No Easy Answer to Neuse River Pollution

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Old MacDonald had a farm. On that farm he had a pig. Actually, old MacDonald has 10,000 pigs that produce a lot of waste.

"Each hog produces the waste of four people," explains Robert Christian, a biology professor at East Carolina University. "Back in the day farmers would have 100 hogs. Now they have thousands due to the increase in human population."

Hogs, among other things, have contributed to North Carolina's Neuse River being named one of the 10 most endangered rivers in the country in 2006.

"The hogs that are being raised in the Neuse River watershed on any given day continue to be a major influence on the degeneration of our water quality," says Larry Baldwin. As part of the Neuse River Foundation, Baldwin is a riverkeeper, dedicated to protect and preserve the Neuse and Trent rivers. The riverkeepers work with regulatory agencies to enforce existing environmental regulations, as well as educate others on the problems of water pollution in a river basin that contains one-sixth of the state's pollution.

The Neuse River makes its start around Durham, N.C. As it winds through the eastern part of the state, the river branches out into several estuaries and sub basins until it finally opens into the Pamlico Sound.

The Division of Water Quality and the North Carolina State Center for Applied Aquatic Ecology listed the Neuse River as one of the 10 most endangered rivers in the country in 2006. Under section 303(d) of the 1972 Clean Water Act, the EPA also requires states, territories and authorized tribes to develop lists of impaired waters. Impaired waters are considered waters that do not live up to the quality standards their states have set for them even after regulated sources of pollution controlled by permits (point sources) have installed the minimum required levels of pollution technology.

A TMDL (Total Maximum Daily Load) is the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop TMDLs for these waters.

The hog industry is not the only thing to blame for the poor condition of the Neuse. Multiple factors come into play such as development, the impact of storm water and hurricanes, discharges from industry and municipalities, over-fishing, mercury deposition, and run-off from pharmaceutical industries. It wasn't always this way, though.

Over the past three centuries, the waters of the eastern North Carolina sounds, their estuaries and tributary rivers that were once thriving with life, have disintegrated. According to a study reported by Christian in a presentation titled *Eco-Governance*, almost half of the population of 44 marine mammals, birds, reptiles, fish, invertebrates, and plants that called North Carolina wetlands home became depleted, rare, or regionally extinct.

While many life forms have not survived in the Neuse, the environmental degradation has allowed dangerous species to maintain and establish themselves there and in other wetlands of eastern North Carolina. For instance, in the late 1970s and early 80s, algal blooms were discovered in the Neuse and surrounding wetlands.

The abundance of nutrients deposited by agriculture, urban run-off, rainfall and point sources from waste treatment is directly linked to the explosion of the algal blooms.

The thick green sludge on the surface of the water is algal blooms. When fish and other organisms ingest it, they die and sink to the bottom of the river. The algal blooms are so thick, they do not allow light to penetrate through to the bottom, thus deoxygenating the water. This leads to the release of harmful toxins into the water, making it less safe to use as drinking water.

The nutrient-rich cocktail of nitrogen and phosphorous is something Nora Deener is working hard to remove from the waters of eastern North Carolina. Deener is a basin-wide planner for the North Carolina Division of Water Quality. “People add these same chemicals to their lawns every day to make it more green and they don’t realize the impact of their run-off,” says Deener.

After assessing data from the EPA, Christian points out that the level of phosphorous dropped in the late 1980s due to a nationwide ban on detergents containing phosphate. While the ban has helped significantly with controlling what goes down the household drain, many other products like lawn care solutions and outside home cleaning materials still contain phosphorous.

After officials recognized multiple problems with the Neuse and its estuary, it is now classified as having “nutrient-sensitive” waters. Regulations such as the ban on phosphorous detergents are just one of the plans the EPA has enacted to save the Neuse. Another goal that was developed was to reduce excessive loading of nitrogen to the river by 30 percent from the cumulative average of loading from 1991 to 1995. This was to have occurred within five years of the rule adoption in 1998. Point source permitting, agricultural best management practices, riparian buffer rules, and run-off controls were instituted. Unfortunately, the reduction goals have not been met after a decade.

Regulation of waste industries and agricultural facilities such as poultry and hog farms by the EPA may be stepping in the right direction in taking control of some run-off.

The Environmental Quality Incentives Program, also known as EQIP, was developed to encourage farmers to improve environmental standards. As part of the 1996 farm bill, EQIP is a voluntary program that eligible farmers can apply for. Funded by the government and tax dollars, EQIP pays farmers thousands of dollars to practice environmental friendliness. The money is then translated into alternative methods of planting crops to prevent erosion, installing fencing to better manage livestock, and storing manure.

In 2006, farmers were paid about $179 million for animal waste management practices. According the records from the Department of Agriculture, North Carolina is one of the few states receiving the largest amount of money.

The USDA has also recently awarded $20 million to 51 projects in 36 states as part of a Conservation Innovation Grant program. A $1 million grant was awarded to the Environmental Credit Corporation, which will provide lagoon covers and carbon credit services to hog concentrated animal feeding operations in North Carolina.

North Carolina State University was also awarded $930,000 for its efforts to support the adoption in North Carolina of pasture-based hog production. North Carolina currently has a suspension on the establishment of new concentrated hog feeding operations, according to the Sustainable Agriculture Coalition's Web site.

However, other factors left up to Mother Nature cannot be controlled or suspended.

The eastern part of the region has experienced both drought and several major hurricanes over the past decade. Hurricanes not only cause stress for humans, they ultimately disturb ecosystems and agriculture. Bar graphs created by the North Carolina Division of Water Quality show a fluctuation of nutrients in the Neuse in the years the hurricanes struck. "While hurricanes may flush out any stagnant water or harmful nutrients, they also carry even more contaminants into the water through high flows and hurricane force winds," suggests Christian.

Drought conditions have not only affected the amount of water being used, but have also been a contributor to the algal blooms. According to Christian, without rain to keep the river at its normal capacity and high flow, water in the estuaries becomes stagnant--perfect conditions for algal blooms.

Human population is also something that cannot be controlled. As eastern North Carolina continues to become a destination place to live, more areas along the Neuse are becoming urbanized.

While the Neuse is inflicted with many problems, many people are working day and night to monitor the levels of nutrients in the water. In fact, it was the monitoring program put into effect by the state that has led to the regulations enforced today.

ModMon (Modeling and Monitoring) and FerryMon are boat systems that work to collect data daily from the areas of the wetlands shielded by the Outer Banks. Both ModMon and FerryMon are long-term, joint water quality monitoring devices that involve universities and state agencies such as NC State and UNC Chapel Hill.

FerryMon is primarily used in the larger rivers and sounds of eastern North Carolina, while ModMon is a smaller motorboat that can navigate through the shallow waters of the estuaries.

The data produced by these programs has been used to assess how the ecosystem has responded and will likely respond to the regulations, as well as other long-term environmental factors.

The efforts of these organizations are just part of the fight to protect the environment. As a vicious cycle, the Neuse may only be revived when people start to realize that it will have long-term effects on their communities within eastern North Carolina, according to Deener.

Brittany Thorp and David Wilder contributed to the reporting of this story.