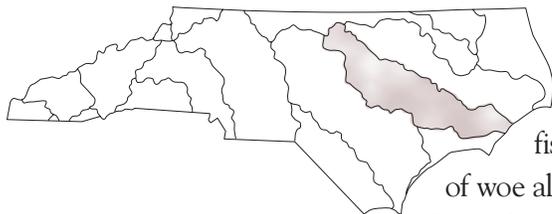


NEUSE RIVER BASIN

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—six 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. 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

Neuse River



NCWRC

above Raleigh. At New Bern 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 fourth 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 freshwater. At the beginning of the 20th century, these



ILLUSTRATION BY DUANE RAVER



profile:

Total miles of streams and rivers: 3,409

Total acres of lakes: 17,446

Total acres of estuary: 264,552

Municipalities within basin: 75

Counties within basin: 18

Size: 6,062 square miles

Population: 1,687,462 (2010 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, which have been beneficial for energy production, flood control and the creation of recreational areas. However, some of these dams have become obsolete, allowing for their removal. Since 1997, several 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.

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 several North Carolina mussels that are federally listed as endangered species.

The Neuse River Basin is home to many species of freshwater mussels and two rare aquatic snail species. Two of these mussels, the dwarf wedgemussel and Tar River spinymussel, are federally listed as endangered. The Neuse River Basin is also home to many Aquatic Significant Natural Heritage Areas. These are areas deemed ecologically significant by the N.C. Natural Heritage Program because they represent the waters that are of most importance to North Carolina's biodiversity and have a significant amount of rare species present.



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, Kemp's 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.

The situation on the lower Neuse and other eastern North Carolina rivers spurred the state 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 crisis also prompted significant new state laws and regulations in 1998 intended to reduce nitrogen inputs 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 riparian 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

CHARLES BRASWELL JR.



Dusk settles on downtown Raleigh.

BEN CASEY



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)



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

BILL LEA

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 current Neuse rules and how they affect you, visit the following website: <http://portal.ncdenr.org/web/wq/ps/nps/neuse>.

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 has now surpassed 1 million. The population in Wake County alone increased over 45 percent between 2000 and 2010 and is projected to increase another 30 percent between 2010 and 2020. By 2020 Wake County is expected to have over 1 million residents.

NC DIVISION OF TOURISM, FILM AND SPORTS DEVELOPMENT



Government officials and residents 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 the use of fertilizers, pesticides and other potentially harmful chemicals.



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 N.C. Department of Environment and Natural Resources worked with the N.C. 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 program designed to reach adults who are not in the traditional classroom. 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. To learn more, visit www.eenorthcarolina.org.

The River Basin education program has also reached thousands of school children across the state. Although originally developed for the general public, approximately 49 percent of all river basin orders are from K-12 teachers who use the materials to teach North Carolina students about the hydrosphere, river basins and local watersheds. Since the creation of this program, over one million river basin publications have been ordered and distributed to help teach North Carolina students and residents about our precious water resources.

State of North Carolina: Governor Pat McCrory • **North Carolina Department of Environment and Natural Resources:** Secretary John E. Skvarla, III • **Office of Environmental Education and Public Affairs:** Program Manager Lisa Tolley; Project Manager Ian Brown • Editor Carla Burgess • Designer Kimberly KC Schott, Red Gate Design • *Special Thanks* North Carolina Wildlife Resources Commission, North Carolina Division of Water Quality and North Carolina Natural Heritage Program • **Date:** 2013 • 5,500 copies of this public document were printed at a cost of \$1,324.12 or 0.241 per copy. • **This publication was funded through a Walmart Stormwater Compliance Grant.**

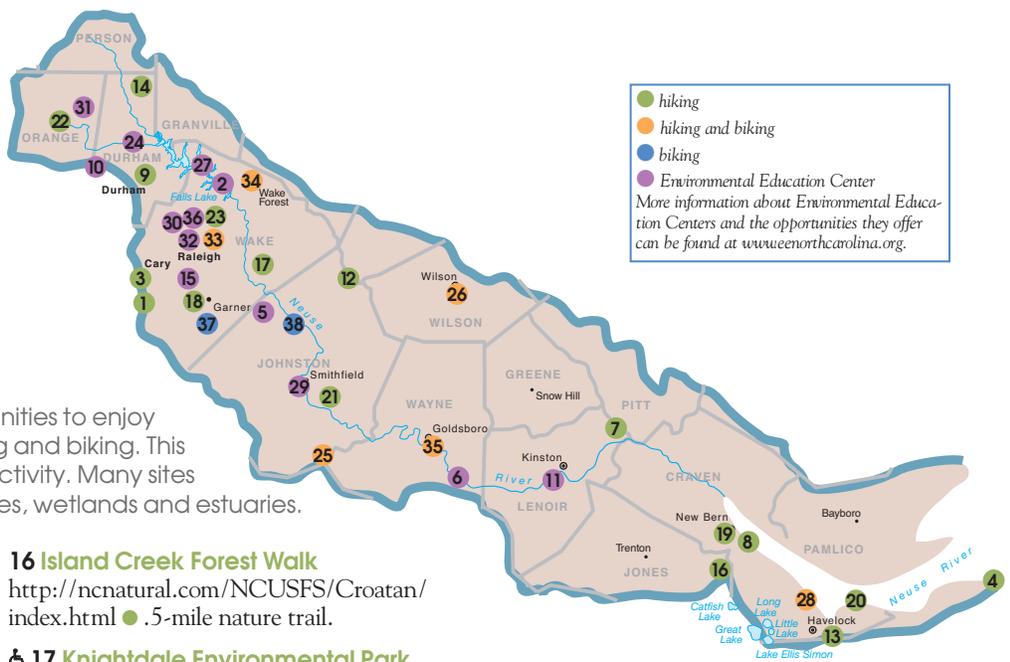
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HIKING & BIKING



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 ●

1 Apex Community Park

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

♿ 2 Blue Jay Point County Park

www.townofcary.org and www.tlc-nc.org

3 Cary Parks and Preserves

www.fws.gov/cedarisland/ ● 14,480 acres
● 16 miles of trails.

♿ 5 Clemmons Educational State Forest

6 Cliffs of the Neuse State Park

www.co.pitt.nc.us/depts/planning/cdwalk
● .5-mile trail.

♿ 8 Creekside Park

www.cravencounty.com/parks/creekside.cfm
● 111 acres ● 1 mile trail; .25-mile wheelchair-accessible trail.

9 Durham Natural Areas

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

10 Eno River State Park

11 Exchange Nature Center at Neuseway Nature Park

www.tlc-nc.org ● 10 acres

13 Havelock Waterfront Park

www.havelocknc.us ● 6.6 acres ● 400-foot nature boardwalk.

14 Hill Demonstration Forest

www.cnr.ncsu.edu/fer/dept/hilldemo.html
● 2,450 acres ● 5 miles of trails.

15 Historic Yates Mill County Park

16 Island Creek Forest Walk

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

♿ 17 Knightdale Environmental Park

www.knightdalenc.gov ● 169 acres
● .5-mile wheelchair-accessible trail.

♿ 18 Lake Benson Park

www.garnernc.gov ● 1.8-mile, wheelchair-accessible trail.

♿ 19 Lawson Creek Park

www.ci.new-bern.nc.us/RP/parks.php ● 140 acres ● Walking trail with wheelchair access.

20 Neusiok Trail

www.fs.usda.gov/recarea/nfsnc/recreation/recarea/?recid=48492&actid=34 ● 21-mile hiking trail.

21 Neuse Riverwalk

www.smithfield-nc.com ● 5-mile trail.

22 Occoneechee Mountain State Natural Area

www.ncparks.gov ● 124 acres ● 2 miles of trails.

23 Schenck Memorial Forest

www.cnr.ncsu.edu/fer/dept/schenckm.html
● 254 acres ● 2 miles of trails.

24 West Point on the Eno

● HIKING and BIKING ●

25 Bentonville Battlefield

www.nchistoricsites.org/bentonvi/bentonvi.htm
● 100 acres ● .25-mile trail.

26 Buckhorn Lake

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

27 Falls Lake State Recreation Area

♿ 28 Flanners Beach in Neuse River Area

www.fs.usda.gov/recmain/nfsnc/recreation
● Trails include wheelchair-accessible loop.

29 Howell Woods Environmental Learning Center

30 Lake Crabtree County Park

♿ 31 Little River Regional Park

32 N.C. Museum of Art Park

33 Raleigh City Parks

www.raleighnc.gov

♿ 34 Smith Creek Soccer Center

www.wakeforestnc.gov/parksrecreation.aspx
● .5-mile, wheelchair-accessible trail.

35 Stoney Creek Greenway

www.greensboro-nc.gov/ ● 3.4-mile trail.

36 William B. Umstead State Park

● BIKING ●

37 Garner Recreation Park

<http://trianglemtb.com/garner.php> ● 6 miles of mountain bike trails.

38 Legend Park (Clayton)

www.townofclaytonnc.org ● (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

www.apexnc.org/depts/parks/index.cfm
● 50-acre lake

2 Bayboro Area Canoe Trails

www.ncsu.edu/paddletails/ ● Several easy trips via Bayboro's Waterfront Park, including the 2-mile sheltered Bay River South Prong Trail.

3 Buckhorn Lake

www.wilsonnc.org/departments/parksandrecreation ● 2,300 acres

4 Cedar Island National Wildlife Refuge*

www.fws.gov/cedariland/

5 Contentnea Creekside Trail Park

www.co.pitt.nc.us/depts/planning/cdwalk/pages/grifton.shtml

6 Creekside Park

<http://cravencounty.recdesk.com/recdeskportal/>
● Access to Brices Creek

7 Eno River via Eno River State Park

www.ncparks.gov ● 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

www.neusewaypark.com ● Access to Neuse River. Canoe rentals available.

9 Falls Lake State Recreation Area*

www.ncparks.gov ● 12,000 acres

10 Havelock Waterfront Park

www.havelocknc.us ● Access to Slocum Creek

11 Howell Woods Environmental Learning Center

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

12 Lake Benson Park

www.garnernc.gov ● 64 acres ● Rental boats only.

13 Lake Crabtree County Park

www.wakegov.com/parks/lakecrabtree
● 520 acres

14 Lake Johnson

www.raleighnc.gov ● 150 acres

15 Lake Lynn

www.raleighnc.gov ● 60 acres

16 Lake Michie

<http://durhamnc.gov/ich/op/prd/Pages/City-Lakes.aspx> ● 540 acres

17 Lake Rogers

www.cityofcreedmoor.org/ ● 175 acres

18 Lake Wheeler

www.raleighnc.gov ● 650 acres

19 Little River Lake

<http://durhamnc.gov/ich/op/prd/Pages/City-Lakes.aspx> ● 510 acres

20 Neuse River Canoe Trail

(highlighted in yellow) www.visitraleigh.com
● 17 miles of trail with 5 access points.

21 Oriental Paddle Trails*

www.ncsu.edu/paddletails/ ● 16-mile network of creeks near Oriental.

22 Shelley Lake

www.raleighnc.gov ● 53 acres

23 Town Commons Park/ Neuse Riverwalk

www.smithfield-nc.com

24 William B. Umstead State Park

www.ncparks.gov ● Big Lake (55 acres), Sycamore Lake (25 acres) and Reedy Creek Lake (25 acres)

25 Union Point and Lawson Creek Parks

www.ci.new-bern.nc.us/RP/parks.php ● Access to the Neuse River and Brices Creek

26 Trent River at Pollocksville*

www.jonescountync.gov/

27 Vandemere Canoe Trails

www.ncsu.edu/paddletails/ ● 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 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 www.ncpaddletails.info



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
- Chestnut Ridge Camp and Retreat Center
- 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
- Falls Lake State Recreation Area
- Falls Lake Visitor Assistance Center
- Hatcher’s Bridge Tree Farm
- Historic Yates Mill County Park
- Howell Woods Environmental Learning Center
- Imagination Station
- Lake Crabtree County Park
- Little River Regional Park
- Museum of Life and Science
- Neuseway Nature Park- Exchange Nature Center
- North Carolina Museum of Art Museum Park
- North Carolina Museum of Natural Sciences
- North Carolina Solar Center
- Prairie Ridge Ecostation for Wildlife and Learning
- Sarah P. Duke Gardens
- Schoolhouse of Wonder
- Stevens Nature Center at Hemlock Bluffs Nature Preserve
- Walnut Creek Wetland Center
- West Point on the Eno Park
- Weyerhaeuser’s Cool Springs Environmental Education Center
- William B. Umstead State Park
- Wilson Botanical Gardens
- White Deer Park

For more information about Environmental Education Centers in North Carolina, check out the Office of Environmental Education and Public Affairs’ website at 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 lakes in the Catawba River Basin. The contacts listed below can help you do just that. To find out about local river organizations and conservation groups, contact your local soil and water conservation district. To find out about how you can get involved in local waterway and other litter cleanups, contact North Carolina Big Sweep.

Clean Water Management Trust Fund

www.cwmtf.net/

Division of Water Quality, Stormwater and Runoff Pollution

www.ncstormwater.org/

Neuse River Basinwide Plan*

<http://portal.ncdenr.org/web/wq/ps/bpu/basin/neuse>

Neuse River Education Team

www.usawaterquality.org/themes/npm/success/NET.html

North Carolina Association of Soil & Water Conservation Districts

www.ncaswcd.org

North Carolina Big Sweep

www.ncbig sweep.org/

North Carolina Stream Watch

www.ncwater.org/Education_and_Technical_Assistance/Stream_Watch

North Carolina Water Science Center

<http://nc.water.usgs.gov/>

*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, fill out the online order form at www.eenorthcarolina.org.