

# afield

FALL

NORTH CAROLINA



Since joining the Chapter six years ago, Julie DeMeester has created one of TNC's top water programs. © CREATIVE FAUNA

**COVER:** The Cape Fear River Bridge links Brunswick and New Hanover counties. Communities in both counties, including Wilmington and the Brunswick County beach towns, rely on the Cape Fear for drinking water. But the Lower Cape Fear is plagued with blue-green algae blooms in hot, stagnant conditions. The Nature Conservancy and the U.S. Army Corps of Engineers are working together through the Sustainable Rivers Program to manage releases from Jordan Lake, which is upstream from from Wilmington near Cary and Durham, to stir up those stagnant waters and stymy algae blooms, which can be harmful to human health. © SKIP PUDNEY

I grew up on the Roanoke River, so it is close to my heart. I live in Durham; my drinking water comes from the Cape Fear River. Suffice it to say that I have a personal stake in those two rivers as do many other North Carolinians.

Since The Nature Conservancy's inception, it has been known for land protection. But we are about much more than that. This newsletter talks about our work on the Roanoke and Cape Fear river basins. Although we have worked on the Roanoke for decades, our work on the Cape Fear is just a few years old.

While water was in the background of our work, it wasn't the focus until six years ago when we hired Julie DeMeester to lead our water program. Julie has established "Team Water," as she likes to call it, as a force to be reckoned with. I am amazed at what this small team has accomplished. It is in no small part due to Julie's personality. Good conservation is often the result of engagement. Julie has a gift for bringing folks with different concerns to find common ground. She has certainly done that on the Cape Fear where "Team Water" is working with local utilities, wildlife and fishery experts, and academics to address water quality issues and help fish find their way upstream to spawn.

That ability to engage for action is shared by many of our staff. Julie says the work we are doing on the Roanoke to reconnect floodplains to help improve fishery habitat is made possible by TNC Steward Aaron McCall. Aaron has worked in the region for more than two decades, building relationships with the hunt clubs and others who value the Roanoke. Aaron has worked with local interests to restore their land— bringing Julie and her team's expertise to problems such as the undersized culverts that dot the Roanoke floodplain making it difficult for fish to navigate.

As you read this newsletter, as you think about all the work that The Nature Conservancy does, know that while it is always based on science, it also requires the kind of personality that can work well with a variety of folks from disparate backgrounds. I truly believe that's one of the things that has made us so successful over the years. Thank you for your support, which has allowed us to hire talented folks who are working every day to make North Carolina a better place.

Best,

Katherine Skinner



The mission of  
The Nature Conservancy  
is to conserve the  
lands and waters on which  
all life depends.

**The North Carolina Chapter**  
334 Blackwell Street, Suite 300  
Durham, NC 27701  
(919) 619-8613  
[nature.org/northcarolina](http://nature.org/northcarolina)  
[facebook.com/TNCNC](https://facebook.com/TNCNC)  
[instagram.com/tnc\\_nc](https://instagram.com/tnc_nc)  
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Executive Director: Katherine Skinner  
Editor: Debbie Crane [dcrane@tnc.org](mailto:dcrane@tnc.org)

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# SUSTAINABLE RIVERS

## BUILDING ON FOUNDATIONAL WORK

Just two percent of the nation's three million miles of waterways are undeveloped and free flowing. Rivers were dammed for water supplies, flood control, navigation, and hydropower—altering the course of nature.

Rivers were meant to ebb and flow. Nature depends on that rhythm. Bald cypress trees need a wet-dry cycle to germinate. Fish need pulses of water to cue them to swim upstream and spawn. Mess with the rhythm of nature and the cascade of negative consequences are myriad. That's why The Nature Conservancy partnered 20 years ago with the U.S. Army Corps of Engineers (USACE), the country's largest water manager, to create the Sustainable Rivers Program (SRP). In North Carolina, that work is taking place on the Cape Fear and Roanoke rivers, both are home to large dams owned and operated by the Army Corps of Engineers. Those dams aren't going away, but they can be managed in a way that benefits nature and people.

The Sustainable Rivers Program has already had a lasting impact in North Carolina. Six years ago, the USACE and TNC announced an agreement under which the USACE operates John H. Kerr Dam and Reservoir in a way that more closely mimics natural water flows, helping to restore balance to downstream forests. Today, TNC and USACE are building on the Roanoke work and moving south to address issues on the Cape Fear River.



**“North Carolina has been a real leader in this program—not only in the river work itself but also in acquiring Congressional support for the SRP.”**

JIM HOWE,  
Sustainable Rivers Program Director

# Sustainable Rivers Program

## North Carolina Work Can Benefit the Nation

The Sustainable Rivers Program (SRP), which is a collaboration between TNC and the U.S. Army Corps of Engineers (USACE) that works to find more sustainable ways to manage river infrastructure in order to maximize benefits for people and nature, is celebrating its 20th anniversary this year.

SRP Director Jim Howe says North Carolina is playing a major role in the program’s success. “North Carolina has been a real leader in this program—not only in the river work itself but also in acquiring Congressional support for the SRP,” he explains. The Roanoke River was one of the first rivers enrolled in the program. The Cape Fear became a part of the SRP in 2017. North Carolina Chapter Executive Director Katherine Skinner and Government Relations Director Will Robinson were instrumental in getting a key member of the NC Congressional Delegation, Rep. David Price, to ensure that the program was funded at the national level.

The USACE is the country’s largest manager of river infrastructure such as dams and locks—influencing 53,000 miles of river. “So far we have about 13,000 miles of river enrolled in the SRP,” says Howe. The program has accelerated since 2017, growing from 18 to 43 rivers.

In 2016, TNC and the Corps agreed to a landmark dam management agreement, which is one of the SRP’s major

success stories. Under that approach, the USACE makes releases out of Kerr Lake Reservoir in a way to more closely mimic pre-dam flows, reducing near constant flooding that has a deleterious effect on downstream forests.

The Cape Fear work is focused on water quality, releasing water from Jordan Lake to stir up and disrupt blue-green algae blooms that plague the lower Cape Fear in the summertime; it is also releasing pulses of water from Jordan Lake to help fish swim past a series of locks and dams that are major impediments for spawning.

Howe credits NC Chapter Water Program Director Julie DeMeester with much of the program’s success inside and outside of North Carolina. “Julie is doing such really incredible work. What Julie is learning about water quality on the Cape Fear, she is also helping us apply at dozens of other sites across the U.S. The North Carolina Team has been really influential in that way.”

“If we can take infrastructure that was built well before the impact that the infrastructure would have on natural ecosystems was known and manage them in ways that will still provide the benefits of flood control, navigation, and water supply while adding in the importance of ecosystem restoration, then that can make a real difference,” Howe says. “That’s an important promise that we can make to future generations.”



## The Cape Fear River: What's in a name?

⋮ The Cape Fear River gets its name from the dangerous Cape Fear shoals that sit at the river mouth near  
⋮ Bald Head Island. The name Cape Fear traces back to English Explorer Sir Richard Grenville who reported in  
⋮ 1585 that he had nearly run aground on the “Cape of Feare.” In one of the first examples of marketing in the  
⋮ New World, the name was changed to “Cape Fair” in the 17th century as a way to attract more European  
⋮ settlers. That name never took hold. The name is evocative, which is why two suspense movies, one in 1962  
⋮ and one in 1991, were named Cape Fear. Neither movie was filmed in the region.

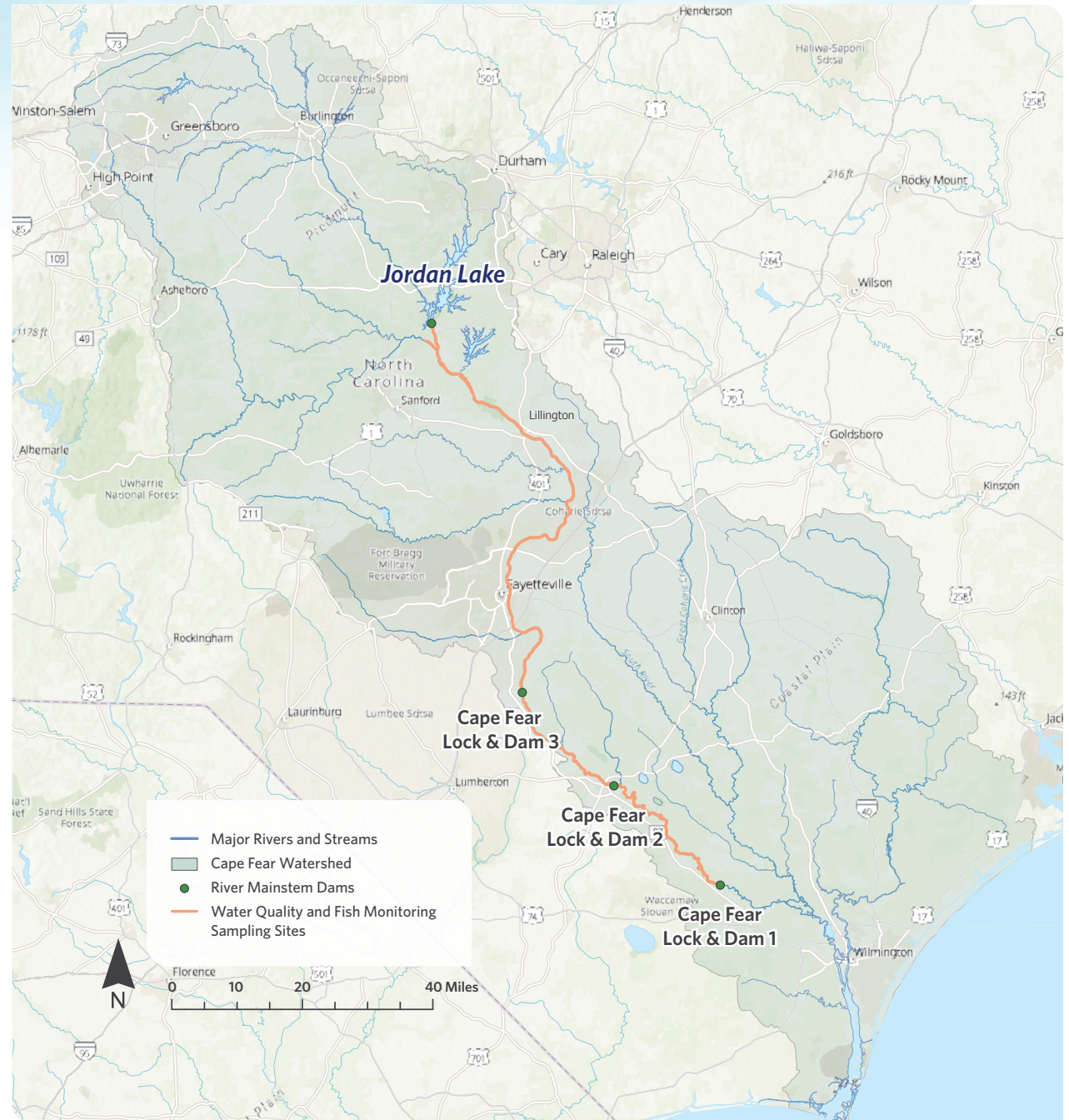
# CAPE FEAR RIVER

## Working to Improve Water Quality, Helping Fish Spawn

Chapter Water Program Director Julie DeMeester has a daily routine. Every morning, she and her 4-year-old son Tate wake up together and look at the United States Geological Survey (USGS) gauges that monitor water flow on the Cape Fear and other rivers. “Tate knows where the gauges are,” she says. “He can tell you how New Hope Creek goes into Jordan Lake, then the Haw and Deep River come together and that’s the Cape Fear.” Julie and her family live in Durham, so when they turn on their water tap, they are drinking from the Cape Fear.

The Cape Fear is the state’s largest water basin, beginning in the Piedmont and emptying into the Atlantic south of Wilmington. More than 2 million people live in the basin, accounting for more than a fifth of the state’s population.

B. Everett Jordan Dam sits in the upper basin, 200 miles from the Atlantic. It was completed in the early 1980s and was originally proposed for flood control. It still serves that purpose. Jordan Lake also provides drinking water for





fast-growing Triangle communities including Cary, Apex, Morrisville, and Durham. The 46,768-acre lake is a major recreational area.

The Nature Conservancy and the U.S. Army Corps of Engineers, which owns and operates the dam, are exploring ways to operate it so that it is more beneficial for people and nature. “Our work on the Cape Fear uses a collaborative science-based approach to understand how we can better manage reservoir releases to improve fish passage and water quality,” explains Ashley Hatchell, who works in water management out of USACE Wilmington headquarters.

During hot, dry months water on the Lower Cape Fear stagnates, resulting in blue-green algae blooms, which can be harmful to people and animals. Releasing water from Jordan Lake can stir up that water and disrupt the algae blooms. In spring, anadromous fish, which live mostly in the ocean but come upriver to spawn, get stuck on the lower reaches of the river that are blocked by a series of locks and dams also managed by USACE. These fish—shad, herring, striped bass, and sturgeon—can make their way past the locks and dams if there is enough water flow. Timing releases from Jordan for when the fish need to swim upstream can help them make it to the rocky parts of the river further upstream where they like to lay their eggs. That’s why DeMeester wakes up and checks the water gauges first thing—to see if it is a good day to release water from Jordan Lake. “I watch that river every day,” DeMeester says.

A few years back, TNC and USACE brought together

NC Chapter Water Program Julie DeMeester (left) confers with U.S. Army Corps of Engineer’s Ashley Hatchell on the Cape Fear.

© CREATIVE FAUNA



experts from across the region who were concerned about fixing flows on the Cape Fear. Diverse interests were represented—local and state government, utilities, conservationists, and scientists. They used all the available data to create the ideal flow rate, or prescription, for the interest they represent. The flow prescriptions were combined to find common ground, differences, and ultimately to create a unified flow prescription for the river.

The work is in its early stages. DeMeester has put together a team of academic and government experts who are monitoring the work. The U.S. Geological Survey (USGS) is using its Autonomous Underwater Vehicle (AUV) to assist. Jason Fine, who is a USGS data scientist, is leading that effort. “At this point, we are collecting background data, giving decision makers like Ashley and Julie more data to work with,” he explains. “We’ll send the AUV down the river and it will do a reading every →







second during its mission.” The AUV measures a number of water quality parameters including dissolved oxygen, temperature, turbidity, pH, total algae, and specific conductivity. Those measures can predict problems; for instance, low dissolved oxygen coupled with high temperatures can result in a blue-green algae bloom. It can also detect the actual algae bloom. The \$400,000 AUV can add a lot of detail to other more traditional USGS sampling sites that dot the river.

Aaron Bunch is a Clemson University researcher documenting the efforts to help fish move upstream. He says that’s particularly important where shad are concerned. “The shad population on the Lower Cape Fear is the highest in the state,” he explains. “Shad populations can be pretty variable on the Atlantic Coast, but for whatever reason on the Cape Fear it is pretty robust.” Atlantic Sturgeon aren’t as common but are making a comeback. The striped bass population is in abysmal shape, resulting in a moratorium on catching them in the river. Anglers are also prohibited from harvesting herring from the river.

In the past, researchers would have physically surveyed the river to find fish. But that’s labor intensive and hit or miss—you have to be sampling at the time that a particular species is in the area. Bunch is using two newer methods of fish sampling—eDNA, which detects fish DNA in a water sample, and acoustic telemetry.

**LEFT:** Lanier Falls on the Cape Fear River at Raven Rock State Park represents the fall line where the river exposes bedrock as the Piedmont transitions to the Coastal Plain. Anadromous fish swim upstream from slow meandering water with a shifting sandy riverbed past the falls to lay their eggs on the rocky substrate. © MARGARET FIELDS/TNC

**RIGHT:** USGS staffer piloting Autonomous Underwater Vehicle on the Cape Fear River. © CREATIVE FAUNA

During his work, Bunch occasionally encounters an angler who wants to know what he was doing. “What I like to tell people is that I hand the fish a smart phone. We put up cellphone towers along the river and then we track the fish with Google maps,” he says. “It isn’t that simple, but it is the same concept, and they really got that explanation.”

Fish are implanted with acoustic tags that emit a sonic signal that is picked up by receivers along the river. “We know the date and time that fish passed a particular area,” he adds.

Bunch, who grew up on the Albemarle Sound in

northeastern North Carolina says his work, which will provide the basis for his PhD, is a labor of love. “I grew up eating salted herring,” he remembers. “My ancestors were commercial fishermen on the Chowan. If anadromous fish don’t have access to spawning grounds, we will never have recovery and sustainability of those populations. And we will have generations of people who will have lost an important cultural connection.”

For Rhonda Locklear, who is an Environmental Program Manager with the Fayetteville Public Works Commission, the work translates into cost savings. “We are in the business of water. And anything we can do to improve the source water is just huge,” she says. “There →



are costs associated with improving water quality. It is a big win for us if we don't have to spend millions to upgrade the water reclamation facilities for nutrient removal."

Fayetteville is one of many municipalities pulling its water from the Cape Fear. Nutrients are a real problem for utilities. And there are lots of nutrients flowing into the river. During normal water flows or times of flooding those nutrients come from runoff—sediment and chemicals like those found in fertilizers. Ultimately the research will help identify ways to reduce that runoff.

In the short-term, pulses of water from Jordan Lake can stir up stagnant water and reduce blue-green algae blooms, which are a very real concern for Brunswick County whose water intake is the last on the Cape Fear River. Powdered Activated Carbon (PAC) is used to



**“We are in the business of water. And anything we can do to improve the source water is just huge.”**

RHONDA LOCKLEAR, Environmental Program Manager with the Fayetteville Public Works Commission

remove blue-green algae from the drinking water. “PAC is about a dollar a pound,” says Glenn Walker, who is Water Resources Manager at Brunswick County Public Utilities. “If you have to feed 25 to 30 parts per million of carbon and you’re treating 24 million gallons of water a day. You are talking about using hundreds of pounds of PAC per hour.”

USACE and TNC have to weigh all the needs of river users. “The water management mission of the Corps is all about balance,” explains Hatchell. “The Sustainable Rivers Program allows us to balance human benefits from the dams with ecological needs of the system. Improving the health of the river and associated habitats is also beneficial to people on the Cape Fear—a healthy river system increases recreation opportunities and

enjoyment of this beautiful resource.”

DeMeester is confident that the research will improve that equation—helping fish move upstream to reproduce and helping people who rely on the river for drinking water and recreation. “There are a lot of reasons to work on the Cape Fear,” she says. “It is a basin that is incredibly complex but also very beautiful. And, it has the potential to be a basin where people and nature thrive together.”

TOP: Rhonda Locklear, Environmental Program Manager with the Fayetteville Public Works Commission at the Fayetteville Water Treatment Plant.

BELOW: Holden Beach (left) and Fayetteville (right) are two of the many communities that rely on the Cape Fear River for drinking water. © WIKI COMMONS/DRUMMONGER; © CITY OF FAYETTEVILLE

RIGHT: Lock and Dam 1 on the Cape Fear River—the first manmade barrier for fish trying to swim upstream to spawn. © MARGARET FIELDS/TNC









# A word on Anadromous Fishes:

Anadromous Fish are hatched in freshwater. The juvenile fish head out to sea, where they spend much of their adult lives, but return to freshwater to spawn. Removing manmade barriers, so that they can move upstream to spawn, is key to TNC's river work.

Anadromous fish in North Carolina include American shad, Atlantic sturgeon, striped bass, and blueback herring.



**American shad**  
*Alosa sapidissima*

American shad, also known as white shad, is the largest shad species. Females average 24.3 inches and males 19.7 inches. Their numbers declined over much of the 20th century due to overfishing and habitat degradation in their spawning areas. They are prized as a food fish; in fact, *sapidissima* means delicious. They are found from Canada to Florida. Shad in the north, including the Roanoke, don't usually die after spawning. But shad to the south, including the Cape Fear, usually die after spawning.



**Atlantic sturgeon**  
*Acipenser oxyrinchus*

Atlantic sturgeon are protected under the Endangered Species Act. Sturgeon mature and grow slowly. Males take a decade to reach sexual maturity—females twice as long. They are the largest fish in North Carolina freshwaters, weighing up to 800 pounds and measuring up to 14 feet.





**Striped bass**  
*Morone saxatilis*

Striped bass, also known as rockfish, start spawning when they are 2 to 4 years old. Although stripers are found in several North Carolina river basins, the Roanoke River is home to the state's only wild population of stripers. Those in other river basins are raised in hatcheries. They can live for two decades, which means the same fish may migrate many times up the Roanoke River to spawn. Striped bass are tightly regulated in North Carolina because of their reduced numbers.



**Blueback herring**  
*Alosa aestivalis*

Blueback herring, also known as river herring, reach a maximum of 16 inches and live for 8 years. Because of their reduced numbers, there is a moratorium on harvesting blueback herring in North Carolina.



“Our hope is that we will be able to influence where restoration happens on the ground.”

DANICA SCHAFFER-SMITH,  
NC Chapter Watershed Scientist

## Modeling Pollution on the Cape Fear River

The Cape Fear watershed is big—the size of New Jersey. Until now, getting an accurate understanding of water quality across such a large area has been difficult. State and local government and community-based organizations pull and analyze water samples but not across the entire basin. Chapter Watershed Scientist Danica Schaffer-Smith is working to fill in those gaps—creating a model that gives TNC and other organizations a better picture of water quality across the basin. TNC, governmental agencies, and other conservation organizations can use this new data to determine where conservation work will have the greatest impact on water quality.

“You can’t realistically sample all over the basin,” Schaffer-Smith explains. “But this model allows us to take the limited sampling we do have and estimate what’s going on across the entire watershed.”

“There’s been a real inequity in how we understand this watershed,” she adds. “There tends to be a bias towards our urban centers where more data is collected. You have big swathes of the Middle and Lower Cape Fear

Rivers, where we don’t have enough data. Currently state agencies are not able to determine if many streams and rivers are impaired, or if they are healthy.”

Schaffer-Smith used the Soil and Water Assessment Tool (SWAT), an open-source watershed model developed by the U.S. Department of Agriculture, to conduct the assessment. The model accounts for land use, point source discharges such as municipal wastewater treatment, nonpoint source discharges or runoff, and weather conditions from 1979 to 2019. It looks at nitrogen, phosphorus, and sediment going into the river—determining where that pollution originates and how it varies depending on weather and river flows.

“This is a highly variable system. There’s just a lot happening in the basin,” Schaffer-Smith says. “There are times when we can be having flooding and drought at the same time in different parts of the Cape Fear.”

That complexity is reflected in the model’s findings. During normal flows and flooding, nonpoint source pollution accounts for 90 percent of the pollution going into the Cape Fear. But during droughts, point sources can drive in-stream pollution. “This is where the dynamics of this watershed are just astounding to me,” Schaffer-Smith says. “Pull out a dry year like 2011 and as





much as 70 percent of nutrient pollution is coming from point sources.”

The model also found that 16 percent of the watershed contributed the most pollutants across all flow conditions. “This is much easier to tackle than something the size of New Jersey,” Schaffer-Smith says. “This identifies key places that are worthy of the most attention.”

The model findings can be overlaid with earlier mapping that Schaffer-Smith produced showing the areas that repeatedly flooded in recent hurricanes. Together, the flood mapping and watershed modeling can help identify areas where restoration would help reduce pollution into the river as well as absorb or slow flooding.

During normal flows and flooding, nonpoint source pollution or runoff accounts for 90 percent of the pollution going into the Cape Fear. But during drought years, point sources such as wastewater treatment plants can drive in-stream pollution. © CREATIVE FAUNA

The modeling can help guide future work in the basin. “Our hope is that we will be able to influence where restoration happens on the ground,” she explains. “This can be really valuable to increase the pace and scale of restoration in the basin and use taxpayer dollars wisely.”

The Conservancy continues to build on the models. A grant from the U.S. Geological Survey (USGS) will drill down on specific communities, considering socioeconomic vulnerability, and determining how restoration will benefit that community. “This additional work will make the model more locally relevant,” Schaffer-Smith says.

A student from North Carolina Central University (NCCU) will work on this part of the project. NCCU Professor Timothy Mulrooney, who will supervise that work, says this is important for the basin and his student. “A big hallmark of our program is to provide students

with experiential learning. This is an opportunity for them to work with TNC professionals, helping to make certain that student is workplace ready.”

NCCU is one of the many partners on the project. Researchers from Arizona State University, USGS, and North Carolina State are also a playing role.

For her part, Schaffer-Smith is looking forward to the next stage of her work, which will get her out from behind a computer. The Water Team is working on an outreach plan to spread the word about the model and its implications. “We want this to be as useful as possible to as many people as possible,” she says.

Ultimately, she looks forward to the day when the computer modeling becomes reality on the landscape. “That will be the icing on the cake, to actually see a project happen based on this work.”



# Will Spoon

## Securing the Cape Fear for Future Generations

Will Spoon's family can trace its roots in the Cape Fear Basin to the Revolutionary War. Spoon grew up a quarter mile from the Rocky River, just above its confluence with the Deep River. In his youth, he played on the riverbanks and paddled on the river. It's in his DNA. Yet, he says he didn't really understand the Cape Fear Basin.

"Some days the river was up. Some days it was down," he remembers. "But I didn't think about the hydrology. I knew generally that the Cape Fear flows into the ocean. But being with TNC has helped me understand the whole system."

Spoon's work with TNC was a natural outgrowth from past employment with the U.S. Coast Guard on the Gulf Coast. Coming back to North Carolina, returning to the land of his ancestors, it was a perfect fit.

That Coast Guard connection fit nicely with the U.S. Army Corps of Engineers. "The service connection was a benefit," he says. "It gave me a common point of reference and common understanding of the processes."

Spoon has been instrumental to the Cape Fear work. On a day this summer he was at home using his computer to monitor

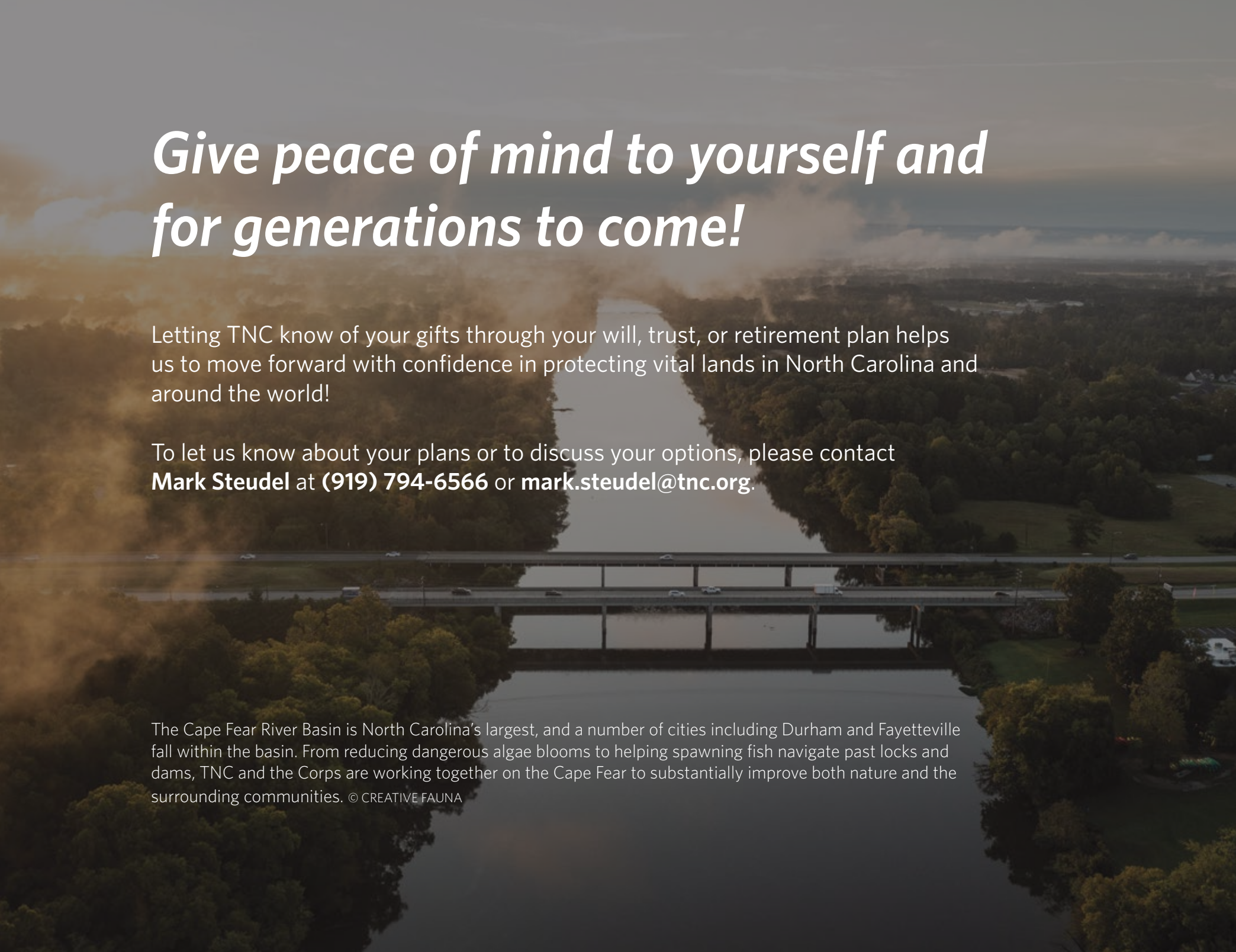
conditions for a possible release of water from Jordan Lake to stir up stagnant water on the Lower Cape Fear. He has also spent countless hours on the river, observing real world conditions. "I really enjoy the scientific method."

He is hopeful that TNC's work will improve conditions in the rapidly growing Cape Fear Basin. He knows firsthand how the region is changing. Chatham County, where he grew up, used to be a rural county. Now mega-developments are springing up near the county seat, Pittsboro. His grandfather ran a Sawmill in Pittsboro when Chatham County was best known for its timber rather than becoming what it is today—a bedroom community for the Triangle. His family is doing its part to maintain some of the county's rural nature, having put the old timberland at the Deep/Rocky River confluence into conservation easements that will allow only the sustainable harvest of timber.

Until his grandparents passed away a few years ago, four generations of his family were in the basin—counting on it for drinking water and recreation. "I feel like this work is helping my family that lives there and securing its future for my children."

*Will Spoon and his sons Henry Douglas, age 3, and Everett William, age 1, hiking along the Cape Fear. Will Spoon and Henry Douglas paddling on the Cape Fear.*



An aerial photograph of a wide river, likely the Cape Fear River, flowing through a lush, green forested area. A multi-lane bridge spans the river in the middle ground. The sky is overcast with soft, diffused light, suggesting a misty or early morning atmosphere. The text is overlaid on the upper portion of the image.

# *Give peace of mind to yourself and for generations to come!*

Letting TNC know of your gifts through your will, trust, or retirement plan helps us to move forward with confidence in protecting vital lands in North Carolina and around the world!

To let us know about your plans or to discuss your options, please contact **Mark Steudel** at **(919) 794-6566** or **[mark.steudel@tnc.org](mailto:mark.steudel@tnc.org)**.

The Cape Fear River Basin is North Carolina's largest, and a number of cities including Durham and Fayetteville fall within the basin. From reducing dangerous algae blooms to helping spawning fish navigate past locks and dams, TNC and the Corps are working together on the Cape Fear to substantially improve both nature and the surrounding communities. © CREATIVE FAUNA



Early morning on the Roanoke River. © CREATIVE FAUNA

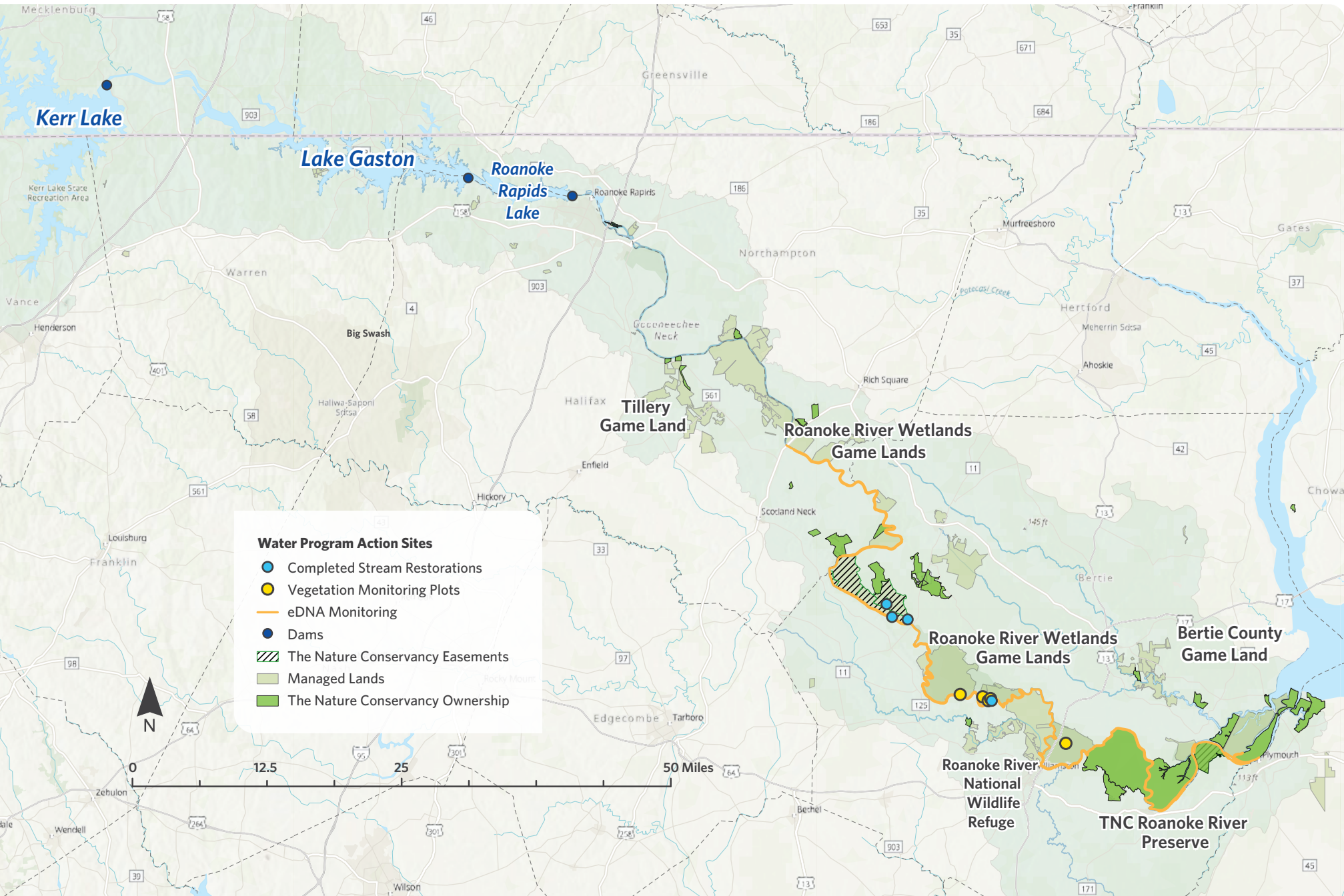


# ROANOKE RIVER

## Building on a Sound Foundation for the Future

The 2016 agreement between The Nature Conservancy and the U.S. Army Corps of Engineers (USACE) to establish dam operations that more closely mimic natural river flows on the Roanoke River was 20 years in the making. But, in a way, Chapter Water Program Director Julie DeMeester sees that milestone as a beginning. In the past six years, the Conservancy and the Corps have built on that work—pivoting to restore downstream floodplains, using cutting edge tools to measure restoration effectiveness, and beginning research to help the USACE make dam operation decisions through a climate change lens.

The 2016 agreement was followed by some of the wettest years on record in the basin. DeMeester says that weather patterns are changing as a result of climate change. TNC is working with researchers from →



**Water Program Action Sites**

- Completed Stream Restorations
- Vegetation Monitoring Plots
- eDNA Monitoring
- Dams
- ▨ The Nature Conservancy Easements
- Managed Lands
- The Nature Conservancy Ownership



multiple universities to look at historical weather patterns and future climate change. “This research will look at how weather has changed in recent times and use that data to project likely weather patterns through 2100.”

“We already know that our Mays are getting much wetter. Weather patterns are shifting,” she explains. “That makes it hard to operate a dam. This new work will quantify those changes and give the Corps something to work with.”

Ashley Hatchell, who works in water management out of USACE Wilmington headquarters, looks forward to the research results. “We hope to learn from these efforts to better inform our operation decisions,” she says.

Few people know the Roanoke River’s floodplain forests as well as Jean Richter, a biologist with the U.S. Fish and Wildlife Service, who has worked on the Roanoke River National Wildlife Refuge since 1996. Those wet Mays concern her. She has monitored Roanoke River forests for more than 25 years. She is seeing a lot of dead trees. “This isn’t related to the new flow regime,” she explains. The rains are coming earlier and lasting longer. She is hopeful that the climate research will give the USACE, TNC, and her organization data to address the issue.

Duke biologist Steve Anderson is also doing forest research—focusing on laurel oak and green ash, which builds on Richter’s monitoring. “We want to better understand the correlation between tree growth and flooding patterns related to river flows,” he explains. “It is such an interesting combination of species that you can’t find anywhere in the State, or even in the Southeast.

Jean Richter monitoring vegetation in the forest along the Roanoke River. © CREATIVE FAUNA



There’s a lot of opportunity for how dam management may impact these special forests in the coming decades.”

The Conservancy has protected more than 93,000 acres in the Roanoke basin. Much of that property is now part of the Refuge and state game lands. TNC also owns and manages land on the river. Today, under the on-the-ground guidance of Steward Aaron McCall, the

Conservancy is correcting the hydrology, which has been altered by road crossings and undersized culverts that hold floodwaters and trap fish. The standing water also degrades water quality; dissolved oxygen is depleted, and fish suffocate. The Conservancy is replacing the culverts under the roads with fish-friendly bridges, which allow floodwaters to rise and fall. Instead of →





being trapped and killed, the fish can continue their way upstream to spawn as they have been doing for millennia.

More than seven miles of floodplain have been reconnected. Restoring the flood plain requires intense effort and it is expensive. And the Conservancy wants to make sure that it is worth the effort. In the past, making such a determination would have been difficult, because it relied on someone actually seeing a fish. Now McCall grabs water samples that are analyzed for environmental DNA (eDNA) to detect whether a particular species of fish has passed through the water. Through that analysis we know that blueback herring, which usually live at sea but come upriver to lay their eggs, are using the now barrier free waterway.

But there are many more barriers along the 140-mile floodplain from the Atlantic to the first dam on the Roanoke. TNC is prioritizing areas for restoration. "These are exciting times on the Roanoke," says DeMeester.

It is also inspiring. "Doing this work out of respect for the natural world is what keeps me going," says Anderson.

Richter says it is time for nature to get back some of what it lost over the years as the river was altered to serve human needs. "People need to know that if everything is geared toward people, then we have forgotten about nature. We're the voice for the natural resource. This resource has been compromised for years and we're just trying to get a little back."

TNC Steward Aaron McCall gathering water samples to test for fish DNA. © CREATIVE FAUNA





Robert Rich © ROBERT RICH

## Meet Our Supporters:

# Dr. Robert Rich

BY SYDNEY BEZANSON

Growing up in rural southeastern North Carolina, Robert Rich spent his days working in forests with his father, who made a living in the logging industry. “The years my father was in the logging business, it was a gentler, less destructive industry, particularly in lowland river areas,” he recounts. Today, Dr. Rich sees an urgent need to preserve natural areas and to continue good land management practices to minimize human impact on the landscape. That’s why he has supported The Nature Conservancy in North Carolina for two decades.

As a young man, Dr. Rich participated in the National Health Service Corps, which places young medical doctors in underserved areas of the United States. For his service tenure, he was located at an Indian Reservation in Mississippi. “When I finished my obligation, the tribe I was working with, they tried to recruit me.” But Dr. Rich felt truly at home in southeastern North Carolina among the flora and fauna he knew from childhood. He returned with his wife and has been practicing family medicine in Bladen County for the last 30 years.

Moving back home has renewed Dr. Rich’s commitment to the land, and, with that in mind, he has remained dedicated to TNC’s mission. “I am always following what TNC is doing,” Dr. Rich says. He supports TNC at a critical time in North Carolina, where developmental pressures loom, especially in upland forests where he remembers working with his father as a boy. “Habitat loss is a real concern. Having experienced varying portions of the Cape Fear River and working with my father, I know some of that is no longer there. It just impressed me in terms of the beauty of the area. Seeing our rural environment change is something I remain concerned about,” he adds.

Dr. Rich looks ahead, as North Carolina is expected to experience further population growth. “My concern is 50 or 100 years down the road if we do not take initiative.” While he wants to see continued protection work in North Carolina, Dr. Rich also hopes conservation groups cultivate a connection to nature in younger generations to safeguard nature’s future.



North Carolina Chapter  
334 Blackwell Street, Suite 300  
Durham, NC 27701

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TNC Steward Aaron McCall  
paddling on the Roanoke River.  
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