

# ENHANCING AQUATIC CONNECTIVITY RESILIENCY AND FLOOD CAPACITY IN THE BLACK RIVER WATERSHED

*BLADEN AND PENDER COUNTIES, NORTH CAROLINA*

**NOAA FY 2022 RESTORING FISH PASSAGE THROUGH BARRIER REMOVAL  
GRANT APPLICATION**

## **SUPPLEMENTAL MATERIALS**

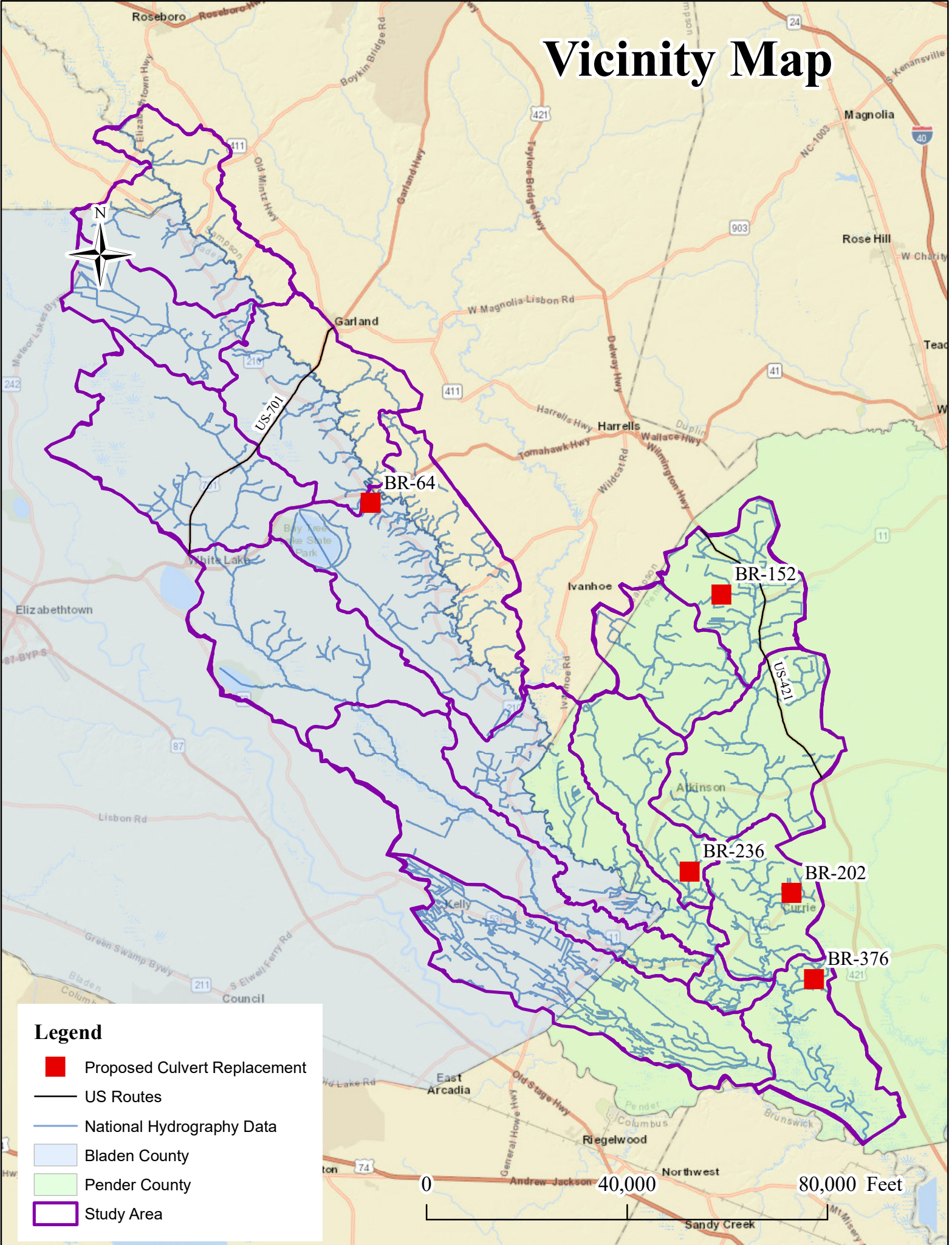
*SUBMITTED BY:*

***CAPE FEAR RESOURCE CONSERVATION AND DEVELOPMENT***









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# Vicinity Map



## Legend

-  Proposed Culvert Replacement
-  US Routes
-  National Hydrography Data
-  Bladen County
-  Pender County
-  Study Area

0 40,000 80,000 Feet



## KEY PERSONNEL RESUMES

# Danielle D. Darkangelo

Nonprofit Executive/Consultant

919-607-9996

[Danielle.darkangelo@gmail.com](mailto:Danielle.darkangelo@gmail.com)

## Expertise

Fundraising Campaigns  
Corporate Sponsorships  
Strategic Planning  
C-Level Coaching  
Program Development  
Donor Engagement  
Board Development  
Fundraising Technology

### Kent State University

Kent, Ohio  
Psychology, BA  
Summa Cum Laude  
Phi Beta Kappa  
University Honors

### Program Development:

- Waterway Conservation
- Habitat Restoration
- Flooding Reduction
- Regenerative Agriculture
- Economic Development
- Regional Agricultural Center
- Adoption
- Therapeutic Foster Care
- Rapid Response Program
- Community Support Team
- Multisystemic Therapy
- Case Management
- Assertive Community Treatment Team
- Integrated Dual Disordered Treatment

### Honors Thesis:

MMPI-2 Defensive Profiles in a Forensic Population

### Professional Conference Presentations:

- MMPI/MMPI-2 Symposium
- American Association of Behavioral Therapy
- American Psychological Association
- Association of Psychological Science

## About Me

Energetic and optimistic nonprofit executive and consultant with 15+ years of experience. Solution-focused and team-dynamic oriented, I specialize in capitalizing and optimizing the most vital assets of your organization, your people including the staff, stakeholders, and recipients of services. Collaboration and team building utilizes the strengths within your personnel to generate momentum and passion enabling your organization to accelerate the mission and vision for your community. Through collaboration and success-focused teams, prolific services, programs, fundraising platforms, and corporate sponsorships are developed and executed to consistently exceed the goals and expectations of the organization.

## PROFESSIONAL EXPERIENCE

### Cape Fear Resource Conservation & Development (CFRCD): June 2017 – Present Executive Director

- Leveraging funds for large-scale, regional projects, working with strategic partners and stakeholders
- Building relationships and collaborations with government, engineering, and nonprofit partners
- Grants/in-kind fundraising for river drainage/habitat conservation/flooding focused on improving waterways for public and private use as well as agricultural and economic development projects
- Yearly organizational, fundraising, and project strategic planning, community engagement, corporate sponsorship, project development, public speaking, political engagement, organizational management

### Nonprofit/Fundraising Consultant: April 2011 - Present

Client Organizations: Community-based/Health organizations/Charitable services

- Fundraising and Development, yearly fundraising strategic plans, C-Level coaching, board and staff development, donor and community engagement, corporate sponsorship, organizational strategic plans, program development, team building, board development, training/education, public speaking

### Nonprofit Technology-Based Fundraising Consultant & Onsite Execution: August 2014 - Present

National Contracts: Gesture: August 2014 to December 2016; OneCause: January 2017 – Present

- Data analytics, sponsorship, mobile bidding, optimizing fundraising strategies, on-site execution

### Team Building: January 2014 - Present

National Contracts: City Hunt/Dr. Clue Treasure Hunts/Teambonding

- Working with National/International corporations to strengthen team dynamics via focused team building exercises and sessions specifically addressing current team challenges

### Nonprofit/Corporate Matchmaker: 2015 - 2016

Zipsprout.com-Connecting National/International corporate sponsors to nonprofit organizations with complimentary philanthropic goals

### Easter Seals UCP NC & VA: August 2008 – April 2011

Regional Program Director, Central Region NC

- Building and supervising 10+ services lines: community and facility-based services
- Services for children, adults, and families
- Built award winning services and service teams/raising \$200,000-\$1,000,000 per year

### Counseling Services Etc.: September 2004 – July 2008

Qualified Professional-Team building for community mental health services/supervision/clinical training specialist/mental health treatment and evaluation

### Federal Bureau of Prisons – 1 year appointment- Academic year 2003/2004

- Federal Evaluations for NGRI/Competency to stand trial/
- Certified Federal Expert Witness for Federal Judicial System

### Department of Corrections and Corrections Outreach: June 1998- August 2003

Psychology Staff -Mental health treatment/intake evaluations/competency evaluations/risk assessment

## EDUCATION

MS, Marine Science,  
University of North Carolina  
at Wilmington, 2003

BSc, Biology and  
Environmental Studies,  
Minor in Chemistry,  
University of North Carolina  
at Wilmington, 1999

Visiting Scholar, Duke  
University Department of  
Biology, 2001

## CERTIFICATIONS & TRAINING

TogetherGreen, 2008,  
Conservation Fellow  
(National Audubon Society)

Intermittent and Perennial  
Stream Identification for  
Riparian Buffer Rules, 2006,  
(Department of Forestry and  
Environmental Resources,  
North Carolina State  
University)

Wetland Determination and  
Delineation, 2004,  
(Department of Forestry,  
North Carolina State  
University)

Rare Plant Identifications,  
2003 (USFWS and NCNHP)

Trained in Wetlands Rapid  
Assessment Procedure  
(WRAP)

Professional Training and  
Experience in Shorebird  
Surveys and Wetland  
Delineations

Certified Boat Operator (< 20  
feet), UNC-Wilmington

## AFFILIATIONS

National Association of  
Environmental Professionals,  
#11460

North Carolina Association  
of Environmental  
Professionals

North Carolina Beach, Inlet  
and Waterway Association  
(Board of Directors – 2016 -

## EXPERIENCE

Mrs. York, an accomplished senior coastal scientist, and project manager for Moffatt & Nichol (M&N), has been involved in the design, preparation, coordination, and adaptive management of multidisciplinary coastal and riverine nature-based projects for more than 18 years. One of her main areas of focus has been navigating the environmental permitting requirements for large-scale beach renourishment programs, while more recently, she has been tirelessly working to improve resiliency within coastal communities using grant-funded nature-based infrastructure design. Mrs. York has led several major initiatives, resulting in more than \$8 million being awarded to projects that invests in restoration of natural systems that enhance habitats for fish and wildlife while helping to protect coastal communities so they may recover more quickly from the impacts of storms, floods and other natural hazards.

## REPRESENTATIVE PROJECT EXPERIENCE

**Restore Access to Historical Spawning Grounds for Endangered Anadromous Fish, Locks and Dams 2 and 3, Cape Fear River, Bladen County, NC.** Environmental Lead for agency coordination, stakeholder engagement, and regulatory permitting process. Secured \$3.4 million to evaluate and permit fish passage at two USACE-owned locks and dams. Coordinated directly with National Fish and Wildlife Foundation (NFWF) to manage a \$840,000 grant through the North Carolina and Virginia River and Waters Program.

**Battleship NORTH CAROLINA Living with Water Master Resiliency Plan, Wilmington, NC.** Grant writer and Project Manager for the design and implementation of an 800-linear foot living shoreline and 2-acre tidal wetland creation project to reduce flood risk and enhance primary nursery habitat. Developed and managed three grants totaling \$2.3 million, including \$1.25 million from the NFWF Emergency Coastal Resilience Fund (ECRF).

**Cape Fear River Partnership Coordinator.** Coordinator of a coalition of federal, state, industry, private, non-profit organizations working towards the restoration of anadromous fish species. Works closely with partners to implement the goals and targets of the Action Plan. Led the award of over \$150,000 in federal funding since 2014 to support the sustainability of the Coordinator position.

**Clear Run Branch Drainage Improvement and Stream Restoration, Wilmington, NC.** Led the development of a NFWF ECRF grant application resulting in the award of \$1.4 million to improve wildlife habitat and decrease flood risk through stream and floodplain restoration or enhancement of 7.5 acres of floodplain habitat and 5,900 feet of stream channel.

**Enhancing Aquatic Connectivity Resiliency and Flood Capacity in the Black River Watershed, Bladen and Pender County, NC.** Project Manager and Grant Lead for the award of \$130,000 from the NFWF SE Aquatics Program to assess 200 stream crossings resulting in prioritization of barriers and award of \$500,000 from the NFWF ECRF for the replacement of two culverts for the purpose of enhancing up to two miles of stream habitat.

## Jeffery S. Crump, PE, CFM

Water Resources Engineer

### EDUCATION

MSCE, Civil Engineering/Water Resources, Villanova University, Pennsylvania, 2014

BSCE, Civil Engineering, Brigham Young University, Utah, 2007

### REGISTRATION

Professional Engineer: California, Civil, 76246, 2010

North Carolina, Civil, 049543, 2019

### CERTIFICATIONS

Certified Floodplain Manager, US-08-03517, 2008

### AFFILIATIONS

Floodplain Managers Association (FMA), Member  
Association of State Floodplain Managers (ASFPM), Member  
Member, American Society of Civil Engineers  
Member, American Public Works Association

### EXPERIENCE

Mr. Crump has over 15 years of experience managing complex hydrology and hydraulic studies, drainage analyses, and flood mapping for a variety of public and private clients throughout California. Mr. Crump provides hydraulic and hydrologic modeling of alluvial fans, bridge replacements, floodplain inundation, sediment transport, scour analysis, dam break and dam inundation studies. Mr. Crump's experience includes preparing reports and studies using EPA-SWMM, XPSWMM 1D/2D, TUFLOW, AES, HEC-HMS, HEC-RAS, HEC-GeoRAS, HEC-RAS 5.0 2D, the Bay Area Hydrology Model, FLO-2D, WSPG, BREACH, Hydraflow, and WMS. He is also proficient in QGIS, Global Mapper, ArcGIS, ArcInfo and ArcView.

### REPRESENTATIVE PROJECT EXPERIENCE

**Black River Aquatic Connectivity Assessment, Bladen and Pender Counties, North Carolina.** Project Engineer responsible for conceptual design for culvert replacement projects to support aquatic species connectivity and reduce flood impacts of roadway overtopping. As lead engineer, Mr. Crump designed sizes and configurations of replacement culverts to address blockages that prohibit aquatic species connectivity. This effort included initial hydraulic modeling, field review and assessment, cost estimating, and prioritization of ten potential culvert replacement projects within the Black River Watershed.

**Cape Fear River Lock and Dam 2 and 3 Fish Passage Project, Bladen County, North Carolina.** Project Engineer responsible for design and modeling of proposed retrofitting of rock weir dams on the face of existing dams to improve fish passage and protect the existing dam structures in the Cape Fear River. The evaluation is currently being completed using FLO3D to determine if projected velocities are with tolerances for targeted species to overcome as they swim upstream.

**Clear Run Branch Drainage Improvements, Phase 1, Wilmington, North Carolina.** Senior civil engineer assisting with final design of plans, specifications, and estimates, and grant preparation for the stream restoration and storm drain improvement project. The project included floodplain enhancements and removal of invasive species for the riparian corridor. The design of the new channel and floodplain system and the associated watershed improvements are completed and will soon be constructed.

**Rotary Drive Drainage Study | High Point, North Carolina.** Senior civil engineer responsible for detailed 1D/2D XPSWMM of drainage conditions in a flood-prone neighborhood. The study evaluated the existing extent of flood impacts and identified undersized drainage infrastructure. The final phase of the study proposed recommended drainage improvements including multi-purpose flood control and stormwater control measures as well as stream restoration with floodplain enhancement to reduce flooding and improve channel stability and water quality.

## EDUCATION

BS, Civil Engineering, North Carolina State University, 1993

## REGISTRATION

### Professional Engineer:

North Carolina, #23912, 1998

Alabama, #32189, 2011

Georgia, #PE030231, 2005

Virginia, #0402059740, 2018

## CERTIFICATIONS

Corridor Modeler

Certification by  
EnvisionCAD

## AFFILIATIONS

American Society of Highway Engineers (ASHE)

## EXPERIENCE

Since joining Moffatt & Nichol in 2000 following six and a half years with the North Carolina Department of Transportation (NCDOT), Mr. Huffman has provided planning, analysis, evaluation, design, construction document preparation, and post-construction-award services for a variety of civil engineering projects, particularly for site work associated with transportation, port and urban waterfront projects. This experience includes civil site development, roadways and highways, culvert and bridge replacements, pavement, rail yards, stormwater management facilities, drainage systems, traffic staging and traffic control plans, utilities, and erosion control plans. In total, Mr. Huffman provides more than 20 years of civil engineering experience.

## REPRESENTATIVE PROJECT EXPERIENCE

**Culvert Replacement on Slocum Trail over Big Branch (BR-236), Pender County, North Carolina.** Design lead for the replacement of 4-54" pipes under Slocum Trail at Big Branch in Pender County near Atkinson, North Carolina. Provided roadway design, hydraulic design, sediment and erosion control, maintenance of traffic, pavement markings, utility coordination along with estimates, bid documents and stakeholder coordination.

**Replacement of Bridge No. 448 over Buffalo Creek (NCDOT TIP: B-5374), Union County, North Carolina.** Project manager for the replacement of Bridge #448 in Union County NC. Replaced existing bridge with a proposed triple barrel culvert. Provided roadway design, hydraulic design, sediment and erosion control, maintenance of traffic, pavement markings, utility coordination along with estimates, bid documents and stakeholder coordination.

**Replacement of Bridge No. 40 on NC 211 over Bear Pen Islands Swamp (NCDOT TIP: B-4438), Brunswick County, North Carolina.** Project Manager provided planning / environmental and final design services for the replacement of an existing bridge on NC 211 over Bear Pen Islands Swamp north of Shallotte, NC in Brunswick County. The improvements included realigning NC 211 to the north on new alignment and demolishing the existing bridge. Project involved environmental documents, roadway design, drainage, maintenance of traffic, pavement markings, structures, erosion control, and permit drawings.

**17BP.1.R.46 Express Design-Build Bridge Replacements Division 1 Year 2, Pasquotank and Perquimans Counties, North Carolina.** Project manager for eight express design-build bridge replacement projects in Division 1 (two bridges in Pasquotank County and six bridges in Perquimans County). Established horizontal and vertical alignments, super elevations, lane and shoulder widths, guardrail requirements, and proper sight distances at all bridge locations. Reviewed all submittals prior to submission to NCDOT. Coordinated with contractor, NCDOT along with multiple sub-consultants to be sure project stayed on schedule and within budget.

# Daniel L. Adams

dadams@pendercountync.gov  
(919) 630-7592

805 S. Walker Street  
Burgaw, NC 28425

## **Education**

**University of North Carolina Wilmington**, Wilmington, NC. December 2019  
Master of Public Administration

**University of North Carolina Wilmington**, Wilmington, NC. May 2016  
Bachelor of Arts in Political Science with a minor in Geography

## **Professional Experience**

**Floodplain Administrator**, *Pender County Government*, Burgaw, NC. July 2019-Present

- Review development proposals, ranging from large subdivisions to single family homes, to ensure proposed development complies with the Pender County Flood Damage Prevention Ordinance and federal floodplain development regulations.
- Serve as the County's project manager for FEMA-funded Hazard Mitigation Grant Program (HMGP) projects.
  - Worked with homeowners through the application process up through project implementation.
  - Procured contractors through the development of Request for Proposals in compliance with North Carolina General Statute and federal procurement laws.
  - Managed four HMGP projects with a total budget of \$8,779,680.
  - Monitored and communicated with contractors to ensure all expenses incurred are eligible for reimbursement as required by the Code of Federal Regulations.
- Implemented the state-funded Disaster Recovery Act grants for Hurricanes Matthew and Florence in collaboration with the North Carolina Office of State Budget and Management and the Pender Long Term Recovery Group. This grant has funded 58 housing repair, elevation, and acquisition projects with a total budget of \$3 million.
  - Managed the project budget and provided cost projections to our non-profit and government partners to ensure spending remained within our allocated range.
  - Collaborated with five non-profit construction agencies to develop a process and plan for restoring homes damaged by Hurricanes Matthew and Florence.
- Developed and implemented the Pender County Drainage Improvement Program, which involves using county and grant-funded resources to improve drainage to reduce the impact of flood events in the County.
- Worked with an engineering consultant and civil construction contractors to implement the Emergency Watershed Protection (EWP) Program grant.
  - The grant is funded through the USDA and has led to over 90,000 linear feet of creeks being cleaned and five stream banks repaired that were suffering from severe erosion.
  - Managed an engineering consultant and three different civil construction contractors who assisted with the implementation of this grant.
- Helped lead the County into the Community Rating System (CRS) program as a Class 7 community, leading to a 15% reduction in costs for flood insurance policy holders in the County.

**Graduate Teaching Assistant**, *University of North Carolina Wilmington*, Wilmington, NC. January 2018-July 2019

- Assisted faculty with researching and writing a technical manual for local governments on how to develop a comprehensive land use plan that is compliant with the Coastal Area Management Act (CAMA), titled *Comprehensive Land Use Planning in Coastal North Carolina*.
- Researched and wrote the Disaster Resilience and Recovery section for the CAMA technical manual.
- Conducted study hall hours for students who needed assistance with their coursework.

## **Skills and Certifications**

- Certified Floodplain Manager (CFM), October 2019
- Basic Geographic Information System (GIS) skills





## LETTERS OF SUPPORT



## Cape Fear Resource Conservation & Development

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NOAA Grant: Restoring Fish Passage through Barrier Removal Grants

Funding Opportunity Number: NOAA-NMFS-HCPO-2022-2007209

Dear NOAA Grant Committee Members:

As the President of the Board of Directors and the Executive Director for Cape Fear Resource Conservation and Development, Inc. (CFRCD), I am writing to enthusiastically endorse the above stated project for Cape Fear Resource Conservation and Development, Inc. (CFRCD), and the 2022 NOAA Grant Proposal for Restoring Fish Passage through Barrier Removal Funding Opportunity Number: NOAA-NMFS-HCPO-2022-2007209)

CFRCD is a private nonprofit 501(c)(3) organization that assists local governments and communities in southeastern NC to carry out projects that improve the quality of life in the region. CFRCD's action-oriented projects protect, enhance, and balance natural and human resources while promoting economic development. CFRCD is part of a larger network of Resource Conservation and Development chapters around the state and country working to enhance resources specific to their service region.

CFRCD's service region is comprised of Bladen, Brunswick, Columbus, New Hanover, and Pender Counties, and has recently taken on 10 additional counties for which to provide services. CFRCD's entire service region has been devastated by hurricanes and other storm events negatively impacting our resources in the last several years. This region has endured severe and record-breaking floods damaging our way of life including the loss of homes, properties, agriculture, and businesses. The damages have impacted rivers and tributaries by blocking and compromising culverts along the watersheds. Many blockages and damages have compromised fish passage for many important species.

CFRCD has made a long-term commitment to execute projects to alleviate these blockages and addressing the impact on fish passage and flooding resulting in damage to the region's species and other resources. The blockages in this region have negatively impacted both the natural and economic resources, which is imperative to mitigate and stabilize the damage to the region as well as prevent future damage to our resources and communities.

CFRCD and partners have been working in the Black River Watershed for the past five years to assess, remediate, restore, and replace compromised culverts negatively impacting flood and fish passage. CFRCD is strongly endorsing this project to complete the years of work in the Black River Watershed where CFRCD has been dedicated to compromised culverts negatively impacting our communities.

CFRCD partners with local and state governments as well as other nonprofits and for-profit organizations to build the strongest partnerships with the greatest likelihood of success for project execution and results. CFRCD is committed to ensuring the resources in our service region are protected. All CFRCD projects are focused on strengthening environmental resources in southeastern North Carolina.

CFRCD looks forward to partnering with NOAA on this project that will stabilize and protect the resources and communities that have been impacted by the flooding and barriers to fish passage in the region over the last several years.

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**Cape Fear Resource Conservation & Development**

15060 Highway 17 N. • Hampstead, NC 28443

Telephone: 919-607-9996

[www.capefearcd.org](http://www.capefearcd.org)

Sincerely,



Danielle Darkangelo, Executive Director, CFRCD  
[ddarkangelo@cfrcd.onmicrosoft.com](mailto:ddarkangelo@cfrcd.onmicrosoft.com)  
919-607-9996



Gary Lanier, President, Board of Directors, CFRCD  
[glanier@columbusco.org](mailto:glanier@columbusco.org)  
910-640-6608

**Cape Fear Resource Conservation & Development**  
15060 Highway 17 N. • Hampstead, NC 28443  
Telephone: 919-607-9996  
[www.capefearcd.org](http://www.capefearcd.org)

SOUTHEAST AQUATIC RESOURCES PARTNERSHIP



**Coordinator:  
Todd Ewing**

**todd@southeastaquatics.net  
www.southeastaquatics.net**

Dear Ms. York:

The Southeast Aquatic Resources Partnership (SARP) has been a key partner in the implementation of the NFWF-funded project, "Assessing Aquatic Connectivity in the Black River Watershed." In collaboration with Moffatt & Nichol, and Pender and Bladen Counties, the Cape Fear Resource Conservation and Development (CFRC&D) completed the assessment, ranking, and prioritization of 200 culverts and barriers for removal and/or restoration in the lower Black River Basin. This basin is a Tier 1 conservation priority of the Cape Fear River basin due to the presence of multiple Species of Greatest Conservation Need identified in North Carolina's State Wildlife Action Plan.

SARP staff facilitated the training and implementation of SARP's standardized protocol (developed by the North Atlantic Aquatic Connectivity Collaborative) to assess fish passability and conditions at over 200 road stream crossings in the lower Black River watershed, a tributary of the Cape Fear River. SARP worked collaboratively with CFRC&D since 2018 to evaluate and rank barriers critical for passing freshwater aquatic species and reducing impacts of flooding from storms, such as Hurricane Florence. Following these assessments, SARP finalized the scoring and ranking of 200 culverts through our Barrier Prioritization Tool (<https://connectivity.sarpdata.com>) and the project team was able to move forward with the selection of top priority projects in the basin, completing the design and engineering and securing funds for one of the top priority structures.

SARP is encouraged by the success of the project thus far and supports the next step of implementing the replacement of additional high priority structures through the work outlined in this proposal. This project has also increased awareness to the utility of a standardized protocol, resulting in the collection of data using the protocol at an additional 100 structures in the Lower Cape Fear basin, for a total of 500 additional data points collected within target basins in the South Atlantic. These data will all be input into the Barrier Prioritization Tool and result in streamlined barrier assessments to evaluate vulnerabilities in existing infrastructure to improve resiliency from future storms and flooding events. SARP will continue to collaborate with CFRC&D and the project team to support barrier restoration and/or replacement to enhance fish and wildlife habitat and community resilience within the Black River watershed.

Sincerely,

**Todd Ewing  
Coordinator,  
Southeast Aquatic Resources Partnership**

Alabama Department of Conservation and Natural Resources • Arkansas Game and Fish Commission • Atlantic States Marine Fisheries Commission • Florida Fish and Wildlife Conservation Commission • Georgia Department of Natural Resources • Gulf of Mexico Fishery Management Council • Gulf States Marine Fisheries Commission • Kentucky Department of Fish and Wildlife Resources • Louisiana Department of Wildlife and Fisheries • Mississippi Department of Marine Resources • Mississippi Department of Wildlife, Fisheries and Parks • Missouri Department of Conservation • National Marine Fisheries Service • North Carolina Department of Environment and Natural Resources • North Carolina Wildlife Resources Commission • Oklahoma Department of Wildlife Conservation • South Atlantic Fishery Management Council • South Carolina Department of Natural Resources • Tennessee Wildlife Resource Agency • Texas Parks and Wildlife Department • Virginia Dept of Game and Inland Fisheries • U.S. Fish and Wildlife Service • US Geological Survey



August 11, 2022

To Whom It May Concern,

The Cape Fear River Assembly (CFRA) is supportive of the Cape Fear Resource Conservation & Development's (CFRC&D) effort to continue the important work of removing barriers (replacing culverts) in the lower Black River basin to support aquatic connectivity, reduce flood risk and improve community resilience to climate change impacts.

CFRA offers this letter of support for CFRC&D's request for federal funds to complete the engineering, design, acquisition of permits and replacement of five culverts for the purpose of enhancing up to nine miles of stream habitat within the lower Black River basin to improve

PO Box 2146  
Fayetteville, NC 28302  
[cfra@cfra-nc.org](mailto:cfra@cfra-nc.org)



aquatic connectivity resiliency and flood capacity for local coastal communities within Pender and Bladen Counties, and anadromous fish corridor habitat. This effort will continue previous work in the Cape Fear River basin to restore access to the historical spawning grounds for several rare and/or endangered anadromous fish species found in the Cape Fear River.

Sincerely,

A handwritten signature in black ink, appearing to read 'Maya Miller', is positioned above the printed name.

Maya Miller  
Executive Director

# Pender County Planning and Community Development

805 S. Walker Street  
PO Box 1519  
Burgaw, NC 28425



Phone: 910-259-1202  
Fax: 910-259-1295  
[www.pendercountync.gov](http://www.pendercountync.gov)

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August 10, 2022

National Oceanic and Atmospheric Administration  
Restoring Fish Passage through Barrier Removal Program

Re: Enhancing Aquatic Connectivity Resiliency and Flood Capacity Project in the Black River

To whom it may concern,

I am writing in support of Cape Fear Resource Conservation and Development's (CFRC&D) application to secure funding to improve aquatic connectivity and reduce flood risk in Pender County through the Restoring Fish Passage through Barrier Removal grant program.

Pender County has been severely impacted by hurricanes and flood events in the recent past that have devastated many homeowners and altered the natural environment, including that of several anadromous fish species. We are encouraged to see that organizations like CFRC&D continue to work with regional stakeholders to improve resilience at the local level while focusing on restoring and improving the natural environment in areas such as the Black River basin.

This project builds off a culvert replacement project that is currently underway in western Pender County, where flooding was severe during both Hurricane Matthew in 2016 and Hurricane Florence in 2018. The team that is working on the implementation of that project has been very effective in developing plans, prioritizing actions, and ensuring the implementation of the project is completed effectively. The project team includes government agencies, non-profit organizations, private companies, regional stakeholders, and landowners.

Pender County has full faith in CFRC&D to execute this project within budget and on time, as their subject matter expertise and support is unparalleled. I urge you to strongly consider funding CFRC&D's application for their Enhancing Aquatic Connectivity Resiliency and Flood Capacity Project in the Black River. I am happy to discuss this further should you have any questions.

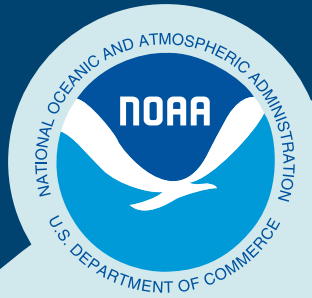
Sincerely,

Daniel Adams  
Hazard Mitigation Coordinator  
910.259.0231  
[dadams@pendercountync.gov](mailto:dadams@pendercountync.gov)



## COMMUNITY BENEFITS OF CONSERVING THE CAPE FEAR RIVER BASIN





**NOAA  
FISHERIES**

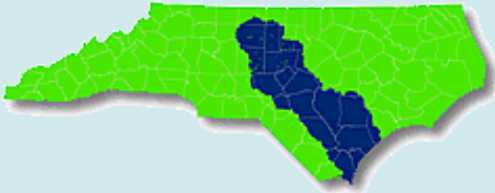


Image: Cape Fear River Watch

# Community Benefits of Conserving the Cape Fear River Basin



Recreation on the Cape Fear River includes fishing, paddling, sailing, and other ways to relax on and near the water. (NOAA)

The Cape Fear River provides drinking water, irrigation and recreational opportunities to millions of people in eastern North Carolina. Because of the river's importance, over 30 organizations came together to form the Cape Fear River Partnership in 2011 to help improve the conditions of the river for both the people and species that use it. NOAA was a founding member of this partnership and has provided extensive assistance in improving the river to increase fish populations. The work of this coalition provides important socio-economic benefits to the North Carolinians living in the watershed, which stretches from the growing urban areas of Greensboro, Durham and Fayetteville through important farmland to eventually meet the Atlantic shoreline outside of Wilmington.

## Key Benefits

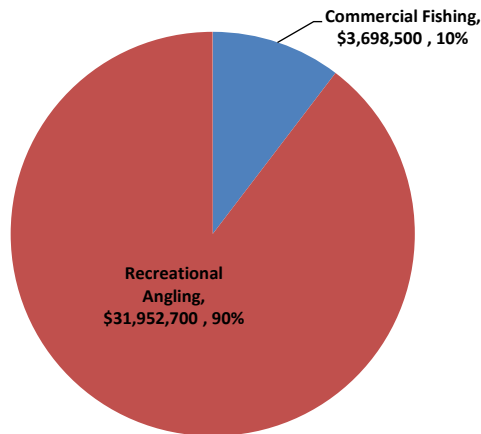
Healthy and productive fisheries and ecosystems in the Cape Fear River watershed provide a long-term source of:

- Jobs
- Income
- Enhanced economic activity, by promoting tourism, recreational fishing, and commercial fishing
- Clean drinking water

Partnering has catalyzed:

- Real work to restore the migratory fish passages needed to support fisheries of striped bass and shad
- Development of financial mechanisms for investing in watershed conservation
- Education of the public and policymakers about Cape Fear River regions that generate large amounts of nutrients

The Cape Fear River in North Carolina supports \$35.7 million in sales of recreationally and commercially important fisheries.



## Why is NOAA Fisheries involved?

The river's importance for people, such as commercial and recreational fishing, tourism, recreation, water quality, and water supply, has a connection to migratory fish. These fish touch every part of the river. By paying attention to the needs of fish, we also support the entire river system's health.

Restoring and improving access to habitat for migratory fish not only enhances the freshwater ecosystem and its biodiversity, but it also provides human benefits that can be described and counted. The Cape Fear River basin, including its many river

tributaries, provides economic goods and services and contributes to the livelihoods and food security of its residents. Keeping track of these benefits helps managers to sustain the flow of goods and services in the interest of current and future generations. Additionally, restoring habitats and fish populations helps the community put its conservation concerns into action.

## Economic Value of Fishing

When looking at the fisheries that the Cape Fear River supports, it is important to examine multiple sections of the river. The commercial fisheries for American shad occur in the Lower Cape Fear, mostly by fishermen using large mesh gill nets, while recreational anglers usually target the American shad in the Middle Cape Fear using hook and line.

In 2013, the fisheries of the Cape Fear River supported nearly 500 jobs, \$14.2 million in income, and \$35.7 million in business sales.

## Aspects of Recreational Fishing

Recreational fishing is popular throughout the Cape Fear River basin. On average, anglers traveled approximately 57 miles round-trip and expected to take three or more trips per year. They generally indicated a high level of overall satisfaction with their fishing trips.

Anglers target species such as the American shad (*Alosa sapidissima*), hickory shad (*Alosa mediocris*), and striped bass (*Morone saxatilis*). American shad were by far the most commonly caught and targeted species of anglers fishing on the Middle Cape Fear.

Local residents surveyed have been fishing recreationally for more than 32 years (on average).

On average, anglers were willing to spend an extra \$8.84 per trip in order to continue fishing. As such, this extra

spending would equal \$106,796 in 2013. For all fishing trips occurring on the Middle Cape Fear, the extra spending would be \$188,584 in 2013.

## Economic Benefits of Drinking Water

Improving water quality, by reducing nutrients and other pollutants into the basin, promises long-term benefits for the natural environment of the Cape Fear River and the drinking water it supplies. From 2009-2012, there were multiple harmful algal outbreaks just upstream of drinking water outtakes. These algal outbreaks affect human health and also lead to fish kills. By decreasing nutrients into the water and improving general water quality, we are decreasing algae, decreasing the treatment costs for drinking water utilities and improving the conditions for fish.

It costs one drinking water utility in the Cape Fear an estimated \$800 to \$1,300 per day to treat algal blooms.<sup>1</sup> Habitat conservation measures like protecting riverside land, increasing vegetation



Fishing is a pastime shared from generation to generation on the Cape Fear River. (NOAA)

buffers near nutrient hotspot inputs and improving habitat within stretches of the river itself can help save money for water utilities as well as increase areas for fish habitat. As a means of comparison, within the Neuse River Basin in North Carolina, a 30% improvement in raw water quality would lead to a savings of between \$2.6 and \$16.7 million over 30 years across the region.<sup>2</sup>

<sup>1</sup> Estimating the exact savings depends on the facility and their technology.

<sup>2</sup> Elsin, Y.K., Kramer, R.A., & Jenkins, W.A. (2010). Valuing Drinking Water Provision as an Ecosystem Service in the Neuse River Basin. *Journal of Water Resources Planning and Management*, 136(4), 474-482.

## What is the Cape Fear River Partnership?

NOAA helped to create the coalition that unites a wide range of concerned parties. The Cape Fear River Partnership consists of 31 partner organizations that represent federal, state, and local government, non-profits, industry, and academia. They work in coordination to conserve the river effectively.

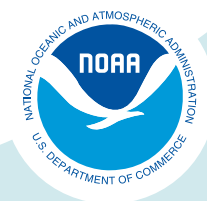
Learn more and find Useful Links to plans and reports at: <http://www.habitat.noaa.gov/protection/capefear>



## References

Benner, R., D. Ryan, and M. Fields. 2014. [The Cape Fear Water Fund: A Partnership for Watershed Conservation](#). The Nature Conservancy. Final Report under Grant Award NA13NMF4630239. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Silver Spring, MD, 18 p.

Hadley, J. 2015. [An Economic Analysis of Recreational and Commercial Fisheries Occurring in the Middle and Lower Cape Fear River, North Carolina](#). Division of Marine Fisheries, North Carolina Department of Environment and Natural Resources. Final Report under Grant Award NA13NMF4630239. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Silver Spring, MD, 26 p.



Contact in Office of Habitat Conservation:  
Giselle Samonte [giselle.samonte@noaa.gov](mailto:giselle.samonte@noaa.gov)

## DATA MANAGEMENT PLAN

Cape Fear Resource Conservation & Development (CFRCD)'s Enhancing Aquatic Connectivity Resiliency and Flood Capacity in the Black River Watershed Project will generate the following types of geotechnical survey, environmental, and engineering data, plans or monitoring reports:

- NEPA documentation and state and federal permits
- Basis of Design Engineering Technical Memorandum
- Bathymetric and topographic survey data (x,y,z and DWG file format)
- Plans (PDF and DWG file format) and specifications for the four culverts to be replaced
- National CADD standards for construction plan deliverables
- Pre- and post-project fisheries monitoring, and
- Stakeholder and Public Outreach Presentation Materials

The data listed above will be prepared and/or collected by members of the project team over the three years proposed for the Project. As listed in Table 2 of the Project Narrative, tasks will be implemented in a sequential order to ensure all tasks are completed within the three-year timeframe (2023 - 2025).

For purposes of future data sharing, the offices and servers of CFRCD/M&N/SARP/Construction Contractor will retain copies of all reports, data, regulatory compliance documents, plans and specifications, fisheries and water quality data and monitoring reports, and supporting information generated over the duration of the project and archived electronically in the respective offices. Upon internal QA/QC access to all data, reports will then be provided to project partners, including NOAA Fisheries. During the construction timeframe, weekly conference calls will be held to discuss progress, as well as on-site meetings. The construction contractor will post all deliverables, including weekly progress updates, to a secure file sharing website maintained by M&N.

Metadata for all biological monitoring components will include sampling locations, observations on site conditions, dates and times of sampling, identity of sampling personnel, and notes on equipment used in collections and analyses. Project managers will oversee QA/QC (task assignment and training, calibrations and standards, record-keeping, data quality check and data posting). CFRCD will develop a page on their existing website devoted to the proposed project providing updates as well as completed reports/photos of site conditions/progress.

The Cape Fear River Partnership will provide regular project updates on [www.capefearriverpartnership.com](http://www.capefearriverpartnership.com) to allow stakeholders to participate and engage in the project's progress. All data will be provided directly to NOAA and assigned technical monitors in digital and paper format. CFRCD will sponsor at a minimum two public presentations of progress/results/goals/importance and applicability throughout the three-year timeframe of the projects. Relevant data will be shared with all project partners and other collaborating agencies for incorporation into appropriate management plans and future decisions regarding fisheries management. Data sharing will be accomplished as soon as practical after QA/QC. The project team will work with the NOAA program office and NOAA archives to determine interest in archiving and further dissemination of the data and reports. Preparation of GIS products and engineering design drawings will comply with ASCE, USACE, and NOAA standards.

## IMPLEMENTATION MONITORING PLAN

CFRCD proposes to conduct Tier 1 monitoring for the proposed Project and each replaced barrier/culvert. A monitoring plan will be developed with project partners, including NOAA, and will include the following metrics: 1) Site Passability: channel width, channel gradient, and jump height 2) Presence of Target Fish Species: presence/absence of diadromous fish species, life stage limited by barrier 3) Annual Operating, Maintenance, and Liability Costs: annual for next five-year period 4) Safety Hazard: describe hazard diminished or eliminated 5) Civic or Community Enhancement: changes to infrastructure, utilities or recreational facilities.

Specific aquatic fish species of interest for the project area and that pass through the five culverts proposed for funding include:

- Atlantic and Shortnose Sturgeon (Federal and State Endangered)
- Thinlip Chub (State Special Concern)
- Broadtail Madtom (Federal Species of Concern)

The following Species of Greatest Conservation Need (SGCN) are also present:

- American Eel
- Ironcolor Shiner
- Blackbanded Sunfish
- Coastal Plain Crayfish
- Striped Bass
- River Herring

CFRCD will provide project designs to NOAA Technical Monitors before implementation to ensure site passability meets fish passage design standards.



## SUPPORTING MATERIALS – MOUs

**MEMORANDUM OF UNDERSTANDING AND COOPERATIVE AGREEMENT  
FOR SERVICES**

**Between**

**Cape Fear Resource Conservation and Development, Inc.**

**And**

**Bladen County, NC, Government**

**This Agreement** is entered into as of May 3, 2021, between Cape Fear Resource Conservation and Development, Inc. hereinafter referred to as "CFRCD" and Bladen County, NC Government, hereinafter referred to as the "County."

**I. Purpose:**

Both the County and CFRCD agree to collaborate on "Assessing Aquatic Activity in the Black River, Phase II" Project hereinafter referred to as "Project."

The National Fish and Wildlife Foundation, hereinafter referred to as "NFWF", has awarded CFRCD a total of \$500,000, which will be coming to CFRCD to support this project. CFRCD and the County are entering into this agreement in support of implementing the following grant in support of the Assessing Aquatic Activity in the Black River project, Phase II.

- \$500,000 – National Fish and Wildlife Foundation
- Additional funding is actively being sought to be utilized for completion of the project

**II. Benefits of Participation:** Implementation of this agreement will assist CFRCD and the County in protecting and supporting conservation of the Black River Watershed by effective aquatic connectivity, decreased flooding, and improved fish passage. It will also increase the capacity of CFRCD to continue seeking grant funding and corporate investments and sponsorships, bringing greater awareness to the conservation needs of the Black River Watershed.

**III. Responsibilities:**

**A. CFRCD agrees to:**

1. Complete the fiscal management for the Grants listed in Section 1. This includes submitting necessary financial reports, tracking matching dollars, paying all invoices associated with the project that are covered by the grants, and other requirements related to the grants.
2. Appoint a project coordinator to ensure that the deliverables for each of the grants are met.
3. Enter into additional contracts with other entities to complete project deliverables. Examples include contracting with various consulting companies to complete evaluation of culverts and general aquatic accessibility throughout the Black River Watershed as well as engaging with Subject Matter Expert engineers to move forward on "shovel-ready" projects to improve the aquatic accessibility throughout the Black River Watershed.

4. Provide the County Manager and project steering committee with project and financial updates.
5. Designate the following as the liaison between CFRCD and the County  
 Danielle Darkangelo – Executive Director  
 Cape Fear Resource Conservation and Development  
 15060 Highway 17 N  
 Hampstead, NC 28443  
 919-607-9996 (Cell)  
[danielle.darkangelo@gmail.com](mailto:danielle.darkangelo@gmail.com) (Email)

**B. The County Agrees to:**

1. In-Kind support such as staff support and GIS use and availability
2. \$9,000 contribution through FY 21/22 funds designated through CFRCD dues in the form of time and efforts
3. Designate the following as the liaison between the County and CFRCD:  
 Greg Martin or his designee  
 Bladen County Manager  
 201 East King Street  
 Elizabethtown, NC 28337  
 910-862-6700 (phone)  
[gmartin@bladenco.org](mailto:gmartin@bladenco.org)

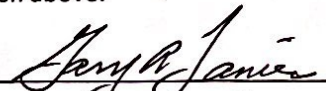
**IV. It is Mutually Agreed**

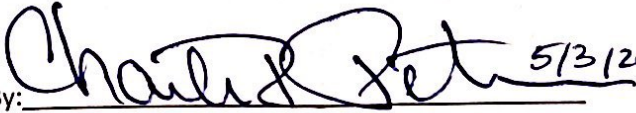
**A. Disputes and Conflict of Interest:**

1. In case of disagreements, differences, or other concerns, the liaisons will work to resolve these issues. If they are unable to resolve the differences, the County Commission Chairperson and President of CFRCD will be informed and brought into the process.
2. If a resolution is not achieved, either party may request and be granted consultation from a mediator selected and agreed to upon by both parties. If mediation is unsuccessful the parties may agree to enter arbitration. The decision of the arbitrators will be final and binding upon both CFRCD and the County.
3. Should a potential conflict of interest arise between CFRCD and the County during the tenure of this agreement, the liaisons will immediately discuss the conflict.

- B. This agreement may be amended in writing by mutual consent of the parties to this agreement.
- C. The entire agreement between the County and CFRCD is contained within this document and its appendices.

In Witness Whereof, the parties hereto have executed this agreement as of the day, month and year first written above:

By:  6/3/2021  
 Gary Lanier - President Date  
 CFRCD Board

By:  5/3/2021  
 Charles R. Peterson, Chairman Date  
 Bladen County Board of Commissioners

**MEMORANDUM OF UNDERSTANDING AND COOPERATIVE AGREEMENT  
FOR SERVICES**

**Between**

**Cape Fear Resource Conservation and Development, Inc.**

**And**

**Pender County, NC, Government**

This Agreement is entered into as of May 2021, between Cape Fear Resource Conservation and Development, Inc. hereinafter referred to as "CFRCD" and Pender County, NC Government hereinafter referred to as the "County".

**I. Purpose:**

Both the County and CFRCD are to collaborate on "Assessing Aquatic Activity in the Black River, Phase II Project" hereinafter referred to as "Project".

- The National Fish and Wildlife Foundation, hereinafter referred to as "NFWF", has awarded CFRCD a total of \$500,000, which will be coming to CFRCD to support this project. CFRCD and the County are entering into this agreement in support of implementing the following grant in support of the Assessing Aquatic Activity in the Black River project, Phase II.
  - \$500,000 – National Fish and Wildlife Foundation
  - Additional funding is actively being sought to be utilized for completion of the project

**II. Benefits of Participation:** Implementation of this agreement will assist CFRCD and the County to protect and support conservation of the Black River Watershed including effective aquatic connectivity, decreased flooding, and improved fish passage. It will also increase the capacity of CFRCD to continue seeking grant funding and corporate investments and sponsorships bringing greater awareness to the conservation needs of the Black River Watershed.

**III. Responsibilities:**

**A. CFRCD agrees to:**

1. Complete the fiscal management for the Grants listed in Section 1. This includes submitting necessary financial reports, tracking match dollars, paying all bills associated with the project that are covered by the grants, and other requirements related to the grants.
2. Appoint a project coordinator to ensure that the deliverables for each of the grants are met.
3. Enter into additional contracts with other entities to complete project deliverables. Examples include contracting with various consulting companies to complete evaluation of culverts and general aquatic accessibility throughout the Black River Watershed as well as engaging with Subject Matter Expert engineers to move forward on "shovel-ready" projects to improve the aquatic accessibility throughout the Black River Watershed.



4. Provide the County Manager and project steering committee with project and financial updates.

5. Designate the following as the liaison between CFRCD and the County

Danielle Darkangelo – Executive Director  
Cape Fear Resource Conservation and Development  
15060 Highway 17 N  
Hampstead, NC 28443  
919-607-9996 (Cell)  
[danielle.darkangelo@gmail.com](mailto:danielle.darkangelo@gmail.com) (Email)

**B. The County Agrees to:**

1. In-Kind support such as staff support and GIS use and availability
2. \$9,000 contribution through FY 21/22 funds designated through CFRCD dues in the form of time and efforts

3. Designate the following as the liaison between the County and CFRCD:

Chad McEwen his designee  
Pender County Manager  
805 S Walker Street  
Burgaw, NC 28425  
910-259-1200 (phone)  
[cmcewen@pendercountync.gov](mailto:cmcewen@pendercountync.gov)

**IV. It is Mutually Agreed**

**A. Disputes and Conflict of Interest:**


1. In case of disagreements, differences, or other concerns, the liaisons will work to resolve these issues. If they are unable to resolve the differences, the County Commission Chairperson and President of CFRCD will be informed and brought into the process.
2. If a resolution is not achieved, either party may request and be granted consultation from a mediator selected and agreed to upon by both parties. If mediation is unsuccessful the parties may agree to enter arbitration. The decision of the arbitrators will be final and binding upon both CFRCD and the County.
3. Should a potential conflict of interest arise between CFRCD and the County during the tenure of this agreement, the liaisons will immediately discuss the conflict.

B. This agreement may be amended in writing by mutual consent of the parties to this agreement.

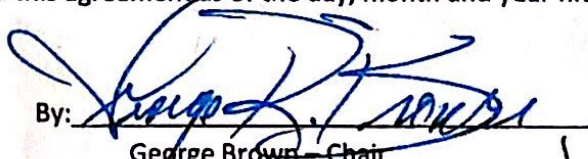
C. The entire agreement between the County and CFRCD is contained within this document and its appendices.

In Witness Whereof, the parties hereto have executed this agreement as of the day, month and year first written above:

By: \_\_\_\_\_

  
Gary Lanier - President  
CFRCD Board

By: \_\_\_\_\_

  
George Brown - Chair  
Pender County Commissioners

6/21/21