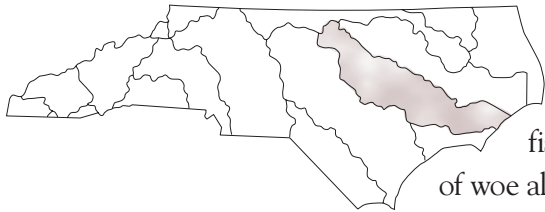


# NEUSE RIVER BASIN



Stretching 248 miles from the Falls Lake Reservoir Dam in the Piedmont to its mouth at Pamlico Sound, the Neuse River is the longest river in North Carolina. At its mouth, it is the widest river in America—6 miles across.



It's not surprising that such a broad-reaching river has touched the lives of so many people. In the 1990s, however, floods, blooms of algae, fish kills and a toxic aquatic organism weaved a tale of woe along the Neuse. Through initiatives in response to these problems, lawmakers and champions of the river hope to begin a chapter of redemption for the 2-million-year-old Neuse.

The Neuse River Basin, whose other major tributaries include Crabtree, Swift and Contentnea creeks and the Eno, Little and Trent rivers, is one of only four river basins that lie entirely within the state's boundaries. The Neuse once began at the confluence of the Eno and Flat rivers, but now spills from Falls Lake Reservoir Dam above Raleigh.

Neuse River

KEN TAYLOR, NCVRC



After this impounded 22-mile beginning, it flows freely as a freshwater river until it reaches New Bern. Here it turns brackish, widens and travels sluggishly as it becomes a 40-mile-long tidal estuary that empties into the southern end of Pamlico Sound. The Neuse River Basin is North Carolina's third largest basin and contains roughly one-sixth of the state's population.

Since it feeds one of the nation's largest and most productive coastal estuaries (Albemarle-Pamlico), the Neuse has played a prominent role in the state's fishing history. The Albemarle-Pamlico estuary system is a nursery for 90 percent of the commercial seafood species caught in North Carolina. The rivers and streams of the Neuse River Basin are spawning areas for shad, herring, striped bass and other anadromous fish—species that live as adults in the ocean but migrate upriver to spawn in



ILLUSTRATION BY DUANE RAYER

## profile:

Total miles of streams and rivers: 3,880

Total acres of lakes: 16,414

Total acres of estuary: 369,977

Total miles of coastline: 21

Municipalities within basin: 74

Counties within basin: 18

Size: 6,235 square miles

Population: 1,320,379 (2000 U.S. Census)

# Fish Routes Reopened



COURTESY OF THE N.C. DIVISION OF TOURISM, FILM AND SPORTS DEVELOPMENT

Dam removal is an important component of stream habitat restoration. Many species of anadromous fish, those that live in saltwater but migrate to freshwater streams to breed, can return to historic spawning grounds that have been blocked. North Carolina has more than 5,000 dams, some of which are obsolete. Since 1997, four dams on the Neuse River have been torn down, reopening more than 1,200 miles of the Neuse River, the Little River and other tributaries. The project received national accolades for its success and thrift—the price tag was a mere \$205 per river mile. Striped bass, shad, herring and other migratory species can now access 90 percent of their original spawning grounds. Fish populations have grown, and fishermen upstream are landing species long lost to them. Several species of freshwater mussels that rely on free-flowing water have also benefited.

fresh water. At the beginning of the 20th century, these spring migrations on the Neuse River produced more catches of shad than any other river in the state. Other important recreational and commercial species include catfish, bass, flounder, blue crabs, shrimp and oysters.

*The dwarf wedgemussel is one of seven North Carolina mussels that are federally listed as endangered species.*

The Neuse River Basin is home to 17 species of rare freshwater mussels and a rare snail species. Two of these mussels, the dwarf wedgemussel and Tar River spinymussel, are federally listed as endangered. The largest known population of the dwarf wedgemussel is found in the Connecticut River, but North Carolina has the greatest distribution of this mollusk—tiny populations in small streams throughout 12 counties. Runoff containing sediment and pollutants is the biggest threat to freshwater mussels, which need clean, clear water to thrive.



KEN TAYLOR, NCWRC

*The Neuse River waterdog is also known as the Carolina mudpuppy.*

The Eno River contains the only known North Carolina population of the rare panhandle pebblesnail. Another significant animal resident is the Neuse River waterdog (*Necturus lewisi*), an aquatic salamander that is found nowhere else in the world outside the Neuse and Tar-Pamlico

WAYNE VAN DEVENDER



river basins. Also called the Carolina mudpuppy, this large salamander grows to 11 inches long. A rare fish, the Carolina madtom, lives only in the Neuse and Tar-Pamlico basins. Other rare fishes in the basin include the Roanoke bass, Carolina darter and shortnose sturgeon, a federally listed endangered species. Other federally listed basin residents include the leatherback sea turtle, Atlantic ridley sea turtle, West Indian manatee and red-cockaded woodpecker.



The Neuse River Basin also boasts an unusual geological formation. In Lenoir County, the Neuse has carved a 100-foot canyon—a unique feature on a coastal plain river. The towering bluff of sedimentary rock is the showpiece of Cliffs of the Neuse State Park southeast of Goldsboro.

A big threat to water quality in the lower Neuse River are large quantities of nutrients, especially nitrogen, contributed primarily from “nonpoint” sources. Nonpoint pollution comes from a large, diffuse area. Fertilizers and animal waste—washed from lawns, urban developed areas, farm fields and animal operations, particularly swine operations — contribute 60 percent of the nitrogen and phosphorus overload. The same nutrients found in those wastes can be beneficial to aquatic life in small amounts, but too many nutrients can contribute to excess growth of aquatic plants (such as algae) and low levels of dissolved oxygen. Aquatic animals need dissolved oxygen to survive. To a significantly lesser degree, water quality in the Neuse River Basin is being affected by “point source” pollution from the more than 400 sites that are allowed (by state permit) to discharge treated wastewater into streams and rivers.

It is thought that nutrient pollution may have stimulated toxic outbreaks of *Pfiesteria piscicida*, a free-swimming, microscopic organism that was linked to major fish kills on the lower river in 1995. The Neuse’s troubles placed the river in the national spotlight. American Rivers, a national conservation organization, included the beleaguered Neuse on its annual “endangered rivers” watchlist in 1995, 1996, 1997 and 2007. Designation by the organization is meant to trigger “a call to decision-makers to hear the voices of the friends of that river.”

The situation on the lower Neuse and other eastern North Carolina rivers spurred the N.C. Legislature in 1997 to enact a statewide moratorium on the creation of new hog farms so researchers can investigate their effect on water quality and examine alternative technologies to better handle their waste. The moratorium was extended in 2003. The crisis also prompted significant new state laws and regulations in 1998 intended to reduce nitrogen inputs

CHARLES BRASWELL JR.



*Dusk settles on downtown Raleigh.*

CHARLES BRASWELL JR.



*The streaked, layered face of the towering rock cliff at Cliffs of the Neuse State Park (left) tells the geological story of the river basin; Lake Johnson Greenway, Raleigh (above)*



BILL LEA

*A sandy beach at the mouth of the Neuse River near the Croatan National Forest*

to the Neuse by 30 percent within five years. The “Neuse rules” are among the first comprehensive management strategies in the country to include mandatory measures for both point and nonpoint sources of nutrients.

The rules require property owners to protect 50-foot strips of land covered with trees, shrubs and other vegetation—known as buffers—along streams, rivers, lakes and estuaries. Deep-rooted plants prevent soil erosion and filter out nutrients in runoff that would otherwise flow into streams. Further, certain industries and municipalities must jointly reduce their point source wastewater discharges into the river. Ten major cities in the basin must now limit stormwater runoff in new developments, and measures to reduce nitrogen runoff are required on farms, golf courses and other large areas of fertilized land. To learn more about the Neuse rules and how they affect you, visit the following Web site: <http://h2o.enr.state.nc.us/nps/neuse.htm>.

Although nutrient pollution has been the most publicized issue, population growth and accompanying development contribute to increased stormwater runoff throughout the basin. As pavement and lawns replace natural forests and woodlands, rain and melting snow race over land more quickly, carrying pollution and entering streams at a high speed. The Triangle (Raleigh-Durham-Chapel Hill region) was home to about 370,000 people in 1970; that population now numbers about 600,000 and is projected to reach 1 million by 2010. The population in Wake County alone is expected to grow by more than 60 percent in the next 20 years; the population in the entire basin is expected to increase by 36 percent during that time.

Government officials and citizens will be challenged to reduce existing sources of water pollution and ensure that population growth does not contribute to new problems. Meanwhile, individuals can strive to decrease erosion and runoff from their property and to improve the quality of runoff by reducing or more wisely using fertilizer, pesticides and other potentially harmful chemicals.

## NEUSE RIVER BASIN

You may have noticed Neuse River Basin signs posted along highways. These were created through a partnership between the Office of Environmental Education and the N.C. Department of Transportation with funding from the Federal Transportation Enhancement Program. Signs in each of the state’s 17 river basins call attention to basin boundaries and promote stewardship of public waters.





BILL LEA

## Environmental Education in the Neuse River Basin

During the summer and fall of 1995, millions of fish died and washed ashore along creeks and rivers of the lower Neuse River. As a result, a Senate Select Committee on Water Quality and Fish Kills was created to coordinate an investigation into the status of North Carolina waters. This committee realized that people needed to know more about how river basins function so that they could make sound decisions on issues that influence water quality. The committee invited the Office of Environmental Education to develop an environmental education strategy aimed at helping the people in the Neuse River Basin become better aware of their connection to the river basin.

To heighten public awareness of river basins, the Department of Environment and Natural Resources worked with the Department of Transportation to install river basin highway signs in the Neuse River Basin to inform travelers that they live in a river basin. Signs have now been placed in all 17 of the state's river basins through funding from the Federal Transportation Enhancement Program. State transportation maps also highlight North Carolina's river basins.

The educational initiative that began in the Neuse River Basin is now a statewide Adult Environmental Education campaign designed to reach adults who are not in the traditional classroom. The program was developed using the theme "Discover Your Ecological Address" and interprets environmental concepts using nine components of one's "ecological address"—including river basins, topography, wetlands, groundwater, biodiversity, soil, air, climate and energy. The program promotes the idea that an individual's personal choices and daily actions have environmental consequences. It encourages people to explore these connections, make better environmental decisions and participate in governmental processes that influence the health of the environment.

The Adult Environmental Education Program has been expanded to include the Informed Consumer Initiative. Started in 2006, this program highlights how many of the choices we make every day as consumers affect the environment. Topics include food, lawn and garden care, waste, water, household goods, personal products and the distances that products travel. To learn more, visit <http://www.eenorthcarolina.org/consumer.htm>.

State of North Carolina: Governor Michael F. Easley • North Carolina Department of Environment and Natural Resources: Secretary William G. Ross Jr. • Office of Environmental Education: Director Lisa Tolley, Project Manager Rachel Golden • Editor Carla Burgess • Designer Kimberly KC Schott, Red Gate Design • Special Thanks North Carolina Wildlife Resources Commission • Date: 2007 • 10,000 copies of this public document were printed at a cost of \$1,462 or \$0.15 per copy. • This publication was funded through the Clean Water Act's Section 319 Grant Program. • In the coming years, some river basin boundaries will change if the state moves forward with plans to modify them to coincide with federal maps. The Cape Fear, White Oak, Chowan, Pasquotank, Tar-Pamlico and Neuse basins would be the most significantly altered.

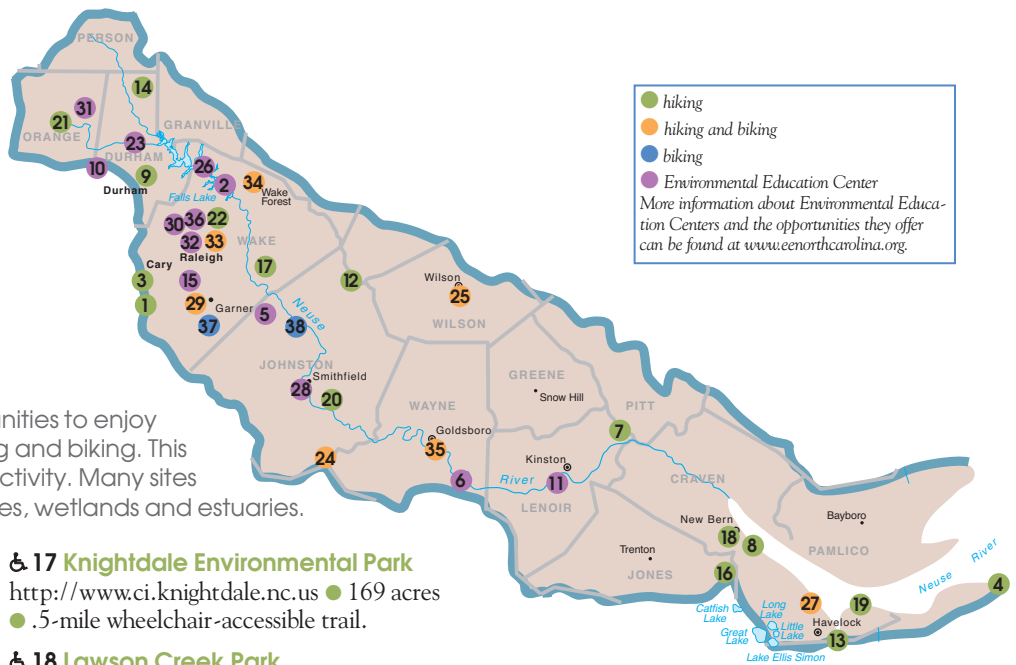
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# HIKING & BIKING



in the Neuse River Basin

The Neuse River Basin offers many opportunities to enjoy and explore nature through walking, hiking and biking. This list includes places for easy to moderate activity. Many sites include views of streams, rivers, creeks, lakes, wetlands and estuaries.



● hiking  
● hiking and biking  
● biking  
● Environmental Education Center  
 More information about Environmental Education Centers and the opportunities they offer can be found at [www.eenorthcarolina.org](http://www.eenorthcarolina.org).

## ● HIKING ●

### 1 Apex Community Park

<http://www.apexnc.org/depts/parks/index.cfm> ● 160 acres ● 3 miles of trails.

### 2 Blue Jay Point County Park

### 3 Cary Parks and Preserves

<http://www.townofcary.org> and [www.tlc-nc.org](http://www.tlc-nc.org)

### 4 Cedar Island National Wildlife Refuge

<http://www.fws.gov/mattamuskeet/cedarisland/> ● 14,480 acres ● 16 miles of trails.

### 5 Clemmons Educational State Forest

### 6 Cliffs of the Neuse State Park

### 7 Contentnea Creekside Trail Park

<http://www.co.pitt.nc.us/depts/planning/cdwalk> ● .5-mile trail.

### 8 Creekside Park

<http://www.co.craven.nc.us> ● 111 acres ● 1 mile trail; .25-mile wheelchair-accessible trail.

### 9 Durham Natural Areas

Duke Forest ([www.env.duke.edu/forest](http://www.env.duke.edu/forest))  
 Penny's Bend Nature Preserve ([www.ncbg.unc.edu](http://www.ncbg.unc.edu))  
 Sarah P. Duke Gardens ([www.hr.duke.edu/dukegardens/](http://www.hr.duke.edu/dukegardens/))  
 West Ellerbe Creek Trail ([www.ellerbecreek.org](http://www.ellerbecreek.org))

### 10 Eno River State Park

### 11 Exchange Nature Center at Neuseway Nature Park

### 12 Flower Hill

<http://www.tlc-nc.org> ● 10 acres

### 13 Havelock Waterfront Park

<http://www.cityofhavelock.com> ● 6.6 acres ● 400-foot nature boardwalk.

### 14 Hill Demonstration Forest

<http://www.cnr.ncsu.edu/for/facilities.html> ● 2,450 acres ● 5 miles of trails.

### 15 Historic Yates Mill County Park

### 16 Island Creek Forest Walk

<http://ncnatural.com/NCUSFS/Croatan/> ● .5-mile nature trail.

### 17 Knightdale Environmental Park

<http://www.ci.knightdale.nc.us> ● 169 acres ● .5-mile wheelchair-accessible trail.

### 18 Lawson Creek Park

<http://www.ci.new-bern.nc.us> ● 140 acres ● Walking trail with wheelchair access.

### 19 Neusiok Trail

<http://www.cs.unca.edu/nfsnc/recreation/recreate.htm> ● 21-mile hiking trail.

### 20 Neuse Riverwalk

<http://www.smithfield-nc.com/parksrec> ● 5-mile trail.

### 21 Occoneechee Mountain State Natural Area

124 acres ● 2 miles of trails.

### 22 Schenck Memorial Forest

<http://www.cnr.ncsu.edu/for/facilities.html> ● 254 acres ● 2 miles of trails.

### 23 West Point on the Eno

## ● HIKING and BIKING ●

### 24 Bentonville Battleground

<http://www.ah.dcr.state.nc.us/sections/hs> ● 100 acres ● 1-mile trail.

### 25 Buckhorn Lake

<http://www.wilsonnc.org/Departments/ParksAndRecreation/facilities.asp> ● 1.9 mile multi-use trail on west side of lake.

### 26 Falls Lake State Recreation Area

### 27 Flanners Beach

<http://www.cs.unca.edu/nfsnc/recreation/recreate.htm> ● Trails include wheelchair-accessible loop.

### 28 Howell Woods Environmental Learning Center

### 29 Lake Benson Park

<http://www.ci.garner.nc.us/parks.htm> ● 1.75-mile, wheelchair-accessible trail.

### 30 Lake Crabtree County Park

### 31 Little River Regional Park

### 32 N.C. Museum of Art Park

### 33 Raleigh City Parks

<http://www.raleighnc.gov>

### 34 Smith Creek Soccer Center

<http://www.ci.wake-forest.nc.us> ● .5-mile, wheelchair-accessible trail.

### 35 Stoney Creek Greenway

<http://www.greatergoldsboro.com/attractions.html> ● 3.4-mile trail.

### 36 William B. Umstead State Park

## ● BIKING ●

### 37 Garner Recreation Park

<http://trianglemtb.com/pages/trails/garner.html> ● 5 miles of mountain bike trails.

### 38 Legend Park (Clayton)

(919) 553-1550 ● 8 miles of trails.



♿ = some trails designated as wheelchair accessible

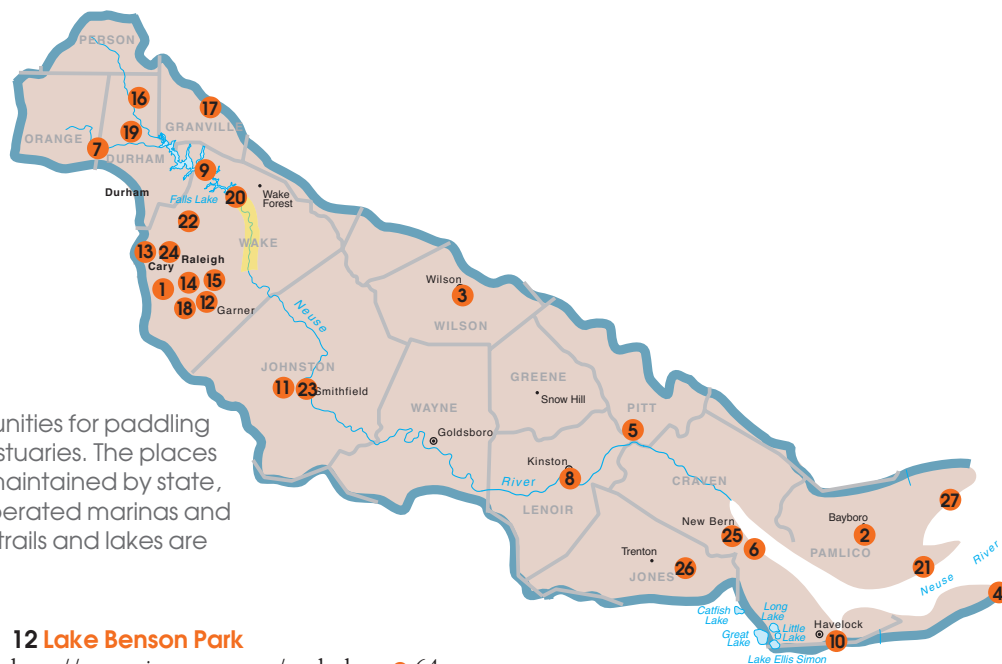


# PADDLING



in the Neuse River Basin

The Neuse River Basin offers many opportunities for paddling creeks, ponds, streams, rivers, lakes and estuaries. The places included here offer public access areas maintained by state, federal or local governments. Privately operated marinas and boat docks may also be available. These trails and lakes are suitable for easy to moderate paddling.



## 1 Apex Community Park

<http://www.apexnc.org> ● 50-acre lake

## 2 Bayboro Area Canoe Trails

<http://www.ncpaddletrails.org> ● Several easy trips via Bayboro's Waterfront Park, including the 2-mile sheltered Bay River South Prong Trail.

## 3 Buckhorn Lake

<http://www.wilsonnc.org> ● 2,300 acres

## 4 Cedar Island National Wildlife Refuge\*

<http://www.fws.gov/mattamuskeet/cedarisland/>

## 5 Contentnea Creekside Trail Park

<http://www.co.pitt.nc.us/depts/planning/cdwalk/pages/grifton.shtml>

## 6 Creekside Park

<http://www.co.craven.nc.us/parks/creekside.cfm> ● Access to Brices Creek

## 7 Eno River via Eno River State Park

<http://ils.unc.edu/parkproject/visit/enri/do.html#canoe> ● The Eno River has class I-III rapids and may flow from gentle to swift, depending on river conditions. Paddlers are encouraged to call (919) 383-1686 to learn about current conditions.

## 8 Exchange Nature Center at Neuseway Nature Park

<http://www.neusewaypark.com> ● Access to Neuse River. Canoe rentals available.

## 9 Falls Lake State Recreation Area\*

<http://ils.unc.edu/parkproject/visit/fala/do.html> ● 12,000 acres

## 10 Havelock Waterfront Park

<http://www.cityofhavelock.com/Departments/ParksRecreation/CityParks.aspx> ● Access to Slocum Creek

## 11 Howell Woods Environmental Learning Center

<http://www.johnstoncc.edu/howellwoods/> ● 5 ponds plus access to two creeks and the Neuse River.

## 12 Lake Benson Park

<http://www.ci.garner.nc.us/parks.htm> ● 64 acres ● Rental boats only.

## 13 Lake Crabtree County Park

<http://www.wakegov.com/parks/lakecrabtree> ● 520 acres

## 14 Lake Johnson

<http://www.raleigh-nc.org> ● 150 acres

## 15 Lake Lynn

<http://www.raleigh-nc.org> ● 60 acres

## 16 Lake Michie

<http://www.ci.durham.nc.us/departments/parks/lakes.cfm> ● 540 acres

## 17 Lake Rogers

<http://www.cityofcreedmoor.org/> ● 175 acres

## 18 Lake Wheeler

<http://www.raleigh-nc.org> ● 650 acres

## 19 Little River Lake

<http://www.ci.durham.nc.us/departments/parks/lakes.cfm> ● 510 acres

## 20 Neuse River Canoe Trail

(highlighted in yellow) <http://www.raleighnc.gov> ● 17 miles of trail with 5 access points.

## 21 Oriental Paddle Trails\*

<http://www.ncpaddletrails.org> ● 16-mile network of creeks near Oriental.

## 22 Shelley Lake

<http://www.raleighnc.gov> ● 53 acres

## 23 Town Commons Park/Neuse Riverwalk

<http://www.smithfield-nc.com/parksnrec/parks.html>

## 24 William B. Umstead State Park

<http://ils.unc.edu/parkproject/visit/wium/home.html> ● Big Lake (55 acres), Sycamore Lake (25 acres) and Reedy Creek Lake (25 acres)

## 25 Union Point and Lawson Creek Parks

<http://www.ci.new-bern.nc.us> ● Access to the Neuse River and Brices Creek

## 26 Trent River at Pollocksville\*

<http://www.co.jones.nc.us/recreation.htm>

## 27 Vandemere Canoe Trails

<http://www.ncpaddletrails.org> ● Smith Creek (6 miles), Vandemere Creek (8 miles), Cedar Creek (.8 miles), Little Vandemere Creek (.8 miles) and Long Creek (1.3 miles)

\*Denotes site with public access areas maintained by the N.C. Wildlife Resources Commission. For directions to boat ramps, visit [www.ncwildlife.org](http://www.ncwildlife.org) and click on Boating/Waterways, then Maps/Location.

► For information about more-challenging paddle trips and side trips along the coast of the Neuse River Basin, visit <http://www.ncpaddletrails.org>.



## WHERE SHOULD I GO



BILL LEA

Estuaries are often called “nurseries” because they provide shelter and food for larval and juvenile fish and shellfish.

What makes the Neuse River Basin special? See for yourself. Visit these Environmental Education Centers to discover more about your ecological address:

- Arboretum at Johnston Community College
- Bass Lake Park and Retreat Center
- Blue Jay Point Center for Environmental Education
- Camp Chestnut Ridge
- Camp Seagull and Seafarer – Extended Season Programs
- Centennial Campus Center for Wildlife Education
- Center for Environmental Farming Systems at Cherry Research Farm
- Clemmons Educational State Forest
- Cliffs of the Neuse State Park
- Crowder District Park
- Don Lee Center
- Durant Nature Park
- Eno River State Park
- Exchange Nature Center at Neuseway Nature Park
- Exploris
- Falls Lake State Recreation Area
- Falls Lake Visitor Assistance Center
- Historic Yates Mill County Park
- Howell Woods Environmental Learning Center
- Imagination Station
- Lake Crabtree County Park
- Little River Regional Park
- North Carolina Museum of Life and Science
- North Carolina Museum of Natural Sciences
- North Carolina Solar Center
- Schoolhouse of Wonder
- Stevens Nature Center at Hemlock Bluffs Nature Preserve
- Wake County Office Park
- West Point on the Eno Park
- Weyerhaeuser’s Cool Springs Environmental Education Center
- William B. Umstead State Park
- Wilson Botanical Gardens

For more information about all the Environmental Education Centers in North Carolina, call the Office of Environmental Education at (919) 733-0711, or check out the Web site at <http://www.eenorthcarolina.org>.

## HOW CAN I HELP



You can gain a sense of community pride by learning more and helping to protect streams, rivers and estuaries in the Neuse River Basin. The contacts listed below can help you do just that.

### Conservation Trust for North Carolina

<http://www.ctnc.org/>  
(919) 828-4199

### Ellerbe Creek Watershed Association

<http://www.ellerbecreek.org/>  
(919) 698-8161

### Eno River Association

<http://www.enoriver.org/>  
(919) 620-9099

### Friends of South Ellerbe Creek

<http://www.owdna.org/fosec.htm>

### N.C. Soil and Water Conservation Districts

<http://www.enr.state.nc.us/DSWC>  
(919) 733-2302

### Neuse River Basinwide Plan\*

<http://h2o.enr.state.nc.us/basinwide>

### Neuse River Education Team

<http://www.neuse.ncsu.edu/>

### Neuse River Foundation

<http://www.neuseriver.org>  
(252) 637-7972

### Neuse River Rapid Response Team

<http://h2o.enr.state.nc.us/esb/nrrt.html>  
1 (888)-764-7661

### North Carolina Stream Watch

[http://www.ncwater.org/Education\\_and\\_Technical\\_Assistance/Stream\\_Watch](http://www.ncwater.org/Education_and_Technical_Assistance/Stream_Watch)  
(919) 715-5433

### Triangle Greenways Council

<http://www.trianglegreenways.org/>  
(919) 545-9104

### Triangle Land Conservancy

<http://www.tlc-nc.org/>  
(919) 833-3662

### Triangle Rails to Trails Conservancy

<http://www.trianglerails.org/>

### Umstead Coalition

<http://umsteadcoalition.org/>

### Upper Neuse River Basin Association

<http://www.unrba.org/>  
(919) 558-2702

\*Basinwide water quality planning is a nonregulatory, watershed-based approach to restoring and protecting the quality of North Carolina’s surface waters. The N.C. Division of Water Quality welcomes community input.

To order additional brochures on any of North Carolina’s 17 river basins, a general river basin booklet or a poster, call the N.C. Office of Environmental Education at (919) 733-0711, or order online at <http://www.eenorthcarolina.org>.