Appendix Chapter 4 Local Initiatives

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Local and Regional Initiatives

North Carolina Coastal Federation

Summary North Carolina Coastal Federation (NCCF) Cape Fear River basin projects, provided by NCCF (August 2022).

The North Carolina Coastal Federation is a non-profit organization dedicated to protecting and restoring the North Carolina coast. Since 1982, the Federation has been working with coastal communities and other partners to improve and protect coastal water quality and natural habitats, which are intricately tied to the coastal economy. By focusing primarily, but not exclusively on natural and productive estuarine shorelines, oyster and marsh restoration, coastal management and cleaning the estuaries of marine debris, they strive to support and enhance the coastal natural environment. The Federation has been a partner in the following projects in the Lower Cape Fear River basin.

Lower Cape Fear River Blueprint

The Lower Cape Fear River Blueprint is a collaborative planning effort, led by the North Carolina Coastal Federation, to protect, manage and restore the important estuarine and riverine natural resources of the lower Cape Fear River. The Blueprint expands upon existing efforts by the Cape Fear River Partnership and Cape Fear Arch by creating a holistic platform of support and advocacy for the river and its resources. By restoring natural features like wetlands, resilient shorelines, urban tree canopies, natural forests and healthy upstream watersheds, the surrounding coastal communities can accrue quality of life benefits today, enhance fish and wildlife resources and help prepare for foreseeable resiliency challenges.

The Blueprint is comprised of four main goals:

- Goal 1: Protect and restore water quality.
- Goal 2: Have resilient living shorelines that protect water quality and natural estuarine function and provide thriving habitat for fish and wildlife.
- Goal 3: Have oyster habitats thrive and support vibrant fisheries, good water quality and resilient estuarine shorelines.
- Goal 4: Protect and preserve native coastal wetland populations that are free of invasive species *Phragmites australis*.

More information can be found online (nccoast.org/capefearblueprint).

Carolina Beach Watershed Restoration Plan

In 2019, the Town of Carolina Beach proactively developed a watershed restoration plan to reduce the effects of stormwater runoff and enhance its environmental stewardship of the Lower Cape Fear River and surrounding waters. This plan provides a voluntary management framework to address water quality impairments in six Carolina Beach watersheds and will be the beginning of a multi-year process to implement and maintain, manage, and mitigate stormwater runoff pollution. This plan combines low-cost, high-yield strategies such as community outreach initiatives and targeted retrofit projects aimed at reducing the impact of impervious surface by mimicking natural hydrology to reduce flooding, protect water quality, and provide the community with clean, usable waters. The Carolina Beach Watershed Restoration Plan includes all Nine Minimum Elements of a watershed management plan as recommended by the EPA to qualify to be eligible to apply for federal 319 Grant funding opportunities. Read the full plan here.

Habitat Restoration Efforts

- Lower Cape Fear Oyster Pathway

  The Federation is working with stakeholders in the region to design and implement 15 acres of oyster reef habitat restoration and living shoreline projects to form the Lower Cape Fear River Oyster Pathway (Pathway). These habitat restoration projects will provide broad ecosystem and fishery services in the lower Cape Fear River estuary, laying the groundwork for a significant amount of resilience work in the near future. The Pathway leverages the strong plan in place through the Lower Cape Fear River Blueprint, and is guided by stakeholder input. Mapping by UNCW researchers, state agencies and engineering firms of existing habitats and anticipated future changes are providing guidance on where and how to focus oyster reef habitat, estuarine shoreline and wetland restoration, protection and resilience projects in the estuarine portion of the Cape Fear River. The Federation is working to identify areas in the Lower Cape Fear River suitable for oyster habitat restoration and protection, oyster reef enhancement for fishery harvest, and oyster mariculture development. Utilizing the North Carolina Shellfish Siting Tool, they are working to identify and evaluate sites in the lower river based on exclusion layers and conditions that might support some, if not all, oyster enhancement activities. The Federation continues to work with Audubon NC, Military Ocean Terminal Sunny Point (MOTSU), Bald Head Island Conservancy and DMF to link and incorporate oyster reef protection, enhancement and restoration activities in the river to build and expand the Lower Cape Fear River Oyster Pathway.

  Read more about the Federation's oyster habitat restoration work in the lower Cape Fear here.

- Living Shorelines

  The Federation partnered with Carolina Beach State Park, Military Ocean Terminal Sunny Point, the N.C. Division of Marine Fisheries and hundreds of community and GE-Wilmington volunteers in 2015 on a multi-year effort to help restore oyster and salt marsh habitat in the lower Cape Fear River. The project partners kicked off the effort with a Living Shoreline project along the park's river shoreline to protect the salt marsh and provide habitat for oysters and the associated reef dwelling organisms. This was just the start of the effort to bring these waters back to their original state, helping not only the river, but the economy as well.

  Read more about this living shoreline work:

  Oyster Restoration in the Cape Fear River

  Local Realtors Protect the Coast for Realtors Action Day

  Doing Their Part: Realtor Action Day Cleans Up

- Artificial Reef in the Lower Cape Fear River

  The North Carolina Division of Marine Fisheries, with support from Carolina Beach State Park and the North Carolina Coastal Federation, is leading the construction of Artificial Reef (AR) 491 in a five-acre project area just off the park's Cape Fear River shoreline. One acre of reef and oyster habitat was constructed by NCDMF in partnership with the Coastal Federation in 2017. In 2018, Federation staff worked with engineers from Moffat & Nichol, Carolina Beach State Park staff, NC Division of Marine Fisheries and researchers from UNC-Wilmington to design an innovative living shoreline and oyster habitat restoration project. The project is designed to be slightly further

offshore from the state park and serve as an intertidal breakwater using large oyster domes. Pending funding, the design is being prepared for permitting. Read more about the project here.

- Navassa Kerr-McGee Superfund Site Natural Resources Damage Assessment Restoration Plan
  The federation is working with local partners to lead oyster restoration and living shoreline implementation efforts in the region to develop the Oyster Pathway, including through the Navassa Kerr-McGee Superfund Site Natural Resources Damage Assessment (NRDA) Restoration Plan. The Kerr-McGee Chemical Corporation site is a former creosote wood-treating facility located on a 250-acre parcel of land adjacent to the Cape Fear River, Brunswick River and Sturgeon Creek in Navassa. Creosote and sludge remaining from the wood treatment process were left on site, which led to the release of hazardous chemicals into the surrounding environment. In 2010, EPA designated the property a Superfund site. In October 2019, the N.C. Department of Environmental Quality, along with the National Oceanic and Atmospheric Administration and U.S. Fish and Wildlife Service acting as Natural Resource Trustees, released the draft restoration plan and environmental assessment that identified proposed projects to restore natural resources injured from releases at the site. That plan was finalized and released as a Final Phase I Restoration Plan and Environmental Assessment in June 2020. The Final Phase I restoration plan outlines 10 selected projects, estimated at $12.3 million.

  In partnership with Carolina Beach State Park, NC Division of Marine Fisheries, and Military Ocean Terminal at Sunny Point, the Federation's project was funded to restore, enhance and protect benthic and related estuarine habitats in the lower Cape Fear River through the restoration plan. Read the federation's full proposal here.

  - Oyster Reef/Estuarine Living Shoreline – The Federation is working with the project partners to restore, enhance and protect benthic (intertidal and subtidal oyster reef habitat, submerged mudflats, and sandy shoals) habitat and related estuarine (salt marsh) habitat in a five (5) acre project area in the lower Cape Fear River adjacent to Carolina Beach State Park. The project will include the construction of offshore intertidal and subtidal patch oyster reef habitat separated by submerged and intertidal flats. The reefs will be linked with Living Shoreline structures, designed to provide fish and oyster reef habitat while enhancing estuarine shoreline resiliency. Estuarine shoreline salt marsh and intertidal flats will be created and enhanced through vegetative plantings and protection from erosion by shoreline stabilization structures.

  - Estuarine Tidal Marsh Restoration – The Federation is also working with the project partners to restore and enhance tidal marsh habitat in a 13.5 acre highly disturbed area, dominated by early successional invasive species composed primarily of Phragmites in the park. The Park has been attempting to eradicate Phragmites within portions of the area over the last 8 years. However, the invasive species continues to dominate the area and has spread in several locations to adjacent, steady-state tidal communities. The Federation will work with the park, and Sunny Point Military Ocean Terminal to restore native tidal marsh habitat in the site through a phased approach. The project may include: 1) invasive species removal; 2) tidal stream restoration; 3) fill removal; and 4) vegetation planting/restoration.

Military Ocean Terminal Sunny Point

The Federation will also explore a new partnership with the Military Ocean Terminal Sunny Point (MOTSU) to develop a resiliency and restoration strategy within the lower Cape Fear River region including waters and lands that fall under the protection of the MOTSU. This new initiative has the potential to build on the restoration and resiliency strategies outlined in the Lower Cape Fear River Blueprint to identify priorities for additional living shoreline, oyster reef restoration and stormwater reduction strategies as part of the Lower Cape Fear River Oyster Pathway and to jointly pursue significant external funding for implementation.

MOTSU is also undertaking a Joint Land Use Study with the Cape Fear Council of Governments. More information can be found here (https://capefearcog.org/lgs/regional-initiatives/sunnypoint/).

Marine Debris Removal

The National Oceanographic Atmospheric Administration (NOAA) Marine Debris Program is currently funding cleanup efforts in the Lower Cape Fear region. This funding supports the extension of the ongoing debris removal to include Pender, New Hanover and Brunswick counties. These cleanup efforts support the development of recommendations for state-wide standards and model local ordinances for more storm resilient marine construction. A four-person crew of fishermen from Sneads Ferry began collecting debris in late November 2019, and as of August 2021, over 2,000,000 pounds of debris have been collected.

Lost Fishing Gear Recovery Project

Since 2014, the Federation has led the Lost Fishing Gear Recovery Project in an effort to remove lost crab pots from North Carolina sounds. Pots can become lost in a variety of ways, including large weather events. With the help of various partners, commercial fishermen are hired to collect the pots during the no-potting period, typically between January 15 and February 7.

This program improves fish habitat and water quality and supports the coastal economy. The expansion of the program enabled the Federation to hire greater numbers of commercial fishermen to collect a greater number of lost pots. This project is funded by the North Carolina General Assembly, with support from the National Oceanic and Atmospheric Administration Marine Debris Program.

A total of 78 commercial watermen and women worked in January 2019 to remove 3,112 crab pots from the North Carolina coast. In Marine Patrol District 3, which covers the southeast region of the coast and the Lower Cape Fear River estuary, seven boats made up of 14 commercial watermen picked up 239 crab pots.

Safe fish consumption in the Lower Cape Fear

The Community Engagement Core of the Duke University Superfund Research Center and Oakland University recently released a report detailing the metals and toxins found in commonly caught fish from popular fishing spots along Cape Fear. This report was the product of years of data collection and analysis, driven by a coalition of community-based organizations, businesses and individuals that aimed to better understand the role the lower river plays in subsistence fishing, especially among the most vulnerable populations within the community.

The Community Engagement Core also developed an outreach campaign, dubbed "Stop, Check, Enjoy," which looks to educate community members on fish consumption advisories and how they can protect their health. The goal of the campaign is to limit exposure to chemical contaminants found in fish from

the lower Cape Fear River by encouraging people to select safer fish and preparation and cooking methods that reduce contaminant levels.

Unique Places to Save

(Summary of Unique Places to Save (UP2S) initiatives provided by Natalie Davis and Christine Pickens to DWR, Basin Planning Branch, via email on November 29, 2022.)

Unique Places to Save (UP2S) is a non-profit conservation organization that takes a creative, entrepreneurial approach towards meeting ecological resilience, conservation, and community development challenges. As a conservation stakeholder and partner in the Cape Fear River Basin, we propose the following conservation strategies that support the goals of the Cape Fear River Basin Plan and Restoration Priorities:

Strategy 1. PUBLIC ACCESS

Build opportunities for stewardship of water resources by increasing public access to rivers. Citizens that directly interact with their local water resources may be more likely to take actions to support watershed health. Inform these opportunities by providing guidance on avoiding or minimizing aquatic stressors and using the sites to meet other objectives such as access for water quality monitoring, increasing riparian buffers, and public outreach.

A. Public River Access-Consider supporting communities, municipalities, and organizations working to expand public river access by providing feedback on placement, features, or special considerations of public river access points. These locations could include larger riparian buffers to offset use/impact and also include facilities/features for outreach to the community such as information kiosks. The Basin Plan could include public river access sites within its prioritization of conservation/protection sites.

B. Outdoor Recreation Facilities-Similar to the access points, increasing facilities such as kayak launches, nature-viewing boardwalks, fishing platforms, and riverside parks increase opportunities for the public to safely interact with and enjoy water resources. The Basin Plan could support outdoor recreation facilities by providing guidance on complementary recreation activities with water resource goals during the planning process for the proposed facility. Strategies for reducing or eliminating stressors associated with recreation activities (e.g., fecal coliform) could be developed and implemented.

Strategy 3. RESTORATION ACTIONS

Where complementary to watershed goals, support or prioritize specific restoration actions and inform the expected ecological uplift when implemented. Inform restoration grant proposals with restoration methods best suited for the Cape Fear River Basin.

A. Dam removal-Dam removal for water quality improvement and wildlife habitat benefits. Dam removal returns slow moving or stagnant impoundments to their natural lotic state and diversifies habitat while also providing water quality improvements such as increasing dissolved oxygen and allowing for natural sediment transport. These water quality improvements are beneficial to freshwater species including the Cape Fear Shiner (Notropis mekistocholas) and the Atlantic Pigtoe (Fusconaia masoni. Dam removal restores fish passage for migratory fishsuch as the Cape Fear Shiner and anadromous fish such as the Atlantic Sturgeon (Acipenser oxyrhynchus).

Wider riparian buffer/floodplain conservation-Restore riparian buffer on rivers for benefits to water quality and wildlife. Use riparian buffers to absorb runoff containing pollutants such as fecal coliform and prevent river contamination. Riparian buffers also provide habitat and food sources for wildlife. Conserve floodplains to improve flood resiliency. A conserved floodplain acts as a buffer during high water events, taking the impact of dangerous tides and absorbing excess water.

Stream restoration-Restore streams using nature-based methods for wildlife benefits and flood resiliency. Use methods such as building riffles, runs, and pools in a stream to provide diverse benthic habitat and restore the stream to a more natural state. Add organic material like logs and branches, which can be used for erosion control and habitat. For example, log vanes direct flow away from eroding banks and create pools where aquatic species can live. De-channelize streams to decrease flooding threats by slowing down the flow of water as it moves through the curves of the stream. Add organic material and stones to streams to help slow and divert water flow. For example, branches and rooted live stakes can be anchored around stream curves to slow down the flow of water while simultaneously providing habitat for aquatic life.

Wetland restoration-Reconnect hydrology to areas cut off from water resources. Create buffers for existing wetlands to allow for marsh migration associated with rising sea level and changes in precipitation and river flow. Use/create/restore wetlands when appropriate for reducing bacteria and other contaminants from surface waters. Address invasive species through hydrology and design, when possible.

Loves Creek Watershed Steward

The Loves Creek Watershed Stewards (LCWS) work to restore the ecological function of Loves Creek and provide economic and community health benefits through watershed stewardship. LCWS members include stakeholders from federal, state and local agencies as well as local businesses, local citizens, and non-profit groups. The group meets quarterly to discuss issues in the watershed and proposes ways to address them. Loves Creek Watershed can be a unique amenity for the Town of Siler City. The urban watershed has potential to offer blue and greenway recreational opportunities for all ages. Restored channels may provide aesthetic, sound, environmental and visual interest. The surrounding, formerly industrial sites within the watershed floodplains present the greatest opportunities for redevelopment around a dense and active downtown core. See the Chapter 4 Appendix for more information on the Loves Creek Watershed Stewards organization and watershed projects.

From its source to the Rocky River, Loves Creek is designated as an impaired stream by EPA for aquatic life due to scarcity of aquatic invertebrates such as larvae of mayflies, stoneflies and caddisflies found in the creek. LCWS suspects the primary cause for this impairment is stormwater runoff. Polluted stormwater runoff is the number one threat to water quality in North Carolina today. Most polluted runoff occurs when rain picks up pollutants like sediment, oil, pet waste, litter, soaps, and fertilizers and carries them to nearby streams. Any stormwater captured by storm drains is dumped into the nearest creek without being treated. In addition, high stream flows due to stormwater runoff erode stream channels destroying aquatic life habitat.

Overview of Loves Creek Projects

In 2012, efforts to improve water quality in Loves Creek included installing stormwater Best Management Practices (BMPs) in a "pocket park" in downtown Siler City. North Carolina State University (NCSU) and NC Cooperative Extension were awarded a $30,000 EPA 319 grant to implement a high-profile demonstration stormwater retrofit system installed at the NC Arts Incubator in an effort to reduce runoff and educate residents about water quality and stormwater runoff.

In 2014, the Loves Creek Watershed Stewards (LCWS), a local stakeholder group for the Loves Creek watershed, formed and meets quarterly to discuss ways to improve Loves Creek and its tributaries. Numerous stakeholders including the Town of Siler City, Biocenosis LLC, Piedmont Conservation Council (PCC), Chatham County, Chatham County Soil and Water Conservation District (SWCD), Siler City Economic Development Organization, NCSU, NC Cooperative Extension, Rocky River Heritage Foundation, The Conservation Fund, local businesses, and local landowners support the group.

In 2015, PCC, in cooperation with Biocenosis LLC, Kris Bass Engineering and the Town of Siler City, received a Environmental Enhancement Grant (EEG) of $270,000 through the NC Attorney General office to restore the stream and floodplain of a degraded tributary to Loves Creek within downtown Siler City. The Stream and Floodplain Rehabilitation Project allowed for the purchase of multiple land parcels along Tributary 1, stream channel restoration, floodplain enhancement, invasive plant control, and trash removal. (Need more detailed information about the project here).

The Triangle J Council of Governments (TJCOG) was awarded an $18,000 EPA 205(j) in 2015 planning grant to assist with the integration of water quality protection within the Town of Siler City plans and review existing ordinances.

With a focus on stormwater runoff and control in the urban areas, PCC in cooperation with LCWS, NC State University, Biocenosis LLC, and the Town of Siler City, was awarded an EPA 319 Non-Point Source grant of $150,000 in 2015 to implement Best Management Practices (BMPs) including stormwater wetlands and a buffer along the upper reach of Loves Creek within Boling Lane Park.

Through a $536 CCAP grant awarded by the Chatham County SWCD in 2015, an eroding hillslope that drains to a tributary of Loves Creek within Boling Lane Park was stabilized with vegetation in efforts to prevent sediment runoff into the creek.

Additionally, in 2016, the Chatham County SWCD awarded a $3,618 CCAP grant to the Town of Siler City to establish a buffer along the tributary to Loves Creek within Boling Lane Park. This work was performed concurrently with the 2015 BMP implementation grant awarded to PCC.

In 2017, a Clean Water Management Trust Fund (CWMTF) planning grant was awarded to PCC

to perform a detailed study of potential improvements and/or restoration methodologies to be applied to Piggly Wiggly, Park Shopping Center and Southern States subwatershed of Loves Creek. The Park Shopping Center Stream Restoration Study grant of $101,219 awarded to PCC in cooperation with NC State University, Biocenosis LLC, and the Town of Siler City.

Siler City Stormwater Infrastructure Mapping and Assessment project was funded in 2018 by EPA 205(j) grant to map and assess the Town of Siler City's stormwater infrastructure within the town's contiguous town limits. The project provided the Town of Siler City with much needed detailed documentation on the location and maintenance needs of the stormwater system that are critical for the town to maintain their system and improve water quality. The $20,962.70 grant was awarded to Triangle J Council of Governments in cooperation with Biocenosis LLC and the Town of Siler City.

Following up on the 2017 CWMTF planning grant, PCC was awarded a $221,012.72 EPA 319 grant in 2019 to implement stormwater controls, rain gardens, stream buffers and other BMPs in the Piggly Wiggly/Park Shopping Center subwatershed of Loves Creek. Due to lack of suitable sites in this small subwatershed, the BMP implementation effort was expanded to adjacent subwatersheds.

Triangle Area Water Supply Water Quality Monitoring Project

[Summary of Triangle Area Water Supply Water Quality Monitoring Project (TAWSMP) provided by Emily Barrett of Triangle J Council of Governments for DWR via email (August 2022)].

On August 18, 1988, several local governments in the Triangle J Council of Governments Region, entered into an interlocal agreement to establish the Triangle Area Water Supply Water Quality Monitoring Project (TAWSMP). TAWSMP has been continuously funded through a series of Joint Funding Agreements with the US Geological Survey, and has just begun Phase IX, which will conclude June 30, 2027. TAWSMP exists to measure water quality conditions and long-term trends in water quality.

The primary objectives of the Monitoring Project continue to be to:

1. Supplement existing data on major ions, nutrients, and trace elements to enable determination of long-term water quality trends.
2. Examine the differences in water quality among water supplies within the region, especially differences among smaller upland sources, large multi-purpose reservoirs, and run-of-river supplies.
3. Provide tributary loading data and in-lake data for predictive modeling.
4. Establish a database for constituents of concern in surface waters in the region.
5. Report results of the monitoring program to governmental officials, the scientific community, and the public.

The objectives for Phase IX of the Monitoring Project are to:

1. Characterize and report water quality monitoring results

a. Perform monitoring of major ions, nutrients, suspended sediment, and chlorophyll *a* to document water-quality conditions throughout the study area and to extend the existing database that the USGS can use in the future to evaluate loads and trends.
b. Monitor the occurrence and distribution of additional parameters of concern to local water suppliers, including bromide and 1,4-dioxane at select sites (see Table 1), and per- and polyfluoroalkyl substances (PFAS) at all sites.
c. Summarize project water-quality data collection in annual data release updates comprising all environmental and QA/QC sample results.

2. Characterize regional surface water availability
   a. Provide information on flow conditions in reservoir tributaries by continuing to operate a network of 10 gaging stations for the collection of continuous streamflow data. Note that the USGS operates 2 additional gages at TAWSMP sites; they are funded by the U.S. Army Corps of Engineers rather than TAWSMP partners. All streamflow data will be made publicly available in real time at https://waterdata.usgs.gov/nc/nwis/rt.
3. Develop interpretive science products to disseminate data and scientific findings.
   a. Produce a two-page fact sheet directed towards the public that TAWSMP partners can use to communicate the goals and benefits of the project.
   b. Publish a report summarizing the results from phases VIII and IX contaminant sampling (PFAS, 1,4-dioxane, bromide, and chromium).

Division of Soil and Water Conservation (DSWC) BMPs and Cost Share Funding

Practice Type

- Only the Agriculture Cost Share Program (ACSP) has coded 'practice type' (Agrichemical Pollution Prevention, Erosion and Nutrient Management, Sediment and Nutrient Management, Stream Protection Management, and Waste Management) for the various BMPs supported by program funds. BMPs outside of the ACSP program were assigned a 'practice type' based on their program/funding pool (AgWRAP, CCAP, Disaster).

Waste Management BMPs Note

- Please note that waste management BMPs tend to be larger and more expensive to implement. In the Cape Fear River Basin, animal waste management BMPs are primarily funded by federal funding sources through the United States Department of Agriculture's Natural Resources Conservation Service. The United States Department of Agriculture's Natural Resources Conservation Service annually receives over 5 times the funding for BMP implementation than the state-level Agriculture Cost Share Program receives. It will be necessary to capture NRCS funded practice installations for a more accurate assessment of agricultural BMPs implemented in the basin.

Disaster Funding (Map)

- Local Soil and Water Conservation Districts (SWCDs), the Division of Soil and Water Conservation, the USDA Natural Resources Conservation Service, and other partners routinely assist with response to natural disasters. For the requested data period, 2012 to 2022, most of the disaster practices implemented by SWCDs in the Cape Fear River Basin were in response to the aftermath of Hurricanes Matthew and Florence and supported by disaster response and recovery funds appropriated by the General Assembly. Based on presidential disaster declaration, the following counties in the Cape Fear River Basin were eligible for Hurricane Matthew disaster response and recovery funds: Bladen, Brunswick, Chatham, Columbus, Cumberland, Duplin, Harnett, Hoke, Johnston, Jones, Lee, Moore, New Hanover, Onslow, Pender, Sampson, and Wayne. Based on presidential disaster declaration, the following counties in the Cape Fear River Basin were eligible for Hurricane Florence disaster response and recovery funds: Alamance, Bladen, Brunswick, Chatham, Columbus, Cumberland, Duplin, Durham, Guilford, Harnett, Hoke, Johnston, Jones, Lee, Montgomery, Moore, New Hanover, Onslow, Orange, Pender, Randolph, Sampson, and Wayne. Other disaster practices implemented by SWCDs in the Cape Fear River Basin from 2012 to 2022 were in response to severe droughts.

DSWC Summary Tables for June 1, 2012 – June 30, 2016 and July 1, 2016 – August 30, 2022

Table 1: Total costs paid for Cape Fear River Basin DSWC BMP Implementation June 1, 2012 – June 30, 2012 and July 1, 2016 – August 30, 2022.

June 1, 2012 - June 30, 2016		
Program Practice Type	**Number**	**Cost**
Agrichemical Pollution Prevention	3	$12,174
Erosion and Nutrient Management	383	$1,228,458
Sediment and Nutrient Management	168	$381,815
Stream Protection Management	154	$665,284
Waste Management	36	$479,298
ACSP Total		
AgWRAP	59	$344,600
CCAP	125	$198,244
Disaster	20	$65,786
Grand Total	**744**	**$3,375,659**
July 1, 2016 - August 30, 2022		
Program Practice Type	**Number**	**Cost**
Agrichemical Pollution Prevention	2	$3,907
Erosion and Nutrient Management	482	$1,853,642
Sediment and Nutrient Management	160	$436,669
Stream Protection Management	115	$547,316
Waste Management	35	$554,224
ACSP Total		
AgWRAP	153	$1,325,520
CCAP	31	$134,413
Disaster	530	$3,947,711
Grand Total	**794**	**$8,803,402**

Table 2: Cape Fear River HUC8 DSWC BMP Implementation by Practice Name, June 1, 2012 – June 30, 2012

Best Management Practice Name	Unit	Haw HUC8 03030002	Deep HUC8 03030003	Upper Cape Fear HUC8 03030004	Lower Cape Fear HUC8 03030005	Black HUC8 03030006	Northeast Cape Fear HUC8 03030007	Grand Total
Agrichemical Pollution Prevention (ACSP)								
Precision Agrichemical Application	N		2			1		3
Erosion and Nutrient Management (ACSP)								
Conservation Cover	ACRE	50						50
Cover Crops	ACRE	350		342	158	1,545	1,459	3,854
Critical Area Planting	ACRE	4.54		9.43		1	4.11	19.08
Crop Residue Management	ACRE				250	1,103	2,309	3,662
Cropland Conversion - Grass	ACRE	137	1	388	285	1,259	848	2,918
Cropland Conversion - Trees	ACRE	210		11		8	36	265
Diversion	Linear Ft	85		15,175		1,187	100	16,547
Land Smoothing	ACRE	90		15.66		21		126.66
Long-Term No-till	ACRE	447		30	109	165	150	901
Micro-Irrigation	ACRE	1						1
Pasture Renovation	ACRE		14			11	66	91
Prescribed Grazing	ACRE	453						453
Rooftop Runoff Management System	N		1	1			1	3
Sod-Based Rotation - 4 Year SBR (29 months)	ACRE					10		10
Sod-Based Rotation - 5 Year SBR (41 months)	ACRE	231		84		8		323
Terrace	Linear Ft		8,139	32,925		3,455		44,519

Best Management Practice Name	Unit	Haw HUC8 03030002	Deep HUC8 03030003	Upper Cape Fear HUC8 03030004	Lower Cape Fear HUC8 03030005	Black HUC8 03030006	Northeast Cape Fear HUC8 03030007	Grand Total
Three Year Conservation Tillage for Grain and Cotton	ACRE			296	46	102	390	834
Sediment and Nutrient Management (ACSP)								
Abandoned well closure	N	2						2
Agriculture Pond Sediment Removal	N	3	3	10		3		19
Field Border	ACRE	24.16	1	0.12		5	0.44	30.72
Filter Strip	ACRE						2	2
Grade Stabilization Structure	N					2	1.2	3.2
Grassed Waterway	ACRE	20.5	3.23	19.4		3.3	0.41	46.84
Heavy Use Area Protection	N	41	30	20			1	92
Streambank and Shoreline Protection	Linear Ft		788					788
Water Control Structure	N						6	6
Stream Protection Management (ACSP)								
Livestock Exclusion Fencing	Linear Ft	55,693	28,152	10,761		275		94,881
Stock Trails & Walkways	Linear Ft	63		343				406
Stream Crossing	N	3	3					6
Stream Protection Well	N	14	18	4				36
Watering Tanks (Troughs)	N	69	54	27				150
Waste Management								
Closure - Waste Impoundments	N	2						2
Dry Stack	N	1	2					3

Best Management Practice Name	Unit	Haw HUC8 03030002	Deep HUC8 03030003	Upper Cape Fear HUC8 03030004	Lower Cape Fear HUC8 03030005	Black HUC8 03030006	Northeast Cape Fear HUC8 03030007	Grand Total
Livestock Mortality Management System - Forced Aeration Static Pile Composter	N			1				1
Livestock Mortality Management System - Mortality Incinerator	N		5	1	3	2	1	12
Livestock Mortality Management System - Rotary Drum Composter	N	1						1
Retrofit of On-Going Animal Operations	N				1			1
Waste Application Systems - Mobile Application System	N	3	8	1			2	14
Waste Application Systems - Underground Main and Hydrant System	N					3		3
Total AgWRAP	**N**	**139**	**126**	**65**	**4**	**11**	**12**	**357**
Total AgWRAP	**ACRE**	**2,018**	**19**	**1,196**	**848**	**4,241**	**5,265**	**13,587**
Total AgWRAP	**Linear Ft**	**55,841**	**37,079**	**59,204**	**0**	**4,917**	**100**	**157,141**
AgWRAP								
Agricultural Pond Repair/Retrofit	N		1	1		1		3
Agricultural Pond Sediment Removal	N		2	9		3		14
Agricultural Water Supply/Reuse Pond	N	2	5	1		1	4	13
Micro-Irrigation System	ACRE		1					1
Water Supply Well & Pump	N	4	6	3		8	12	33
CCAP								
Abandoned well closure	N	40	7	4		2	1	54
Backyard rain garden	N	15	2					17

Best Management Practice Name	Unit	Haw HUC8 03030002	Deep HUC8 03030003	Upper Cape Fear HUC8 03030004	Lower Cape Fear HUC8 03030005	Black HUC8 03030006	Northeast Cape Fear HUC8 03030007	Grand Total
Cisterns	N	18			1			19
Critical Area Planting	SqFt	56,852	6,777					63,629
Grassed Swale	SqFt	7,364	10,096					17,460
Impervious surface conversion	SqFt	100	3,600					3,700
Pet waste receptacle	N		8					8
Riparian buffer	SqFt	253	203,425					203,678
Stream Restoration	Linear Ft	78						78
Streambank and Shoreline Protection	Linear Ft	1,337						1,337
Structural Stormwater Conveyance	N	1						1
Disaster								
Agriculture Pond Sediment Removal	N			10		1		11
Stream Protection Well	N		1	1		2		4
Water Supply Well & Pump	N	1				1	3	5
Grand Total	**N**	**220**	**158**	**94**	**5**	**30**	**32**	**539**
Grand Total	**SqFt**	**64,569**	**223,898**	**0**	**0**	**0**	**0**	**288,467**
Grand Total	**ACRE**	**2,018**	**20**	**1,196**	**848**	**4,241**	**5,265**	**13,588**
Grand Total	**Linear Ft**	**57,256**	**37,079**	**59,204**	**0**	**4,917**	**100**	**158,556**

Table 3: Cape Fear River HUC8 DSWC BMP Implementation by Practice Name, July 1, 2016 – August 30, 2022

Best Management Practice Name	Unit	Haw HUC8 03030002	Deep HUC8 03030003	Upper Cape Fear HUC8 03030004	Lower Cape Fear HUC8 03030005	Black HUC8 03030006	Northeast Cape Fear HUC8 03030007	Grand Total
Agrichemical Pollution Prevention (ACSP)								
Precision Agrichemical Application	N			1			1	2
Erosion and Nutrient Management (ACSP)								
Conservation Cover	ACRE					15		15
Cover Crops	ACRE	2,104.00	88.00	1,782.00	560.00	5,464.00	4,559.00	14,557.00
Critical Area Planting	ACRE	9.04	4	2.5	1	0.95	0.75	18.24
Crop Residue Management	ACRE	56				471	647	1174
Cropland Conversion - Grass	ACRE	226	237	935.7	165	940	998.69	3,502.39
Cropland Conversion - Trees	ACRE	116		116	14	46	30	322
Diversion	Linear Ft	404		3,725				4,129
Land Smoothing	ACRE	30.4		2.2				32.6
Long-Term No-till	ACRE	112			142	95	67	416
Nutrient Scavenger Crop	ACRE					148		148
Pasture Renovation	ACRE		8	16		11	59	94
Prescribed Grazing	ACRE	120		201		116	20	457
Rooftop Runoff Management System	N		4	5		4	4	17
Sod-Based Rotation - 3 Year SBR (17 months)	ACRE		54					54
Sod-Based Rotation - 4 Year SBR (29 months)	ACRE			24		11		35
Sod-Based Rotation - 5 Year SBR (41 months)	ACRE	227	36	105.7		168		536.7
Stripcropping	ACRE	17						17

Best Management Practice Name	Unit	Haw HUC8 03030002	Deep HUC8 03030003	Upper Cape Fear HUC8 03030004	Lower Cape Fear HUC8 03030005	Black HUC8 03030006	Northeast Cape Fear HUC8 03030007	Grand Total
Terrace	Linear Ft			7,545				7,545
Sediment and Nutrient Management (ACSP)								
Three Year Conservation Tillage for Grain and Cotton	ACRE					43	77	120
Abandoned well closure	N	3		3				6
Agricultural Road Repair/Stabilization	Linear Ft		1,344	334				1,678
Agriculture Pond Sediment Removal	N	2		2				4
Field Border	ACRE	19.13		10.85		1.3	1	32.28
Grade Stabilization Structure	N		1	2		1	8	12
Grassed Waterway	ACRE	21.06	1	14.39		1.8	1	39.25
Heavy Use Area Protection	N	23	34	10		1	1	69
Nutrient Management	ACRE					239		239
Riparian buffer	ACRE	11						11
Rock-lined Outlet	N	1		1				2
Stream Protection Well	N	1						1
Stream Restoration	Linear Ft	83						83
Streambank and Shoreline Protection	Linear Ft	1,736						1,736
Stream Protection Management (ACSP)								
Water Control Structure - In-Line Structures	N					1		1
Livestock Exclusion Fencing	Linear Ft	28,952	31,360	3,878		650	240	65,080
Stock Trails & Walkways	Linear Ft	2,597	185					2,782
Stream Crossing	N	3	1				1	5

Best Management Practice Name	Unit	Haw HUC8 03030002	Deep HUC8 03030003	Upper Cape Fear HUC8 03030004	Lower Cape Fear HUC8 03030005	Black HUC8 03030006	Northeast Cape Fear HUC8 03030007	Grand Total
Stream Protection Well	N	14	10	1		1	1	27
Waste Management (ACSP)								
Watering Tanks (Troughs)	N	37	37	17		1	5	97
Closure - Waste Impoundments	N	2						2
Dry Stack	N	1	4					5
Lagoon Biosolids Removal Incentive	100 GALLONS					3,654	5,555	9,209
Livestock Mortality Management System - Composter	N	1	1	1				3
Livestock Mortality Management System - Forced Aeration Static Pile Composter	N			1				1
Livestock Mortality Management System - Mortality Incinerator	N	1	2	1		4		8
Waste Application Systems - Mobile Application System	N		6	1				7
Waste Application Systems - Underground Main and Hydrant System	N	1				3.55	1	5.55
Waste Treatment Lagoon	N				1			1
Total AgWRAP	**N**	**90**	**100**	**46**	**1**	**16.55**	**22**	**275.55**
Total AgWRAP	**ACRE**	**3,068.63**	**428.00**	**3,210.34**	**882.00**	**7,771.05**	**6,460.44**	**21,820.46**
Total AgWRAP	**Linear Ft**	**33,772**	**32,889**	**15,482**	**0**	**650**	**240**	**83,033**
Total AgWRAP	**100 GALLONS**	**0**	**0**	**0**	**0**	**3,654**	**5,555**	**9,209**

Best Management Practice Name	Unit	Haw HUC8 03030002	Deep HUC8 03030003	Upper Cape Fear HUC8 03030004	Lower Cape Fear HUC8 03030005	Black HUC8 03030006	Northeast Cape Fear HUC8 03030007	Grand Total
AgWRAP								
Agricultural Pond Repair/Retrofit	N	2		5		2	1	10
Agricultural Pond Sediment Removal	N	2	1	12	1	3	3	22
Agricultural Water Collection System	N	1						1
Agricultural Water Supply/Reuse Pond	N		5	1		5	2	13
Conservation Irrigation Conversion	ACRE	57						57
Micro-Irrigation System	ACRE	1		9				10
CCAP								
Water Supply Well & Pump	N	21	8	10	9	21	36	105
Abandoned well closure	N	4	5	4		1		14
Cisterns	N	1	1					2
Critical Area Planting	SqFt	12,032	100					12,132
Impervious surface conversion	SqFt	1,667						1,667
Permeable pavement	SqFt	14,000						14,000
Pet waste receptacle	N	4	3					7
Riparian buffer	SqFt	12,428	39,563					51,991
Disaster								
Streambank and Shoreline Protection	Linear Ft	435					90	525
Agricultural Pond Repair/Retrofit	N						1	1
Agricultural Water Supply/Reuse Pond	N		1	1			1	3
Critical Area Planting	ACRE				2.2	0.39		2.59

Best Management Practice Name	Unit	Haw HUC8 03030002	Deep HUC8 03030003	Upper Cape Fear HUC8 03030004	Lower Cape Fear HUC8 03030005	Black HUC8 03030006	Northeast Cape Fear HUC8 03030007	Grand Total
Disaster (75/90%) Agricultural Pond Repair/Retrofit	JOB			2	0.5	1	3	6.5
Disaster Agricultural Pond Repair/Retrofit	JOB					1		1
Disaster Emergency (40%) Agricultural Pond Repair/Retrofit	JOB			2			5	7
Disaster Emergency Agricultural Pond Repair/Retrofit	JOB	1				1	1	3
Disaster Emergency Auxiliary Spillway Repair/Retrofit	JOB						1	1
Disaster Lagoon Management Incentive	GALLONS	4,403,200	4,088,800		2,937,300	35,309,713	34,768,458	81,507,471
Disaster Pasture/Hayland Renovation	ACRE	483	531	90	82	118	1,506.00	2,810.00
Disaster Response Repair	JOB					1	1	2
Disaster Winter Forage Crop	ACRE		654	491	117	92	3,026.00	4,380.00
Drought Pasture Renovation	ACRE	105				7		112
Emergency Access Restoration	N	1		44	4	37	176	262
Non-Field Farm Road Repair	N	1	6	24	31	44	21	127
Pasture Renovation	ACRE		49				24	73
Grand Total	**N**	**127**	**130**	**147**	**46**	**129.55**	**263**	**842.55**
Grand Total	**SqFt**	**40,127**	**39,663**	**0**	**0**	**0**	**0**	**79,790**
Grand Total	**ACRE**	**3,714.63**	**1,662.00**	**3,800.34**	**1,083.20**	**7,988.44**	**11,016.44**	**29,265.05**
Grand Total	**Linear Ft**	**34,207**	**32,889**	**15,482**	**0**	**650**	**330**	**83,558**
Grand Total	**Job**	**1**	**0**	**4**	**0.5**	**4**	**11**	**20.5**

Best Management Practice Name	Unit	Haw HUC8 03030002	Deep HUC8 03030003	Upper Cape Fear HUC8 03030004	Lower Cape Fear HUC8 03030005	Black HUC8 03030006	Northeast Cape Fear HUC8 03030007	Grand Total
Grand Total	GALLONS	4,403,200	4,088,800	0	2,937,300	35,309,713	34,768,458	81,507,471
Grand Total	100 GALLONS	0	0	0	0	3,654	5,555	9,209

Survey for the Cape Fear River Basinwide Water Resources Management Plan (Basin Plan)

To better represent all the communities that live, work, and depend on the Cape Fear River and its tributaries for drinking, recreation, connection to nature, and way of life, the NC Department of Environmental Quality (DEQ) Division of Water Resources (DWR) and the Cape Fear River Assembly (CFRA) launched an effort to capture various and diverse voices throughout the basin. Working collaboratively, DWR basin planners and CFRA complied a survey that covered many topics with the hope of identifying issues, concerns, connections, opportunities, and priorities in the basin. A co-created framework was circulated throughout the basin to many individuals, organizations, utilities, companies, committees, and local governments. The survey was a new approach to engage stakeholders during plan development. It captured concerns and interests in the basin, it identified where more education and outreach is needed, and it captured input from some underserved communities and residents in the region. DWR and CFRA received 230 responses to the survey, an unprecedented response in terms of stakeholder engagement and the basin planning process. All responses were optional and participating was voluntary. This document is meant to share some of the results of the survey and includes lessons learned along the way.

Survey Results

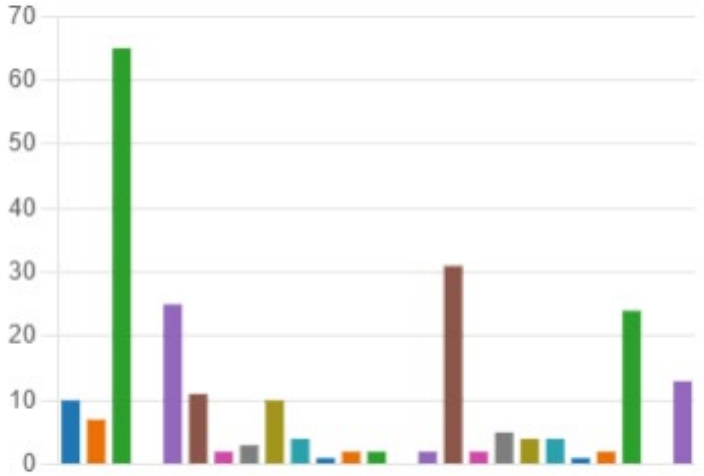
The joint survey for the Cape Fear River Basin plan was sent to community leaders, state and local governments, small business owners who make their living off of the river, and several watershed groups throughout the basin. DWR worked with CFRA to identify community leaders in areas of the basin that are typically underserved or may not be aware of DWR's basin planning initiatives and plan development. A total of 17 questions were in the survey. It was divided into two sections. The first section consisted of eight questions. Many were multiple choice and included a question asking where the participant lived in the basin. The second section asked participants to rank concerns and challenges. It also allowed participants to write-in their own concerns and thoughts on how to address water resource concerns in the basin. Below are the questions and the results of the survey. Participants were advised that not all topics would be addressed in the basin plan but that responses would be used to help guide where additional information, education and resources are needed in the basin for both DWR and CFRA.

Section 1

Question 1: What county do you reside in?

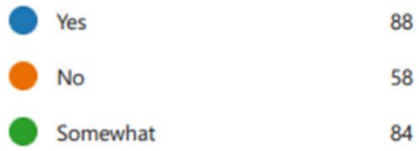
Top 4 include: Brunswick (65); New Hannover (31); Chatham (25); Wake (24) [63% of the total]

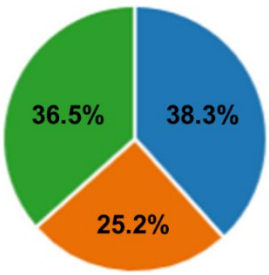
Alamance	10
Bladen	7
Brunswick	65
Caswell	0
Chatham	25
Cumberland	11
Duplin	2
Durham	3
Guilford	10
Harnett	4
Hoke	1
Johnston	2
Lee	2
Montgomery	0
Moore	2
New Hanover	31
Onslow	2
Orange	5
Pender	4
Randolph	4
Rockingham	1
Sampson	2
Wake	24
Wayne	0
Other	13



Question 2: Are you familiar with river basin plans?

230 responses, approximately 75% familiar or somewhat familiar with the basin plans.





Question 3: How do you use the river basin plans? (153 responses)

Response topics included:

- General basin water quality information
- General basin watershed characteristics
- General water use and availability in the basin
- Information about water resource management
- Decision making tool
- Guidance for implementation
- Planning purposes
- Understanding pollution sources and potential solutions
- Academic purposes; classroom resource
- Reference materials for grant applications; justification for cost share program funds
- Prioritization of conservation work
- Prioritization for monitoring and special studies
- Guides location for recreational uses
- For information about stream classifications
- What to expect during the next NPDES permit renewal process

Other responses:

- If the Hardison Amendments were repealed, we could use basin plans for regional climate resilience planning.
- Monitoring only for common contaminants/pollutants so lack of trust that testing is accurate or as in depth as needed to ensure complete understanding of quality and safety.
- Used OASIS model to evaluate the impacts of water supply withdrawals on downstream users.

Question 4: In your opinion, how do you feel that waters in the Cape Fear River basin are being protected on a scale from 1 to 5, with 5 being very protective and 1 being not protective at all? (230 responses)

Average Value = 2.47

Question 5: Which water related topics would you like to learn more about in regards to the Cape Fear River basin? (Pick your top three).

	Response	Number of Responses
1	Sources of potential pollution to the river basin	168
2	The health of rivers and streams in the river basin	143
3	Policies regarding the river basin	83
4	Common contaminants	82
5	Water supply	75
6	Impacts from stormwater	65
7	Conservation groups and restoration efforts in the basin	45
8	Wildlife in the basin	43
9	Recreational opportunities	23
10	Educational opportunities	18
11	Volunteer opportunities	12
12	Learning water quality vocational skills	8
13	Other	13

Other topics included:

- Interbasin transfers (IBTs)
- PFAS related contaminants
- Fisheries management
- Climate change and impact on water quality and supply
- Oversight and enforcement of protective measures
- Invasive species (Hydrilla specifically) basin and mitigation measures taken (to eradicate them)

Question 6: Are you affiliated with a group or community member who works to protect our natural resources?

Question 7: If yes, what group(s) are you involved with? (135 responses)

Responses categories included:

- State and federal resource agencies
- Environmental advocacy groups
- Educational institutions
- Local municipalities
- Regional water and sewer authorities; public utilities
- Water supply organizations
- Farmers
- County Soil & Water Conservation Districts (SWCD)
- Industry and industry environmental compliance officers
- NPDES coalition members
- Council of Governments
- Duke Energy
- Fisherman/boat captains
- Highway construction contractor
- Local/CFR basin Indian tribes
- Environmental justice organizations

Question 8: Have you or someone you know completed a project or community effort to improve water quality or quantity? Please provide a few details on the type of project, the successes, obstacles, and lessons learned from the project or effort. (136 responses)

Projects Include:

- Stream, wetlands, buffer and living shoreline restoration
- Land acquisition, conservation, and preservation
- Installation of best management practices (BMPs) for agriculture, stormwater, etc.
- Watershed restoration plan development and implementation
- Municipal pretreatment and collection system programs
- Wastewater treatment plant improvement projects
- Invasive species removal (instream and riparian zones)
- Oyster reef construction
- Industrial remediation
- Monitoring: instream, habitat, source identification, BMPs, etc.
- Environmental research
- Sustainable rivers project (USACE/TNC)
- Removal of lock & dams; dam fish passage projects
- Debris removal projects
- Environmental education

Obstacles Identified:

- Land acquisition process is lengthy and arduous
- DWR aquatic weed program is underfunded, understaffed and has insufficient legal mandates
- Long term survival of oyster recruitment for restoration of oyster reed
- Invasive species control (such as kudzu)
- Getting municipal parks staff to understand the value of natural buffers for flood storage, nutrient uptake, habitat, and stream shading. Cannot mow down to the stream on restoration sites.
- Lack of funding for agricultural BMPs

Lessons learned:

- Be patient and persistent when pursuing grant funds
- Partnerships with other conservation entities is critical to success
- Set short term goals that are obtainable, so results from your efforts can be seen while working to resolve the long-term goals
- Impacts from hurricanes can be reduced when stream debris is not an issue
- Agricultural workshops show the community the positive impacts BMPs have on the environment
- Farms typically under fertilize crops due to high fertilizer costs

Section 2

Question 9: At DEQ, we understand the complex and changing issues surrounding emerging compounds (i.e., GenX, PFAS, 1,4-dioxane) are a major concern to many people living and working in the basin. DWR will include relevant weblinks in the upcoming basin plan, including DEQ's Emerging Compounds website. Besides emerging compounds, which of the following subjects are you most concerned about in regard to water quality in the Cape Fear River basin? (Select you top three to five answers)

	Response	Number of Responses
1	Urban development and stormwater	133
2	Drinking water treatment	102
3	Aquatic habitat	95
4	Wastewater infrastructure	95
5	Declining fisheries/shellfish	81
6	Animal agriculture	65
7	Algal blooms	60
8	Flooding	56
9	Bacteria	53
10	Groundwater resources	49
11	Recreational use (swimming, wading, fishing)	48

	Response	Number of Responses
12	Nutrient enrichment	47
13	Drought	35
14	Sea level rise	35
15	Sustenance (relying on the river as a primary food source)	24
16	Row crop agriculture	16
17	Other	15

Other topics included:

- Frailty of the NPDES permit program
- Fish passage
- Pollutants and emerging contaminants
- Lack of enforcement of the Clean Water Act (CWA)
- Need for data driven policies
- Interbasin transfers
- Policies related to water treatment
- Habitat protection and endangered species impacts
- Clarity changes in White Lake

Question 10: Of the examples listed below, which do you view as the top three biggest challenges regarding water quality in the Cape Fear River basin?

	Response	Number of Responses
1	Development pressures	138
2	Current management strategies & protections	131
3	Lack of prioritization at the state or federal political level	123
4	Lack of oversight (i.e., inspections, reporting, etc.)	118
5	Lack of education and outreach (community engagement)	47
6	Not enough stream monitoring data available	39
7	Communities not connected to the river because of limited or no access	30
8	Too much water being withdrawn or used on a daily basis	17
9	Other	23

Other topics included:

- Industrial monitoring needs
- The affordability of treating forever chemicals
- Not enough resources to adequately implement existing programs intended to protect water resources
- Lack of buffers to protect against flooding and runoff issues
- Outdated regulatory standards

- DEQ understaffed
- Not enough prosecutions of known polluters
- Agricultural pressures, impacts and lack of political will to address agriculture
- Policies are not data-driven/cost-effective
- Removal of dams

Question 11: In your opinion, what are three ways the challenges you identified in question 9 can be addressed?

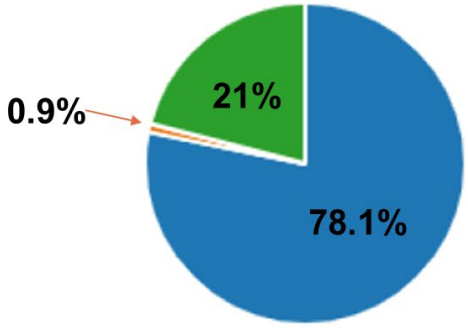
	Response	Number of Responses
1	State elected officials prioritizing water protection	132
2	Increased oversight (i.e., inspections, reporting, etc.) of existing rules and regulations	121
3	Increased funding and monitoring for data collection, data monitoring, technical assistance, and planning	85
4	Improving management measures	78
5	Provide technical and financial assistance to develop watershed action plans and/or implement best management practices (BMPs)	78
6	Increased education and outreach about our water resources (in school, for elected officials, etc.)	65
7	Diversifying the people, organizations, and decision-making bodies to include representation of the communities the basin encompasses	46
8	Building communication efforts across the basin	24
9	Creating online tools and surveys to help identify areas of concern and track implementation efforts	15
10	Opening up more access and opportunities for indigenous communities to participate in decision making and water management	15
11	Other	18

Other topics included:

- Improving development regulations; limit development; reduce urban sprawl; equal representation across decision-making boards
- Basinwide buffer requirement; 150-foot riparian buffers
- Chemours needs to be closed; penalties for violators
- Increased knowledge and regulation of industrial waste
- State funding for collection and wastewater improvements
- Support working lands initiatives
- Testing wells for saltwater intrusion
- DEQ revamped/improved

Question 12: A riparian buffer is an area adjacent to a stream, lake or wetlands that contains a combination of trees shrubs and/or other perennial plants. Riparian buffers are often managed differently from the surrounding landscape and play a key role in protecting our water resources. Would you support basinwide riparian buffers? (229 responses)

Yes	179
No	2
Maybe	48



Question 13: What information do you want the DWR river basin planner to know and/or consider while developing the river basin plan? (137 responses)

General Topics	Information to know or consider while developing the plan
Water Quality (WQ)	Biological, instream and stream flow data; use outside data; advocate for more monitoring; education of elected officials; atmospheric deposition; fish consumption; stormwater management
Water Supply	Upstream impacts; supply WQ; IBTs; increasing demand and quantity; drought; saltwater intrusion; groundwater quality and quantity concerns; treatment costs
Development Concerns	Growth and development projections; nature-based solutions; tree protections; buffers needed; land use changes documented
Pollutants/Emerging Contaminants (EC)	Need for monitoring; stronger and enforceable regulations; hold upstream sources accountable; improved response times; violations reported; use best available technologies to limit pollutants; health Issues; atmospheric deposition; identify watersheds of concern; source identification; sources/industry pays for cleanup and treatment costs; groundwater contamination
Climate Impacts	Climate projections; flooding; nature-based solutions; drought
Agriculture/Industrial	Point and nonpoint sources of pollution; bacteria; nutrients; watershed poultry and swine concentrated animal feeding operations (CAFO) and animal numbers and nutrient loadings; conservation easements
Buffers	Include recommendation for riparian buffers; invasive species removal; tree protection ordinances; conservation easements
Wastewater	Point sources - nutrients; contaminants; violation; enforcement actions; use best available technologies throughout the basin;

General Topics	Information to know or consider while developing the plan
	contaminants in land applied sludge; strengthen pre-treatment programs/rules; infrastructure concerns/upgrades
Management Measures	Need for stronger protective measures; enforcement of existing measures; include recommendations for stronger watershed protective measures; collaborate with all users during development of protective measures; education of elected officials; regulations based on science; work with JLOW (Jordan Lake One Water); stormwater management/measures
Watershed Stakeholders	Promote local watershed actions and restoration efforts; education of the public and elected officials; increase/improve public river access; inclusion; coordination amongst NGOs
Wildlife	Sustainable fish and shellfish resource protection; wildlife corridors; prioritize resource
Technology	Include GIS and mapping tools; remote sensing

In addition to the concerns listed above, public health and drinking water were recurring topics. Through these comments, it was apparent how important it is that the population living and working in the basin understand the value of the water. Another recurring topic was that of community engagement and the need for more education. Many organizations working on these issues also expressed an interest in finding points of connectivity. This included recognizing Indigenous Communities, their roles in stewardship and the need to further include these communities in decision making, planning and implementation. North Carolina is home to more Indigenous People than anywhere east of the Mississippi River. North Carolina has eight state recognized Tribes and two federally recognized Tribes. Increased partnership, self-determination and leadership around land, water and environmental issues is needed.

Other thoughts outside of the general topics above included:

- Water is life
- Without healthy rivers and clean/adequate water resources, opportunities for equitable economic development are compromised
- Address issues in a non-political way, based on science
- Convince our legislators to provide funds necessary to carry-out the plans made to preserve clean rivers. The plan won't do any good unless it is implemented, and this will take money.

Question 14: What two to three topics would you like to see addressed in the basin plan? (154 responses)

The main theme of the responses could be characterized as the need for better watershed protection measures through improved regulations and enforcement for a full range of concerns including new development, stormwater, agriculture and permitting and eliminating contaminants that may be impacting human health and the aquatic ecosystems as a whole. Responses also focused on community education and outreach as well as protective and restorative measures.

General Topics	Specific topics to address in the basin plan
Water Quality (WQ)	Current conditions; trends; monitoring; recommendations; priorities; protections; aquatic habitat; algal blooms; BMP implementation
Water Supply	Quantity; quality; IBTs; treatments; upstream impacts; modeling update
Development Concerns	Stormwater; anticipated growth; limiting urban sprawl; water quality impacts; sediment/erosion control; land use changes; tree protections; buffers
Pollutants/Emerging Contaminants (EC)	Permitting/oversight; source identification; monitoring; mitigation/elimination
Climate Impacts	Understanding long term impacts; flooding; drought; sea level rise; invasive species
Agriculture/Industrial	Water quality impacts; monitoring; improve technology; CAFO concerns; increased funding for BMPs; enforcement; permitting
Buffers	Basinwide riparian protections; wildlife corridors; water quality protection
Wastewater	Nutrients; improve technology and infrastructure; eliminate emerging contaminants; enforcement; monitoring
Management Measures	Address point and nonpoint sources of pollution; development; permitting; agriculture; oversight and compliance; working land preservation/protection; open space; tree protections
Watershed Stakeholders	Education and outreach; improve/increase recreational opportunities and access points; transparency; inclusion
Wildlife	Fisheries and habitat protection; fish passage; wildlife corridors

Question 15: How do you receive or how would you like to receive information regarding water quality or quantity issues in the Cape Fear River basin? (165 responses)

Responses included:

- Email and listservs
- Social media
- Internet
- News media (TV and radio)
- Conservation group newsletters and emails
- Conferences

Question 16: Additional comments (47 responses)

Responses included:

- New development concerns throughout the basin. Build with resiliency in mind, encourage the use of green growth/technologies and reduce impervious surfaces.
- Appreciation for the basin plan and the opportunity to participate in the survey
- Request for more frequent basin plans
- Keep the public informed about issues affecting the river
- Ensure polluters are required to eliminate their discharge and "clean up their mess"
- Prevent pollution by using better wastewater treatment techniques and BMPs to control nonpoint sources of pollution
- Implement the basin plan once complete
- Management decisions need to be scientifically based (less politically driven)
- Concerns for drinking water quality
- Hold polluters accountable and stop allowing discharge of pollutants into the Cape Fear River
- Water quality is very important and there must be more attention from our elected officials
- Work with stakeholders and experts on nutrient strategies developed in the basin plan
- DEQ needs more staff dedicated to basin planning in order to do a thorough comprehensive plan

Question 17: Please leave your email if you would like to receive follow-up information. (Optional) (95 responses)

Survey Outreach

The Cape Fear River Assembly (CFRA) worked with DWR's Basin Planning Branch (BPB) to identify how best to share information about the survey. CFRA developed a community framework, or guide, for the survey. It was distributed to stakeholders in the basin including members of the monitoring coalitions, local municipalities, individuals and groups who rely on the river for their livelihood or sustenance, and members of underserved communities. The framework was a short seven-page document highlighting what information is included in the basin plan, the purpose or goals of the basin plan, stakeholders in the basin, and how to participate. BPB developed a factsheet that was also distributed among stakeholders, outfitters who rely on the river for their livelihood, and listservs.

Both documents noted that the basin plan provides guidance and can be used to support decisions as they relate to protecting our water resources on a local and regional scale, educate communities about the need for nutrient management, water resource planning, BMP implementation, and water supply and demand. CFRA and BPB also noted that the basin plan won't address all the concerns or topics identified in the survey nor will it generate or create new rules or regulations. The framework and the factsheet are included at the end of this document.

Overview of Survey Results

Based on survey results, several concerns/topics identified by participants were included in the basin plan. These include changes in water quality and land use, stormwater, permitting/oversight, point and nonpoint sources of pollution, the need for basinwide riparian buffers and voluntary BMPs to reduce pollutants from entering waterbodies, agriculture, and the need to continue or increase funding for BMPs, education, as well as water and wastewater infrastructure.

Topics identified that were not included in the basin plan include improving or increasing recreational opportunities, anticipated growth and urban sprawl, invasive species, and tree protections. CFRA compiled resources to share with participants who brought these concerns up in the survey. CFRA was also working to connect with organizations who may have information around these topics. The resources will vary based on what's available, ongoing updates, organizations working in these areas and other factors. It is important that everyone who voiced a concern or expressed interest in the basin plan be heard. Every single answer on the survey was read, recorded and presented in the information included in this summary. We hope to continue this process and allow for more information sharing, resources, water quality updates and community inclusion as time, priorities and resources allow.

Lessons Learned & Next Steps

CFRA and DWR are continually trying to build relationships with stakeholders in the basin. CFRA can play an important role in helping basin planners build relationships or right relations with the public but especially Indigenous communities. The process requires a deep commitment to respect, trust, transparency and active engagement. CFRA believes that building relationships, especially through authentic connection and consistency, was a challenge during plan development due to timelines, and in some cases, no knowledge of basin planning, state processes, and water resources protection. Right relationships require dedication, the ability to have face-to-face conversations, and includes time dedicated to follow up and solutions. Currently, there is no designated funding or personnel to engage in relationship building in a way that is meaningful and long lasting. True engagement would require educating people on the process of river basin planning and why it is important. Many of the communities living in the basin are working full-time, are not aware of their dependence on the river for daily needs and have lost connection to the river. The day-to-day challenges in life often put other priorities at the top of the list.

The next time a community framework is built, CFRA encourages using a diverse group of citizens helping to draft the language included in the framework to ensure it is meeting communities where they are in their understanding of the role the river plays in their lives. Additionally, translating the survey into Spanish to include the Latinx population is vital for equal representation. The Cape Fear River Basin has been stewarded and cared for by several state recognized American Indian Tribes. These Tribal Communities hold Indigenous Ecological Knowledge and histories with the river that must be honored and appreciated, as well as incorporated into all processes that occur in these areas.

Many of the organizations that participated have some stake in how the river is managed, both from a qualitative and quantitative perspective. Some of these stakeholders are used to receiving preferential treatment, have the capacity to participate in basinwide committees and coalitions, and receive compensation to do so as a part of their job. Committing to inclusion means that the state, as well as long

standing partners, need to make space for inclusivity and be willing to engage in a process that is more in alignment with all voices and needs throughout the basin.

Authentic connection and more access to the river in addition to education and outreach efforts are needed to cultivate awareness of the issues and opportunities in these communities. The communities need safe spaces to tell their stories, ask their questions, and platforms to understand the obstacles and challenges the Cape Fear River faces on an ongoing basis. This type of work is place-based, and the Cape Fear River Basin is vast. What happens upstream affects the people downstream. The decisions made in one area on the river have consequences in all areas on the river.

CFRA and basin planners have learned a lot in this process and are committed to providing information, resources and connections to those who have participated in the survey or showed an interest in participating in the survey. This is a first step toward opening up a larger conversation about what is needed in the basin. We are grateful to those who participated and are hopeful that more inclusive efforts will become the rule instead of the exception.

Cape Fear River Basin

Profile:

River Basin Size:
9,164 mi^2

Total miles of stream and rivers:
6,584

Total miles of impaired stream by selected parameters:
Chlorophyll-a: 50
Turbidity: 31
Fecal Coliform: 64

Total acres of lakes:
34,796

Total acres of estuary:
24,472

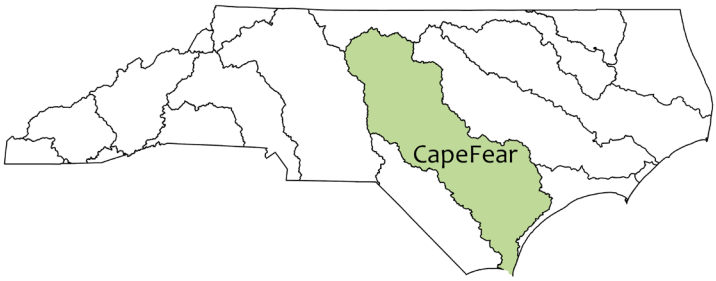
Total acres of impaired lake/estuary by selected parameters:
Chlorophyll-a: 9,553
Turbidity: 2,252
Fecal Coliform: 2,104

2022 IR

The **Cape Fear River Basin** is the largest river basin in North Carolina draining the central Piedmont, Sandhills, and Coastal plain regions. The river basin includes the Haw, Deep, Black, Cape Fear, and Northeast Cape Fear rivers. Collectively, these rivers create a network of connected waterways flowing to the Atlantic Ocean.

Currently, North Carolina's Division of Water Resources (DWR) is preparing the draft Cape Fear River Basin Water Resources Management Plan focusing on the quality and quantity of these waterways. This plan takes a watershed-based approach to restoring and protecting the quality of North Carolina's waterways.

Protecting these waterways requires coordinations between many agencies, local governments, and stakeholders in the watershed. We need you to get involved with the State's basin planning efforts to help identify areas of concern, bring awareness to problems your community faces, and collaboratively work to help mitigate stressors to water quality and quantity. Keep reading to learn more about water pollution sources and how you can get involved in the State's planning efforts.



Cape Fear River Basin in NC

Point and Non-point Source Pollution

Water quality problems can be caused by point and non-point sources of pollution. Point source pollutants are primarily associated with wastewater and stormwater discharges from municipal and industrial wastewater treatment facilities. To ensure that point source pollution does not negatively impact water quality or human health, wastewater and stormwater point source pollutants are regulated. Non-point source pollution (NPS) originates from multiples sources, some examples include construction, agriculture, and land clearing activities. People can contribute to NPS everyday through the use of lawn chemicals, oil or fuel vehicle leaks, and even failure to clean up pet waste.

Nutrients/Chlorophyll-a

Nutrients (nitrogen and phosphorus) are essential for plant growth and survival. Nutrients in waterways can come from both point and non-point sources, such as agricultural and urban runoff, wastewater treatment plants, forestry activities and atmospheric deposition. Chlorophyll-a, a constituent of algae, is used as an indicator of algal growth/productivity. When high concentration of nutrients are available in a stream, river or estuary, excessive algal growth known as algal blooms can occur. Certain species can produce toxins and create harmful algal blooms, leading to negative water quality impacts such as low dissolved oxygen and fish kills. To prevent algal bloom, there is a need to reduce nutrients by implementing source-specific best management practices (BMPs) such as repairing failing septic systems, reducing fertilizer runoff, and protecting streamside buffers to help reduce nutrient runoff.

Turbidity

Turbidity is a measure of water clarity. Any land-disturbing activities that mobilize or produce particulate matter will reduce light penetration, ecological health and productivity, recreational value, habitat quality, and can even reduce drinking water reservoir capacity. High turbidity can promote pathogen growth and lead to waterborne disease outbreaks. Preventing erosion, expanding riparian buffers, and installing source-specific BMPs can help maintain good water clarity.


Cape Fear River

Pathogens

Some pathogens that make their way into waterways include fecal coliform, which lives in the digestive tract of warm-blooded animals (humans as well as other mammals) and are excreted in their waste. Exposure to water contaminated with feces poses health risks. Sources of fecal coliform in surface water are urban stormwater, pets, wildlife, improperly managed animal waste facilities, or improperly treated discharges of domestic wastewater. While rainfall can wash pathogens from the land surface into waterways, persistent releases of untreated human or animal waste into waterways should be avoided. This can be achieved by implementing source-specific BMPs, improving animal waste management systems, and repairing failing septic systems to prevent pathogens from impacting downstream waterways.

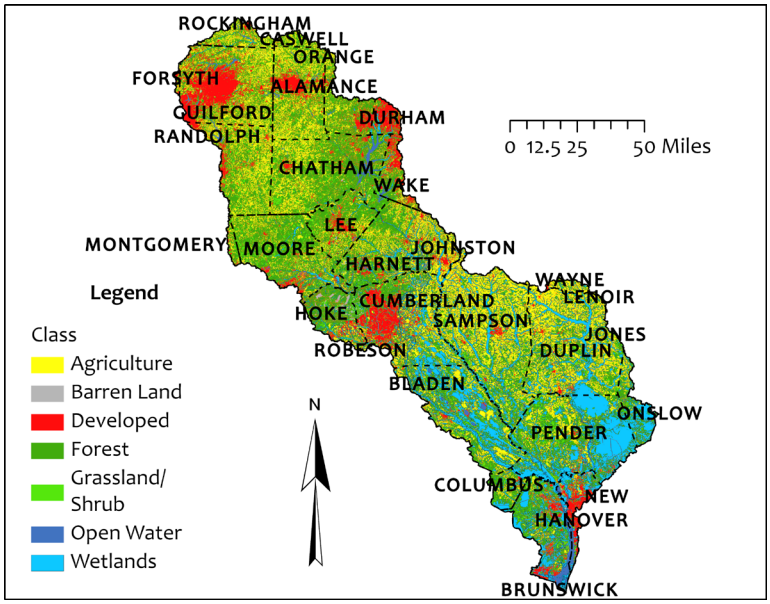
Cape Fear River Basin

Get Involved

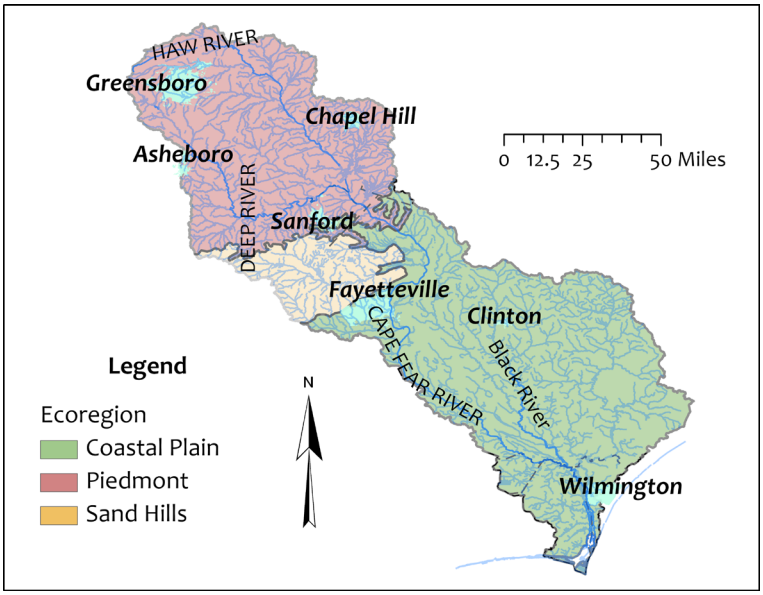
The Cape Fear River Basin offers many opportunities to enjoy and explore nature through walking, hiking, biking, and paddling. Many sites include views of streams, rivers, creeks, lakes and wetlands. There are numerous recreational opportunities that encourage appreciation and support of our natural resources.

As population and industry in the watershed continue to increase, conservation groups, municipalities and other stakeholders are collaborating to manage growth, monitor water quality, restore wetlands and protect the other valuable resources of the Cape Fear River basin. There are many opportunities for people to get involved with grassroots efforts to protect community creeks, streams, and rivers. Individuals can help by reducing the use of fertilizers, pesticides and other chemicals, and controlling erosion on their properties.

Land use (2019)



Regions and Waters



Resources

Financial resources for North Carolina water improvement projects are available through federal, state, and private sources through grants, cost shares, and loans. DWR maintains a Funding Source Website with many of these available sources that can be navigated to using: **https://deq.nc.gov/about/divisions/water-resources**.

DWR creates many programs, events, and other resources to connect and engage communities with their local water resources. Some of which include Stream Watch, Our Water, and Project WET. If you're interested in learning how you can utilize these water education resources into your own programs, please email **lauren.daniel@ncdenr.gov.**

We Need Your Help

In partnership with the Cape Fear River Assembly (CFRA), DWR's Basin Planning Branch (BPB) developed a survey to connect with stakeholders and address their concerns. The answers we collect will help guide DWR's and CFRA's efforts in understanding the issues facing the Cape Fear River Basin. We encourage you to speak out about water quality issues in your area, please participate in our survey by following this link, https://forms.office.com/g/3L8mK44Pjk. The following link will take you to the framework for the survey, detailing the survey's purpose and DEQ's mission: https://qrcgcustomers.s3-eu-west-1.amazonaws.com/account19862747/29091426_1.pdf?0.0103551561192754.

Visit, https://deq.nc.gov/about/divisions/water-resources/water-planning/basin-planning-branch, for more information about river basin planning. With this link, you can also navigate to additional grant programs, interactive maps, and educational resources. To receive basin planning updates and news about the Cape Fear River Basin, you can join the mailing list also linked on this page. If you have any questions or comments please contact our main point of contact for the Cape Fear River basin, Nora Deamer (nora.deamer@ncdenr.gov).

2022 CAPE FEAR RIVER BASIN PLAN

In Partnership with:

DEQ - Division of Water Resources

& Cape Fear River Assembly

Photo Credit: Nancy Hulbert

CFRA Cape Fear River Assembly

DEQ NORTH CAROLINA Department of Environmental Quality

OVERVIEW OF THE PLAN AND PROCESS

Photo Credit: Liah McPherson

Timeframe

CFRB Plan -and Process Development
Q2 2022

Attend Community Meetings
June - September 2022

Gather All Public Comment
Complete by October 1, 2022

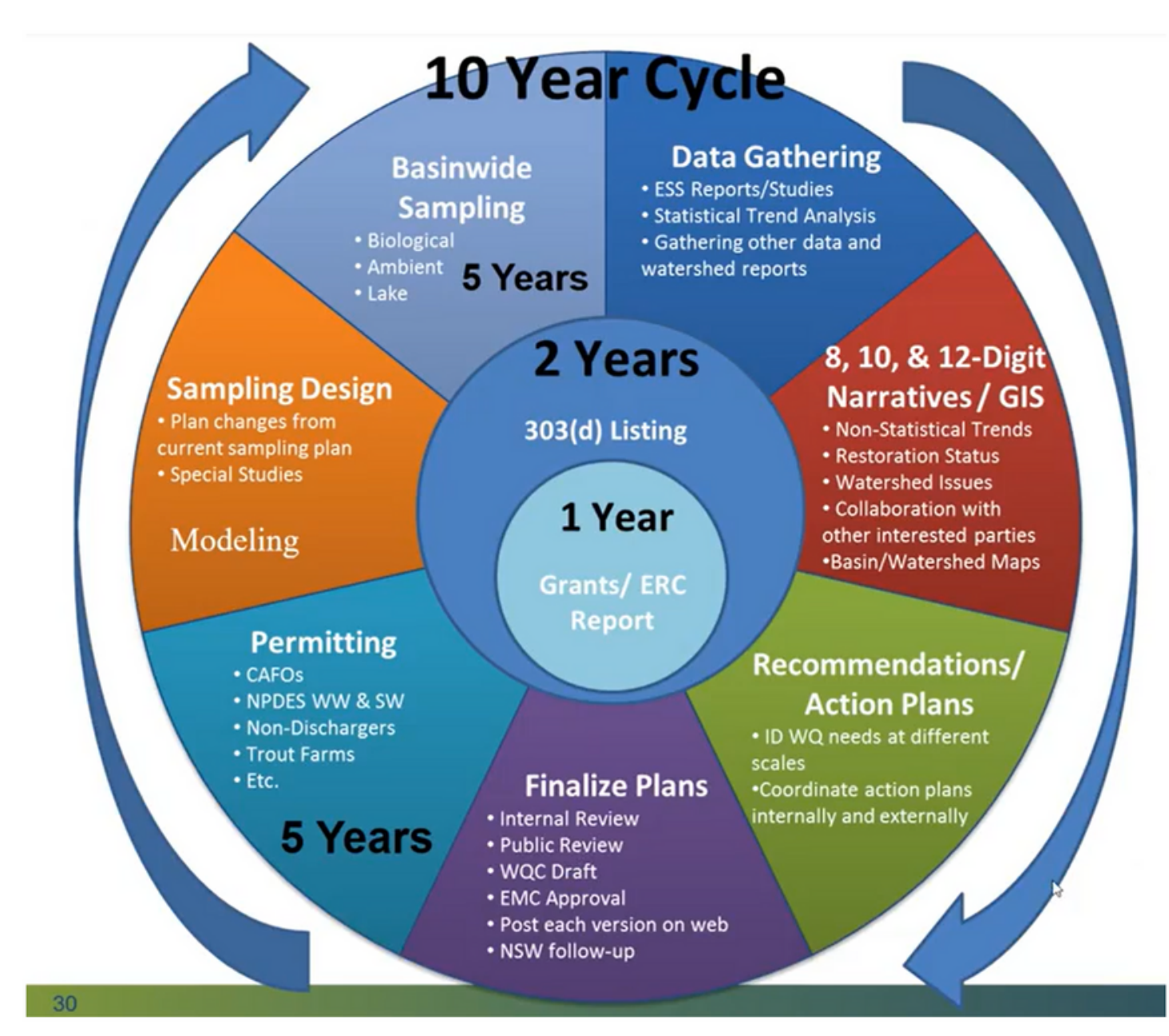
Submit Basin Plan to the EMC
end of December 2022
*Environmental Management Commission

Goals

- Develop a plan that is relevant, informative and can be adapted as needed
- Include the input of community members, stakeholders, and organizations currently working and living on the river
- Expand our reach to all populations and listen to voices of underrepresented communities, communities of Color and Indigenous Communities
- Identify priority issues from all the input and information gathered

RIVER PLANNING CYCLE

Note: It has been almost 20 years since the last plan



Why is this important?

- Provides a benchmark for where we have been, where we are and where we are going
- Uses scientifically based water quality and water quantity analysis for planning purposes
- Identifies areas where additional monitoring is needed to address impacts or impairments
- Provides guidance to support decisions about water resources management
- Serves as an educational tool for community members, stakeholders, decision makers and organizations focused on water resource management

WHAT'S INCLUDED IN THE PLAN?

Basin plans provide guidance to support decisions for:

- Permitting strategies
- Nutrient management strategies
- Watershed resource planning and implementation of Best Management Practices
- Water supply and demand decisions

WHAT'S NOT INCLUDED IN THE PLAN?

- Not a rule/regulation, basin plans are for planning purposes only
- Information on pollution sources across the basin - point and nonpoint sources
- Water quality analysis on all waterbodies
- In-depth evaluation of emerging compounds

WHAT WILL WE DO WITH THE INFORMATION?

Cape Fear River Assembly

- All comments will be documented and catalogued
- Publish the priorities of the communities, organizations and stakeholders in a transparent way
- Include information that isn't part of the plan in cataloguing process and provide resources and community connection

Division of Water Resources

- Comments will be considered for inclusion in the plan
- Share information across the divisions of DEQ
- Continue to work with stakeholders and resource agencies to prioritize issues for inclusion in plan updates
- Develop recommendations to address concerns identified during plan development

WHO ARE WE ASKING TO PROVIDE INPUT?

- TNC Water Group
- Upper Cape Fear River Program
- Middle Cape Fear River Program
- Lower Cape Fear River Program
- Waccamaw Siouan STEM Studio
- Lumbee Led - Eastern North Carolina Coalition
- Coharie Tribal Administrator and Volunteer Coordinator
- Cape Fear River Partnership
- Sandhills Conservation Partnership
- Clean Cape Fear
- Chatham Conservation Partnership
- Loves Creek Watershed Stewards
- Cape Fear Arch
- UNCW, UNCP, Duke and NC State
- Triangle Supply Group
- Jordan Lake One Water
- Haw River Assembly
- YWCA - Lower Cape Fear
- New Hanover County NAACP
- NC Sandhills Prescribed Burning Association
- NC Cooperative Extension
- Multiple municipality utilities

WHAT'S NEXT?

Contact: DEQ-Division of Water Resources
Nora Deamer
nora.deamer@ncdenr.gov

Contact Cape Fear River Assembly:
Maya Miller
cfra@cfra-nc.org

Please take a moment to fill out the Survey for the Cape Fear River Basin Water Resources Management Plan with your questions, comments and concerns.