NEWPORT RIVER WATERSHED

PROTECTION & RESTORATION PLAN

September 30, 2024

NORTH CAROLINA
COASTAL FEDERATION

With Contributing Partners:

Carteret County | Town of Newport | Town of Morehead City | Town of Beaufort | Bolton & Menk, Inc.

Funded By: N.C. Land and Water Fund

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North Carolina Coastal Federation
Working Together for a Healthy Coast

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SECTION 1

Purpose and Need for Watershed Plan

In collaboration with a diverse group of stakeholders, the North Carolina Coastal Federation developed the Newport River Watershed Protection and Restoration Plan.

This plan identifies strategic actions to address declining water quality and flooding in the river and its estuary. It serves as a roadmap for local communities and government agencies, outlining voluntary actions to mitigate existing and potential pollution threats to the river. The plan provides an overview of past, present, and projected water quality conditions and outlines strategies to reduce polluted stormwater runoff, improve water quality, and mitigate flooding. These strategies include mimicking or restoring natural drainage functions and implementing cost-effective measures such as land protection, restoration, and stormwater management retrofits. Community engagement initiatives are also emphasized to address the impacts of land use on water quality and flooding.

The Newport River Watershed Plan aligns with federal and state requirements, following the U.S. Environmental Protection Agency's (EPA) Nine Minimum Elements for Watershed Plans and the N.C. Department of Environmental Quality (DEQ) Section 319 Program. It includes all necessary elements for eligibility for Federal 319 grant funding. This plan is the culmination of a nearly two-year planning and public engagement process involving input from four local governments, state and federal agencies, fishers, landowners, scientists, business owners, and residents. Preparation of the plan was funded by the N.C. Land and Water Fund and the North Carolina General Assembly.

This restoration plan has initiated a multi-year process to implement, maintain, and manage efforts to mitigate stormwater pollution and flooding. It identifies multiple areas of concern and outlines actions to significantly reduce stormwater runoff and flooding. Additionally, the plan provides information enabling the Federation and its partners to apply for state and national grants to fund these actions.

During the plan's development, significant conservation actions identified in the planning process have already begun to be carried out. These include: (1) the creation and phased acquisition of the Newport River Watershed Preserve, which will protect and restore hydrology on over 3,500 acres along six miles of the river's shoreline; and (2) the implementation of a pilot stormwater retrofit program, funded by the N.C. General Assembly, to upgrade out-of-compliance stormwater systems previously permitted under the state's coastal stormwater permit program.

SECTION 2

Characterization of the Newport River and its Watersheds

The Newport River estuary is one of the most commercially important and ecologically endangered coastal waters in North Carolina, according to the N.C. Oyster Restoration Blueprint.

The transformation of natural forests and wetlands into subdivisions, shopping centers, crop land, and pine tree farms has increased rates and volumes of polluted stormwater runoff. These changes have caused damaging variations in salinity levels, frequent disruptions of shellfish harvests, and dramatically increased sediment loads that smother oyster beds. Research by UNC scientist Dr. Antonio Rodriguez shows that nearly as much sediment and silt accumulated in the Newport River over the past half-century as in the previous 200 years.[1] Additionally, tropical storms and northeasters cause severe and persistent flooding that exceeds drainage capabilities, impacting roads and homes. Extreme weather events can disrupt daily life for weeks, including for the thousands of people employed at the nearby Marine Corps Air Station Cherry Point.

The river is flushed by tides every four to ten days and drains a 120-square-mile watershed that includes urban and industrial development, farms, roads, national and industrial forests, and wetlands. The river's estuary is 12 miles long and between two to four miles wide, with an average depth of about three feet. The volume and rate of runoff into the river have increased dramatically in recent decades as rapid population growth intensified land uses that altered the landscape's hydrology.

The river runs southeast through the Town of Newport and opens into the Bogue Sound between the Towns of Beaufort and Morehead City. The river has supported local fishermen for generations, whether they caught wild shellfish or farmed their own oysters. In the mid-to-late 1980s, concerns about water quality degradation in North Carolina coastal waters prompted the North Carolina Environmental Management Commission to adopt coastal stormwater regulations. Despite these additional safeguards, water quality continues to decline as more nearby land is altered and the rate and volume of stormwater runoff increases. Commercial shellfish operations are frequently disrupted by temporary harvest closures that now occur whenever there is 1 to 1.5 inches of rainfall.

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1 Dr. Rodriguez confirmed in person that this is a valid conclusion from research studies he has completed within the Newport River watershed as reported in peer reviewed published studies he has published.

Watersheds

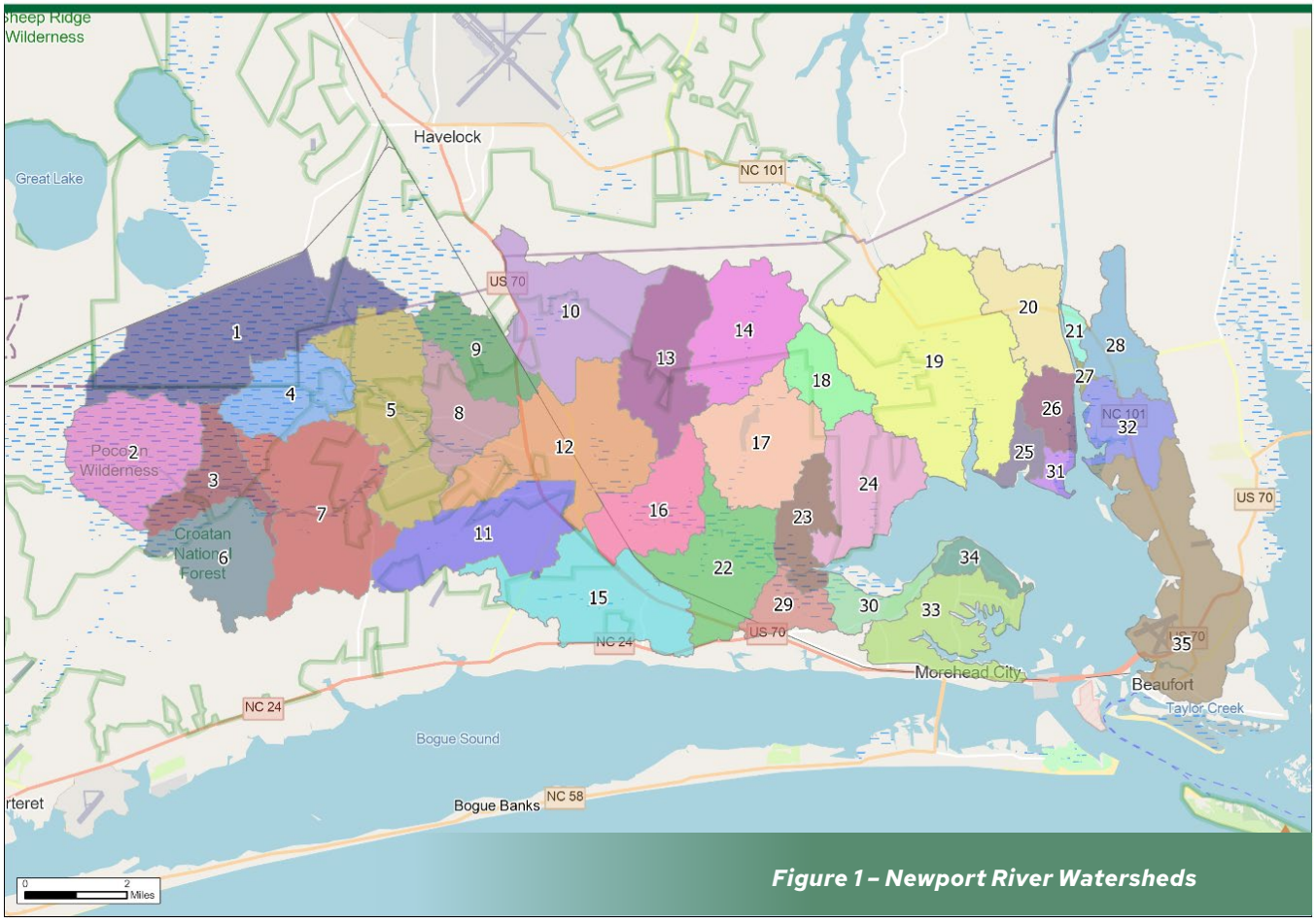


Figure 1 – Newport River Watersheds

The Newport River is characterized by six watersheds at the HUC-12 level. To better visualize and analyze water quantity and quality concerns, the watersheds were further delineated into 35 sub-watersheds.

Natural Features

The Newport River watershed includes various wetland areas, creeks, and streams, including 37,237 acres of wetlands. The river area is also surrounded by forested areas, agriculture, and high density and low intensity residential areas. The Newport River watershed possesses qualities that make the sound ideal for growing shellfish and as a fish nursery. The river offers an ideal mix of fresh and salt waters for producing oysters. The Newport River waters are also ideal for nursery habitats for many local aquatic species.

The soils within the watersheds are primarily class A/D and class B/D. These soil groups are characterized by high to moderate infiltration rates that may decrease as the soil becomes saturated. It is important to understand the soil types at potential project locations to determine feasibility of different project types. Overall, there appears to be a number of soils within the river's watersheds that will allow for stormwater management systems that infiltrate into the landscape rather than runoff into nearby surface waters.

Land Use Trends

Development within the Newport River watersheds is highly concentrated in sub-watersheds 12, 15, 22, 29, 30, 33, 34, and 35. These sub-watersheds correspond to the Towns of Newport, Morehead City, and Beaufort. Apart from sub-watershed 12, there was a large increase in development post-1985 for these identified sub-watersheds. Sub-watersheds 30 and 33, associated with Morehead City, both saw an increase in developed areas of over 10% from 1985 to 2020. This is relevant when considering the amount of impervious surface coverage due to parking lots, roof coverage, connected impervious surfaces, and often reduced vegetated coverage.

The land uses within the watersheds falls primarily in groups 6 – Wetland, 4 – Tree Cover, and 1 – Developed. These categories represent the current designated land uses as classified by USGS and are not representative of altered or developed land. Understanding the current land uses of the watershed is important for determining the most effective stormwater reduction strategies and community education and outreach approaches. For example, if a watershed is predominately residential, it may be more effective to develop strategies that focus on lot-level stormwater reduction or homeowner education.

Future land use projections were compiled from slated conservation lands from the CAMA Land Use Plans for each jurisdiction and zoning information. Development is expected to increase surrounding the towns of Beaufort, Morehead City, and Newport. This development includes the addition of both residential and commercial areas. Certain land parcels are slated as conservation land, including a portion of the Croatan National Forest which accounts for most sub-watersheds one, two, three, and four. Future land use may change from projections due to changes in population, ability of agencies and jurisdictions to acquire land for conservation, and among other factors. Projections are based solely on information known at the time of this plan development.

For more information regarding the characteristics of the Newport River watersheds, refer to Appendix B: Area Characteristics.

Water Quality

North Carolina has various methods to protect and measure water quality. This plan uses the state's water quality classification system and swimming usage tier scale systems (refer to Appendix C: Water Quality for detailed guide of Water Quality Classification and Standards).

While Newport River has both SA (shellfish) and SC (waters where treated sewage can be discharged) waters, the watersheds that are the primary focus of this plan are Class SA which are classified as legally "impaired" on the 303(d) list. These waters should be able to support direct contact recreation and commercial shellfish uses. In addition, the Newport River carries a Primary Nursery Area (PNA) classification based on the quality of these waters to provide a good habitat for juvenile species. A PNA is any area of an estuarine system that supports the initial stages of post-larval development. The Marine Fisheries Commission is responsible for protecting land and waters deemed necessary to support and maintain productivity of estuarine and marine fisheries. Waters designated as PNA by the Marine Fisheries Commission, or the Wildlife Resources Commission are often classified as High Quality Waters (HQW) and are subject to the requirements of such waters.

Waters in the river are also monitored for their suitability for swimming. The tier scale assigned by the State affects the prioritization of sampling and the minimum water quality standards for swimming waters being tested. Tier I classified waters are the highest priority and are locations that are used daily, Tier II are not used as heavily for swimming and see the most use on weekends, and Tier III sites are used less frequently. These Tiers coincide with sampling requirements and maximum observation of bacteria. There are two swimming water quality monitoring stations within the boundaries of the watershed. Land use change has impacted the condition of the Newport River watersheds over the past five decades. Factors such as increased volumes and rates of stormwater runoff, pollution, drainage infrastructure, and dockage have affected the water quality within the watersheds. Water quality concerns have been noted in assessments completed by NC Shellfish Sanitation, NC Recreational Water Quality, and other regulatory agencies.

Trends Observed by DMF Shellfish Sanitation

Over the course of the last two decades, the area's surface waters have become increasingly more polluted by bacterial contamination. Areas within the Newport River watershed have been closed for shellfish harvest since 1926 following the first Sanitary Survey conducted by the Division of Marine Fisheries. Persistently high bacterial counts have resulted in the designated uses of these waters not being met, which has led to waters within the multiple Newport River sub-watersheds being placed on the state's 303(d) list for impairment, according to the 2022 Integrated Report. High bacteria counts have also led to the expansion of restricted and prohibited areas for shellfish harvest in the last five decades. In addition to the restricted and prohibited areas, temporary closures are issued by the Division of Marine Fisheries because of rain events and resultant runoff. The closure is temporary and makes it unlawful for any person to take any oysters, clams, or mussels from the area for sale or consumption. Temporary closures are often lifted following satisfactory sampling events. Within the Newport River watersheds, a rainfall event of 1 to 1.5 inches can result in a temporary closure. The rainfall depth inciting temporary closures has decreased through the years, as more intense land uses have increased the amount of runoff generated per storm. Due to the decrease in rainfall depth needed to temporarily close waters, in combination with increased intensity and frequency of severe weather events, the Newport River shellfish areas have seen an increase in the number and duration of annual closures.

History of Recreational Water Advisories

Recreational water advisories warn people about potentially hazardous water conditions due to increased bacteria levels caused by stormwater runoff. Only sub-watershed 35 has a recreational water sampling station. Two sampling sites are located within this watershed, C55A and C55B. Site C55A has had 20 advisories and alerts since 2006; Site C55B has had no advisories or alerts since 2006.

History of Impaired Listings on 303(d) List

Many sections of the Newport River, along with its major tributaries, are listed on the 303(d) EPA impaired waters list due to their polluted shellfish growing area status. Additionally, some parts of the river have been identified as exceeding criteria for dissolved oxygen levels. The Clean Water Act (CWA) mandates that impairments on 303(d) listed waterways be addressed (see Appendix C: Water Quality for more details on assessment categories). When surface waters fail to meet federal water quality standards, the CWA requires measures to be taken to mitigate the impairment and restore water quality. This often involves conducting a Total Maximum Daily Load (TMDL) study to determine the necessary reduction of contaminants to meet standards. TMDL studies can be time-consuming and costly, and limited resources often hinder their development for smaller waterbodies impacted by nonpoint source pollution. Currently, there are no TMDL reports for the impaired waters of the Newport River Watersheds. Partners agree that reducing stormwater volume is the most beneficial and cost-effective strategy to decrease contamination and avoid the need for TMDL development.

Potential Pollution Sources

Due to rapid alteration of the natural hydrology within the watershed, bacterial contaminants have been identified as the primary issue of concern as reported in water quality assessments and Shellfish Sanitation reports. The difficulty in preventing violations of bacteria standards for coastal waters caused by stormwater runoff is compounded by the unique challenges related to coastal hydrology and bacteria pollution.

These are: The two bacteria used as indicators of water quality, fecal coliform and enterococcus, naturally occur across the terrestrial landscape. These bacteria originate in the feces of warm-blooded animals, such as birds, deer, raccoons, domestic pets and people. Although prudent measures should be taken to reduce the sources of bacteria, these efforts alone will not result in satisfactory improvements in coastal water quality due to unnatural levels of stormwater being discharged.

Treating stormwater runoff to remove bacteria pollution before it flows into shellfish and swimming waters is impractical. Although some technology exists for decreasing bacteria levels in runoff, these generally will not lower levels to the extent that they comply with the numerical fecal coliform standards for these waters. In addition, the current stormwater control measure permitting system does not reliably hold permittees accountable. Installed practices may not function as intended and can become a source of bacteria.

Treated runoff can easily be re-contaminated. Due to the ubiquitous nature of bacteria on the landscape, treated runoff, once discharged back on the landscape, will simply pick up more bacteria. The result is ineffective costly treatment.

For more information about water quality within the Newport River watersheds, see Appendix C: Water Quality.

A more effective approach is to reduce the rate and amount of stormwater entering the river by promoting infiltration within the landscape adjacent to the watershed. Stormwater runoff can convey a variety of nonpoint source contaminants from a variety of sources. Potential nonpoint sources range from wildlife and human sources, including lack of proper maintenance and operation of permitting stormwater control measures, sewer systems, septic systems, highways, and land application areas.

The key strategy is to keep the landscape functional for storing and infiltrating polluted rainwater and disconnecting surface waters from stormwater conveyance systems.

SECTION 3

Runoff Volume

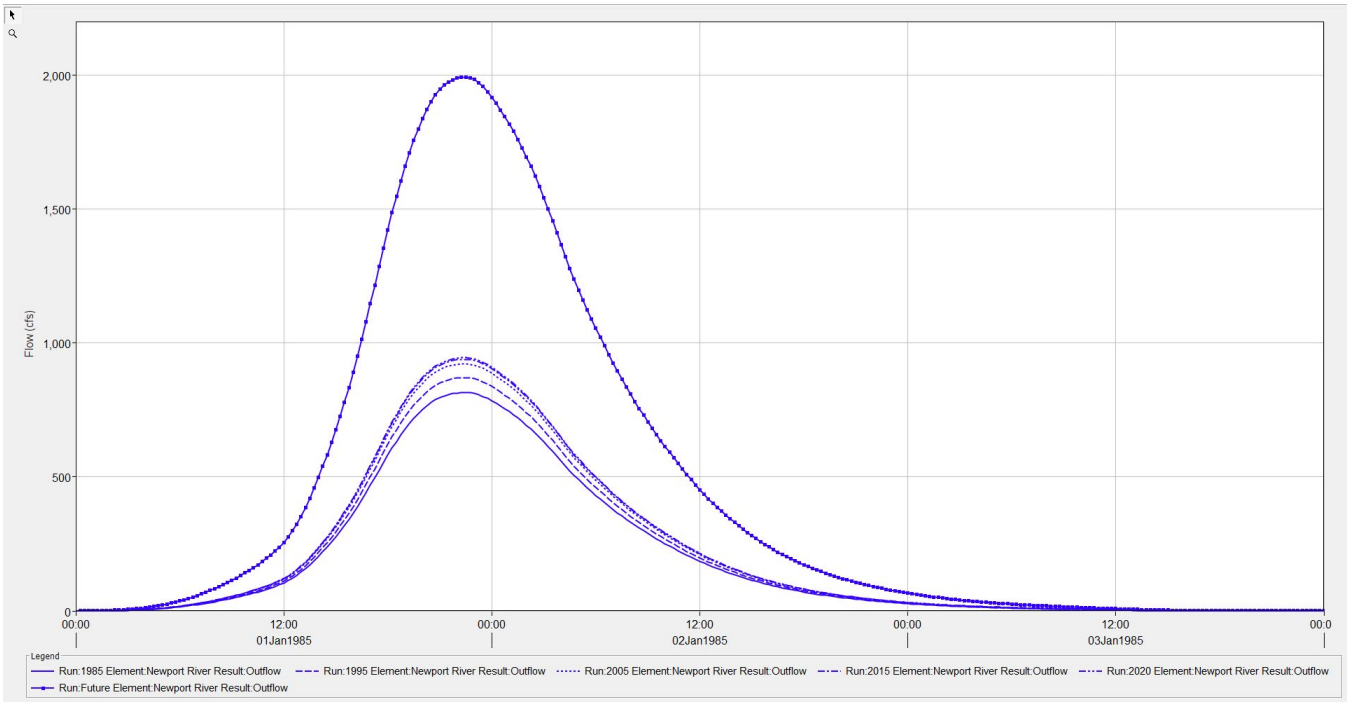
Runoff volumes and flow rates were calculated for a one-year, 24-hour storm event across the Newport River watershed and its 35 sub-watersheds.

These calculations consider land use changes from 1985 through 2020, with future projections assuming full development of available land according to current zoning or development regulations. Notable increases in runoff volumes were observed, with the total estimated runoff volume for the entire river basin increasing from 125,788,832 cubic feet in 1985 to 138,649,760 cubic feet in 2020—an increase of more than 10%. If current land use trends continue, the future projected runoff volume could increase by over 77% from 1985 levels.

Table 3-1: Cubic feet of runoff volume created by the 1-year, 24-hour storm event

Watershed	1985 Runoff Volume	1995 Runoff Volume	2005 Runoff Volume	2015 Runoff Volume	2020 Runoff Volume	Future Conditions (2050) Runoff Volume
Newport River	125,788,832	128,572,404	131,236,200	133,184,749	138,649,760	157,236,040

Figure 3-1: Hydrograph of runoff volume increases from 1985 to 2020, with future projection



The hydrograph in Figure 3-1 illustrates an overall increase in runoff rates and volumes of approximate 815.0 to 944.8, respectively from 1985 to 2020. Watershed studies nationwide suggest that such an increase may mark the threshold where increases in surface runoff from land use change causes significant water quality degradation.[1] Analysis of 35 sub-watersheds within the river basin shows considerable variation in hydrologic alterations over the past 35-year period. Sub-watersheds closer to shellfish growing areas experienced the largest increases in runoff rates and volumes. Based on data from Table 3-2, the average increase in runoff volume across all sub-watersheds was 14.25%, with a substantial standard deviation of 15.15%, indicating significant variability among these drainage areas. The average increase in runoff volume per sub-watershed was 367,455 cubic feet. This analysis reveals trends crucial for understanding changes in runoff rates and volumes over time and their potential impacts, particularly regarding shellfish growing waters.

1 https://www.epa.gov/sites/default/files/2014-03/documents/protect_water_higher_density1.pdf

Key Trends and Implications:

01 Overall Increase in Runoff Volumes

General Trend:

The data shows a consistent increase in runoff volumes across most sub-watersheds from 1985 to 2020. This increase is due to changes in land uses, ditching and drainage, urbanization, and weather patterns, which could lead to more intense rainfall events and reduced water infiltration.

Implications:

Increased runoff typically carries more pollutants, particularly fecal coliform bacteria and sediment, leading to both permanent and temporary harvest closures in shellfish growing areas.

02 Larger Increases in Runoff in Sub-watersheds Near Shellfish Growing Areas

Proximity Impact:

Sub-watersheds nearest to shellfish growing areas, classified as having a relative distance of '1,' exhibit the most significant increases in runoff volume. This is particularly concerning because these regions are critical for shellfish harvest, which are highly sensitive to water quality changes. The short distance allows limited natural treatment of surface runoff, leading to higher fecal coliform levels in drainage reaching the shellfish waters, resulting in harvest closures.

Possible Causes:

These increases likely result from more intensive land uses resulting in hydrologic modifications, such as increased ditching and impervious surfaces.

03 Runoff Decreases in Certain Watersheds

Anomalies:

A few watersheds, such as Watersheds 25, 6, and 10, showed a decrease in runoff volume, possibly due to reforestation, which enhances water absorption and retention.

Importance of Investigation:

Understanding these decreases provide valuable insights into effective runoff management strategies.

04 High Variability in Percent Increase

Variability:

The percentage increase in runoff varies significantly, from nearly 50% in some watersheds to no increase or even a decrease in others, indicating the influence of localized land use factors.

Local Factors:

Factors like land use changes, particularly reforestation and urbanization, may explain the variability. Watersheds with higher increases need more aggressive management actions to mitigate runoff impacts.

05 Runoff Volume Not Directly Correlated with Watershed Size

Non-Correlation:

The data doesn't show a direct correlation between watershed size and percentage increase or decrease in runoff volume, suggesting that land use changes are more critical determinants.

06 Potential Impact on Shellfish Growing Waters

Water Quality Concerns:

Watersheds closer to shellfish growing areas that experienced significant runoff increases are likely to contribute more to bacterial loading and other types of pollution, affecting shellfish harvest and health.

Need for Focused Management:

High-impact watersheds require targeted management strategies, such as nature-based stormwater reduction strategies, stricter land-use controls, or hydrologic restoration projects, to reduce runoff and its adverse effects.

Table 3-2: Average percent increase and quantity of increase in runoff from sub-watersheds by relative distance from shellfish growing waters

Relative Distance from Shellfish Growing Waters (1 = closest, 5 = farthest)	Average Percent Increase	Average Quantity of Increase (cubic feet)
1	18.11%	492,676
2	13.74%	323,171
3	7.25%	322,853
4	4.44%	328,157
5	-0.92%	-13,240

Table 3-2 provides the following insights:

- **Closer Proximity Impact:** Watersheds closest to shellfish growing waters (Relative Distance = 1) have the highest average percent increase (18.11%) and the highest average quantity of increase in runoff (492,676 cubic feet).
- **Decreasing Trend:** A general decreasing trend in both percent increase and quantity of increase is observed as the relative distance from shellfish growing waters increases.
- **Negative Growth:** Watersheds farthest from shellfish growing waters (Relative Distance = 5) show a slight average decrease in runoff volume, with a negative percent increase and a small negative quantity of increase.

These findings point to eight sub-watersheds that are closest to shellfish growing waters and experiencing significant runoff increases, which should be the priority for implementing actions recommended in this plan to reduce the rate and volume of runoff.
These watersheds are listed in Table 3-3.

Table 3-3: Highest Priority Watersheds for Runoff Reduction Actions

Sub-Watershed	Quantity of Increase (1985 to 2020) (cubic feet)	Percent Increase from 1985 to 2020
33	1,854,378	20.26%
22	1,214,126	27.90%
35	1,017,148	7.70%
30	706,992	46.29%
19	650,156	3.77%
17	603,978	49.33%
20	541,692	13.49%
16	541,663	22.65%

In addition to the eight sub-watersheds identified in Table 3-3 above, research from Dr. Antonio Rodriguez's lab at the UNC Institute of Marine Sciences in Morehead City provides data supporting the inclusion of sub-watershed 23 as a priority for focused management actions (see Table 3-3). The study found that silviculture operations within this and adjacent high-priority sub-watersheds (17 and 22) occupy approximately 20% of the river's total watershed and are located near the shellfish growing waters in the estuary.[1] Researchers documented significant ditching and land clearing that led to hydrological modifications in sub-watersheds 23, 17, and 22, beginning around 1958.

These silviculture activities triggered a sudden increase in the rate of delta-shoreline advance in areas of the river just upstream of and around Cross Rocks. The character of the sediment associated with this increased runoff shifted from sand to clay dominance between 1964 and 1967. The study also found that while erosion typically increases during periods of deforestation, sediments from the silviculture operations did not enter the river until a high-energy discharge event, such as heavy rainfall, occurred. This research highlights that the land use changes and hydrological modifications prior to 1985 were significant in these three sub-watersheds. Therefore, sub-watersheds 23, 17, and 22 should be the focus of management actions aimed at reducing runoff volume and rate during large storm events.

Summary

- **High Runoff Increases:** Watersheds 33, 22, and 35 have the highest runoff increases, each exceeding 1 million cubic feet.
- **Significant Percentage Increases:** Watersheds 30 and 17 show substantial percentage increases (46.29% and 49.33%, respectively) with moderate quantity increases.
- **Critical Targets:** Watersheds 19, 20, and 16 also contribute significantly to runoff increases, making them key targets for runoff reduction efforts.
- **Sub-Watershed (23) Added as a Priority Area for Action:** Sub-Watersheds 17, 22, and 23 underwent significant ditching and forestry clearing between 1958 and 1967 to facilitate a large commercial silviculture operation. Recent scientific research indicates that these modifications continue to contribute to significant runoff and sedimentation in the upper portions of the estuary during big rain events, and these pre-1985 land use modifications should also be addressed by efforts to reduce runoff.

Additional details on this overall runoff change analysis for each sub-watershed are provided in Table 3-4 on the next page.

1 MATTHEUS, Christopher R., *IMS, UNC at Chapel Hill, 3431 Arendell Street, Morehead City, NC 28557, RODRIGUEZ, Antonio B., Institute of Marine Sciences, University of North Carolina, 3431 Arendell St, Morehead City, NC 28557 and MCKEE, Brent, Department of Marine Sciences, UNC at Chapel Hill, 3202 Venable Hall, CB 3300, Chapel Hill, NC 27599, mattheus@email.unc.edu*

Table 3-4: Changes in rates and volumes of runoff by sub-watersheds sorted by relative distance to the water and quantity increase (in cubic feet)

Watershed	1985 Runoff Volume	2020 Runoff Volume	Percent increase from 1984 to 2020	Relative Distance from Shellfish Growing Waters	Quantity of Increase
33	9,152,399	11,006,777	20.26%	1	1,854,378
22	4,351,698	5,565,824	27.90%	1	1,214,126
35	13,204,853	14,222,001	7.70%	1	1,017,148
30	1,527,187	2,234,179	46.29%	1	706,992
19	17,250,485	17,900,641	3.77%	1	650,156
17	1,224,286	1,828,264	49.33%	1	603,978
20	4,014,613	4,556,305	13.49%	1	541,692
16	2,390,967	2,932,630	22.65%	1	541,663
29	1,872,110	2,295,247	22.60%	1	423,137
32	3,868,698	4,167,699	7.73%	1	299,001
23	715,477	898,179	25.54%	1	182,702
26	1,674,317	1,785,013	6.61%	1	110,696
24	771,254	878,470	13.90%	1	107,216
27	293,852	359,925	22.49%	1	66,073
21	658,491	706,900	7.35%	1	48,409
31	336,149	379,892	13.01%	1	43,743
25	1,283,436	1,247,816	-2.78%	1	-35,620
15	3,091,652	3,903,473	26.26%	2	811,821
28	4,059,702	4,552,378	12.14%	2	492,676
5	4,929,264	5,351,530	8.57%	2	422,266
13	1,292,430	1,527,902	18.22%	2	235,472
9	1,716,736	1,922,143	11.96%	2	205,407
34	1,688,624	1,848,825	9.49%	2	160,201
14	1,267,648	1,414,719	11.60%	2	147,071
11	944,554	1,055,007	11.69%	2	110,453
12	7,736,417	8,259,749	6.76%	3	523,332
4	3,832,264	4,125,076	7.64%	3	292,812
8	2,075,686	2,228,102	7.34%	3	152,416
1	11,918,276	12,568,190	5.45%	4	649,914
2	5,262,275	5,469,045	3.93%	4	206,770
7	3,248,147	3,375,935	3.93%	4	127,788
3	2,581,440	2,609,988	1.11%	5	28,548
18	163,754	164,123	0.23%	5	369
6	802,046	770,714	-3.91%	5	-31,332
10	4,587,645	4,537,100	-1.10%	5	-50,545
Total	125,788,832	138,649,761	10.22%		12,860,929

For more information regarding runoff calculations and volumes, see Appendix D: Runoff Calculations.

SECTION 4

Goals and Objectives

The overarching goal of the Newport River Watershed Protection and Restoration Plan is to protect and restore water quality so that shellfish and swimming uses of the river can be maintained and enhanced, and the natural infrastructure can sustain and adapt to changes such as sea level rise, increased flooding, and shoreline erosion.

Bacteria closes the river to shellfish harvest and results in swimming advisors. The elevated rates and volumes of stormwater runoff also have other negative impacts on the productivity of the river, causing unpredictable and unnatural shifts in salinity levels as well as rapid sedimentation that is smothering oyster beds and causing widespread shoaling. The comprehensive goal of this plan requires several strategies and efforts from many partners, including municipal, town and county leaders, residents, local businesses, users such as fishermen and shellfish growers, NGO's and other stakeholders from Carteret County, the Town of Beaufort, the Town of Morehead City, and the Town of Newport.

Secondary goals of this plan include preventing further degradation of water quality, restoring impaired water quality, pursuing projects that increase community resilience, reducing nuisance flooding, and maintaining the varied recreational uses of the river. Primary and secondary goals are summarized in Table 1 - Goals, below.

Table 4-1: Goals

Primary Goal

PG.1	This plan seeks to address water quality and quantity degradation within the Newport River watershed so that shellfish, swimming, and other uses of the Newport River can be maintained and enhanced, chronic and acute flooding is reduced, and the productivity of the river remains high supporting the local economy and communities.

Secondary Goals

SG.1	Prevent further degradation of water quality.
SG.2	Restore impaired water quality consistent with the water quality classifications and standards that are assigned to the Newport River.
SG.3	Achieve these benefits by pursuing projects that increase community resilience to extreme weather conditions, especially flooding and erosion.
SG.4	Reduce nuisance and acute flooding.
SG.5	Maintain the varied recreational and commercial uses of the river.

This plan outlines ways that the North Carolina Coastal Federation collaborates with the four local governments (Carteret County, Beaufort, Morehead City, and Newport) that have jurisdiction within the Newport River, private landowners, oyster farm operators, and state and federal agencies to work toward accomplishing these goals, objectives, and actions. Some of these actions are low-cost and others will require substantial investments.

State appropriations and federal, state, local and private funding are necessary to acquire key properties and to retrofit land uses to reduce existing and future sources of stormwater pollution. As a fundamental strategy, the recommended actions in this plan aim to protect, restore, or replicate through nature-based strategies as well as engineering practices the natural hydrology of the river's watersheds to reduce the rate and volume of stormwater runoff.

These goals will be accomplished over the coming 25 years by achieving objectives and management actions identified below. This plan uses innovative approaches to reduce and prevent increased rates and volumes of stormwater runoff within the Newport River watersheds to improve and protect water quality and reduce flooding. This plan emphasizes eight restoration objectives to accomplish its goals (Table 4-2 - Objectives).

Table 4-2: Objectives

O.1	Design and implement actions plan based upon the most current and accepted scientific and technical knowledge.
O.2	Restore and perpetually conserve working lands and undeveloped properties that either already contribute increased rates and volumes of polluted runoff, or which are anticipated to be developed in ways that will result in further degradation of water quality and increased flooding.
O.3	Retrofit private residential, commercial and industrial land uses to reduce the rate and volume of stormwater runoff.
O.4	Retrofit public land uses to reduce the rate and volume of stormwater runoff.
O.5	Install living shorelines and restore degraded salt marshes to enhance and restore riparian water quality buffers and reduce impacts from flooding and storm surges.
O.6	Monitor and adapt management strategies in this five-year plan to ensure the goal and objectives of the plan are being met.
O.7	Inform and engage the residents, visitors and other stakeholders to enlist their help and support to accomplish plan objectives.
O.8	Update plan every five years.

SECTION 5

Implementation Actions and Timelines

During the next five years, the following actions will be pursued and accomplished to achieve reductions in the rate and volume of polluted stormwater runoff and to protect and restore uses of the river.

Objective 01

This objective seeks to use and promote research and monitoring to inform the design and implementation of actions recommended by this plan.

Table 5-1

Actions and Timeline for Objective 1		Timeline
A1.1	Continue to work closely with the N.C. Division of Marine Fisheries, Shellfish Sanitation and Recreational Water Quality Section, to use its water quality monitoring and Sanitary Shoreline Survey results to identify acute and chronic water quality issues and problems to guide the location of management actions, and to determine if the implementation of plan actions is having a measurable result on the frequency and geographic extent of shellfish closures and swimming advisories.	Years 1-5
A1.2	Continue ongoing work by the Department of Biological and Agricultural Engineering at N.C. State University that is funded by the Kenan Institute to conduct expanded water quality monitoring to help identify hotspots of pollution during dry and wet weather conditions, and to measure the impact of implementation actions taken because of this plan.	Years 1-5
A1.3	Continue efforts to obtain funding for Dr. Antonio Rodriguez at the UNC Institute of Marine Sciences to establish baseline conditions to be able to monitor changes in the rates of sedimentation within the upper reaches of the river's estuary because of thousands of acres of hydrologic restoration work that is currently being undertaken.	Years 1-5
A1.4	In 2025, organize an advisory committee to include scientific experts to help design and guide hydrologic restoration on properties acquired for conservation in the watershed.	Years 1-3
A1.5	Produce an annual list of research priorities that will aid in the implementation and adaptation of plan actions. To prepare this list, convene all researchers and other stakeholders that are engaged in the use, research and management of the river.	Years 1-5

Objective 02

Restore and perpetually conserve working lands and undeveloped properties that either already contribute increased rates and volumes of polluted runoff due to past hydrologic modifications, or which are anticipated to be developed in ways that will result in further degradation of water quality and increased flooding.

This objective involves prioritization of working and undeveloped lands to preserve and/or restore natural hydrology within the watershed. Due to rapidly increasing populations and associated intense development pressures within the watersheds, protection of the Newport River depends heavily on preservation and/or restoration of working and natural lands where natural hydrology can be maintained or restored.

This can only occur by the acquisition of properties either by fee-simple conservation purchases or through conservation easements that protect natural hydrology and vegetated riparian buffers

This objective focuses on identifying, prioritizing, acquiring (in fee-simple or through conservation easements) working and natural properties that can be managed to provide for enhancements and protection of water quality and reductions in flooding. All these management actions are focused within Sub-watersheds 17, 22 and 23 that are identified as priority areas for management actions to achieve the greatest benefits for water quality within the shellfish waters that are in close proximity.

Table 5-2

Actions and Timeline for Objective 2		Timeline
A2.1	Create the Newport River Watershed Preserve Master Plan to prioritize the restoration of hydrology and protection of approximately 7,728.44 acres of riparian waterfront areas (See Figure 5.2.1). (Phases 1, 2, 3, 4, 5 and saltmarsh parcel).	Years 1-5
A2.2	Obtain ownership of Phase 1 in 2024 (Completed)	Complete
A2.3	Use existing N.C. Land and Water Fund grant to develop a final restoration plan for Phase 1 parcel (1,436.90 acres) by 2025.	Years 1-2
A2.3	Acquire Phase 3 (593.27 acres) from N.C. Coastal Land Trust in 2024.	Year 1
A2.4	Use existing funding from EPA to develop a restoration concept plan for Phases 2 and 3 (1,490.27 acres) in 2024-25.	Years 1-2
A2.5	Obtain and then use pending grants to develop final restoration plan for Phases 2 and 3 in 2025 and 2026.	Years 1-3
A2.6	Acquire Phase 2 (897 acres) from N.C. Coastal Land Trust in 2025. Acquire ownership of 462.83-acre saltmarsh parcel on southside of the river from N.C. Land Trust at the same time as the closing occurs on Phase 2.	Year 1-2
A2.7	Apply for and obtain a Phase 1 grant from the National Fish and Wildlife Foundation to model the water quality impact of the mosquito drainage ditches in the 462.83 acres salt marsh that the Federation is acquiring, and based upon those results, examine options to restore natural sheet flow across the marshes by modifying the existing ditches.	Year 1-2
A2.8	Restore Hydrology on Phases 1, 2, and 3 in 2026 and 2027 achieving an estimated 4,224,735 cubic feet reduction in stormwater runoff.	Years 2-5
A2.9	Work with N.C. Coastal Land Trust to Acquire for Restoration remaining parcels to complete the Newport River Watershed Preserve on the north side of river (totaling 4,122.47 acres) in 2024 through 2029. This acquisition could achieve an estimated 8,613,199 cubic feet reduction in runoff.	Years 1-5
A2.10	Acquire Ownership in 2025 from N.C. Coastal Land Trust of the 462.83-acres of salt marsh parcel on south side of river and add that to the Newport River Watershed Preserve. In 2025, begin investigations of restoration alternatives to repair damaged caused by extensive mosquito ditching that occurred decades ago. Based upon this investigation, seek funding to carry out appropriate runoff reduction mitigation projects. This work could achieve approximately 1,867,000cubic feet reduction in runoff.	Year 1-5
A2.11	Work with the Croatan National Forest and USDA on its on-going hydrology study to determine if there are opportunities to reduce the rate and volume of unnatural runoff entering the river from the federal properties.	Years 1-2
A2.12	Partners (Federation, N.C. Coastal Land Trust, DoD, and others) continue work to expand the Newport River Watershed Preserve Master Plan to include additional properties that drain to the Newport River as part of a larger, landscape initiative to create a network of properties that would establish a 46,000-acre conservation reserve in Carteret and Craven counties. This would add approximately 7,000 acres of property that drain to the river as part of the watershed preserve and result in an estimated reduction in volume of 16,081,102 cubic feet.	Years 3-20

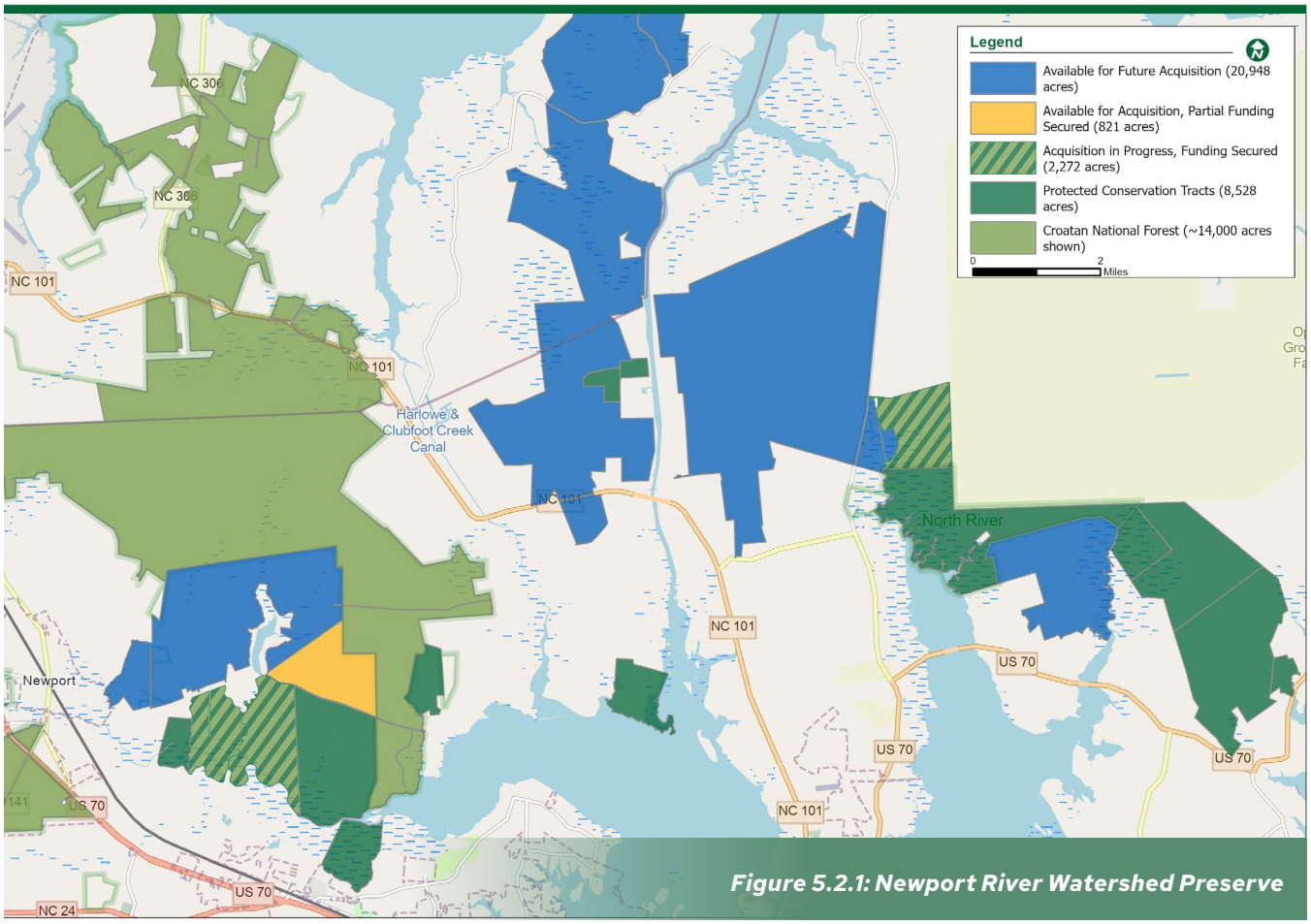


Figure 5.2.1: Newport River Watershed Preserve

Objective 03

Retrofit stormwater management systems on private residential, commercial and industrial land uses to reduce the rate and volume of stormwater runoff.

Stormwater system retrofits for existing development will reduce the overall rate and volume of polluted stormwater runoff into coastal waters. There are a wide variety of nature-based solutions to reduce the rate and volume of runoff that can be designed and installed to achieve this objective. The primary strategy is to maximize the ability of the natural landscape to hold, infiltrate and slow the runoff of surface runoff. These retrofits are needed on properties that were built prior to the adoption of coastal stormwater runoff regulations, and on those with state issued coastal stormwater permits that no longer have state-of-the-art designs or which have not been properly built, operated and maintained.

Potential project opportunities were identified based upon a compliance evaluation conducted by the state, as well as based upon discussions and meetings with project partners from the towns of Beaufort, Morehead City, and Newport as well as Carteret County. The project locations were determined based upon the "hot spots" of water quality and quantity concerns identified during these meetings. A high-level feasibility analysis was conducted at the locations of highest concern to determine the most appropriate project for each location.

Table 5-3

Actions and Timeline for Objective 3		Timeline
A3.1	Continuously investigate the availability of stormwater grants and potentially state appropriations and other funding sources to install lot-level, lower-cost retrofits that disconnect impervious surfaces and enhance stormwater infiltration.	Years 1-5
A3.2	Continuously explore opportunities to secure funds from the Community Conservation Assistance Program (CCAP) to help pay for private landowner stormwater retrofits.	Years 1-5
A3.3	Use a portion of the existing $5 million appropriation from the N.C. General Assembly to develop and begin to implement a cost-share program that will help landowners within the watershed that have state issued coastal stormwater permits comply with regulations and upgrade their stormwater systems. Focus evaluation on the 349 permits issued in the watershed, with priority given to the 30 permits that DEQ has found to be out of compliance, 30 permits that are expired, and 149 permits that DEQ has not evaluated for compliance. See next three tables for list of these permits. Estimated volume reduction from 25 retrofits in the first 5 years would be 1 million cubic feet. This work would accelerate once the retrofit program is up and running.	Years 1-5
A3.4	Further evaluate and rank for funding the retrofits sites that were visited in the field or identified by local government officials (see list). Prioritize any sites that have DEQ stormwater permits that are out of compliance.	Years 1-2

Table 5-3.1: Existing State issued permits on private properties that are out of compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8030302	Country Club Run Phase 1	Country Club Rd Sr 1177	Morehead City	No	Low	Active	Low Density
SW8030106	Eastman Creek Landing	Tuttles Grove Rd	Beaufort	No	Low	Active	Low Density
SW8041006	Gracelyn Park	Chatham St	Newport	No	Low	Active	Curb and Gutter
SW8050445	Eastman Creek Landing Phases 2 & 4	Carteret	Beaufort	No	Low	Active	Low Density
SW8051039	Country Club Run Phase 2	Off Country Club Run	Morehead City	No	Low	Active	Curb and Gutter
SW8040502	Morehead City Beaufort Elks Lodge No.1710	400 Miller Farm Rd	Morehead City	No	Low	Active	Low Density
SW8050108	Palmetto Plantation @ Olde Beaufort Village	Professional Park Dr	Beaufort	No	Low	Active	Curb and Gutter
SW8061113	North River Club Section Two	169 Taylor Farm Rd	Beaufort	No	High	Active	Other, Curb and Gutter
SW8060505	Murta Commercial Building (Modification to Lot 7H)	Lot 7h Jarret Bay Industrial Park S	Beaufort	No	Low	Active	Low Density
SW8101218	Gallants Point (formerly Aqua 10 Marina)	End of Aqua 10 Rd	Beaufort	No	Low	Active	Redevelopment
SW8090334	Newport Park	100 McQueen Ave	Newport	No	High	Active	Detention Pond
SW8090203	A & M Mini Storage	US Highway 70	Newport	No	High	Active	Detention Pond
SW8140210	S&W Ready Mix Concrete Morehead City	5161 Business Dr	Morehead City	No	Low	Active	Low Density
SW8200301	Pinnacle Storage - Wildwood	5475 US 70 W	Morehead City	No	High		
SW8200302	The Vinings at Wildwood II	5475 US 70 W	Morehead City	No	N/A	Active	Off-site
SW8900501	Martin Creek Subdivision	Sr 1318	Morehead City	No	Low		
SW8880205	Somerset Plantation Subdivision	Hwy 24	Morehead City	No	Low	Active	Low Density
SW8880401	Town Creek Marina	232 W Beaufort Rd	Beaufort	No	High		
SW8940112	Cypress Bay Shopping Center Expansion	NC 24 At US 70	Morehead City	No	High	Active	Detention Pond
SW8921004	Down East Trading Post	1901 Live Oak St	Beaufort	No	High		

Table 5-3.1: Existing State issued permits on private properties that are out of compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8931006	Sand Ridge Subdivision	Lincoln Foxhall Bayberry Graystone Roads	Newport	No	High	Expired	Detention Pond
SW8980429	Lowe's at Morehead Crossing	5219 Hwy 70	Morehead City	No	High		
SW8971034	Morehead Professional Park	Penny Lane John Platt Dr	Morehead City	No	High	Expired	Detention Pond
SW8971234	Crab Point Bay Subdivision	E Oglesby Rd	Morehead City	No	Low		
SW8970925	Courtyard West Aka Pollard Property	1800 Courtyard W	Newport	No	High	Expired	Detention Pond
SW8980926	Whitewater Subdivision Master Plan (Jarrett Bay)	530 Sensation Weigh	Beaufort	No	Low		
SWA000003	Morehead City Country Club Golf Course and Club Facilities Improvements	2900 Country Club Rd	Morehead City	No	High	Expired	High & Low Desnity Combo
SW8991033	Lot 5 Whitewater Subdivision at Jarrett Bay	Sensation Weigh Rd	Beaufort	No	Low		
SW8991110	Newport Middle School	Corner of US 70 Hibbs Rd	Newport	No	High	Expired	Detention Pond
SW8990638	Buena Vista Subdivision	Buena Vista Dr	Morehead City	No	Low		

Based on DEQ information as of January 2024: https://www.deq.nc.gov

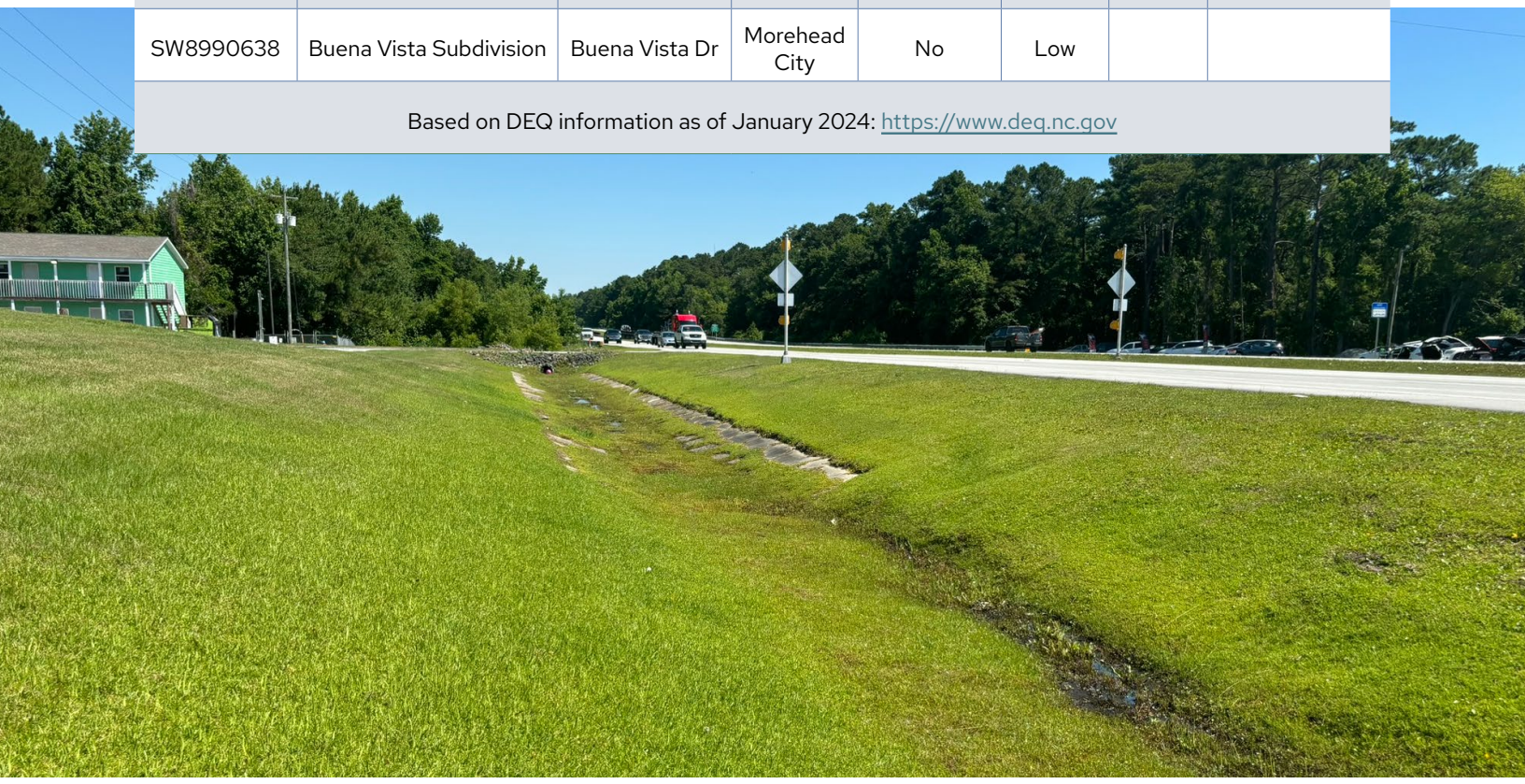


Table 5-3.2: Expired state issued stormwater permits on private properties that have not been evaluated by DEQ for compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8000527	Oakwood Mobile Homes	5526 US 70	Morehead City	Not Evaluated	High	Expired	Detention Pond
SW8001125	Pier 1 Imports Site	5218 Hwy70	Morehead City	Not Evaluated	High	Expired	Detention Pond
SW8010535	NC Hwy 24 Property Lot 3 Commercial Deve	Cypress Bay Shopping Ctr Food Lion	Morehead City	Not Evaluated	High	Expired	Detention Pond
SW8021203	East Carolina Bank-Morehead City	NC Hwy 24	Morehead City	Not Evaluated	High	Expired	Detention Pond
SW8050115	Storage Ideas, LLC	Ashley Pl Hwy 70	Newport	Not Evaluated	High	Expired	Detention Pond
SW8050116	GATCO II, LLC	Hwy 70	Morehead City	Not Evaluated	High	Expired	Detention Pond
SW8050508	Park Villas formerly Building Partners	Old Murdoch Rd Sr 1151	Morehead City	Not Evaluated	High	Expired	Detention Pond
SW8050809	Lot 7A - Jarrett Bay Industrial Park	1401 Sensation Weigh-Lot 7a Jarret Bay Industrial Park	Beaufort	Not Evaluated	High	Expired	Infiltration
SW8060112	Lot 10 Jarrett Bay - True World Marine	1401 Sensation Weigh-Lot 10 Jarrett Bay Industrial Park	Beaufort	Not Evaluated	High	Expired	Sand Filters
SW8070534	Phillips Property	5437 Hwy 70	Morehead City	Not Evaluated	High	Expired	Detention Pond
SW8070820	Mainsail of Beaufort	Jct of Turner St and Jill St	Beaufort	Not Evaluated	High	Expired	Detention Pond
SW8080109	Parker Honda	5327 Hwy 70 W	Morehead City	Not Evaluated	High	Expired	Detention Pond
SW8080125	Pirates Landing	Professional Park Dr	Beaufort	Not Evaluated	High	Expired	Detention Pond
SW8080212	Walgreen Store No 11895 Morehead City	5053 Hwy 70	Morehead City	Not Evaluated	High	Expired	Infiltration
SW8080224	Crystal Coast Boat and RV Storage	471 Tom Mann Rd	Newport	Not Evaluated	High	Expired	Detention Pond
SW8080512	Waterway Marina and Club at Beaufort	346 Steel Tank Rd	Beaufort	Not Evaluated	High	Expired	Hybrid Infiltration, Sand Filters
SW8080606	Beaufort Corporate Park	Between Family Lane And Copeland Rd	Beaufort	Not Evaluated	High	Expired	Detention Pond
SW8100508	The Cottages at Palmetto Plantation	Professional Park Dr	Beaufort	Not Evaluated	High	Expired	Detention Pond

Table 5-3.2: Expired state issued stormwater permits on private properties that have not been evaluated by DEQ for compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8100606	CVS Store 7381 Beaufort	1701 Live Oak St	Beaufort	Not Evaluated	High	Expired	Wetlands
SW8131205	Walmart Neighborhood Market Store #7098-00	415 Roberts Rd	Newport	Not Evaluated	High	Expired	Detention Pond
SW8930405	Somerset Court of Newport	3020 Market St	Newport	Not Evaluated	High	Expired	Detention Pond
SW8960108	Thompson Apartments	Off Symi Cir	Morehead City	Not Evaluated	High	Expired	Detention Pond
SW8970432	The Professional Center	3302 Bridges St	Morehead City	Not Evaluated	High	Expired	Detention Pond
SW8970855	Boulia Enterprises	Hwy 70	Newport	Not Evaluated	High	Expired	Detention Pond
SW8990120	CRSWMA Newport Convenience Center	Hibbs Rd Sr 1141	Newport	Not Evaluated	High	Expired	Low Density, Infiltration
SW8991109	Troon Apartments	300 Troon Way	Beaufort	Not Evaluated	High	Expired	Detention Pond
SW8880712	Eagles Bay Elderly Apartments	100 Eagles Bay Ct	Beaufort	Not Evaluated	N/A	N/A	Permit Data Not Available
SW8880907	Westwood Square Apartments	Brook St	Morehead City	Not Evaluated	High	N/A	Permit Data Not Available
SW8890611	Adams Harbor	NC 1122	Morehead City	Not Evaluated	N/A	N/A	Permit Data Not Available
SW8910508	Wards Landing Subdivision	NCSR 1149 And US 70	Newport	Not Evaluated		N/A	Permit Data Not Available

Based on DEQ information as of January 2024: https://www.deq.nc.gov

Table 5-3.3: Active state issued stormwater permits on private properties that have not been evaluated by DEQ for compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8000324	Gregory Poole Power Systems Lot 11A Jarrett Bay	1500 Sensation Weigh Rd	Beaufort	Not Evaluated	Low	Active	Low Density
SW8000520	Gloryfields Subdivision	Country Club Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8000523	House of Silk Flowers	2660 NC Hwy 101	Beaufort	Not Evaluated	Low	Active	Low Density
SW8000533	Courtesy Village Aka Sand Ridge Apartmen	Lincoln Rd	Newport	Not Evaluated	N/A	Active	Off-site
SW8000640	Lot 14 Jarrett Bay Marine Industrial Park	1150 Sensation Weigh	Beaufort	Not Evaluated	Low	Active	Low Density
SW8000933	First Citizens Bank Newport	7045 Highway 70 E	Newport	Not Evaluated	High	Active	Detention Pond
SW8000935	The Reserve Phase II			Not Evaluated	Low	Active	Low Density
SW8001205	Lot 15 Jarrett Bay Marine Industrial Park	Sensation Weigh	Beaufort	Not Evaluated	Low	Active	Low Density
SW8001208	Ruby Tuesday Restaurant	5227 Hwy 70 W	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8010209	Newport Hotel at Fort Benjamin Commons	Joyce Ave	Newport	Not Evaluated	High	Active	Detention Pond
SW8010302	Larry Styron Property Smith - Herring Fa	Smith Herring Farm Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8010530	The Reserve	Brandywine Blvd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8010702	Lot 6 Jarrett Bay Marine Industrial Park	1001 Sensation Weigh	Beaufort	Not Evaluated	Low	Active	Low Density
SW8011103	Kings Mill	New Bern St	Newport	Not Evaluated	N/A	Active	Off-site
SW8011110	The Reserve Green	Brandywine Blvd	Morehead City	Not Evaluated	Low	Active	Curb and Gutter
SW8020127	God's Property	Off Carl Garner Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8020314	Boys and Girls Club of Carteret County	331 Arendell St	Morehead City	Not Evaluated	High	Active	Infiltration
SW8020322	Lot 18 Jarrett Bay Ma-rine Industrial Park North	1501 Sensation Weigh Rd	Beaufort	Not Evaluated	Low	Active	Low Density
SW8020902	Joan's Haven Subdivision Section 2	Sr 1154 Mill Creek Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8020933	Ronnie Perry- Lot 11 Webbs Park SD	Lois Ln	Morehead City	Not Evaluated	Low	Active	Low Density

Table 5-3.3: Active state issued stormwater permits on private properties that have not been evaluated by DEQ for compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8021037	Bridge Mill Professional Park	Bridges St	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8021206	Blair Point Park	Intersection Sr 1176 Sr 1179	Morehead City	Not Evaluated	Low	Active	Low Density
SW8030204	Beaufort Child Development Facility, Permitted under Beaufort Professional Park	Professional Park Dr	Beaufort	Not Evaluated	N/A	Active	Off-site
SW8030501	Lowes Food Store at Morehead Plaza	Morehead City	Morehead City	Not Evaluated	Low	Active	Infiltration, Redevelop-ment
SW8030822	Plantation on the Bay Subdivision	Fowler Dr	Newport	Not Evaluated	Low	Active	Low Density
SW8031053	Sea Gate Subdivision Block C, Sec. III Lots 1-10	Old Stanton Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8031109	Blue Point Bay	Murdoch Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8040244	E Linwood Parker Residence	Russell Creek Rd	Beaufort	Not Evaluated	Low	Active	Low Density
SW8040419	Hestron Corp. 13-41 AC-Tract	Hwy 70 W	Morehead City	Not Evaluated	Low	Active	Low Density
SW8050412	South Park Subdivision	Howard Blvd	Newport	Not Evaluated	Low	Active	Curb and Gutter
SW8050428	Quail Crossing	SR 1124 Nine Foot Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8050503	J & S Carolina Proper-ties, LLC Site Plan	US Hwy 70	Newport	Not Evaluated	Low	Active	Low Density
SW8050553	Taylor Clearing-Harkers Island Road	Carteret	Beaufort	Not Evaluated	Low	Active	Low Density
SW8050601	United Pentecostal Church	8125 Hwy 70 E	Newport	Not Evaluated	Low	Active	Curb and Gutter
SW8050605	Bridgewater at Ware Creek	Russell Creek Rd off Hwy 101	Morehead City	Not Evaluated	Low	Active	Low Density
SW8050619	Lot 7J Jarrett Bay Industrial Park	1101 Spartina Dr	Beaufort	Not Evaluated	Low	Active	Low Density
SW8051027	The Coves at Newport	US Hwy 70	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8051138	Eden Bridge Subdivision	Brooks St	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8060421	Park Meadows Subdivision	Lakewood Ct	Newport	Not Evaluated	Low	Active	Low Density
SW8060709	Lana Gardens Subdivision	Roberts Rd	Newport	Not Evaluated	Low	Active	Curb and Gutter

Table 5-3.3: Active state issued stormwater permits on private properties that have not been evaluated by DEQ for compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8061006	All Saints Church Amia Inc	290 McCabe Rd	Newport	Not Evaluated	High	Active	Hybrid Sand Filters, Low Density
SW8061111	Castle Glen Apartments	Bern St	Newport	Not Evaluated	N/A	Active	Off-site
SW8070227	Blair Farms Section VIII	Blair Farms Pkwy	Morehead City	Not Evaluated	Low	Active	Curb and Gutter
SW8070321	Rams Run	Sr 1124 Quinn Hill Loop Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8070428	Laughton Landing	Sr 1177 Country Club Rd	Morehead City	Not Evaluated	Low	Active	Curb and Gutter
SW8070507	Pinnacle Pointe	1454 Oglesby Rd	Morehead City	Not Evaluated	Low	Active	Curb and Gutter
SW8070642	Waste Industries Roberts Road	427 Roberts Rd	Newport	Not Evaluated	High	Active	Detention Pond
SW8070733	Cape Point Bait Company	1465 Hwy 101	Beaufort	Not Evaluated	Low	Active	Low Density
SW8070741	Newport Shopping Center Phase 2	Hwy 70	Newport	Not Evaluated	High	Active	Detention Pond
SW8070827	Commerce Avenue Condominiums	3302 Bridges St	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8070851	Noland Company	300 Greenfield Dr	Morehead City	Not Evaluated	Low	Active	Low Density
SW8070934	Chic-fil-A Restaurant at Crystal Coast Plaza	5156 Hwy 70	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8071106	Wards Creek Point	End of Channel Rock Rd	Beaufort	Not Evaluated	Low	Active	Low Density
SW8071113	Coastal Yacht Hangar Lot 9 Jarrett Bay	1301 Sensation Weigh Rd	Beaufort	Not Evaluated	High	Active	Infiltration, Other, Low Density
SW8071222	West Beaufort Boating Access Area	W Beaufort Rd at Town Creek	Beaufort	Not Evaluated	Low	Active	Low Density
SW8080110	Morehead Enterprises LLC Highway 70 Morehead City	5208 Hwy 70	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8080326	Narron Business Park	Arthur Farm Rd	Morehead City	Not Evaluated	Low	Active	Curb and Gutter
SW8080421	Chadwick Shores Plantation	NCSR 1155	Newport	Not Evaluated	Low	Active	Low Density
SW8090302	Cypress Village Subdivision	300 Masontown Rd	Newport	Not Evaluated	Low	Active	Low Density

Table 5-3.3: Active state issued stormwater permits on private properties that have not been evaluated by DEQ for compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8090338	Little Nine Development	Little Nine Dr	Morehead City	Not Evaluated	Low	Active	Redevelop-ment
SW8090402	Ashley Place Subdivision 3	Between Fox Hall Rd and Can-non Blvd	Newport	Not Evaluated	Low	Active	Low Density
SW8090620	Jones Pond	Hwy 70 Carteret Dr	Beaufort	Not Evaluated	High	Active	Detention Pond
SW8090624	Lot 2 Jones Brothers Business Park	401 Miller Farm Rd	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8090637	McDonalds Beaufort	Hwy 70 Carteret Dr	Beaufort	Not Evaluated	N/A	Active	Off-site
SW8090908	Bayview Homes	1300 Bay St	Morehead City	Not Evaluated	Low	Active	Redevelop-ment
SW8091014	Bur Oaks Section Four	Bur Oaks Blvd	Newport	Not Evaluated	Low	Active	Low Density
SW8091016	Core Creek Marina & Beaufort Waterway RV Park formerly Adams Creek Marina	329 Core Creek Rd	Beaufort	Not Evaluated	Low	Active	Redevelop-ment
SW8091205	Olive Garden Restaurant Morehead City	US Highway 70	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8091221	Beaufort Harbor Marina and Yacht Club	101 Cedar St	Beaufort	Not Evaluated	Low	Active	Redevelop-ment
SW8100203	Gracelyn Park Phase IV	Edgewood Ave	Newport	Not Evaluated	Low	Active	Curb and Gutter
SW8100302	Aarons Furniture	7075 Hwy 70	Newport	Not Evaluated	N/A	Active	Off-site
SW8100601	The Vinings at Wildwood	133 Wildwood Rd	Newport	Not Evaluated	High	Active	Detention Pond, Wetlands
SW8101117	Compass Landing Apartment Homes	Access Old Fashion Way	Newport	Not Evaluated	High	Active	Detention Pond
SW8110112	Dollar General More-head City	3017 Bridges St	Morehead City	Not Evaluated	Low	Active	Redevelop-ment
SW8110203	Morehead Professional Park Lot 6	Sw Int of John Platt Drive and Penny Ln	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8110402	Oneals Drug Store	129 Nine Foot Rd	Newport	Not Evaluated	High	Active	Wetlands
SW8110419	Hibbs Road American Tower Site 273437	5899 Hwy 70	Newport	Not Evaluated	Low	Active	Low Density
SW8110510	Morehead City Sales Yard	5101 Business Dr	Morehead City	Not Evaluated	High	Active	Detention Pond

Table 5-3.3: Active state issued stormwater permits on private properties that have not been evaluated by DEQ for compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8110612	Little Nine Road Extension	Little Nine Dr	Morehead City	Not Evaluated	Low	Active	Other
SW8111203	State Employees Credit Union Beaufort Office	Pinners Point Rd	Beaufort	Not Evaluated	High	Active	Detention Pond
SW8120115	Pearl G West Property	231 Pinners Point Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8120402	Crystal Coast Hospice House	E Chatham St	Newport	Not Evaluated	N/A	Active	Off-site
SW8120503	Eitner Jayne Commercial Center	4913 Bridges St Extension	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8120611	Longhorn Steakhouse Lot A East Gate Plaza	Int Hwy 70 and Flowers Ln	Morehead City	Not Evaluated	Low	Active	Redevelop-ment
SW8121010	Shipps Storage	457 Tom Mann Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8130305	Old Town Creek Harbor Homes	501 Turner St	Beaufort	Not Evaluated	Low	Active	Low Density
SW8140505	Fences Unlimited	203 Jacob Dr	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8140602	Duke Energy Progress Morehead City Operations Facility	270 Arthur Farm Rd	Newport	Not Evaluated	High	Active	Detention Pond
SW8140803	Lot 10A Morehead Professional Park	Penny Ave	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8150206	Lot 16 Wayne See Business Park	204 Jacob Dr	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8150313	Palmetto Plantation and Olde Beaufort Village Phase 2	Professional Park Dr	Beaufort	Not Evaluated	High	Active	Detention Pond
SW8150511	Lot 19 at Wayne See Industrial Park	5035 Mattie St	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8150720	Storage Solutions Business Drive	Lot 30 Wayne See Industrial Park	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8160618	West End Pump Station and Force Main	261 Arthur Farm Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8160720	General Services Operations Building	Off Business Dr	Newport	Not Evaluated	N/A	Active	Off-site
SW8160805	Lot 20 Wayne See Industrial Park	5031 Mattie St	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8160902	Wayne See Subdivision Lot 14	Lot 14 Wayne See Industrial Park	Morehead City	Not Evaluated	N/A	Active	Off-site

Table 5-3.3: Active state issued stormwater permits on private properties that have not been evaluated by DEQ for compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8161010	Lidl Grocery Store Morehead City	US Hwy 70 W	Morehead City	Not Evaluated	Low	Active	Redevelop-ment
SW8170511	Heritage Pointe Phase One	Off Mason Town Rd	Newport	Not Evaluated	Low	Active	Curb and Gutter
SW8170613	Beaufort Storage	1795 Live Oak St	Beaufort	Not Evaluated	N/A	Active	Off-site
SW8171005	McDonalds Morehead City	5173 5179 Hwy 70 W	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8171114	Lucas Kidney Research Center	623 35th St	Morehead City	Not Evaluated	Low	Active	Redevelop-ment
SW8180219	Harlowe 230 kV Substation	4417 Hwy 101	Newport	Not Evaluated	Low	Active	Low Density
SW8180505	Salvation Army	2800 Bridges St	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8180509	Pelican Point Properties US HWY 70E Pond	5133 Hwy 70 E	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8180510	The Wash Factory	5129 Hwy 70 E	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8180706	Hannula Storage	215 Jacob Dr	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8180902	Dollar General - Carteret County	2440 Hwy 101	Beaufort	Not Evaluated	High	Active	Infiltration
SW8181007	Shearline Boatworks	301 Facility Dr	Morehead City	Not Evaluated	Low	Active	Low Density
SW8190206	Carl Garner Laydown Yard	209 Carl Garner Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8190313	Taco Bell	1798 Live Oak St	Beaufort	Not Evaluated	High	Active	Other
SW8190515	Randolph Johnson Park	1017 Pine St	Beaufort	Not Evaluated	Low	Active	Low Density
SW8190603	Waste Removal Contractors Plant and Storage Yard	167 Little Nine Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8190702	Green Recycling Solutions	812 926 Hibbs Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8190705	North Carolina State Employee's Credit Union - Newport Branch	102 Joyce Ave	Newport	Not Evaluated	High	Active	Other
SW8190904	Compass Margaritaville Hotels & Resorts	115 Cedar St	Beaufort	Not Evaluated	High	Active	Infiltration, Redevelop-ment
SW8200303	Stroud Engineering Office	422 Hwy 24	Morehead City	Not Evaluated	High	Active	Detention Pond

Table 5-3.3: Active state issued stormwater permits on private properties that have not been evaluated by DEQ for compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8200405	Line 243 Retrofit Receiver	US Hwy 70	Newport	Not Evaluated	Low	Active	Low Density
SW8200610	Coastal Gym	5301 Hwy 70	Morehead City	Not Evaluated	N/A	Active	Off-site
SW8201102	Elijah's Landing Apartments	3200 Bridges St	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8201215	Carteret Health Care Laydown Area	Bridges Street and Penny Ln	Morehead City	Not Evaluated	Low	Active	Redevelop-ment
SW8210504	Duke Energy Progress - Morehead 115kV Substation	510 Maple Ln	Morehead City	Not Evaluated	Low	Active	Low Density
SW8210508	Heritage Pointe - Phase Four	At Approx 156 Howard Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8210514	East Port II Apartments	619 Professional Park Dr	Beaufort	Not Evaluated	High	Active	Detention Pond
SW8211005	Kimeplex Park	788 NC-24	Newport	Not Evaluated	High	Active	Detention Pond
SW8211206	Brandywine Bay WWTP Replacement	104 Sleepy Ct	Morehead City	Not Evaluated	Low	Active	Low Density
SW8220207	AA Storage Beaufort	2176 Live Oak St	Newport	Not Evaluated	High	Active	Detention Pond
SW8880210	Hardesty Farms	Hardesty Ln	Newport	Not Evaluated	Low	Active	Low Density
SW8880511	Silver Lakes	Silver Lake Subdivision	Morehead City	Not Evaluated	Low	Active	Low Density
SW8880713	Riverwoods Phase 5	Sr 1149	Newport	Not Evaluated	Low	Active	Low Density
SW8881117	Market Place II	Hwy 70 W	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8891005	Eagles Nest Mobile Home Park	Off NCSR 1124	Morehead City	Not Evaluated	Low	Active	Low Density
SW8900221	Waste Industries Roberts Road	427 Roberts Rd	Newport	Not Evaluated	High	Active	Detention Pond
SW8930603	Deer Haven Subdivision	NCSR 1154	Newport	Not Evaluated	Low	Active	Low Density
SW8940404	Duke Energy Progress North River 115k V Substation	1150 Hghway 101	Beaufort	Not Evaluated	N/A	Active	Low Density
SW8940813	Justins Corner Subdivision	Off Mandy Ln	Morehead City	Not Evaluated	Low	Active	Detention Pond
SW8960328	The Village at Camp Morehead By The Sea	Off NC 24	Morehead City	Not Evaluated	Low	Active	Curb and Gutter

Table 5-3.3: Active state issued stormwater permits on private properties that have not been evaluated by DEQ for compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8960616	Bur Oaks Subdivision	Bur Oaks Blvd Sr 1195	Newport	Not Evaluated	Low	Active	Low Density
SW8961108	Newport Food Lion	7075 Hwy 70	Newport	Not Evaluated	High	Active	Detention Pond
SW8970102	Woodlands IV Subdivision	N New Bern St	Newport	Not Evaluated	Low	Active	Low Density
SW8970307	Blair Pointe Phase I	NCSR 1177	Morehead City	Not Evaluated	Low	Active	Low Density
SW8980103	Britthaven of Newport	210 Foxhall Rd	Newport	Not Evaluated	N/A	Active	Off-site
SW8980409	Jarrett Bay Boatworks Steel Tank Road	530 Sensation Weigh	Beaufort	Not Evaluated	Low	Active	Redevelop-ment
SW8980826	Alice J. Bayer	NC Hwy 101	Beaufort	Not Evaluated	Low	Active	Low Density
SW8981115	Sheerline Subdivision	530 Sensation Weigh	Beaufort	Not Evaluated	Low	Active	Low Density
SW8990929	Jones Brothers Industrial Park formerly Jones Brothers Partnership Shell Building	Miller Farm Rd	Morehead City	Not Evaluated	High	Active	Detention Pond
SWA000076	Development of 5264 Highway 70	5264 Highway 70	Morehead City	Not Evaluated	High	Active	Detention Pond

Based on DEQ information as of January 2024: https://www.deq.nc.gov

Table 5-3.3: Potential retrofit projects on private developed lands

Location	Project Type	Approximate Treatment Volume (CFT)	Project Cost	Cost per CFT
Tuttles Grove	Regional Stormwater Wetland	270,644	$1,353,000	$5.00
Heritage Pointe	SCM Retrofit	36,583	$658,000	$17.98
Lowes Shopping Center on HWY 70	SCM Retrofit	57,037	$1,027,000	$18.00
Blair Farms	Infiltration Basin	61,621	$1,294,000	$21.00

Objective 04

The rate and volume of stormwater runoff being transported over land to waterways needs to be reduced to restore water quality. This objective focuses on opportunities on publicly owned land that is owned by the federal, state and local governments, including N.C. Department of Transportation. By focusing the objective on public lands and conveyance systems; governmental agencies managing property and infrastructure within the watershed can lead by example and demonstrate commitment to improving watershed health to the community.

Table 5-4

Actions and Timeline for Objective 4		Timeline
A4.1	Utilize the plan as framework to obtain public funds for stormwater management to help pay for expenditures on retrofits and projects.	Years 1-5
A4.2	Locations identified by stakeholders with chronic flooding problems impacting public infrastructure should be evaluated for stormwater retrofit projects to determine if correction measures that protect water quality and reduce flooding can be identified. Feasible designs should be prioritized for securing funding for retrofits. These locations are listed in Table 5-4.1 below.	Years 1-3
A4.3	Review list of state issued stormwater permits that are held by governmental agencies and prioritize retrofits for permits that are not in compliance with requirements, or which have not been evaluated for compliance. Examine two permits that are not in compliance (Table 5-4.2), four that are expired (Table 5-4.3), and 31 that have not been evaluated for compliance by DEQ. Pick priority projects to provide cost-share support to bring them into compliance using the $5 million appropriation by the N.C. General Assembly, and other funds that will be secured.	Years 1-2
A4.4	Work with N.C. Department of Transportation to install stormwater retrofits along its highway drainage system that will reduce the rate and volume of runoff into coastal waters. Specific projects identified include the large ditches that drain directly into the Newport River along Highway 70 (estimated cost is $2 million for the retrofit with a volume reduction of 62,490 cubic feet for the 1-year, 24-hour storm) and the oversized ditches along Highway 70 at the Beaufort Airport (estimated cost is $1 million for the retrofit with a volume reduction of 68,664 cubic feet for the 1-year, 24-hour storm). See Table 5-4-3 below for other potential retrofit locations.	Years 1-3
A4.5	Work with the Towns to incorporate Green Street Designs that reduce the rate and volume of runoff into future capital improvement plans of municipal streets. Review sites identified during field visits that would make good green street retrofits (see Table 5-4.4).	Years 1-5
A4.6	Where applicable and practical, work with government agencies to seek to use pervious paving surfaces for public development or redevelopment projects.	Years 1-5
A4.7	Pursue strategy with NC DOT to incorporate retrofits into the state-maintained transportation system within the watershed. Pursue strategy with DOT that any new road upgrades or maintenance plans include plans to reduce the rate and volume of runoff.	Years 1-5
A4.8	Work with the Town of Morehead City to Implement green street retrofits on N.23rd Street.	Years 1-4

Table 5-4.1: Flooding hotspots on public properties identified during field visits with governmental officials

- Briarpatch Dr, Beaufort
- Ronnie Rd, Beaufort
- Broad St, Beaufort
- Marsh St, Beaufort
- Pollock St, Beaufort
- Cedar St, Beaufort
- 2nd St & Carteret Ave, Beaufort
- 1st St & Craven Ave, Beaufort
- White Sands, Newport
- Market St, Newport
- Gracelyn Park, Newport
- Live Oak St @ First St, Beaufort
- Hilltop Rd, Newport
- W Railroad St, Newport
- Country Club Rd @ Kingfisher Dr, MHC
- Blair Pointe Rd @ Country Club Rd
- Avery St, MHC
- Emeline Pl W of S Yaupon Terrace
- Pine St, Beaufort
- Mulberry St, Beaufort

Table 5-4.2: Publicly owned state permitted stormwater systems deemed by DEQ to be out of compliance

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8090334	Newport Park	100 McQueen Ave	Newport	No	High	Active	Detention Pond
SW8991110	Corner of US 70 Hibbs Rd	Corner of US 70 Hibbs Rd	Newport	No	High	Expired	Detention pond

Table 5-4.3: Publicly owned state permitted stormwater systems with expired permits that have not been evaluated by DEQ

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8070340	Newport Elementary School - Additions & Renovations	Chatham St	Newport	Not Evaluated	High	Expired	Detention Pond
SW8070933	Morehead City Baseball Park	Mayberry Loop Rd	Morehead City	Not Evaluated	High	Expired	Infiltration
SW8121001	Beaufort Fire Department Substation	2731 Highway 101	Beaufort	Not Evaluated	High	Expired	Detention Pond
SW8151004	Beaufort Fire Department #1	Live Oak St	Beaufort	Not Evaluated	High	Expired	Detention Pond

Table 5-4.4: Publicly owned state permitted stormwater systems with active permits that have not been evaluated by DEQ

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8000838	Morehead City 2000 Street Improvements Plan			Not Evaluated	Low	Active	Other
SW8001007	Business Drive Extension			Not Evaluated	Low	Active	Low Density
SW8010430	New Beaufort Elementary School	Carraway St	Beaufort	Not Evaluated	High	Active	Infiltration
SW8010714	Morehead Middle School	400 Barbour Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8010913	Contract No. 8-WWTP Filter & Irrigation	Town of Morehead City	Morehead City	Not Evaluated	Low	Active	Low Density
SW8011018	Contract No. 41 Water Treatment Plant	Carteret County	Beaufort	Not Evaluated	Low	Active	Low Density
SW8020314	Boys and Girls Club of Carteret County	331 Arendell St	Morehead City	Not Evaluated	High	Active	Infiltration
SW8040101	Contract No. 9-Bikeway Improvements	N Side of Bridges St	Morehead City	Not Evaluated	Low	Active	Other
SW8050713	Contract No. 34 Street Improvements	Various Within City	Morehead City	Not Evaluated	Low	Active	Other
SW8060239	2005 WWTP Improvements Morehead City	Treatment Plant Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8070403	Newport Boating Access Area	333 E Chatham St	Newport	Not Evaluated	Low	Active	Low Density
SW8070844	Morehead Community Center	N 16th St	Morehead City	Not Evaluated	Low	Active	Low Density
SW8071222	West Beaufort Boating Access Area	W Beaufort Rd at Town Creek	Beaufort	Not Evaluated	Low	Active	Low Density
SW8090105	Reclaimed Water Elevated Storage Tank	Mayberry Loop Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8090120	Contract 71 Water Treatment Plant No. 4	1545 Country Club Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8100512	Carteret County Industrial Park Lot 6A	311 Facility Dr	Newport	Not Evaluated	Low	Active	Low Density

Table 5-4.4: Publicly owned state permitted stormwater systems with active permits that have not been evaluated by DEQ

Permit Number	Facility Name	Facility Address	City	DEQ Compliant?	Density	Status	Regulated Activity
SW8160618	West End Pump Station and Force Main	261 Arthur Farm Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8171117	Newport - 230kV Substation - Switch	232 Danny Garner Rd	Newport	Not Evaluated	Low	Active	Low Density
SW8180219	Harlowe 230 kV Substation	4417 Hwy 101	Newport	Not Evaluated	Low	Active	Low Density
SW8921104	Morehead City Elementary School			Not Evaluated	Low	Active	Low Density
SW8921205	Morehead Middle School	400 Barbour Rd	Morehead City	Not Evaluated	Low	Active	Low Density
SW8950901	Carteret County Senior Center	3820 Galantis Dr	Morehead City	Not Evaluated	High	Active	Detention Pond
SW8950903	1995 Morehead Waterfront Improvements			Not Evaluated	Low	Active	Redevelopment
SW8980101	Carteret County Industrial Park	Business Dr	Morehead City	Not Evaluated	Low	Active	Low Density
SW8980540	Morehead City Well 5 & Tank 3			Not Evaluated	Low	Active	Low Density
SW8981035	Town of Newport Water Treatment Improve.			Not Evaluated	Low	Active	Low Density
SW8981125	Town of Newport Sewer / Middle School Tr			Not Evaluated	Low	Active	Low Density
SW8990419	Michael J Smith Field	180 Airport Rd	Beaufort	Not Evaluated	High	Active	Low Density, Detention Pond
SWG040012	Well No. 4 Access Road	Approx 1830 Live Oak St	Beaufort	Not Evaluated	N/A	Active	General Permit
SWG040109	Town of Newport Chatham Street Sewer Extension	Extending From 330 E Chatham St	Newport	Not Evaluated	N/A	Active	General Permit
SWG040113	Morehead Wildwood Harlowe 115kV Line Loop into Harlowe Substation	Intersection of Hwy 101 and Harvesty Loop Rd	Newport	Not Evaluated	N/A	Active	General Permit

Based on DEQ information as of January 2024: https://www.deq.nc.gov

Table 5-4.3: NCDOT flooding hotspots and other stormwater retrofit locations identified during field visits

- Chatham St & Newport Loop Rd
- Chatham St & HWY 70, Newport
- Wildwood Rd @ Oak Trail
- Along US 70 @ Circle K
- E Chatham St @ Newport River
- HWY 70 @ Bayberry Rd, Newport
- Country Club Rd @ Kingfisher Dr
- N20thSt between Anne Neal Rd & Jersey St
- Blair Pointe Rd @ Country Club Rd
- HWY 70 @ Brandywine
- N 20th St & Mayberry Loop Rd

Table 5-4.4: Calico Creek stormwater retrofit project already funded and being implemented

Location	Project Type	Approximate Treatment Volume (CFT)	Project Cost	Cost per CFT
Meeting St, Beaufort (currently under design)	SCM Retrofit	51,498	$927,000	$18.00
Fairview Dr & Live Oak St, Beaufort	Infiltration Basin	65,231	$1,370,000	$21.00
Bayberry Rd, Newport	Bioretention Cell	32,608	$489,000	$15.00
Calico Creek, Morehead City (currently ongoing)	Swales, Permeable Pavement, Stormwater Drain Pipes	-	$5,000,000	-
Totals		**149,337**	**$2,786,000**	**$18.66**

Objective 05

Water quality is protected and enhanced through the protection and restoration of salt marshes along estuarine shorelines. Within the Newport River watershed, in addition to water quality benefits, salt marshes provide valuable functions such as fisheries/animal habitats, storm surge mitigation, sea level rise adaptation, and shoreline stabilization. While many shorelines have been stabilized with traditional hardened approaches (bulkheads, rip-rap revetments), there remain many shorelines surrounding the Newport River that are naturally vegetated shorelines. Where existing bulkheads need repair, or naturally vegetated shorelines are unable to be sustained over time, restoration projects including living shorelines provide excellent opportunities to provide erosion control as well as water quality benefits.

Table 5-5

	Actions and Timeline for Objective 5	Timeline
A5.1	Continue outreach to estuarine shoreline property owners along the Newport River to enroll them in the Federation's cost-share program that encourages the use of living shorelines instead of bulkheads and other hard-stabilization structures for erosion control.	Years 1-5
A5.2	Seek additional state and federal funds to continue the living shoreline cost-share program.	Years 1-5
A5.3	Complete the development of an estuarine shoreline management plan for the Town of Morehead City that will identify priority areas for salt marsh restoration and living shorelines along the Newport River within the Town's jurisdiction. Quantify the water quality benefits of sites prioritized in the plan. The Town has committed $400,000 to the development of this plan.	Year 1
A5.4	As the Morehead City Estuarine Shoreline Management Plan nears completion, seek to prepare similar plans for the areas along the Newport River for the Town of Beaufort and for the incorporated shorelines within the jurisdiction of the Carteret County.	Year 2-5
A5.5	Determine the feasibility of restoring the nearly 462 acres of salt marsh currently owned by the N.C. Coastal Land Trust (which will be transferred to the Federation in 2025). Mosquito ditches throughout this marsh short circuit its protective water quality functions and ability to dampen storm surges on inland properties. The estimated cost of restoration is $4,764,000 which could achieve a volume reduction of 1,867,057 cubic feet in a 1-year, 24-hour storm.	Years 1-3
A5.6	Scope out a living shoreline project for the Yacht Basin Shoreline in Morehead City that is estimated to cost $1.5 million and would reduce the volume of runoff by 3,081 cubic feet per the 1-year, 24-hour storm.	Year 2
A5.7	Continue to work with the UNC Institute of Marine Sciences to develop a living shoreline salt marsh restoration project on Phillips Island.	Years 1-4

Objective 06

Accomplishing the actions in this plan requires monitoring the performance of the plan and projects that are implemented. Records should be maintained on the progress of the plan. Progress made in achieving water quality improvements should be tracked and recorded. This plan will be adapted as necessary based upon the results of this monitoring.

Table 5-6

Actions and Timeline for Objective 6		Timeline
A6.1	Document the rate and volume of stormwater reduced by actions taken because of this plan by utilizing the Runoff Reduction Calculator Tool or other appropriate volume calculation methodologies, which will be maintained by the Federation.	Years 1-5
A6.2	Maintain a dashboard and monitor the performance of stormwater reduction retrofits that have been installed within the watersheds. This will be carried out as part of the tools and data collected for the ongoing $5 million project to develop a cost-share program for stormwater retrofits.	Years 1-3
A6.3	Conduct yearly, scheduled assessments with partners of the progress made to date implementing plan actions.	Years 1-5
A6.4	Based upon yearly assessments, revise and update actions as needed that can still be accomplished within the 5-year timeframe of the plan.	Yearly

Objective 07

Community awareness and engagement is a critical component to achieving the primary goal of this plan. Stakeholders including residents, property owners, fishers, business owners, developers and others can help advance actions in the plan.

Table 5-7

Actions and Timelines for Objective 7		Timeline
A7.1	Develop regular articles to appear in Coastal Review as well as to be televised on "Stories from the Coast" (on WRAL, WITN, WECT) that provide updates and analysis on plan implementation.	Years 1-5
A7.2	Use financial support for outreach and education provided by funding from U.S. EPA for the CPRG grant to raise awareness and understanding of the value of the coastal habitats on the Newport River to improve resiliency as well as to protect water quality.	Years 1-5
A7.3	Distribute copies of Smart Yards to residents and landowners within the watershed.	Years 1-5
A7.4	Include education signage at select retrofit sites to educate the public about the techniques and widespread applicability.	Years 1-5
A7.5	Form and conduct advisory committee to plan restoration and recreational infrastructure for the Newport River Watershed Preserve.	Years 1-2
A7.6	Continue to convene working group of partners that devised the plan to maintain engagement to implement actions and to provide continuity and liaisons with local governments.	Yearly

Objective 08

Starting in year 4 of this plan, it should be comprehensively reviewed and updated to reflect actions achieved, in progress, or not started. The update should include any Community awareness and engagement is a critical component to achieving the primary goal of this plan. Stakeholders including residents, property owners, fishers, business owners, developers and others can help advance actions in the plan.

Table 5-8

Actions and Timelines for Objective 8		Timeline
A8.1	Convene planning team to review and update plan actions.	Years 4-5
A8.2	Distribute drafts of update to local governments for review and suggestions.	Year 5
A8.3	Incorporate new actions that provide additional opportunities for reducing the existing rates and volumes of stormwater runoff.	Year 5
A8.4	At the end of year 5, release updated plan and begin anew on implementation.	Year 5

Quantitative Measures

To achieve the measurable outcome of reductions in permanent and temporary closures of shellfish waters within the Newport River watersheds, the volume of runoff will be reduced by the following quantities listed in Table 5-9 over the next 5 years, and then in 10 year increments. The overall volume reduction goal increases over this time period as land uses intensify in the watershed.

Table 5-9 Runoff Reduction Goal Targets and Schedule

Time Frame	Overall Volume Reduction Goals (CFT) From 1985 Baseline Year	Objective 2: Restore and Conserve Working and Undeveloped Properties (CFT)	Objective 3: Retrofit Private Stormwater Management Systems (CFT)	Objective 4: Retrofit Publicly Owned Stormwater Management Systems (CFT)	Percent of Total Runoff Volume Reduction Goal Achieved
Short-Term (2030)	12,860,928	4,224,735	1,000,000	500,000	33%
Mid-Term (2040)	19,000,000	8,613,199	1,500,000	1,000,000	87%
Long-Term (2050)	31,447,208	16,081,102	2,000,000	1,500,000	116%

Explanation

- **Time Frame:**
  - The table is divided into three key periods: Short-Term (2030), Mid-Term (2040), and Long-Term (2050).

- **Overall Volume Reduction Goals (CFT):**
  - These values represent the overall runoff volume reduction goals, measured in cubic feet (CFT), from a baseline year (1985) to account for the increased runoff due to land use changes.
  - The goals increase over time, indicating a plan to progressively reduce runoff more significantly as time progresses.

- **Objective 2:** Restore and Conserve Working and Undeveloped Properties (CFT):
  - This objective focuses on restoring and conserving working lands and undeveloped properties to help reduce runoff.
  - The volume of runoff reduction attributed to this objective also increases over time.

- **Objective 3:** Retrofit Private Stormwater Management Systems (CFT):
  - This objective involves retrofitting existing private stormwater systems to reduce runoff.
  - The runoff reduction goal from this activity starts at 1,000,000 CFT by 2030 and increases to 2,000,000 CFT by 2050.

- **Objective 4:** Retrofit Publicly Owned Stormwater Management Systems (CFT):
  - Similar to Objective 3 but focuses on publicly owned systems.
  - The targeted reductions increase over time, aiming for 1,500,000 CFT by 2050.

- **Percent of Total Runoff Volume Reduction Goal Achieved:**
  - This column indicates the percentage of the total runoff volume reduction goal achieved by each respective time period.
  - By 2030, the plan aims to achieve 33% of the total goal.
  - By 2040, 87% of the total goal is projected to be achieved.
  - Interestingly, by 2050, the table shows that 116% of the total goal will be achieved, indicating an overachievement of the target.

Summary

This table reflects a phased approach to reducing runoff volume through various conservation and retrofitting efforts. The goals are designed to escalate over time, leading to significant reductions by 2050. The table also suggests that, by 2050, the efforts might exceed the originally set goals, demonstrating a strong commitment to managing runoff effectively.

SECTION 6
Conclusion

The *Newport River Watershed Protection and Restoration Plan* sets forth goals, objectives, management actions, and timelines designed to enhance water quality by reducing runoff rates and volumes.

These efforts will also mitigate flooding and elevate community awareness regarding watershed management. The successful implementation of this plan hinges on the collaborative efforts of the Federation and its partners, who will work together to execute the proposed actions. Achieving these goals will require the voluntary participation and support of diverse public and private stakeholders, providing mutual benefits such as safeguarding the military training mission of the U.S. Department of Defense, preserving open space and recreational areas for residents and visitors, and ensuring clean water for the thriving shellfish and seafood industries.

Protecting and restoring water quality in the Newport River is an ongoing commitment that will extend beyond the initial five-year scope of this plan. To remain effective, the plan will be updated every five years, reflecting progress, challenges, and new opportunities. Continuous evaluations will ensure that the Newport River Watershed Protection and Restoration Plan meets the evolving needs of both the watershed and the community. The Federation will maintain active engagement with all stakeholders, including towns and the county, to monitor progress in implementing educational initiatives, project developments, cumulative runoff reduction, and ongoing water quality monitoring.

The most direct measure of the plan's success will be the frequency and duration of shellfish harvest closures in the Newport River. The primary goal is to prevent the expansion of these closures, ultimately reducing both their occurrence and the acreage affected. Key strategies to achieve these objectives include reducing runoff rates and volumes from land uses within the Newport River watersheds.

Water quality data from the Shellfish Sanitation and Recreational Water Quality Section of the N.C. Division of Marine Fisheries will be used to monitor the Newport River watersheds. These agencies regularly test and report on coastal water quality, allowing the plan's effectiveness to be assessed without the need for additional data collection efforts.

The Newport River Watershed Preserve, currently being acquired, is strategically located near shellfish growing waters and has the potential to significantly reduce existing runoff rates and volumes that impair water quality. Restoring hydrology on this land, which currently contributes to water quality issues, is a critical action that will ensure it remains undeveloped and unurbanized.

The 2,927 acres of the Preserve currently being acquired can achieve approximately 33 percent of the volume reduction goals set forth in this plan. Completing the acquisition of an additional 4,122 acres and restoring hydrology on those parcels will not only meet the reduction goals for current conditions but also help offset future runoff increases from land use changes, achieving about 87% of the reduction goal set for 2040. Continued expansion of this Preserve over time will more than offset runoff increases elsewhere in the watershed.

Photo by www.nccoast.org

However, it is also essential to secure runoff reductions from private and public lands and to ensure that new land uses comply with existing state coastal stormwater standards.

The total cost to implement the actions identified in this plan will vary significantly depending on factors such as project location, size, design complexity, labor and materials, land values, and market fluctuations. Annual maintenance costs should be considered and budgeted accordingly by those responsible for any stormwater management system or retrofit. Project partners will explore a variety of funding sources on a project-by-project basis and pursue projects that deliver multiple benefits to local governments, residents, and visitors within the river's watershed.

Appendix A: Definitions of Acronyms and Technical Terms

Acronyms and Technical Terms	
303(d) LIST	A list of waterbodies in each state that are too polluted or degraded to meet water quality standards. States are required to update their lists every two years.
319 GRANT	A grant program, named after Section 319 of the Clean Water Act, funded by EPA and administered by NC DEQ to find solutions to impaired water.
APPROVED AREA	An area determined suitable for the harvest of shellfish for direct market purposes.
AU	Assessment Unit
BIORETENTION AREAS	Also, known as rain gardens, these provide onsite retention of stormwater using vegetated depressions engineered to collect, store, and infiltrate runoff.
BMP	Best Management Practice of stormwater management; also, commonly referred to as Stormwater Control Measure (SCM) or Stormwater Infiltration Practice (SIP).
CAFO	Confined Animal Feeding Operation
CATCHMENT	A geographic unit within a sub watershed made up of a singular river, stream, or branch that contributes to a larger watershed.
CFU	Colony Forming Unit, used to measure fecal coliform bacteria concentrations.
CONDITIONALLY APPROVED CLOSED	This management strategy by North Carolina Shellfish Sanitation, refers to shellfish-growing waters that are closed to harvest because of high bacteria concentrations but can be opened temporarily, usually during periods of drought, when bacteria levels are low enough to make the shellfish safe to eat.
CONDITIONALLY APPROVED OPEN	This management strategy by North Carolina Shellfish Sanitation, refers to shellfish growing areas that are open to harvest but are temporarily closed after periods of moderate or heavy rain.
CWA	Clean Water Act
DCM	North Carolina Division of Coastal Management
DEGRADED WATERS	General description of surface waters that have elevated pollution levels, could include high bacteria levels, pathogens, sediment, low dissolved oxygen, and/or high nutrient levels. This is not a legal description of impairment (see impaired waters definition).
DEQ	North Carolina Department of Environmental Quality

Acronyms and Technical Terms	
DESIGNATED USE	A Clean Water Act term referring to the use, such as swimming, shellfish harvesting or aquatic life support, that was designated to a waterbody by the state. The waterbody may not actually be able to support its designated use.
DOT	Department of Transportation
EPA	Environmental Protection Agency
EXISTING USE	A Clean Water Act term referring to all current uses and any use the waterbody has supported since November 28, 1975.
FDA	U.S. Food and Drug Administration
FECAL COLIFORM	Bacteria found in the intestines of warm-blooded animals. They are not normally harmful to humans, but if found in a waterbody they could indicate the presence of harmful bacteria. These bacteria have been used for decades to determine the suitability of shellfish-growing waters because of their easy detectability.
FLOW	The volume of water moving through a channel over time, often measured in cubic feet per second (cfs).
GIS	Geographic Information Systems
GROWING WATERS	Waters that support or could support shellfish life.
HUC	Hydrologic Unit Code
HYDROGRAPH	A graph showing changes in the discharge of a surface water river, stream, or creek over a period of time.
HYDROLOGIC CYCLE	The cycle by which water evaporates from oceans and other bodies of water, accumulates as water vapor in clouds, and returns to the oceans and other bodies of water as precipitation or groundwater. Also, known as the water cycle.
HYDROLOGY	The science dealing with the waters of the earth, their distribution on the surface and underground, and the cycle involving evaporation, precipitation, flow to the seas, etc.
IMPAIRED WATERS	This Clean Water Act term refers to waters that no longer meet their designated uses. That would include conditionally approved and conditionally closed waters and any water where swimming advisories are being issued. These waters have been listed as impaired on the state's 303(d) list for the EPA.
IMPERVIOUS COVER	A hard surface area, such as a parking lot or rooftop, which prevents or retards water from entering the soil, thus causing water to run off the surface in greater quantities and at an increased rate of flow.

Acronyms and Technical Terms	
INTERTIDAL	Area of land that is submerged during high tide and exposed at low tide.
LAND USE	The management and modification of natural environments or wilderness into built environments such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods.
LID	Low Impact Development refers to management strategies that attempt to mimic conditions to reduce the flow of stormwater. To be successful, they should be integrated into all phases of urban planning and design from the individual residential lot level to the entire watershed.
LULC	Land use/land cover
MAXIMUM EXTENT PRACTICABLE	Refers to pollution controls that are technologically available and capable of being done after taking into consideration cost and logistics.
MS4	Municipal separate storm sewer systems
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source, diffused sources of pollution, where there is no singular distinct outflow point.
NRCS	Natural Resources Conservation Service
NSSP	National Shellfish Sanitation Program
RETROFITTING	Structural stormwater management measures for preexisting development designed to help reduce the effect of impervious areas, minimize channel erosion, reduce pollutant loads, promote conditions that improve aquatic habitat, and correct past efforts that no longer represent the best science or technology.
ROW	Right of Way
RUNOFF CURVE	A runoff curve number is a numeric parameter derived from combining the effects of soil, watershed characteristics, and land use.
SA	This is a state saltwater classification intended for shellfish harvesting. These are waters that should also support aquatic life, both primary and secondary recreation (activities with frequent or prolonged skin contact), and shellfishing for market purposes. It is one of the highest water classifications in the state.

Acronyms and Technical Terms	
SB	This is a state saltwater classification intended for swimming.
SC	This is a state saltwater classification intended for fish propagation and incidental swimming. The waters are safe for swimming but have a higher risk of pollution and human illness than SB waters.
SCM	Stormwater Control Measure, also more commonly known as a Best Management Practice (BMP) of stormwater management; also, commonly referred to as Stormwater Infiltration Practice (SIP)
SHELLFISH	Shellfish as referenced in this document means molluscan shellfish, oysters and clams.
SHELLFISH SANITATION	Shellfish Sanitation and Recreational Water Quality Section, N.C. Division of Marine Fisheries, N.C. DEQ.
SIP	Stormwater Infiltration Practice, also more commonly known as a Best Management Practice (BMP) of stormwater management; also, commonly referred to as Stormwater Control Measure (SCM).
STORMWATER	Water from rain that flows over the land surface, picking up pollutants that are on the ground.
SUBWATERSHED	A geographic unit within a watershed made up of individual minor rivers, streams, or branches that contribute to a larger watershed.
TMDL	Total maximum daily load, the maximum amount of a pollutant that can be found in a waterbody and still meet federal Clean Water Act standards.
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WATERSHED	All areas that drain to a waterbody, whether that be a lake, mouth of a river, or ocean.
WQS	Water quality standards
WWTP	Wastewater Treatment Plant

Appendix B: Watershed Area Characteristics

Soils

The watersheds of the Newport River are predominated by Group A/D and Group B/D hydrologic soil according to the United States Department of Agriculture Natural Resource Conservation Service (NRCS) data collected from Web Soil Survey (Figure B-1 Soil Types and Figure B-2 Hydrologic Soil Group).

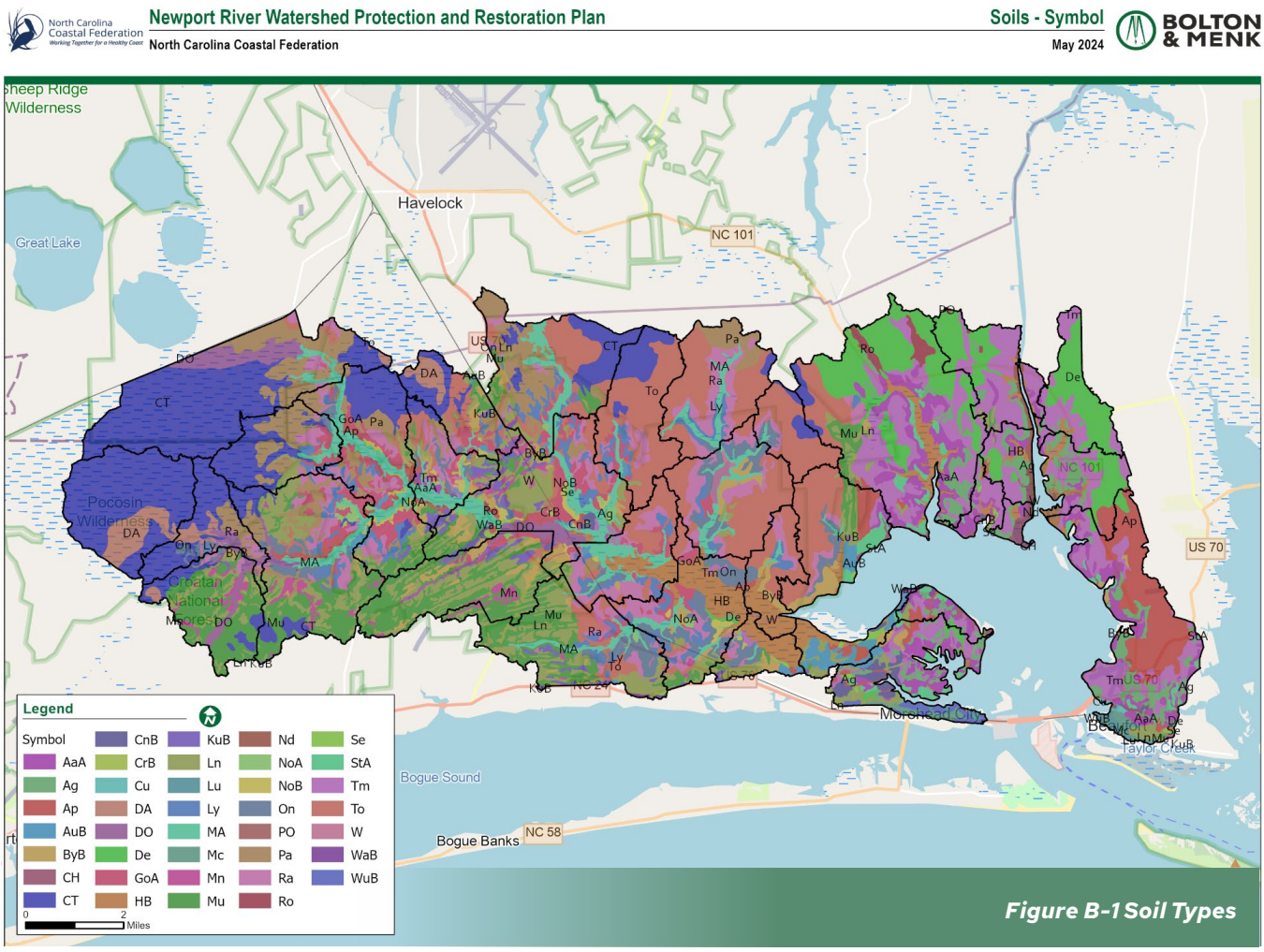


Figure B-1 Soil Types

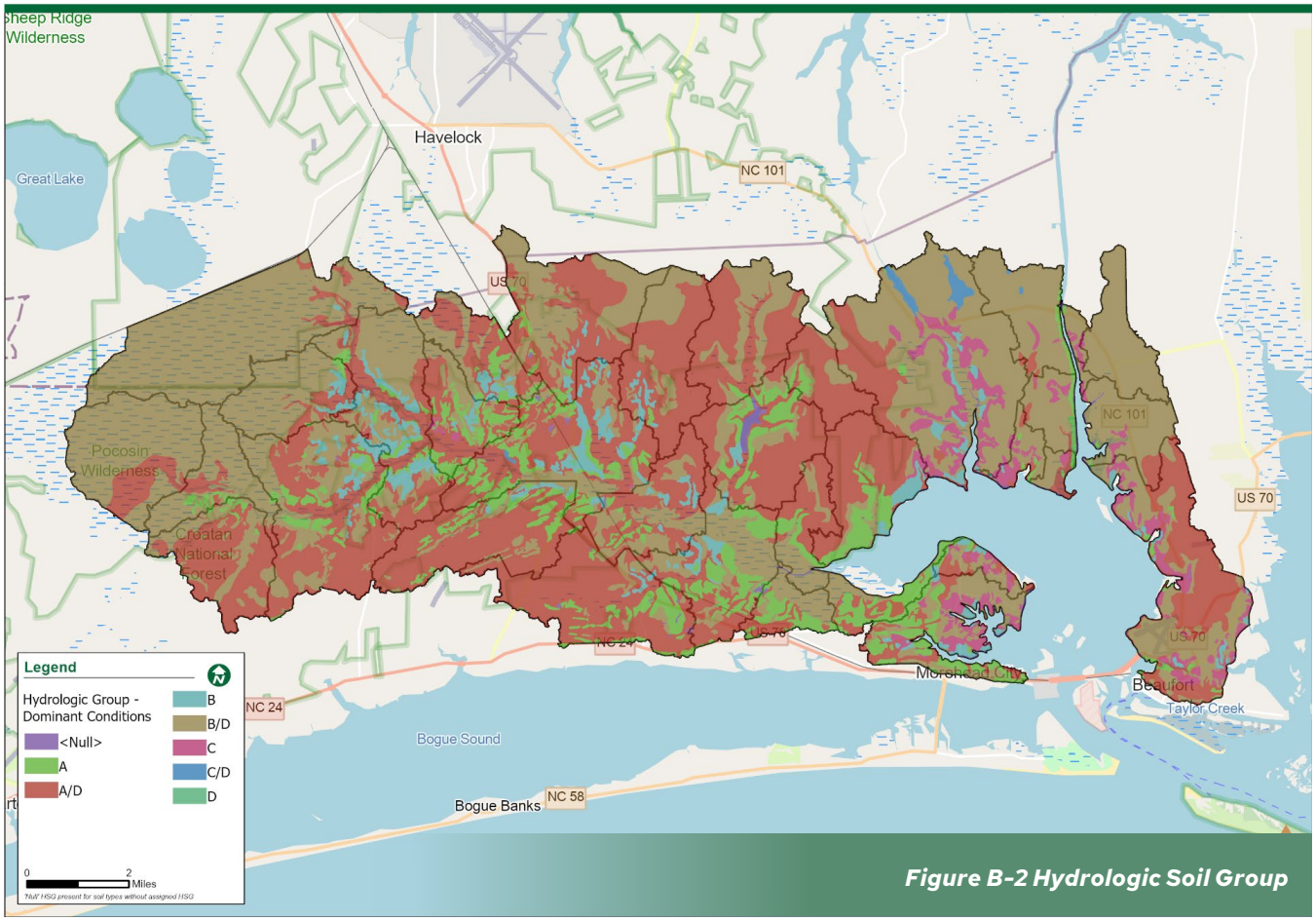


Figure B-2 Hydrologic Soil Group

Four hydrologic soil groups (HSG; A, B, C, D) exist with progressively decreasing infiltration potential characteristics; soils classified under Group A have the highest infiltration potential and are often the quickest draining soils, while soils classified under Group D have the highest runoff potential. It is possible to have a soil type that has characteristics from two hydrologic groups; for example, a soil can be designated as Group A/D, which means it has characteristics of both Group A and Group D. This is because of the changing nature of soil when it is saturated. Once a soil is saturated, that "wet" soil behaves like soil from a different group because of the change of the available water capacity of the soil. Certain wet soils are placed in Group D based solely on the presence of a water table within 60 centimeters (24 inches) of the surface, even though the saturated hydraulic conductivity may be favorable for water transmission. If these soils can be adequately drained, they are assigned to dual hydrologic soil groups (A/D, B/D, and C/D) based on their saturated hydraulic conductivity and the water table depth when drained. When referring to hydrologic soil groups, adequately drained means that the seasonal high-water table is kept at least 60 centimeters (24 inches) below the surface in a soil where it would be higher in a natural state.

The following is the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) summary description for each soil group 2:

GROUP A

Soils are sands, loamy sands, or sandy loams. These soils have high infiltration rates even when thoroughly saturated. These soils consist of deep, well to excessively drained sands or gravels and have a high rate of water transmission.

GROUP B

Soils are silt loams or loams. These soils have moderate infiltration rates when thoroughly saturated and consist of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures.

GROUP C

Soils are sandy clay loams. These soils have low infiltration rates when thoroughly saturated and consist of soils with a horizon that impedes downward movement of water and possess moderately fine to fine texture.

GROUP D

Soils are clay loams, silty clay loams, sandy clays, silty clays, or clay. These soils have the highest runoff potential. These soils have very low infiltration rates when thoroughly saturated and consist of clay soils with a high swelling potential, soils with a permanent high-water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material.

Soil survey data is useful in determining target sites for infiltration based retrofit projects. Site soil characteristics, as with any characteristic, should always be field surveyed to determine the extent of characteristics at a project site. Project consultants Bolton & Menk, Inc. (BMI) has determined that on coastal barrier islands with deep sand profiles, the infiltration rate is higher than reported of similar "group A" soils in other locations where the soil type may have originally been mapped and tested. Overall, there appears to be a number of soils within the river's watersheds that will allow for stormwater management systems that infiltrate into the landscape rather than runoff into nearby surface waters.

Photos by www.nccoast.org

Wetlands

The watersheds of Newport River contain approximately 37,237 acres of wetlands. The types of wetlands are summarized in Table B-1 Wetlands within Newport River Watersheds and depicted in Figure B-3 Wetlands.

Table B-1: Wetlands within newport river watersheds

Wetland Type	Acreage
Estuarine and Marine Wetland	3,349
Freshwater Emergent Wetland	509
Freshwater Forested/Shrub Wetland	33,379
Total Wetland	**37,237**

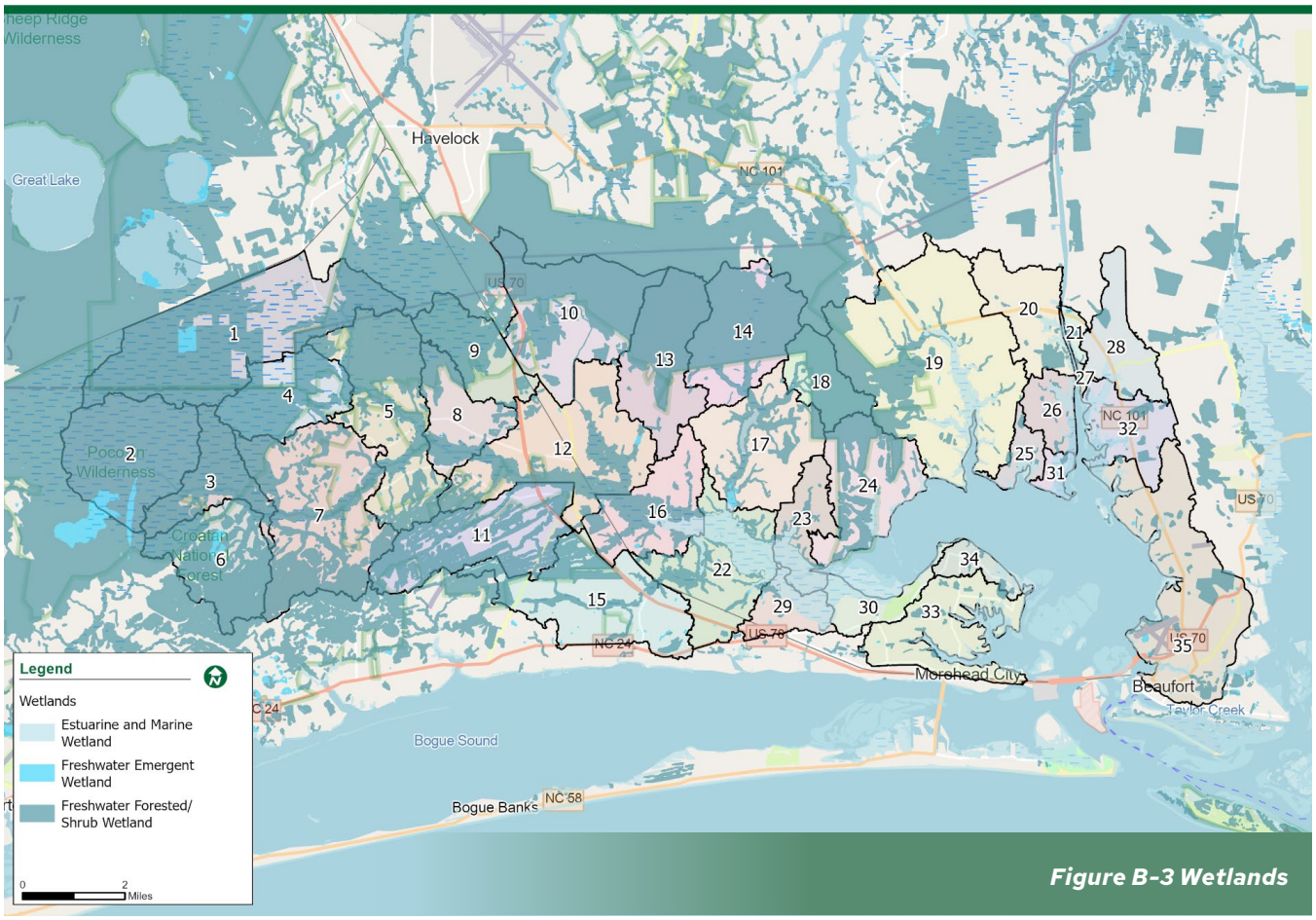


Figure B-3 Wetlands

Creeks and Streams

The named Creeks and Streams within the Newport River watersheds are summarized in Table B-2 Named Waters within Newport River Watersheds and depicted in Figure B-4 Named Creeks and Streams, below.

Table B-2: Named Waters within Newport River Watersheds

Named Creek or Stream	Approximate Length in Watershed Area (ft)
Adams Creek Canal (Intracoastal Waterway)	7029.9
Alligator Creek	6947.5
Bell Creek	11842.3
Big Creek	3980.7
Big Ramhorn Branch	6415.5
Billys Branch	4626.9
Black Creek (Mill Pond)	21814.4
Blakes Branch	4791.0
Calico Creek	13179.5
Cedar Swamp Creek	14175.4
Core Creek (Intracoastal Waterway Adams Creek Canal)	15805.9
Crab Point Bay	27439.3
Cypress Drain	5456.1
Deep Creek	25213.2
East Canal	3229.0
East Prong Jasons Branch	3147.3
Eastman Creek	8701.9
Gable Creek	6332.8
Ghouls Fork	6664.9
Harlowe Canal	7652.7
Harlowe Creek	22758.6
Hull Swamp	26413.2
Jasons Branch	6678.8
Juniper Branch	7421.1
Laurel Branch	1190.7
Little Creek	2773.6
Little Creek Swamp	13586.0
Little Deep Creek	11826.9
Little Ramhorn Branch	4017.5
Little Run	2485.1
Lodge Creek	1399.8
Main Prong	14808.8
Mairey Branch	3796.7
Meadows Branch	3965.0
Mill Creek	14367.2
Milldam Branch	7046.9
Millis Swamp	6843.6
Money Island Swamp	7192.2
Newport River	103065.3
Northwest Prong Newport River	17055.3
Oyster Creek	5796.8
Peak Swamp	4997.8
Russell Creek	4648.9
Sandy Branch	9333.1
School House Branch	1192.5
Shoe Branch	13661.8
Smiths Swamp	8592.0
Smiths Swamp Branch	4093.6
Snows Swamp Branch	6924.6
South Canal	8900.0
Southwest Prong Newport River	35006.1
Town Creek	7907.6
Turner Creek	10010.8
Wading Creek	10385.8
Ware Creek	6126.9
Willis Creek	4236.1

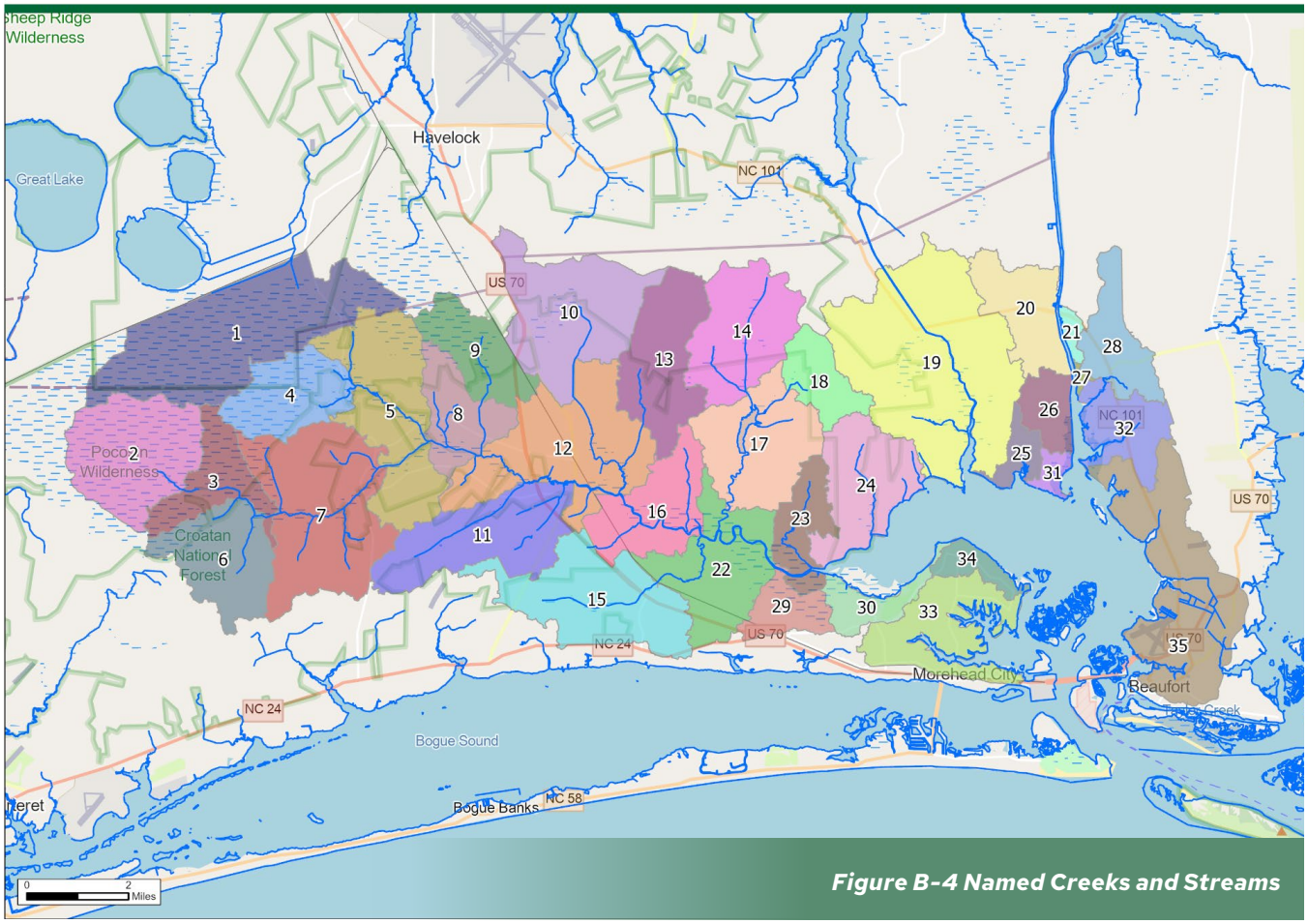


Figure B-4 Named Creeks and Streams

Land Use

Land use was analyzed for the years 1985, 1995, 2005, 2015, and 2020 based upon the USGS Land Change Monitoring, Assessment, and Projection (LCMAP) dataset. The classification system uses the Anderson Level 1 Classification, which is provided below.

Table B-3: Anderson level 1 land cover classifications

Value	Classification	Description
1	Developed	Areas of intensive use with much of the land covered with structures (e.g., high-density residential, commercial, industrial, mining, or transportation), or less intensive uses where the land cover matrix includes vegetation, bare ground, and structures (e.g., low-density residential, recreational facilities, cemeteries, transportation/utility corridors, etc.), including any land functionality related to the developed or built-up activity.
2	Agricultural	Land in either a vegetated or unvegetated state used in production of food, fiber, and fuels. This includes cultivated and uncultivated croplands, hay lands, orchards, vinefeet, and confined livestock operations. Forest plantations are considered as forests or woodlands (Tree Cover class) regardless of the use of the wood products.
3	Grass/Shrub	Land predominantly covered with shrubs and perennial or annual natural and domesticated grasses (e.g., pasture), forbs, or other forms of herbaceous vegetation. The grass and shrub cover must comprise at least 10% of the area and tree cover is less than 10% of the area.
4	Tree Cover	Tree-covered land where the tree cover density is greater than 10%. Cleared or harvested trees (i.e., clearcuts) will be mapped according to current cover (e.g., Barren, Grass/Shrub).
5	Water	Areas covered with water, such as streams, canals, lakes, reservoirs, bays, or oceans.
6	Wetland	Lands where water saturation is the determining factor in soil characteristics, vegetation types, and animal communities. Wetlands are composed of mosaics of water, bare soil, and herbaceous or wooded vegetated cover.
7	Ice/Snow	Land where accumulated snow and ice does not completely melt during the summer period (i.e., perennial ice/snow).
8	Barren	Land comprised of natural occurrences of soils, sand, or rocks where less than 10% of the area is vegetated.

Current land use is depicted in Figure B-5 2020 Land Cover, below.

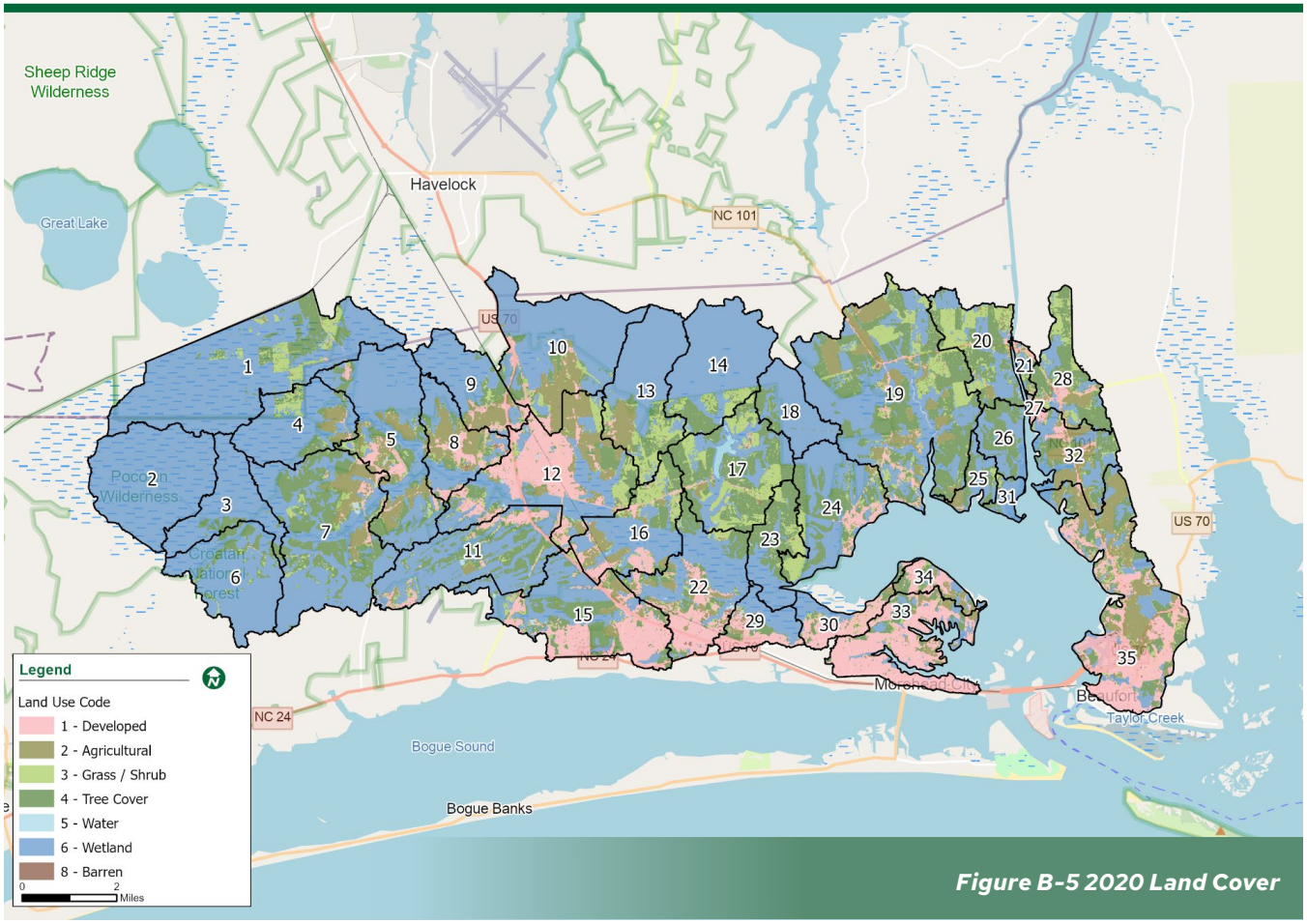


Figure B-5 2020 Land Cover

Future land use projects were compiled based upon slated conservation lands and zoning information from each jurisdiction within the Newport River watersheds. Projected future land use is depicted in Figure B-6 Projected Future Land Cover, below.

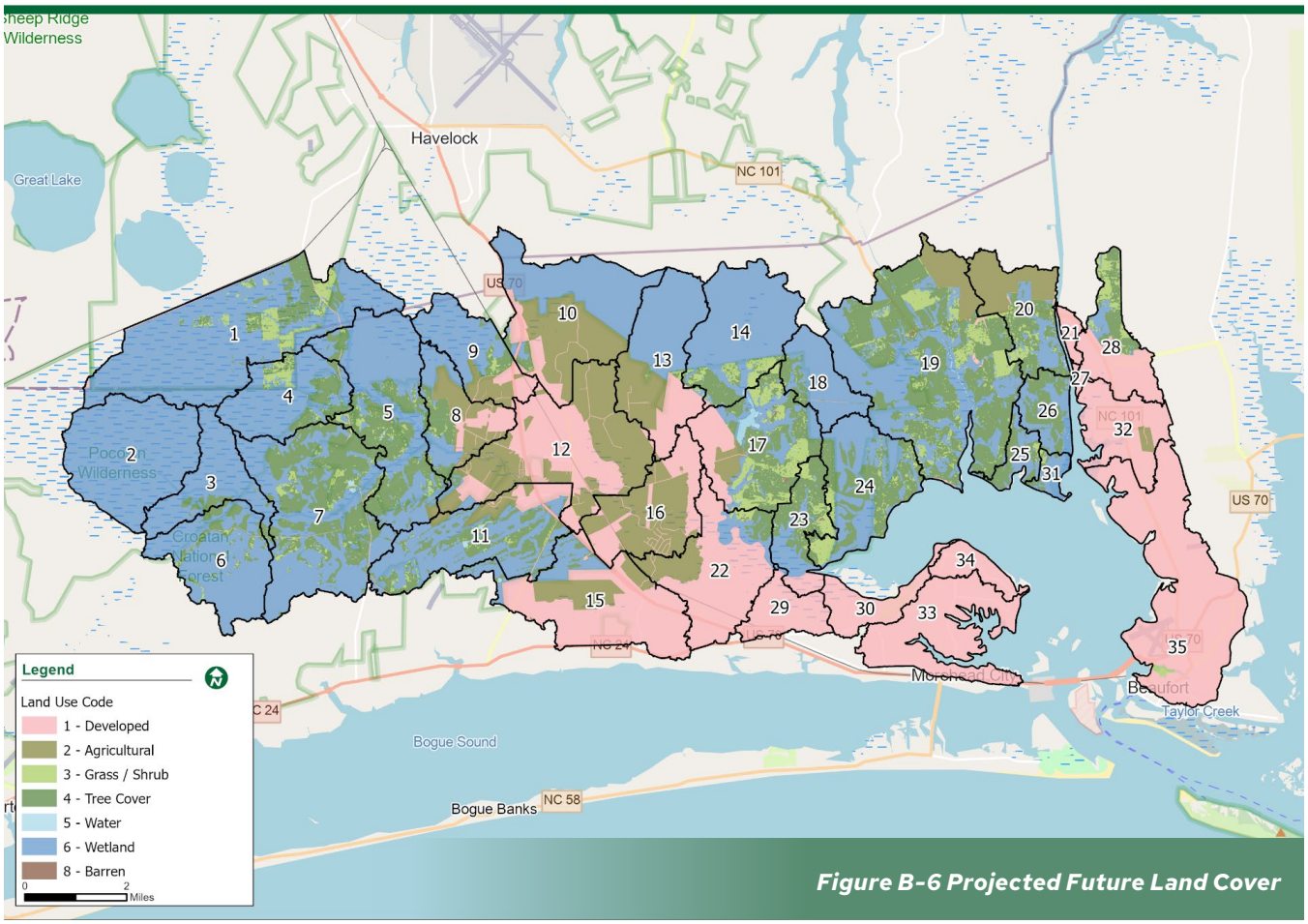


Figure B-6 Projected Future Land Cover

Appendix C: Water Quality Standards and Specifications

303(d) List Reporting Categories

Further information regarding 303(d) List and its reporting categories:

"The term "303(d) list" is short for a state's list of impaired and threatened waters (e.g., stream/river segments, lakes). States are required to submit their list for EPA approval every two years. For each water on the list, the state identifies the pollutant causing the impairment, when known. In addition, the state assigns a priority for development of Total Maximum Daily Loads (TMDL) based on the severity of the pollution and the sensitivity of the uses to be made of the waters, among other factors (40 C.F.R. §130.7(b)(4)). In general, once a water body has been added to a state's list of impaired waters it stays there until the state develops a TMDL and EPA approves it. EPA reporting guidance provides a way to keep track of a state's water bodies, from listing as impaired to meeting water quality standards. This tracking system contains a running account of all the state's water bodies and categorizes each based on the attainment status. For example, once a TMDL is developed, a water body is no longer on the 303(d) list, but it is still tracked until the water is fully restored."

Table C-1: EPA 303(d) List Categories

Category/ Subcategory	Description
Category 1	**Meets tested standards for clean waters.** All designated uses are supported, no use is threatened.
Category 2	**Waters of concern.** Available data and/or information indicate that some, but not all, designated uses are supported.
Category 3	**Insufficient data.** There is insufficient available data and/or information to make use of support determination.
Category 4	**Polluted waters that do not require a TMDL.** Available data and/or information indicate that at least one designated use is not being supported or is threatened, but a TMDL is not needed.
Category 4a	**Has a TMDL.** A State developed TMDL has been approved by EPA or a TMDL has been established by EPA for any segment-pollutant combination.
Category 4b	**Has a pollution control program.** Other required control measures are expected to result in the attainment of an applicable water quality standard in a reasonable period.
Category 4c	**Is impaired by a non-pollutant.** The non-attainment of any applicable water quality standard for the segment is the result of pollution and is not caused by a pollutant.
Category 5	**Polluted waters that require a TMDL or other WQI project.** Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed.

DWR Primary Surface Water Classification

All surface waters in North Carolina are assigned a primary classification by the N.C. Division of Water Resources (DWR). All waters must at least meet the standards for Class C (fishable / swimmable) waters. The other primary classifications provide additional levels of protection for primary water contact recreation (Class B) and drinking water (Water Supply Classes I through V).

To find the classification of a water body you can either use the BIMS database or contact the Classifications & Standards/Rules Review Branch. To view the regulatory differences between the currently implemented classifications for freshwaters, click here for the freshwater classifications table.

Table C-2: North Carolina surface Water Classifications

Primary Use Classifications	
SA	Commercial Shellfishing
SB	Primary Recreation in tidal salt water
SC	Aquatic Life, Secondary Recreation, and Fishing in tidal salt water
SWL	Coastal wetlands
Supplemental Use Classifications	
HQW	High Quality Waters
ORW	Outstanding Resource Waters
NSW	Nutrient Sensitive Waters
CA	Critical Area
UWL	Unique Wetland
	Special Designations (variable based on river basin)

Full Descriptions Available on DEQ Website.

CLASS SC

All tidal salt waters are protected for secondary recreation such as fishing, boating, and other activities involving minimal skin contact; aquatic life propagation and survival; and wildlife.

CLASS SB

Tidal salt waters are protected for all SC uses in addition to primary recreation. Primary recreational activities include swimming, skin diving, water skiing, and similar uses involving human body contact with water where such activities take place in an organized manner or on a frequent basis.

CLASS SA

Tidal salt waters that are used for commercial shellfishing or marketing purposes and are also protected for all Class SC and Class SB uses. All SA waters are also HQW by supplemental classification.

High Quality Waters (HQW)

Supplemental classification intended to protect waters which are rated excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, primary nursery areas designated by the Marine Fisheries Commission, and other functional nursery areas designated by the Marine Fisheries Commission.

The following waters are HQW by definition:

- WS-I,
- WS-II,
- SA (commercial shellfishing),
- ORW,

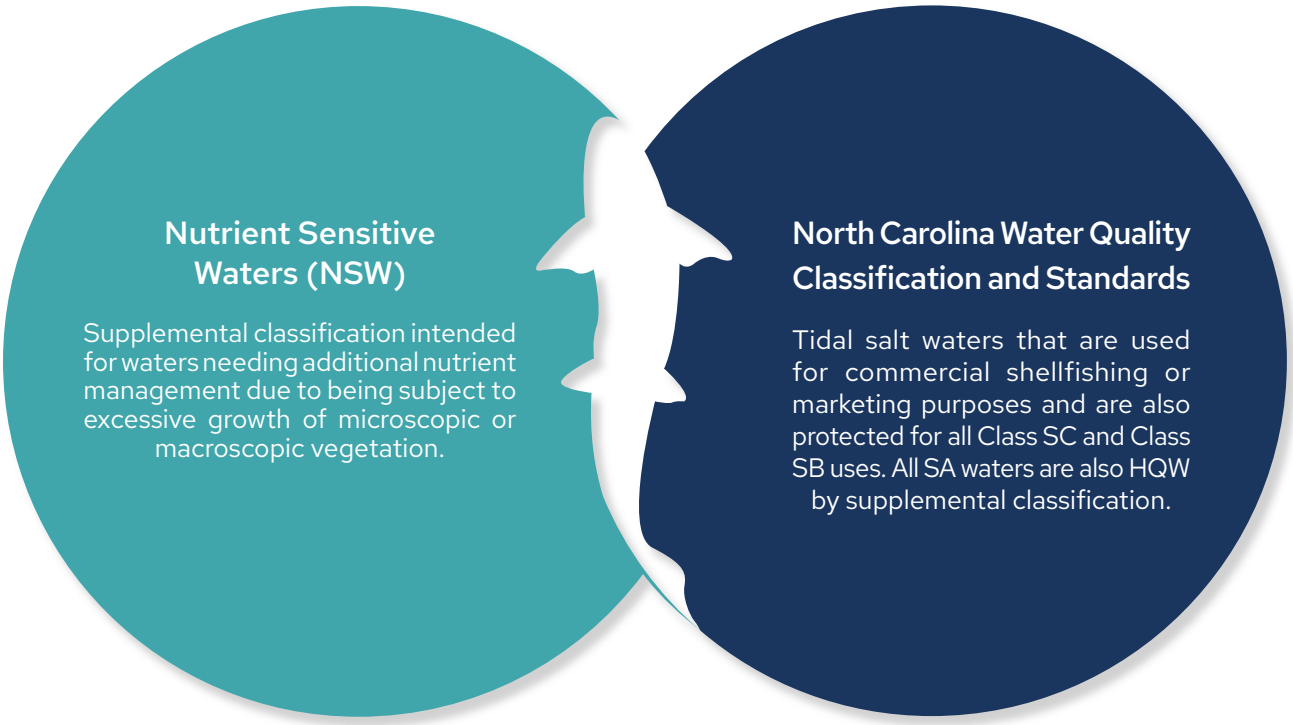
Primary nursery areas (PNA) or other functional nursery areas designated by the Marine Fisheries Commission, or Waters for which DWR has received a petition for reclassification to either WS-I or WS-II

Outstanding Resource Waters (ORW)

All outstanding resource waters are a subset of High Quality Waters. This supplemental classification is intended to protect unique and special waters having excellent water quality and being of exceptional state or national ecological or recreational significance.

To qualify, waters must be rated Excellent by DWR and have one of the following outstanding resource values:

- Outstanding fish habitat and fisheries,
- Unusually high level of water-based recreation or potential for such kind of recreation,
- Some special designation such as North Carolina Natural and Scenic River or National Wildlife Refuge,
- Important component of state or national park or forest
- Special ecological or scientific significance (rare or endangered species habitat, research, or educational areas).
- For more details, refer to the Biological Assessment Branch homepage.



CLASS SA

The following water quality standards apply to surface waters that are used for shellfishing for market purposes and are classified SA. Water quality standards applicable to Class SC waters as described in Rule .0220 of this Section also apply to Class SA waters.

- **Best Usage of Waters:** Shellfishing for market purposes and any other usage specified by the "SB" or "SC" classification;
- **Conditions Related to Best Usage:** Waters shall meet the current sanitary and bacteriological standards as adopted by the Commission for Health Services and shall be suitable for shellfish culture; any source of water pollution which precludes any of these uses, including their functioning as PNAs, on either a short-term or a long-term basis shall be considered to be violating a water quality standard;
- **Organisms of coliform group:** fecal coliform group not to exceed a median MF of 14/100 ml and not more than 10 percent of the samples shall exceed an MF count of 43/100 ml in those areas most probably exposed to fecal contamination during the most unfavorable hydrographic and pollution conditions.
- **Quality Standards applicable to Class SA Waters:**
  - Floating solids; settleable solids; sludge deposits: none attributable to sewage, industrial wastes, or other wastes;
  - Sewage: none;
  - Industrial wastes, or other wastes: none which are not effectively treated to the satisfaction of the Commission in accordance with the requirements of the Division of Health Services;

CLASS SB

Tidal salt waters are protected for all SC uses in addition to primary recreation. Primary recreational activities include swimming, skin diving, water skiing, and similar uses involving human body contact with water where such activities take place in an organized manner or on a frequent basis.

The following water quality standards apply to surface waters that are used for primary recreation, including frequent or organized swimming, and are classified SB. Water quality standards applicable to Class SC waters are described in Rule .0220 of this Section also apply to SB waters.

- **Best Usage of Waters:** Primary recreation and any other usage specified by the "SC" classification;
- **Conditions Related to Best Usage:** The waters shall meet accepted sanitary standards of water quality for outdoor bathing places as specified in Item of this Rule and will be of sufficient size and depth for primary recreation purposes; any source of water pollution which precludes any of these uses, including their functioning as PNAs, on either a short-term or a long-term basis shall be considered to be violating a water quality standard;
- **Quality Standards applicable to Class SB waters:**
  - **Industrial wastes; or other wastes:** none which are not effectively treated to the satisfaction of the Commission; in determining the degree of treatment required for such waters discharged into waters which are to be used for bathing, the Commission shall take into consideration quantity and quality of the sewage and other wastes involved and the proximity of such discharges to the waters in this class; discharges in the immediate vicinity of bathing areas may not be allowed if the Director determines that the waste cannot be treated to ensure the protection of primary recreation;
  - **Organisms of coliform group:** fecal coliforms not to exceed a geometric mean of 200/100 ml (MF count) based on at least five consecutive samples examined during any 30-day period and not to exceed 400/100 ml in more than 20 percent of the samples examined during such period.
  - **Floating solids; settleable solids; sludge deposits:** none attributable to sewage, industrial wastes, or other wastes;
  - **Sewage:** none;

CLASS SC

All tidal salt waters are protected for secondary recreation such as fishing, boating, and other activities involving minimal skin contact; aquatic life propagation and survival; and wildlife.

The water quality standards for all tidal salt waters are the basic standards applicable to Class SC waters. Additional and more stringent standards applicable to other specific tidal saltwater classifications are specified in Rules .0221 and .0222 of this Section.

- **Best Usage of Waters:** Aquatic life propagation and maintenance of biological integrity (including fishing, fish and functioning PNAs), wildlife, secondary recreation, and any other usage except primary recreation or shellfishing for market purposes.
- **Conditions Related to Best Usage:** The waters shall be suitable for aquatic life propagation and maintenance of biological integrity, wildlife, and secondary recreation; Any source of water pollution which precludes any of these uses, including their functioning as PNAs, on either a short-term or a long-term basis shall be violating a water quality standard.
- **Quality Standards applicable to Class SB waters:**
  - **Chlorophyll a (corrected):** not greater than 40 ug/l in sounds, estuaries, and other waters subject to growths of macroscopic or microscopic vegetation; the Commission or its designee may prohibit or limit any discharge of waste into surface waters if, in the opinion of the Director, the surface waters experience or the discharge would result in growths of microscopic or macroscopic vegetation such that the standards established pursuant to this Rule would be violated or the intended best usage of the waters would be impaired;
  - **Dissolved oxygen:** not less than 5.0 mg/l, except that swamp waters, poorly flushed tidally influenced streams or embayments, or estuarine bottom waters may have lower values if caused by natural conditions;
  - **Floating solids; settleable solids; sludge deposits:** only such amounts attributable to sewage, industrial wastes, or other wastes, as shall not make the waters unsafe or unsuitable for aquatic life and wildlife, or impair the waters for any designated uses;
  - **Gases, total dissolved:** not greater than 110 percent of saturation;
  - **Organisms of coliform group:** fecal coliforms not to exceed a geometric mean of 200/100 mL (MF) count) based on at least five consecutive samples examined during any 30-day period and not to exceed 400/100 mL in more than 20 percent of the samples examined during the search period; violations of the fecal coliform standard are expected during rainfall events, and in some cases, this violation is expected to be caused by uncontrollable nonpoint source pollution; all coliform concentrations are to be analyzed using the MF technique unless high turbidity or other adverse conditions necessitate the tube dilution method; in the case of controversy over results the MPN 5-tube dilution method shall be used as the reference method;
  - **Oils; deleterious substances; colored or other wastes:** only such amounts as shall not render the waters injurious to public health, secondary recreation or to aquatic life and wildlife or adversely affect the palatability of fish, aesthetic quality or impair the waters for any designated uses; for the purpose of implementing this Rule, oils, deleterious substances, colored or other wastes shall include but not be limited to substances that cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines pursuant to 40 CFR 110.4(a)-(b);
  - **pH:** shall be normal for the waters in the area, which generally shall range between 6.8 and 8.5 except that swamp waters may have a pH as low as 4.3 if it is the result of natural conditions;
  - **Phenolic compounds:** only such levels as shall not result in fish-flesh tainting or impairment of other best usage;
  - **Radioactive substances:** (i) Combined radium-226 and radium-228: The maximum average annual activity level (based on at least four samples, collected quarterly) for combined radium-226, and radium-228 shall not exceed five picoCuries per liter; (ii) Alpha Emitters. The average annual gross alpha particle activity (including radium-226 but excluding radon and

uranium) shall not exceed 15 picoCuries per liter; (iii) Beta Emitters. The maximum average annual activity level (based on at least four samples, collected quarterly) for strontium-90 shall not exceed eight picoCuries per liter; nor shall the average annual gross beta particle activity (excluding potassium-40 and other naturally occurring radionuclides) exceed 50 picoCuries per liter; nor shall the maximum average annual activity level for tritium exceed 20,000 picoCuries per liter;

- **Salinity:** changes in salinity due to hydrological modifications shall not result in removal of the functions of a PNA; projects that are determined by the Director to result in modifications of salinity such that functions of a PNA are impaired will be required to employ water management practices to mitigate salinity impacts;
- **Temperature:** shall not be increased above the natural water temperature by more than 0.8 degrees C (1.44 degrees F) during the months of June, July, and August nor more than 2.2 degrees C (3.96 degrees F) during other months and in no cases to exceed 32 degrees C (89.6 degrees F) due to the discharge of heated liquids;
- **Turbidity:** the turbidity in the receiving water shall not exceed 25 NTU; if turbidity exceeds this level due to natural background conditions, the existing turbidity level shall not be increased. Compliance with this turbidity standard can be met when land management activities employ Best Management Practices (BMPs) [as defined by Rule .0202(6) of this Section] recommended by the Designated Nonpoint Source Agency (as defined by Rule .0202 of this Section). BMPs must be in full compliance with all specifications governing the proper design, installation, operation, and maintenance of such BMPs;
- **Toxic substances:** numerical water quality standards (maximum permissible levels) to protect aquatic life applicable to all tidal saltwaters: (i) Arsenic, total recoverable: 50 ug/l; (ii) Cadmium: 5.0 ug/l; attainment of these water quality standards in surface waters shall be based on measurement of total recoverable metals concentrations unless appropriate studies have been conducted to translate total recoverable metals to a toxic form. Studies used to determine the toxic form or translators must be designed according to the "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators. (iii) Chromium, total: 20 ug/l; (iv) Cyanide: 1.0 ug/l; (v) Mercury: 0.025 ug/l; (vi) Lead, total recoverable: 25 ug/l; collection of data on sources, transport and fate of lead shall be required as part of the toxicity reduction evaluation for dischargers that are out of compliance with whole effluent toxicity testing requirements and the concentration of lead in the effluent is concomitantly determined to exceed an instream level of 3.1 ug/l from the discharge; (vii) Nickel: 8.3 ug/l; attainment of these water quality standards in surface waters shall be based on measurement of total recoverable metals concentrations unless appropriate studies have been conducted to translate total recoverable metals to a toxic form. Studies used to determine the toxic form or translators must be designed according to the "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion" published by the Environmental Protection Agency (EPA 823-B-96-007) which are hereby incorporated by reference including any subsequent amendments. The Director shall consider conformance to EPA guidance as well as the presence of environmental conditions that limit the applicability of translators in approving the use of metal translators. (viii) Pesticides: (A) Aldrin: 0.003 ug/l; (B) Chlordane: 0.004 ug/l; (C) DDT: 0.001 ug/l; (D) Demeton: 0.1 ug/l; (E) Dieldrin: 0.002 ug/l; (F) Endosulfan: 0.009 ug/l; (G) Endrin: 0.002 ug/l; (H) Guthion: 0.01 ug/l; (I) Heptachlor: 0.004 ug/l; (J) Lindane: 0.004 ug/l; (K) Methoxychlor: 0.03 ug/l; (L) Mirex: 0.001 ug/l; (M) Parathion: 0.178 ug/l; (N) Toxaphene: 0.0002 ug/l. (ix) Polycholorinated biphenyls: 0.001 ug/l; (x) Selenium: 71 ug/l; (xi) Trialkyltin compounds: 0.002 ug/l expressed as tributyltin.

- **Action Levels for Toxic Substances:** if the Action Levels for any of the substances listed in this Subparagraph (which are generally not bioaccumulative and have variable toxicity to aquatic life because of chemical form, solubility, stream characteristics or associated waste characteristics) are determined by the waste load allocation to be exceeded in a receiving water by a discharge under the specified low flow criterion for toxic substances (Rule .0206 in this Section), the discharger shall be required to monitor the chemical or biological effects of the discharge; efforts shall be made by all dischargers to reduce or eliminate these substances from their effluents. Those substances for which Action Levels are listed in this Subparagraph may be limited as appropriate in the NPDES permit if sufficient information (to be determined for metals by measurements of that portion of the dissolved instream concentration of the Action Level parameter attributable to a specific NPDES permitted discharge) exists to indicate that any of those substances may be a causative factor resulting in toxicity of the effluent. NPDES permit limits may be based on translation of the toxic form to total recoverable metals. Studies used to determine the toxic form or translators must be designed according to: "Water Quality Standards Handbook Second Edition" published by the Environmental Protection Agency (EPA 823-B-94-005a) or "The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit From a Dissolved Criterion.

Shellfish Sanitation Classifications

Table C-4: Shellfish Sanitation Classifications

North Carolina Shellfish Sanitation Growing Area Classifications	
Approved	These areas are always open to shellfish harvesting and close only after rare heavy rainfall events such as hurricanes. The median fecal coliform Most Probable Number (MPN) or geometric mean MPN of water shall not exceed 14 per 100 milliliters, and the estimated 90th percentile shall not exceed an MPN of 43 per 100 mL for a five-tube decimal dilution test.
Conditionally Approved-Open Shellfish Areas	Sanitary Survey indicates an area can meet approved area criteria for a reasonable period of time, and the pollutant event is known and predictable and can be managed with a plan. These areas are open to harvest much of the year but are immediately closed after certain sized rainfall events.
Conditionally Approved-Closed Shellfish Areas	Sanitary Survey indicates an area can meet approved area criteria during dry periods of time, and the pollutant event is known and predictable and can be managed with a plan. This growing area classification allows harvest when fecal coliform bacteria levels are lower than the state standard in areas that otherwise might be closed to harvesting. These areas are regularly monitored to determine if temporary openings are possible.
Prohibited Shellfish Harvest Areas	Sanitary Survey is not routinely conducted because previous sampling data did not meet criteria for Approval or Conditional Approved. Area may also be closed as a matter of regulation due to the presence of point source discharges or high concentrations of boats with heads.

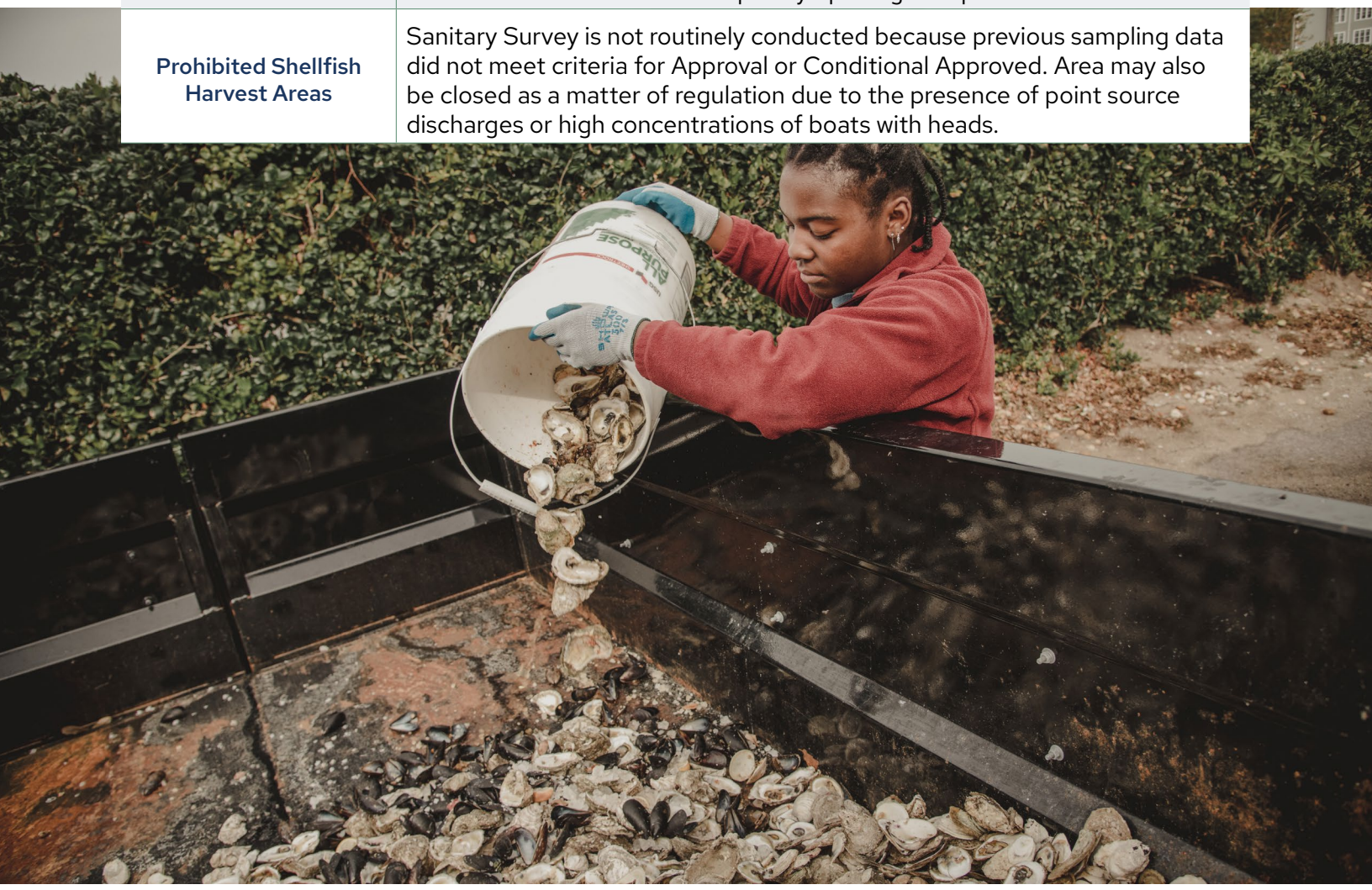


Photo by www.nccoast.org

Recreational Water Quality Standards

Table C-5: Recreational Water Quality Standards

Tier	Description

Tier I	"Tier I swimming area" means a swimming area used daily during the swimming season, including any public access swimming area and any other swimming area where people use the water for primary contact, including all oceanfront beaches.
	• **The enterococcus level in a Tier I swimming area shall not exceed either:**
	  • A geometric mean of 35 enterococci per 100 milliliters of water, that includes a minimum of at least five samples collected within 30 days; or
	  • A single sample of 104 enterococci per 100 milliliters of water.
	Tier I Swimming areas:
	• A swimming advisory shall be issued by the Division when samples of water from a swimming area exceeds a geometric mean of 35 enterococci per 100 milliliters during the swimming season.
	• A swimming alert shall be issued by the Division when a single sample of water from a swimming area exceeds 104 enterococci per 100 milliliters and does not exceed 500 enterococci per 100 milliliters during the swimming season.
	• A swimming advisory shall be issued by the Division when a sample of water from a swimming area exceeds a single sample of 500 enterococci per 100 milliliters during the swimming season.
	• A swimming advisory shall be issued by the Division when at least two of three concurrent water samples collected at a swimming area exceeds 104 enterococci per 100 milliliters during the swimming season.
	A Tier I swimming area advisory shall be rescinded when two consecutive weekly water samples and the geometric mean meet the bacteriological limits in Rule 18A .3402(a) of this Section. A swimming alert shall be rescinded within 24 hours of compliance with Rule 18A .3402(a)(2) of this Section.

Tier II	"Tier II swimming area" means a swimming area used an average of three days a week during the swimming season. The enterococcus level in a Tier II swimming area shall not exceed a single sample of 276 enterococci per 100 milliliters of water. **Tier II swimming areas:** • A swimming alert shall be issued by the Division when a single sample of water from a swimming area exceeds 276 enterococci per 100 milliliters and does not exceed 500 enterococci per 100 milliliters during the swimming season. • A swimming advisory shall be issued by the Division when a single sample of water from a swimming area exceeds 500 enterococci per 100 milliliters during the swimming season. A Tier II or Tier III swimming area advisory or alert shall be rescinded after water samples meet the bacteriological standard in Rule 18A .3402(b) or (c) of this Section.

Tier	Description
Tier III	"Tier III swimming area" means a swimming area used an average of four days a month during the swimming season. Tier III swimming area with a water sample result of 500 enterococci per 100 milliliters or higher on the first sample shall be resampled the following day. If the laboratory results of the second sample exceed 500 enterococci per 100 milliliters a swimming advisory shall be issued by the Division. A Tier II or Tier III swimming area advisory or alert shall be rescinded after water samples meet the bacteriological standard in Rule 18A .3402(b) or (c) of this Section.
Swimming Season	April 1 through October 31 of each year. The enterococcus level in a Tier III swimming area shall not exceed two consecutive samples of 500 enterococci per 100 milliliters of water.
Winter Season	November 1 through March 31 of each year.

Photos by www.nccoast.org

Division of Marine Fisheries Shellfish Sanitation Section Observations

There are monitoring stations utilized by the Division of Marine Fisheries Shellfish Sanitation Section to classify shellfish growing waters to determine which waterbodies are suitable for harvest and raw consumption. The Division of Water Resources uses this water quality data to ensure that designated uses are being met. Every three years, Shellfish Sanitation staff survey the entire shoreline of shellfish growing areas to document current and potential pollution sources. The data collected by Shellfish Sanitation is publicly available and is a source of historical and present-day information regarding quality of an area. By utilizing historic data, communities can research long term changes in water quality. Shellfish closure area information can be used by communities to determine what waterways are impaired and the source of impairment. These up-to-date surveys and monitoring station data will be the primary source of historic and current information.

Stations exceeding fecal coliform levels of Class SA (GM >14/100 ml; specifically, fecal coliform group not to exceed GM 14/100 ml and not more than 10 percent of the samples shall exceed GM 43/100 ml in those areas most probably exposed to fecal contamination during the most unfavorable hydrologic and pollution conditions; Appendix A) appear to maintain frequency over the last two decades. Understanding how often water quality stations have exceeded a single sample reading of 14/100 ml will aid in the development of milestones and assist in the monitoring of progress.

The water quality sampling stations for the E-4 growing area are provided in Figure C-1 E-4 Growing Area Water Quality Sampling Stations, on the next page.

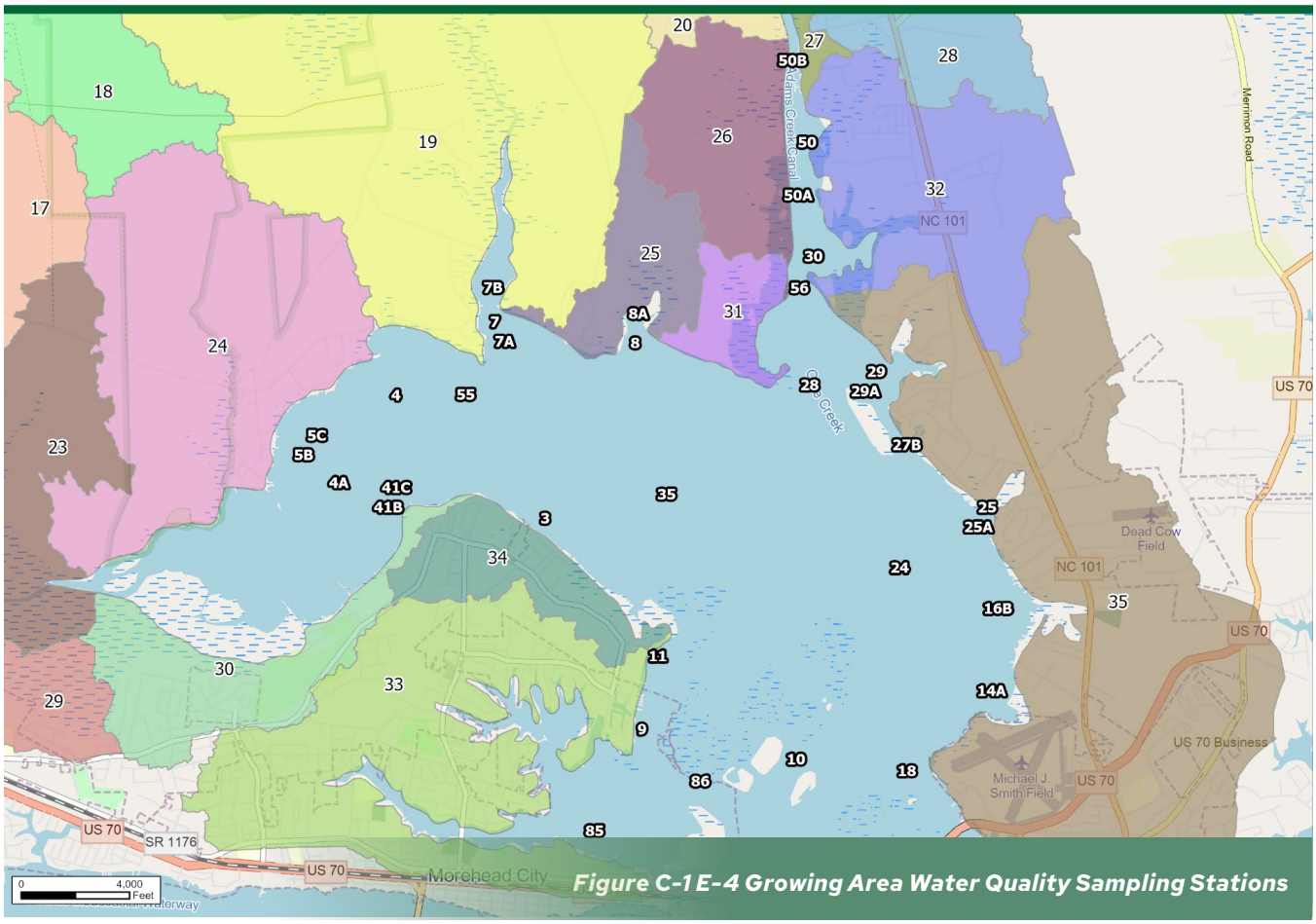


Figure C-1 E-4 Growing Area Water Quality Sampling Stations

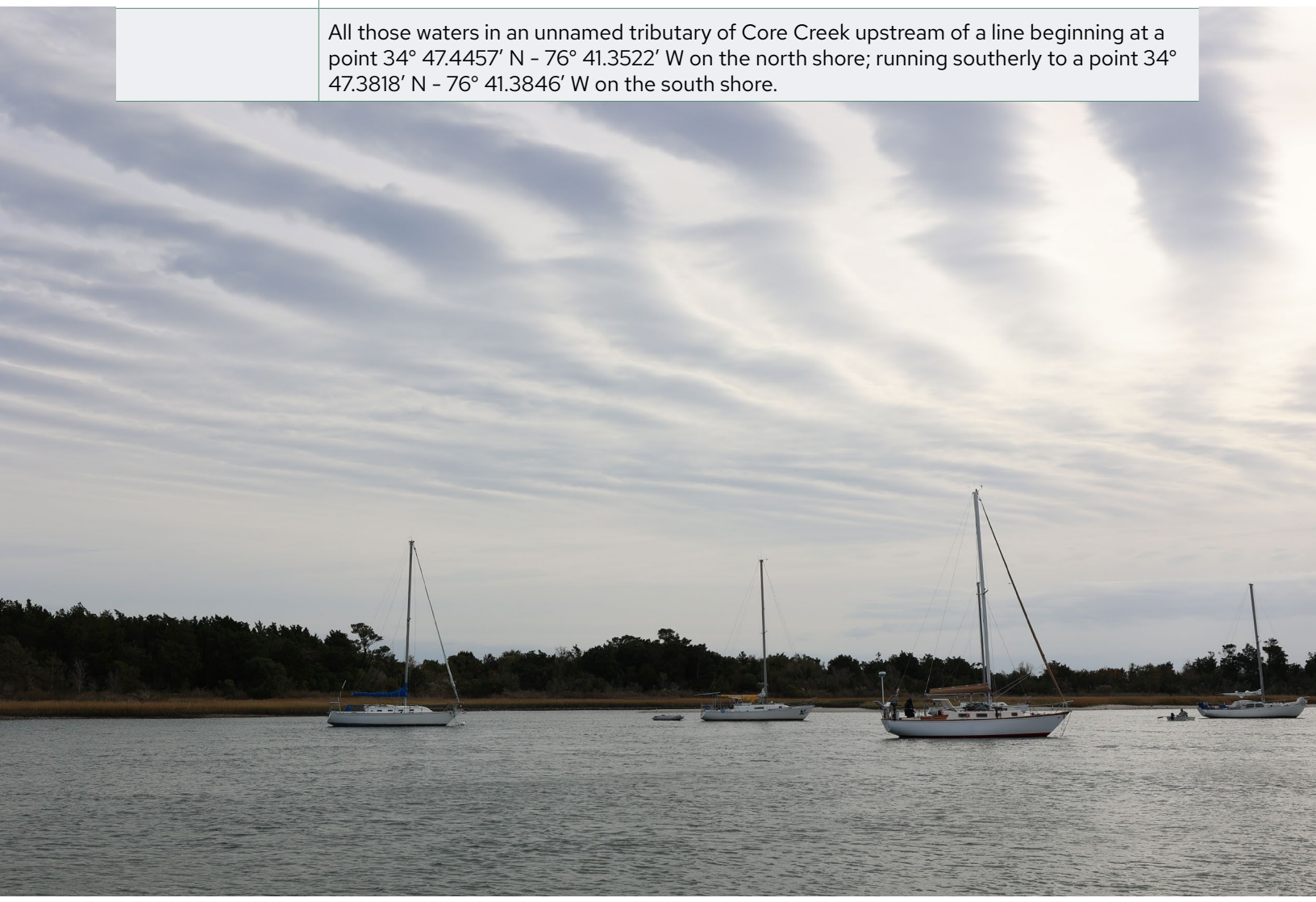
Permanent Closures

High bacteria counts have led to numerous sections of the Newport River and its tributaries closing to shellfish harvest. Table C-6 Current Permanent Closures for the E-4 Shellfishing Area details the prohibited areas for the Newport River area as of 2022 and Proclamation PA-PC-2022.

Table C-6: Current permanent closures for the E-4 shellfishing area

Waterbody	Current Closure Area
Town Creek	All those waters enclosed by a line beginning at a point 34° 44.2009′ N - 76° 40.0289′ W approximately 500 feet northeast of Gallant Point; running westerly approximately 850 feet to a point 34° 44.1592′ N - 76° 40.5181′ W near Green Marker "7"; running southeasterly approximately 1800 feet to a point 34° 43.3553′ N - 76° 40.2064′ W at the west end of the draw bridge over Gallant Channel; running east along the bridge to the Beaufort mainland, then following the shoreline of Town Creek back to the point of beginning.
Newport River Area/Calico Bay/ Calico Creek/ Crab Point Thorofare Area	Beginning at a point 34° 44.2879′ N - 76° 42.4376′ W on the west side of Crab Point Thorofare; running easterly to a point 34° 44.2515′ N - 76° 42.2720′ W on the east side of Crab Point Thorofare on the Haystacks Marsh; running southerly following the shoreline, crossing mouths of creeks to the southernmost point of the Haystacks Marshes at 34° 43.8594′ N - 76° 41.6525′ W; running easterly across the IWW to the southern tip of Phillips Island at a point 34° 43.7680′ N - 76° 41.3084′ W; running southerly to a point 34° 43.4193′ N - 76° 41.1750′ W on the east side of the spoil island; running along the shoreline to a point 34° 43.2848′ N - 76° 41.2249′ W on the east end of the Newport River High Rise Bridge; running westerly along the bridge to a point 34° 43.2577′ N - 76° 41.6844′ W on the Morehead City mainland at the State Port; running northerly along the shoreline of the yacht basin, Calico Creek and Willis Creek back to the point of beginning.
Newport River	All those waters in Newport River upstream of a line beginning at a point 34° 46.1172′ N - 76° 45.0672′ W on the northwest shore; running southeasterly to a point 34° 45.6646′ N - 76° 44.0603′ W on the southeast shore near Lawton Point.
Harlowe Creek	All those waters in Harlowe Creek upstream of a line beginning at a point 34° 46.6935′ N - 76° 43.4719′ W on the west shore; running easterly to a point 34° 46.6843′ N - 76° 42.9301′ W on the east shore.
Core Creek Area	All those waters bounded on the south by a line beginning at a point 34° 47.9976′ N - 76° 41.2753′ W on the west shore; running easterly to a point 34° 47.9948′ N - 76° 41.1016′ W on the east shore.
Gable Creek	All those waters in Gable Creek upstream of a line beginning at a point 34° 44.3052′ N - 76° 39.9288′ W on the southwest shore; running northeasterly to a point 34° 44.4847′ N - 76° 39.6329′ W on the northeast shore.
Wading Creek	All those waters upstream of a line beginning at a point 34° 45.1380′ N - 76° 39.5728′ W on the north shore, running southwesterly to a point 34° 45.0433′ N - 76° 39.7203′ W; running southerly to a point 34° 44.9009′ N - 76° 39.7223′ W; running southeasterly to a point 34° 44.7747′ N - 76° 39.5168′ W on the south shore, to include all of Wading Creek.
Russell Creek	All those waters upstream of a line beginning at a point 34° 45.6558′ N - 76° 39.9643′ W on the north shore, running southeasterly to a point 34° 45.4718′ N - 76° 39.8096′ W on the south shore, to include all of Russell Creek.
Deerfield Shores Marina	All those waters in the marina at Deerfield Shores and extending beyond the entrance canal beginning at a point 34° 46.0165′ N - 76° 40.3889′ W on the shore west of the entrance canal; running southwesterly to a point 34° 45.9896′ N - 76° 40.4156′ W; running southeasterly to a point 34° 45.9644′ N - 76° 40.3711′ W; running northeasterly to a point 34° 45.9922′ N - 76° 40.3449′ W on the shore east of the entrance canal.

Waterbody	Current Closure Area
Oyster Creek	All those waters upstream of a line beginning at a point 34° 46.6491′ N - 76° 42.4808′ W on the west shore; running northeasterly to a point 34° 46.6954′ N - 76° 42.3159′ W on the east shore.
Ware Creek	All those waters in Ware Creek upstream of a line beginning at a point 34° 46.6327′ N - 76° 40.7743′ W on the north shore; running southerly to a point 34° 46.3494′ N - 76° 40.7823′ W on the island; thence following the shoreline of the island southeasterly to a point 34° 46.0826′ N - 76° 40.6004′ W; thence running easterly to a point 34° 46.0798′ N - 76° 40.4368′ W on the south shore of the creek.
Eastman Creek	All those waters in Eastman Creek upstream of a line beginning at a point 34° 47.9948′ N - 76° 41.1016′ W on the north shore; running southerly to a point 34° 47.7604′ N - 76° 41.0791′ W on the south shore.
	All those waters in an unnamed creek near Brenda Lane upstream of a line beginning at a point 34° 47.5862′ N - 76° 40.9788′ W on the north shore; running southerly to a point 34° 47.5571′ N - 76° 40.9848′ W on the south shore
Bell Creek	All those waters in Bell Creek upstream of a line beginning at a point 34° 47.3387′ N - 76° 40.9818′ W on the north shore; running southwesterly to a point 34° 47.2820′ N - 76° 41.0468′ W; running southerly to a point 34° 47.0044′ N - 76° 41.0586′ W on the south shore.
	All those waters in an unnamed tributary of Core Creek upstream of a line beginning at a point 34° 47.4457′ N - 76° 41.3522′ W on the north shore; running southerly to a point 34° 47.3818′ N - 76° 41.3846′ W on the south shore.



The prohibited areas have expanded over the years, as more pollution has degraded the water quality of the Newport River. Figure C-2 E-4 Shellfish Growing Area Permanent Closures 1978 - 1980 and Figure C-3 E-4 Shellfish Growing Area Permanent Closures 2012 - 2017 depict the permanent closure areas from the 1978-1980 Sanitary Survey and 2012-2017 Sanitary Survey, respectively.

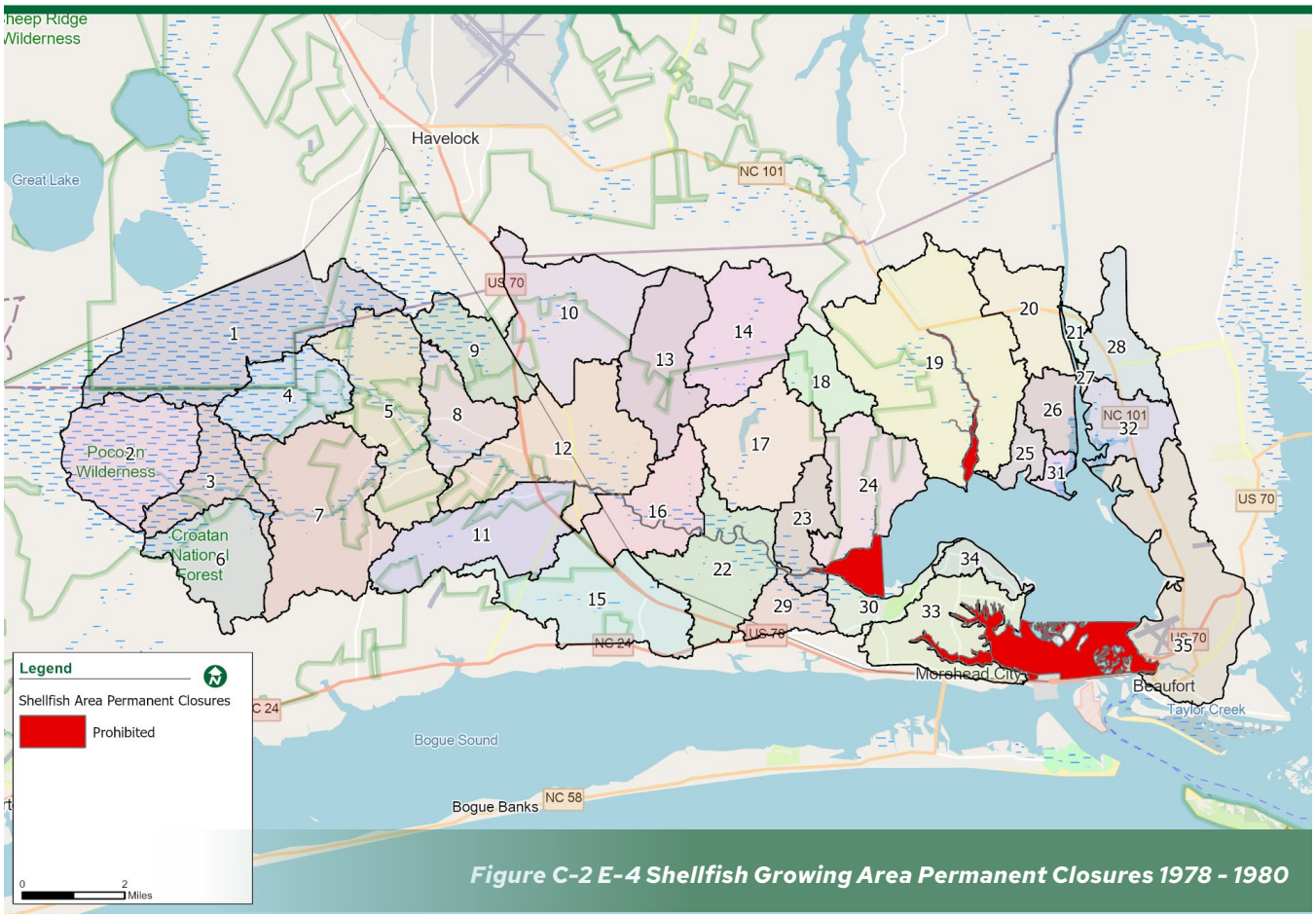


Figure C-2 E-4 Shellfish Growing Area Permanent Closures 1978 - 1980

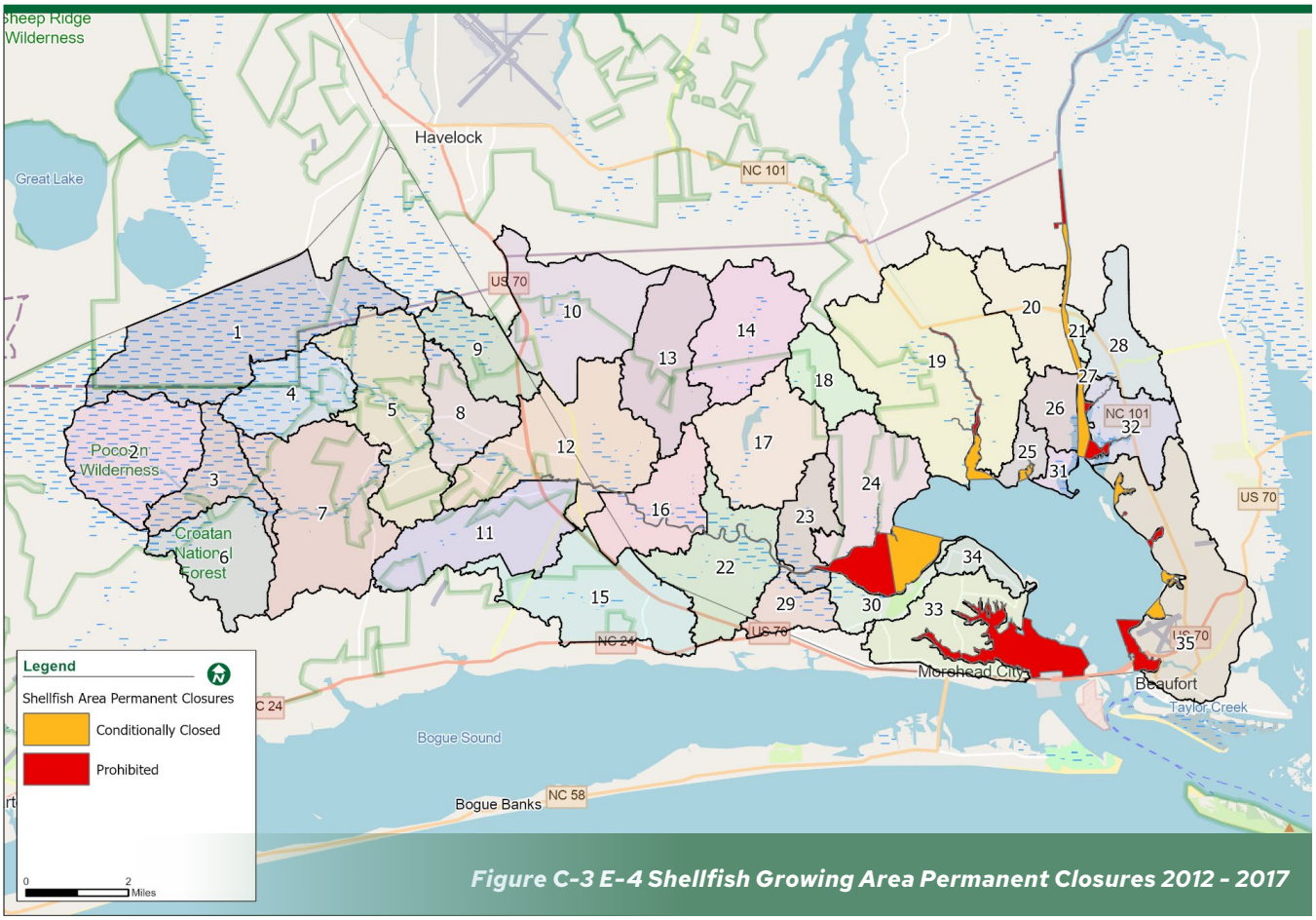


Figure C-3 E-4 Shellfish Growing Area Permanent Closures 2012 - 2017

Temporary Closures

Shellfish Sanitation issues temporary closures for additional areas following a rainfall event of a designated depth. The temporary closures make it unlawful for any person to take oysters, clams, or mussels from the area for sale or consumption.

The trends for temporary closures within the E-4 shellfish area are depicted in Figure C-4 Average Duration of Temporary Closures and Annual Rainfall Depth and Figure C-5 Total Number and Duration of Temporary Closures, below.

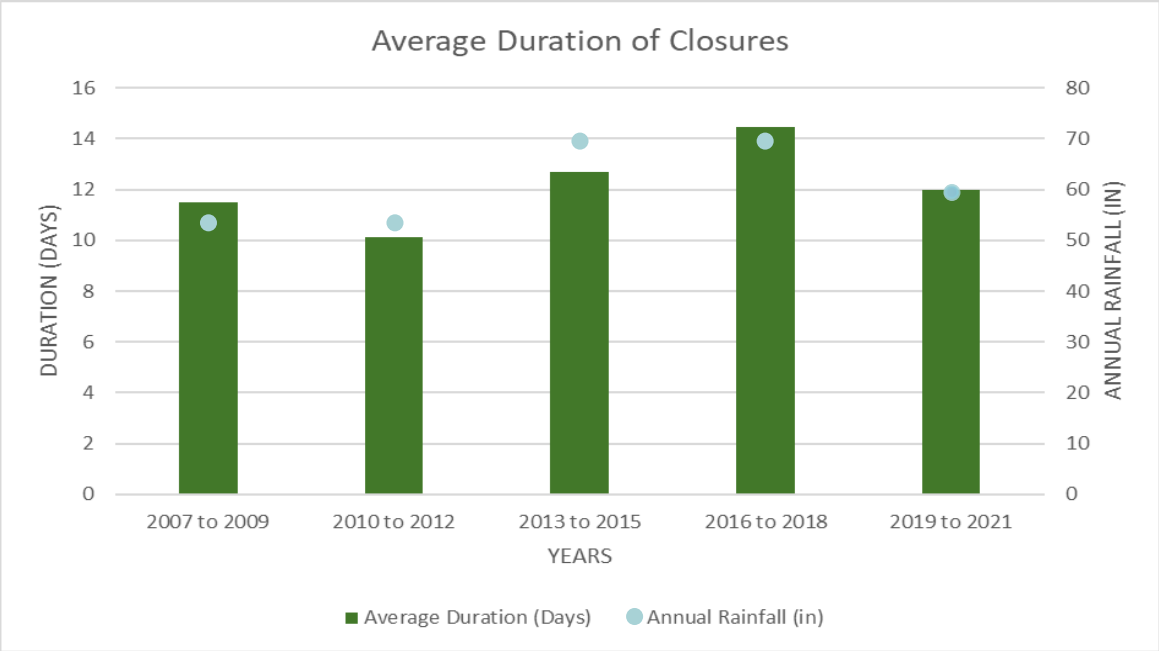


Figure C-4 Average Duration of Temporary Closures and Annual Rainfall Depth

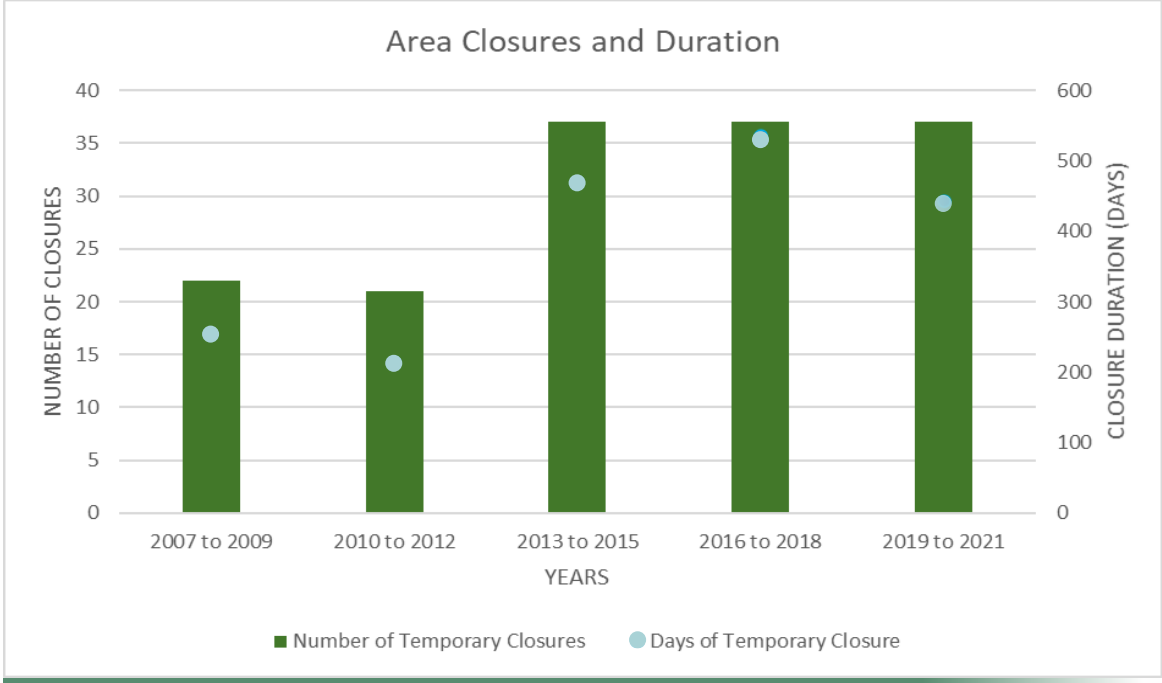


Figure C-5 Total Number and Duration of Temporary Closures

Observations Recorded by Shellfish Sanitation in Shoreline Sanitary Services

JUNE 1943

World War Two efforts increased the population of Morehead City which corresponded with an increase in sewage flow. Shellfish Rule #52 was amended to prohibit harvesting, sale, or consume shellfish from designated territories. The County Health Officer was encouraged to continue hosting classes focused on educating the public on the harmful effects of contaminated waters. It was proposed to add treatment facilities for waste and storm water to increase the economic value of fishing and tourist areas along the coast of Morehead City and Beaufort, NC. Additional sanitary surveys were recommended for all shellfish growing areas located near military bases due to increased boat traffic.

MAY 1952 – JULY 1954

The waters of Taylor Creek and North River, Newport River, and Morehead City were examined to determine the increase or decrease of pollution in the surrounding areas of Morehead City and Beaufort since 1945. Shellfish areas that had a median coliform content of 70 organisms per 100ml per sample were not considered safe for human consumption. Taylors Creek experiences raw sewage pollution inputs from residential and commercial establishments along the east and west banks of the channel. Of 155 samples collected from the Taylor Creek and North River area 41 were considered unsafe as they were more than 70 coliforms per 100ml. The Intracoastal waterway within the Newport River area showed 33 out of 183 water samples to be more than 70 per 100ml of coliform. There has been little change in pollution within this area since 1945 and it was recommended to retain this area as restricted territory. The population of Morehead City (approximately 5,000 created a need to collect 252 samples of which 90 showed coliform levels more than 70 per 100ml. The samples located south of the Intracoastal waterway did not yield these high samples.

DECEMBER 1971

Based on analyses of data collected from November 6, 1969, to September 20, 1971, and a survey conducted from December 1-11, 1971, it was determined that the Newport River estuary experienced increased rates of pollution after rainfall events. Pollution from the west and east sides was documented to occur during periods of dry and wet weather. It was recommended to permanently close the areas that pollution occurs year-round but in areas of the estuary that are only polluted during wet weather events they should close only if excessive rainfall occurred. However, the entire estuary should close to shell fishing after rainfall that exceeds 0.5 inches. The Newport and Carteret County sewage treatment plants do not pose a threat to sanitation levels of the estuary when they are operating without malfunctions. The closed safety zone put in place allows adequate flow time to shellfishing areas if a malfunction occurs and offers enough water dilution. Necessary safety zones should be included in the closed portions of the estuary.

1976 – 1977

The populations of Newport, Morehead City, and Area E-4 were 1,700 and 5,300, and 8,491 respectively. Population does increase during the summer months as these areas of Carteret County are tourist destinations. Three sewage treatment plants within the 60 square mile radius of the Newport River area have caused approximately 2,580 acres of shellfish harvest areas to be permanently closed. Throughout the time of the survey 62 out of 2,426 inspected sewage disposal systems received Notices of Violation. 37 of these violations were corrected at the time of this report. During 1976-1977, 398 water samples and 46 shellfish samples were collected. Based on these results, a proclamation was issued to restrict shellfish harvesting from the Core Creek area due to pollution.

MARCH 1978 – JANUARY 1980

There are 8,600 acres of shellfish waters within the Newport River Area and development is increasing within this area with the area on the north and east side experiencing the most. Studies conducted during this time concluded that coliform and fecal levels increase during adverse weather events but have been stabilizing throughout the years. Issues have only seen to occur during the mid-winter months where rainfall and runoff is greatest. The only area that experienced unsatisfactory levels for coliform was located near Gallant Point where most of the area is prohibited due to its location being within the safe zone of the Morehead City Sewage Treatment Plant. 500 acres surrounding Phillips Island was reopened to shellfishing in February of 1979.

JUNE 1982 – SEPTEMBER 1985

The approximate population of the Newport River basin area has grown to 40,000 people with six sewage treatment plants within the area. Population density and land use varies greatly within the region as does drainage systems, all which effect water quality. A 10% rule was established and based on 193 water samples, all stations within the Town Creek and Calico Creek section were found to be satisfactory, however most of this section is in the prohibited area. Of the samples taken from Newport River and Core Creek section, four were found to have unsatisfactory results with two being located within the prohibited area of Core Creek. Upper Newport River was recommended for immediate closure due to three stations exceeding fecal coliform MPN of 43 more than 10% of the time.

OCTOBER 1987 – SEPTEMBER 1990

The Newport River Watershed experienced an increase of 7,000 people in 1977 to a population of 22,000 people in 1990. The land use is still representative of agricultural, commercial, forestry, and urban development which occurs on both sides of the river. Agriculture was considered a major cause of shellfish closures in the area. The 30 year old West Carteret High School sewage treatment plant operates at 95% of design parameters but is not able to meet current standards, so a new city sewer must be in place by 1992. A new digester and trickling filter is being added to the Morehead City Sewage Treatment Plant which serves 6200 people and discharges 1.7 million GPD into Calico Creek. The 3-year-old, Newport Sewage Treatment Plant has an average daily flow of 250,000 gallons and averages less than 10 coliform colonies per 100ml. The Deerfield Subdivision treatment plant is currently in the permitting process. The Haystack Condominiums package treatment plant is in the process of hiring a new operator which should decrease vandalizations of the area.

There were 5 violations out of 166 individual septic systems inspected that drain to the Newport River. This report is the first that stated how the North Carolina State Port could be a source of contamination. It was concluded that shellfish harvesting areas were closed when rainfall exceeded 2.0 inches. Recommendations to close approximately 20 acres in Wading Creek and 50 acres in Gable Creeks to shellfish harvesting were made based on the bacteriological survey. Additionally, recommendations to close the area surrounding Deerfield Shores Marina were also made.

JULY 1991 – APRIL 1994

The population of the E-4 area increased to approximately 24,000. The drainage area of the Newport River is approximately 175 square miles. It was determined that the Morehead City Municipal Wastewater Treatment Plant (WWTP) which discharges into Calico Creek, Newport Municipal WWTP which discharges into the upper points of the river, and Merritt Ford WWTP which discharges into Hull Swamp do not affect shellfish harvesting areas because of their distance and travel time. The West Carteret High School wastewater is now treated at the Morehead City WWTP. Three out of 150 septic systems on the shoreline received violations and are in the process of repair. Inspections of marinas did not increase the closure area.

APRIL 1996 – JUNE 1998

The Newport River area has an approximate population of 29,285. The Haystacks condominium complex package plant for wastewater was shut down and the complex's wastewater is now treated by the Morehead City Municipal WWTP. 8 marinas or mooring facilities are in areas that are closed to shell fishing. Since the last survey there were 29 days of temporary openings of Core Creek and Harlowe Creek to shell fishing which are normally closed. Deterioration of water quality occurs based on increased land use and population change. Bacteriological samples from stations #4B, #5, #41, #57, and #7 in the upper Newport River caused 400 acres to be classified as conditionally approved closed. More sampling stations are recommended to closely monitor closures and determine updates as needed.

APRIL 1996 – JUNE 2000

Newport River is recommended to be immediately closed after 1.5 inches of rainfall in 24 hours. Immediate closure of temporarily opened areas, including Harlowe Creek, Core Creek, and Oyster Creek, will be recommended after .75 inches of rain within 48 hours.

FEBRUARY 2000 – MAY 2005

Area E-4's watershed is comprised of approximately 45% forestland, 38% wetlands, 9% residential, 5% bays/estuaries, and 3% cropland and proposed to have an approximate population of 20,500 according to the U.S Census Bureau. Pollution sources were mapped using GPS and a new methodology based on the EPA Wetlands Program Grant. The Morehead Municipal WWTP exceeded its monthly average flow limit seven months during 2003. An additional 2.5 MGD oxidation ditch treatment facility is planned to upgrade the Morehead Municipal WWTP. The Newport WWTP is permitted to 0.5MGP maximum. An increase in flow to 0.25 MGD is planned and will not affect the permanent shellfish closure line. All marinas in the area are maintaining permanent closure to shellfish harvesting. Only two of the five pump-out facilities at marinas were operational when evaluated for this study.

The highest subdivision growth area is Blair Farm, Oyster Cove, and The Meadows which have or are planned to add 39 lots, 34 houses, and 49 houses. Trash dumping areas from mobile home parks on Oglesby Rd. and 20th Street in Morehead City are areas of concern as they are both located beside a drainage ditch. 150 acres of this area will be reclassified as conditionally approved closed due to not meeting NSSP standards. 15 acres will be reclassified as conditionally approved open and will begin downstream from station #8A. In 2003, there was a record amount of rainfall that exceeded the yearly average by over 40 inches, which most likely contributed to the low water quality of the Newport River during this time.

JANUARY 2006 – OCTOBER 2010

The population within this area is 25,000 and growing. The Newport Watershed Treatment Plant expanded its permit capacity to 600,000 GPD and 750,000 GPD. Tertiary treatment filters were added to increase treatment and attempts were made to add a UV disinfections system to the treatment process but those were not successful. 100,000 gallons of partially treated wastewater overflowed from the plant into the river and was left unreported for four days. In 2006, 2007, and 2008 flood waters caused unknown values of partially treated wastewater to enter the river resulting in an entire river closure. A 160,000-gallon spill in 2009 resulted in a 22-day river closure. The treatment plant is under a Special Order by Consent from the NC Division of Water Quality for failure to comply with fecal coliform discharge limits. A new Morehead City WWTP was built and placed online in 2008 with a permitted capacity of 2.5GPD. The Morehead City WWTP lost its chlorine feed for 12 hours which resulted in a 25-day closure to Calico Creek in February 2008. Seven lift station overflows have been reported since 2005. The Deerfield Shores package WWTP replaced a malfunctioning generator and has experienced no spills.

The Morehead City Yacht Basin is fully renovated with 98 slips, sewage pump outs, and fuel service. An additional 12 slips are used for Sea Tow and commercial fishing boats. Haystack Condominiums meets all permitting requirements as does the Town Creek and Discovery Diving Marinas. The areas surrounding the Jarret Bay/Gregory Poole facility are classified as prohibited due to the number of slips present. Mariners Pointe, Pinnacle Pointe, and Calamanda Creek are new subdivisions being constructed adjacent to Prohibited waters. Blair Farms area, Lo'r Deck South, Country Club Run, and Mainsail of Beaufort are sites for continued growth and construction of neighborhoods and condominiums. Three new developments were also built and are connected with the Newport WWTP. Two failing septic systems and three graywater discharges were located when onsite wastewater was inspected across the region. Based on 1,020 water samples, stations #5B and #41B did not meet standards. Stations #50, #50A, and #50B were added to closed portions of Core Creek in 2007.

JULY 2009 – JUNE 2014

The E-4 area is reported to having 11,382 water acres and a population of 32,126 according to the 2010 U.S. Census. A new WWTP was scheduled for completion in November or December of 2014. This plant was built on higher ground to mitigate the risk of flooding. The existing plant experienced 3 minor spills, but no closures were issued. Six overflow events caused by heavy rains and a malfunction in the UV disinfection system have occurred with only 4 resulting in temporary closures. There are plans to redevelop the Homer Smith Seafood property. A permit modification request was submitted to redesign the layout of Core Creek Marine facility (now called Beaufort Marine Center). Yacht Hanger and Jarrett Bay Boat works are also discussing ways to improve their facility layout that would not impact its existing classifications of surrounding areas. The Town Creek Harbor is a marina that was completed in 2013 but was severely damaged by hurricane Irene. Russell Creek is experiencing a decline in water quality due to stormwater runoff from North River Club golf course, surrounding farmland, roadways, and residential areas.

Since 2011, 4 new developments that include over 100 residential apartments, 6 lots with a marina, and small residential subdivisions have been added to the area. 8 additional greywater discharges were located during this survey, with 7 draining to Prohibited or Conditionally Approved Closed waters. All stormwater from the 160-acre, Brandywine Bay golf course drains through ditches, and ponds to a small tributary of the Newport River. Areas that house the majority of the wildlife and domestic animals including horses, goats, and dogs drain to prohibited or Conditionally Closed areas, so they prove no threat to the watershed. During the time of this report the E-4 area was closed 65 times for a total of 594 days due to excessive rainfall. There have been 8 temporary openings which allowed for 73 days to harvest shellfish from the current Conditionally Approved Closed areas in the watershed. There were four sampling stations (#25, #29, #41, and #50) that were not approved for shell fishing waters as they exceeded the 90th percentile of 43.

MAY 2012 - MARCH 2017

Population within the Newport River Area is 31,756. The Newport WWTP went online in 2015 and can treat up to 1.2 MGD with average flow being 500,000 GPD. Beaufort WWTP experienced overflows after extreme rainfall which caused the surrounding areas to remain closed for 23 days. Beaufort Yacht Basin and Town Creek Harbor are new marinas being built to include 64 and 16 slips respectively. The Homer Smith Seafood property is being redeveloped and permitted for 95 slips but currently only has 62 slips with continued development of up to 95 slips. Core Creek Marina is under development and is permitted for 10 slips.

MAY 2015 – MARCH 2020

The permanent population in the E-4 watershed is 31,756. Hurricane Florence caused 2 major lift stations and 80% of collection system to flood losing 1.1 million gallons of sewage causing a 35-day closing of the Newport River.

The Morehead City WWTP increased its daily average to 1.8 MGD and treats to tertiary level and then utilizes UV to disinfect. Hurricane Dorian caused 228,000 gallons of untreated wastewater to be lost due to power outages closing the river for 27 days after the storm. The Brandywine Bay Package WWTP increased to 150,00 GPD allowing the plant to operate at maximum capacity. To increase infiltration, it is planned to build a 300,000 GPD batch reactor. The Deerfield Shores Package WWTP had to cease operation until the interconnection to the Town of Beaufort sewer system was completed. Operations were to begin again on July 1, 2020. Town Creek Marina is experiencing a five-phase renovation project to a final slip count of 79. Town Creek Harbor is only permitted for 16 slips but currently operates with 19. Beaufort Yacht Basin increased its slip count to 82 and Homer Smith Docks and Marina were only permitted for 85 but had 111 slips present. Bock Marine added a Clean Marine Solutions wastewater treatment system. The new high-rise bridge across Town Creek results in increased stormwater outfalls along the Newport River and Town Creek areas.

A new subdivision is planned for 16 lot single family homes and 9 slip boat dock within the Prohibited region of Newport River. 86 new homes are being built in the surrounding subdivisions of Newport River, which is consistent with the increased population growth. While inspecting onsite wastewater there were several septic failures found including potential for improper handling of wastewater, raw sewage being released, effluent on the surface of groundwater, greywater being improperly discharged, and discharge pipes found shellfish growing areas. Numerous cattle operations and horse farms are located within the Newport River watershed as well as prevalent wildlife in this area. Golf courses in the area did not experience lasting damage due to Hurricane Florence other than a couple hundred lost trees. The sand mining project in Wading Creek is completed and sampling results did improve from previous years. Portions of E-4 were closed temporarily 63 times for 851 days during the time of this reporting period. Improvements of the bacteriological data were widespread including stations #7, #16A, #16B, #30, #41B, and #50. This has caused station #7 and #7A to meet safe shellfish harvest standards.

Recreational Water Advisories

The North Carolina Recreational Water Quality Program issues advisories, which notify the public when bacteriological standards exceed safe measures for human contact by the presence of enterococcus bacteria. Figure C-6 Recreational Water Sampling Sites depicts the sampling sites used by the North Carolina Recreational Water Quality Program to issue advisories. Two sampling sites, C55A and C55B, are within proximity of the Newport River sub-watershed 35. Only site C55A has had advisories or alerts since 2006. The recreational water advisories are listed in Table C-7 Recreational Water Advisories for Newport River Watersheds.

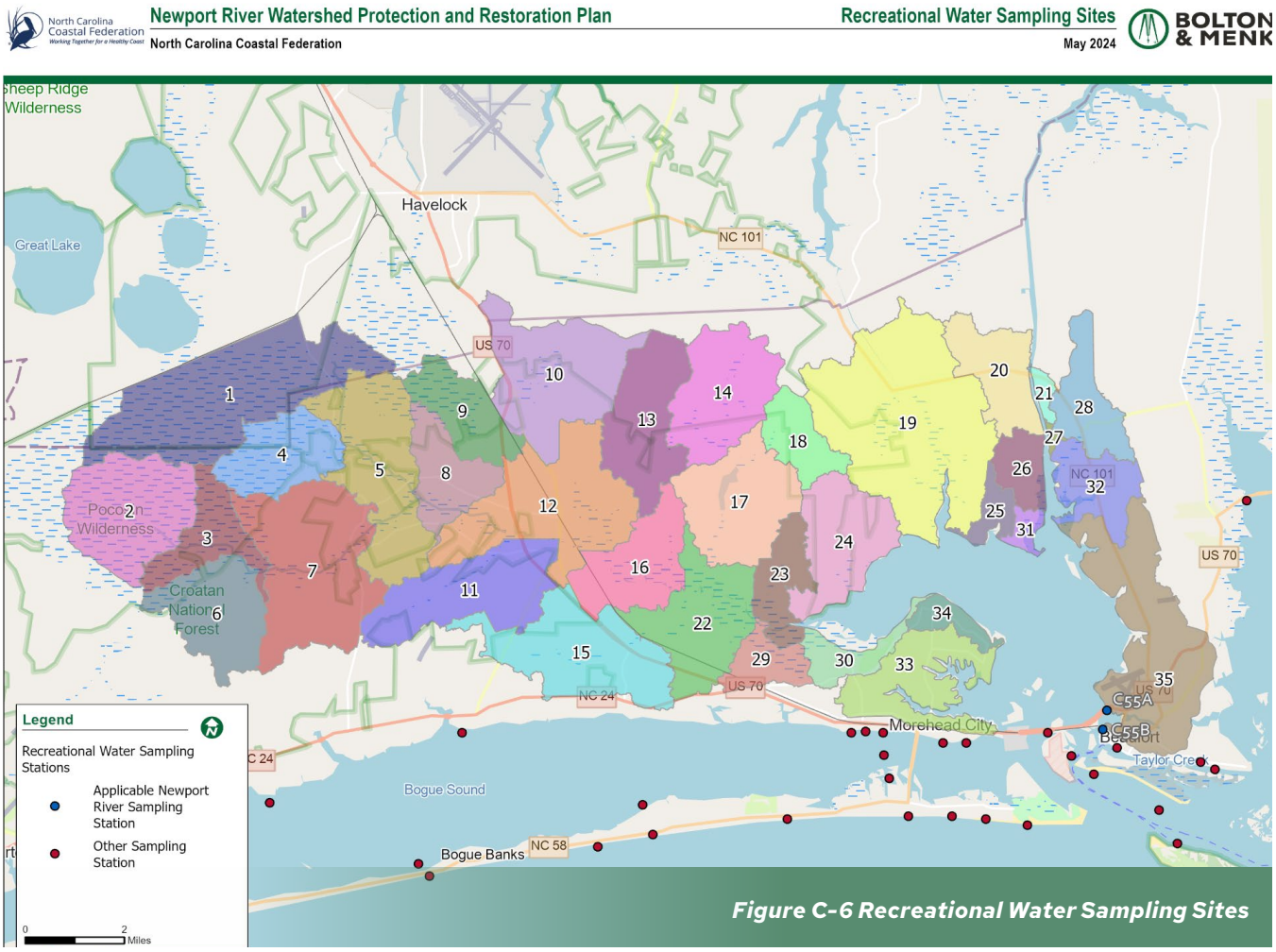


Figure C-6 Recreational Water Sampling Sites

Table C-7 Recreational Water Advisories for Newport River Watersheds

Type	Start Date	End Date	Water Body	Station
Advisory	Jun. 28, 2006	Jul. 12, 2006	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Aug. 2, 2006	Aug. 30, 2006	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Apr. 17, 2008	Apr. 18, 2007	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	May 30, 2007	May 31, 2007	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Sep. 12, 2007	Oct. 10, 2007	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Sep. 23, 2009	Sep. 24, 2009	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Oct. 7, 2009	Oct. 14, 2009	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Sep. 9, 2009	Oct. 6, 2009	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Sep. 14, 2010	Sep. 15, 2010	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Sep. 28, 2010	Oct. 26, 2010	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Sep. 27, 2011	Nov. 1, 2011	Sound	C55A - North side mouth of Town Creek in Beaufort
Alert	May 30, 2012	May 31, 2012	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	May 31, 2012	Jun. 8, 2012	Sound	C55A - North side mouth of Town Creek in Beaufort
Alert	Sep. 5, 2012	Sep. 6, 2012	Sound	C55A - North side mouth of Town Creek in Beaufort
Alert	Apr. 16, 2019	Apr. 17, 2019	Sound	C55A - North side mouth of Town Creek in Beaufort
Alert	Oct. 2, 2019	Oct. 3, 2019	Sound	C55A - North side mouth of Town Creek in Beaufort
Alert	Jun. 23, 2020	Jun. 24, 2020	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Jun. 24, 2020	Jul. 7, 2020	Sound	C55A - North side mouth of Town Creek in Beaufort
Advisory	Jul. 14, 2020	Jul. 16, 2020	Sound	C55A - North side mouth of Town Creek in Beaufort
Alert	Sep. 29, 2020	Sep. 30, 2020	Sound	C55A - North side mouth of Town Creek in Beaufort

Photo by www.nccoast.org

Water Quality Impairments per 303(d) List

The Newport River has been listed on the 303(d) List since the first report published by NCDEQ in 1998. Figure C-7 2022 Integrated Report depicts the current impairments within the Newport River watersheds as of the 2022 Integrated Report. Table C-8 Sections of Newport River on 303(d) List summarizes the current impairments listed in the 2022 Integrated Report.

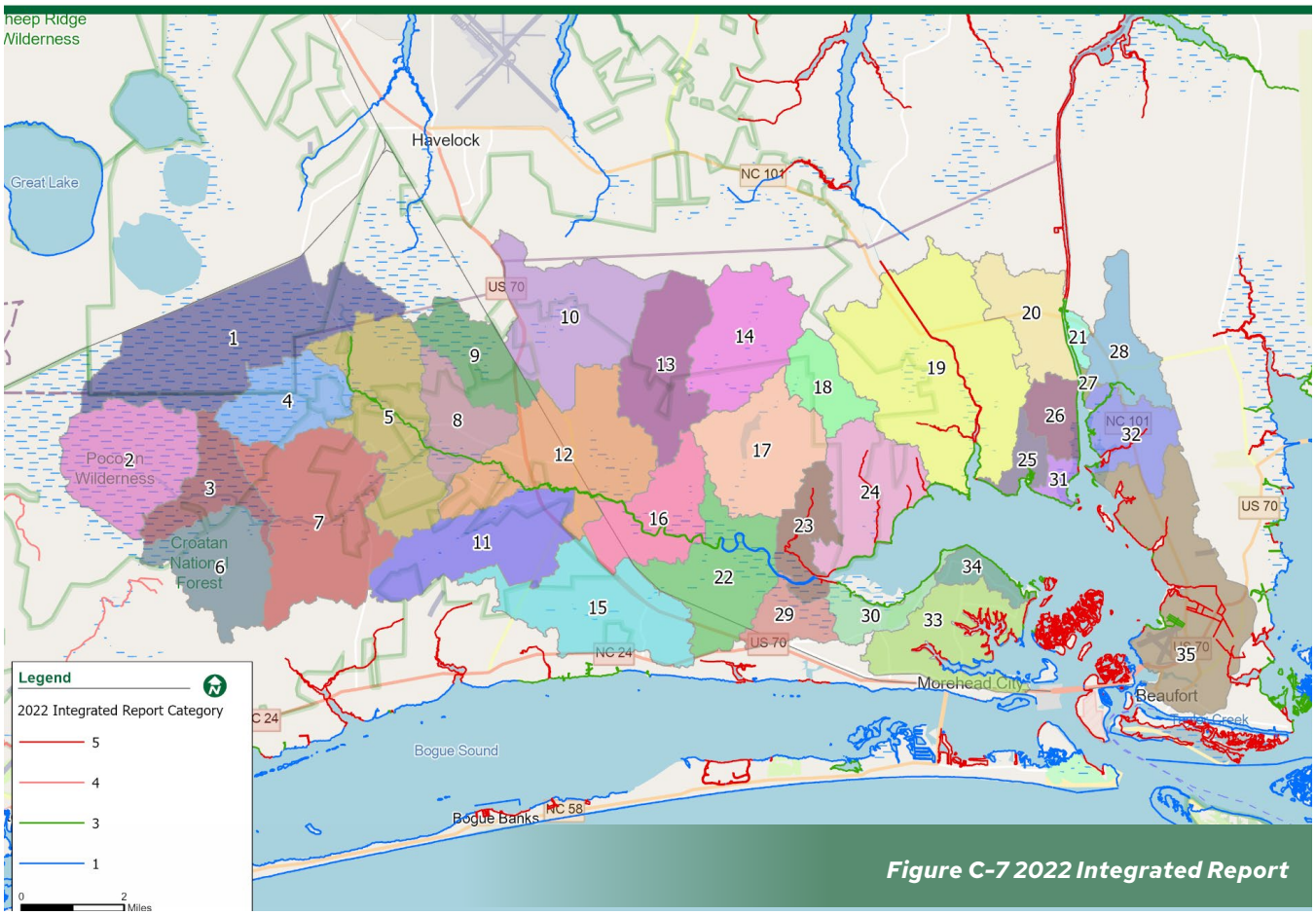


Figure C-7 2022 Integrated Report

Table C-8: Sections of Newport River on 303(d) List

AU Name	AU Number	Classification	303(d) Year*	IR Category	Parameter(s)
Newport River	21-(1)a	C	2014	5	Dissolved Oxygen
Newport River	21-(1)b	C	2014	5	Dissolved Oxygen
Newport River	21-(17)a	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)b1	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)b1	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)c	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)d1a	SA; HQW	2008	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17) d1b	SA; HQW	2008	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)d3	SA; HQW	2008	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)e1	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)e2	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)f	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)g1	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)g2	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Newport River	21-(17)h	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Calico Creek	21-32a	SC; HQW	2008	5	Dissolved Oxygen, pH, Chlorophyll a, Turbidity, Copper
Calico Creek	21-32b	SC; HQW	2008	5	Dissolved Oxygen, Chlorophyll a
Crab Point Bay	21-30	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)

Table C-8: Sections of Newport River on 303(d) List

AU Name	AU Number	Classification	303(d) Year*	IR Category	Parameter(s)
Gable Creek	21-28a	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Gable Creek	21-28b	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Willis Creek	21-29	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Wading Creek	21-27	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Turner Creek	21-25-1-11-1	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Russell Creek	21-26a	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Russell Creek	21-26b	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Ware Creek	21-25	SA; HQW	2008	5	Shellfish Growing Area Status (Fecal, SH, SA)
Core Creek (Intracoastal Waterway – Adams Creek Canal)	21-24a	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Core Creek (Intracoastal Waterway – Adams Creek Canal)	21-24b1	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Core Creek (Intracoastal Waterway – Adams Creek Canal)	21-24b2	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Core Creek (Intracoastal Waterway – Adams Creek Canal)	21-24c	SA; HQW	2008	5	Shellfish Growing Area Status (Fecal, SH, SA)
Bell Creek	21-24-2a	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Bell Creek	21-24-2b	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Eastman Creek	21-24-1	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Oyster Creek	21-23a	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)

Table C-8: Sections of Newport River on 303(d) List

AU Name	AU Number	Classification	303(d) Year*	IR Category	Parameter(s)
Oyster Creek	21-23b	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Harlowe Creek	21-22a	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Harlowe Creek	21-22b1	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Harlowe Creek	21-22b2	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Harlowe Creek	21-22b3	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Harlowe Creek	21-22c	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Harlowe Canal	21-22-1	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Alligator Creek	21-22-2	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Big Creek	21-20	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Mill Creek	21-19	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)
Little Swamp Creek	21-18	SA; HQW	2002	5	Shellfish Growing Area Status (Fecal, SH, SA)

*Lists date section first appears on 303(d) List. Integrated Reports prior to 2002 did not include the same distinction by Assessment Unit (AU). Newport River was included in both the 1998 and 2000 Integrated Report but 2002 is left as the '303(d) Year' for segments in this table to reflect the first year each AU was added to the 303(d) List.

The parameter causing the 303(d) impairments was primarily the shellfish growing area status measured through fecal coliform criteria in shellfish waters used for shellfish harvesting. Additional listings were made based on the parameters of dissolved oxygen, chlorophyll a, pH, turbidity, copper, or a combination of such parameters. Suspected causes of these impairments include polluted runoff from nearby sources. Recent population growth in the Newport River area has created a higher probability of pollutants and contaminants entering the waters through runoff. Elements of population growth that can impact runoff and water quality include improperly working septic and sewage lines, highways, and other paved area.

Non-Point Pollution Sources per North Carolina Division of Marine Fisheries

The following are direct excerpts from ***Shoreline Survey Program Standard Operating Procedure*** created by Shellfish Sanitation and Recreational Water Quality Section in June 2011. These are the standardized definitions used to designate nonpoint sources[1].

Dockage

In accordance with North Carolina Division of Environmental Health rules, and with guidance from the United States Food and Drug Administration and the National Shellfish Sanitation Program that marinas be considered as potential sources for contamination of shellfish, the North Carolina Shellfish Sanitation and Recreational Water Quality Section adopts the following policy to be used in the classification of shellfish harvesting waters with respect to marinas, docking facilities, and other mooring areas.

Definitions

- **Marina:** A marina shall be defined as any water area with a structure (dock, basin, floating dock, etc.) which is utilized for docking or otherwise mooring vessels and constructed to provide temporary or permanent docking space for more than 10 boats.
- **Open System:** An open-system marina is a marina constructed in an area where tidal currents have not been impeded by natural or man-made barriers.
- **Closed System:** A closed-system marina is a marina constructed in a canal, basin, tributary, or other area with restricted tidal flow.
- **Commercial Marina:** A commercial marina is defined as a marina that offers one or more of the following services: Fuel, transient dockage, haul-out facilities, or repair services.
- **Private Marina:** A private marina includes any marina that is not defined as a commercial marina.
- **Entrance Canal:** The entrance canal will be defined as the canal which is created or significantly altered during marina construction to provide access for boats to that facility.
- **Cabin:** An enclosed space on board a boat that can provide overnight shelter.

Defining Slips

When conducting a marina inspection, the following items will be counted as slips, in the manner defined below:

- **Finger Pier Dockage:** A narrow pier; may project from the shore, larger pier, or dock.
- **Linear Dockage:** Typically, a slip will be counted for every 25 feet of linear dockage available. However, in cases where all boats using the facility are greater than 25 feet in length, a reasonable estimate of typical boat length can be substituted to determine the slip count.
- **Dockage Areas for Fueling or Sewage Pump out Use:** A slip will be counted for every 50 feet of linear dockage at any fueling dock or sewage pump out dock.
- Moorings associated with the marina, or within 100 feet of the last slip.

When conducting a marina inspection, the following items will not be counted as slips:

- **Staging Areas Associated with Haul Outs or Dry Stack Drop Zones :** Staging areas will be considered as any areas where the permanent dockage of boats would prohibit or significantly impede the use of an active haul-out or drop zone.
- Moorings not associated with the marina that are more than 100 feet from the last slip.

1 *Shellfish Sanitation. (2015). Shoreline Survey Program Standard Operating Procedures. North Carolina Department of Environmental Quality, Division of Marine Fisheries, Shellfish Sanitation and Recreational Water Quality Section.*

- **Temporary Tie-Ups Associated with A Boat Ramp:** Temporary tie-ups associated with boat ramps will be considered as any areas where the permanent dockage of boats would prohibit or significantly impede the use of an active boat ramp.

Jet Ski Slips: If there is evidence at a marina that any of these docking types are being used for permanent dockage, then they will be considered slips and will be included in the total slip count for the marina.

****Note: In open-system marinas subject to significant wave or wake action, cleats or tie-ups not associated with defined boat slip structures such as pilings or finger piers will not be included in the total slip count unless it can be shown that the area in question is being used for the dockage of boats. If a boat is seen tied up in one of these areas, confer with DCM officials to determine if this situation warrants further investigation. ****

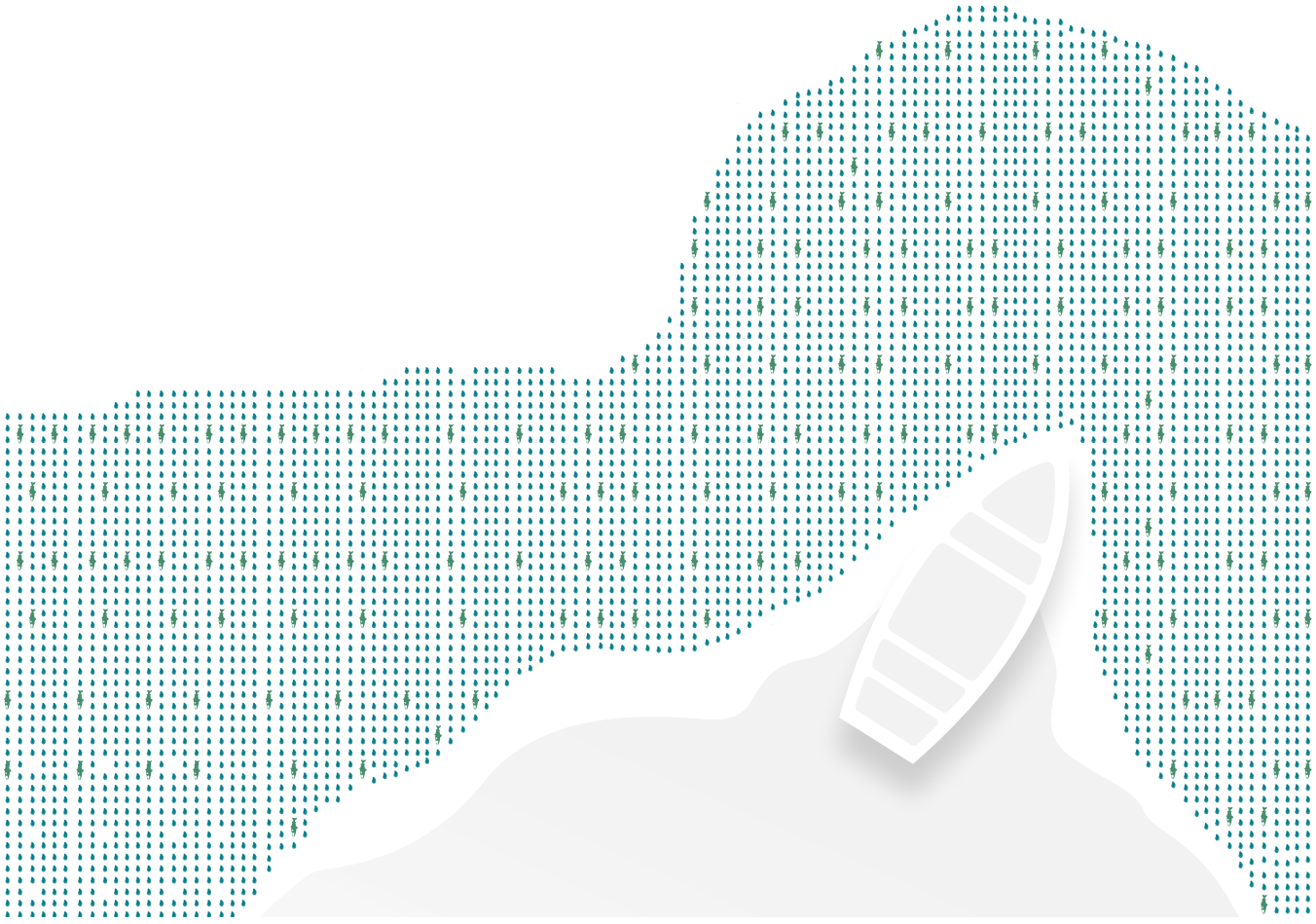
Stormwater Conveyance

Stormwater conveyances evaluated during the shoreline survey include any ditches, swales, or pipes that drain residential areas, roads, farms, golf courses, or other human-altered landscapes into shellfishing waters. Conveyances not evaluated include small ditches dug by individual homeowners, pipes draining single-home gutter systems, or any drainage not reaching shellfishing waters. Photographs of each conveyance should be taken indicating the type of conveyance and the type of land use(s) drained.

Definitions

- **"Conveyance":** Indicate the type(s) of stormwater conveyance that drain to the area being evaluated. Select from: "Ditch/Swale to Pipe," "Ditch/Swale," "Curb/Gutter to Pipe," "Curb/Gutter to Ditch/Swale," "Pipe to Pipe End," "Pipe End to Ditch/Swale," or "Other." If "Other" is selected, describe the conveyance system in the comments section.
- **"Diameter":** If applicable, indicate the diameter of the last pipe the stormwater flows through before discharging (including culvert pipes). If more than one pipe is used, indicate the combined diameter of all pipes. The most common pipe diameters are available from the drop-down menu, or you can select "Other" and indicate the pipe diameter in the comments section. If a pipe is present but you cannot determine its diameter, select "Unknown." If no pipe is present, select "Not Applicable."
- **"Ditch Size":** If applicable, enter the depth and width, in feet, of the ditch or swale here
- If no pipe is present, use best professional judgement to determine the relative size of the drainage area.
- **"FC Conc":** This data field serves as an indicator of the potential peak bacteria concentration discharged by the conveyance being evaluated. It is a subjective measure based on your experience, although some relative guidelines are provided:
  - Low = Drains a small area or an area with low-impact land uses; good buffers; little to no potential inputs; good filtering prior to discharge
  - Medium = Drains a larger area or an area with mixed impact land-uses; some buffers; some potential inputs, nonmajor; little filtering prior to discharge

- **High = Drains a large area or an area with predominantly high impact land-uses; little to no buffer; numerous potential sources or major sources; little to no filtering prior to discharge**
- **"FC Load":** This data field is a composite of the "System Size" and "FC Concentration" fields and indicates the relative contribution of this stormwater conveyance to the total bacterial load within the growing area. Average the values determined for "System Size" and "FC Concentration" to determine this value.
- **"Sys Size":** This data field serves as an indicator of the size of the area drained by the conveyance being evaluated. If a pipe diameter can be determined, then the following criteria will be used to determine system size:
  - **Low = ≤ 18 inches**
  - **Medium = 19-35 inches**
  - **High = ≥ 36 inches**
- **"Rain 24 Hr":** Select "Yes" if there has been rainfall in the area within the last 24 hours, or "No" if not.
- **"Flow":** If there is a flow moving through the conveyance, select "Yes."
- **"Illicit":** If there has not been a recent rainfall, but there is flow moving through the conveyance, it could be an indicator of an illicit discharge. If you have reason to believe that the flow through this conveyance is the result of an illicit discharge, select "Yes." If not, select "No," or if it is unclear, select "Maybe/Uncertain."
- **"Source":** Indicate the primary potential or actual pollution source drained by the conveyance. Select from "Agricultural Runoff," "Animal Operations," "Dog Pens," "Leaking Sewer Pipes," "Roadway/ Residential," "Septic Failure," "Sewer Overflow," "Wildlife," "Other," or "Unknown"
- **"Visible":** If there are any pollution sources visibly impacting the stormwater conveyance being evaluated, select "Yes."



Lack of Proper Maintenance of Permitted Stormwater Control Systems

Properly functioning stormwater control systems work to protect the surface by reducing the amount of polluted runoff flowing into waterways. Lack of proper maintenance of permitted stormwater control systems can increase the contaminants that runoff into surface waters. Improperly maintained stormwater control systems often do not treat stormwater but allow the stormwater to bypass the system, directing it straight to a stream or other waterway. Any pollutants that have been captured by stormwater runoff will also bypass the improperly maintained stormwater control system and enter the waterway.

There are 349 Coastal Stormwater Permits issued by the State along with 25 NPDES Stormwater Permits within the 35 watersheds (Figure C-8 State and NPDES Stormwater Permits, Table C-9 Existing State Stormwater Permits within Newport River Watersheds, Table C-10 Existing NPDES Permits within Newport River Watersheds). Of the Coastal Stormwater Permits, 32 have been found out of compliance, 34 permits are expired, and 180 have never been evaluated for compliance by the State.

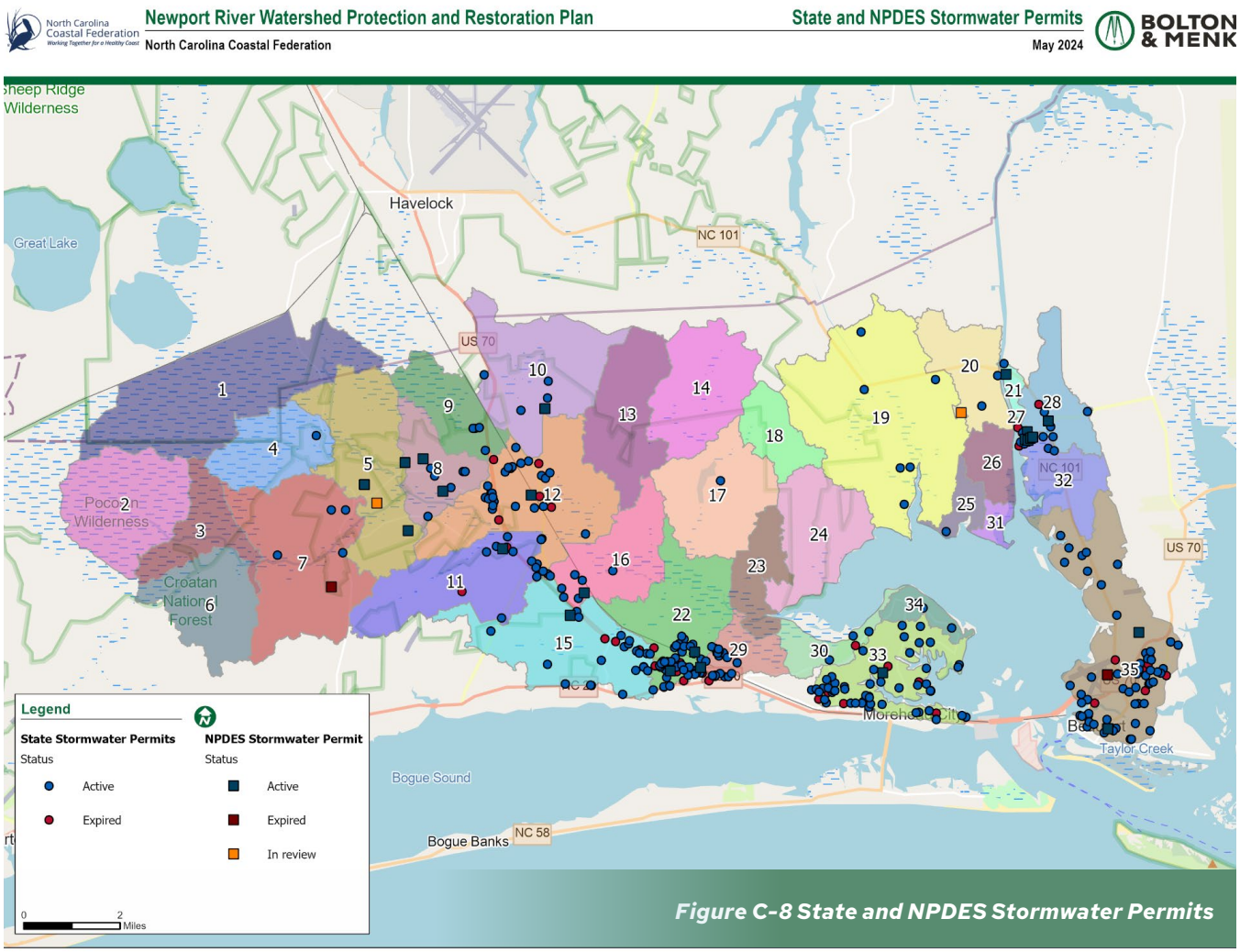


Figure C-8 State and NPDES Stormwater Permits

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8000640	Lot 14 Jarrett Bay Marine Industrial Park	1150 Sensation Weigh	Beaufort
SW8000838	Morehead City 2000 Street Improvements P		
SW8000520	Gloryfields Subdivision	Country Club Rd	Morehead City
SW8000523	House of Silk Flowers	2660 NC Hwy 101	Beaufort
SW8000527	Oakwood Mobile Homes	5526 US 70	Morehead City
SW8000533	Courtesy Village Aka Sand Ridge Apartmen	Lincoln Rd	Newport
SW8000324	Gregory Poole Power Systems Lot 11a Jarrett Bay	1500 Sensation Weigh Rd	Beaufort
SW8010712	20th St. Carteret	20th St N of Cambridge	Morehead City
SW8010714	Morehead Middle School	400 Barbour Rd	Morehead City
SW8010913	Contract No. 8-WWTP Filter & Irrigation	Town of Morehead City	Morehead City
SW8010914	Contract No. 19-Sanitary Sewer Rehabilitation	Morehead City	Morehead City
SW8011018	Contract No. 41 Water Treatment Plant	Carteret County	Beaufort
SW8011103	Kings Mill	New Bern St	Newport
SW8011110	The Reserve Green	Brandywine Blvd	Morehead City
SW8010112	Kabuto-Japanese House of Steak and Sushi	5308 Hwy 70	Morehead City
SW8010209	Newport Hotel at Fort Benjamin Commons	Joyce Ave	Newport
SW8010302	Larry Styron Property Smith - Herring Fa	Smith Herring Farm Rd	Newport
SW8010416	Carteret OB-GYN Associates	302 Medical Ct	Morehead City
SW8010430	New Beaufort Elementary School	Carraway St	Beaufort
SW8020712	Carolina Marlin Club Marina Association, Inc. Bulkhead Improvements	409 Is Dr	Newport
SW8030204	Beaufort Child Development Facility, Permitted under Beaufort Pofessional Park	Pofessional Park Dr	Beaufort
SW8030302	Country Club Run Phase 1	Country Club Rd Sr 1177	Morehead City
SW8030317	Oyster Cove @ Blair Farm Section I	Blair Farm Pkwy	Morehead City
SW8030329	B-3626 Replacement Bridge (Mill Creek Road)	Sr 1154 Just E of Newport	Newport
SW8030411	Blair Pointe Subdivision Lots 10 & 11	Blair Pointe Rd	Morehead City
SW8030413	VA Clinic	US Hwy 70 W	Morehead City
SW8030501	Lowes Food Store at Morehead Plaza	Morehead City	Morehead City
SW8030516	Bridges Street Extension Water/Sewer Improvements	Morehead City	Morehead City
SW8030801	CVS Pharmacy 04390 Morehead City	Int of Arendell and Bridges St	Morehead City

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8020830	Newport Triangle	301 McQueen Ave	Newport
SW8020901	Coastal Community Action, Inc. New office	301 McQueen Ave	Newport
SW8020902	Joan's Haven Subdivision Section 2	Sr 1154 Mill Creek Rd	Morehead City
SW8020933	Ronnie Perry- Lot 11 Webbs Park SD	Lois Ln	Morehead City
SW8020938	Beaufort Elementary School Borrow Site	Hwy 70	Beaufort
SW8021002	Moores Marine Yacht Center	Lot 8 Sensation Weigh	Beaufort
SW8021037	Bridge Mill Pofessional Park	Bridges St	Morehead City
SW8021203	East Carolina Bank-Morehead City	NC Hwy 24	Morehead City
SW8021206	Blair Point Park	Intersection of Sr 1176 Sr 1179	Morehead City
SW8030106	Eastman Creek Landing	Tuttles Grove Rd	Beaufort
SW8010530	The Reserve	Brandywine Blvd	Morehead City
SW8010535	NC Hwy 24 Property Lot 3 Commercial Deve	Cypress Bay Shopping Ctr Food Lion	Morehead City
SW8010611	Contract No. 18-2001 Clean Water Project		
SW8010643	Contract No. 16-Oglesby Farm Subdivision		
SW8010702	Lot 6 Jarrett Bay Marine Industrial Park	1001 Sensation Weigh	Beaufort
SW8000933	First Citizens Bank Newport	7045 Highway 70e	Newport
SW8000935	The Reserve Phase II		
SW8001007	Business Drive Extension		
SW8001125	Pier 1 Imports Site	5218 Hwy70	Morehead City
SW8001205	Lot 15 Jarrett Bay Marine Industrial Park	Sensation Weigh	Beaufort
SW8001208	Ruby Tuesday Restaurant	5227 Hwy 70 W	Morehead City
SW8020119	Carteret Clinic	3510 John Platt Dr	Morehead City
SW8020127	God's Property	off Carl Garner Rd	Newport
SW8020314	Boys and Girls Club of Carteret County	331 Arendell St	Morehead City
SW8020322	Lot 18 Jarrett Bay Marine Industrial Park North	1501 Sensation Weigh Rd	Beaufort
SW8031220	Palmetto Place	Pofessional Park Dr	Beaufort
SW8040101	Contract No. 9-Bikeway Improvements	N Side of Bridges St	Morehead City
SW8040131	Blair Farm Section 6	Blair Farm Pkwy	Morehead City
SW8040205	Mike Toler Chrysler Dodge Jeep Ram	5360 Highway 70	Morehead City
SW8040725	Carteret County Industrial Park-Lot 6B	Facility Dr Carteret County Industrial Park	Morehead City
SW8040738	NC DOT Bridge Replacement TIP B-3626 over Deep Creek	Sr 1154 Next To Prison Camp	Newport
SW8040743	US Fish & Wildlife Partner's Project	Hwy 70	Morehead City

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8040930	North River Farms Wetlands Restoration - Phase II	Hwy 70	Newport
SW8041006	Gracelyn Park	Chatham St	Newport
SW8050735	Brown Project	Blair Point Rd	Morehead City
SW8050809	Lot 7a - Jarrett Bay Industrial Park	1401 Sensation Weigh-Lot 7a Jarret Bay Industrial Park	Beaufort
SW8050915	Pine Knoll Waterway Maintenance Dredging	Bogue Sound and Pin Knoll Waterway	Beaufort
SW8030822	Plantation on the Bay Subdivision	Fowler Dr	Newport
SW8050240	Queen Anne's Revenge Shipwreck Recovery Project	Beaufort Inlet	Beaufort
SW8050328	Ottis Landing Waterfront Amenity	705 707 Shepard St	Morehead City
SW8050412	South Park Subdivision	Howard Blvd	Newport
SW8050428	Quail Crossing	SR 1124 Nine Foot Rd	Newport
SW8050445	Eastman Creek Landing Phases 2 & 4	Carteret	Beaufort
SW8050503	J & S Carolina Properties, LLC Site Plan	US Hwy 70	Newport
SW8050508	Park Villas formerly Building Partners	Old Murdoch Rd Sr 1151	Morehead City
SW8051027	The Coves at Newport	US Hwy 70	Morehead City
SW8051039	Country Club Run Phase 2	off Country Club Run	Morehead City
SW8051138	Eden Bridge Subdivision	Brooks St	Morehead City
SW8031002	Brandywine Bay - Village Green	Corner of Hwy 24 Brandwine Blvd	Morehead City
SW8031053	Sea Gate Subdivision Block C, Sec. III Lots 1-10	Old Stanton Rd	Morehead City
SW8031109	Blue Point Bay	Murdoch Rd	Morehead City
SW8050521	Gallants Channel Waterfront	172 W Beaufort Rd	Beaufort
SW8050553	Taylor Clearing-Harkers Island Road	Carteret	Beaufort
SW8050566	Morehead Beaufort Yacht Club Maintenance Dredging	409 Island Dr	Beaufort
SW8050601	United Pentecostal Church	8125 Hwy 70 E	Newport
SW8050605	Bridgewater at Ware Creek	Russell Creek Rd off Hwy 101	Morehead City
SW8050619	Lot 7J Jarrett Bay Industrial Park	1101 Spartina Dr	Beaufort
SW8050713	Contract No. 34 Street Improvements	Various Within City	Morehead City
SW8040244	E Linwood Parker Residence	Russell Creek Rd	Beaufort
SW8040322	Beaufort Manor Apartments	Pofessional Park Dr	Beaufort
SW8040419	Hestron Corp. 13-41 AC-Tract	Hwy 70 W	Morehead City

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8040502	Morehead City Beaufort Elks Lodge No.1710	400 Miller Farm Rd	Morehead City
SW8041120	Pond Properties Commercial Development	Hwy 70 W	Morehead City
SW8050108	Palmetto Plantation @ Olde Beaufort Village	Pofessional Park Dr	Beaufort
SW8050115	Storage Ideas, LLC	Ashley Pl Hwy 70	Newport
SW8050116	GATCO II, LLC	Hwy 70	Morehead City
SW8050117	Wayne See Business Park	Pond Drive at Gloria Dawn Rd	Morehead City
SW8051231	Audubon Pointe Section 5 Blair Farm	Blair Farm Pkwy	Morehead City
SW8060112	Lot 10 Jarrett Bay-True World Marine	1401 Sensation Weigh-Lot 10 Jarrett Bay Industrial Park	Beaufort
SW8060148	Beaufort Force Main Improvements	Beaufort	Beaufort
SW8060149	The Wye Subdivision	US 70 at NC 101	Beaufort
SW8070428	Laughton Landing	Sr 1177 Country Club Rd	Morehead City
SW8070507	Pinnacle Pointe	1454 Oglesby Rd	Morehead City
SW8070508	Town of Beaufort Wastewater Treatment Plant	Freedom Park Rd	Beaufort
SW8070534	Phillips Property	5437 Hwy 70	Morehead City
SW8070542	Municipal Boat Dock Project Jaycee Park	Shephard St	Morehead City
SW8070543	Turner Street Boardwalk	Turner St	Beaufort
SW8060625	Mariners Pointe	Ogelsby Rd	Morehead City
SW8070207	North River Club Golf Course Clubhouse Facility	169 Taylor Farm Rd	Beaufort
SW8070227	Blair Farms Section VIII	Blair Farms Pkwy	Morehead City
SW8070321	Rams Run	Sr 1124 Quinn Hill Loop Rd	Newport
SW8070340	Newport Elementary School - Additions & Renovations	Chatham St	Newport
SW8070403	Newport Boating Access Area	333 E Chatham St	Newport
SW8061111	Castle Glen Apartments	Bern St	Newport
SW8061113	North River Club Section Two	169 Taylor Farm Rd	Beaufort
SW8061126	George Sutton Site	Old Airport Rd	Morehead City
SW8061131	Kelly Farms Waste Area	Tom Mann Rd	Newport
SW8060505	Murta Commercial Building (Modification to Lot 7H)	Lot 7h Jarret Bay Industrial Park S	Beaufort
SW8070820	Mainsail of Beaufort	Jct of Turner St and Jill St	Beaufort
SW8070827	Commerce Avenue Condominiums	3302 Bridges St	Morehead City
SW8070844	Morehead Community Center	N 16th St	Morehead City

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8070851	Noland Company	300 Greenfield Dr	Morehead City
SW8070857	Gene Autry Project	209 Churchgate Ln	Newport
SW8070933	Morehead City Baseball Park	Mayberry Loop Rd	Morehead City
SW8070934	Chick-fil-a Restaurant at Crystal Coast Plaza	5156 Hwy 70	Morehead City
SW8070642	Waste Industries Roberts Road	427 Roberts Rd	Newport
SW8070733	Cape Point Bait Company	1465 Hwy 101	Beaufort
SW8070741	Newport Shopping Center Phase 2	Hwy 70	Newport
SW8060239	2005 WWTP Improvements Morehead City	Treatment Plant Rd	Morehead City
SW8060921	Maintenance Dredging Waterway Connecting Pamlico Sound & Beaufort Harbor, Beaufort Harbor & Rollinson Channel	Carteret County	Morehead City
SW8061006	All Saints Church Amia Inc	290 McCabe Rd	Newport
SW8060709	Lana Gardens Subdivision	Roberts Rd	Newport
SW8060256	Contract #42 Utility Extensions	Carteret County	Morehead City
SW8060421	Park Meadows Subdivision	Lakewood Ct	Newport
SW8080212	Walgreen Store No. 11895 Morehead City	5053 Hwy 70	Morehead City
SW8080222	NC EONS Science Platform	In Pamlico Sound	Morehead City
SW8080224	Crystal Coast Boat and RV Storage	471 Tom Mann Rd	Newport
SW8080326	Narron Business Park	Arthur Farm Rd	Morehead City
SW8080421	Chadwick Shores Plantation	NCSR 1155	Newport
SW8080512	Waterway Marina and Club at Beaufort	346 Steel Tank Rd	Beaufort
SW8080529	Tiller School	1950 Hwy 70 E	Beaufort
SW8080606	Beaufort Corporate Park	Between Family Lane and Copeland Rd	Beaufort
SW8091022	Replace Bridge 43 Over Deep Creek Project B4454	Crossing of Deep Creek on Sr 1133	Newport
SW8100508	The Cottages at Palmetto Plantation	Pofessional Park Dr	Beaufort
SW8100512	Carteret County Industrial Park Lot 6A	311 Facility Dr	Newport
SW8100601	The Vinings at Wildwood	133 Wildwood Rd	Newport
SW8100602	Bojangles Restaurant Newport	Courtesy Towne Square Shopping Ctr	Newport
SW8100606	CVS Store 7381 Beaufort	1701 Live Oak St	Beaufort
SW8100617	Future US Hwy 70 Outparcels Tract Two	Approx 1830 Live Oak St	Beaufort
SW8100720	Martinez Residence Dock Project	Lot 19 Settlement Ln	Newport
SW8100812	Verizon Wireless Lot B East Gate Plaza	Flowers Ln	Morehead City
SW8101117	Compass Landing Apartment Homes	Access Old Fashion Way	Newport

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8101218	Gallants Point (formerly Aqua 10 Marina)	End of Aqua 10 Rd	Beaufort
SW8110112	Dollar General Morehead City	3017 Bridges St	Morehead City
SW8090617	Highway 101 Clearing Project	Hwy 101	Beaufort
SW8081108	East Gate Plaza	5116 Hwy 70 W	Morehead City
SW8090230	McDaniel Kirchner Residential Dock	1809 and 1811 Calico Dr	Morehead City
SW8090620	Jones Pond	Hwy 70 Carteret Dr	Beaufort
SW8090621	Beaufort East Village Wastewater Disposal System	Freedom Park Rd	Beaufort
SW8090302	Cypress Village Subdivision	300 Masontown Rd	Newport
SW8090624	Lot 2 Jones Brothers Business Park	401 Miller Farm Rd	Morehead City
SW8090334	Newport Park	100 McQueen Ave	Newport
SW8090338	Little Nine Development	Little Nine Dr	Morehead City
SW8090402	Ashley Place Subdivision 3	Between Fox Hall Rd and Cannon Blvd	Newport
SW8090419	SR 1154 Mill Creek Road	Sr 1154	Newport
SW8090425	Well No. 4 Access Road	Approx 1830 Live Oak St	Beaufort
SW8090514	Replace Bridge Carteret 40 Project BK 5103	Sr 1140 Roberts Rd	Newport
SW8090525	Dollar General Highway 24/East Southwinds Drive Newport	980 Hwy 24	Newport
SW8071106	Wards Creek Point	End of Channel Rock Rd	Beaufort
SW8071113	Coastal Yacht Hangar Lot 9 Jarrett Bay	1301 Sensation Weigh Rd	Beaufort
SW8071222	West Beaufort Boating Access Area	W Beaufort Rd at Town Creek	Beaufort
SW8080106	Calico Subdivision	Site Western Side of NCSR 1176	Morehead City
SW8080109	Parker Honda	5327 Hwy 70 W	Morehead City
SW8080110	Morehead Enterprises LLC Highway 70 Morehead City	5208 Hwy 70	Morehead City
SW8080125	Pirates Landing	Pofessional Park Dr	Beaufort
SW8091205	Olive Garden Restaurant Morehead City	US Highway 70	Morehead City
SW8091221	Beaufort Harbor Marina and Yacht Club	101 Cedar St	Beaufort
SW8100203	Gracelyn Park Phase IV	Edgewood Ave	Newport
SW8100208	Freeman Coastal Properties	300 Greenfield Dr	Morehead City
SW8100222	El Salvador Excavation Project	W of Beaufort Inlet In Atlantic Ocean	Beaufort
SW8100302	Aarons Furniture	7075 Hwy 70	Newport
SW8090105	Reclaimed Water Elevated Storage Tank	Mayberry Loop Rd	Morehead City

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8090120	Contract 71 Water Treatment Plant No. 4	1545 Country Club Rd	Morehead City
SW8090203	A&M Mini Storage	US Highway 70	Newport
SW8090637	McDonalds Beaufort	Hwy 70 Carteret Dr	Beaufort
SW8090713	Lo'R Deck South at Town Creek	Pine and Turner St	Beaufort
SW8090719	Veltman Pier	1404 Cove Ct	Morehead City
SW8090818	Snead Pier Improvements	1403 Oglesby Rd	Morehead City
SW8090819	Raynor Pier Project	1409 Oglesby Rd	Morehead City
SW8090908	Bayview Homes	1300 Bay St	Morehead City
SW8090928	Golitz Boatlift Project	1405 Oglesby Rd	Morehead City
SW8090929	Teague Boatlift Project	1403 Oglesby Rd	Morehead City
SW8091014	Bur Oaks Section Four	Bur Oaks Blvd	Newport
SW8091016	Core Creek Marina & Beaufort Waterway RV Park formerly Adams Creek Marina	329 Core Creek Rd	Beaufort
SW8131205	Walmart Neighborhood Market Store #7098-00	415 Roberts Rd	Newport
SW8121010	Shipps Storage	457 Tom Mann Rd	Newport
SW8111203	State Employees Credit Union Beaufort office	Pinners Point Rd	Beaufort
SW8120115	Pearl G West Property	231 Pinners Point Rd	Beaufort
SW8120220	Fish Antennae Placement Atlantic Vaneer Creek	Int Lennoxville and Lewistown Roads	Beaufort
SW8120315	Newport River Pier Extension	US Hwy 70 W Radio Is	Morehead City
SW8120402	Crystal Coast Hospice House	E Chatham St	Newport
SW8120411	Construction of Oyster Reefs for Research	Back Sound Newport River and N River	Morehead City
SW8120503	Eitner Jayne Commercial Center	4913 Bridges St Extension	Morehead City
SW8110203	Morehead Pofessional Park Lot 6	Sw Int of John Platt Drive and Penny Ln	Morehead City
SW8110327	Handy Mart Newport	Nw Int of US Hwy 70 and NCSR 1124	Newport
SW8110402	Oneals Drug Store	129 Nine Foot Rd	Newport
SW8110419	Hibbs Road American Tower Site 273437	5899 Hwy 70	Newport
SW8110510	Morehead City Sales Yard	5101 Business Dr	Morehead City
SW8140602	Duke Energy Progress Morehead City Operations Facility	270 Arthur Farm Rd	Newport
SW8121019	Beaufort Spring	Hwy 70	Beaufort
SW8120611	Longhorn Steakhouse Lot a East Gate Plaza	Int Hwy 70 and Flowers Ln	Morehead City

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8121001	Beaufort Fire Department Substation	2731 Highway 101	Beaufort
SW8110607	Fish Antennae Project	112 Mansfield Pkwy and 2050 Mason Ln	Morehead City
SW8110612	Little Nine Road Extension	Little Nine Dr	Morehead City
SW8140210	S&W Ready Mix Concrete Morehead City	5161 Business Dr	Morehead City
SW8140505	Fences Unlimited	203 Jacob Dr	Morehead City
SW8140510	2014 Water System Improvements Tootle Road Well Raw Water Line	Various Streets	Morehead City
SW8150120	Old Town Creek Harbor Homes Dredging Project	501 513 Turner St	Beaufort
SW8150206	Lot 16 Wayne See Business Park	204 Jacob Dr	Morehead City
SW8150313	Palmetto Plantation and Olde Beaufort Village Phase 2	Pofessional Park Dr	Beaufort
SW8130714	Havelock Morehead City Wildwood 115kV Transmission Line Maintenance Project	Along Hwy 70	Morehead City
SW8140616	Disposal Areas 22 and 23 Improvements	Aiww	Morehead City
SW8140803	Lot 10a Morehead Pofessional Park	Penny Ave	Morehead City
SW8141205	Eastport at the Park	Pofessional Park Dr	Beaufort
SW8130305	Old Town Creek Harbor Homes	501 Turner St	Beaufort
SW8151004	Beaufort Fire Department #1	Live Oak St	Beaufort
SW8180505	Salvation Army	2800 Bridges St	Morehead City
SW8180509	Pelican Point Properties US HWY 70E Pond	5133 Hwy 70 E	Morehead City
SW8180510	The Wash Factory	5129 Hwy 70 E	Morehead City
SW8180706	Hannula Storage	215 Jacob Dr	Morehead City
SW8180811	Carteret County ABC Warehouse	318 Greenfield Dr	Morehead City
SW8180902	Dollar General - Carteret County	2440 Hwy 101	Beaufort
SW8181007	Shearline Boatworks	301 Facility Dr	Morehead City
SW8170511	Heritage Pointe Phase One	off Mason Town Rd	Newport
SW8190705	North Carolina State Employee's Credit Union - Newport Branch	102 Joyce Ave	Newport
SW8181209	Harlowe - Newport 230kV Transmission Line	Danny Garner Rd	Newport
SW8190206	Carl Garner Laydown Yard	209 Carl Garner Rd	Newport
SW8190313	Taco Bell	1798 Live Oak St	Beaufort
SW8190515	Randolph Johnson Park	1017 Pine St	Beaufort
SW8190603	Waste Removal-Contractors Plant and Storage Yard	167 Little Nine Rd	Morehead City
SW8190702	Green Recycling Solutions	812 926 Hibbs Rd	Newport

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8160902	Wayne See Subdivision Lot 14	Lot 14 Wayne See Industrial Park	Morehead City
SW8161010	Lidl Grocery Store Morehead City	US Hwy 70 W	Morehead City
SW8160618	West End Pump Station and Force Main	261 Arthur Farm Rd	Newport
SW8160720	General Services Operations Building	off Business Dr	Newport
SW8160805	Lot 20 Wayne See Industrial Park	5031 Mattie St	Morehead City
SW8150511	Lot 19 at Wayne See Industrial Park	5035 Mattie St	Morehead City
SW8190814	Beaufort Marine Center	1501 Sensation Weigh	Beaufort
SW8170613	Beaufort Storage	1795 Live Oak St	Beaufort
SW8171114	Lucas Kidney Research Center	623 35th St	Morehead City
SW8171117	Newport - 230kV Substation - Switch	232 Danny Garner Rd	Newport
SW8180219	Harlowe 230 kV Substation	4417 Hwy 101	Newport
SW8190904	Compass Margaritaville Hotels & Resorts	115 Cedar St	Beaufort
SW8150720	Storage Solutions Business Drive	Lot 30 Wayne See Industrial Park	Morehead City
SW8200301	Pinnacle Storage - Wildwood	5475 US 70 W	Morehead City
SW8200302	The Vinings at Wildwood II	5475 US 70 W	Morehead City
SW8200303	Stroud Engineering office	422 Hwy 24	Morehead City
SW8171005	McDonalds Morehead City	5173 5179 Hwy 70 W	Morehead City
SW8210906	Embassy at Morehead City	3822 Galantis Dr	Morehead City
SW8211005	Kimeplex Park	788 NC-24	Newport
SW8211206	Brandywine Bay WWTP Replacement	104 Sleepy Ct	Morehead City
SW8880712	Eagles Bay Elderly Apartments	100 Eagles Bay Ct	Beaufort
SW8880713	Riverwoods Phase 5	Sr 1149	Newport
SW8880907	Westwood Square Apartments	Brook St	Morehead City
SW8881117	Market Place II	Hwy 70 W	Morehead City
SW8881208	Carteret County Development Center	Church St	Morehead City
SW8900221	Waste Industries Roberts Road	427 Roberts Rd	Newport
SW8900501	Martin Creek Subdivision	Sr 1318	Morehead City
SW8900513	Beaufort Landing Village	Int of Turner Jill Streets	Beaufort
SW8201215	Carteret Health Care Laydown Area	Bridges Street and Penny Ln	Morehead City
SW8210412	North Morehead Extension	903 Hamilton Dr	Morehead City
SW8210504	Duke Energy Progress - Morehead 115kV Substation	510 Maple Ln	Morehead City
SW8210508	Heritage Pointe - Phase Four	At Approx 156 Howard Rd	Newport

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8210514	East Port II Apartments	619 Pofessional Park Dr	Beaufort
SW8890405	Jesse Rawls Property	Lot 3 Convenient Pl Subdivision	Newport
SW8220207	Aa Storage Beaufort	2176 Live Oak St	Newport
SW8200405	Line 243 Retofit Receiver	US Hwy 70	Newport
SW8880205	Somerset Plantation Subdivision	Hwy 24	Morehead City
SW8880210	Hardesty Farms	Hardesty Ln	Newport
SW8880401	Town Creek Marina	232 W Beaufort Rd	Beaufort
SW8880511	Silver Lakes	Silver Lake Subdivision	Morehead City
SW8880515	Black Creek Site Drainage	Sr 1154	Newport
SW8880520	Vision Cable	Hwy 70	Newport
SW8200610	Coastal Gym	5301 Hwy 70	Morehead City
SW8201102	Elijah's Landing Apartments	3200 Bridges St	Morehead City
SW8890518	Bulk Storage Handling Facility Morehead City	Fourth St	Morehead City
SW8890608	WXFI TV8 Transmitter Building	Block 30 Open Grounds Farm	Newport
SW8890611	Adams Harbour	NC 1122	Morehead City
SW8890807	Wysocki Commercial Property	off Hwy 70	Morehead City
SW8891005	Eagles Nest Mobile Home Park	off NCSR 1124	Morehead City
SW8910508	Wards Landing Subdivision	NCSR 1149 and US 70	Newport
SW8910611	Carteret County Jail and Law Enforcement Center	Craven St	Beaufort
SW8940716	The Courtyard at Barbour Rd	303 Barbour Rd	Morehead City
SW8940813	Justins Corner Subdivision	off Mandy Ln	Morehead City
SW8950901	Carteret County Senior Center	3820 Galantis Dr	Morehead City
SW8950903	1995 Morehead Waterfront Improvements		
SW8951001	Makenzie Square	3332 Bridges St	Morehead City
SW8960108	Thompson Apartments	Off Symi Cir	Morehead City
SW8940112	Cypress Bay Shopping Center Expansion	NC 24 at US 70	Morehead City
SW8940222	Morehead City Annex - W&S		
SW8940404	Duke Energy Progress North River 115k V Substation	1150 Hghway 101	Beaufort
SW8921205	Morehead Middle School	400 Barbour Rd	Morehead City
SW8930405	Somerset Court of Newport	3020 Market St	Newport
SW8930603	Deer Haven Subdivision	NCSR 1154	Newport
SW8960328	The Village at Camp Morehead By the Sea	Off NC 24	Morehead City

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8921004	Down East Trading Post	1901 Live Oak St	Beaufort
SW8921104	Morehead City Elementary School		
SW8960616	Bur Oaks Subdivision	Bur Oaks Blvd Sr 1195	Newport
SW8931006	Sand Ridge Subdivision	Lincoln Foxhall Bayberry Graystone Roads	Newport
SW8950802	Morehead City W & S		
SW8990120	CRSWMa Newport Convenience Center	Hibbs Rd Sr 1141	Newport
SW8981035	Town of Newport Water Treatment Improve.		
SW8981115	Sheerline Subdivision	530 Sensation Weigh	Beaufort
SW8981125	Town of Newport Sewer / Middle School Tr		
SW8981243	Blair Farm Subdivision Section 2 and 4	E Side of NCSR 1176	Morehead City
SW8980409	Jarrett Bay Boatworks Steel Tank Road	530 Sensation Weigh	Beaufort
SW8980429	Lowe's at Morehead Crossing	5219 Hwy 70	Morehead City
SW8980540	Morehead City Well 5 & Tank 3		
SW8971034	Morehead Pofessional Park	Penny Lane John Platt Dr	Morehead City
SW8961108	Newport Food Lion	7075 Hwy 70	Newport
SW8970831	Lee Bulkhead and Lot Filing Project	Lot 5 Spooners Creek S D	Morehead City
SW8970102	Woodlands IV Subdivision	N New Bern St	Newport
SW8980716	Wallace Conner Outparcels formerly Newport Food Lion Outparcels	7075 Hwy 70	Newport
SW8971131	South River Bulkhead / Boat Ramp Facility	NCSR 1319	Morehead City
SW8971234	Crab Point Bay Subdivision	E Oglesby Rd	Morehead City
SW8980101	Carteret County Industrial Park	Business Dr	Morehead City
SW8980103	Britthaven of Newport	210 Foxhall Rd	Newport
SW8970855	Boulia Enterprises	Hwy 70	Newport
SW8970925	Courtyard West Aka Pollard Property	1800 Courtyard W	Newport
SW8970307	Blair Pointe Phase I	NCSR 1177	Morehead City
SW8970432	The Pofessional Center	3302 Bridges St	Morehead City
SW8970706	The Pantry formerly East Coast Super Center	5230 Highway 70	Morehead City
SW8970812	Rosewood Townhomes	2900 Myrtle St	Morehead City
SW8980826	Alice J. Bayer	NC Hwy 101	Beaufort
SW8980926	Whitewater Subdivision Master Plan (Jarrett Bay)	530 Sensation Weigh	Beaufort
SW8990419	Michael J Smith Field	180 Airport Rd	Beaufort

Table C-9: Existing State Stormwater Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
SW8990429	Secure Storage formerly Heilig Meyers Furniture	5285 Hwy 70 W	Morehead City
SW8991202	David Horton Commercial Park	Little Nine Dr	Morehead City
SWA000003	Morehead City Country Club Golf Course and Club Facilities Improvements	2900 Country Club Rd	Morehead City
SWA000076	Development of 5264 Highway 70	5264 Highway 70	Morehead City
SWG040109	Town of Newport Chatham Street Sewer Extension	Extending From 330 E Chatham St	Newport
SWG040113	Morehead Wildwood Harlowe 115kV Line Loop into Harlowe Substation	Intersection of Hwy 101 and Harvesty Loop Rd	Newport
SW8990929	Jones Brothers Industrial Park formerly Jones Brothers Partnership Shell Building	Miller Farm Rd	Morehead City
SW8991033	Lot 5 Whitewater Subdivision at Jarrett Bay	Sensation Weigh Rd	Beaufort
SW8991109	Troon Apartments	300 Troon Way	Beaufort
SW8991110	Newport Middle School	Corner of US 70 Hibbs Rd	Newport
SWA000137	Heritage Pointe Phase Three	214 Howard Rd	Newport
SWG040012	Well No. 4 Access Road	Approx 1830 Live Oak St	Beaufort
SWG040040	Sycamore Drive Production Well No. 5 and Raw Water Main	Sycamore Dr	Beaufort
SW8990638	Buena Vista Subdivision	Buena Vista Dr	Morehead City

Table C-10: Existing NPDES Permits within Newport River Watersheds

Permit Number	Facility Name	Facility Address	City
NCG020750	Sparrow Hawk Sand Pit - Newport	Sparrow Hawk Lane-off of Lake Rd	Newport
NCG020800	Miller Mine No. 2	PO Box 1376	Morehead City
NCG020946	Simpson Hocutt Mine	1690 Roberts Rd	Newport
NCG020957	Nine Foot Road Sandpit	Nine Foot Rd	Newport
NCG020683	Nine Foot Road Mine #2 - Newport	601 Nine Foot Rd	Newport
NCG020886	Simpson Family Properties LLC	790 Hwy 101	Beaufort
NCG020980	Roberts Road Mine	Roberts Rd	Newport
NCG030272	Bally Refrigerated Boxes - Morehead City	135 Little Nine Rd	Morehead City
NCG080687	Beaufort Public Works Facility	412 Hedrick St	Beaufort
NCG080015	Waste Industries Roberts Road	427 Roberts Rd	Newport
NCG110061	Beaufort WWTP	301 Freedom Park Rd	Beaufort
NCG110110	Morehead City WWTP	1000 Treatment Plant Rd	Morehead City
NCG100022	Atlantic Auto Parts & Salvage	5891 Hwy 70	Newport
NCG140107	Newport- Plant 20013	247 Carl Garner Rd	Newport
NCG140438	S & W Ready Mix - Morehead Plant	5161 Business Dr	Clinton
NCG140209	S & W Ready Mix - Morehead City Plant #14	5126 US Hwy 70 W	Morehead City
NCG190003	Bock Marine - Core Creek/Beaufort	233 Core Creek Rd	Beaufort
NCG190003	Bock Marine - Core Creek/Beaufort	233 Core Creek Rd	Beaufort
NCG190010	Parker Offshore LLC	2570 Hwy 101	Beaufort
NCG190052	SHM Jarrett Bay LLC DBA Safe Harbor Jarrett Bay	530 Sensation Weigh	Beaufort
NCG190086	Banks Boatworks	1501 Sensation Weigh	Beaufort
NCG190092	Banks Boatworks LLC	1201 Sensation Weigh	Beaufort
NCG190095	Powell Brothers Maintenance	1150 Sensation Weigh	Beaufort
NCG190097	Triton Marine Services Inc	1050 Sensation Weigh	Beaufort
NCG210119	Veneer Technologies - Newport	3337 W Railroad Blvd	Newport

Sewer Systems

Sewer systems can consist of storm, sanitary, or combination sewers. Storm sewers handle storm runoff and carry it to streams. Sanitary sewers handle raw sewage and carry it to wastewater treatment facilities. Combination sewers handle both stormwater runoff and raw sewage. Sewage overflow can occur because of blockages, inadequate carrying capacity, leaking pipes, and power outages at pumping stations. An overflow can allow contaminants to flow into nearby surface waters.

Septic Systems

Septic systems treat wastewater using separation and filtration before the water is filtered into the soil. Improperly working septic systems have the potential to pollute nearby waterways with pathogens, nutrients, and chemicals. Septic systems must be maintained and periodically pumped to continue proper operation. Shellfish Sanitation noted improper septic systems to be of concern to water quality during previous surveys.

Highways

Debris and heavy metals, oils, and other toxic surfaces on highways from construction and traffic can be carried by runoff waters to nearby waterways. Pesticides and fertilizers used along the highway may also runoff and pollute surface and ground water. Measures can be taken during road construction to prevent harmful contaminants from polluting waterways.

Figure C-9 Potential Non-Point Pollution Sources depict various potential non-point sources of pollution within the Newport River watersheds.

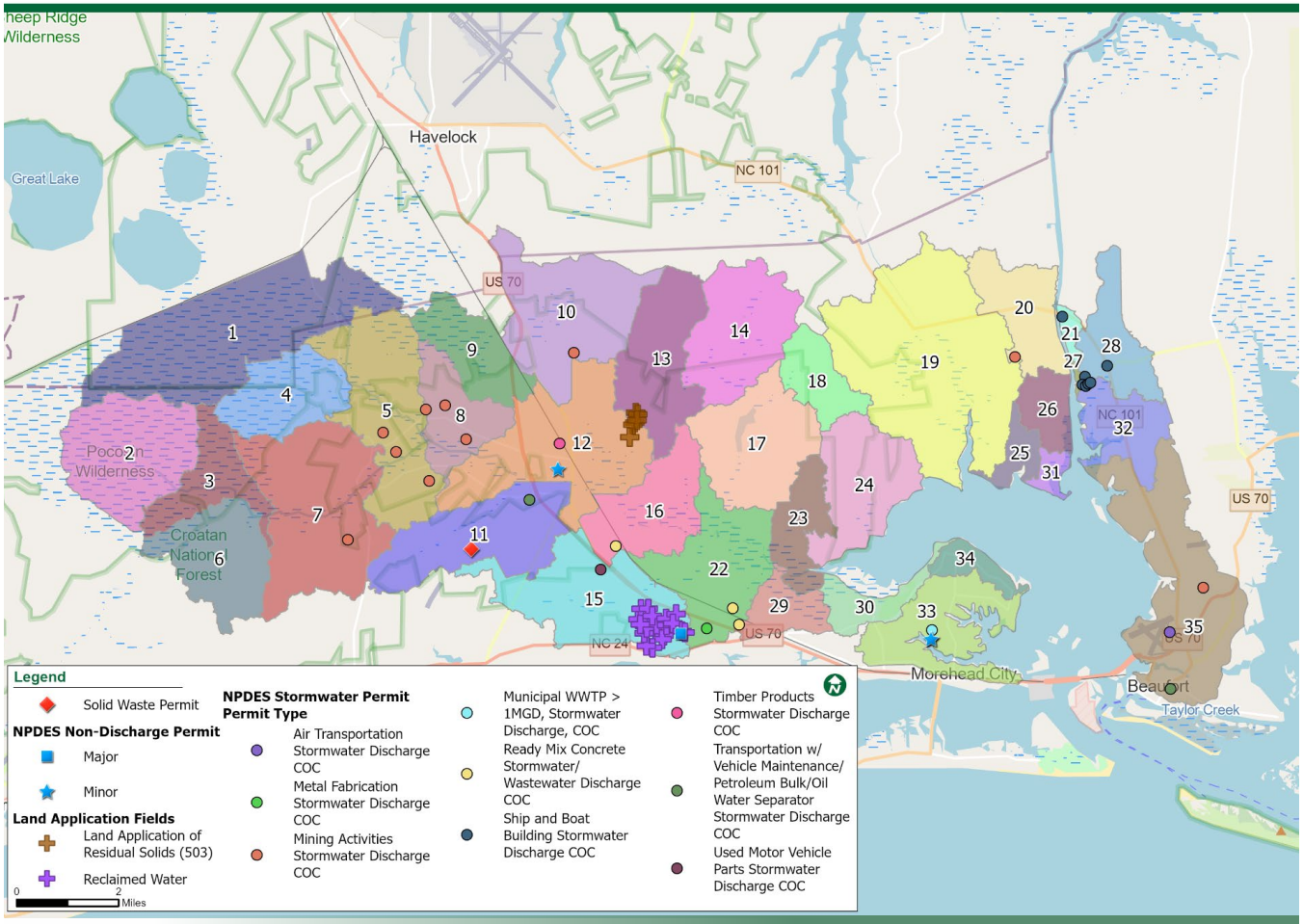


Figure C-9 Potential Non-Point Pollution Sources

Water Quality Sampling

Researchers from North Carolina State University collected water samples in 2022 to test water quality parameters in wet and dry conditions. Samples were collected in dry conditions on March 4, 2022, and following a storm event on March 25, 2022. Additional samples were collected and tested for bacteria concentration on June 23, 2022, after a small rainfall event. The results of these samples allowed the Newport River project team to further pinpoint areas of concern for water quality issues and base location of project sites to improve the quality of the water in these areas.

Figure C-10 Bacteria Water Sampling Results and Figure C-11 Turbidity Water Sampling Results depict water quality sampling results for the various sampling sites and dates.

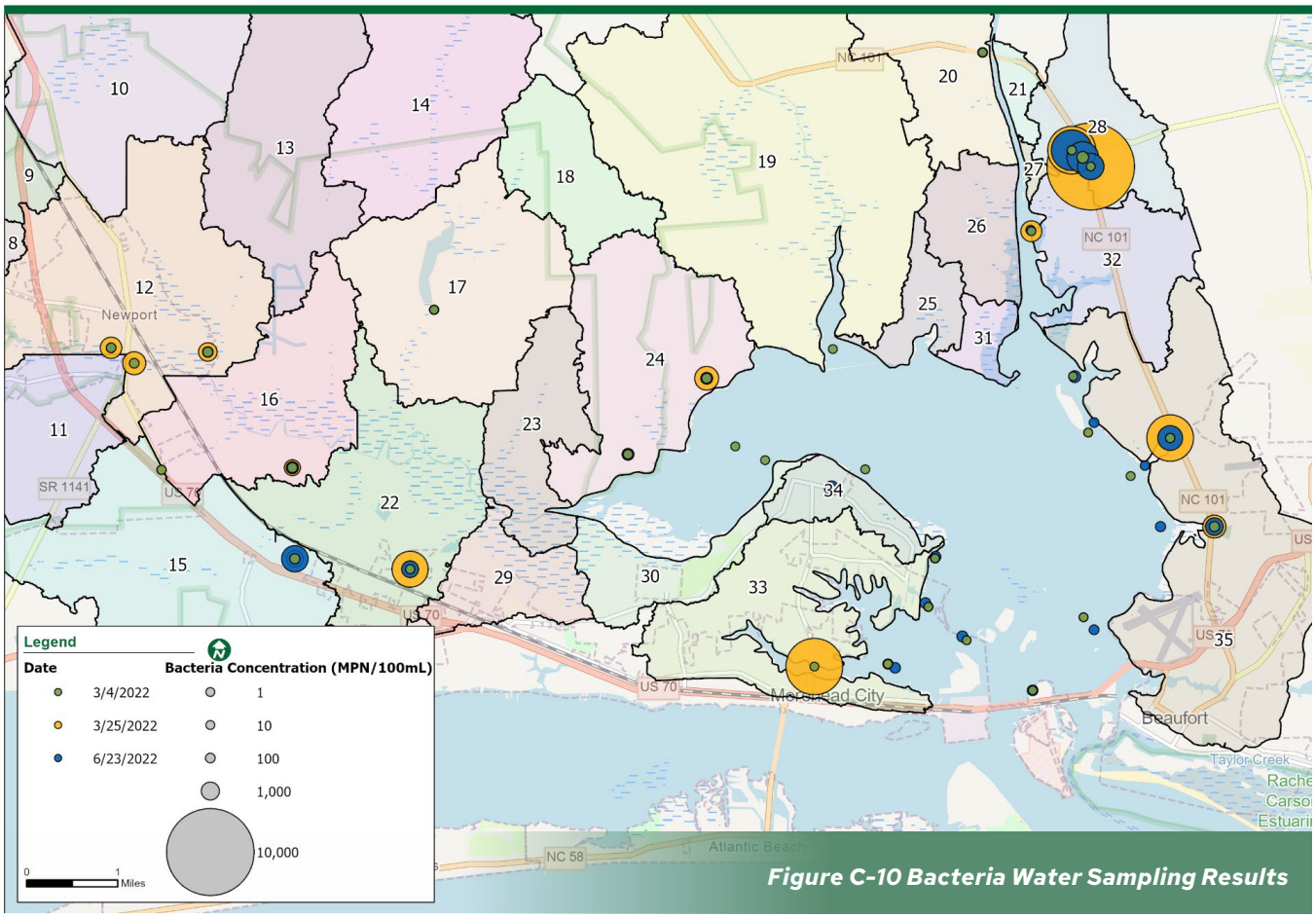


Figure C-10 Bacteria Water Sampling Results

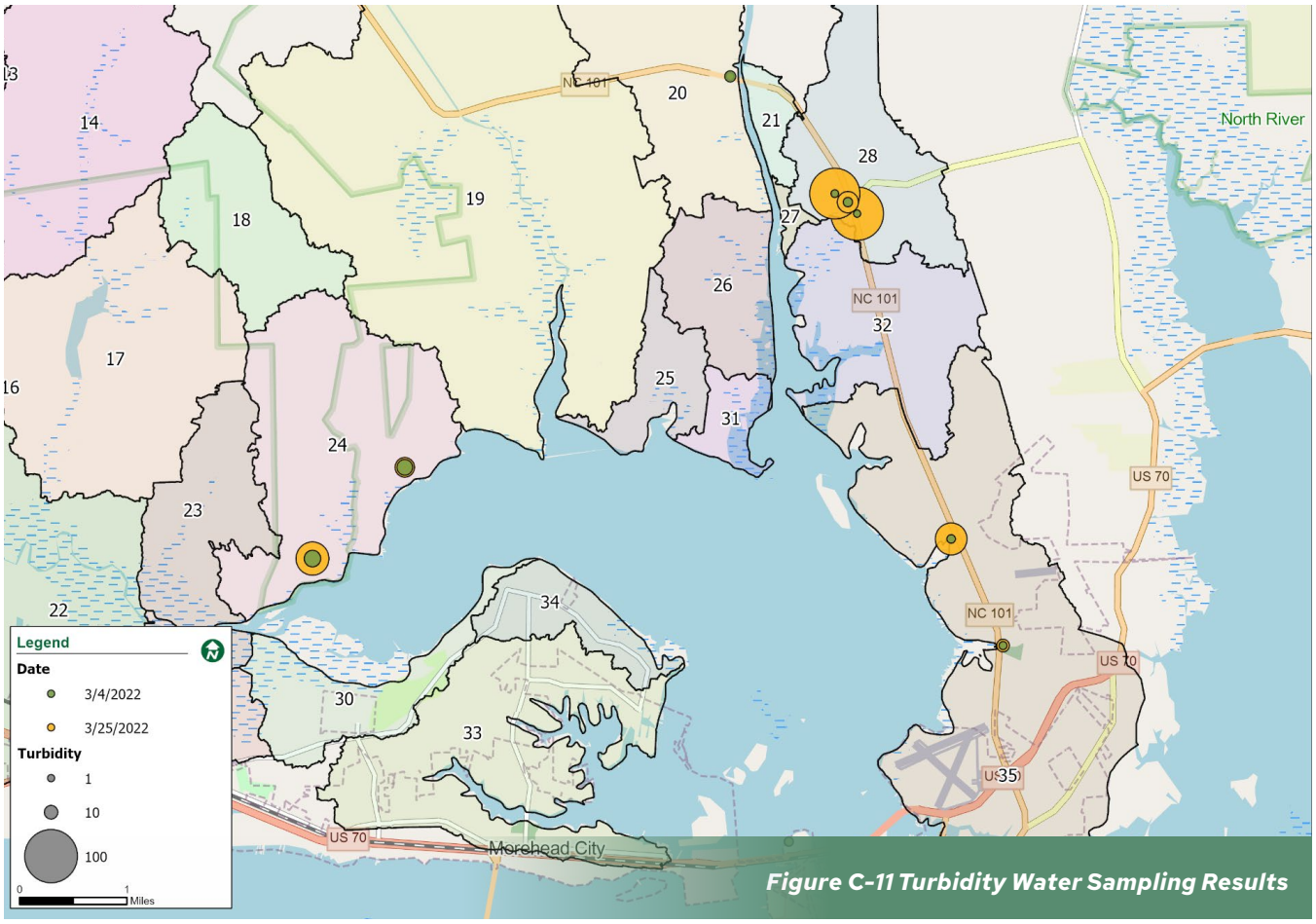


Figure C-11 Turbidity Water Sampling Results

Bacteria Modeling

Bacteria and nutrient modeling were conducted utilizing the Center for Watershed Protection Watershed Treatment Model. The model is a spreadsheet model that calculates annual loading for bacteria, nitrogen, phosphorus, and total suspended solids based upon current and future land use and stormwater management practices. Results of the model are summarized in Table C-11. The model was conducted on a whole watershed and sub-watersheds basis for sub-watersheds identified through high bacteria sampling and discussions with stakeholders. Future bacteria loading rates were calculated based upon changing land use without the implementation of additional stormwater BMPs.

Table C-11: Bacteria Modeling Results

Watershed	Annual Existing Surface Load (Billion colonies)	Annual Existing Surface Load per Acre (Billion colonies/acre)
Whole	6,178,400	73.4
15	271,581	76.0
22	293,916	101.7
28	78,301	51.0
33	630,561	257.7
35	717,109	151.8

NOAA Precipitation Frequency Table

The National Oceanic and Atmospheric Administration (NOAA) precipitation models state that a 1-year, 24-hour storm event for Newport, NC results in 3.66 inches of precipitation and a 2-year, 24-hour storm results in 4.46 inches Table C-12. Both estimations are used to develop hydrographs of the watershed. The 1-year, 24-hour storm event is used because it has been established as the maximum storm parameter possible to protect shellfishing waters (Class SA) in North Carolina by DEQ. The 1-year, 24-hour storm event depth of precipitation will also be necessary as part of developing hydrographs of the data.

Table C-12: NOAA Precipitation Models

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.479** (0.443-0.518)	**0.565** (0.521-0.610)	**0.660** (0.607-0.712)	**0.737** (0.678-0.795)	**0.833** (0.761-0.896)	**0.907** (0.827-0.978)	**0.981** (0.890-1.06)	**1.06** (0.950-1.14)	**1.15** (1.03-1.24)	**1.23** (1.09-1.33)
10-min	**0.765** (0.708-0.827)	**0.903** (0.833-0.976)	**1.06** (0.972-1.14)	**1.18** (1.08-1.27)	**1.33** (1.21-1.43)	**1.44** (1.32-1.56)	**1.56** (1.42-1.68)	**1.67** (1.51-1.80)	**1.82** (1.63-1.97)	**1.94** (1.72-2.10)
15-min	**0.956** (0.885-1.03)	**1.14** (1.05-1.23)	**1.34** (1.23-1.44)	**1.49** (1.37-1.61)	**1.68** (1.54-1.81)	**1.83** (1.67-1.97)	**1.97** (1.79-2.12)	**2.11** (1.90-2.28)	**2.29** (2.05-2.48)	**2.43** (2.15-2.63)
30-min	**1.31** (1.21-1.42)	**1.57** (1.45-1.70)	**1.90** (1.75-2.05)	**2.16** (1.99-2.33)	**2.49** (2.28-2.68)	**2.75** (2.51-2.97)	**3.02** (2.74-3.25)	**3.28** (2.96-3.54)	**3.64** (3.26-3.94)	**3.93** (3.49-4.26)
60-min	**1.64** (1.51-1.77)	**1.97** (1.81-2.13)	**2.44** (2.24-2.63)	**2.81** (2.59-3.04)	**3.32** (3.03-3.57)	**3.73** (3.40-4.02)	**4.16** (3.77-4.48)	**4.61** (4.15-4.97)	**5.23** (4.67-5.65)	**5.74** (5.09-6.23)
2-hr	**2.04** (1.87-2.21)	**2.48** (2.29-2.71)	**3.15** (2.90-3.42)	**3.71** (3.40-4.02)	**4.49** (4.09-4.85)	**5.15** (4.66-5.57)	**5.84** (5.28-6.32)	**6.59** (5.91-7.13)	**7.65** (6.78-8.31)	**8.54** (7.51-9.28)
3-hr	**2.21** (2.02-2.42)	**2.69** (2.46-2.95)	**3.42** (3.12-3.76)	**4.06** (3.68-4.45)	**4.97** (4.49-5.43)	**5.77** (5.18-6.30)	**6.62** (5.91-7.22)	**7.55** (6.68-8.24)	**8.91** (7.79-9.77)	**10.1** (8.73-11.1)
6-hr	**2.67** (2.40-3.00)	**3.24** (2.92-3.64)	**4.14** (3.71-4.65)	**4.92** (4.41-5.53)	**6.05** (5.38-6.77)	**7.03** (6.21-7.86)	**8.10** (7.10-9.04)	**9.27** (8.07-10.3)	**11.0** (9.42-12.3)	**12.5** (10.6-14.0)
12-hr	**3.17** (2.84-3.61)	**3.86** (3.46-4.39)	**4.95** (4.41-5.63)	**5.92** (5.26-6.74)	**7.32** (6.44-8.31)	**8.56** (7.48-9.68)	**9.92** (8.57-11.2)	**11.4** (9.79-12.9)	**13.7** (11.5-15.4)	**15.7** (13.0-17.6)
24-hr	**3.66** (3.40-3.99)	**4.46** (4.14-4.86)	**5.77** (5.35-6.28)	**6.87** (6.34-7.47)	**8.49** (7.78-9.23)	**9.90** (8.98-10.7)	**11.4** (10.3-12.4)	**13.1** (11.7-14.3)	**15.7** (13.6-17.1)	**17.8** (15.3-19.6)
2-day	**4.22** (3.89-4.62)	**5.11** (4.71-5.59)	**6.57** (6.03-7.20)	**7.82** (7.17-8.56)	**9.70** (8.83-10.6)	**11.3** (10.2-12.4)	**13.2** (11.7-14.4)	**15.2** (13.3-16.7)	**18.3** (15.7-20.2)	**20.9** (17.6-23.3)
3-day	**4.51** (4.17-4.89)	**5.46** (5.05-5.94)	**6.98** (6.44-7.60)	**8.26** (7.60-8.99)	**10.1** (9.27-11.0)	**11.8** (10.6-12.8)	**13.5** (12.1-14.8)	**15.5** (13.7-17.0)	**18.5** (16.0-20.3)	**21.1** (18.0-23.4)
4-day	**4.79** (4.45-5.17)	**5.81** (5.39-6.28)	**7.39** (6.84-8.00)	**8.69** (8.03-9.43)	**10.6** (9.71-11.5)	**12.2** (11.1-13.2)	**13.9** (12.5-15.2)	**15.8** (14.1-17.3)	**18.6** (16.3-20.4)	**21.2** (18.3-23.4)
7-day	**5.53** (5.12-5.98)	**6.66** (6.17-7.21)	**8.36** (7.73-9.06)	**9.78** (9.01-10.6)	**11.8** (10.8-12.8)	**13.5** (12.3-14.7)	**15.3** (13.8-16.7)	**17.3** (15.4-18.8)	**20.1** (17.6-22.0)	**22.4** (19.4-24.7)
10-day	**6.30** (5.86-6.78)	**7.54** (7.02-8.12)	**9.34** (8.69-10.1)	**10.8** (10.0-11.7)	**13.0** (12.0-14.0)	**14.7** (13.5-15.9)	**16.6** (15.1-18.0)	**18.6** (16.8-20.2)	**21.5** (19.1-23.5)	**23.9** (21.0-26.3)
20-day	**8.47** (7.97-9.07)	**10.1** (9.50-10.8)	**12.3** (11.5-13.2)	**14.1** (13.2-15.1)	**16.6** (15.4-17.8)	**18.7** (17.3-20.1)	**20.8** (19.1-22.5)	**23.2** (21.0-25.0)	**26.4** (23.6-28.6)	**29.0** (25.6-31.7)
30-day	**10.4** (9.81-11.1)	**12.4** (11.7-13.2)	**14.9** (14.0-15.9)	**16.9** (15.9-18.1)	**19.7** (18.4-21.1)	**21.9** (20.3-23.4)	**24.2** (22.3-25.9)	**26.5** (24.2-28.6)	**29.7** (26.9-32.1)	**32.2** (28.9-35.0)
45-day	**13.0** (12.2-13.8)	**15.3** (14.4-16.4)	**18.3** (17.2-19.6)	**20.8** (19.4-22.3)	**24.3** (22.5-26.0)	**27.1** (25.1-29.1)	**30.1** (27.6-32.3)	**33.1** (30.2-35.7)	**37.4** (33.6-40.6)	**40.8** (36.2-44.6)
60-day	**15.8** (14.9-16.8)	**18.6** (17.5-19.8)	**22.0** (20.7-23.4)	**24.7** (23.1-26.2)	**28.4** (26.5-30.2)	**31.3** (29.1-33.4)	**34.3** (31.7-36.6)	**37.3** (34.2-40.0)	**41.4** (37.6-44.6)	**44.6** (40.1-48.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Runoff Calculations

The primary issue to be addressed through the stormwater runoff volume reduction methodology is the reduction of contamination and localized flooding (Table D-1 Identifying and Linking Concerns, Causes, and Indicators). Stormwater runoff is one of the primary causes of increased fecal coliform impairments and localized flooding within the Newport River Watersheds.

Appendix D: Runoff Calculations

Table D-1: Identifying and linking concerns, causes, and indicators

Issue	Source of Issue	Quantify Issue Indicators
Water quality is impaired and not meeting its designated use standard of class SA	Nonpoint source bacteria transported by stormwater runoff	Fecal coliform cannot exceed GM of 14/100 mL
Instances of localized flooding	Volume of stormwater runoff due to impervious surfaces	Volume of water

Calculation Methodology

Stormwater runoff for the Newport River was calculated using the SCS Curve number method. To compare the watersheds over time and to set a volume reduction goal, historic land cover was used to determine the curve numbers of specific land sections. This assesses the USGS Land Cover data and assigning those sections to specific pre-determined cover conditions with corresponding curve numbers based on the soil types found within the Newport River watersheds. A GIS analysis of combining land cover combined with the NRCS soil type was used for specific sections of land. After this analysis was performed a curve number was assigned for each section of land to determine a composite curve number. For example, if a portion of land was identified as Developed having a soil type with an HSG rating of Type 'A' a curve number of 77 was assigned. This methodology was used for consistency across all analysis due to the urban development of the watersheds over the last five decades as well as the lack of historic parcel information.

Table D-2: LCMAP Curve Number Development

LCMAP Primary Classification		A	A/D	B	B/D	C	C/D	D
No Data	0	100	100	100	100	100	100	100
Developed	1	77	77	85	85	90	90	92
Cropland	2	58	58	73	73	82	82	87
Grass/Shrub	3	49	49	69	69	73	73	79
Tree Cover	4	36	36	60	60	73	73	79
Water	5	100	100	100	100	100	100	100
Wetland	6	36	36	60	60	73	73	79
Ice/Snow	7	100	100	100	100	100	100	100
Barren	8	68	68	79	79	86	86	89

Previous analyses have utilized current NOAA ATLAS 14 values for rainfall depth as well as rainfall intensity. Hydrographs were developed using the Hydrologic Modeling System released by the Hydrologic Engineering Center (HEC-HMS). The model performs hydrologic analysis of watersheds using event infiltration, unit hydrographs, and hydrologic routing. Developed curve numbers, initial abstraction values, impervious percentage, and lag times were input into the model and used for hydrograph development. Initial abstraction values were calculated as a function of the watershed curve number. Impervious percentage was determined based upon standard percent impervious for developed land cover classes and verified using historic aerial imagery. Lag times were determined as a function of time of concentration developed from the longest flow path of each watershed. Within the HEC-HMS model, the SCS curve number method and SCS unit hydrograph method were used to develop hydrographs for each watersheds for each year, for a total of 210 hydrographs.

Runoff Calculations

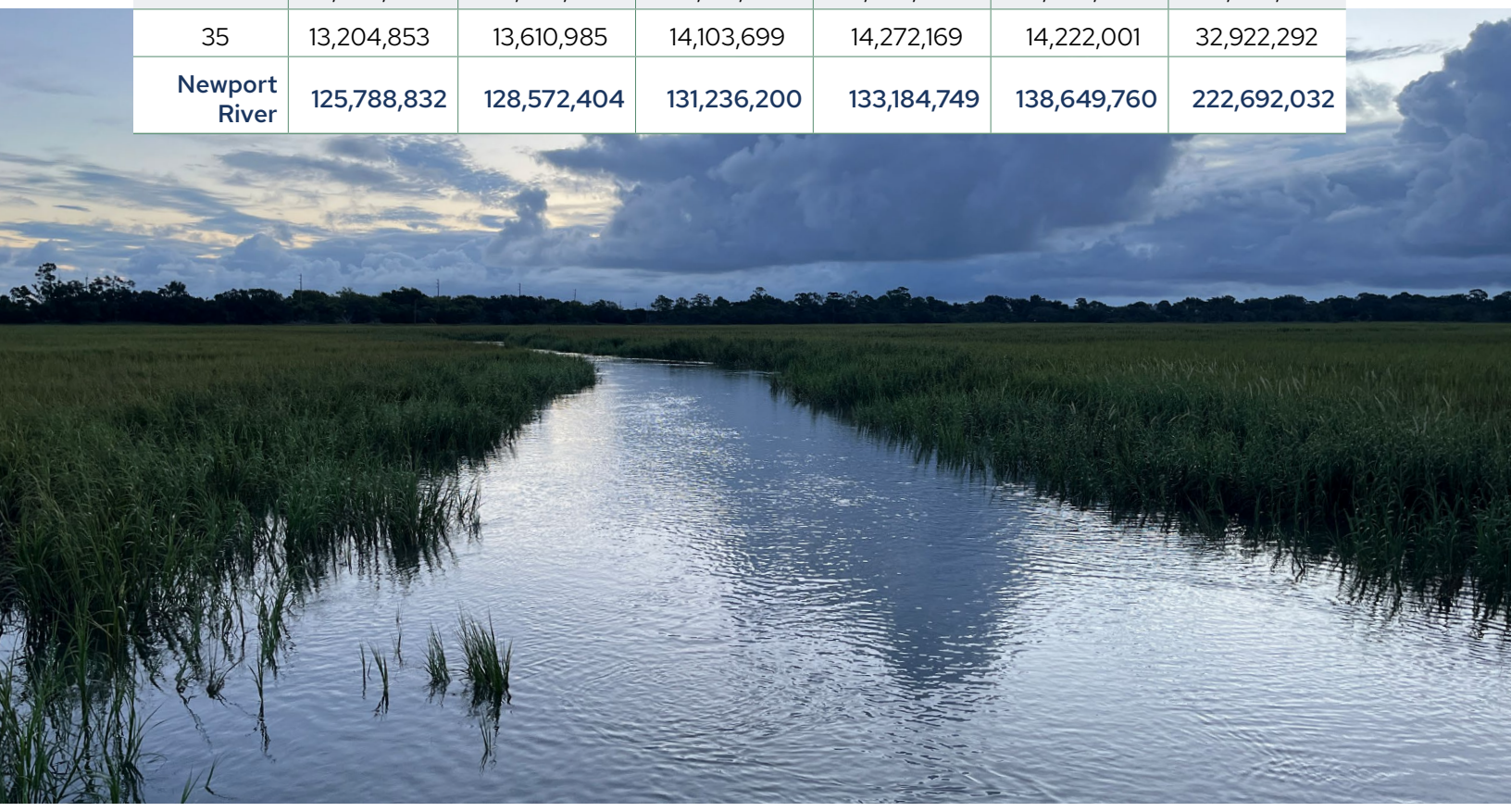
Runoff Volumes

Table D-3 Newport River Runoff Volumes is a summary of runoff volume for each watershed for 1985, 1995, 2005, 2015, 2020, and projected future conditions.

Table D-3: Newport River Runoff Volumes

Watershed	1985 Runoff Volume	1995 Runoff Volume	2005 Runoff Volume	2015 Runoff Volume	2020 Runoff Volume	Future Conditions Runoff Volume
1	11,918,276	12,064,265	11,820,849	11,861,206	12,568,190	12,506,772
2	5,262,275	5,261,093	5,260,427	5,260,523	5,469,045	5,221,102
3	2,581,440	2,576,195	2,567,636	2,568,787	2,609,988	2,555,198
4	3,832,264	3,736,330	3,716,729	3,766,491	4,125,076	3,472,527
5	4,929,264	4,991,526	4,975,407	4,980,310	5,351,530	3,643,617
6	802,046	786,558	775,352	766,871	770,714	749,834
7	3,248,147	3,186,284	3,147,478	3,148,548	3,375,935	2,379,469
8	2,075,686	2,037,752	2,008,307	2,002,004	2,228,102	2,890,911
9	1,716,736	1,722,341	1,682,489	1,697,298	1,922,143	2,262,120
10	4,587,645	4,495,395	4,489,378	4,476,951	4,537,100	7,578,061
11	944,554	984,278	1,042,455	993,581	1,055,007	1,216,723
12	7,736,417	7,691,828	8,102,673	8,177,382	8,259,749	16,891,590
13	1,292,430	1,221,195	1,141,899	1,299,913	1,527,902	4,334,692
14	1,267,648	1,224,728	1,198,354	1,363,337	1,414,719	1,400,757
15	3,091,652	3,436,345	3,995,368	3,904,714	3,903,473	12,916,422
16	2,390,967	2,533,430	2,554,567	2,611,460	2,932,630	9,207,608
17	1,224,286	1,154,770	1,278,355	1,457,423	1,828,264	3,588,430
18	163,754	162,313	176,448	169,700	164,123	159,942

Watershed	1985 Runoff Volume	1995 Runoff Volume	2005 Runoff Volume	2015 Runoff Volume	2020 Runoff Volume	Future Conditions Runoff Volume
19	17,250,485	17,539,350	17,406,247	17,478,349	17,900,641	17,178,172
20	4,014,613	4,165,786	4,015,143	4,063,804	4,556,305	5,620,932
21	658,491	694,271	694,466	695,392	706,900	1,723,816
22	4,351,698	4,837,487	5,132,240	5,208,261	5,565,824	14,018,637
23	715,477	631,377	577,931	893,815	898,179	1,180,993
24	771,254	769,608	707,386	746,864	878,470	519,068
25	1,283,436	1,269,316	1,299,495	1,250,438	1,247,816	1,219,484
26	1,674,317	1,836,022	1,673,678	1,626,142	1,785,013	1,656,326
27	293,852	280,244	336,498	353,772	359,925	547,131
28	4,059,702	4,137,444	4,314,527	4,369,696	4,552,378	8,085,620
29	1,872,110	2,106,450	2,190,640	2,253,791	2,295,247	6,163,576
30	1,527,187	1,709,725	1,804,763	2,070,974	2,234,179	5,373,220
31	336,149	351,310	334,413	325,986	379,892	359,746
32	3,868,698	3,894,197	4,052,500	4,102,151	4,167,699	11,324,475
33	9,152,399	9,736,106	10,806,829	11,112,680	11,006,777	17,588,579
34	1,688,624	1,736,100	1,851,575	1,853,964	1,848,825	4,234,194
35	13,204,853	13,610,985	14,103,699	14,272,169	14,222,001	32,922,292
Newport River	**125,788,832**	**128,572,404**	**131,236,200**	**133,184,749**	**138,649,760**	**222,692,032**



Runoff Hydrographs

The runoff hydrographs for the entire estuary and its individual watersheds are presented below with a baseline year of 1980.

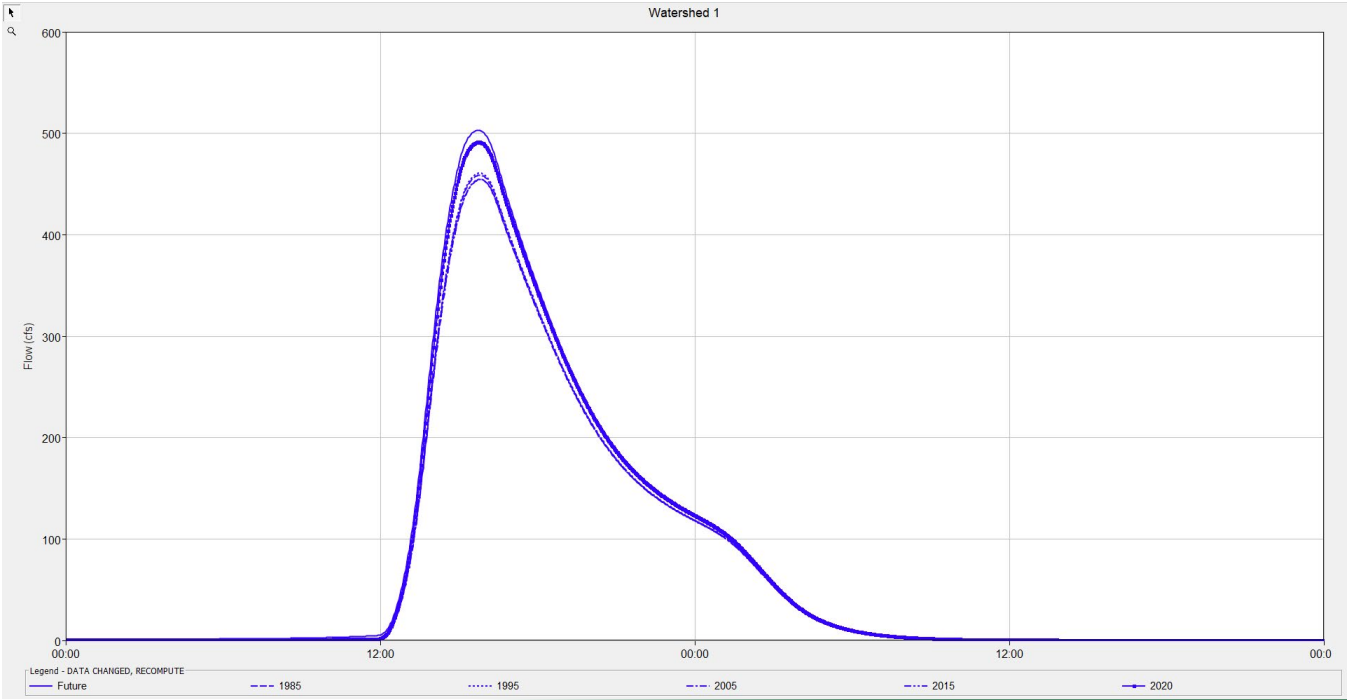


Figure D-1 Watershed 1 Hydrographs

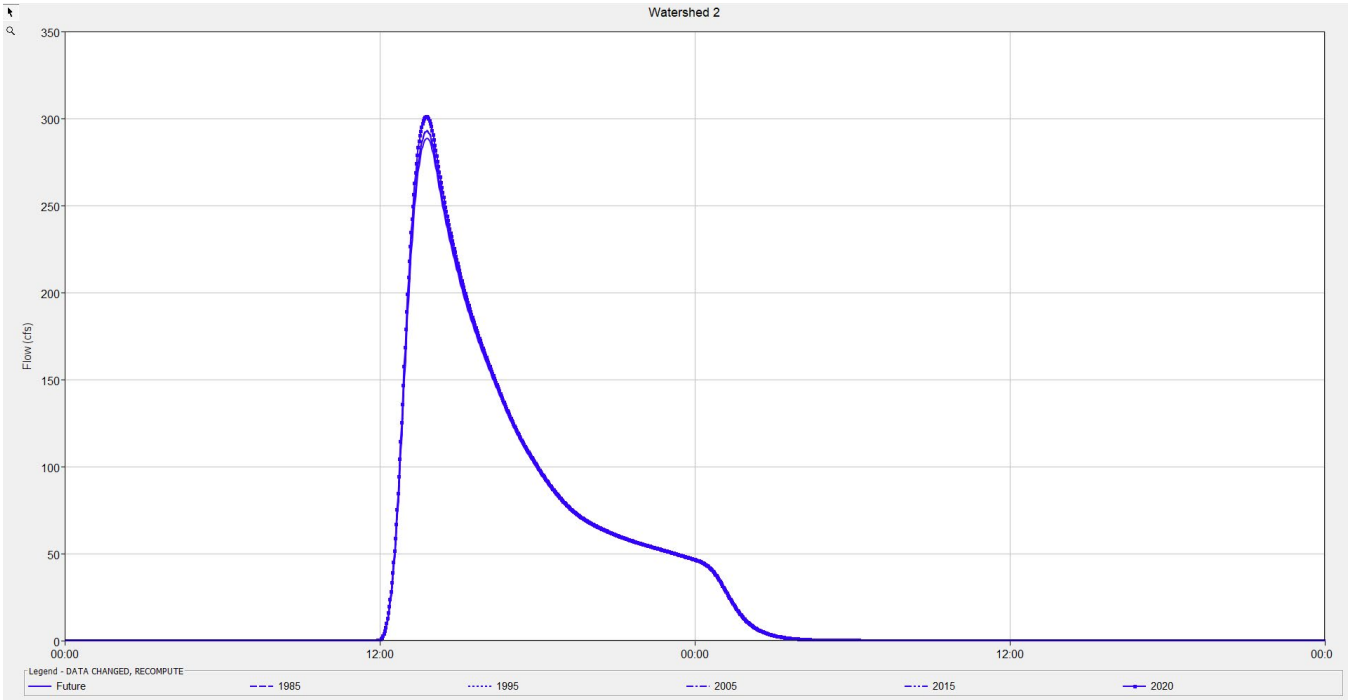


Figure D-2 Watershed 2 Hydrographs

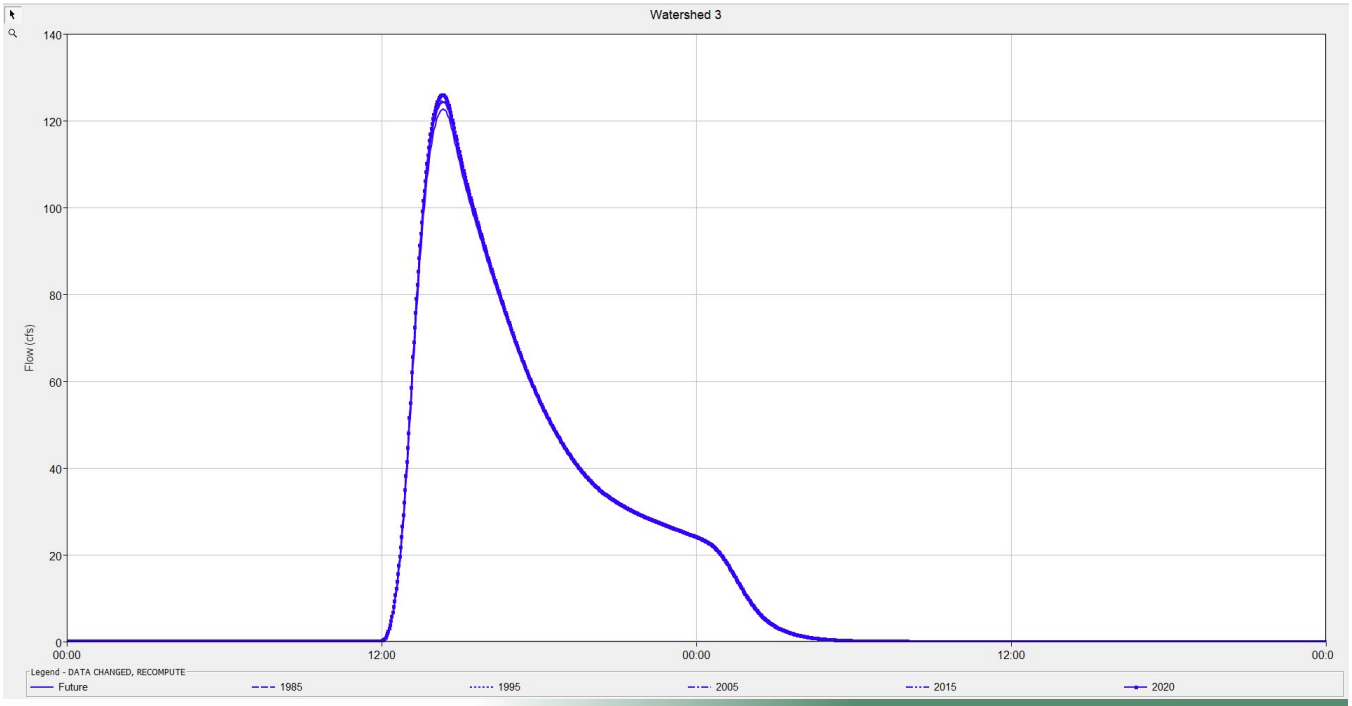


Figure D-3 Watershed 3 Hydrographs

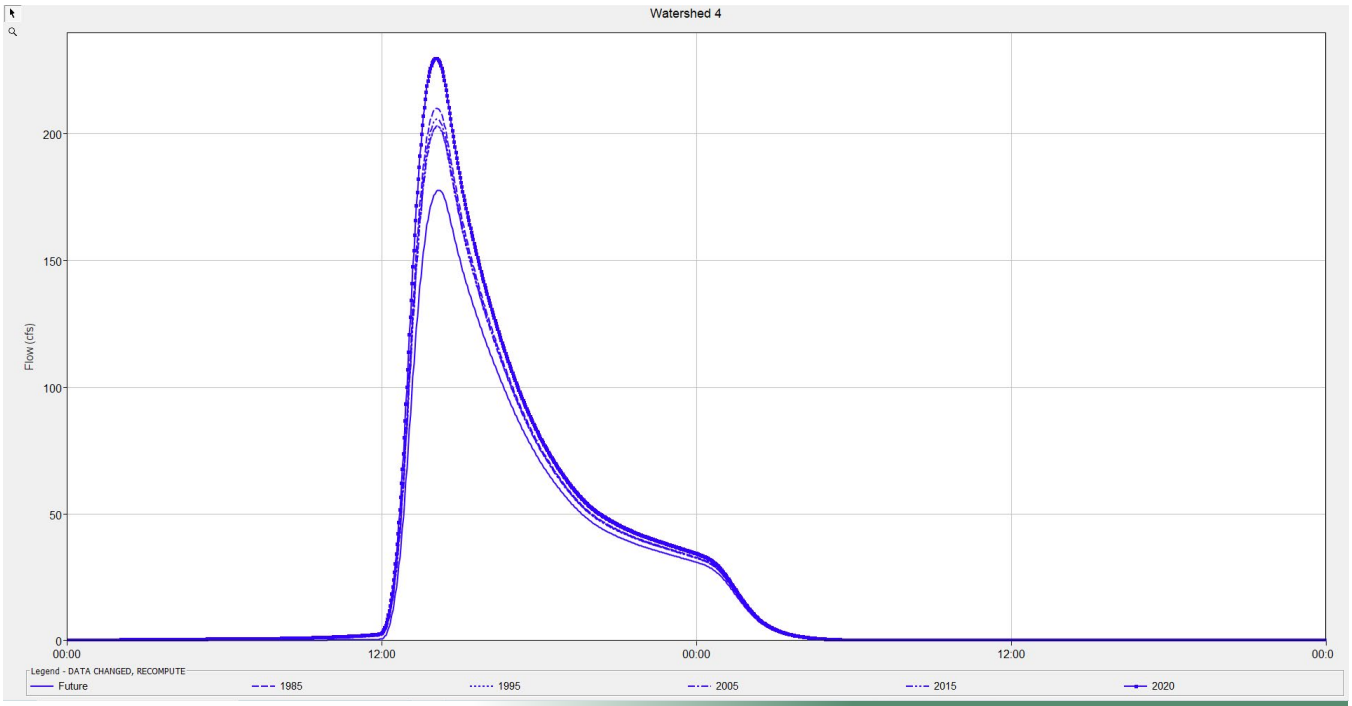
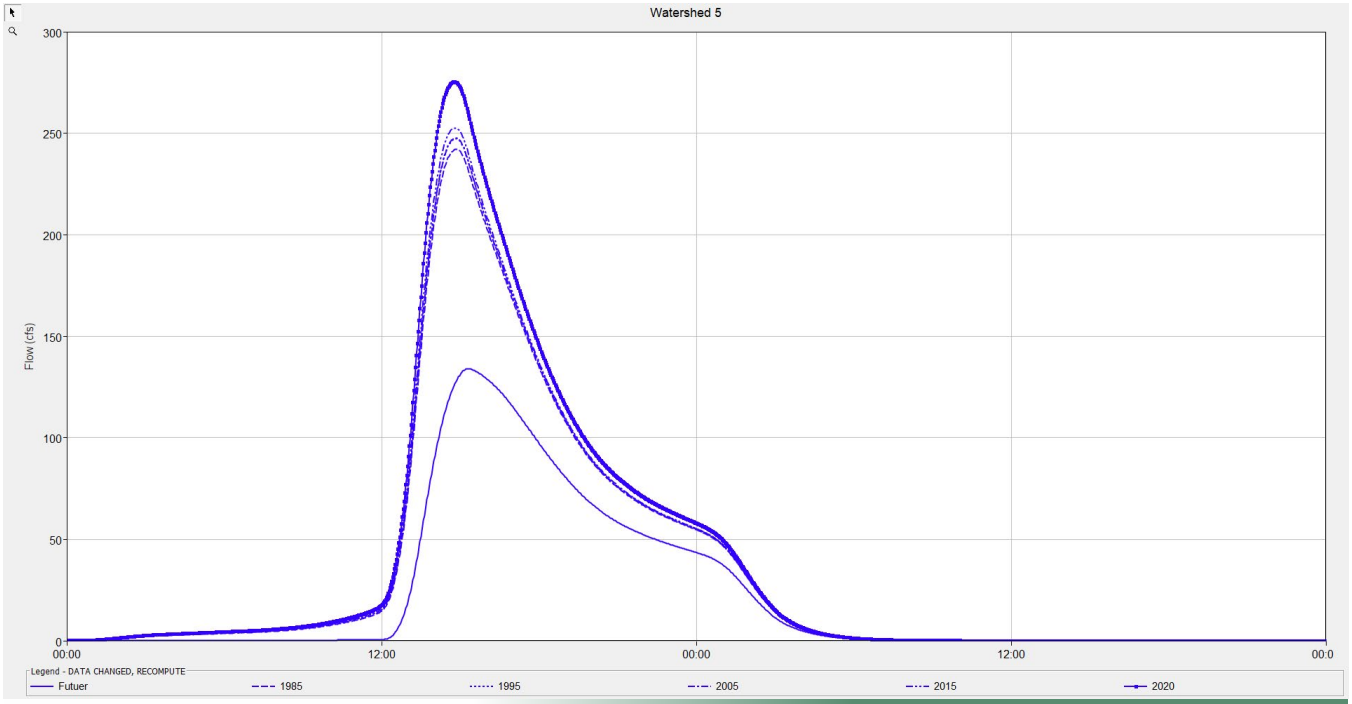


Figure D-4 Watershed 4 Hydrographs



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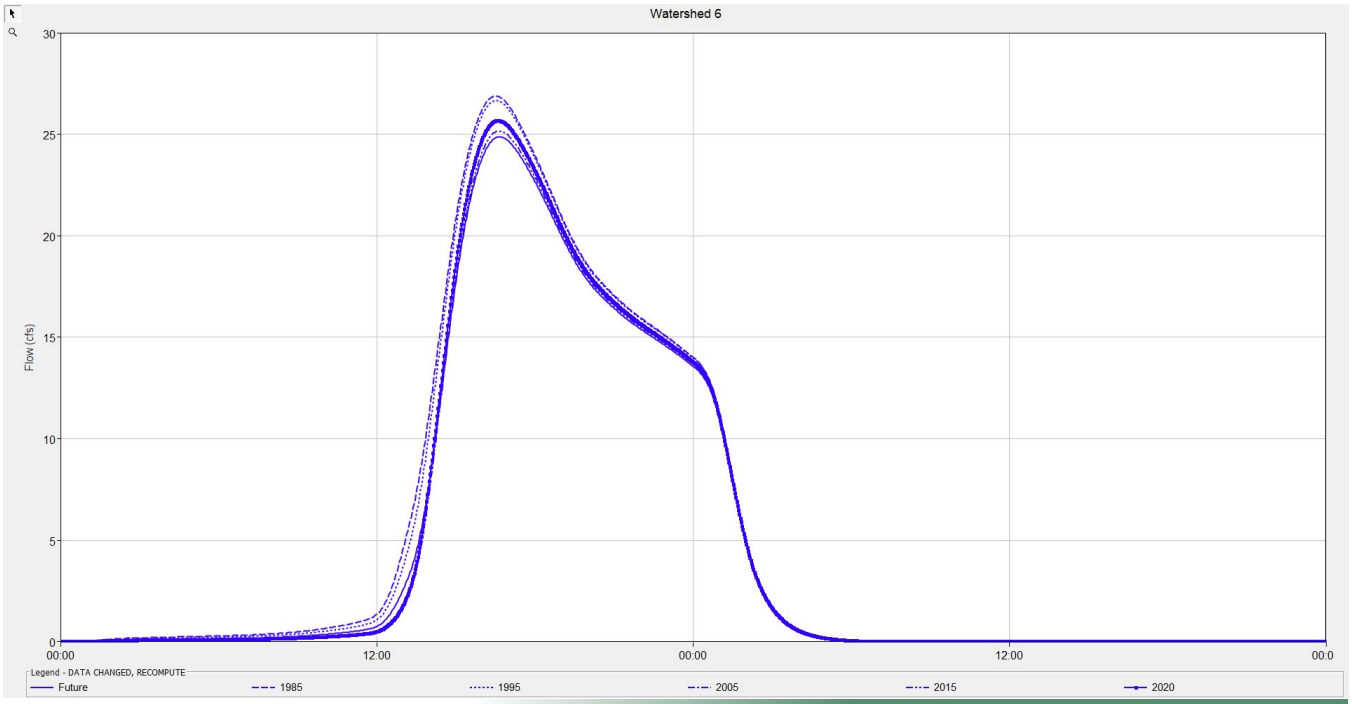

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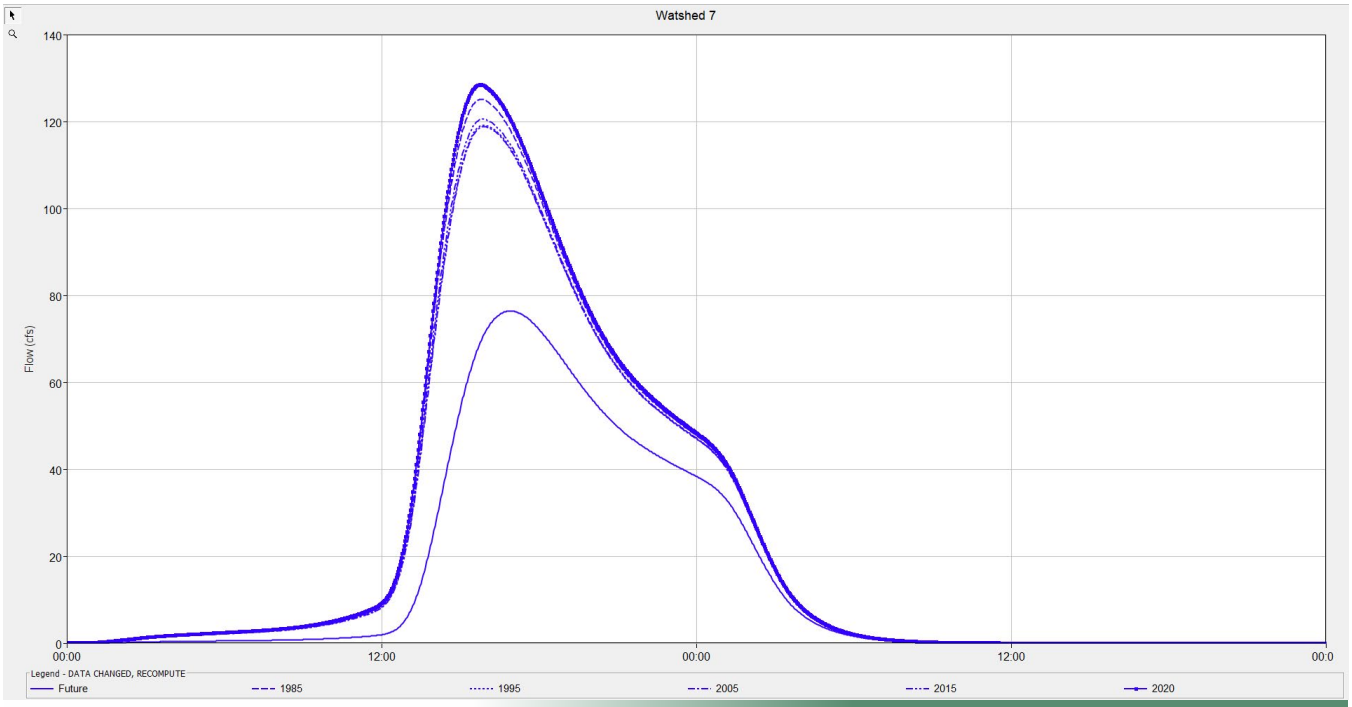

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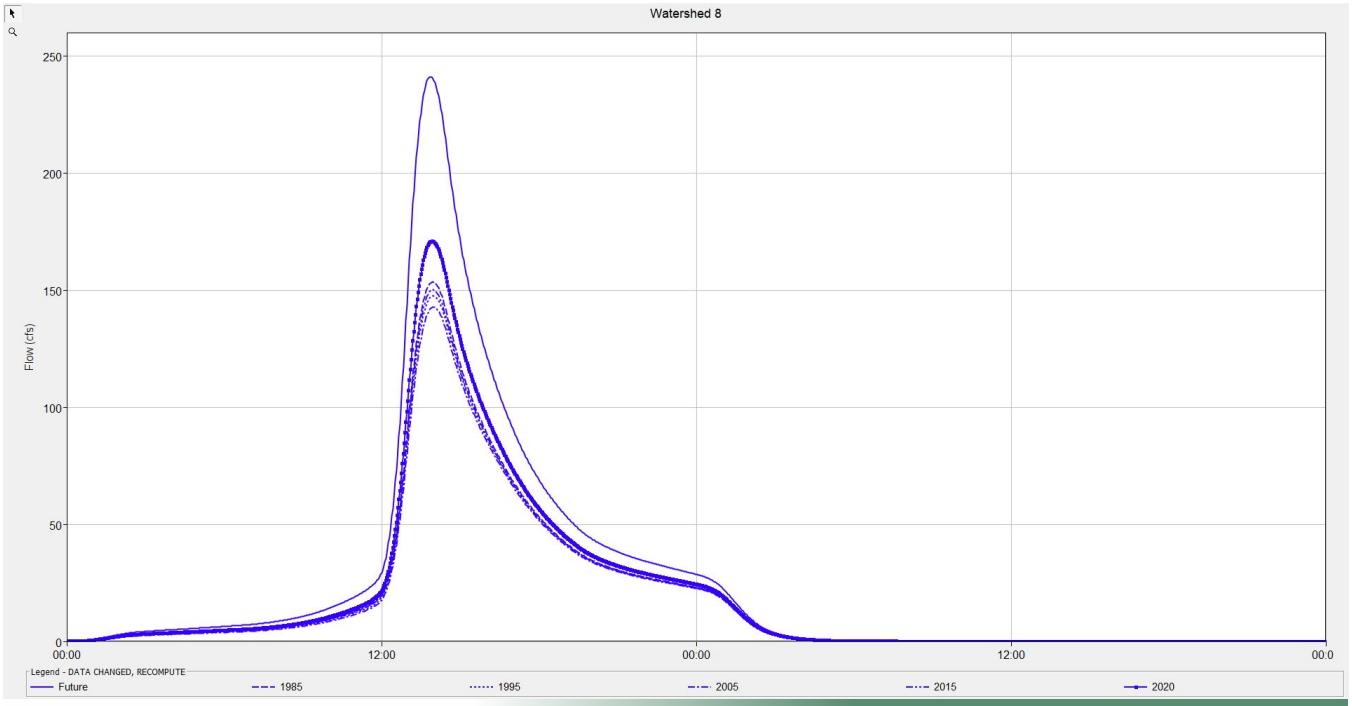

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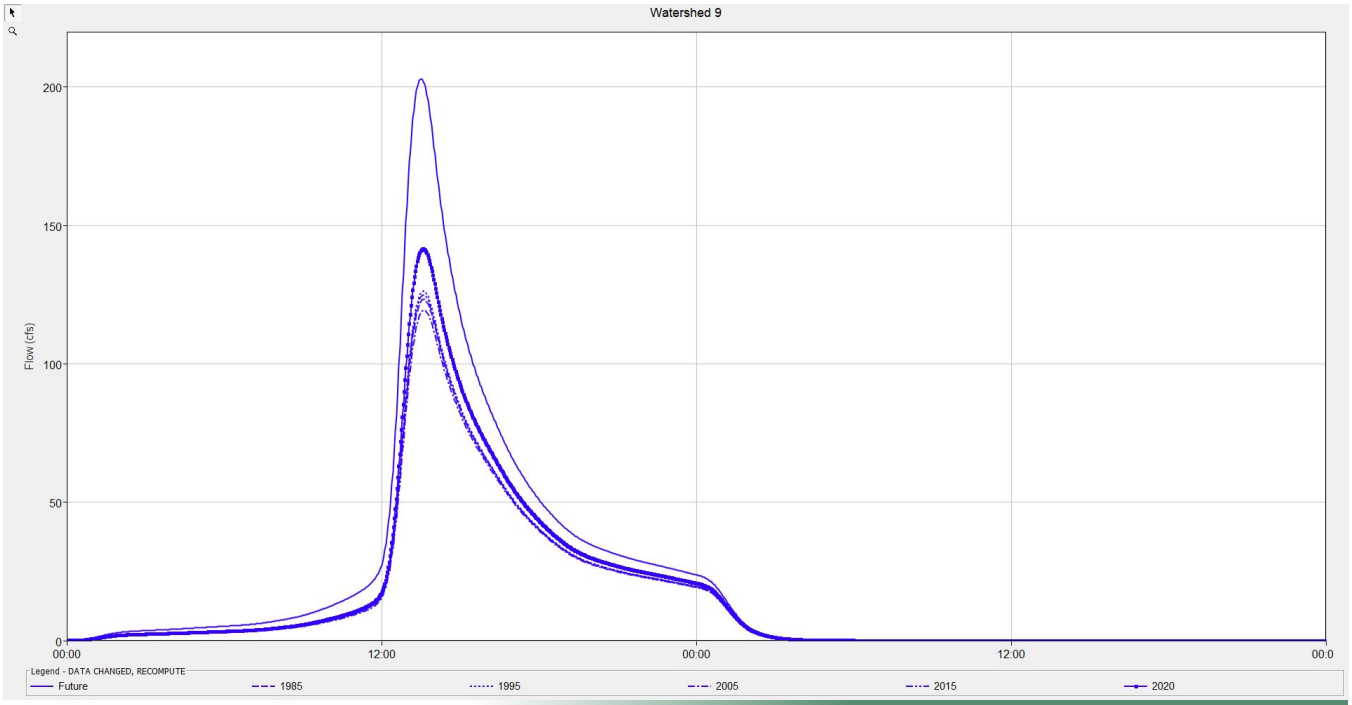

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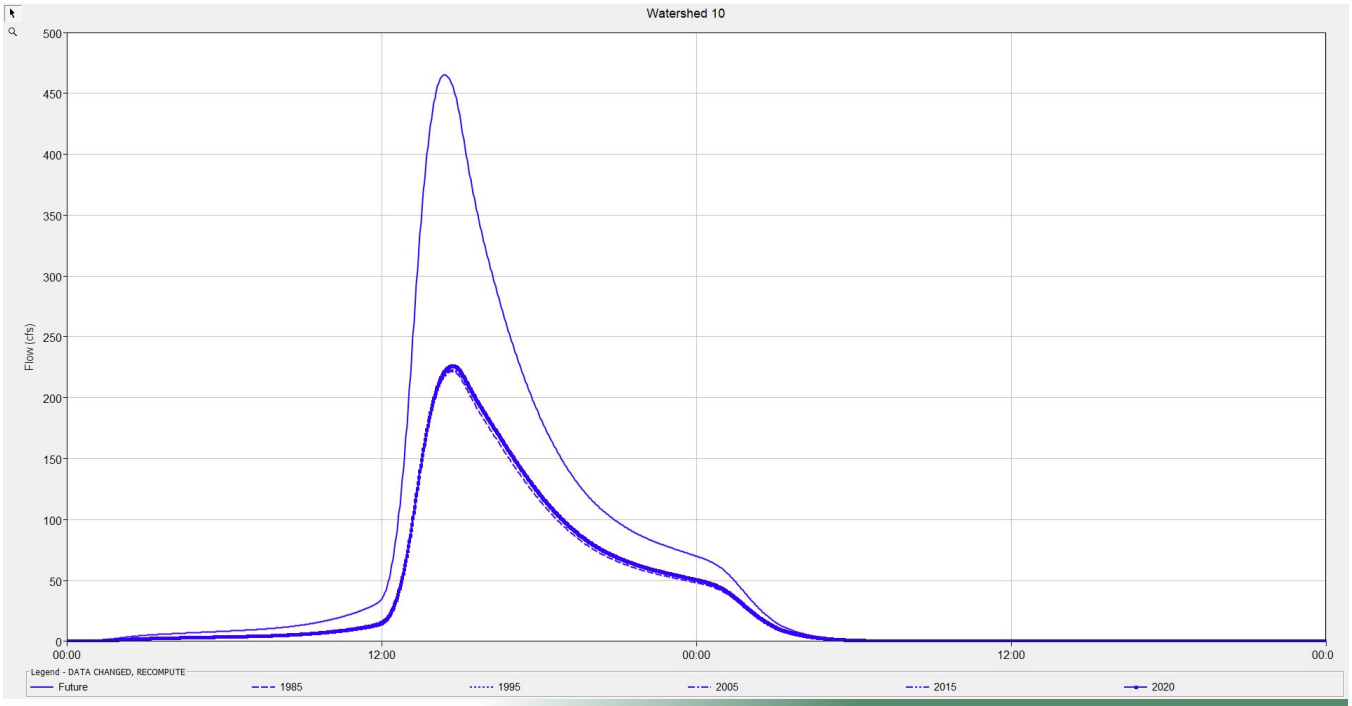

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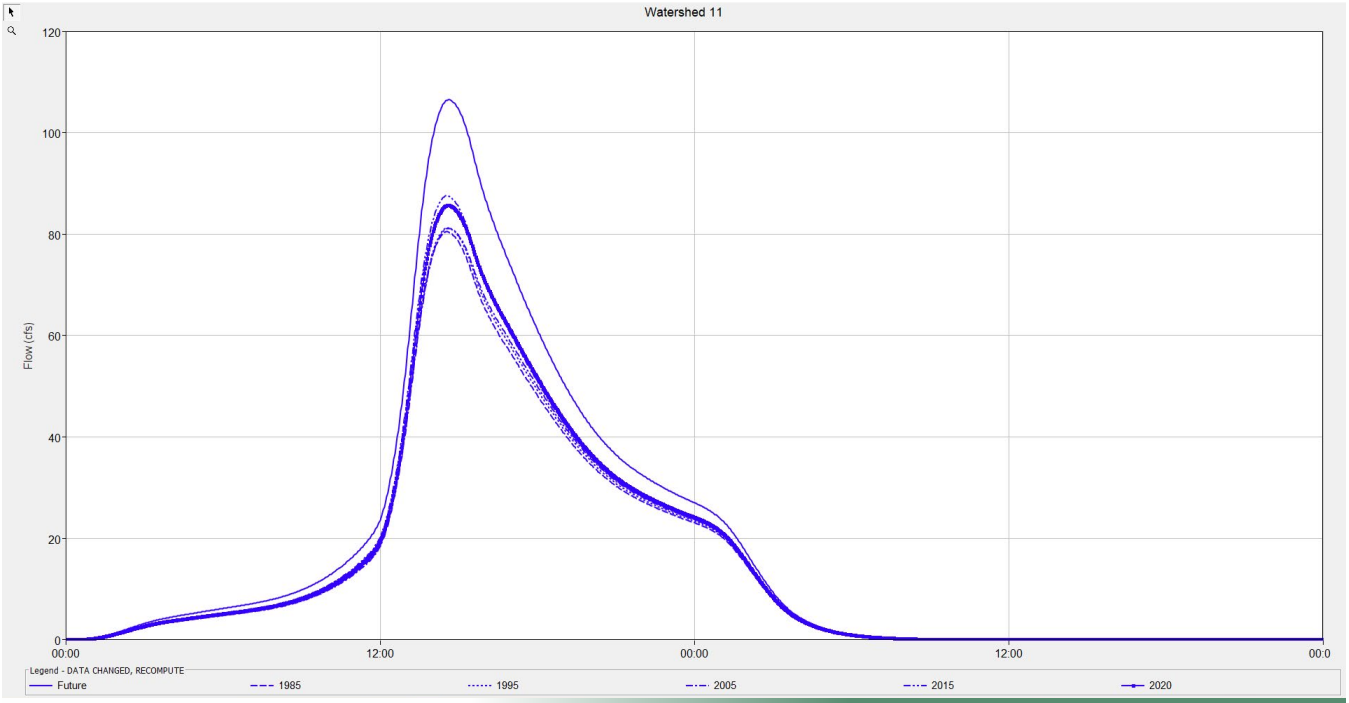

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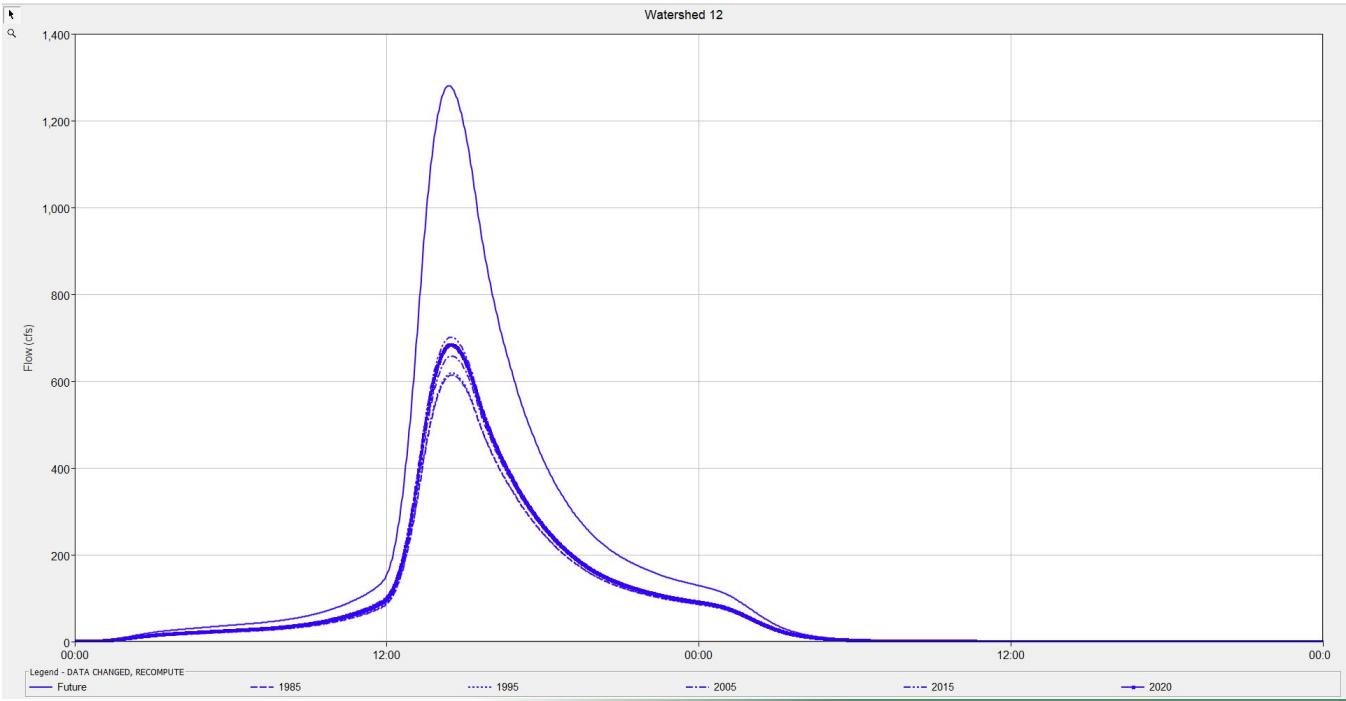

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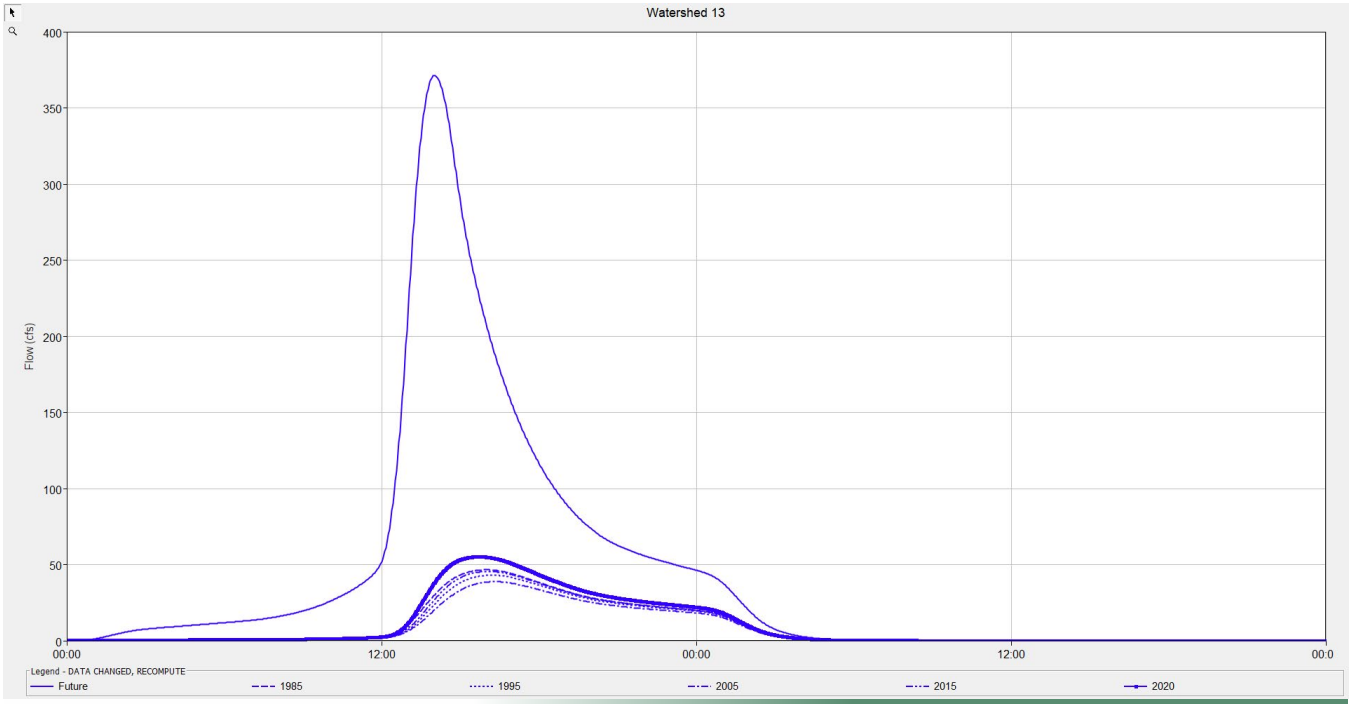

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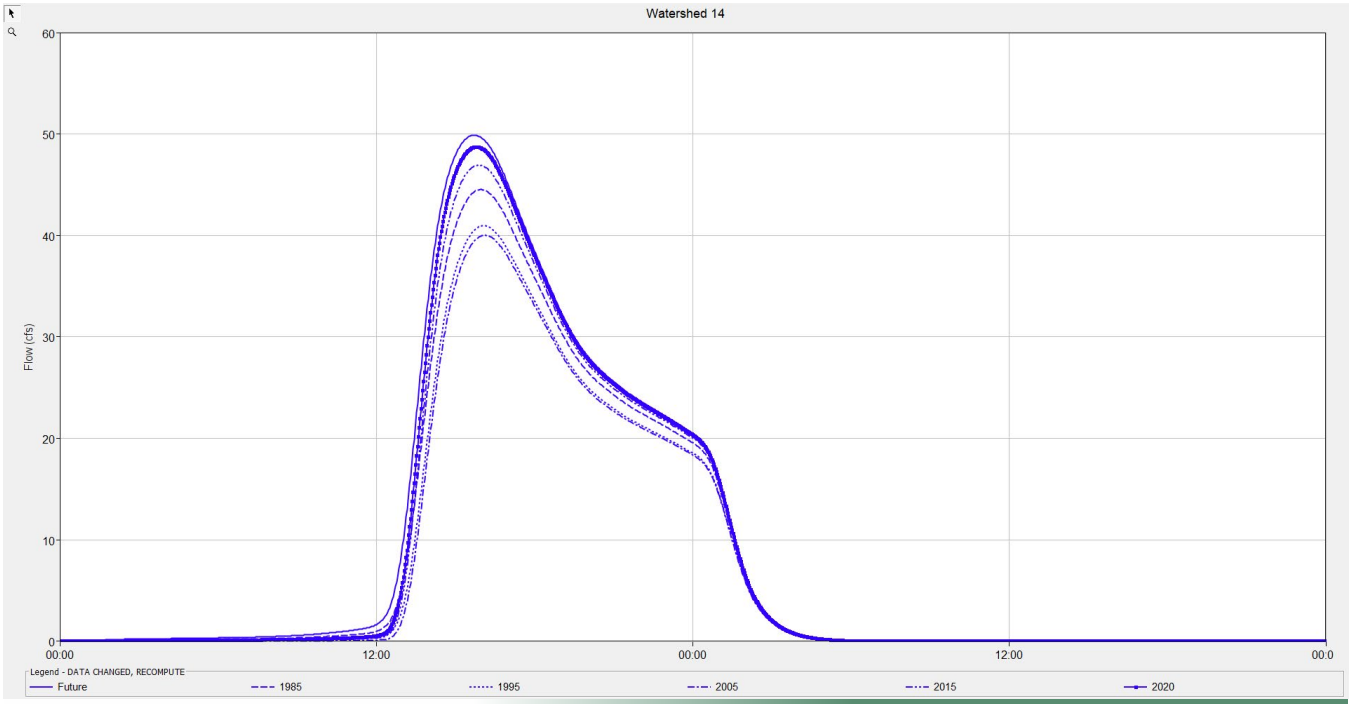

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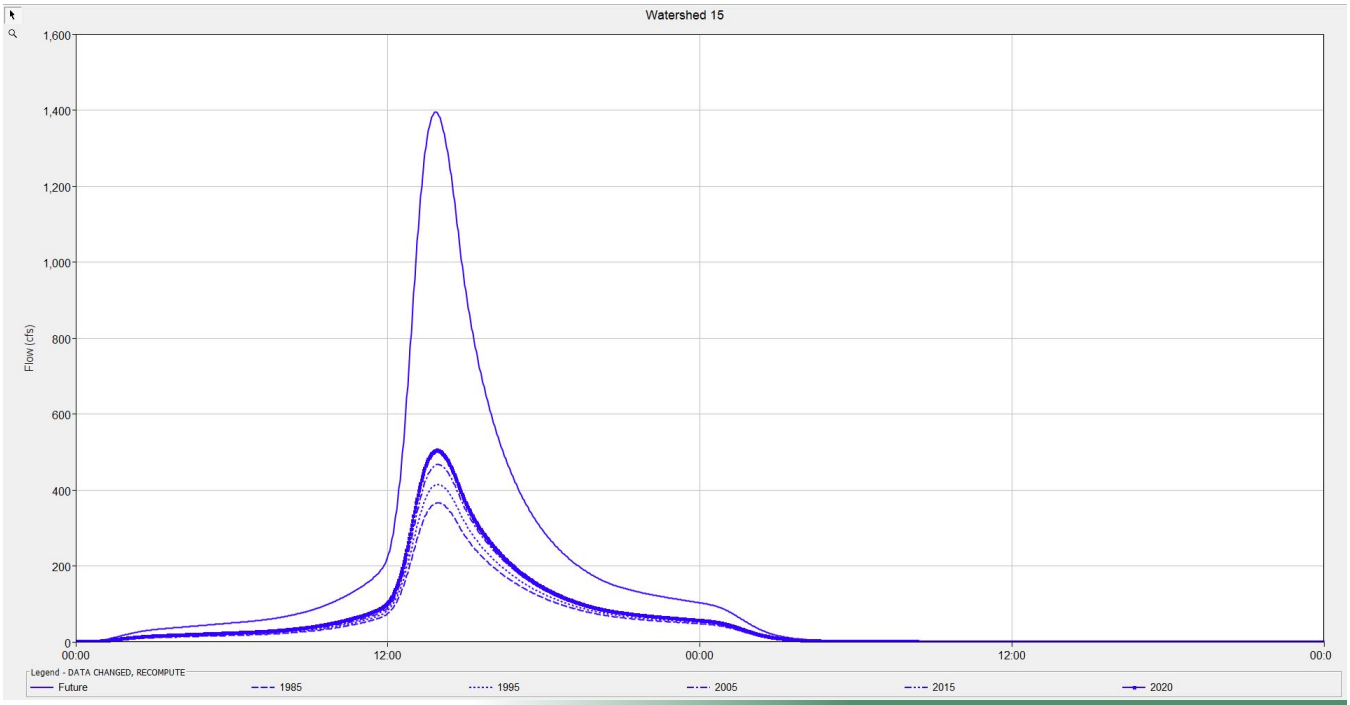

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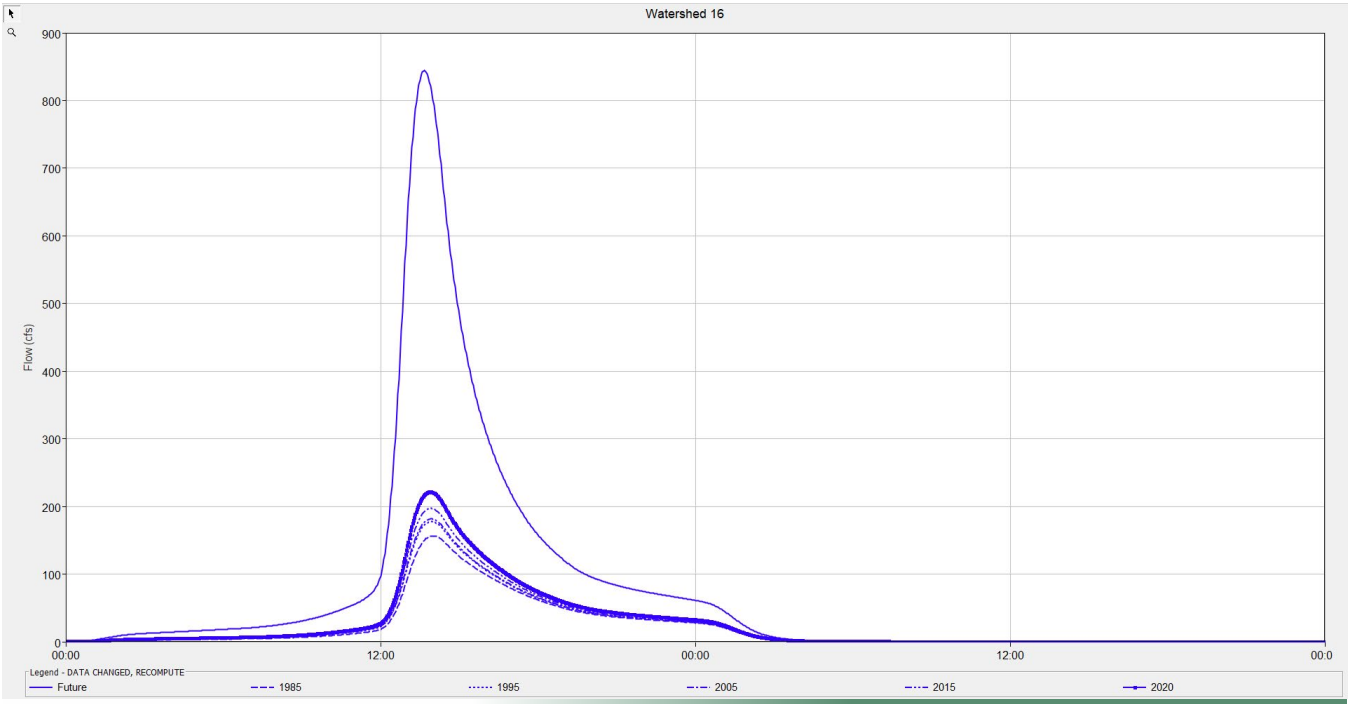

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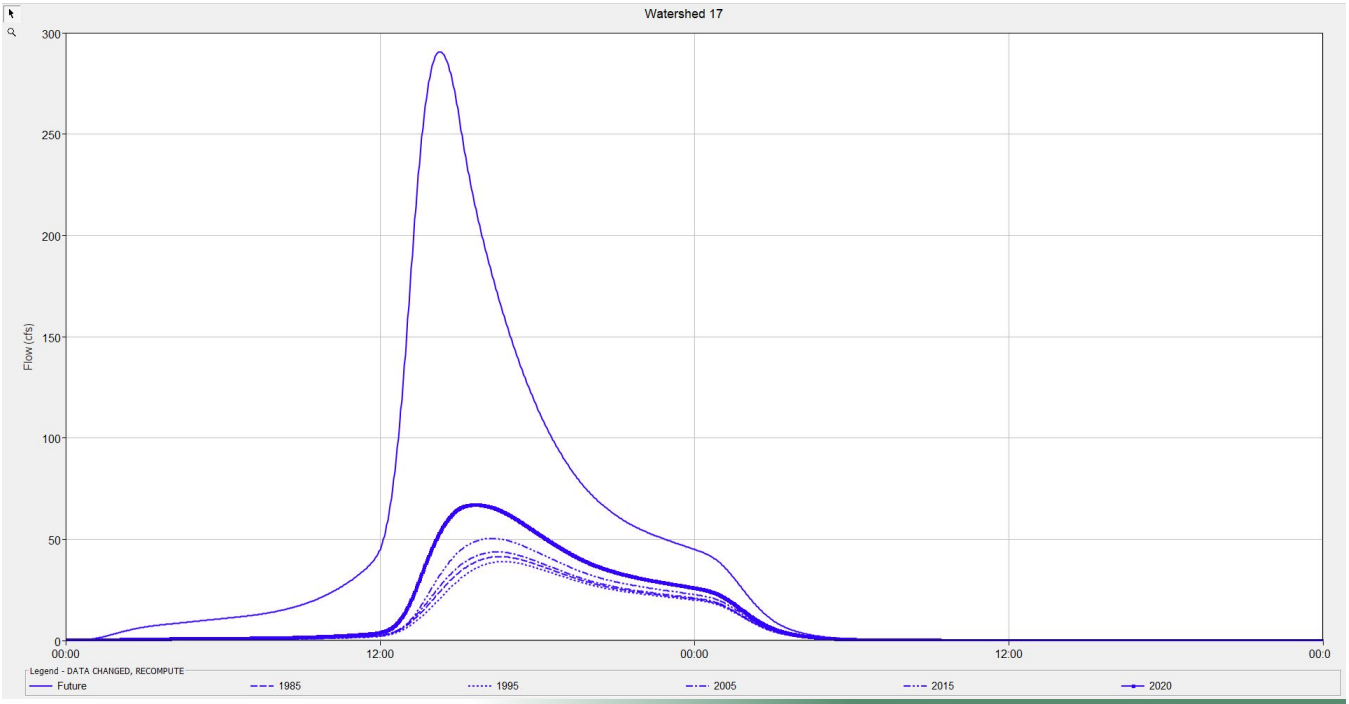

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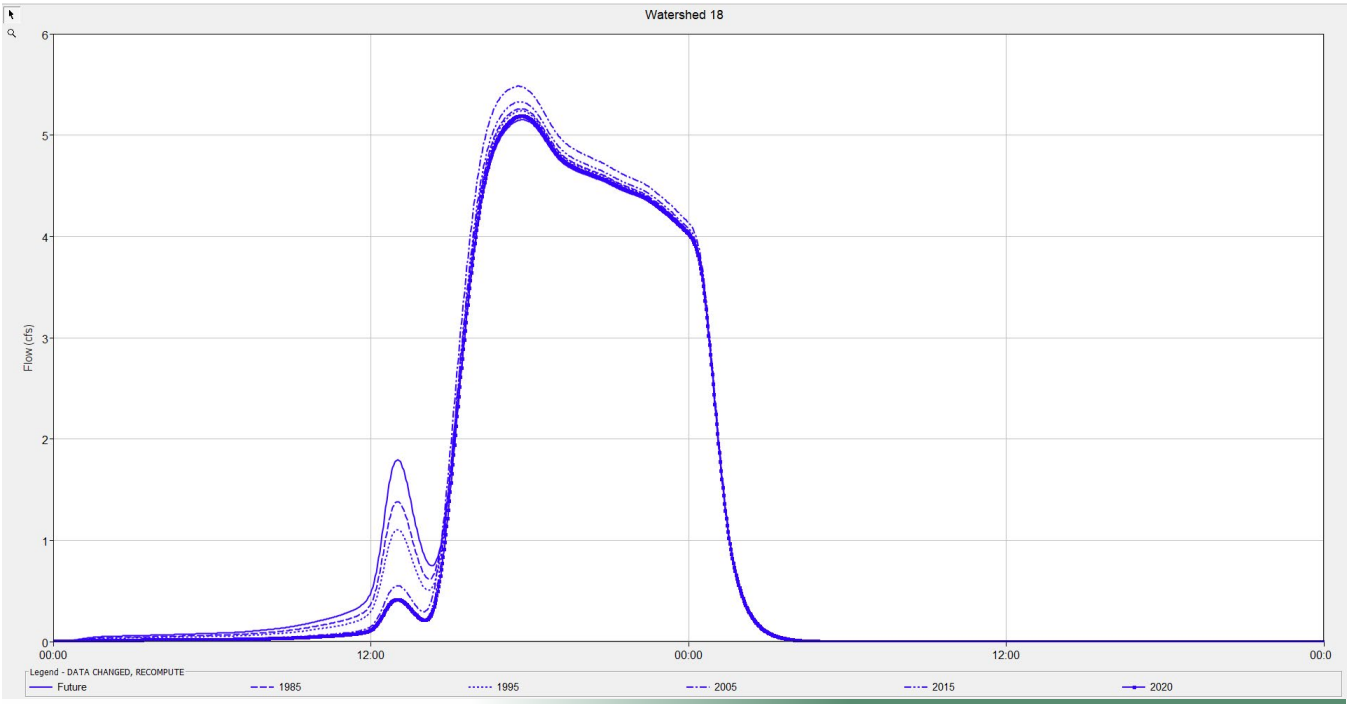

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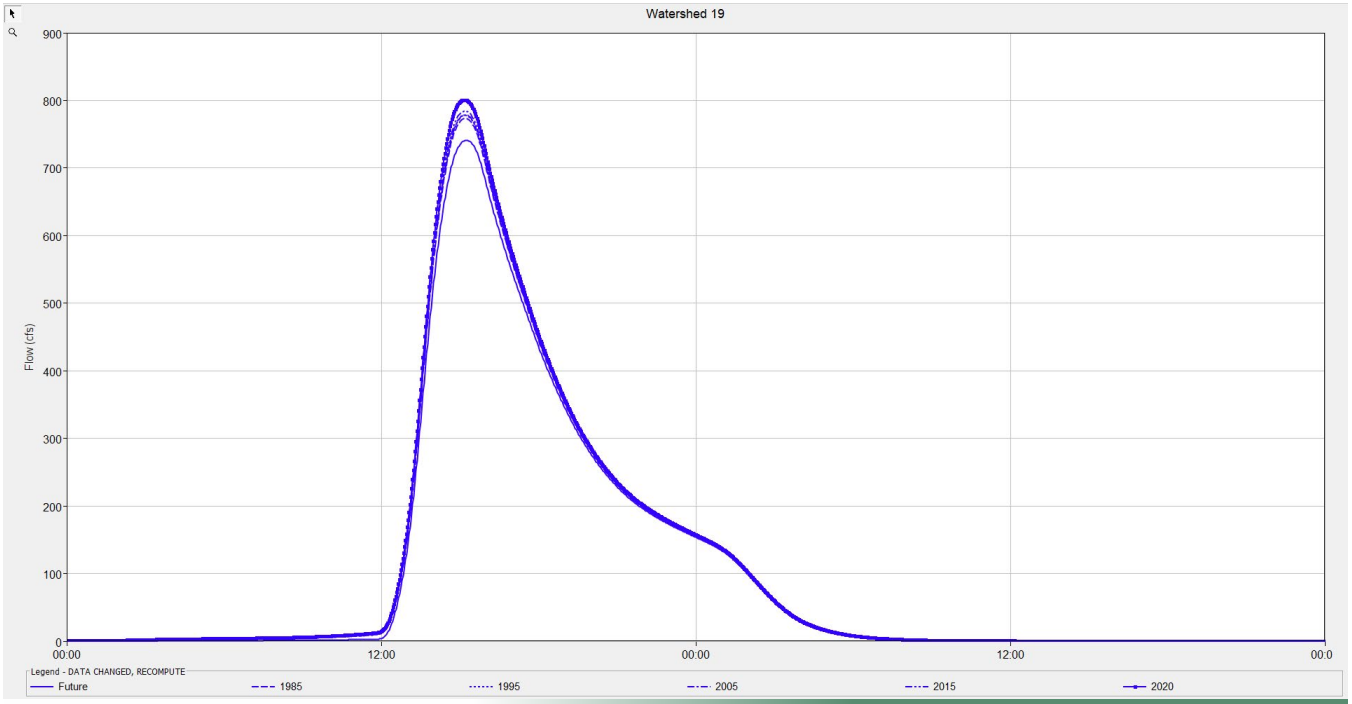

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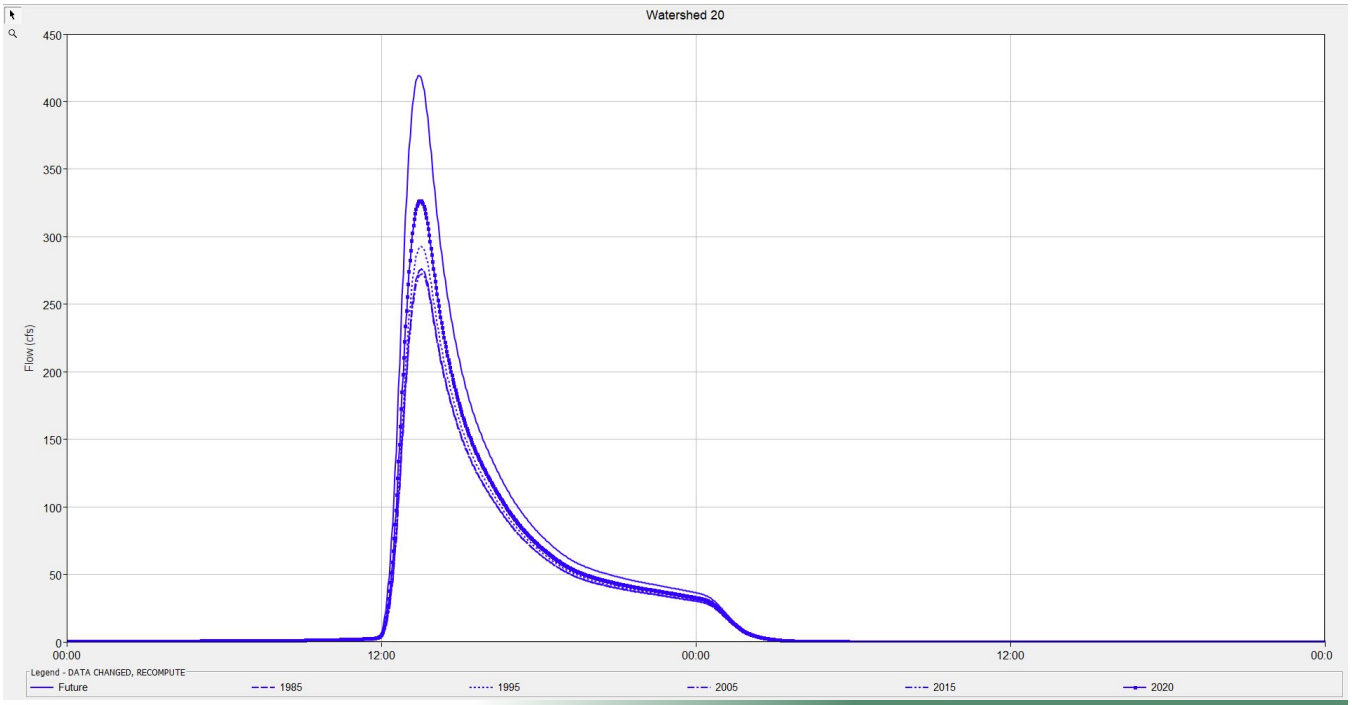

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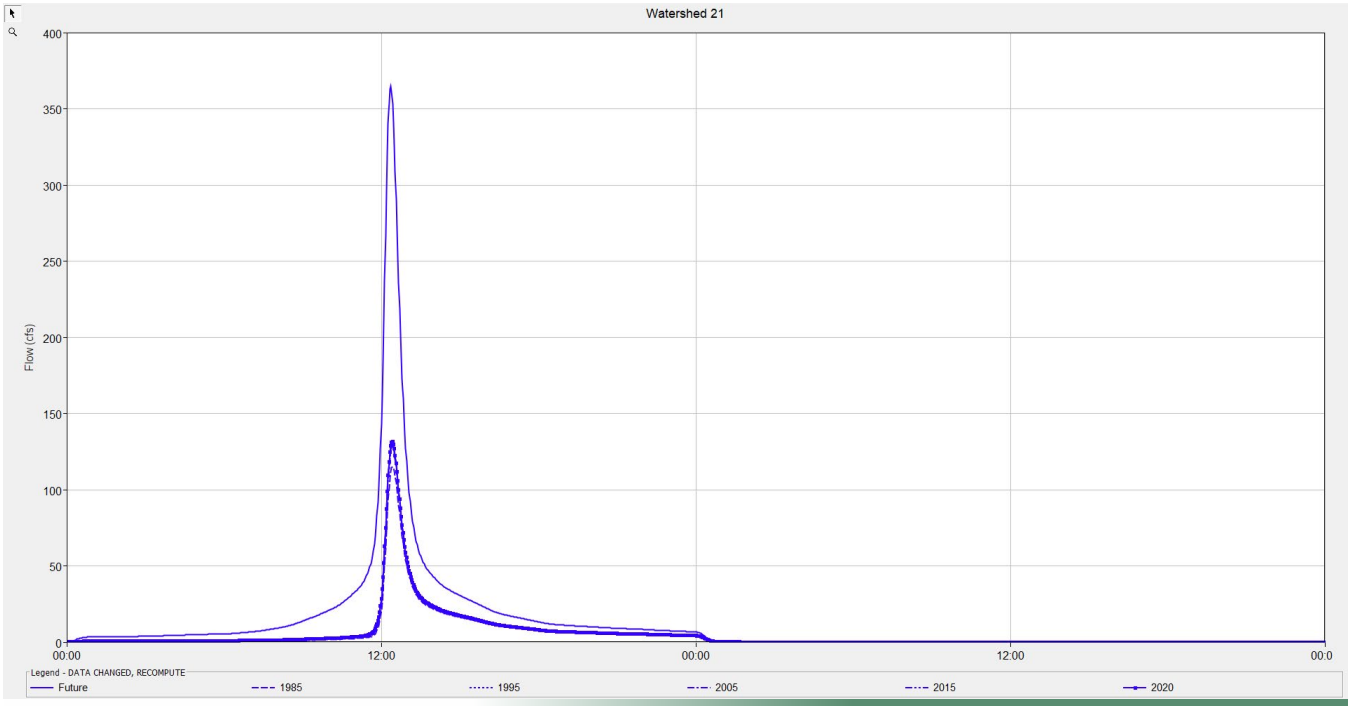

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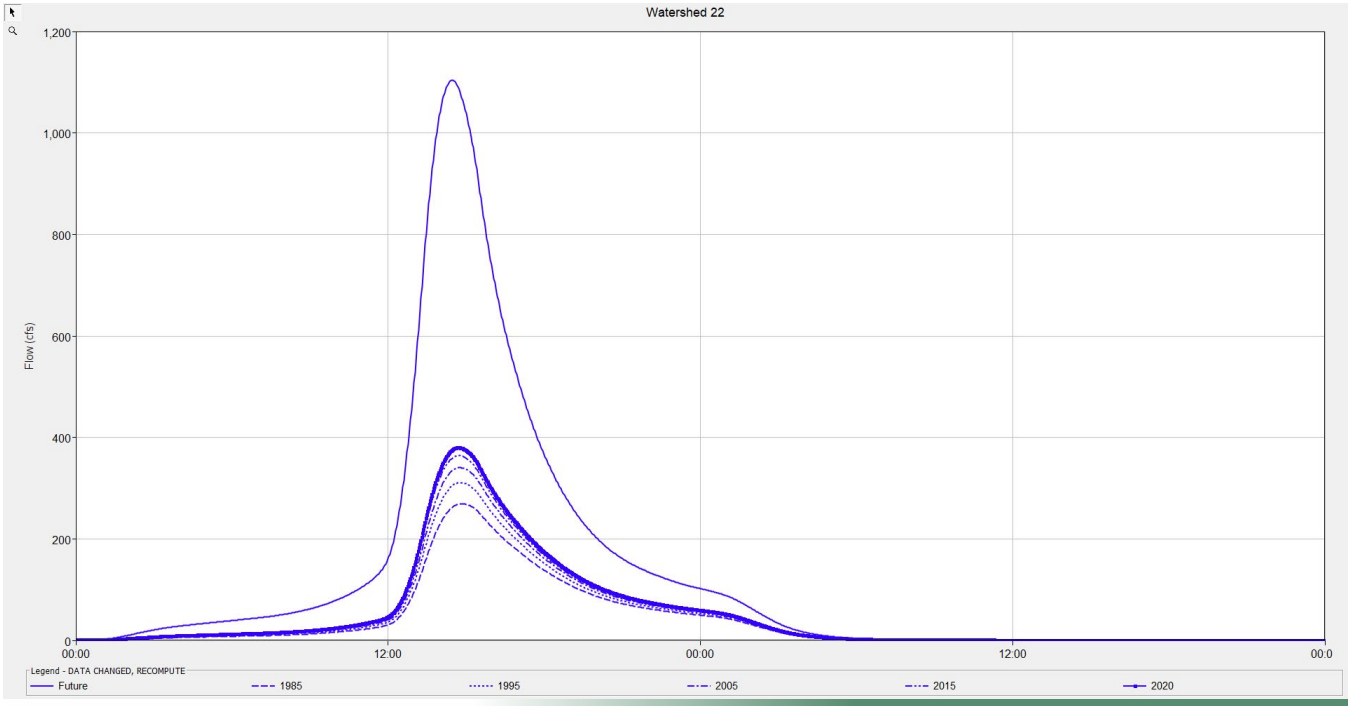

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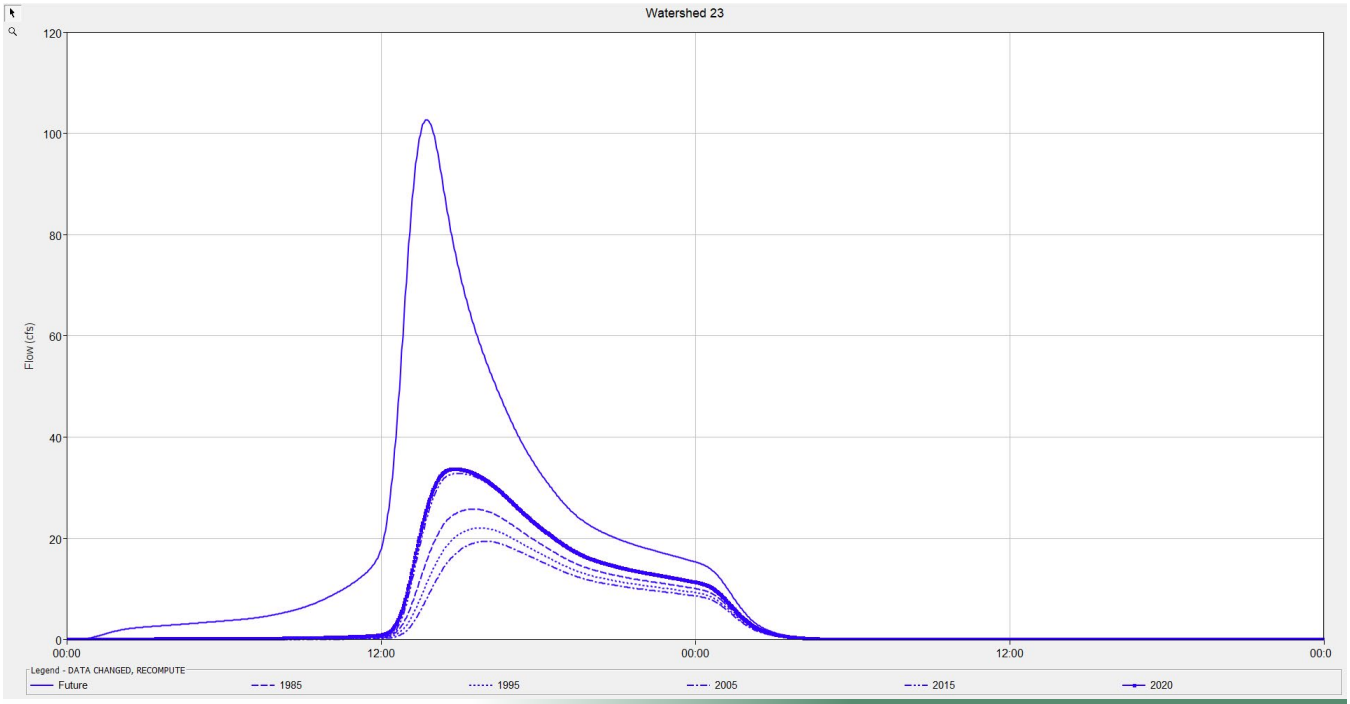

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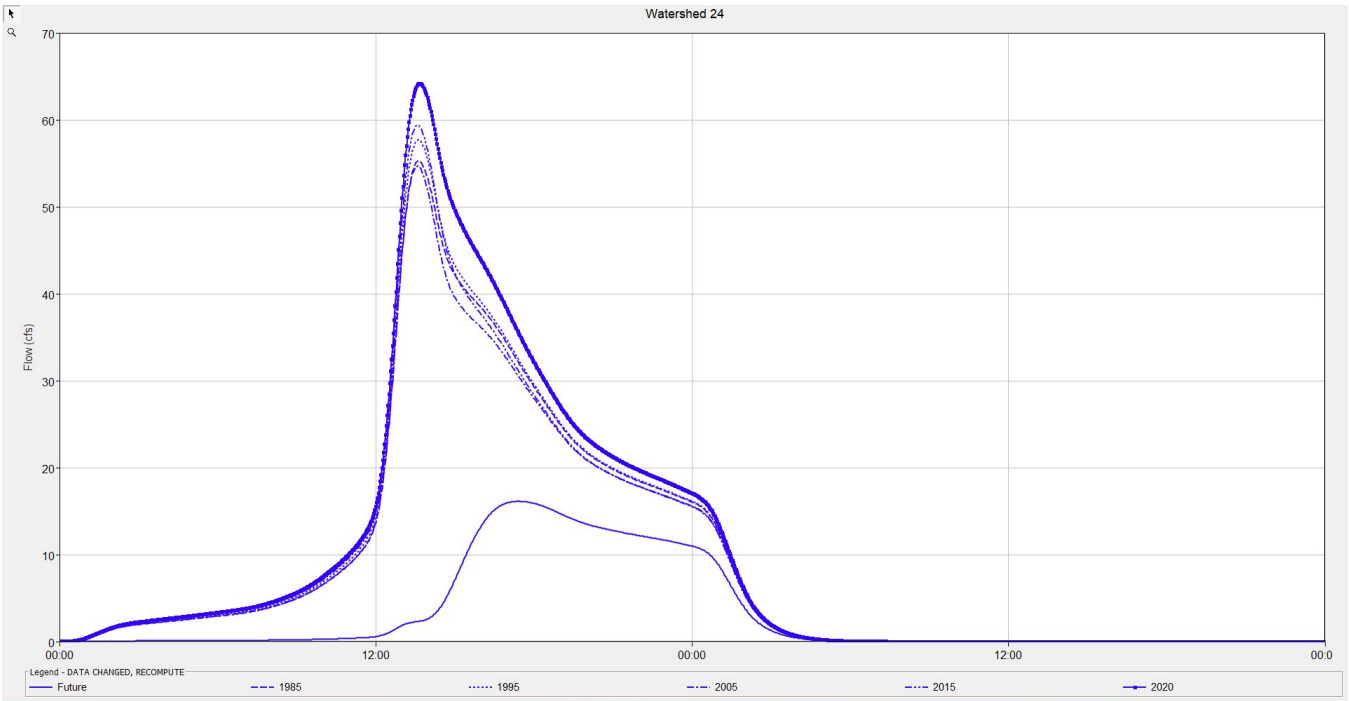

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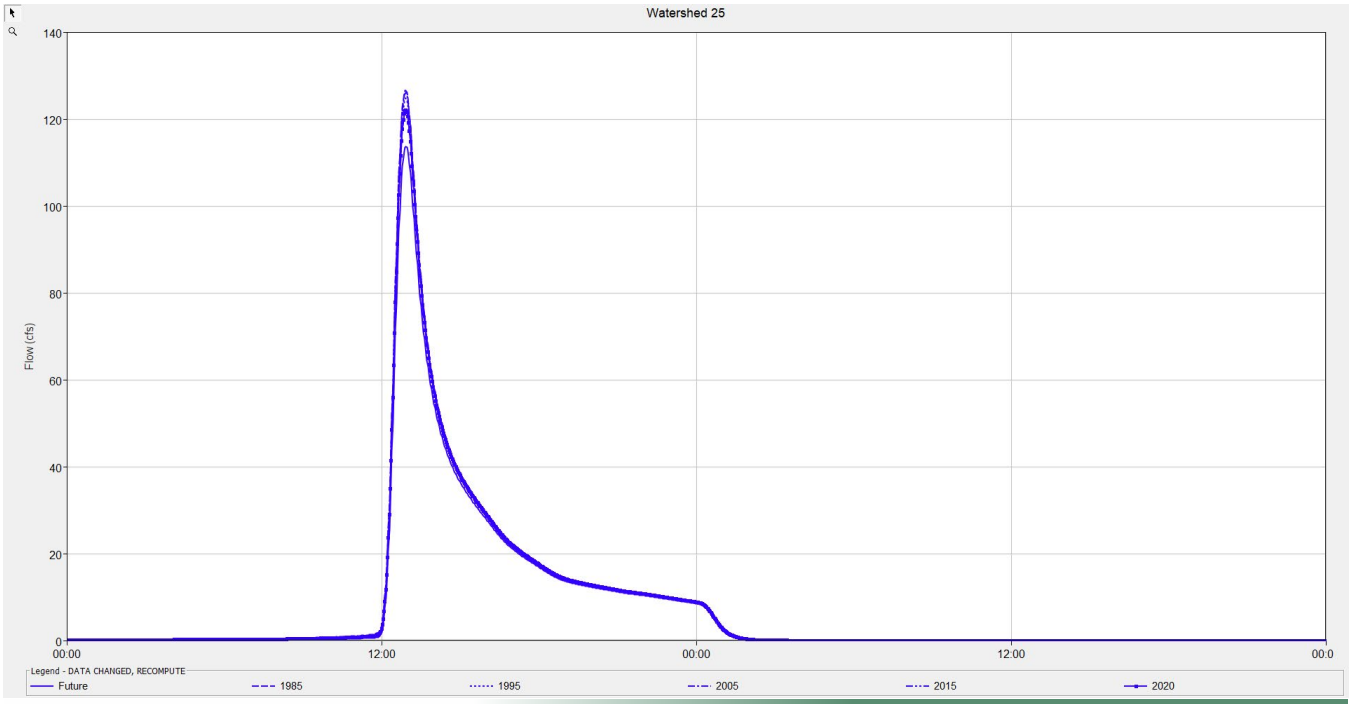

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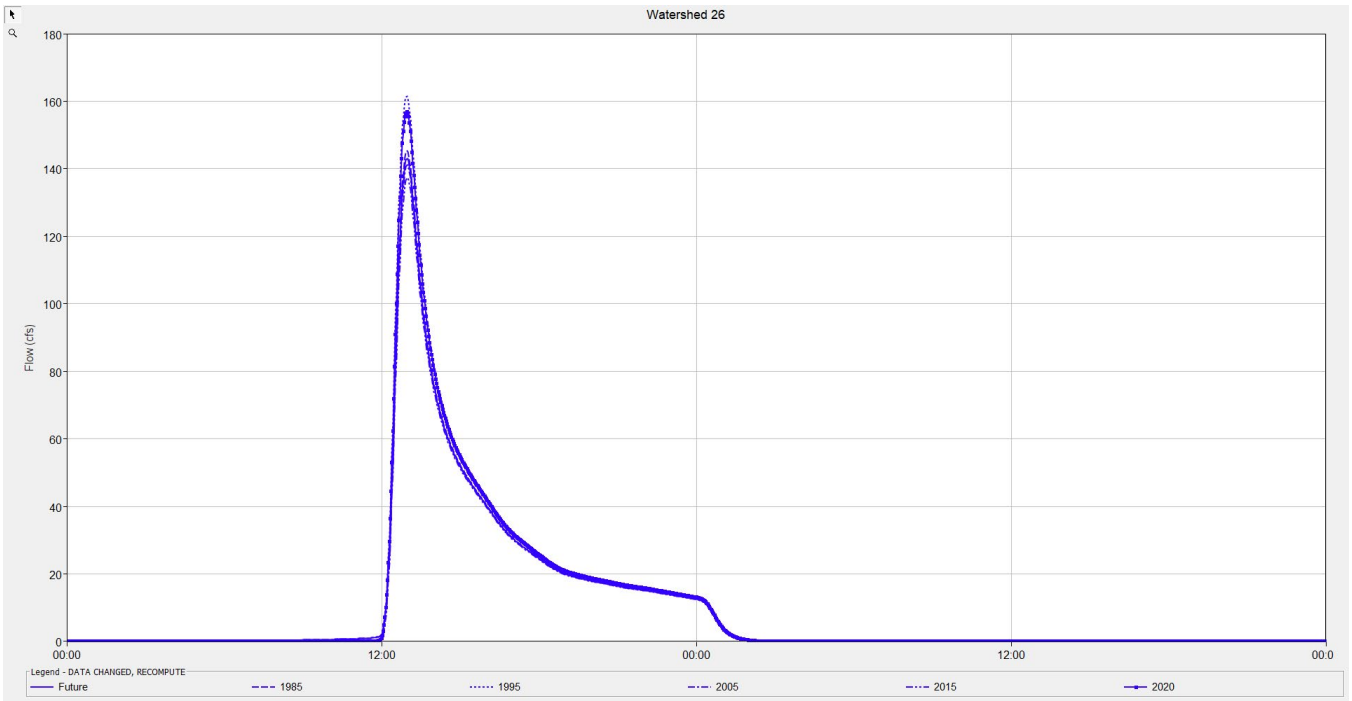

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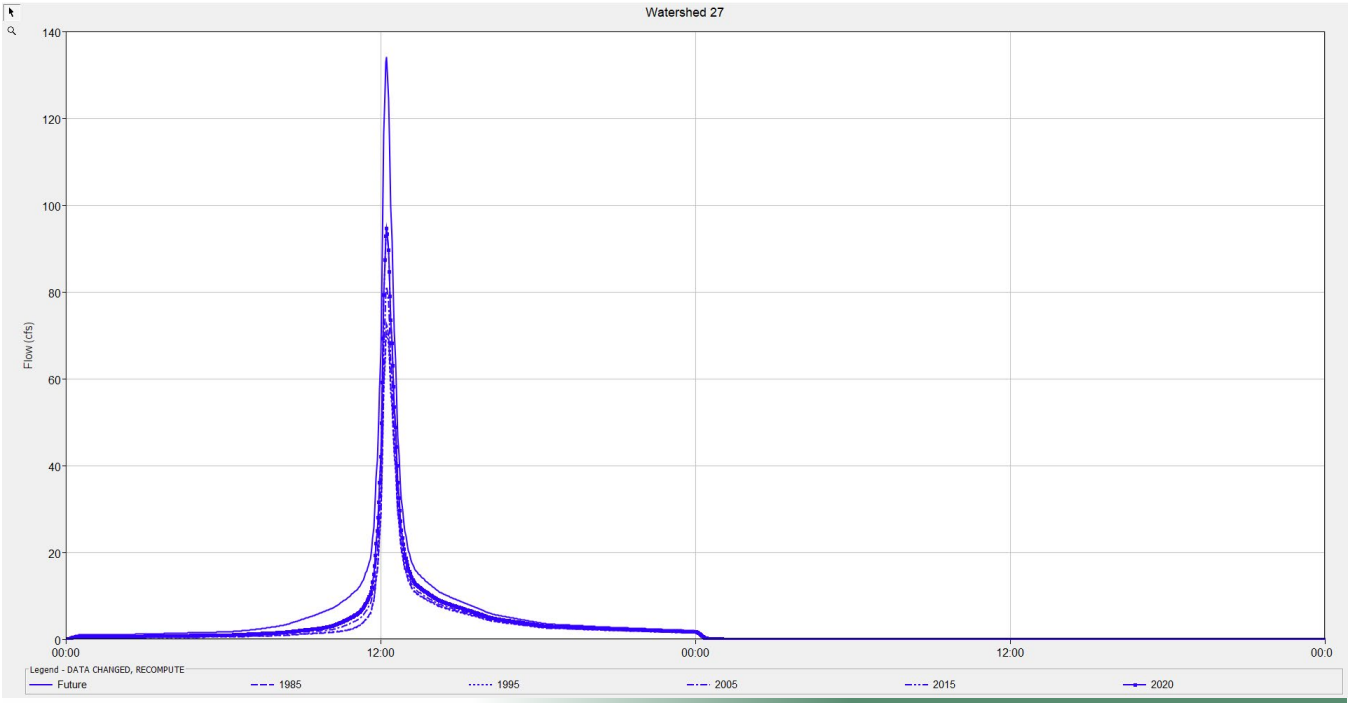

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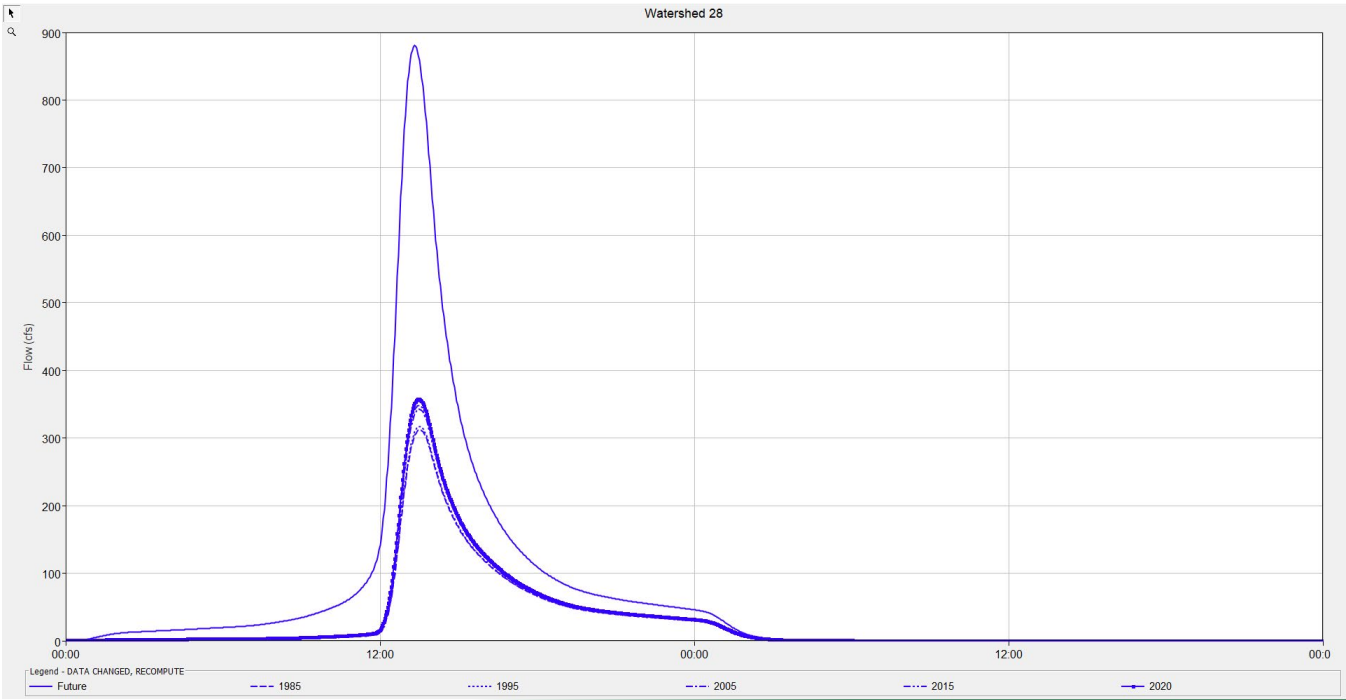

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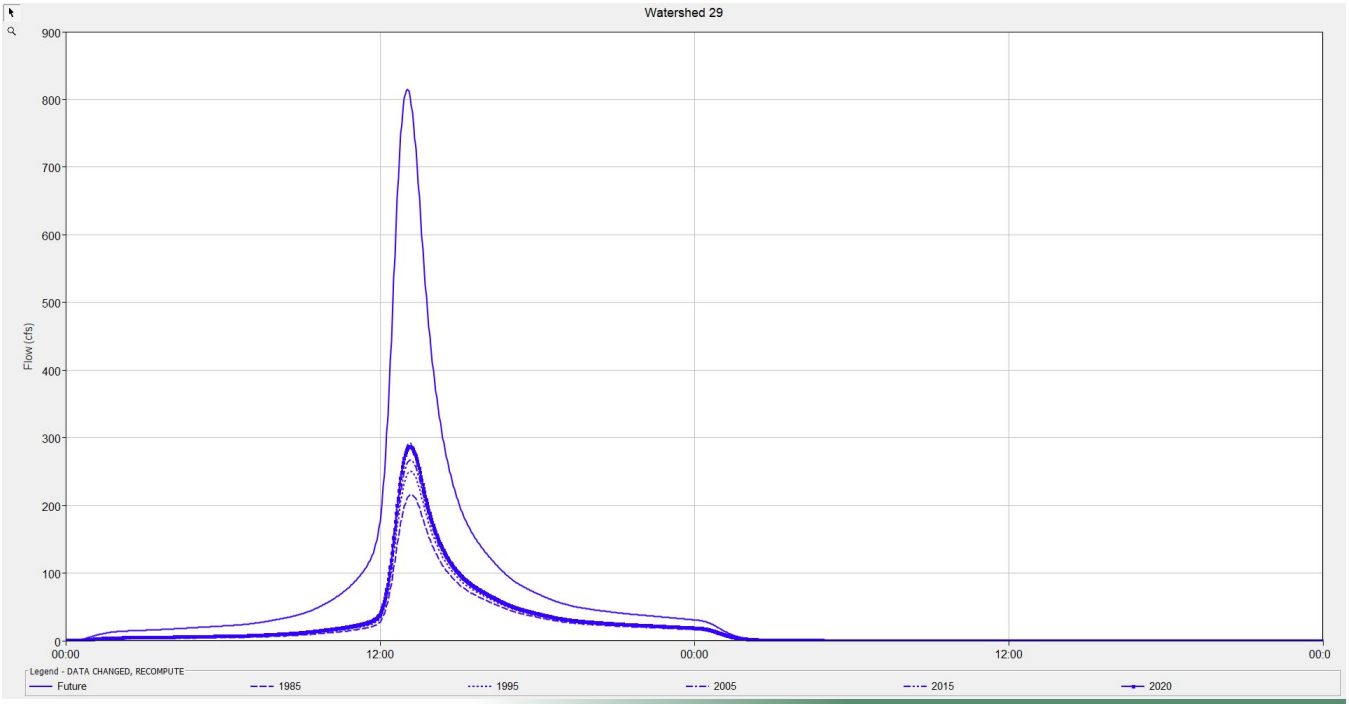

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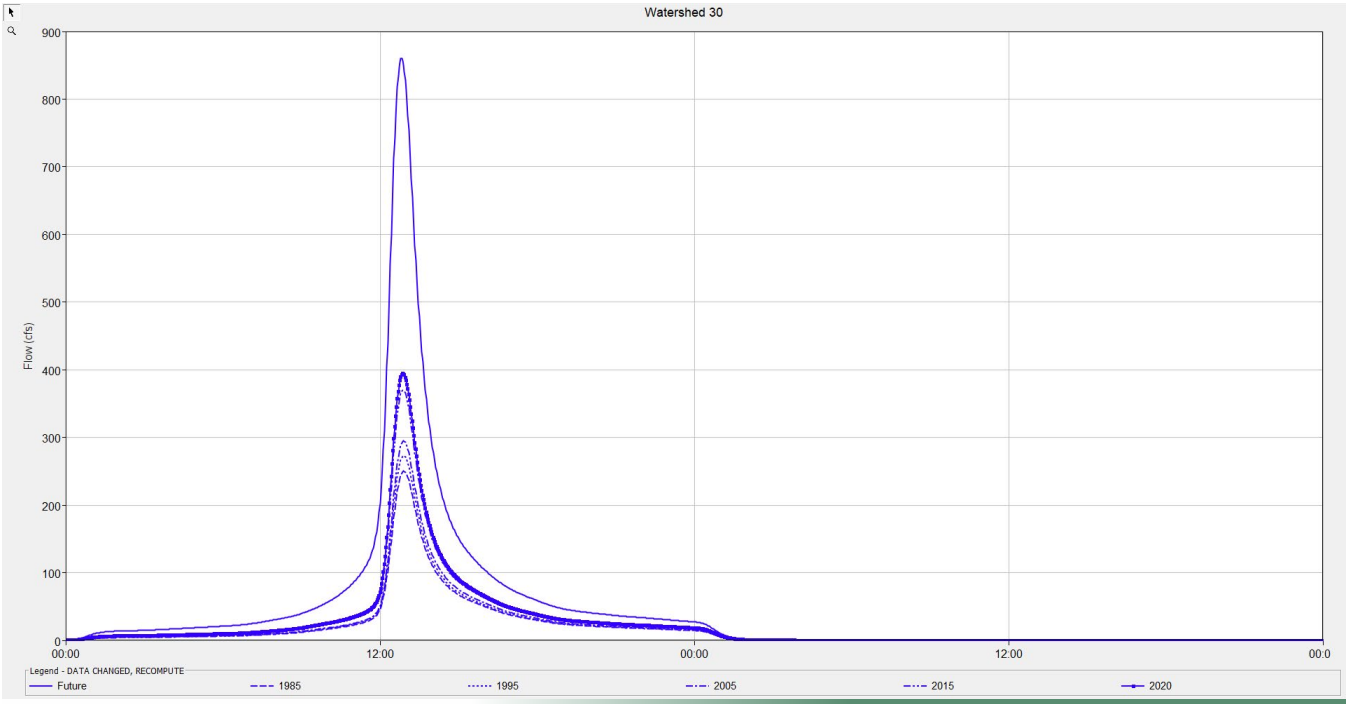

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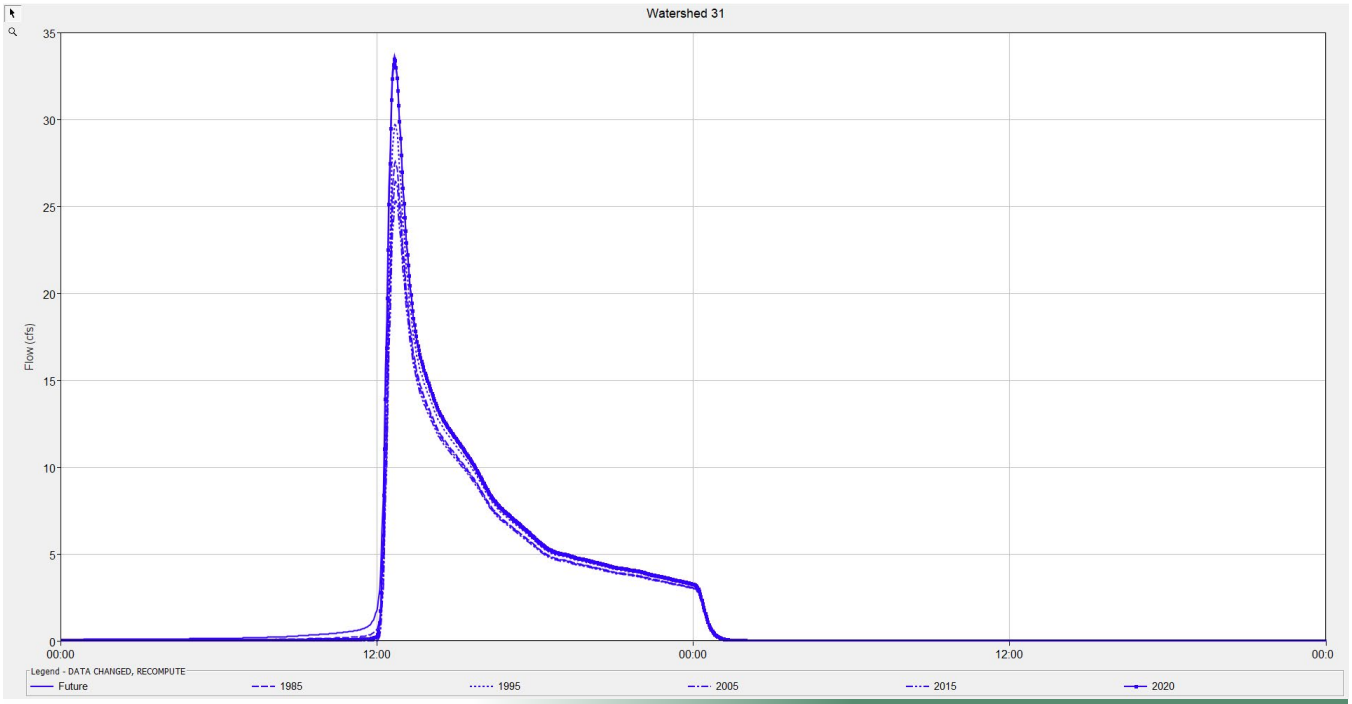

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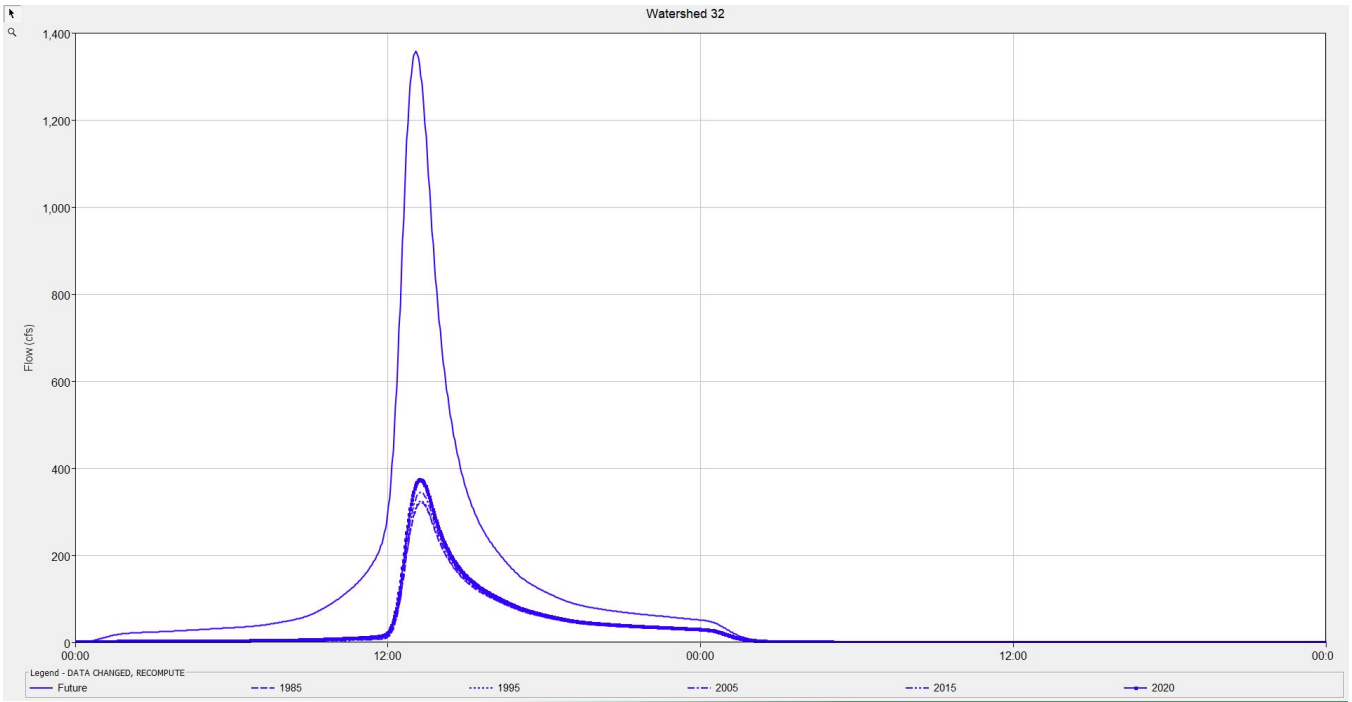

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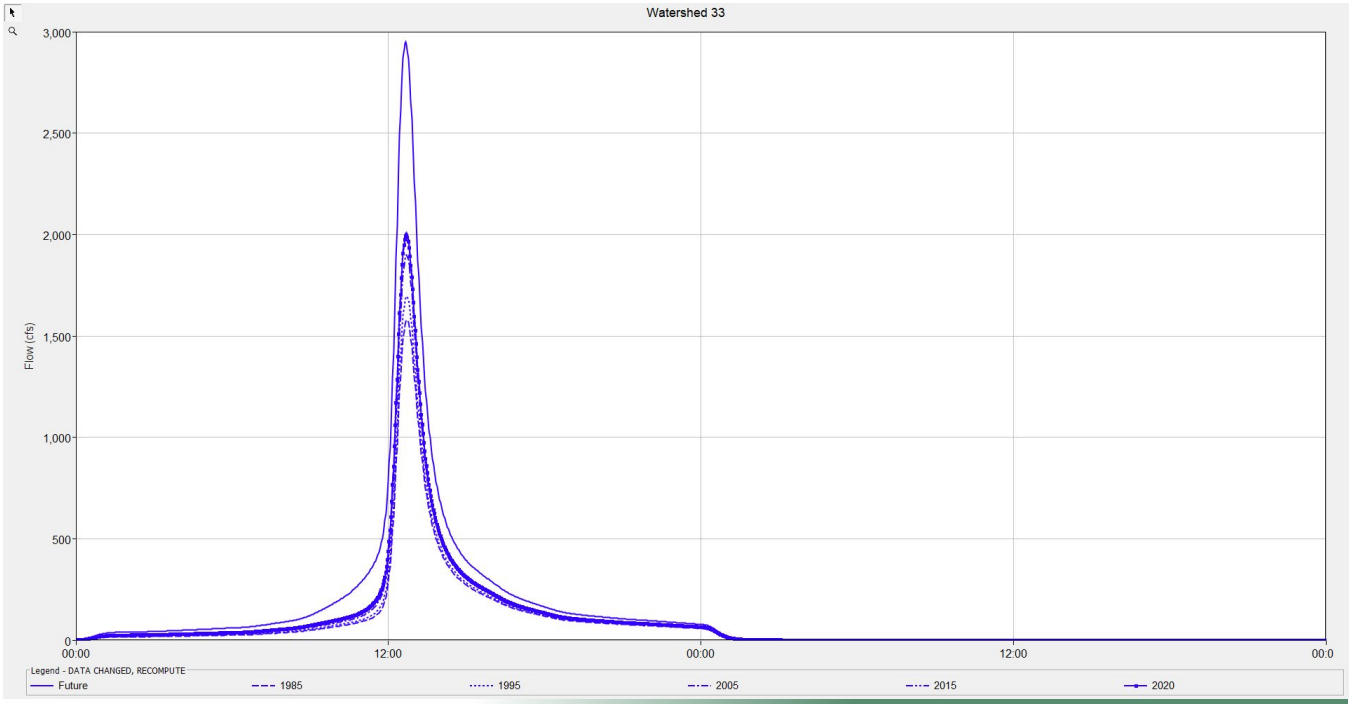

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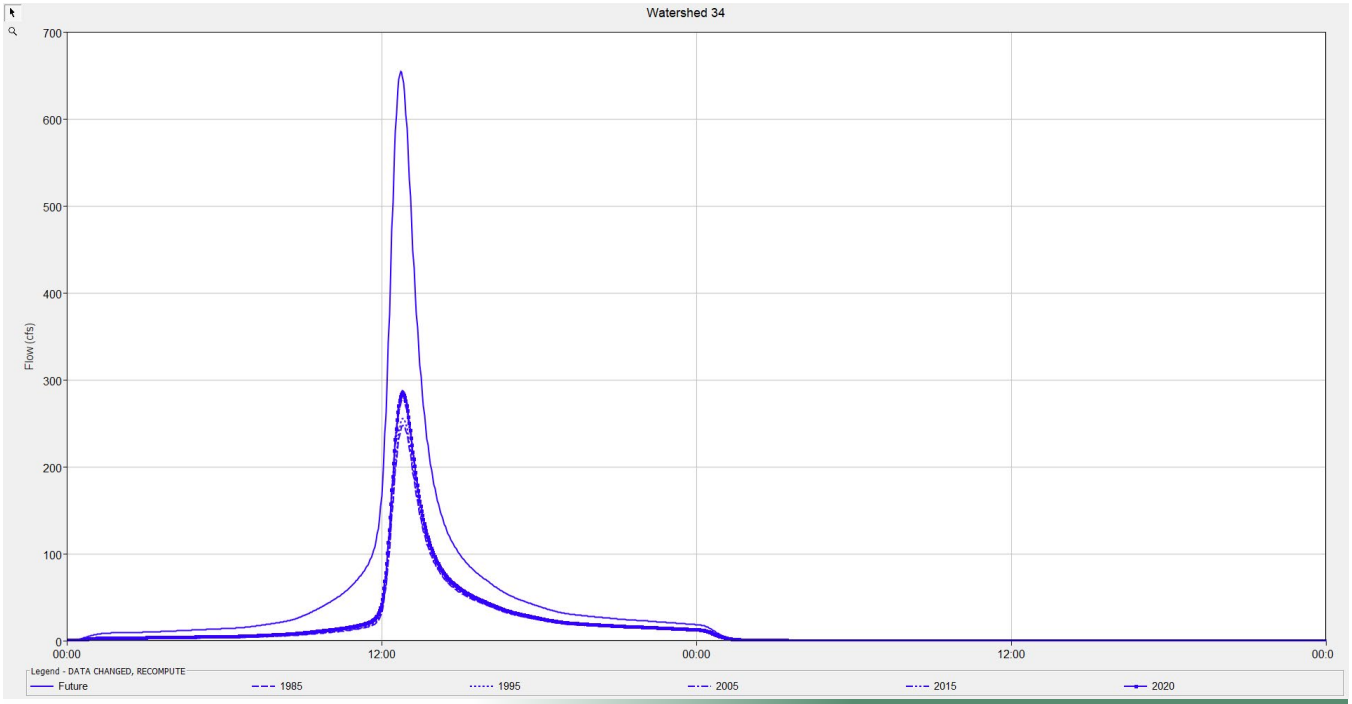

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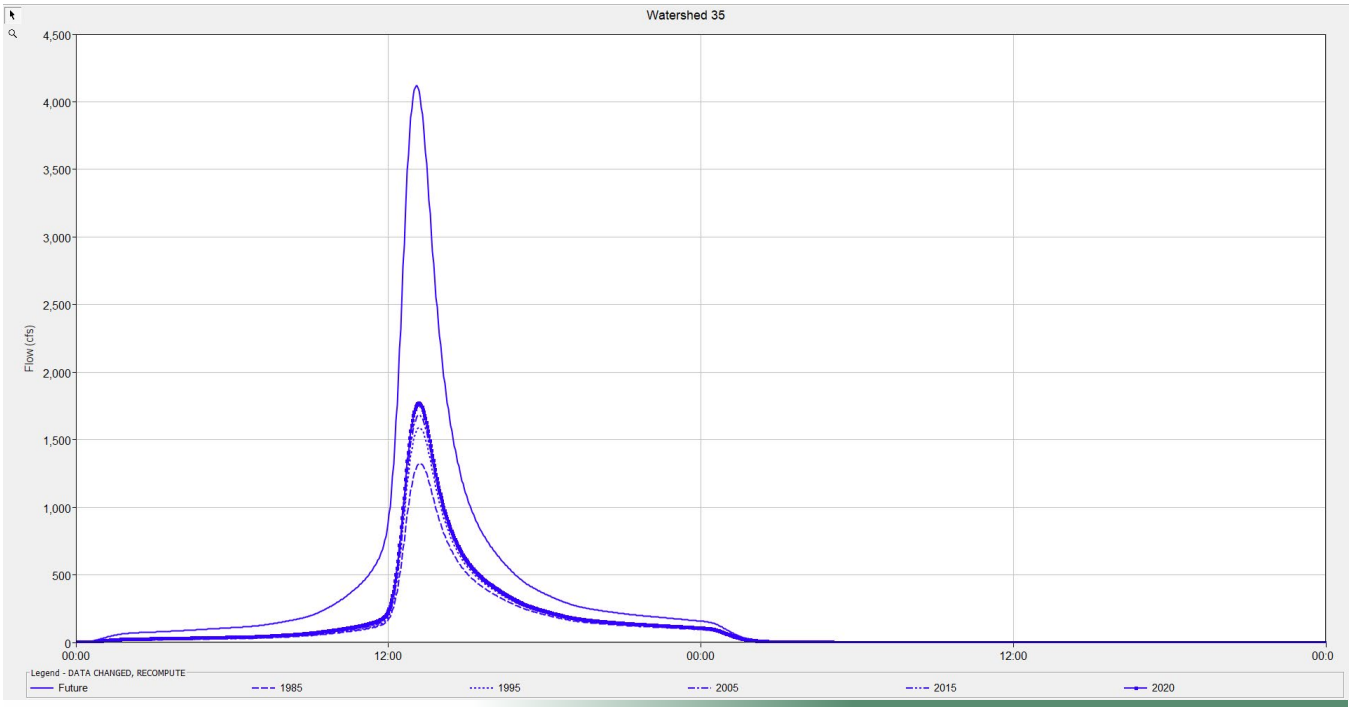


Figure D-35 Watershed 35 Hydrographs

Appendix E: Management and Implementation Strategies

North Carolina Coastal Stormwater Management

Stormwater management approaches have evolved greatly over the years as new research and technologies have been developed. The three years that the state stormwater rules were updated in 1995, 2008 and most recently in 2017. Below is a summary of excerpts from the previous and current North Carolina Rules and Regulations that pertain to the 20 Coastal Counties in NC (Table F-1 Coastal County Stormwater Regulation Overview).

Table E-1: Coastal County Stormwater Regulation Overview

1988 Regulation Summary	
SA Regulation	• No direct outlet to SA waters • Infiltration control system must handle 1.5-inch rainfall • Excess of 1.5-inch rainfall volume must flow through a vegetative filter strip of at least a 50 foot width prior to entering mean high water of SA water
ORW Regulation	• Regulation determination upon acceptance of SA water reclassified as ORW.
HQW Regulation	• Additional stormwater regulation maybe developed on a case-by-case basis for HQW
1995 Regulation Summary	

SA Regulation	• Pertains to all areas withing ½ mile of SA waters or SA tributaries
	• **Low density development:**
	  ◦ Storm water conveyance via a 30-foot-wide vegetative strip
	• **High density development**
	  ◦ No direct outlet to SA waters
	  ◦ Infiltration control system or other approve SCM must handle 1.5-inch rainfall
	  ◦ Excess of 1.5-inch rainfall volume must flow through a vegetative filter strip of at least a 50-foot width prior to entering mean high water of SA water

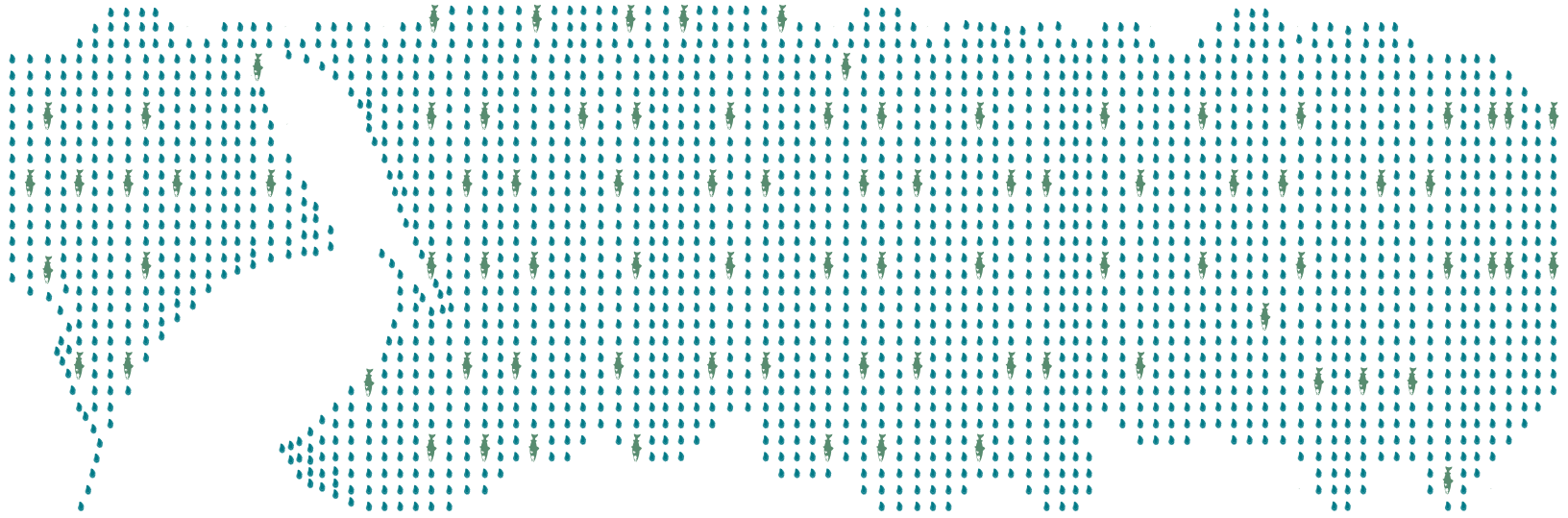
ORW Regulation	• Determined upon site specific basis • Within 575 feet of ORW development shall conform to SA regulations listed above
HQW Regulation	• Additional stormwater regulation maybe developed on a case-by-case basis for HQW

2007 Regulation Summary	

SA Regulation	• Pertains to all areas withing ½ mile of SA waters or SA tributaries
	• No new source new or redevelopment of stormwater flow or volume
	• Low density development
	  ◦ Storm water conveyance via a 30-foot-wide vegetative strip
	• High density development
	  ◦ No direct outlet to SA waters
	  ◦ Infiltration control system or other approve SCM must handle 1.5-inch rainfall
	  ◦ Excess of 1.5-inch rainfall volume must flow through a vegetative filter strip of at least a 50-foot width prior to entering mean high water of SA water

ORW Regulation	• Further determined upon site specific basis
	• Within 575 feet of ORW development shall conform to SA regulations listed above
	• Low density development:
	  ◦ Storm water conveyance via a 30-foot-wide vegetative strip
	• High density development
	  ◦ No direct outlet to SA waters
	  ◦ Storm water conveyance via a 50-foot-wide vegetative strip
	  ◦ Uses SCM to control 1.5-inch event or 1-year 24-hour storm event (whichever is greatest)
	  ◦ Any additional flow not treated beyond the SCM requirement must pass through a 50-foot min vegetative buffer
	• Infiltration control

HQW Regulation	• Additional stormwater regulation maybe developed on a case-by-case basis for HQW



2017 Regulation Summary	

SA Regulation	• Pertains to all areas within ½ mile of SA waters or SA tributaries
	• Low density development
	  • **Storm water conveyance via a 50-foot-wide vegetative strip for new development and 30-foot width for redevelopment**
	• High density development
	  • No direct outlet to SA waters
	  • Runoff off treatment volumes that meet:
	  • Achieve runoff volume match
	  • Provide treatment without discharge in excess of pre-existing 1-year 2-hour storm event (non-discharging SCM)
	  • Provide runoff treatment for the difference between the pre and post-development runoff volumes for a 1-year, 24-hour event while also containing:
	  • Documentation of infeasibility of meeting MDC
	  • Filtration through minimum of 18 inches of sand prior to discharge
	  • Discharge into a level-spreader, a swale that fans out at a natural grade or a natural wetland that doesn't drain to SA waters
	  • Runoff volume excess of the 1-year 24-hour event shall be released to vegetative set back or pre-existing SCM.
	• Excess of 1.5-inch rainfall volume must flow through a vegetative filter strip of at least a 50-foot width prior to entering mean high water of SA water

ORW Regulation	• Within 575 feet of ORW development shall conform to SA regulations listed above • Built upon area withing 575 feet of SA-ORW may not exceed 25% • Further determined upon site specific basis
HQW Regulation	• Additional stormwater regulation maybe developed on a case-by-case basis for HQW

The most current version of the State Stormwater Rules, notably 15A NCAC 02H.1019 Coastal Counties, requires all projects within one-half mile of SA-HQW or SA-ORW waters to match preexisting hydrology. This most recent legislation impacts a significant portion of the study area.

Table F-2 Watershed Permits and Regulation Year, below, summarizes the number of permits within each watershed and which regulations they currently fall under. Strategies can be focused on updating stormwater infrastructure that falls under one of the previous iterations of the State Stormwater Rules.

Table E-2: Watershed Permits and Regulation Year

Watershed	Permits under 1988 Regulation	Permits under 1995 Regulation	Permits under 2007 Regulation	Permits under 2017 Regulation
One	0	0	0	0
Two	0	0	0	0
Three	0	0	0	0
Four	0	0	0	0
Five	0	0	0	0
Six	0	0	0	0
Seven	0	2	2	0
Eight	0	2	1	2
Nine	0	0	3	1
Ten	0	1	2	2
Eleven	8	4	4	2
Twelve	0	13	9	9
Thirteen	0	0	0	0
Fourteen	0	0	0	0
Fifteen	0	6	4	10
Sixteen	0	3	2	1
Seventeen	0	1	0	0
Eighteen	0	0	0	0
Nineteen	0	0	2	2
Twenty	0	2	1	0
Twenty-One	0	0	0	1
Twenty-Two	0	7	19	16
Twenty-Three	0	0	0	0
Twenty-Four	0	0	0	0
Twenty-Five	1	0	0	0
Twenty-Six	0	0	0	0
Twenty-Seven	0	3	2	1
Twenty-Eight	0	4	1	2
Twenty-Nine	1	2	12	5
Thirty	0	2	1	2
Thirty-One	0	0	0	0
Thirty-Two	0	3	4	2
Thirty-Three	10	31	40	10
Thirty-Four	0	0	2	0
Thirty-Five	4	13	30	17
TOTAL	**24**	**99**	**141**	**85**

Communities may consider amending or adding ordinances to better address stormwater runoff. Possible changes and amendments could include preserving tree coverage and vegetated areas and the consideration of ordinances to minimize the amount of clearing and tree removal that can occur. Similar regulations have been used in other nearby coastal communities. The communities can also consider landscaping policies that emphasize the use of native plants and reduce the use of fertilizers and pesticides. Pet waste regulations and the installation of waste cleanup stations can also be considered in public spaces. Future maintenance and capital improvement projects at town-owned buildings, parks, parking lots, and drainage systems will consider the incorporation of LID techniques and other Green Street Designs.

Research from leading stormwater management engineers at North Carolina State University, Dr. Bill Hunt, who was monumental in the development of many of the stormwater practices and regulations currently in use, has spoken out about the current stormwater regulations. He has pointed out that with the current trend in weather patterns, especially in costly counties, the NC Stormwater regulation capture volumes should increase by 150% to adequately capture and treat the most prevalent storm events effectively. This recommendation could also be used as a metric to upgrade and retrofit existing BMPs to better handle and service the watersheds.

Photos by www.nccoast.org

Identified Potential Retrofit Project

Site Identification

Project and conservation sites were identified through two main methods: meetings with local stakeholders and existing conditions analysis. Multiple project meetings were held with local stakeholders to discuss the plan. Early meetings focused on determining areas of greatest need within the watershed to ensure the best benefit was gained from the plan and proposed projects. The locations identified in these meetings were analyzed based upon existing conditions, including topography, rough drainage area, and soils, to determine the best project type for addressing the needs of the watershed.

Potential Project Opportunities

Based upon the project locations identified by the project team and local stakeholders, 12 potential projects and one ongoing project were identified. These projects are meant to illustrate types of solutions that can be implemented. The identified projects were formulated at a high-level design; further consultation and analysis should be completed before projects are implemented. The 12 identified projects are summarized below.

- **Calico Creek, Morehead City:** The Calico Creek Stormwater Improvements project is an active project within the Town of Morehead City to construct nature-based SCMs along neighborhood streets. SCMs include treatment swales, permeable pavement, and disconnected impervious surfaces. Project work includes implementation of permeable pavement in place of existing sidewalks and parking areas, regrading of streets to aid in draining to SCMs, and implementation of 8,000 linear feet of storm drains and 80 drop inlets and manholes. Due to the ongoing nature of this project, it has been excluded from the high-level analysis within this report.
- **Meeting Street, Beaufort:** Meeting Street is surrounded by mostly impervious surfaces, including single family houses, apartment complexes, and businesses. The current stormwater management practice for the area is a system of wet ponds. It can be considered to transition one or multiple wet ponds into a different type of SCM, such as a stormwater wetland, to better treat and handle stormwater runoff.
- **Intersection of Fairview Drive and Live Oak Street, Beaufort:** The intersection of Fairview Drive and Live Oak Street is often flooded following rain events. This intersection is surrounded by mostly impervious surfaces, including both homes and businesses. It is also located within 500 feet of Town Creek. Undeveloped parcels located beside the roads offer the space to implement an infiltration basin, bioretention cell, or other SCM.
- **Tuttles Grove:** Eastman Creek crossing under Tuttles Grove Rd was identified as a hotspot for bacteria concentration following rainfall events. This area is less developed than other project locations listed, but is within close proximity to larger business centers and a water treatment plant. One or multiple SCMs, such as stormwater wetlands, can be implemented to treat runoff prior to entrance into Eastman Creek.
- **Bayberry Road, Newport:** The Bayberry Rd area of Newport experiences flooded streets following rainfall events. The area is fairly developed, with homes along the entire length of the road on approximately half acre lots. Based upon site visits and aerial imagery, there is limited stormwater infrastructure in the area to handle moderate to severe rainfall events.
- **Heritage Pointe Subdivision:** The Heritage Pointe subdivision is located off Masontown Rd and approximately half a mile from the Newport River tributary Shoe Branch. The subdivision is developing with houses built on quarter-acre lots. The current stormwater practices include a system of wet ponds throughout the subdivision. The stormwater treatment could be upgraded to include more treatment effective SCMs such as an infiltration basin or a bioretention cell.
- **Shopping Center on HWY70:** The shopping center located on HWY70 bordered by Little Nine Rd and HWY24 sees frequent flooding following rain events. This area is highly impervious, consisting of several stores and parking lots. The stormwater is currently managed through a system of wet ponds. Permeable pavement and an infiltration system may offer increased capacity to handle stormwater runoff while also offering more treatment for the stormwater to remove constituents. Treatment through a stormwater wetland can also be considered for stormwater management.

- **Blair Farms Subdivision:** The Blair Farms subdivision is located north of Crab Point Bay, with several fingers of the Bay being adjacent to the development. The subdivision currently has limited stormwater infrastructure. In order to best treat stormwater prior to entrance in Crab Point Bay and mitigate flooding concerns, it is recommended that SCMs, such as an infiltration basin, be implemented within the subdivision.
- **Mosquito Ditches:** Small ditches were dug in a section of land south of the Newport River as it enters The Narrows section to help solve concerns surrounding mosquito concerns. These ditches altered the natural flow of water to the Newport River. Because the original reason for the ditches are no longer a concern, the tract of land can instead be adapted into an active water management project to hold water back from the Newport River.
- **Yacht Basin Shoreline:** The shoreline of Yacht Basin has been affected by erosion, impacting homes and public infrastructure along the shore. This includes several houses and roads within Morehead City. A living shoreline could be considered for this location to help stabilize the shoreline and protect the structures and roadways along the shoreline.
- **Ditches Along HWY70:** The ditches along some sections of HWY70 in the Newport area are concrete lined. The concrete lining makes the ditches more impervious and prevents the infiltration of stormwater flowing through the ditches. The ditches should be restored to a more natural, vegetated state to provide a greener conveyance of stormwater runoff.
- **Beaufort Bypass Road:** The Beaufort Bypass Road southeast of Michael J Smith Field is often subject to flooding following and during rainfall events. This section of the road is bordered by the airport and some developments but is also adjacent to undeveloped land. This land offers area and opportunity for the implementation of an SCM, such as a stormwater wetland or infiltration basin to help treat and manage runoff.
- **Weyerhauser Tracts:** The Weyerhauser Tract is located north of the Newport River as it enters The Narrows section. The land tract is approximately 3,140 acres of forested ditched and drained land. This tract offers a good option for a conservation tract with active water management activities. By utilizing structures to control the flow of and hold back water, such as dikes and water control structures, the amount of runoff entering the Newport River can be reduced.

Figure E-1 shows the potential project locations for each project.

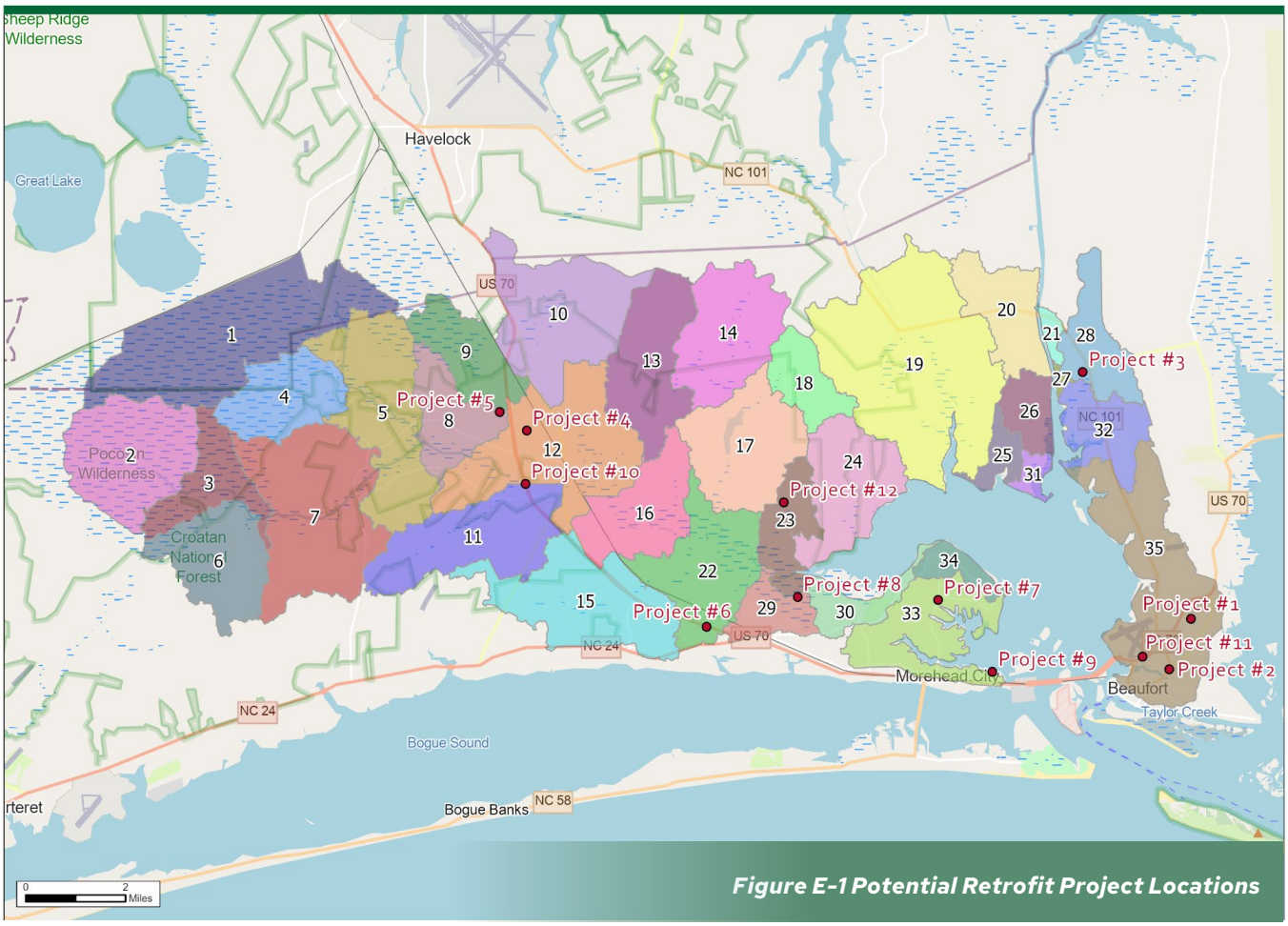


Figure E-1 Potential Retrofit Project Locations

Approximate treatment volumes were calculated based upon the probable treatment of a 1-year, 24-hour storm event. This design storm was chosen to match the requirements set forth by the State of North Carolina for stormwater control measure design. Treatment volumes were reduced based upon the percentage of untreated effluent listed in A.2 SCM Credit Table of the NC DEQ Stormwater Control Measure Credit Document[1].

Water Quality, Water Quantity, and Bacteria Removal/Prevention rankings were based upon documented studies for each project type listed. Treatment capabilities of bioretention SCMs, permeable pavement, and regional BMPs were determined from the tables listed in A.2 SCM Credit Table and A.3 SCM Stormwater Benefits of the NC DEQ Stormwater Control Measure Document. The bioswale treatment capabilities were determined based upon median pollutant removal percentages available in the Minnesota Stormwater Manual, which includes values for tree trenches. The bioswales included as potential projects within this plan function similarly to a tree trench. Drainage water management plan capabilities were determined based upon potential volume reduction for each proposed project area. Water quality and bacteria reduction rankings are based upon the underlying idea that preventing polluted water from reaching downstream receiving streams reduces nutrient and bacteria loading within Stump Sound.

1 *North Carolina Department of Environmental Quality Stormwater Control Measures Design Manual*

The benefits of each identified project are summarized in Table F-3 Summary and Benefits of Potential Stormwater Projects, below.

Table E-3: Summary and benefits of Potential Stormwater Projects

#	Location	Watershed	Project Type	Approximate Treatment Volume (CFT)	Project Cost	Water Quality	Water Quantity	Bacteria Reduction
1	Meeting St, Beaufort	35	SCM Retrofit	51,498	$927,000	Good	Excellent	Excellent
2	Fairview Dr & Live Oak St, Beaufort	35	Infiltration Basin	65,231	$1,370,000	Excellent	Excellent	Excellent
3	Tuttles Grove	28	Regional Stormwater Wetland	270,644	$1,353,000	Good	Good	Good
4	Bayberry Rd, Newport	12	Biorentention Cell	32,608	$489,000	Good	Excellent	Excellent
5	Heritage Pointe	8	SCM Retrofit	36,583	$658,000	Good	Excellent	Excellent
6	Lowes Shopping Center on HWY 70	22	SCM Retrofit	57,037	$1,027,000	Good	Excellent	Excellent
7	Blair Farms	33	Infiltration Basin	61,621	$1,294,000	Excellent	Excellent	Excellent
8	Mosquito Ditches	29	Wetland Restoration	1,867,057	$4,764,000	Good	Good	Good
9	Yacht Basin Shoreline	33	Living Shoreline	3,081	$1,500,000	Good	Excellent	Good
10	DOT Ditches along HWY 70	12	Drainage Ditch Improvement	65,216	$2,000,000	Good	Good	Fair
11	Airport Ditches	35	Drainage Ditch Improvement	68,664	$1,000,000	Good	Good	Fair
12	Weyerhaeuser Tracts	24	Wetland Restoration/ Flood Attenuation	1,078,640	$13,932,000	Fair	Excellent	Excellent
Total				**3,657,880**	**$30,314,000**			

Multi-Criteria Decision Analysis

A multi-criteria decision analysis (MCDA) was completed for the 12 proposed projects within the Newport River watersheds. The projects were ranked based upon the estimated treatment volume, cost estimate, water quality and quantity benefits, bacteria load reduction and prevention, and proximity to highly impervious areas.

The MCDA criteria are described as follows:

- **Treatment Volume:** Value of 1 to 5, with 1 representing a lower approximate treatment volume and 5 representing a high approximate treatment volume.
- **Cost:** Value of 1 to 5, with 1 representing a higher cost project and 5 representing a lower cost project.
- **Water Quality:** Value of 1, 2, or 3, representing a low, medium, or high ability to prevent water quality concerns, respectively.
- **Water Quantity:** Value of 1, 2, or 3, representing a low, medium, or high ability to prevent water quantity concerns, respectively.
- **Bacteria Reduction/Prevention:** Value of 1, 2, or 3, representing a low, medium, or high ability to reduce and prevent bacteria load, respectively.
- **Surrounding Area Imperviousness:** Value of 1 to 3, with 3 representing a high impervious percentage of surrounding area and 1 representing a low impervious percentage of surrounding area. The impervious percentage was based upon current aerial imagery.
- **Total:** Sum of criteria.

Table E-4: MCDA for Potential Projects, below, shows the results of the MCDA

	Project Information						MCDA Criteria						
Rank	Site No.	Location	Watershed	Project Type	Approximate Treatment Volume (AC-FT)	Project Cost	Treatment Volume	Cost	Water Quality	Water Quantity	Bacteria Reduction	Surrounding Impervious Area	Total
1	1	Meeting St, Beaufort	35	SCM Retrofit	1.18	$926,969	2	4	2	3	3	3	17
2	2	Fairview Dr & Live Oak St, Beaufort	35	Infiltration Basin	1.50	$1,369,855	2	3	3	3	3	3	17
3	7	Blair Farms	33	Infiltration Basin	1.41	$1,294,036	2	3	3	3	3	3	17
4	4	Bayberry Rd, Newport	12	Bioretention Cell	0.75	$489,119	1	5	2	3	3	3	17
5	5	Heritage Pointe	8	SCM Retrofit	0.84	$658,491	1	4	2	3	3	3	16
6	6	Lowes Shopping Center on HWY 70	22	SCM Retrofit	1.31	$1,026,664	2	3	2	3	3	3	16
7	3	Tuttles Grove	28	Regional Stormwater Wetland	6.21	$1,353,222	4	3	2	2	2	2	15
8	11	Airport Ditches	35	Drainage Ditch Improvements	1.58	$1,000,000	3	3	2	2	2	2	14
9	12	Weyerhauser Tracts	24	Flood Attenuation & Wetland Restoration	24.76	$13,932,000	5	1	2	3	2	1	14
10	8	Mosquito Ditches	29	Wetland Restoration	42.86	$4,764,000	5	1	2	2	2	1	13
11	9	Yacht Basin Shoreline	33	Living Shoreline	0.07	$1,500,000	1	2	2	3	2	3	13
12	10	DOT Ditches along HWY 70	12	Drainage Ditch Improvements	1.50	$2,000,000	2	2	2	2	2	2	12

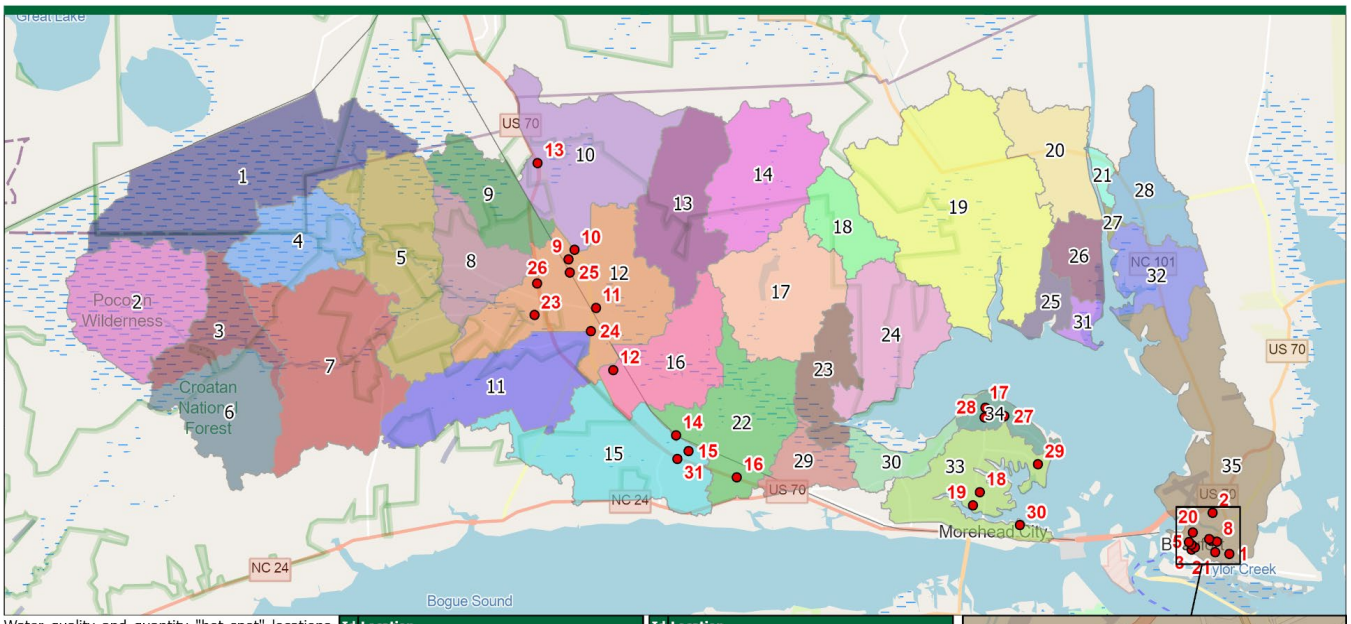
All projects are recommended for implementation and the MCDA should in no way be used to limit project implementation or determine project implementation schedule.

Additional Areas of Concern

An additional 31 locations within the watersheds were identified as having a water quality and/or water quantity concern through the planning process. The majority of the 31 locations were identified by local stakeholders as areas that impact the public and environment. Many locations were noted to have nuisance flooding and/or high contaminant counts spanning multiple years.

Many types of SCMs and green infrastructure stormwater solutions can be utilized in these locations to mitigate the impact of flooding and its effect on the community. Examples of solutions that can be implemented in these locations include but are not limited to infiltration basins, bioretention cells, permeable pavement, wet ponds, bioswales, and stormwater wetlands. Further investigation at each flooding hot spot location should be conducted to determine the best SCM and/or solution for the area. Recommended criteria for selecting the SCM include total project cost, treatment area size, volume reduction of stormwater runoff, and treatment effectiveness for bacteria and nutrients.

The additional "hot spot" areas are identified in Figure F-3 Potential Conservation Areas, below.



Water quality and quantity "hot spot" locations identified on this map consist of known locations throughout the watersheds that are subject to high bacteria loads, high nutrient concentrations, consistent nuisance flooding, and/or other concerns related to water quality and quantity. Locations were identified through meetings with local stakeholders and existing conditions analysis. This list was compiled throughout plan completion and may not represent all hot spots within the watershed. While the locations depicted in this map are not the focus of specific projects identified through this plan, it is recommended that stormwater control measures (SCMs) are investigated for each site to alleviate water quality and/or quantity concerns at each location and the watershed as a whole.

Id	Location
1	Briarpatch Dr, Beaufort
2	Ronnie Rd, Beaufort
3	Broad St, Beaufort
4	Marsh St, Beaufort
5	Pollock St, Beaufort
6	Cedar St, Beaufort
7	2nd St & Carterest Ave, Beaufort
8	1st St & Craven Ave, Beaufort
9	White Sands, Newport
10	Chatham St & Newport Loop Rd, Newport
11	Market St, Newport
12	Gracelyn Park, Newport
13	Chatham St & HWY 70, Newport
14	Along Railroad Tracks, Hull Swamp
15	Wildwood Rd @ Oak Trail
16	Along US 70 @ Circle K

Id	Location
17	Joselyn Dr & Country Club Rd
18	N 20th St & Mayberry Loop Rd
19	Emeline Pl W of S Yaupon Terrace
20	Mulberry St, Beaufort
21	Pine St, Beaufort
22	Live Oak St @ First St, Beaufort
23	Hilltop Rd, Newport
24	E Chatham St @ Newport River, Newport
25	W Railroad St, Newport
26	HWY 70 @ Bayberry Rd, Newport
27	Country Club Rd @ Kingfisher Dr, MHC
28	N 20th St between Anne Neal Rd & Jersey St, MHC
29	Blair Pointe Rd @ Country Club Rd, MHC
30	Avery St, MHC
31	HWY 70 @ Brandywine

Figure E-2 Additional Areas of Concern

Potential Conservation and Restoration Lands

Due to rapidly increasing populations and associated heavy development pressures within the watersheds, protection of the Newport River depends heavily on management of existing open spaces and undeveloped lands and acquisition of priority lands, either as purchases of lands or establishment of conservation easements, buffers, or other land protection strategies. conservation easements, buffers, or other open space protection strategies.

Conservation of undeveloped land offers an opportunity to reduce runoff and potential pollutants flowing into the Newport River. Acquisition to create the Newport River Watershed Preserve is progressing, with funding in place or pending to secure the first part of the preserve by the end of 2025. Figure E-3 shows the map of these parcels that will be the primary focus of land conservation efforts in the watershed over the next five years.

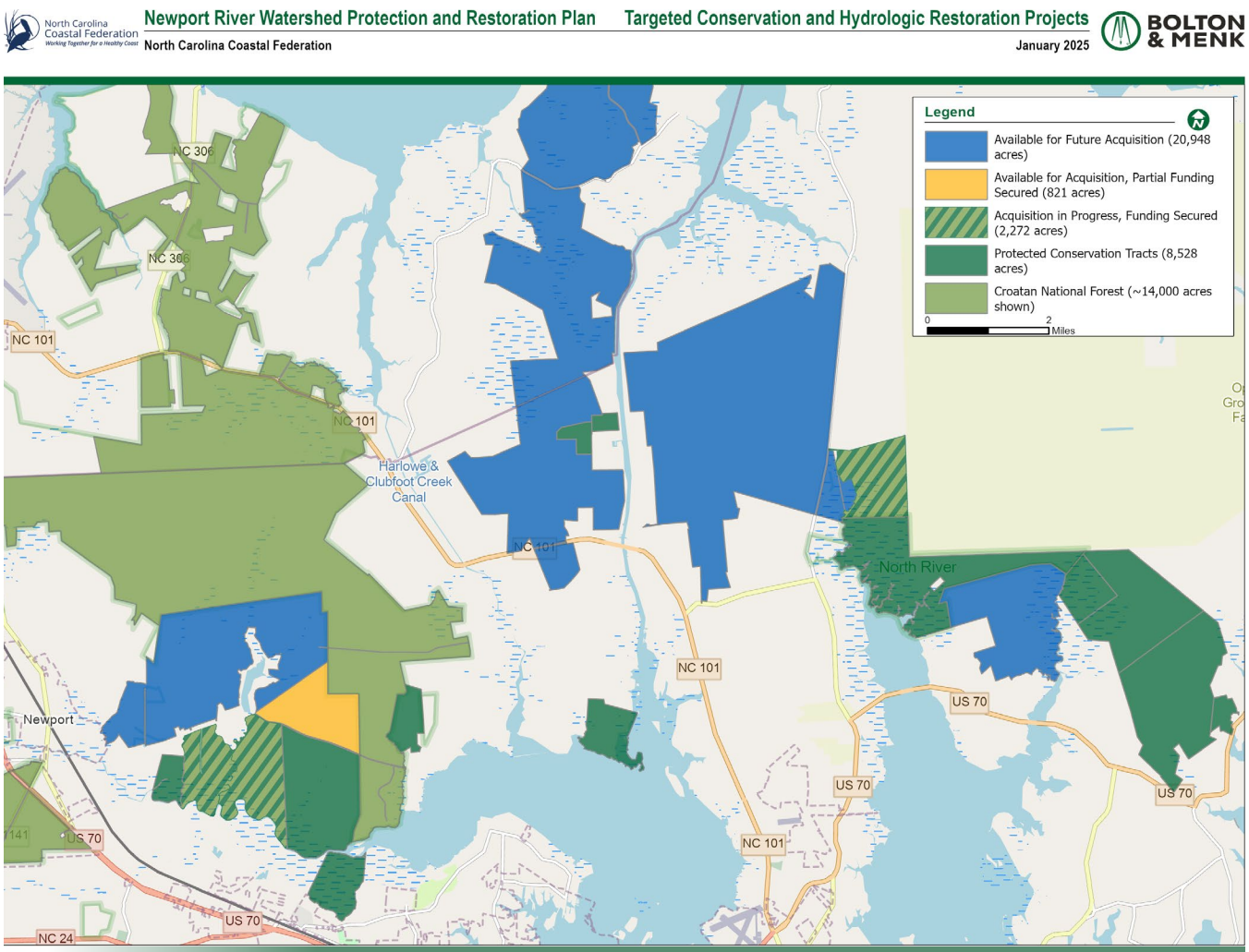


Figure E-3: Location of Targeted Conservation and Hydrologic Restoration Projects

Education and Outreach

Education and outreach is an essential part of ensuring the success of the Newport River Watershed Protection and Restoration Plan. By involving the community in stormwater management, a greater reduction in stormwater quality and quantity concerns can be achieved. Education and outreach should focus on understanding and reasonable approaches the public can take to reduce stormwater runoff.

The following are general ideas for consideration in implementing education and outreach in the jurisdictions:

- Assemble a community stormwater outreach committee to steer outreach and education efforts within the community. Include regional partners as resources.
- Identify outlets to reach community members and target audiences such as newsletters, utility bill messaging, social media and print messaging posted at community facilities.
- Develop messaging for various audiences but focus primarily on the general public.
- Promote Smart Feet. Post on social media, in addition, print publications and have them available at community public locations such as Town Halls.
- Create signage for completed retrofits to educate community members when possible.
- Consider a series of demonstrations that can be installed at assessable local locations to showcase simple techniques like painted rain barrels, downspout disconnection and native plantings or rain gardens.
- Host community planting event to add native plantings and pollinator gardens and develop signage promoting impact of simple techniques.
- Offer gutter downspout giveaway and track numbers distributed. Ask for pre-post photos and post on social media for community involvement and interaction.
- Prepare and promote a simple annual report on plan progress and simple tasks people can do on their properties like the current Annual Drinking Water Quality Report.

Stormwater Management Devices & Strategies

The purpose of this appendix is to provide example concepts and designs of typical stormwater runoff reduction practices that can be used throughout the watershed and within the public right of way. The measures shown are examples of the techniques and processes encouraged with the watershed restoration & stormwater resilience plan.

These figures and details are intended to serve as the starting point for stormwater retrofits alongside active roadways. These details outline the major design elements of curbside stormwater management facilities. Roadside safety, pedestrian safety, maintenance, gutter spread, and other factors must still be evaluated prior to implementation. Additionally, existing utilities or environmental conditions may make it necessary to modify or revise the standard designs to fit each individual BMP location. Curbside stormwater management may not be feasible in all locations.

Load Reductions for Potential SCMs

The Watershed Treatment Model was utilized to determine the potential load reduction for total nitrogen, total phosphorus, total suspended solids, and fecal coliform of potential SCMs (Table E-5 Modeled Contaminant Reduction by SCM). All reduction numbers are based on a treatment area of 1 acre with 100% imperviousness, representing the most developed areas of the watershed. A one-year, 24-hour design storm was utilized for calculations to account for the most recent Stormwater Rules. A combination of these reduction techniques can be applied across the watershed to maximize the reduction of nutrients, solids, and bacteria entering the Newport River.

Table E-5: Modeled contaminant reduction by SCM

SCM	TN Reduction (lb/ year/treated acre)	TP Reduction (lb/ year/treated acre)	TSS Reduction (lb/ year/treated acre)	Bacteria Reduction (billion/ year/treated acre)
Bioretention	14.8	2	454.5	618.0
Bioswale	11.9	1.7	383.8	412.0
Infiltration Practices	14.8	2.1	479.8	676.3
Permeable Pavement	13.1	1.8	410.3	515.0
Rooftop Disconnection	8.1	1.1	252.5	343.3
Wetland	8.9	1.7	429.3	549.3
Wet Pond	6.5	1.7	429.3	480.6

The N.C. DEQ The Stormwater Design Manual[1] is includes all the Minimum Design Criteria (MDC) that are codified in the state's stormwater rules, which went into effect on Jan. 1, 2017. The state's Stormwater Program periodically updates the Manual to provide better guidance on meeting the stormwater rules. Chapters C-1 through C-12 were updated on November 20, 2020. Sign up via email for updates on the state's list serve for the manual.[2]

1 https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/stormwater/stormwater-program/stormwater-design-manual

2 michelle.evans@ncdenr.gov

Potential Stormwater Incentive Strategies

There are numerous programs across the county that incentive property and business owners to upgrade and improve the effectiveness of their stormwater control systems. The EPA has identified five basic incentive categories that can be utilized to encourage the reduction of stormwater[1]:

Table E-6: EPA Basic Incentive Categories

Incentive Type	Description
Stormwater Fee Discount	Require a stormwater fee that is based on impervious surface area. If property owners reduce need for service by reducing impervious area and the volume of runoff discharged from the property, the municipality reduces the fee.
Development Incentives	Offered to developers during the process of applying for development permits. Examples include zoning upgrades, expedited permitting, reduced stormwater requirements, and increases in floor area ratios.
Grants	Provide direct funding to property owners and/or community groups for implementing a range of green infrastructure projects and practices.
Rebates & Installation Financing	Provide funding, tax credits or reimbursements to property owners who install specific practices. Often focused on practices needed in certain areas or neighborhoods
Awards & Recognition Incentive	Provide marketing opportunities and public outreach for exemplary projects. May include monetary awards. Emphasize LID projects on website, at Council meetings and in utility mailers.

In 2023, the North Carolina General Assembly allocated $5 million for a five-year pilot program to incentivize property owners to upgrade and bring their state-permitted coastal stormwater control systems into compliance with state regulations. Led by the North Carolina Coastal Federation, the program is partially focusing on the Newport River Watershed to assess its impact on addressing compliance challenges. It will explore cost-sharing strategies with permit holders to achieve the most effective system upgrades within the financial constraints many face.

1 Managing Wet Weather with Green Infrastructure Municipal Handbook: Incentive Mechanism. 2009. US Environmental Protection Agency, EPA-833-F-09-001. Retrieved from https://www.epa.gov/sites/production/files/2015-10/documents/gi_munichandbook_incentives_0.pdf