkinseed	1	.03	15	0.0
Redbreast Sunfish	166	4.92	4,434	.61
Redear Sunfish	247	7.32	30,886.5	4.28
Redfin Pickerel	28	.83	777	.11
Sawcheek Darter	1	.03	1	0.0
Smallmouth Buffalo	1	.03	3,150	.44
Spotted Sunfish	270	8.0	10,584	1.47
Spotted Sucker	29	.86	20,299	2.81
Striped Bass	1	.03	2,206	.31
Swampfish	3	.09	4	0.0
Taillight Shiner	178	5.27	306.5	.04
Tessellated Darter	2	.06	6	0.0
Thinlip Chub	3	.09	8.8	0.0
Warmouth	191	5.66	15,665	2.17
Yellow Bullhead	2	.06	118	.02
Yellow Perch	4	.12	248	.03

Table 2: Species composition collected during the fall 2011 on the Little Pee Dee River

Species	Number	% Species Composition	CPUE (#/Hr)	Mean Weight (Kg)	Catch per Unit Effort (Kg/Hr)	Biomass% Total Weight
American Eel	92	2.50	9.20	.1529	1.41	1.87
Blue Catfish	3	.08	.30	3.8933	1.17	1.49
Bowfin	117	3.18	11.70	1.8794	21.99	28.12
Black Crappie	12	.33	1.20	.3253	.39	.50
Bluegill	231	6.28	23.10	.0541	1.25	1.60
Banded Pygmy Sunfish	2	.05	.20	.0008	.00	.00
Brook Silverside	413	11.23	41.30	.0010	.04	.05
Channel Catfish	61	1.66	6.10	.7343	4.48	5.73
Creek Chubsucker	11	.30	1.1	.0527	.06	.07
Chain Pickerel	12	.33	1.2	.2693	.32	.41
Carp	4	.11	.40	7.5375	3.02	3.86
Coastal Shiner	1225	33.31	122.50	.0017	.21	.27
Dusky Shiner	1	.03	.10	.0010	.00	.00
Dollar Sunfish	64	1.74	6.40	.0061	.39	.04
Eastern Silvery Minnow	22	.60	2.20	.0035	.01	.01
Flathead Catfish	51	1.39	5.10	4.2975	21.92	28.03
Grass Carp	3	.08	.30	9.4333	2.83	3.62
Golden Shiner	10	.27	1.00	.0044	.00	.01
Hogchoker	1	.03	.10	.0060	.00	.00
Ironcolor Shiner	2	.05	.20	.0010	.00	.00

Species	Number	% Species Composition	CPUE (#/Hr)	Mean Weight (Kg)	Catch per Unit Effort (Kg/Hr)	Biomass% Total Weight
Largemouth Bass	239	6.49	23.90	.3175	7.59	9.71
Longnose Gar	84	2.28	8.40	.4408	3.70	4.74
Pirate Perch	5	.14	.50	.0014	.00	.00
Redbreast Sunfish	573	15.58	57.30	.0140	.81	1.03
Redear Sunfish	156	4.24	15.60	.1352	2.11	2.70
Sawcheek Darter	1	.03	.10	.0001	.00	.00
Shorthead Redhorse	8	.22	.80	1.1774	.94	1.20
Spotted Sunfish	132	3.59	13.20	.0236	.31	.40
Spotted Sucker	39	1.06	3.90	.8557	3.34	4.27
Taillight Shiner	1	.03	.10	.0010	.00	.00
Thinlip Chub	2	.89	3.30	.0014	.00	.01
Tessellated Darter	33	1.85	6.80	.0378	.26	.33
Warmouth	68	.05	.20	.0010	.00	.00
Total #	3,678					100

Appendix 4. SCDNR Freshwater Fisheries Lumber River Data.

Table 1: Lumber River fish sampling summary table from the SCDNR fisheries investigations in lakes and streams study completion report, July 1, 1990 to June 30, 1993,on stream reach 2(portion of the Lumber River from the NC-SC State Line to the confluence with the Little Pee Dee River)

Species	Number	% Species Composition	CPUE (#/Hr)	Mean Weight (Kg)	Catch per Unit Effort (Kg/Hr)	Biomass% Total Weight
American Eel	20	1.80	2.86	0.1236	0.35	2.42
Blue Catfish	1	0.09	0.14	0.0120	0.00	0.01
Bowfin	31	2.79	4.43	1.4048	6.22	42.66
Bluegill	85	7.64	12.14	0.0233	0.28	1.94
Channel Catfish	3	0.27	0.43	0.4953	0.21	1.46
Creek Chubsucker	9	0.81	1.29	0.1375	0.18	1.21
Chain Pickerel	5	0.45	0.71	0.0042	0.00	0.02
Coastal Shiner	361	32.46	51.57	0.0012	0.06	0.44
Dollar Sunfish	12	1.08	1.71	0.0057	0.01	0.07
Flat Bullhead	3	0.27	0.43	0.0570	0.02	0.17
Flathead Catfish	2	0.18	0.29	1.1455	0.33	2.24
Flier	2	0.18	0.29	0.05000	0.01	0.10
Golden Shiner	1	0.09	0.14	0.0070	0.00	0.01
Hogchoker	2	0.18	0.29	0.0055	0.00	0.01
Largemouth Bass	53	4.77	7.57	0.4219	3.19	21.90
Longnose Gar	10	0.90	1.43	0.4329	0.62	4.24
Mosquitofish	3	0.27	0.43	0.0007	0.00	0.00
Pirate Perch	9	0.81	1.29	0.0043	0.01	0.04
Pumpkinseed	1	0.09	0.14	0.0270	0.00	0.03

Species	Number	% Species Composition	CPUE (#/Hr)	Mean Weight (Kg)	Catch per Unit Effort (Kg/Hr)	Biomass% Total Weight
Redbreast Sunfish	303	27.25	43.29	0.0262	1.13	7.76
Redear Sunfish	41	3.69	5.86	0.0480	0.28	1.93
Redfin Pickerel	2	0.18	0.29	0.0100	0.00	0.02
Spotted Sunfish	110	9.89	15.71	0.0257	0.40	2.77
Spotted Sucker	6	0.54	0.86	0.6332	0.54	3.72
Santee Chub	1	0.09	0.14	0.0030	0.00	0.00
Tessellated Darter	6	0.54	0.86	0.0024	0.00	0.01
Warmouth	23	2.07	3.29	0.0319	0.10	0.72
White Catfish	7	0.63	1.00	0.5987	0.60	4.11
Total	1,112	100			14.58	100.00

Appendix 5. Potential Little Pee Dee-Lumber Focus Area Partners.

Ducks Unlimited Conserves, restores and manages wetlands and associated habitats for North America's waterfowl through working with landowners and partners to acquire land and establish conservation easements and management agreements.

The **Natural Resources Conservation Service** provides financial and technical assistance to farmers, ranchers and forest landowners wanting to make conservation improvements to their land. NRCS also provides incentives for these landowners wanting to put wetlands, agricultural land, grasslands and forests under long-term conservation easements.

The **Pee Dee Land Trust** works with landowners to conserve and promote the appreciation of significant natural, agricultural and historical resources within the Pee Dee Region of South Carolina.

Private landowners adopting ecological ethics and applying natural management principles within the Focus Area benefits the conservation of the landscape as a whole. Some landowners choose to place their properties in conservation easements to maintain and conserve the natural integrity of their property in perpetuity.

The **South Carolina Department of Natural Resources** (SCDNR) serves as the principal advocate for and steward of South Carolina's natural resources. SCDNR serves in this capacity on many fronts including wildlife and fish management, habitat protection through land acquisition, natural resources law enforcement and research.

The **Nature Conservancy** utilizes science to target lands and waters in need of conservation for acquisition or conservation easement.

The **United States Fish & Wildlife Service** works to develop and apply environmental stewardship based on ecological principles and scientific knowledge of fish and wildlife. Utilizing this information and basic principles, the Service helps guide the conservation, development and management of the Nation's fish and wildlife resources.

Wildlife Action is a private, non-profit organization that serves to promote public awareness about wildlife habitat and the conservation, preservation and restoration of natural resources.

The **Winyah Rivers Foundation** works to protect, preserve, monitor and revitalize the health of the lands and water of the greater Winyah Bay watershed, which includes the Waccamaw, Lumber-Little Pee Dee, Lower Pee Dee, Lynches and Black River watersheds.

Appendix 6: References and Resources

Bogan, A. E and J. Alderman. 2008. Workbook and Key to the Freshwater Bivalves of South Carolina. Revised Second Edition. North Carolina Freshwater Bivalve Conservation Partnership. Raleigh, NC. pp 74. http://www.dnr.sc.gov/aquaticed/pdf/WorkbookSCclams.pdf Last accessed March 31, 2016.

_____, _____ and J. Price. 2008. Field guide to freshwater mussels of South Carolina. SCDNR. Columbia, SC. 43 pp. http://www.dnr.sc.gov/aquaticed/pdf/MussellFieldGuide.pdf. Last accessed March 31, 2016.

Eversole, A. G. 2014. Identification and distribution of crayfishes in South Carolina: A South Carolina State Wildlife Grants Project Final Report. SCDNR. Columbia, SC. 69 pp. https://griffingroups.com/file/view/377780/identification-and-distribution-of-crayfish-in-south-carolina-eversole-2014. Last accessed March 31, 2016.

Federal Highway Administration and South Carolina Department of Transportation. 2010. Interstate-73 final environmental impact statement: From I-95 to the Myrtle Beach region. U.S. Department of Transportation. Washington, D.C. http://www.i73insc.com/draft_envir_statement.shtml. Last accessed March 31, 2016.

Rohde, F. C., R. G. Arndt, J. W. Foltz and J. M. Quattro. 2009. Freshwater fishes of South Carolina. University of South Carolina Press. Columbia, SC. 430 pp.

South Carolina Department of Health and Environmental Control. 2005. Total maximum daily load for fecal coliform for Hills Creek, Lynches River, North and South Branch of Wildcat Creek, Flat Creek, Turkey Creek, Nasty Branch, Gulley Branch, Smith Swamp, Little Pee Dee River, Maple Swamp, White Oak Creek and Chinners Swamp of the Pee Dee Basin, South Carolina. SCDHEC Tech. Rept. No. 029-05. SCDHEC. Columbia, SC. 121 pp. https://www.scdhec.gov/HomeAndEnvironment/Docs/tmdl_pd_fc.pdf. Last accessed March 31, 2016.

_____. 2007. Watershed Water Quality Assessment Pee Dee River Basin. South Carolina Department of Health and Environmental Control. Tech. Rept. No. 005-07. SCDHEC Bureau of Water. Columbia, SC. 463 pp. https://www.scdhec.gov/HomeAndEnvironment/Docs/pd-005-07.pdf. Last accessed March 31, 2016.

South Carolina Department of Natural Resources. 2009. Boating guide to the Little Pee Dee Scenic River water trail in Dillon County. SCDNR. Columbia, SC. 77 pp. http://www.dnr.sc.gov/water/river/pdf/LittlePeeDeeTrailGuide.pdf. Last accessed March 31, 2016.

_____. 1990-1993. Fisheries investigations in lakes and streams District VII annual progress report. SCDNR. Columbia, SC.

South Carolina Department of Natural Resources. 2013. An Overview of the eight major river basins of South Carolina. SCDNR. Columbia, SC. 30 pp. https://www.dnr.sc.gov/water/waterplan/pdf/Major_Basins_of_South_Carolina.pdf. Last accessed March 31, 2016

_____. 2015. South Carolina state wildlife action plan (SWAP). SCDNR. Columbia, SC. http://www.dnr.sc.gov/swap/index.html. Last accessed March 31, 2016.

Wachob, A., A. D. Park and R. Newcome, Jr. 2009. South Carolina state water assessment: Second Edition. SCDNR Land, Water and Conservation. Columbia, SC. http://www.dnr.sc.gov/water/hydro/HydroPubs/assessment/SC_Water_Assessment_2.pdf. Last accessed March 31, 2016.