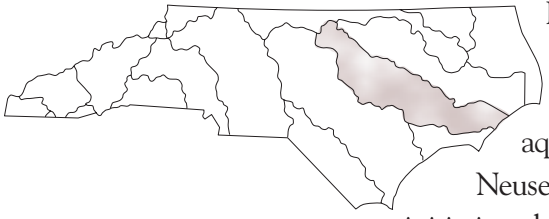
NEUSE RIVER BASIN

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 within North Carolina's borders. 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. Floods, blooms of algae, fish kills and a toxic aquatic organism weaved a tale of woe along the Neuse in the 1990s. But through new and historic initiatives, 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. 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 and contains roughly one-sixth of the state's population.

Neuse River

NCWRC

Because 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 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

striped bass

ILLUSTRATION BY DUANE RAVER

profile:

Total miles of streams and rivers: 3,880

Municipalities within basin: 74

Counties within basin: 18

Size: 6,235 square miles

Population: 1,320,379 (2000)

Fish Routes Reopened

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

The Neuse River was the scene of a "dam success story" according to the conservation groups American Rivers, Trout Unlimited and Friends of the Earth, thanks to the removal of the Quaker Neck Dam on the Neuse River near Goldsboro in 1997. "Dollar for dollar, the Quaker Neck Dam removal is one of the most cost-effective river restoration projects in the United States," says American Rivers' Rivers Unplugged campaign director Margaret Bowman. Since the removal, an unprecedented 1,000 miles of river habitat—at a cost of only $205 per river mile—has been reopened for migrating fish, including striped bass and American and hickory shad. The project restored access to 75 miles of the Neuse River and 925 miles of tributaries, allowing fish to return to 90 percent of their historic Neuse River spawning grounds. Recovering fish populations are expected to boost recreational and commercial fisheries, with significant benefits to local economies. Source: American Rivers

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 Neuse River Basin is home to 14 species of rare freshwater mussels and a rare snail. One of these mussels, the dwarf wedgemussel, is federally listed as endangered. The largest known population is found in the Connecticut River, but North Carolina has the greatest distribution of the dwarf wedgemussel—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.

The dwarf wedgemussel is one of six North Carolina mussels federally listed as endangered species.

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 basins. Also called a 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 and Carolina darter.

WAYNE VAN DEVENDER

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.

The biggest threats to water quality in the Neuse River estuary 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 dissolved oxygen. Aquatic animals need dissolved oxygen to survive. To a significantly lesser degree, water quality in the Neuse 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.

CHARLES BRASWELL JR.

Dusk settles on downtown Raleigh.

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 and 1997. 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 while researchers investigated their effect on water quality and examined alternative technologies to better handle their waste. The crisis also prompted significant new state laws and regulations in

A family enjoys an adventure outdoors.

CHARLES BRASWELL JR.

The streaked, layered face of the towering rock cliff at Cliffs of the Neuse State Park tells the geological story of the river basin.

CHARLES BRASWELL JR.

BILL LEA

A SANDY BEACH AT THE MOUTH OF THE NEUSE RIVER NEAR THE CROATAN NATIONAL FOREST

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 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 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 in the estuary 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. In 2000, 140 miles of streams were impaired by urban stormwater and that figure is growing. The Triangle 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 notice "Neuse River Basin" signs posted along highways throughout the basin. The signs are part of a statewide educational program to raise public awareness that we all live in a river basin and that our individual actions affect the quality of its waters. Signs in all 17 river basins of the state are made possible by a partnership between the N.C. Department of Environment and Natural Resources and the N.C. Department of Transportation, along with funds from the Federal Transportation Enhancement Program.

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 basin. 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 basin to inform travelers that they live in a river basin. Signs will be placed in all 17 of the state's river basins through funding from the Federal Transportation Enhancement Program. State transportation maps designate the river basins with highlighted boundary lines.

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 eight components of one's "ecological address"—including river basins, topography, wetlands, groundwater, biodiversity, soil, air and climate. 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.

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* Anne Taylor • **This publication was funded through the Clean Water Act's Section 319 Grant Program**: *Project Manager* Lisa Tolley • *Editor* Carla Burgess • *Designer* Kimberly Schott, Red Gate Design • *Special Thanks* North Carolina Wildlife Resources Commission • **Date:** 2002 • No state funds were used to print this public document.

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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:

- Blue Jay Center for Environmental Education
- Camp Chestnut Ridge
- Camp Seagull and Seafarer – Extended Season Programs
- Center for Environmental Farming Systems
- Clemmons Educational State Forest
- Cliffs of the Neuse State Park
- Crowder District Park
- Don Lee Center
- Durant Nature Park
- Eno River State Park
- Exploris
- Falls Lake State Recreation Area
- Falls Lake Visitor Assistance Center
- Howell Woods Environmental Learning Center
- Imagination Station
- Johnston Community College Arboretum
- Lake Crabtree County Park
- Neuseway Nature Center
- North Carolina Museum of Life and Science
- North Carolina State Museum of Natural Sciences
- The 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

For more information about 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.ee.enr.state.nc.us

WHAT CAN I DO

- Do your part to positively influence water quality in the Neuse River Basin.
- Get involved in basinwide planning or a local organization interested in rivers and streams in the river basin.
- Take the time to learn about the environmental consequences of your actions.

WHO SHOULD I CONTACT

The following contacts can provide information:

- North Carolina Office of Environmental Education, Department of Environment and Natural Resources, (800) 482-8724 or (919) 733-0711, Web site http://www.ee.enr.state.nc.us
- Stream Watch Program, Division of Water Resources, Department of Environment and Natural Resources, (919) 733-4064, Web site http://www.ncwater.org
- Lower Neuse River Basin Association, Web site http://www.uncwil.edu/neuseriver/lnba.htm
- Neuse River Foundation, (252) 637-7972, Web site http://www.neuseriver.org
- Neuse Riverkeeper, (252) 637-1970, Web site http://www.neuseriverkeeper.com/
- Albemarle-Pamlico National Estuary Program, (919) 733-5083 Ext. 585, Web site http://h2o.enr.state.nc.us/nep/
- Neuse River Education Team, Web site http://www.neuse.ncsu.edu/
- Neuse Rapid Response Team, Web site http://www.esb.enr.state.nc.us/nrrt.html
- Upper Neuse River Basin Association, (919) 558-2702, Web site http://www.unrba.org/
- Eno River Association, (919) 620-9099, http://www.enoriver.org/
- American Rivers, (202) 347-7550, Web site http://www.amrivers.org

To find out more about water quality in the Neuse River Basin, contact the Division of Water Quality's Basinwide Planning Program, Department of Environment and Natural Resources, at (919) 733-5083, Web site http://h2o.enr.state.nc.us/basinwide/.