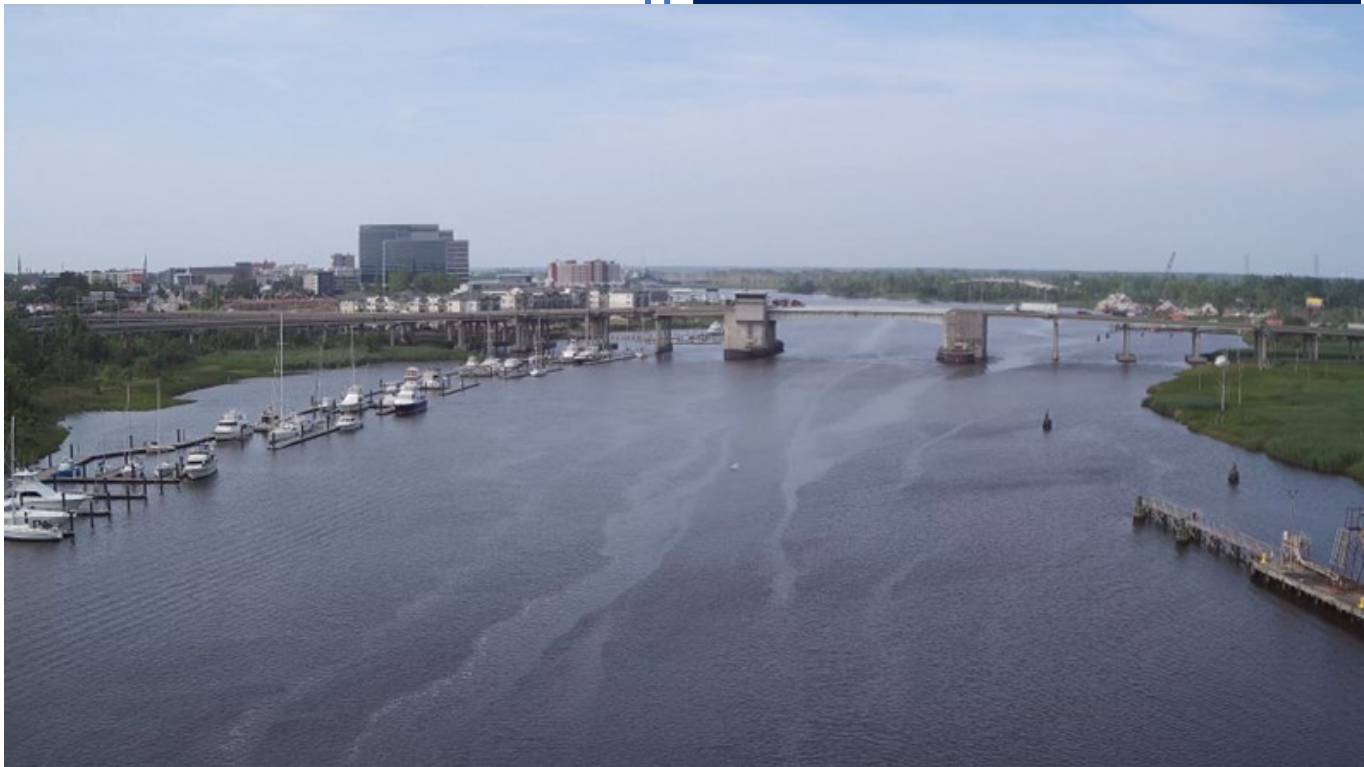


2023

Source Water Protection Plan



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Cape Fear Public Utility Authority
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Cape Fear Public Utility Authority
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2023 SOURCE WATER PROTECTION PLAN

Introduction

In 2014, North Carolina House Bill 894: An Act to Improve Source Water Protection was signed into law. The law was passed after large spills into rivers in West Virginia and North Carolina affected source waters of nearby drinking water systems. The law was written to include all public water suppliers that rely on surface waters, affecting small and large utilities alike.

The concept of the law is simple but important: It requires water utilities to work with upstream dischargers and stakeholders to develop protocols for water system staff should a spill occur and to inventory existing protection efforts then build upon them by creating management strategies for potential contamination sources (PCSs). Unless otherwise stated, PCSs refer to point sources of contamination. In a contamination event, the time that might be saved by giving an upstream discharger a direct number to call or by training staff on proper protocol could make a significant difference in building an effective response.

At Cape Fear Public Utility Authority (CFPUA), plans to address contamination events are critical to the resiliency of our daily operations. CFPUA receives raw water from the Cape Fear River from its own pump station and from one operated by the Lower Cape Fear Water and Sewer Authority, both of which have intakes at Kings Bluff in Bladen County. Our intakes are the last on the Cape Fear River, downstream of hundreds of dischargers, industrial areas, and municipalities. Our largest water distribution system – which serves approximately 160,000 people and includes the local hospital, university, and the downtown district – relies on the river to produce an average of approximately 16 million gallons of drinking water per day and climbing. In addition, our watershed is classified as WS-IV, a designation given to waters in moderately to highly developed watersheds and that includes protections for aquatic life, wildlife, and secondary contact recreation. In short, protecting the Cape Fear River will support a flourishing environment, economy, and community.

In preparing this plan, CFPUA staff posed hypothetical worst-case scenarios and ensured CFPUA had plans to respond. The process also highlighted the legislation's limitations. As a public water supplier, CFPUA is unable to enforce this law and the PCSs identified are not required by law to communicate with us. Additionally, while the law is designed to address acute contamination events, it does little to encourage public water suppliers to prepare for chronic challenges to source water protection like emerging contaminants and the impacts of climate change.

This plan is the result of combined efforts of external partners and CFPUA staff across the organization, including plant operators, emergency response staff, and experts in environmental management and geographic information systems (GIS). CFPUA staff identified and attempted to contact more than 150 PCSs with the potential to impact CFPUA source water and ensured that protocol is in place to address these scenarios. The Source Water Protection Plan (SWPP) Team, made up of a few CFPUA staff and a growing number of external stakeholders, worked to identify existing source water protection efforts and how they can be improved.

This plan will be revised as additional threats to our source waters are identified or when the status of previously identified PCSs changes. Updated versions of the plan will be posted to the CFPUA website and shared internally and with our SWPP team.

Threats to Source Water

The Cape Fear River crosses central and eastern North Carolina for approximately 200 miles and meets the Atlantic Ocean in Southport. Throughout its course, the river supplies water for a variety of municipal, industrial, and agricultural users, bolstering its economic importance but also increasing its vulnerability to pollution.

Staff has identified three categories of potential threats to CFPUA source waters: Acute Threats (Accidents and Malevolent Events); Acute Threats (Natural Events); and Chronic Threats. Each category requires different planning and response strategies, and most threats will necessitate coordination throughout the watershed to address them properly.

Acute Threats (Accidents and Malevolent Events)

Acute Accidents and Malevolent Events are the threats that spurred the development of House Bill 894. These threats are typified by events such as train derailments and major industrial spills into the Cape Fear River. These events typically last anywhere from a few hours to a few days.

To prepare for and respond to these events, CFPUA:

- Monitors water quality at its intakes
- Has the option of closing the intakes until the contamination passes
- Can implement emergency water conservation plans
- Can optimize use of storage tanks and system interconnects

Acute Threats (Natural Events)

Acute Natural Events are contamination events caused by short-term changes in the environment. These threats vary widely and can range from severe algal blooms to heavy precipitation events and flash droughts that degrade water quality.

To prepare for and respond to these events, CFPUA:

- Monitors water quality at its intakes
- Monitors environmental indicators across the state
- Maintains emergency water conservation plans
- Is increasing the resiliency of its infrastructure
- Uses advanced treatment techniques at the Sweeney Water Treatment Plant

Chronic Threats

The Cape Fear River and similar waterways may be affected by long-term problems that can degrade water quality or impact water quantity. Because these problems often occur over long periods of time, effective monitoring and response is difficult. Chronic threats faced by CFPUA include emerging contaminants and unregulated runoff, the impacts of climate change, and the potential for Interbasin Transfers upstream of our intakes. CFPUA regularly samples for emerging contaminants, including 1,4-dioxane and several PFAS compounds. To view CFPUA sampling results visit our [Emerging Contaminants](#) and [Drinking Water Quality](#) webpages.

To prepare for and respond to Chronic Threat events, CFPUA:

- Participates in watershed-wide groups and partnerships
- Reviews the latest research on treatment techniques and environmental change and monitors changes in federal and state regulations
- Comments on potential permitting and regulatory changes that may impact our operations
- Increases resiliency of infrastructure and systems

Source Water Assessment Program Report

According to the Safe Drinking Water Act Amendments of 1996, all states must establish a Source Water Assessment Program (SWAP) and provide public water systems with findings that could impact their source waters. North Carolina House Bill 894 recommends identifying the SWPP's area of assessment by using the geographic radius surrounding the raw water intake provided by the North Carolina Department of Environmental Quality (NCDEQ) SWAP report. Each SWAP report evaluates "the potential of a drinking water source to become contaminated by identified potential contaminant sources (PCS) within the delineated area."¹ CFPUA's SWAP report assigned our drinking water source a susceptibility rating of moderate, a PCS rating of lower, and an inherent vulnerability rating of higher.

The Cape Fear River basin has 9,164 square miles of drainage area and 21,300 miles of river including its tributaries.² Within the river basin, CFPUA's SWAP report delineates a Protected Area and defines it as "the area within ... 10 miles upstream and draining to a river intake. ... In 1995, the state allowed local governments to request that the 10-mile Protected Area ... be measured 'run of river' rather than using a 10-mile arc linear measurement." Four PCSs are located inside of the Protected Area and could threaten our source water with acute contamination. In this SWPP, our short-term goals and strategies will focus on the PCSs within the Protected Area, an area clearly delineated as a 10-mile arc upstream of the Kings Bluff intake in Appendix C.

While the PCSs identified by NCDEQ's SWAP report are point sources of contamination, non-point source contaminants are also an essential SWPP component. The EPA estimates that 70% of water contaminants come from stormwater runoff, a non-point source of pollution.³ Tracing and mitigating non-point source pollution is difficult anywhere, but it is especially difficult in a large watershed. The long-term goals and strategies in this plan will focus on PCSs beyond the Protected Area and will include non-point source contamination.

Another type of non-point source contamination in our Source Water Protection Plan Area (SWPPA) are emerging contaminants like Per- and Polyfluoroalkyl Substances (PFAS). Given our current understanding of the distance contaminants can travel and the chronic threats that PFAS pose to our drinking water, we chose to expand our SWPPA to include contaminant sources up to Fayetteville. This extended the SWPPA to approximately 45 miles upstream of CFPUA's raw water intakes.

Additionally, in 2019 new language in America's Water Infrastructure Act was adopted by NCDEQ. As a result, water systems were asked to include all *known* contaminant sources that affect their raw water in their SWPPs. In response, staff added nine additional NPDES Wastewater Treatment Facility sites where sampling has indicated their discharge affects raw water at CFPUA's intake. These PCSs are outside of the SWPPA and extend as far as 160 miles above CFPUA's raw water intake. The 10-mile arc or Protected Area, the SWPPA, and the "added PCS area" are shown in a series of maps in Appendix C.⁴

Continuing to identify PCSs upstream of the minimum requirements helped CFPUA create a more realistic interpretation of the risks and opportunities for improvement. Although this plan outlines goals for PCSs within the 10-mile arc upstream of our intake, the maps in Appendix C include additional PCSs and illustrate the path forward. The SWPP Team supports this future expansion and has already added a member from Fayetteville. We believe this plan will help focus our efforts and customize solutions to each PCS type.

The SWPP Team

In early 2022, CFPUA staff contacted various stakeholders in the Lower, Middle, and Upper Cape Fear River basins with an invitation to join our SWPP Team. On April 28, 2022, the SWPP Team met for the first time

¹ North Carolina Department of Environmental Quality's Division of Water Resources, Public Water Supply (2020). Source Water Assessment Program Report for CFPUA-Wilmington. https://www.ncwater.org/SWAP_Reports/NC0465010_SWAP_Report-20200909.pdf

² North Carolina Department of Environmental Quality (n.d.). *Cape Fear River Basin*. <https://deq.nc.gov/cape-fear-river-basin>

³ North Carolina Department of Health and Human Services' On-Site Water Protection Branch, Non-Point Source Pollution Program: Resources. Ongoing and Emerging Issues Document. <https://ehs.dph.ncdhhs.gov/oswp/docs/nps/OngoingandEmergingIssues.doc>

⁴ Note that the maps in Appendix C shows a single intake location because both of CFPUA's intakes are located only a short distance apart.

and used CFPUA's existing Source Water Risk and Resiliency Plan (SWRRP) as a basis for the conversation. The team discussed ongoing source water protection efforts in the various river basins, potential PCS management strategies, SWPP goals, how to involve the public in the SWPP process, and plans to improve CFPUA's source water protection planning. After the April meeting, it was identified that the SWPP team would benefit from growth and additional members. A second meeting was held in October 2022. The agenda included further defining the goals of CFPUA's SWPP and outlining strategies to accomplish and/or advance established goals. Quarterly meetings are going to be held in 2023, with the first occurring on February 28, 2023.

Name	Agency, Title
Glenn Walker	Brunswick County Public Utilities, Water Resources Manager
Maya Miller	Cape Fear River Assembly, Director
Dana Sargent	Cape Fear River Watch, Executive Director
Kemp Burdette	Cape Fear River Watch, Riverkeeper
Beth Eckert	CFPUA, Director of Environmental Management and Sustainability
Erin Tremblay (Co-chair)	CFPUA, Public Environmental Policy Specialist
Holden Shepard	CFPUA, Security and Emergency Manager
Kathryn Pohlman (Co-chair)	CFPUA, Assistant Director of Environmental Management and Sustainability
Krysdyn Burden	CFPUA, Environmental Management and Regulatory Specialist
Tara Arnette	CFPUA, Management Systems and Compliance Auditor
Anna Reh-Gingerich	City of Wilmington, Watershed Coordinator
Jennifer Butler	City of Wilmington, Stormwater Education Program Manager
Lee Ferguson	Duke University, Associate Professor of Civil and Environmental Engineering
Rhonda Locklear	Fayetteville Public Works Commission, Environmental Program Manager
Wayne Egan	Fayetteville Public Works Commission, Operations Supervisor
Jordyn Apel-Hughes	Feast Down East, Executive Director
Tim Holloman	Lower Cape Fear Water and Sewer Authority, Executive Director
Dru Harrison	NC Division of Soil and Water Conservation, Director and Community Conservationist
Deborah Maxwell	NC NAACP, President
Detlef Knappe	NC State, S. James Ellen Distinguished Professor of Civil, Construction, and Environmental Engineering
Dylan McDonnell	NHC Planning and Land Use, Long Range Planner
Amy Cox	Pender County Utilities, Utilities Analyst
Bonnie Monteleone	Plastic Ocean Project, Executive Director
Emily Mulvihill	Plastic Ocean Project, Head of Administration & Events, Executive Director Assistant
Larry Cahoon	UNCW, Professor of Biology and Marine Biology
Roger Shew	UNCW, Lecturer of Geology
Jennifer Biddle	UNCW, Associate Professor of Public Administration
Riley Alber	Wilmington Compost Company, Owner

Table 1. CFPUA's SWPP Team

The following goals were developed following the first meeting and subsequent research.

Short-Term Goals

The goals outlined in this section should be accomplished within three years of this approved report and focus on PCSs within the 10-mile arc, as well as building a foundation for this program. Some of these goals will be ongoing. Together these goals collect data, create organized communication channels, and build a database of resources to help address PCSs in the Protected Area. PCSs in the Protected Area include three animal operations and a wastewater treatment plant. Building relationships with these entities, in addition to researching best practices, are the first steps to long-term source water contamination solutions. Each PCS will have different solutions for minimizing the risk of contaminants. Further, non-point source pollution such as animal operations requires tailored solutions depending on the nuances of the location and processes. Additionally, understanding the composition of the effluent of the wastewater treatment facility will determine the best practices for eliminating potential contaminants. Future updates to this report will include similar strategies for all PCSs in the SWPPA as well as future PCS additions to the SWPPA.

GOAL 1: CULTIVATE AND SUSTAIN GENUINE PARTNERSHIPS WITH KEY STAKEHOLDERS THAT CONTRIBUTE TO THE SWPP

Performance Metric: Recruit at least one representative from each county in the 10-mile arc, the four PCS sites within that arc, and five other community members to serve on the SWPPT. The SWPPT should grow by at least five members per year in the first three years.

Strategy	Responsible Party	Timeline
Solicit comments on the draft SWPP from the organizations that align with the SWPP's mission and goals. Invite invested members to join the team.	Each team member will be responsible for encouraging community feedback on the draft SWPP and suggesting new potential members to the co-chairs.	Fall-Winter 2022
Develop a resource for members to easily access information about the SWPP and the team.	Co-chairs with guidance from the team	Fall-Winter 2022
Host at least one event annually for team members, key stakeholders, and community members to share ideas and collaborate on source water protection efforts.	In the inaugural year, the team will work to identify a time and event and decide on the responsible party for future events.	2022-2023
Gain resolutions and letters of support from entities with missions that align with the SWPP or that implement strategies outlined in the SWPP.	Team members will liaise with affiliated organizations. Co-chairs will provide templates and other information as requested.	Ongoing

GOAL 2: CREATE A DATABASE OF RELEVANT RESOURCES RELATING TO SOURCE WATER PROTECTION ACROSS THE UNITED STATES. THE RESOURCES CAN GUIDE AND INSPIRE FUTURE GOALS AND STRATEGY DEVELOPMENTS IN THE SWPP.

Performance Metric: Completion of the database and guidelines for updating it, including methodology, timeline, responsible party, and any notes.

Strategy	Responsible Party	Timeline
Compile resources on source water protection from guiding documents and leading organizations. *	Team members will provide their knowledge of sources. Co-chairs will be responsible for the first year.	2022-2023
Identify strategies and programs that are innovative or may fill a gap in the SWPP.	Team members will review and provide feedback in the first SWPP update.	Fall 2023
Complete the database, make it accessible to SWPPT members, and determine a timeline with SWPPT for updating the database.	Co-chairs with guidance from the team	2024
Connect with community colleges and universities to encourage research, projects, and coursework that could support the database.	Co-chairs will be responsible, but the team will be encouraged to share the opportunity.	Ongoing
Interview utilities with innovative or successful ideas and identify their processes, funding sources, and any lessons learned.	Co-chairs	Ongoing

**Initial resources will include: American Water Works Association, Water Environment Federation, National Association of Clean Water Agencies, US Water Alliance, Water Utility Climate Alliance, Association of Metropolitan Water Agencies.*

GOAL 3: BUILDING UPON GOAL 1 STRATEGIES, CREATE A COMMUNICATION TREE THAT 1) SURPASSES EXISTING SPILL AND RESPONSE NOTIFICATION (SPCC) REQUIREMENTS, 2) OPENS A TWO-WAY COMMUNICATION CHANNEL BETWEEN PCSs AND CFPWA AND FACILITATES TIMELY COMMUNICATION, AND 3) EMPHASIZES PROACTIVE COMMUNICATION IN EFFORT TO IMPROVE CFPWA REACTION TIME IN THE EVENT OF A SPILL INTO THE RIVER

Performance Metric: Development of a communication tree for the Cape Fear River.

Strategy	Responsible Party	Timeline
Determine where there are gaps in the existing communication paths and listservs.	Team members will provide insight at the second SWPP Team meeting.	Winter 2022
Identify SWPPs with strong communication plans downstream from spills and interview a knowledgeable source on how it was developed.	Co-chairs will be responsible, but the team will be encouraged to provide insight.	2023
Identify utilities with community communication plans and identify any new practices to implement.	Co-chairs will be responsible, but the team will be encouraged to provide insight.	2023

Work with subject matter experts to develop the communications guide.	Co-chairs	Spring/Summer 2024
Make the communication tree accessible for stakeholders.	Co-chairs	Fall 2024
Collect comments and suggestions on the communications guide and update it as needed.	Team members will liaise between affiliated organizations.	Ongoing

GOAL 4: DEVELOP A PROCEDURE FOR UPDATING THE PCS INVENTORY

Performance Metric: Completion of a documented procedure for updating the PCS inventory.

Strategy	Responsible Party	Timeline
Review Unregulated Contaminant Monitoring Rule Reports as they are released.	Co-chairs	Ongoing
During utility interviews described in Goal 2, ask upstream utilities about known emerging contaminants.	Co-chairs	Ongoing
Identify additional local, county, state, and federal databases not included in the SWAP report and record data source locations in the database described in Goal 2. Local data gathering may also include windshield surveys to identify local PCSs and interviewing local residents within the vicinity of PCSs.	Co-chairs with guidance from the team	Ongoing

GOAL 5: DEVELOP A SWPP VISION STATEMENT

Performance Metric: Complete a final SWPP vision statement supported by the SWPP Team.

Strategy	Responsible Party	Timeline
Host an SWPP Team brainstorming meeting and provide vision statement inspiration for the team to vote on	Co-chairs	July 2022

Long-Term Goals

The goals in this section should be accomplished within three to five years of the submitted report and focus on PCSs beyond the 10-mile arc, as well as non-point sources within the SWPPA. These goals will build on existing infrastructure and create new resources to strengthen the SWPP.

GOAL 6: DEVELOP FUNDING STRATEGIES IN PARTNERSHIP WITH PCSs, BOTH POINT SOURCE AND NON-POINT SOURCES OF CONTAMINATION, TO IDENTIFY SOLUTIONS THAT ARE MORE COST-EFFECTIVE WHEN TREATED ON-SITE INSTEAD OF AT THE TREATMENT PLANT

Performance Metric: Once funding sources are identified and the funding program is established, fund at least one project annually to reduce contaminants entering the Cape Fear River.

Strategy	Responsible Party	Timeline
Establish a sub-team of individuals on the SWPPT and in the community that have experience with funding projects.	Co-chairs	2025
Identify opportunities using the Source Water Risk and Resiliency Plan (SWRRP) and interview key stakeholders at the PCSs.	Sub-team	2026
Create an application process for funding partnerships, including a rubric, application, review committee, impact measurements, and check-ins.	Co-chairs with guidance from the Team and leadership from other utilities in the Lower Cape Fear River Basin.	2026
Create a list of “shovel-ready” projects for grants and other funding sources.	Sub-team	2026
Launch a program for funding partnerships. (Example: Tampa Bay’s Mini Grant Program)	Sub-team	2027
Create partnerships with interested schools, health and wellness organizations, wildlife organizations, and others that may have overlapping goals to apply for different grants.	Sub-team	2027

GOAL 7: CREATE REGIONAL RESOURCES FOR EDUCATING THE COMMUNITY ON THE SWPP AND HOW TO BE INVOLVED

Performance Metric: Connect with individuals in each county covered by the SWPP annually at events, community meetings, homeowner association meetings, schools, and as requested.

Strategy	Responsible Party	Timeline
Establish a sub-team of individuals on the SWPPT and in the community that creates educational materials and/or are educators.	Co-chairs	2025
Utilizing the database in Goal 2, identify gaps in community education in the SWPPA.	Sub-team	2026
Create an educational campaign for the community to encourage actions that prevent the contamination of source water and provide information on how to respond to a spill.	Sub-team	2026
Create lesson plans for teachers around the SWPP.	Sub-team	2026-2027

Implement a campaign and track the number of people we reach.	Sub-team	2027
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Potential Contaminant Source Inventory

PCS Risk Rating Rubric

The SWPPA includes a variety of PCSs that individually or collectively can affect the quality of CFPWA raw water. To assess these sites, staff created a Risk Rating Rubric (Appendix A) designed to objectively rate the risk associated with each category of PCS. The rubric asks eight general questions to quantify how severely a PCS could affect the Kings Bluff intake and/or CFPWA drinking water. These questions also serve to define the criteria used to rank the PCSs.

We will use the risk rating scores to prioritize the development of management strategies for each PCS. We will first develop management strategies for PCSs within the Protected Area, then expand our focus to the development of management strategies for PCSs outside of this area. *In both instances, we will develop management strategies for high-risk PCSs first.* Appendix F lists each PCS by operation type and risk score. Some of the PCSs listed in Appendix F note "NA" for operation status. This indicates that despite in-depth research, staff members were unable to find the status. We aim to remedy this as we conduct local research on each PCS in pursuit of accomplishing Goal 4. We also aim to resolve any inconsistencies among PCS data sheets and document a comprehensive methodology for assigning risk to PCSs.

PCSs identified by the SWAP report and within the Protected Area include three animal operation facilities and a wastewater treatment plant. PCSs with risk ratings between 10-12 are considered high risk, while PCSs assigned risk scores between 12-15 are considered very high risk with 15 as the maximum possible score. Three of the PCSs within the Protected Area have a PCS risk score of 10, and one has a risk score of 12. However, each produces contamination treatable by our Sweeney Water Treatment Plant. PCSs outside of the Protected Area are comprised mostly of animal operation facilities. Out of the 121 total PCSs, there are 56 with high risk or very high-risk scores, and these are a mixture of operation types. All but six of the 56 PCSs with high and very high-risk scores are located within a 20-50 mile range of our source water intake. We will develop management strategies for the PCS outside of the Protected Area after we have enacted management strategies for the PCSs within the Protected Area.

Data and Limitations

The data used in this plan was gathered from NCDEQ's GIS website. This data is categorized by operation type. The data was downloaded and clipped to the initial CFPWA SWPP maps. Staff investigated each of the categories in the table below and identified the PCSs that could affect the Kings Bluff raw water intake.

PCS Types Within SWPPA	PCS Types Outside of SWPPA
Active Permitted Landfills	Brownfield Agreement Sites
Animal Operation Sites	Dry Cleaning Solvent Cleanup Sites
Active Hazard Sites	Federal Remediation Branch Sites
Inactive Hazard Sites	Manufactured Gas Plant Sites
NPDES Wastewater Treatment Facility Sites	Military Installations, Ranges, and Training Areas
Pre-Regulatory Landfill Sites	
Regional Underground Storage Tanks	

Table 2. PCS Types. Note: PCS Types listed in boldface have instances within CFPUA's Protected Area.

NCDEQ datasets provided information that helped staff assess the risk associated with individual PCSs. The data provided general information about operations onsite and, when mapped, visualized trends and clusters of industries in geographic areas. However, the data had limitations. Some data is suspected to be out-of-date or incomplete, which may affect the quality and accuracy of the risk assessment associated with a particular PCS. Using the data available, staff created an individual datasheet for each PCS with information that may be relevant in the event of a spill (see Appendix B).

PCS Outreach and Inventory Updates

Per SWPP compliance requirements, staff created a comprehensive plan for communicating with identified PCSs. Staff attempted to contact each PCS via phone, email, and/or letter. Each letter or email was accompanied by the contact form (see Appendix D) the PCS should use in the event of a spill or discharge that could reach the Cape Fear River. In a spill event, this form provides the necessary information needed for CFPUA to make timely decisions to protect our customers.

Future updates of this plan will include an updated list of PCSs. Staff will create the revised list based on the most current SWAP Report and by using the strategies identified in *Goal 4: Develop a Procedure for Updating the PCS Inventory* to identify PCSs that fall outside of the SWAP Report's scope. PCS updates will be reflected in the plan narrative, the PCS risk category list, PCS data sheets, and in the maps. Staff have already identified additional PCSs to add to our inventory, including several that fall under the Pollution Incident and Tier II PCS categories.

Management Strategies

Before developing PCS management strategies for the entire SWPPA, the SWPP Team began with an inventory of current source water protection efforts in the Cape Fear River Basin. Because our water quality is affected by numerous upstream dischargers, building strategic upstream partnerships will play an integral part in cultivating a regulatory management strategy approach. To start, the team generated the following list of ongoing non-regulatory protection strategies, including specific activities and programs. Additional protection strategies will be included in future SWPP updates.

Ongoing Source Water Protection Strategies

Community education, outreach, and partnership opportunities:

- Lower, Middle & Upper Cape Fear River Basin Programs
- Cape Fear River Watch
- Cape Fear River Assembly
- Cape Fear River Partnership
- The City of Wilmington's Heal Our Waterways Program
- Cape Fear Resource and Conservation Development
- The Fayetteville Public Works Commission (PWC)
- Feast Down East
- NC Division of Soil and Water Conservation
- 1-4 dioxane ListServ and periodic meetings *
- NCDEQ Divisional Email Distribution Lists
- Watershed Roundtable *

Pollution Mitigation

- Bladen County Soil & Water has incentives for farmers to keep nutrients out of the water

- Household hazardous collection programs - Community-based recycling
Stormwater BMPs - Forest management - Prescribed burning - Construction of wetlands - Stormwater retention ponds
Conservation easements or outright purchase of property, especially for use as riparian buffer zones
Regulatory Management Strategies - CAMA permit counties - Brunswick - Pender - New Hanover - Water Supply Watershed Protection Overlay District - Bladen County

Table 3. The SWPP Team's list of ongoing regulatory and non-regulatory source water protection strategies and programs

Description of Source Water Protection Strategies

Lower, Middle & Upper Cape Fear River Basin Programs

Each Cape Fear River basin – lower, middle, and upper – has a program dedicated to understanding the “processes which control and influence the Cape Fear River and to provide a mechanism for information exchange and public education.” Each program is comprised of academia, government, industry, and the public, and is administered by the Aquatic Ecology Laboratory at the University of North Carolina Wilmington’s Center for Marine Science. Specific activities to develop this understanding include:

- basin-wide water quality monitoring programs,
- stakeholder partnerships aimed at broadening research needed to create a successful management plan,
- environmental education about river pollution and water quality monitoring status updates, and
- development of a public database containing both current and historical data.

Together, all three programs aim to provide sound data for key decision makers to use when making decisions related to management and protection of the Cape Fear River.

A potential PCS management strategy related to these programs is the establishment of a water quality data sharing and monitoring protocol between the Lower Cape Fear River Basin and the Middle Cape Fear River Basin. The creation of a two-way data sharing avenue would help to maintain an informed group of stakeholders in each section of the river, provide insight into how and where contaminants travel, and offer potential research collaboration opportunities. CFPWA and participating stakeholders could build on this management strategy by installing monitoring stations every few miles along the river to check for various contaminants, namely phosphorus and nitrogen, both precursors to toxic algal blooms.

The Cape Fear River Watch

The Cape Fear River Watch (CFRW) is a nonprofit organization with a mission to “protect and improve the water quality of the Cape Fear River Basin for all people through education, advocacy, and action. Their

education efforts include a citizen science Creekwatchers Program, monthly seminars, river paddles, clean-ups, eco-tours, and summer camps. Over the years, they have advocated and taken action to protect the river basin. They played pivotal roles in preventing Titan America from building a concrete plant along the Cape Fear River and in holding Duke Energy responsible for cleaning up coal ash after a coal ash pond stormwater drain broke and spilled into the Dan River in 2014. They are currently involved in legal proceedings that aim to reduce the amount of PFAS that DuPont/Chemours can release into the environment. Further, their RiverKeeper® Kemp Burdette, has received recognition as a “[Waterkeeper Warrior](#)” for his success in critical political and environmental battles to keep the river clean. CFRW also received the “Conservation Organization of the Year” award at the 56th Annual Governor’s Conservation Achievement Awards. CFPWA’s partnership with the CFRW has the potential to become a strong and strategic alliance against water pollution in the Cape Fear River.

Cape Fear River Assembly

The Cape Fear River Assembly (CFRA) brings together a broad group of stakeholders, including agriculture, local government, industry, academia, community based organizations, and citizens groups “who strive to maintain and improve the quality of life in the Cape Fear River Basin by encouraging smart management of the river, its tributaries, and adjacent land use from a basin-wide perspective.” What makes this group unique is the range of diversity within the stakeholder group. Whereas many source water protection-related organizations are comprised of environmentalists and those who strictly aim to protect source water, the CFRA involves organizations responsible for pollution - members of industry and agriculture.

Developing relationships with upstream dischargers helps to foster open communication in the event of water quality issues or spill. No matter the issue that needs resolving, stronger relationships with all parties involved can only benefit the Cape Fear River as well as the economy and people it supports. Hearing from upstream dischargers also helps to broaden CFPWA staff members’ view of the river and actions that can be taken to protect water quality.

Cape Fear River Partnership

In 2011, NOAA and almost 30 other interested parties formed the Cape Fear River Partnership to make the Cape Fear River healthier for both people and fish. Their mission is to “restore and demonstrate the value of robust, productive, and self-sustaining stocks of migratory fish in the Cape Fear River.” Work toward their mission inherently includes strong emphasis on improving water quality and fish habit.

Research included in [The Cape Fear River Action Plan for Migratory Fishes](#) concluded that improved access through Lock and Dam #1 would benefit several species of migratory fish. In 2021, the Partnership worked alongside the US Army Corps of Engineers, the Cape Fear River Watch, and other partners to [modify Lock and Dam #1 to improve fish passage](#). The Partnership plans to continue progress toward achieving additional actions outlined in the Cape Fear River Action Plan for Migratory Fishes. In general, their goals are as follows:

- **Goal 1:** Restore access to historic migratory fish habitat.
- **Goal 2:** Improve habitat conditions for migratory fish within the Cape Fear River basin.
- **Goal 3:** Engage new stakeholders and increase interest in improving fish passage and habitat conditions through communication of socioeconomic values associated with such improvements.

The City of Wilmington’s Heal Our Waterways (HOWW) Program

In 2012, the City of Wilmington adopted a resolution to approve the [Bradley and Hewletts Creek Watershed Restoration Plan](#). These creeks were highly polluted with fecal bacteria from stormwater runoff which negatively impacts the environment and local economy. The Heal Our Waterways (HOWW) Program was created to implement the Restoration Plan. HOWW uses simple stormwater solutions within the community to help reduce and filter stormwater runoff that would otherwise negatively impact the Bradley and Hewletts Creek Watersheds by implementing practices like installing rain barrels, planting rain gardens and native plants, and rerouting gutter downspouts in these two watersheds.

The Cape Fear Resource and Conservation Development

The Cape Fear Resource and Conservation Development's mission is to "conserve natural resources while encouraging sound economic development and community development through project funding and implementation in southeastern North Carolina." They are a nonprofit dedicated to helping local communities and governments in southeastern NC complete projects that strike the balance between resource conservation and economic development. Some of their past work includes the Agricultural Center for Rescue and Education, the Regional Drainage and Aquatic Activity in the Cape Fear River Basin Project, and the Bladenboro Affordable Housing and Downtown Revitalization Project.

The Fayetteville Public Works Commission (PWC)

The Fayetteville Public Works Commission (PWC), a member of our SWPPT, participates in various programs including the Regional NC Envirothon, Fayetteville Fourth Friday events, the Dogwood Festival, sewer overflow response and monitoring, water quality monitoring of sixteen different locations in the Big and Little Cross Creek watershed, hydrilla removal partnerships, and illegal dumping monitoring programs. These partnerships and programs can be leveraged to stay connected to current events and river related news and disperse source water protection information ranging from specific needs, like a search for new team members or data, to spreading general source water protection awareness. We will utilize similar connections and programs provided through each member of the SWPPT to meet our goals and continue to develop and update a comprehensive SWPP.

Feast Down East

The mission of Feast Down East is to "strengthen the farming communities in and around the Wilmington area by providing resources, education and distribution opportunities to farmers while addressing equitable food access in communities with the greatest need." Part of their work includes building support for local food through education, overcoming barriers to buying and providing local food to consumers, and farm-to-table partnerships with restaurants. Feast Down East's partnerships with local farmers is a great way to better understand how CFPWA can support what agriculture stakeholders value and balance those values with improved water quality. In addition, Feast Down East wants to get involved with local soil and water districts to advocate and educate through the lens of agriculture and food. The Feast Down East representative on our SWPPT will keep us connected to this initiative as it develops.

NC Division of Soil and Water Conservation

The NC Division of Soil and Water Conservation works alongside the North Carolina Soil and Water Conservation Commission and the 96 Soil and Water Conservation Districts throughout the state to protect and improve soil and water resources. Each district, usually delineated by county, have various programs to manage natural resources related to soil and water. For example, New Hanover County's Soil and Water

District strives to “protect and enhance the soil and water of New Hanover County” through programmatic focus on environmental education, storm-water management, and land preservation and conservation.

We currently have a representative from the NC Soil and Water Conservation Division on our SWPPT. As we build our SWPPT and continue source water protection efforts, we will keep each Soil and Water Conservation district in mind as a resource and potential partner.

1-4 Dioxane ListServ

The 1-4 dioxane listserv is made up of a group of individuals downstream of Greensboro, NC who have opted to receive alerts when 1-4 dioxane is elevated in the Cape Fear River. This listserv is managed by the City of Greensboro’s Water Reclamation Manager, Elijah Williams. Based on the 1-4 dioxane exceedance level, water utilities on the listserv who source their water from the Cape Fear River downstream of Greensboro may choose to shut their intake for a certain period of time or employ other measures to ensure good water quality at their facilities. As a point source potential contaminant, utilizing this source water protection strategy is an important way to recognize fluctuations in water quality and act immediately to protect our source water and our consumers.

NCDEQ Divisional Email Distribution Lists

CFPUA’s Sustainability Division receives various NCDEQ listserv email notifications, including those from the following divisions: Air Quality, Coastal Management, Drinking Water, Water Infrastructure, and Water Resources. In addition to staying current with news from NCDEQ, Sustainability staff also receive emails from the NC Department of Public Safety regarding emergency management. Together, these listservs provide valuable information to staff on environmental and water quality news, river contamination events, funding opportunities, stakeholder meetings, water equity, and more. We use this information to make short- and long-term decisions about source water management and related activities.

Watershed Roundtable

The Watershed Roundtable is a meeting of key stakeholders in the Cape Fear Region to discuss projects, updates, and issues in the watershed. This group was organized by Mick Noland, the interim Chief Executive Officer of Fayetteville Public Works Commission as of September 2022. Roundtable stakeholders range from non-profits that are focused on environmental preservation and pollution reduction to various NPDES permit holders. This informational roundtable ensures that critical information about the watershed is shared, that efforts are not duplicated, and that gaps in resource management are identified and filled.

Bladen County Soil & Water Incentives For Farmers

There are several cost share programs and grants for best management practices (BMPs) for agricultural sites. These funding opportunities can be applied for by the municipality, businesses, or organizations depending on the requirements outlined in the applications. These financial incentives help agricultural entities implement projects that prevent nonpoint source pollution such as sediment, chemicals, and biological material that may be discharged to bodies of water.

Some of the best management practices included in these funding sources include cover crops, no-till practices, and sod-based rotation incentive practice. These practices work to reduce the number of contaminants being introduced to stormwater that is then carried to other water sources. Other funding programs also provide technical assistance to help assess what best management practices would work best on specific agricultural sites. This ensures that the solution best matches the issue at the site, leading to a more successful result.

By connecting with successful programs like Bladen County to see how they have incorporated such projects, the SWPP team can share these experiences and lessons learned with other communities that may need assistance. Being a resource for connecting others with resources is a goal of the SWPP. This will be a critical part of helping the agricultural community implement best practices for stormwater on their sites. The financial opportunity will also serve as a gateway for funding projects that cannot be budgeted with current income. This aspect of source water protection is important because much of the land in the Cape Fear watershed is agricultural lands. Supporting farmers' implementation of best management practices will have a large impact on the quality of the river's water.

Household Hazardous Collection Programs

By providing a permanent or temporary space to collect household hazardous waste, community members are less likely to dispose of these items improperly. Without programs to collect these materials, they will be discarded in the landfill, sewer, or in the environment. The chemicals and metals within hazardous waste can be detrimental to flora and fauna, especially in fragile ecosystems.

According to NC DEQ, the average household creates 30 pounds of hazardous waste per year in the United States. Not every area has a permanent household hazardous waste collection facility. The areas without the facilities may not have robust educational programs for the public about the impacts of improper disposal of these materials. By sharing resources and materials from the permanent collections' programs to areas without these services, habits can be improved through insight and support. By providing these areas with the tools and resources needed to know how, where, and when they can properly dispose of hazardous household waste, those materials can be diverted from the watershed.

Community-Based Recycling

Recycling programs throughout the watershed support water diversion and pollution reduction. By providing an economic stream for resource recovery, recycling is a more reliable method of disposal to prevent litter or water contamination due to leachate. According to research by the University of Central Oklahoma, "recycling paper cuts down on-air pollution by 73% and water pollution by 35%. Recycling steel reduces 97% of the mining waste produced through the manufacture of virgin resources, and cuts back 86% and 76% on air pollution and water pollution, respectively. Additionally, using recycled glass decreases mining wastes by 80% and air pollution by 20%."

Additionally, microplastics are a new emerging contaminant. Throughout their life plastics are slowly broken into smaller pieces but are not destroyed. These microplastics are a threat to water quality and bioaccumulate in ecosystems starting with the smallest aquatic life. Providing a grave-to-cradle solution for plastic materials helps avoid those materials entering the environment and staying in the circular economy.

While these community-based or municipal recycling programs are not the top priority for watershed management currently, their value is increasingly more important with population growth, regional planning opportunities, and material management needs.

Forest Management

Trees and other foliage are important to stormwater management. When water is absorbed by flora, it cannot carry sediment and other contaminants to water bodies like streams and lakes. This reduces the overall amount of pollution in the waterways. Additionally, the root structure of trees, bushes, and other plants provides structure to the soil, helping to decrease overall erosion and sediment loss.

The Cape Fear watershed is quickly losing forest to development. Replacing this vegetated environment with parking lots, buildings, and other impervious surfaces leads to increased stormwater pollution. By partnering with organizations and government entities that protect forests and support smart growth, less potential nonpoint source contaminants will need to be addressed. Partnerships for research and funding opportunities are the most relevant aspects of this SWPP to forest management and will be pursued by the SWPPT's research action team.

Prescribed Burning

To maintain healthy, native forest in southeastern North Carolina, fire is a key part of the cyclical maintenance. Many of the conifers require fire to open the cones and drop seeds for new plants. These new seeds will need sunlight to grow, and fire will shed the forest of the underbrush shading the floor while the conifers remain unaffected. Prescribed burns are practiced in the Cape Fear watershed area to maintain healthy forest and control the timing and size of the fire. Without prescribed or controlled burning, forests are vulnerable to lightning strikes and other fire starters. Wildfires can be detrimental to the natural and built environment that often has a negative effect on both water and air quality. While maintaining healthy forests is a useful tool in reducing water pollution, the opportunities to support and connect with this type of work may be limited for the purpose of the SWPP. Both the SWPPT's research and innovation action teams will work to elevate the status of importance of this type of work as needed.

Construction of Wetlands

Wetlands are nature's water filter. They absorb harmful chemicals and other contaminants through the soil and vegetation. They slow the speed of water flow, allowing heavier sediments and other biological materials to fall to the bottom. By constructing wetlands in areas where there is runoff due to impervious surfaces, the stormwater can be cleaned naturally of pollution. Instead of draining into a storm drain that is directed into a stream, it can be funneled into a wetland that slowly enters a flowing body of water. These affordable, nature-based solutions create clean water while providing critical habitat for wildlife. Constructed wetlands in the watershed are one of the tools to clean nonpoint source pollution from stormwater runoff. CFPUA's SWPPT plans to explore the potential for improving the river's water quality by identifying areas that could be developed or re-developed into a wetland where an increase in impervious surface has contributed to potential nonpoint source pollution.

Stormwater Retention Ponds

Similar to constructed wetlands, stormwater retention ponds can be used for filtering stormwater runoff for smaller or more constrained areas. These ponds hold water and allow time for the sediments, contaminants, and other pollution to drop to the bottom. Depending on the type of retention pond, the clean water may then slowly enter another stream, or it may remain as a body of water. Stormwater retention ponds are an affordable, simple solution to some stormwater management issues. These ponds are often incorporated into building and development to manage stormwater pollution on site.

Conservation Easements/Purchased Property

A natural land barrier between a pollution source and the Cape Fear River can help improve water quality. CFPUA is looking at various options for creating these barriers. Two options being conservation easements and purchasing property for riparian buffer zone use. Conservation easements are legal agreements with the state designed to protect an area's natural habitat from development. Alternatively, the outright purchase of property would allow CFPUA full control and ownership to create riparian buffer zones and preserve natural

areas. Both options would help in improving water quality by protecting the river from nutrient runoff and erosion.

CAMA Permit Counties

Coastal counties within North Carolina are part of the Coastal Area Management Act (CAMA) program. CAMA was introduced in 1973 to protect and manage the coastal resources of North Carolina. For this SWPP, we are focusing on Brunswick, Pender, and New Hanover counties. The CAMA program helps manage development and land clearing in areas of environmental concern (AEC) by requiring a permit. AEC are coastal areas that contain natural hazards or important environmental, economic, or cultural resources.⁵ By helping to regulate the development on these vulnerable areas, the CAMA program helps to protect water sources from erosion and sedimentation due to land clearing as well as from commercial and residential runoff. It is important that the SWPP and SWPP team use CAMA as a resource to avoid duplicating any efforts and to identify gaps where CAMA does not have authority.

Water Supply Watershed and Protection Overlay District

The water supply watershed and protection overlay district defines an area that is a water supply watershed. By defining these areas, counties can enforce regulation aimed at protecting water quality. Such enforcement could include limiting development, regulating land use, and ensuring best management practices are being taken to limit watershed disturbance. In Bladen County three water supply watershed and protection overlay districts have been identified on the NC Surface Water Supply Watersheds online GIS portal provided by NC DEQ⁶. It should be noted that two of the districts do extend into neighboring counties. The protection of water supply watersheds upstream is crucial in improving the water quality downstream.

The SWPP Team will use these collective protection strategies as a basis for developing PCS management strategies for the SWPA. Exploring these avenues will facilitate outreach to upstream communities, help develop potential collaborations with other stakeholders, and identify areas where source water protection planning can be improved. Strengthening our connections with stakeholder organizations like those mentioned above will also help us gain access to community input on the development of management strategies.

Public Outreach and Involvement

CFPUA intends to share this plan with our customers. To address the community's interest in local water quality, CFPUA has been employing a variety of communication techniques to reach our customer base. These include video production, social media outreach, and engaging web content. We intend to use these techniques to increase awareness of our 2023 Source Water Protection Plan beyond our customer base. The SWPP Team will share the plan through various communication platforms to spread awareness of the plan throughout the region. By sharing the plan upstream, we hope to spread awareness about how individual citizen actions like applying pesticides and fertilizers at home negatively affect the surrounding environment and drinking water quality. Additional efforts to share the plan are described in Goals 1 and 7.

⁵ New Hanover County Government Webpage. CAMA Permit Program. [https://news.nhcgov.com/537/CAMA-Permit-Program#:~:text=The%20Coastal%20Area%20Management%20Act,of%20Environmental%20Concern%20\(AECs\)](https://news.nhcgov.com/537/CAMA-Permit-Program#:~:text=The%20Coastal%20Area%20Management%20Act,of%20Environmental%20Concern%20(AECs))

⁶ North Carolina Department of Environmental Quality. NC Surface Water Supply Watersheds GIS Portal. <https://data.ncdenr.opendata.arcgis.com/datasets/ncdenr::nc-surface-water-supply-watersheds/explore?location=34.419251%2C-78.423038%2C11.00>

The formation of this plan was influenced by a diverse group of community representatives. Three students from the University of North Carolina Wilmington helped create various pieces of the plan. CFPUA staff has presented the plan to the CFPUA Board of Directors on multiple occasions to solicit their feedback. The SWPP will also undergo a two-week public comment period to solicit feedback from stakeholder organizations and the general public. The following image is a press release CFPUA's Communication staff issued about the SWRRP. We intend to release similar information to the public about the SWPP.

Posted on: April 22, 2020

[ARCHIVED] CFPUA COMPLETES SOURCE WATER PROTECTION PLAN ALONG 160 MILES OF WATERSHED

A years-long effort by CFPUA staff has culminated in the [2020 Source Water Risk and Resiliency Plan](#), a detailed summary of sites with the potential to affect water quality at the region's primary drinking water source: the intakes on the Cape Fear River.

Work on the Source Water Risk and Resiliency Plan (SWRRP) started in response to 2014's North Carolina House Bill 894: An Act to Improve Source Water Protection. Spurred in part by a 2013 coal ash spill into North Carolina's Dan River, the law directed utilities to open lines of communication with upstream industries and dischargers.

By designating contacts between utilities and potential contaminant sources, the legislation aims to enable faster, more-effective response to water emergencies.

The law recommended looking at dischargers within just a few miles of water intake sites, but CFPUA's Public and Environmental Policy Department (PEP), which developed the SWRRP, went several steps further.

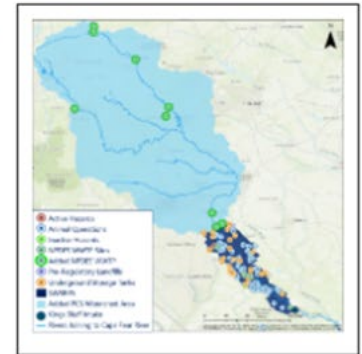


Figure 1. A section of a CFPUA press release about the SWPP.

Contingency Planning

Emergency Response Plans

In the event CFPUA needs to respond quickly to river contamination, staff would refer to one or more of the following Incident Action Plans (IAP) or Standard Operating Procedures (SOPs):

Public Information and Policy Procedure:

- Directs internal communication procedures for customer notifications as required by Public Notification Rule

Critical Customer Call List:

- Lists contact information for CFPUA customers that service vulnerable populations (such as hospice and nursing homes), are critical to community resiliency (such as fire departments), or demand large volumes of water to sustain their operations (such as the University of North Carolina Wilmington)

Water System Contamination:

- Contains three IAPs depending on whether the contamination is possible, credible, or has been confirmed

Water Supply Interruption:

- Referred to if interruptions have occurred due to longer-term events such as drought or acute loss of one source

Water Emergency Advisory Stages:

- Outlines the stages of CFPUA water conservation procedures to be implemented depending on operating conditions such as drought advisories and water conditions

Water Emergency Management Plan:

- Action plan for complying with the CFPUA Emergency Water Conservation Ordinance

Algal Blooms:

- Outlines monitoring guidelines and responses to algal blooms of varying severity

2021 Water System Interconnects Map:

- Identifies locations of interconnects to help redistribute water throughout all three of CFPUA's water systems to maintain water supply during a shortage or other event

ICWater Software:

- Allows CFPUA to predict the timing of chemical spills that occur upriver of the CFPUA's water intake on the Cape Fear River

The plans and protocols discussed above include strategies approved by the U.S. Environmental Protection Agency (EPA) from documents such as "Effective Risk and Crisis Communication during Water Security Emergencies," and "Critical Information Policies for Water Utilities," which helps utilities identify and manage potentially sensitive information.

In addition, we have encouraged PCSs in our SWPPA to follow instructions provided by the Incident Form (Appendix D) as soon as possible following the release of contamination into the Cape Fear River. This form includes CFPUA's emergency contacts and requests basic organizational, contact, site, and incident information from the PCS.

Closing the Intake

CFPUA uses two intakes at Kings Bluff, near Lock and Dam #1, on the Cape Fear River. In an emergency, both can be closed remotely until the contamination passes. Both can also be closed manually at several points. Another option would be to divert, isolate, or blow-off water at various points along the transmission line before the contamination reaches the Sweeney Plant. If CFPUA had to close an intake, the following would occur:

- Treatment processes would reduce and/or cease at the Sweeney Plant depending on the scenario
- Available stored water in clear wells and elevated tanks would be strategically utilized
- All interconnects would open
- Emergency wells would be activated
- CFPUA's groundwater sources would operate at maximum capacity

CFPUA water systems could sustain themselves for approximately 36 to 48 hours with a 10 percent margin of error. During this time, mandatory water conservation measures would be enacted to help retain water supply during the event. Detailed conservation procedures and implementation triggers are outlined in the CFPUA Water Emergency Management Plan.

Communications

Emergency Communication Flow

All public notices and media communications regarding a contamination incident will be conducted by the Director of Communications or a designated staff member. Utility staff has produced pre-formatted media releases and distribution lists for multiple incident types, ensuring that the public is adequately informed through multiple channels. Information sharing partnerships exist with local radio stations, news outlets, and government agencies. Additionally, information regarding a spill and any contaminant properties will be

made available on the CFPUA website (<https://www.cfpua.org/>) and accessible through social media. CFPUA also may partner with New Hanover County Emergency Management to use the county's automated telephone notification system to distribute advisories, as well as recording information for use on the CFPUA Customer Information Line.

After initial notifications have been released, designated personnel will monitor social media outlets for information requests. Additional updates will be provided as the situation progresses via media outlets and the utility website. Samples are taken frequently during contamination events to monitor contaminant concentrations, providing data to support decision-making strategies.

In the event of a continuous or especially lengthy spill or low treated water storage levels at the start of the incident response, updates may also be provided addressing water supply levels. The tone of messages encouraging water conservation will change according to the severity of a water supply threat.

Implementing, Maintaining, and Updating the SWPP

The SWPP will be updated every three years according to Section 6.1.3 of the SWPP Guidance. Events such as the construction of a new intake, the introduction of any new PCS located within the SWPPA, or major land use changes in the SWPPA will be captured in updated versions. Future SWPP updates will also include any additional information discovered through goal and strategy implementation. The SWPPT will meet quarterly to update the plan and/or implement the goals outlined in this plan according to individual goal timelines.

Although some of the goals outlined in this report could be considered PCS management strategies, the SWPP Team will include management strategies for each PCS type in our SWPPA in future iterations of the SWPP. It is important to note that CFPUA's current Emergency Response Plans (ERPs) are maintained by an in-house Security and Emergency Manager and address protections for CFPUA's drinking water. These plans will be considered by the SWPP Team in the development of additional management strategies. Personnel assignments for responsibilities identified in CFPUA's contingency plans are indicated in each ERP or SOP and at times are determined by CFPUA's Security and Emergency Manager.

If the need for funding arises to implement goals outlined in the SWPP, team members will explore various avenues, including the list of grant opportunities below:

- National Fish & Wildlife Foundation, especially the Emergency Coastal Resilience Fund Grants
- N.C. Clean Water Management Trust Fund Grants
- N.C. Coastal Non-point Source Program Grant
- National Water Quality Initiative

While the SWPP Team will be responsible for completing the SWPP goals, the team may work with external partners or use external sources to accomplish the goals. Further, the person responsible for overseeing the administration and implementation of the SWPP is Kathryn Pohlman. As CFPUA's Assistant Director of Environmental Management and Sustainability, Kathryn is involved with internal sustainability initiatives, water quality procedures, and emergency management plans. Kathryn also organized the SWPP Team, led the meeting, and has environmental ties in the community as the local university's previous Sustainability Director. For these reasons, Kathryn is the most appropriate SWPP program administrator.

Acknowledgements

Work on the SWPP began in 2018 and has continued through 2023. The progress made to date could not have been done without the dedication and guidance of CFPUA staff and our external partners. The plan's scope extends far beyond the required SWPP guidelines – a goal that was only achievable with the expertise and input from everyone involved.

We would like to acknowledge the work of the following departments at CFPWA for their contributions to the SWPP:

- Communications Department
- Environmental Management and Sustainability Department
- Linear Assets & Project Management Department
- Public & Environmental Policy Department
- Treatment & Engineering Department

We would also like to thank each member of the SWPP Team listed in Table 1, as well as students from the University of North Carolina Wilmington who devoted their time to the SWPP throughout the course of their internships with CFPWA. The students we would specifically like to thank are:

- **Christina Smyth | UNCW Department of Environmental Sciences**
 - Bachelor of Science in Environmental Sciences, with concentration in Conservation
- **Bennett Winslow | UNCW Department of Physics**
 - Bachelor of Arts in Physics, with a minor in Environmental Sciences
- **Lauren Whitehouse | UNCW Department of Geosciences & Undergraduate Honors College**
 - Bachelor of Arts in Geoscience, with minors in Geospatial Technology and Environmental Studies

Appendices

Appendix A

[Risk Assessment Rubric](#)

Appendix B

[PCS Data Sheets](#)

Appendix C

[Maps](#)

Appendix D

[PCS Contact Form](#)

Appendix E

[Acronym Definitions](#)

Appendix F

[PCS List by Risk Assignment](#)