Lowcountry Regional Water Quality Management Plan

Lowcountry Council of Governments Planning Department

Table of Contents

Figures

Chapter 1 - Introduction

Plan Purpose

Ground and surface water in the Lowcountry are fundamentally the most important natural resources in the Region and must meet state and federal water quality standards in order to ensure availability in quality as well as quantity for future generations. Water as a resource is essential in sustaining human, plant, and animal life, as well as being necessary for agricultural, recreational, industrial, energy production, and domestic purposes. The Lowcountry is fortunate to have fresh water systems and salt water systems as well as areas of mixing water systems, which are referred to as estuaries. Estuaries are necessary as they help to filter inland pollutants before they can reach the ocean; they also contain a vast amount of wild and plant life that can only be found in these environments. These settings provide vital economic benefits – according to NOAA, in Beaufort County alone; total ocean-related wages were $176 million in 2009 (16.2% of all jobs). For Coastal Jasper County ocean-related jobs were 6.6 percent of all jobs and one percent for Colleton County. The value of diverse natural resources reaches beyond county lines to benefit the entire Region.

The Lowcountry depends upon its water systems for both the health of its inhabitants and also for the continued vitality of its economy. The Lowcountry relies heavily on tourism for economic success, especially in southern Beaufort County. Its location, coastal setting, and climate provide attractions that draw in millions of tourists every year. This coastal climate also attracts retirees from all over the country and internationally, due to its weather and environment. These retirees bring outside money that is spent on local services that provide support for the Lowcountry's economy. Also, the coastal landscape of the Lowcountry has attracted the movie industry, the mix of coastal and fresh water systems providing excellent locations for cinematic settings.

The "Clean Water Act" of 1972 was passed by the United States Congress in an attempt to restore and maintain an exemplary clean water standard throughout the nation. This legislation established goals at a national level to improve the integrity of US water systems by aiming to further develop a comprehensive approach to water quality preservation throughout the nation. The two goals originally established by the "Clean Water Act" were: 1) eliminate the discharge of pollutants into navigable water by 1985, and 2) attain water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water by 1983. Although these goals were not accomplished in the 1980s, with the current level of scientific knowledge and techniques available Lowcountry water systems can, and effectively will, meet and exceed these goals by the use of this and other Water Quality Management Plans.

South Carolina Department of Health and Environmental Control (DHEC) is responsible for the Water Quality Management Plan (WQMP) for non-designated areas. Six Councils of Governments have been designated as Water Quality Planning Agencies for specific Regions in South Carolina. The Lowcountry Council of Governments (LCOG) has been delegated this role, which includes the responsibility of completing and updating the Water Quality Management

Plan (WQMP) and performing the administrative functions for wastewater certifications (208 Certifications) in the Lowcountry. The statewide WQMP is broad in scope and may give direction to the planning agencies in their creation of a more local or Regional plan. There are important aspects of the statewide plan that can be linked to the Lowcountry's WQMP as they directly relate to this Region of South Carolina.

For example, Section V Sub-section C of the statewide plan contains information with regards to septic tanks. While decentralized wastewater treatment systems can be a useful and viable alternative, these system can be problematic in the Lowcountry. This is due to the Lowcountry's high water table allows the ground and groundwater to be especially susceptible to even small inflows of pollutants. Therefore strict policies are needed with regards to septic tank location, maintenance, and monitoring. As such, by regulation, DHEC's Bureau of Environmental Health will not issue permits for new individual sewage treatment and disposal systems where public sewer is accessible for connection as determined by them. In addition, sub-surface disposal systems serving more than one piece of deeded property (community systems) should not be permitted where existing centralized collection systems are deemed accessible during the 208 certification review process. .

Consistent with R. 61-56 for Onsite Wastewater Systems, a wastewater treatment facility is considered to be accessible for connection when it adjoins the property in question, the sewer authority has granted permission for the connection and annexation or easements to cross adjacent property are not required for connection. Unless specifically granted an exception, in areas where centralized sewer is not currently accessible, DHEC requires public ownership of onsite wastewater systems serving more than one piece of deeded property. Consistent with R. 61-69.505.8, proposals for such community systems permitted under R. 61-56 must be reviewed for consistency with this Plan (DHEC 2011).

Another section of importance to the Lowcountry is Section V, Sub-section D dealing with nonpoint source pollution. Nonpoint source pollution is of extreme concern for areas with such a high water table such as the Lowcountry. Any small spill or slow leak of a pollutant can easily enter the ground water table and then cause damage to not only the area's water quality for human consumption, but also many of the ecosystems in the Region. Nonpoint source pollution can also occur in construction zones, where preventative measures are not taken. Heavy rain and wind can often remove the topsoil and other sediments and deposit them in storm water systems in areas where construction is occurring. This is particularly important to the Lowcountry, as not only does the Region have a sensitive water system, balancing both fresh and salt waters, but it is also undergoing major growth and expansion, and active construction sites are scattered throughout the Lowcountry, with the primary area of concentration in Southern Beaufort County.

Throughout the nation there is concern that U.S. water systems have not been restored and reconditioned as they were expected to after the implementation of the "Clean Water Act" in the early 1970's. However, current water management plans and policies are better adept to maximize available opportunities for the restoration and protection of the nation's water systems while not impeding the development of our economy.

Need for WQMP Update

Introduction

The previous Water Quality Management Plan provided technical information, including Regional descriptions, water quality factors, and various administrative data. However, the policies in the previous plan lacked planning direction for decision-making by LCOG as well as the various management agencies and service providers in the Region. Additionally, the previous plan did not satisfactorily address implementation and mitigation measures to deal with the growing problem of point and nonpoint source pollutants on water quality. The 2012 Plan includes current information based on the latest impaired water body list, updated objectives, updated maps and new socio-economic data.

In recent years, nonpoint source pollution has been recognized as an important factor in water protection. Nonpoint source pollution generally comes from several origins, and involves excess nutrients, toxic chemicals, and bacterial contamination associated with runoff, that isn't easily identifiable. For example, while decentralized wastewater system can be a useful and viable alternative in rural areas to treat and dispose of wastewater, malfunctioning systems pose a threat to the quality of the Region's ground and surface water. Due to the high water table of the Lowcountry and its proximity to sensitive ecosystems, it is imperative that bacteria and other pollutants that are associated with wastewater not be given the opportunity to enter these natural systems.

Overview of Growth

Since the late 1990s, the Region has seen growth in terms of population and the built environment, but it has come at an uneven rate throughout the four counties. Much of the growth has originated in Beaufort County, particularly in the Bluffton area along US 278 between Hilton Head and Interstate 95. Jasper County has grown in population, but some of the housing planned never came to fruition, and developments remain unfinished. Colleton County's population grew modestly. Hampton County's population has declined slightly with little build-up in housing. Since 2007, growth in terms of development has ceased, due to the collapse of the housing market and the broader economic downturn. Building and population are discussed further in subsequent sections.

Regional wage levels have increased between 1995 and 2010, although the trend has slowed, if not reversed, since 2007 as the financial crisis worsened. All counties within the Region experienced setbacks in terms of wages. Hampton County's decline in average weekly wages between 2009 and 2010 reached 10.7 percent, the sharpest in the Region (SCLMI).

The Region's economy is structured around two main industries: tourism and the military's Tri-Command, both of which are located in Beaufort County. Tourism in the Lowcountry has created many jobs, but they are often low-paying and may only provide seasonal employment despite the temperate year-round climate. The military, on the other hand, provides the second highest number of jobs to the public at Parris Island Marine Corps Recruit Depot, Marine Corps Air Station Beaufort, and Beaufort Naval Hospital, while also providing above average wages to these civilians. However, with changing government priorities and military strategies, each of these installations could be closed at some future time, potentially dealing a serious setback to the economy of the Lowcountry. Due to the location of such large-scale economic activities in Beaufort County, many citizens from the surrounding counties commute to Beaufort for

employment; data from the Lowcountry Workforce Investment Board Strategic Plan showed that approximately 12,101 residents of surrounding counties traveled to Beaufort on a daily basis for employment, which is equivalent to 23.03% of the workforce (Low Country Workforce Investment Board, 2008).

The ethnic make-up of the Lowcountry has also changed with the emergence of a growing Hispanic population that has had major annual increases. In the period from 2000-2009, the Hispanic population in Beaufort County has increased 196.6% in Beaufort County, 180.2% in Colleton County, 130.2% in Hampton County, and 282.3% in Jasper County. Black and white populations have also grown, but at similar rates to those of the past (Census Estimates 2009).

Environmental and Planning Concerns

Since the WQMP was completed more than 15 years ago, Beaufort Jasper Water and Sewer Authority (BJWSA) has absorbed many water facilities within Beaufort and Jasper counties, thus taking on a major management role. With a large agency taking on many of the previous agencies' duties, this has streamlined many processes, and has increased the agency's service areas. This has resulted in more public wastewater service to rural areas and decreased the number of private systems in use. In turn, this has decreased pollution associated with private onsite wastewater systems.

In Hampton County, The Lowcountry Regional Water System has begun consolidating services for a coalition of municipalities. Operating expenditures, environmental permitting, fees, labor, and capital equipment purchases and maintenance are costly for individual municipalities. As a result, the aim of the authority is to reduce the operational costs of each system by pooling resources and consolidating services.

Another changing factor in the Lowcountry has been the increasing knowledge of environmental concerns within the Region. Two main issues with regards to environment have emerged since the mid 1990's. One of these issues is a greater knowledge of nonpoint source pollution. As mentioned previously, with the high water table of the Lowcountry, especially in the areas closer to the coast, nonpoint source pollution is easily able to contaminate the ground water. Activities such as inadequate oversight of landfills, poor maintenance of storage tanks, urban/agricultural runoff, and the improper storage of HAZMAT elements all pose threats to the Region's ground water quality. Thus, these issues need to be addressed in such a way as to decrease current levels of nonpoint source pollution threats to ground water and eventually eliminate this problem for the betterment of the Region and its water resources.

Pursuant to the Clean Water Act, section 303 (d), South Carolina lists the impaired water bodies in the state. In the 2010 list, the state has identified over a hundred water bodies impaired in the Lowcountry. DHEC will project the Total Maximum Daily Load (TMDL) for the impaired water bodies. TMLDs identify the maximum amount of a specific pollutant that can be released into the water while maintaining water quality standards. TMDLs also provide pollutant reduction amounts needed in impaired water bodies to meet water classification standards. Currently, there are four watersheds that have TMDLs developed within the Region.

Wellhead protection is another issue of environmental concern for the Region of the Lowcountry. Wellhead protection programs are designed to ensure that levels of available fresh water are adequate for the area's population at the least, and a level of reserve is always present in the case of a drought. This is an essential policy for current and future plans that was

not previously seen as a major issue. Also with the increase in population in the Lowcountry and the further burden on the supply of fresh water that this influx will create, it is essential that the Region initiate a program and implement policies to ensure that adequate levels of fresh water will be available for the entire four-county Region should a drought occur.

Another change in the Lowcountry is the increase in the number of jurisdictions with comprehensive plans. Many jurisdictions in the four counties have adopted a plan that guides future growth and provides recommendations for how these urban and rural areas can expand. These plans, which include servicing and infrastructure policies and recommendations, can tie directly into the Lowcountry's WQMP, and therefore need to be recognized by the Regional plan. Finally, the previous WQMP has been amended 19 times since its implementation in 1996. These range from changes in agencies to expansions in flows and additions of treatment plants. This relatively large number of major changes in a short period of time also points toward the need for a major revision to the old plan.

Planning Process/Overview

The purpose of this section is to outline how the LCOG Planning Department updated this WQMP. The process ensured that all new ideas and policies support the goals and objectives of the plan as a whole.

The first phase of plan development included a review of the previous WQMP and assessment of the WQMP's of other COGs. This was done to better understand the directions taken in water management by surrounding areas and to also help in tying on the WQMP of the Lowcountry to its surrounding Regions to better strengthen each plan individually. The Lowcountry's previous plan was analyzed to determine what had worked and what had not, what problems were associated with the previous plan and how could they be addressed and remedied. The next step was to address the quality of water in the Lowcountry. DHEC provides detailed reports with regards to each water basin, sub-basin, and watershed. These reports address general information, water quality, known discharges and treatment facilities, and growth pressures. Once this was completed the findings were compared to those of the same reports from previous updates.

The next phase in the development of the plan was to develop a goal and set of objectives. By addressing the problems within the previous plan and understanding the issues with regard to the Lowcountry's water quality, goals and objectives were tailored to meet the changing needs of the Lowcountry.

In 1975, the Governor of South Carolina designated the boundaries for five COGs as Water Quality Planning agencies. Thus, LCOG is the Water Quality Planning Agency for Beaufort, Colleton, Hampton, and Jasper Counties. DHEC and LCOG agreed on the specific functions that the Water Quality Planning Agency would perform. As mentioned, one such responsibility is the ongoing certification process (208 Certification) for new wastewater activities, such as collection and treatment facilities, including on-site treatment for residential sub-division developments. DHEC also provided the Planning Agency with criteria for determining a list of agencies involved in the implementation of the policies of the WQMP. These organizations were given the title of Management Agency (with varying degrees) or Service Agencies that will fulfill the responsibilities pursuant to the Clean Water Act.

An updated Regional overview was then created using essentially the same criteria used in the previous plans. Information with regards to location and setting, land cover, demographics, and development trends were gathered and compared to the previous data to determine what had occurred since the last plan and what was expected to occur in the future. This information was gathered from a large variety of sources; essentially the newest info for each subject was used for the plan. Government agencies such as DHEC, EPA, USGS, and many other local and private agencies were consulted as well.

The WQMP is a dynamic document that changes over time as the needs of the Region's cities and counties evolve. By regularly updating and revising the WQMP, LCOG can ensure that water quality issues remain relevant and that potential problems are mitigated before they become too severe.

Chapter 2 - Roles & Responsibilities

Overview

The roles and responsibilities have been delegated from the top-down. General policies and management guidelines are created by federal and state governments, while the smaller watershed-by-watershed monitoring will be the responsibility of the county or city/town. In the Lowcountry three agency types were created and delegated certain roles and responsibilities to aid in the successful completion and implementation of the WQMP. Definitions and descriptions of the *Water Quality Planning Agency* (WQPA), *Water Quality Management Agency* (WQMA), and the *Service Agency* (SA) are found in the following sections.

Water Quality Planning Agency (WQPA)

The WQPA is the highest tier of local government directly involved in the water quality management plan. It is responsible for updating and maintaining the area-wide WQMP. It also must review preliminary engineering reports, construction permit applications, plans and specifications to certify whether such activities are in conformance with the area's WQMP. The planning agency must also evaluate conflicts between proposed projects and the WQMP and facilitate modifications to either the project or the WQMP as necessary to preserve the goals and objectives of the plan. Preparing annual reports of 208 activities and submitting them to the DHEC is another responsibility of the WQPA, this is to be completed and delivered to DHEC in the month of July. Finally, it is required that the planning agency coordinate and facilitate public participation through public hearings and/or meetings. The Lowcountry Council of Governments is the WQPA for the four-county Region of Beaufort, Colleton, Hampton and Jasper.

Water Quality Management Agency (WQMA)

The water quality management agency is a political entity assigned by the WQPA to carry out the management agency roles. The boundaries of each management agency are the same as the current political jurisdiction boundaries. Any change in a management agency will require an amendment to the WQMP and will have to follow all DHEC approval processes. Management Agencies have been divided into three levels that represent their water quality management functions. With the emergence of the Beaufort-Jasper Water and Sewer Authority (BJWSA) it has been observed that many Level 1 Management Agencies have had their

facilities consolidated by the Water & Sewer Authority. Recently, the City of Beaufort, and Towns of Port Royal and Hardeeville, which are the joining agencies that make up the BJWSA, have become Level 3 Management Agencies due to this consolidation.

Level 1 **Management Agency** – A political entity that owns, operates, and maintains a public wastewater collection system and treatment facility is considered a Level 1 Management Agency. These agencies, acting within their political jurisdiction, are responsible for the following: implement assigned portions of the WQMP; enact and enforce local regulations to control the location of wastewater treatment facilities; review and update waste treatment facilities plans; and monitor the acquisition, construction, operation, and maintenance of all treatment facilities within its management agency boundaries to ensure compliance and consistency with WQMP and local plans. The water quality responsibilities within wastewater service area boundaries are to ensure that treatment facilities are in compliance with facilities plans and the WQMP as well as to refuse wastewater for treatment from any entity that does not comply with any provisions of the WQMP applicable to such area.

The Level I Water Quality Management Agencies in the Lowcountry are:

Town of Yemassee	(Beaufort County)
Town of Edisto Beach	(Colleton County)
City of Walterboro	(Colleton County)
Town of Brunson	(Hampton County)
Town of Estill	(Hampton County)
Town of Hampton	(Hampton County)
Town of Ridgeland	(Jasper County)

Level II Management Agency – Also defined as a "satellite system" or a political entity that owns, operates, and maintains only a public wastewater collection system, with treatment provided by contract by another management agency or service agency is a Level II Management Agency. The responsibilities for these management agencies are to implement assigned portions of the WQMP; enact and enforce local regulations to control the location of treatment facilities; review facilities plans for compliance with the WQMP while ensuring that the wastewater collection systems are also in compliance; and monitor the acquisition, construction, operation, and maintenance of all treatment facilities within its management agency boundaries to ensure compliance and consistency with the WQMP.The following is the only the Level II Water Quality Management Agency in the Lowcountry:

Town of Varnville (Hampton County)

Level III Management Agency – A political agency that does not own, operate, or maintain a public wastewater collection system or treatment facility is a Level III Management Agency. Level III Management Agencies have public wastewater services provided within their jurisdictions by other management or service agencies. The responsibilities of the Level III Management Agencies are to implement assigned portions of the WQMP; enact and enforce local regulations to control the location of treatment facilities; review and approve facilities plans; and monitor the acquisition, construction, operation, and maintenance of all waste treatment facilities within its management agency boundaries to ensure compliance and consistency with the WQMP and local plans. The water quality management responsibilities delegated to service agencies ensure that the waste treatment works are in compliance with facilities plans and the WQMP and also to refuse wastewater treatment from any entity that does not comply with any provision of the WQMP applicable to such area.

The Level III Water Quality Management Agencies are as follow:

Beaufort County	
City of Beaufort	(Beaufort County)
Town of Bluffton	(Beaufort County)
Town of Hilton Head Island	(Beaufort County)
Town of Port Royal	(Beaufort County)
Colleton County	
Hampton County	
Jasper County	
City of Hardeeville	(Jasper County)

Service Agency

Service Agency – An entity that designs, constructs, owns, operates, and maintains public wastewater collection and treatment facilities is a Service Agency. While all Level I Management Agencies are also technically Service Agencies, their wastewater facilities planning jurisdiction often differs from their management agency jurisdiction. Service Agency facility boundaries are based on wastewater treatment facility planning areas, and not political jurisdictional boundaries. The water quality management responsibilities of service agencies, within wastewater service area boundaries, are to implement assigned portions of the area wide WQMP and ensure that treatment facilities are in compliance with facilities plan and WQMP; and refuse wastewater for treatment from any entity that does not comply with any provision of the WQMP applicable to such area.

BJWSA has emerged as the largest Service Agency in the Region due to its numerous consolidations of various municipal water systems. The BJWSA was created in the 1950's as the provider of fresh water to the military installations and sea island residents of Beaufort County. Since this time the Authority has continually grown to service the majority of Beaufort and Jasper Counties. In 1987 BJWSA expanded its services to include the collection, treatment, and disposal of wastewater. The Authority continues to grow and provide more rural developments with water and wastewater services.

The Service Agencies are:

Service Agency	Management Agency
Beaufort/Jasper Water and Sewer Authority	Beaufort County Jasper County City of Beaufort Town of Port Royal City of Hardeeville Town of Bluffton
Broad Creek PSD	Town of Hilton Head
Hilton Head #1 PSD	Town of Hilton Head
South Island PSD	Town of Hilton Head
Fripp Island PSD	Beaufort County
SCPRT – Hunting Island	Beaufort County
Delta Plantation	Jasper County
City of Walterboro	City of Walterboro Colleton County
Town of Hampton	Town of Hampton Town of Varnville Hampton County
Town of Estill	Town of Estill Hampton County
Town of Ridgeland	Town of Ridgeland Jasper County
Town of Yemassee	Town of Yemassee

The following map (Figure 1) is of the four counties of the Lowcountry and the availability of the public wastewater within each county. The boundaries are limited to those facilities which are either publicly owned or serve a large segment of the population. They are considered to have the capability to eventually serve the areas contained within their boundaries. The planning boundaries presented in the map are for the purpose of determining the most logical locations for the wastewater treatment based on facility location and other factors. However, the boundaries displayed do not necessarily represent all areas that may be added to the sewer system. Local management agency plans and policies will determine the actual areas to be served by sewer.

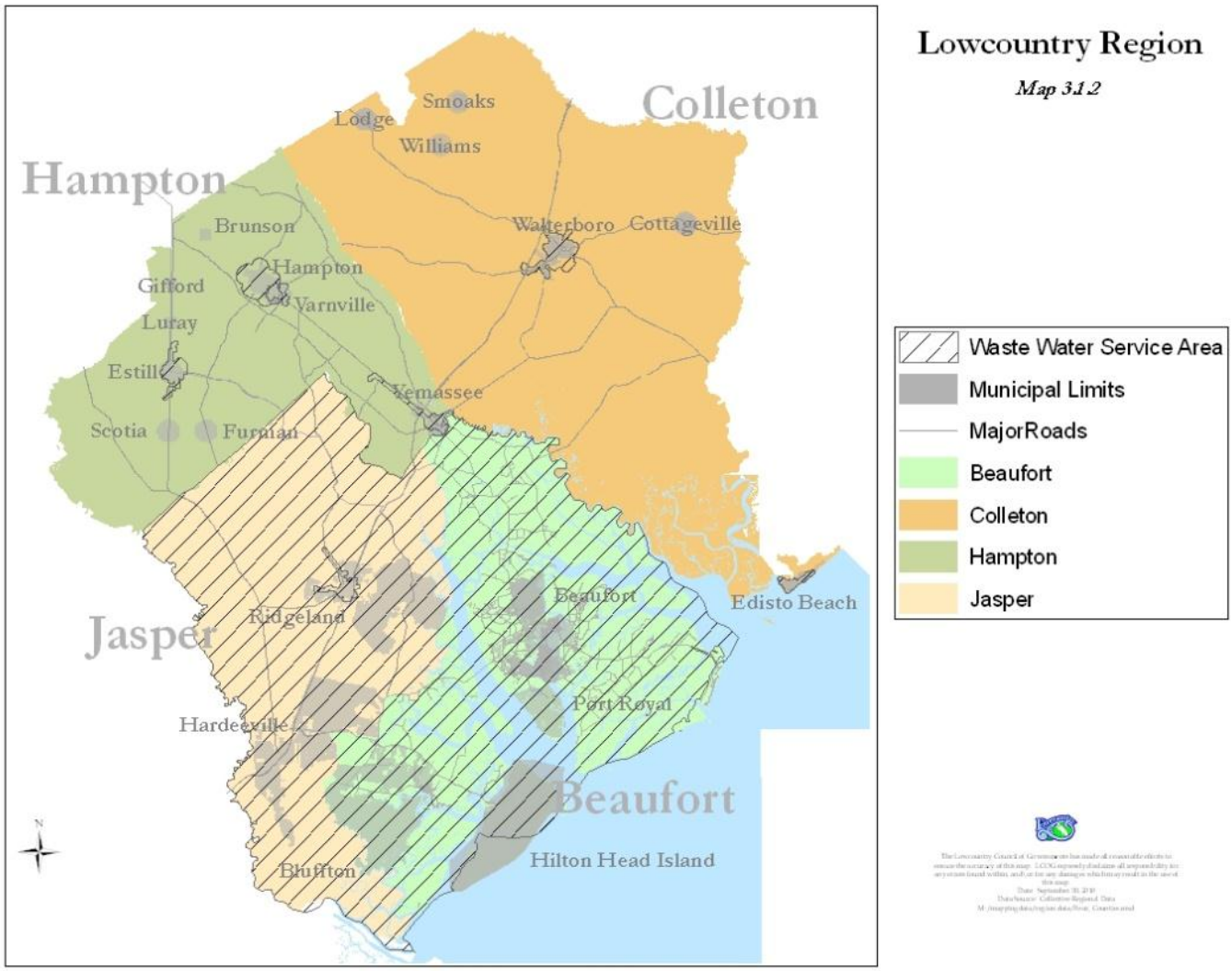


Figure 1: Lowcountry Region Waste Water Availability

Chapter 3 - Regional Overview

Location & Setting of Lowcountry

The Lowcountry Region is the southernmost Region of South Carolina. It is comprised of four counties; Beaufort, Colleton, Hampton, and Jasper, with a total area of 3,318.5 square miles. The Region is very unique as its total area is 13.9% water, second only to the Waccamaw Region in the state of South Carolina. Beaufort County's 387 square miles of water area (42.0% of the county's total area) is the second largest total water area in a single county in the state. The Lowcountry's total land area makes up only 9.5% of South Carolina's land area, while the Region's water area comprises over 23% of the state's total (see figure 2)

Land and Water Area

County	Total Area	Land Area	Water Area	Percent Land Area	Percent Water Area
Beaufort	922.88	535.27	387.61	58.00%	42.00%
Colleton	1,133.21	1068.61	64.61	94.30%	3.70%
Hampton	562.63	523.24	39.39	93.00%	7.00%
Jasper	699.79	680.89	18.9	97.30%	2.70%
Lowcountry	3,318.51	2857.23	461.28	86.10%	13.90%
South Carolina	32,020.20	30,109.47	1,910.73	94.03%	5.97%

Figure 2: Land and Water Area in Acres
Census: **2000**

Of the six Major Land Resource Areas (MLRAs), as defined by the USDA, found in South Carolina, two of them are responsible for the topographical and geomorphological structure of the Lowcountry. The MLRAs in the Lowcountry are the Lower Coastal Plain and the Coastal Zone. The Lower Coastal Plain is relatively flat with some shallow valleys that contain various rivers and streams. The soil here is usually quite fertile, housing many forests and other natural areas. The elevation of this area is no more than 125 feet above sea level, and no less than 25 feet above sea level (DHEC).

Hampton and Colleton counties are in the Lower Coastal Plain. Hampton County is mainly made up of agricultural and forestry activities, with a few industrial businesses scattered throughout. There are three small, but significant, urban areas in this county: the Hampton/Varnville area (the largest urban area in the county), the Estill/Furman/Scotia area, and the Yemassee area (located on the border of Beaufort County). All three of these areas are small towns and villages that act as goods and service vendors to the surrounding rural area. The northern portion of Colleton County is also found in the Lower Coastal Plain. This area, similar to that of Hampton County, is a very rural county dependent upon agriculture and forestry. Colleton's largest urban area, Walterboro, is located near Interstate 95.

The Coastal Zone is the transition zone from the Lower Coastal Plain to that of the Atlantic Ocean. This area of the Lowcountry is characterized as having abundant supplies of swamps and other wetlands, including the very sensitive estuaries. The smaller rivers and streams of the upper and lower coastal plain come together here to form large rivers and water channels that flow out to the ocean. This area is mainly tidally-influenced and can experience enormous day to day changes in water levels throughout the year. The elevation of the Coastal Zone ranges from 25 feet above sea level to sea level itself (DHEC). All four counties

in the Lowcountry Region are located in the Coastal Zone, and as such they are largely composed of significant amounts of wetlands and water oriented land forms.

Beaufort County is the most populous of all four counties in the Lowcountry and contains three major urban areas: Greater Beaufort (City of Beaufort and Town of Port Royal), the Town of Bluffton, and the Town of Hilton Head Island. Hilton Head Island has capitalized on its Atlantic coast scenery and environment to become a premier resort and tourist area. The island's beautiful beaches and excellent golf courses draw millions of visitors every year, along with many retirees that wish to move to a subtropical climate. This urban area has a service-based economy.

Part of the mainland area located directly north of Hilton Head Island is home to the Town of Bluffton. The town and surrounding had been experiencing the greatest amount of residential subdivision and major retail growth in the entire Lowcountry.

The City of Beaufort is located northeast of both Hilton Head Island and Bluffton, on the north side of the Broad River. Beaufort is a historically significant city that was established in 1711. It has become a tourist destination because it is the site of numerous historical attractions as well as two large military installations. Marine Corps Air Station Beaufort and the Marine Corps Recruit Depot Parris Island located respectively to the west and south of the City of Beaufort provide much of the city's economic vitality.

The portion of the Coastal Zone that is located in Colleton County is the Town of Edisto Beach, a small resort and retirement community found along the Atlantic Coast at the southern tip of the county.

Jasper County is the southernmost county in South Carolina. Approximately 70% of Jasper County lies in the Coastal Zone and the other 30% in the Lower Coastal Plain. There are only two urban areas in this county: Hardeeville and Ridgeland. They are both located along Interstate 95, with Hardeeville a few miles east of the South Carolina-Georgia border and Ridgeland located a few miles to the north of Hardeeville. Along the border of South Carolina and Georgia follows the Savannah River, the largest water system other than the Atlantic Ocean in the Lowcountry.

Land Cover

Land cover changes show the pace and scope of development over time. An increasing population will ultimately manifest itself in the built environment, which can have a profound impact on the Region's natural resources, particularly as urban areas encroach on water, wetlands and forests. One-third of the Lowcountry Region consists of upland forests. Another third is comprised of forested and non-forested wetlands that are abundant on the Southeastern Atlantic coast and stretch along the major rivers and sounds. All counties within the Region have experienced losses of forests and wetlands due to human activities, which include: forestry, agriculture and development.

The forests blanket a relatively large portion of the Region--providing a vital natural resource for economic development. In juxtaposition, forests are an integral part of the hydrological cycle as water filters through vast systems to reach the wide-ranging water bodies. Much of the forests lost are considered core or a larger tract of land that has not been significantly impacted by roads and other infrastructure. As these forests change land cover type, fragmentation occurs, limiting the connectivity resulting in reductions of biodiversity and ecosystem services.

The Region is set apart from others by the extensive wetlands which reach deep into the coastal landscape. The estuarine and marine wetlands tie the land and the ocean together and provide habitat for a wealth biodiversity. This environment is prime for fish and wild life; provides for flood control; recharges groundwater; traps sediments, excess nutrients, and pollutants; and offers food and other commodities.

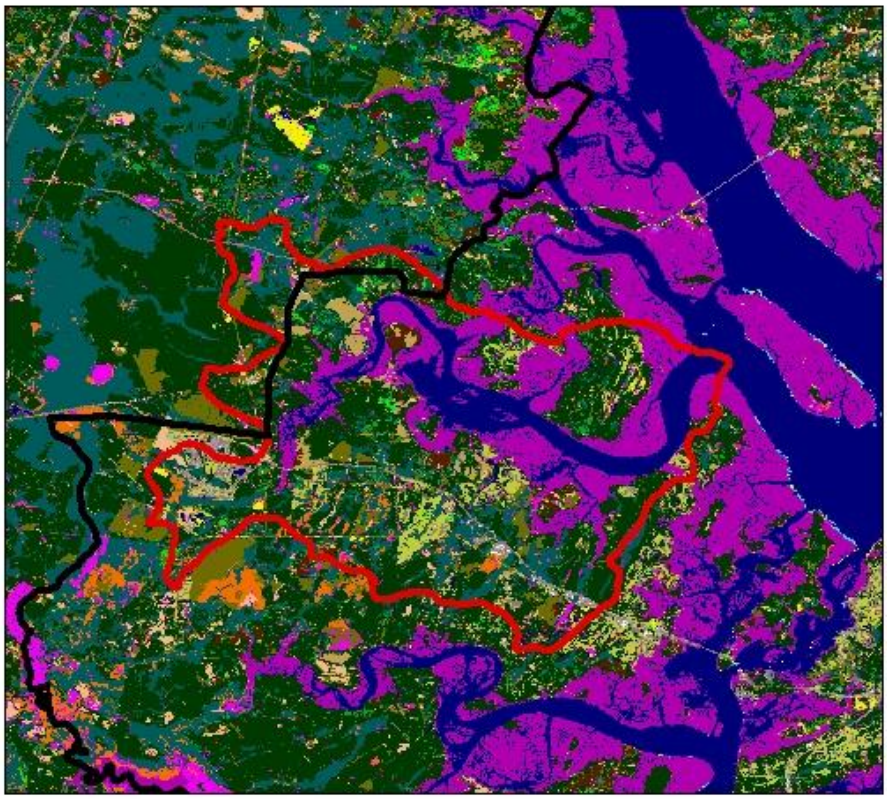
Mixed among the forests and wetlands are areas of urban development. Three percent of the land cover in the Lowcountry is considered urban. All counties have seen an increase in developed areas during last couple of decades, which leads to an increase in the amount of impervious surfaces shaped by development. Impervious surfaces include roofs, driveways, roadways, sidewalks and parking lots. As they increase so do the negative environmental impacts of pathogens, toxins, and nutrients that runoff from urban or developed sites.

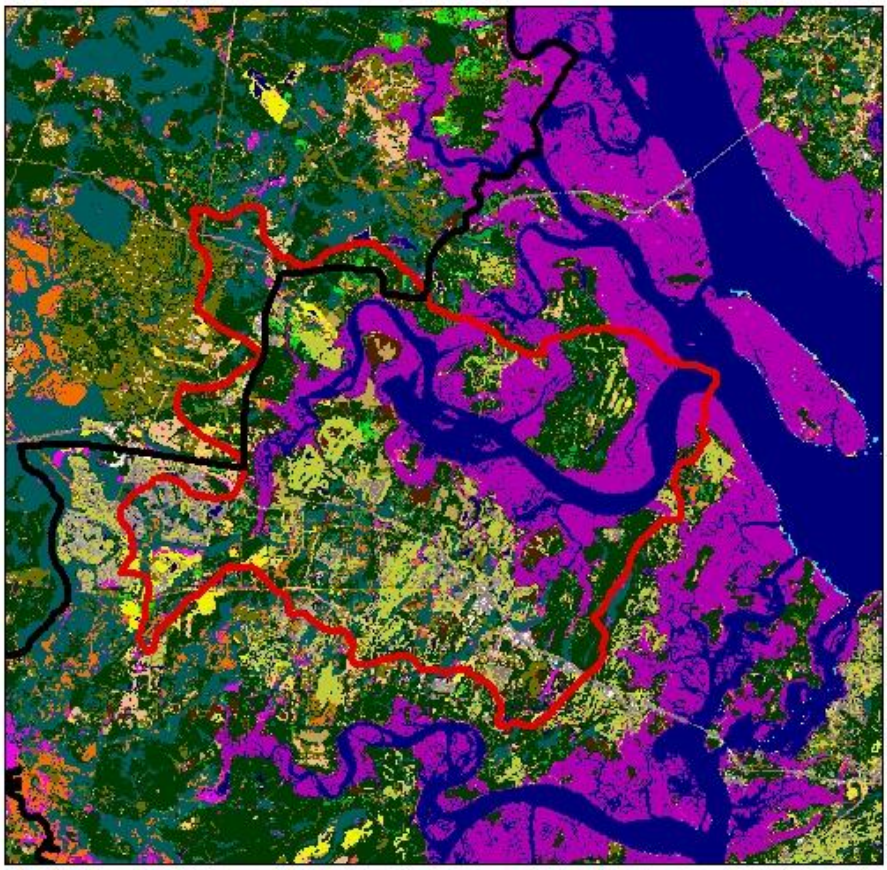
Figure 3 illustrates the pace of development in the fastest growing southern portions of the Region. The Town of Bluffton is at the center of the images. The lighter colors indicate developed areas, dark green shows forested areas, and the pink indicates palustrine and estuarine emergent wetlands. Palustrine wetlands are considered more vulnerable due to less stringent regulations.

The Okatie Area Watershed is depicted by the red outline, which highlights the 12 digit hydrological unit code (HUC). The Okatie Watershed is being serviced by a DHEC issued EPA 319 grant to improve water quality in the Okatie River. Because the county line that crosses through the watershed, both Beaufort and Jasper counties are involved in the project. Collaborative work between jurisdictions is crucial in order to improve the quality of water in the Region.

The May River is just south of the Okatie River Watershed. This river has experienced pressures from development as well, in particular high levels of fecal coliform which is often associated with storm water runoff. As with the Okatie, the May River Watershed is being serviced by a DHEC issued EPA 319 grant to improve water quality conditions.

To highlight the land cover type and change in the four counties within the Region, the following information was derived from the Digital Coast, a service provided by the National Oceanographic and Atmospheric Administration (NOAA) for coastal communities. Forested areas in this analysis included Deciduous Forest, Evergreen Forest, Mixed Forest, Palustrine Forested Wetlands, and Estuarine Forested Wetlands.





Okatie Area Watershed Land Cover Change 1996-2006

- County Line
- 12 Digit HUC
- Bare Land
- Cultivated
- Deciduous Forest
- Developed Open Space
- Estuarine Aquatic Bed
- Estuarine Emergent Wetland
- Estuarine Forested Wetland
- Estuarine Scrub/Shrub Wetland
- Evergreen Forest
- Grassland
- High Intensity Developed
- Low Intensity Developed
- Medium Intensity Developed
- Mixed Forest
- Palustrine Aquatic Bed
- Palustrine Emergent Wetland
- Palustrine Forested Wetland
- Palustrine Scrub/Shrub Wetland
- Pasture/Hay
- Scrub/Shrub
- Unclassified
- Unconsolidated Shore
- Water

N

Data: C-CAP

Figure 3: Okatie Area Watershed Land Cover Change

Beaufort County

Beaufort County was 22.76 percent forest (including forested wetlands) and 31.92 percent wetland (including forested wetlands) in 2006. Between 1996 and 2006, Beaufort County has lost 24.10 square miles of forest and 4.10 square miles of wetland. In this case, much of the loss can be attributed to development (NOAA 2011).

In 2006, Beaufort County's land cover was 4.75 percent developed. Much of the development has occurred in areas that once were forested followed by scrub and wetlands. In 2006, Beaufort County's land cover was 1.16 percent impervious, a 26.55 percent net increase from 1996 (NOAA, 2011). Much of the land conversion has occurred in southern Beaufort County along the U.S. 278 Corridor. While development occurred rapidly in the late 1990s through the mid-2000s, the pace has slowed since 2007 as economic conditions worsened.

Beaufort County has been more urbanized over time than the other counties in the Region. Because of the potentially negative impacts of urban growth on water quality, alternatives should include low impact development (LID) and other methods that are less taxing on the natural systems. Several of these methods are outlined in Chapter Six.

Figure 4 generally correlates with the demographic and building data presented later in this Plan. Southern areas of the County have experienced rapid growth, while the northern areas have seen less development. Higher intensity development can have a profound impact on the water quality with increased levels of bacteria, petroleum, pharmaceuticals, heavy metals, nutrients, and insecticides being washed into area rivers, creeks and streams. Water bodies within the County have been deemed impaired by DHEC due to high levels of fecal coliform, which is an often associated with urbanized areas. Chapter Four pinpoints watersheds and water bodies with impairment.

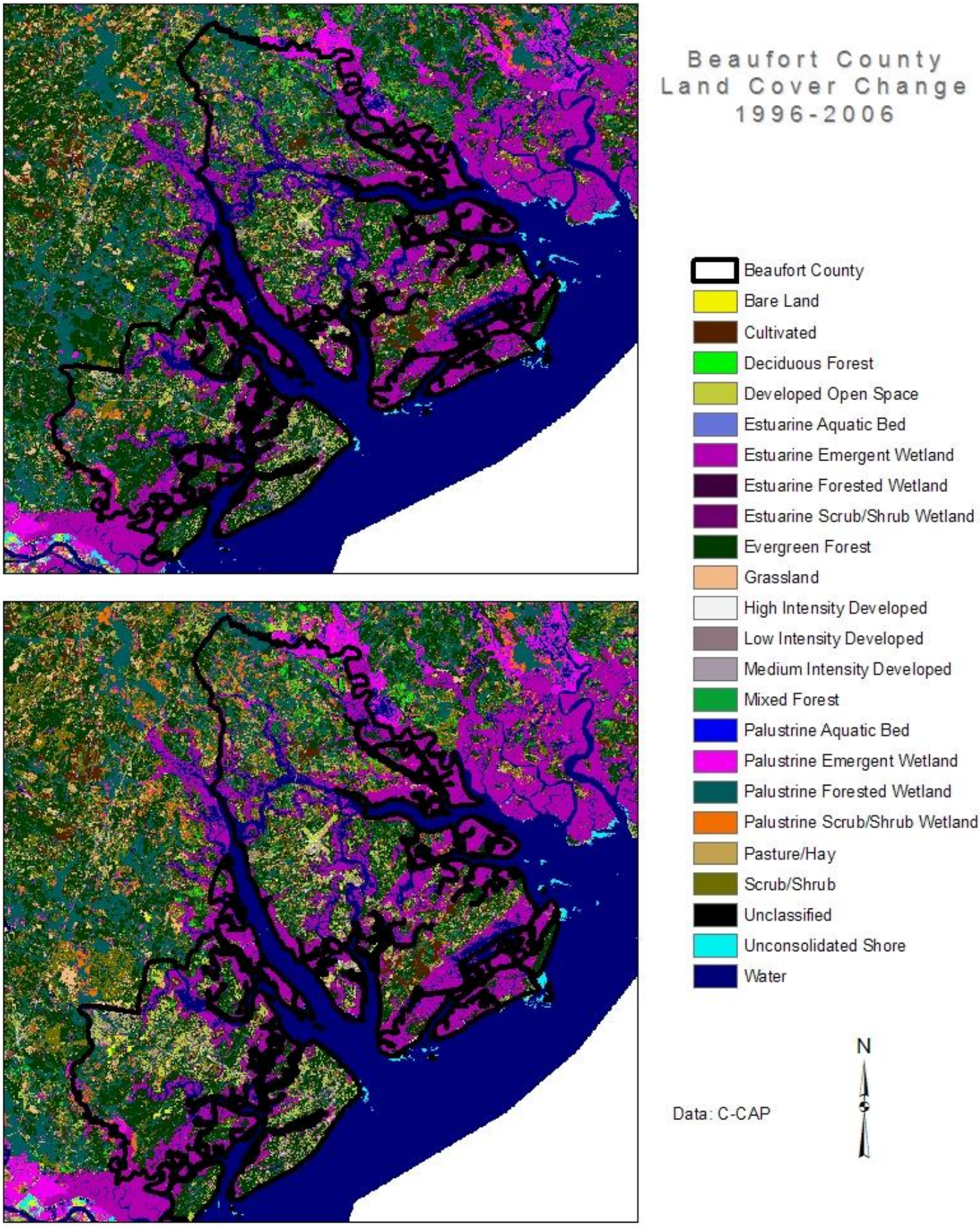


Figure 4: Beaufort County Land Cover Change

Colleton County

Colleton County's land cover was 48.5 percent forest (including forested wetlands) in 2006, a 16.28 percent decrease since 1996. Thirty-seven percent of Colleton County's land cover was considered wetland (including forested wetlands) in 2006, a net decrease of 2.02 percent (NOAA 2011).

Among the Region's counties, Colleton County had the smallest proportion of developed area, at 1.69 percent in 2006, an 11.91 percent increase from 1996. The increase outpaces the population growth, outlined in the demographic section. The impervious surfaces made up 0.41 percent of the land cover in 2006, a 9.51 percent increase from 1996 (NOAA 2011).

Although the land cover change has not been as dramatic as seen in the previous images, Colleton County's land cover change is visible in the following map. The change from forested areas to open space, grasslands, and scrub is noteworthy; these land cover types are less effective in terms of filtering pollution. Colleton County has increased the area of cultivated land by 4.4 percent to over100 square miles. Agricultural activities can also negatively impact water quality.

Forested wetlands have been changed to scrub wetlands along riverine, which disturbs the hydrological process and in turn increases non-point source pollution. The areas along the rivers and streams are crucial in protecting water quality, especially from the impacts of agriculture, by intercepting sediment and nutrients.

Areas closer to the coast in Colleton County, which includes the ACE Basin National Estuarine Research Reserve, have remained unchanged because of their protected status. Not only does the Reserve protect vulnerable land, it also focuses on community educational resources for better management of coastal waters and habitats through their Coastal Training Program (CTP).

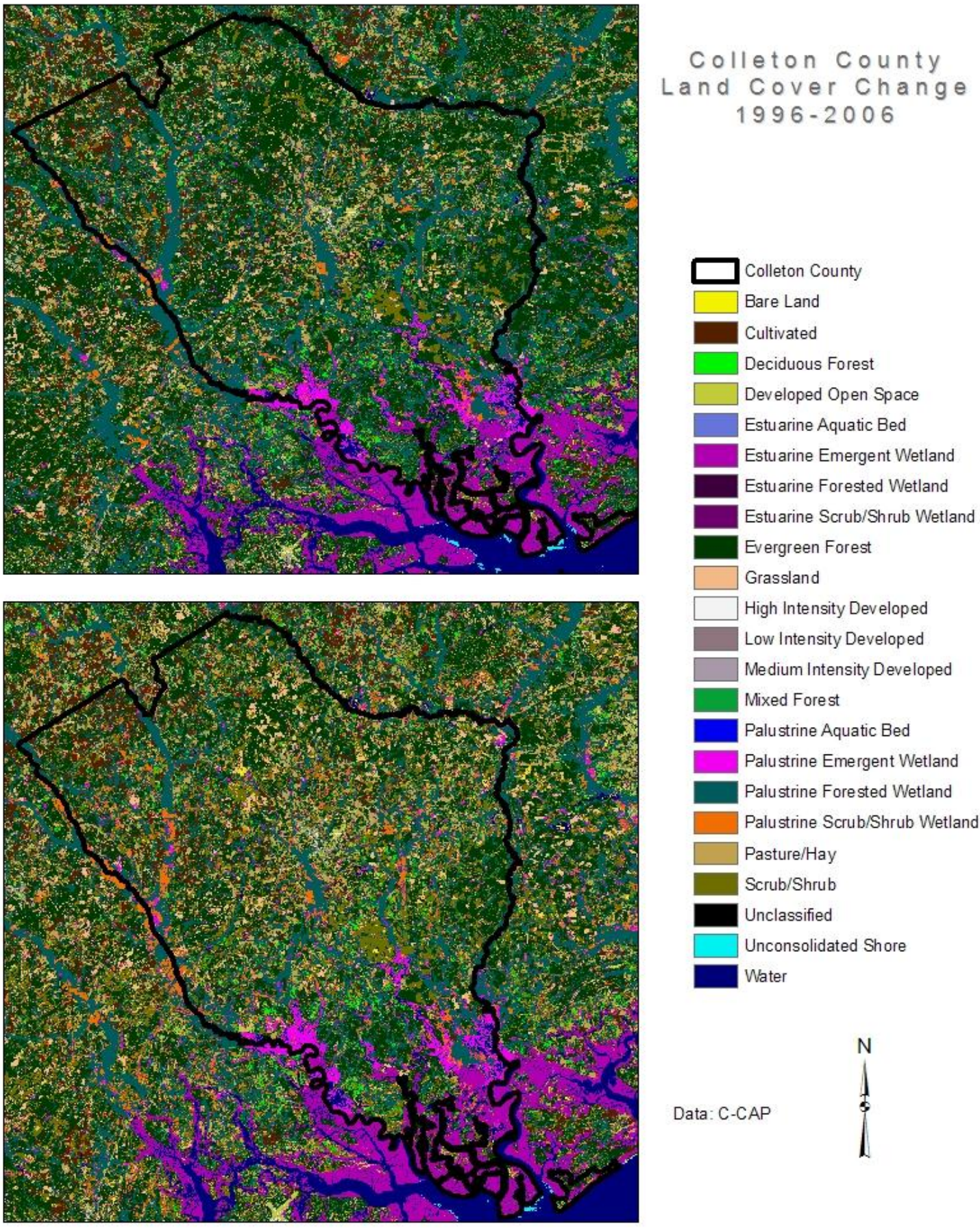


Figure 5: Colleton County Land Cover Change

Hampton County

Hampton County's land cover was over half forested (51.71%).However, between 1996 and 2006 Hampton County experienced a net loss of 21.06 percent – primarily from core forests. Much of this land changed from forest to scrub. Hampton County's land cover was nearly a third wetland (31.02%) in 2006. From 1996 to 2006 the County had a net loss of wetlands at 2.14 percent (NOAA 2011).

Hampton County's developed land cover was at 2.56 percent in 2006 a 6.93 percent increase from 1996, even as the population has remained fairly stable. The impervious area was 0.72 percent in 2006, a 6.38 percent increase from 2006. Most of the developed land was previously forest (NOAA 2011).

Hampton County is more rural than the other counties in the Region, but activities on the land still have an impact on water quality. Cultivated land cover accounts for over 90 square miles in the County. These activities are often associated with increased nutrients, herbicides, and insecticides. Insecticides have harmful impacts on aquatic life; nutrients cause algal blooms and decrease levels of dissolved oxygen; herbicides can increase the sediments in the water. Agricultural activities also alter the dynamics of water systems with drainage and channelization, changing the magnitude of water flushing into wetland systems and the duration which water remains in the wetland.

In the following image (Figure 6), change from forested wetlands to scrub wetlands along the east and west borders is depicted. This indicates land cover changes near the riverine areas. Disturbance of forested wetlands can lead to reduced evapotranspiration and soil compaction ultimately changing the hydrological cycle. .

Hampton County is landlocked, unlike the other counties in the Region; but it is serviced by rivers and streams that feed into the delicate estuarine systems along the coast. Land uses and land cover type in Hampton County will not only impact water within the County, but also on a Regional scale.

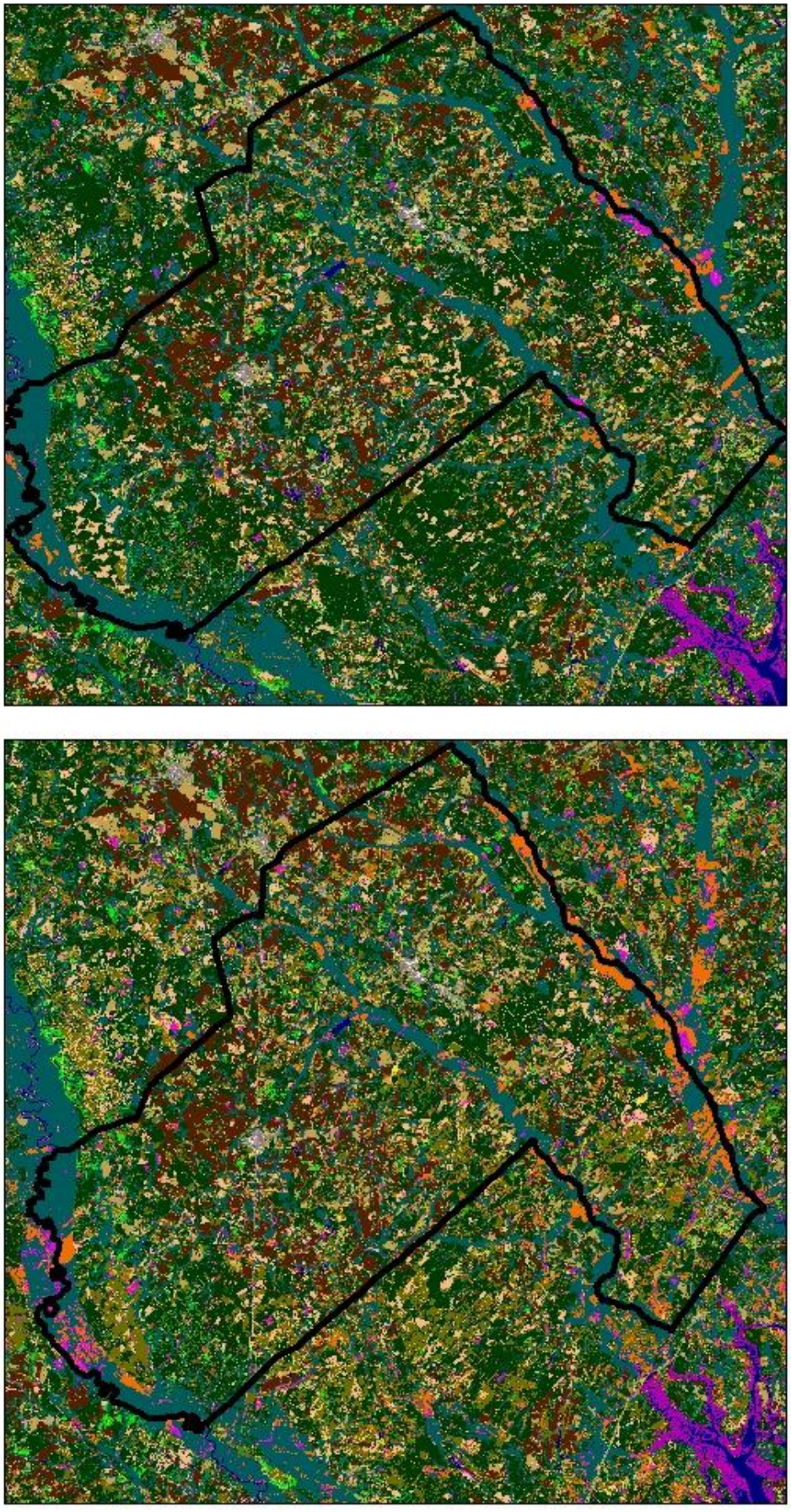


Figure 6: Hampton County Land Cover Change

Jasper County

Jasper County is dominated by forested land cover (52.79%) followed by wetlands (41.35%). The developed areas make up 1.72 percent of the total area of the County and 0.41 percent is impervious. Between 1996 and 2006 the net increase in developed areas was 12.56 percent, which led to a net increase in impervious surfaces of 13.41 percent (NOAA 2011).

Nearly a fifth (18.65%) of the forested land cover changed to scrub, grassland, agriculture, and development between 1996 and 2006. Figure 7 shows the loss of forests and woody wetlands while developed areas, grass lands, scrub, agriculture areas all increased. The gained land covers are less efficient at dealing with stormwater pollution (NOAA 2011).

Jasper County's land cover change is clear when comparing the images (Figure 7) from the ten year period between 1996 and 2006, especially in the area along the southeastern boundary near Beaufort County. Higher density development and open space are depicted in the 2006 image. This type of land cover is desirable for economic development, but poses a threat to the water quality in the Region due to the land cover type's lack of ability to absorb pollutants. In Chapter Six, goals objectives, and policies are outlined to balance the pressures from development. Some methods include: low impact development (LID) and bioretention along with other stormwater best management practices.

As part of the Okatie 319 Program, Jasper County is currently implementing a storm water management strategy that includes a new stormwater ordinance and manual that will guide future development in unincorporated areas of the County. The ordinance and manual will aim to improve the quality and reduce the quantity of stormwater runoff by targeting areas near valuable water resources, such as the Okatie River and applying regulations to limit runoff. The manual will explicitly lay out pre- and post-construction strategies to reduce pollutant levels in area water bodies. The objective is to keep stormwater at preconstruction levels.

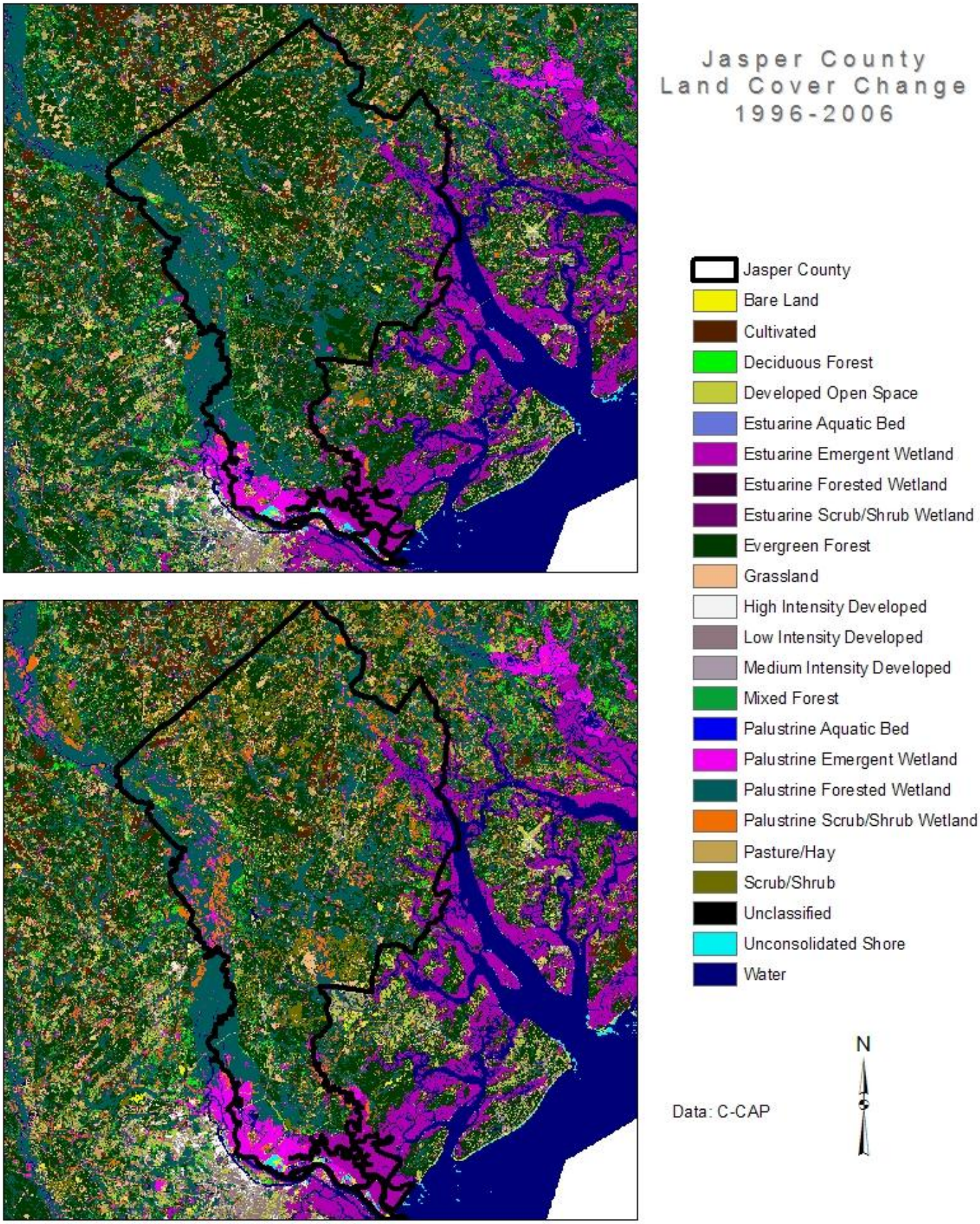


Figure 7: Jasper County Land Cover Change

Demographics

The Lowcountry Region has grown in terms of population 22.72 percent, or an average yearly increase of 2.07 percent, but growth has been uneven in the four counties. Most of the growth has occurred in Beaufort County at a 34.15 percent increase between 2000 and 2010. The town of Bluffton experienced the largest increase among the Region's municipalities at 882.75 percent in the same ten year period. Jasper County's population increased 19.82 percent between 2000-2010 with the growth focused in the towns of Ridgeland and Hardeeville. Colleton County grew at a 1.74 percent and Hampton County lost 1.38 percent in the ten year period. (Census, 2010) Figure 8 illustrates where the Region's population was concentrated and where the growth has occurred between 2000 and 2010 (Census 2010).

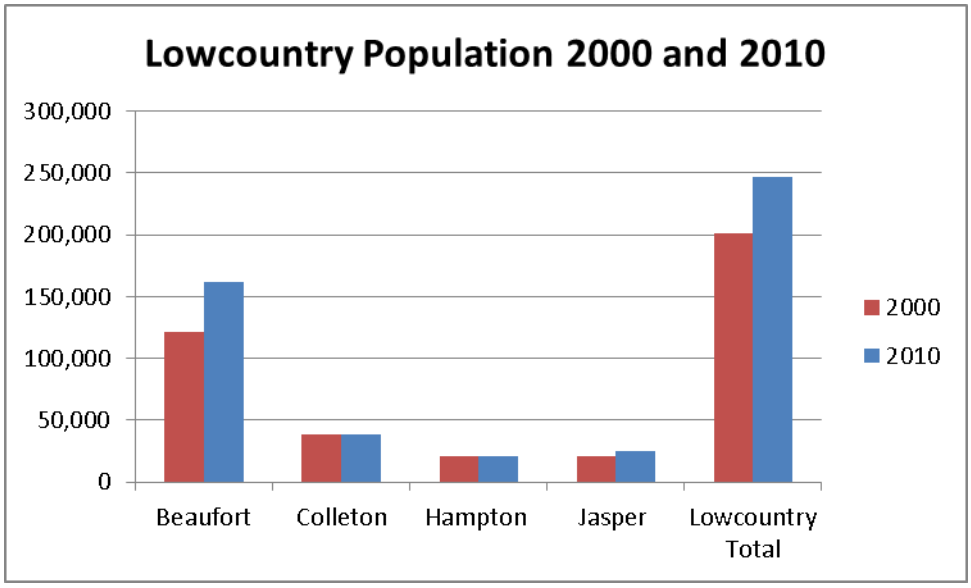


Figure 8: Lowcountry Population 2000 and 2010

Projections

Given the uncertainty about future economic growth in the Lowcountry, as well as the rest of the US, it is extremely difficult to forecast future population levels. As a result, we prepared two sets of straight line projections, in five-year increments, utilizing two trend rates. The first set is a result of applying the average annual growth rates for each of the four counties for the period between 2000 and 2010; the second uses the 2005-2010 average annual growth rates.

Since economic and demographic conditions may change in the near future, it is essential that population data be monitored annually so that future growth can be planned for on a continuing basis.

Growth at 2000-2010 Average Annual Rate				
	2015	**2020**	**2025**	**2030**
Beaufort	191,846	226,863	268,273	317,241
Colleton	39,204	39,519	39,836	40,156
Hampton	21,090	21,090	21,090	21,090
Jasper	27,329	30,144	33,249	36,673
Lowcountry Total	279,469	317,616	362,448	415,160

Figure 9: Population Projections

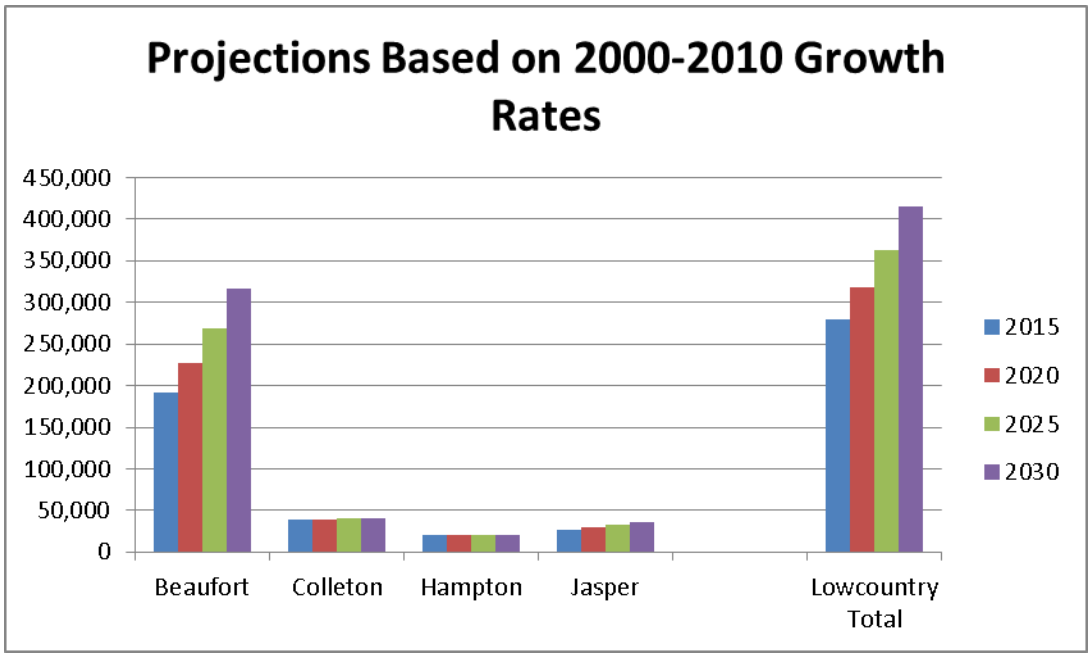


Figure 10: Population Projections

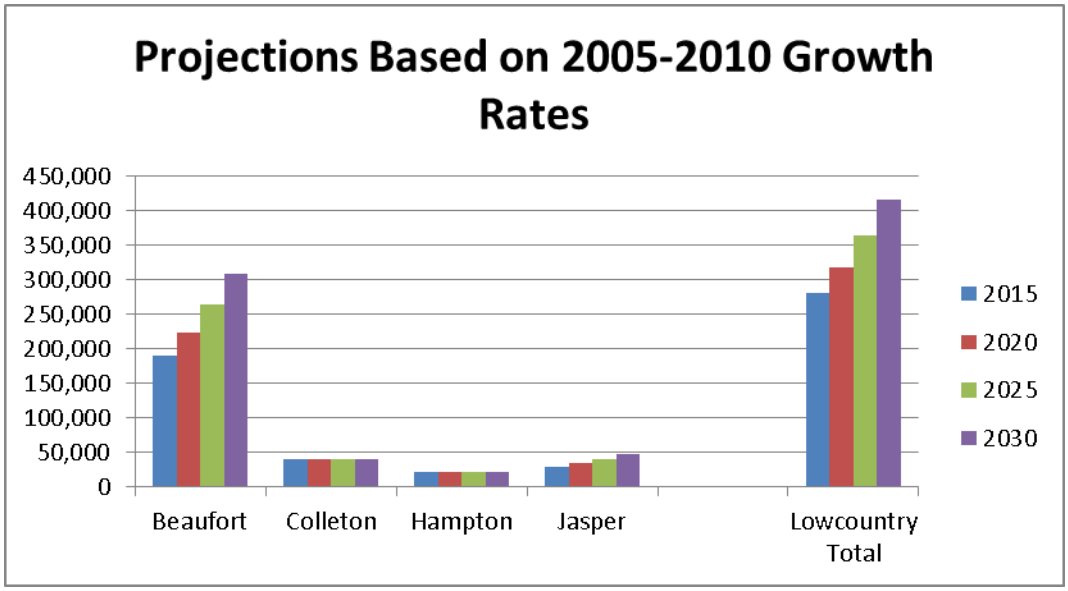


Figure 11: Chart -- Population Projections

According to the projections, growth will remain primarily centered in Beaufort County with modest growth in Colleton and Jasper Counties and a slight decline in population in Hampton County. The projected growth in Beaufort County shows the potential for increased pressures on natural and man-made systems. Planning should be implemented to anticipate future growth in terms of water and sewer needs as economic conditions begin to improve.

Development Trends

(A) 208 Certification

One of LCOG's responsibilities is to perform conformance reviews for all proposed sewer and sewer-related projects in the Lowcountry. The Planning Department has found that tracking what are referred to as "208 certifications," issued as the final step in that process, provides a useful and reliable method of determining how much and what type of building activity is likely to take place in the Lowcountry within the 18 months after project approval. Figure 13 shows certifications in Beaufort County peaked in 2006 at the height of the housing boom and markedly declined through the late 2000s and early 2010s as the housing market collapsed. The decline in certifications mirrors that of the beginning of the Great Recession in late 2007. In Figure 12, Beaufort County's data is split into the northern and southern areas to illustrate the distinct growth in the southern part of the County.

Colleton and Hampton Counties' 208 certifications have remained somewhat static during the housing boom of the 2000s. Jasper County did experience some growth in terms of housing during this period, but activity declined as it has in Beaufort County. In Jasper County housing speculation may have influenced some of the certifications, but much of the development never came to completion.

The number of recent certifications in the Region does not indicate a turnaround in building activity in the near future even as the economy has begun to recover.

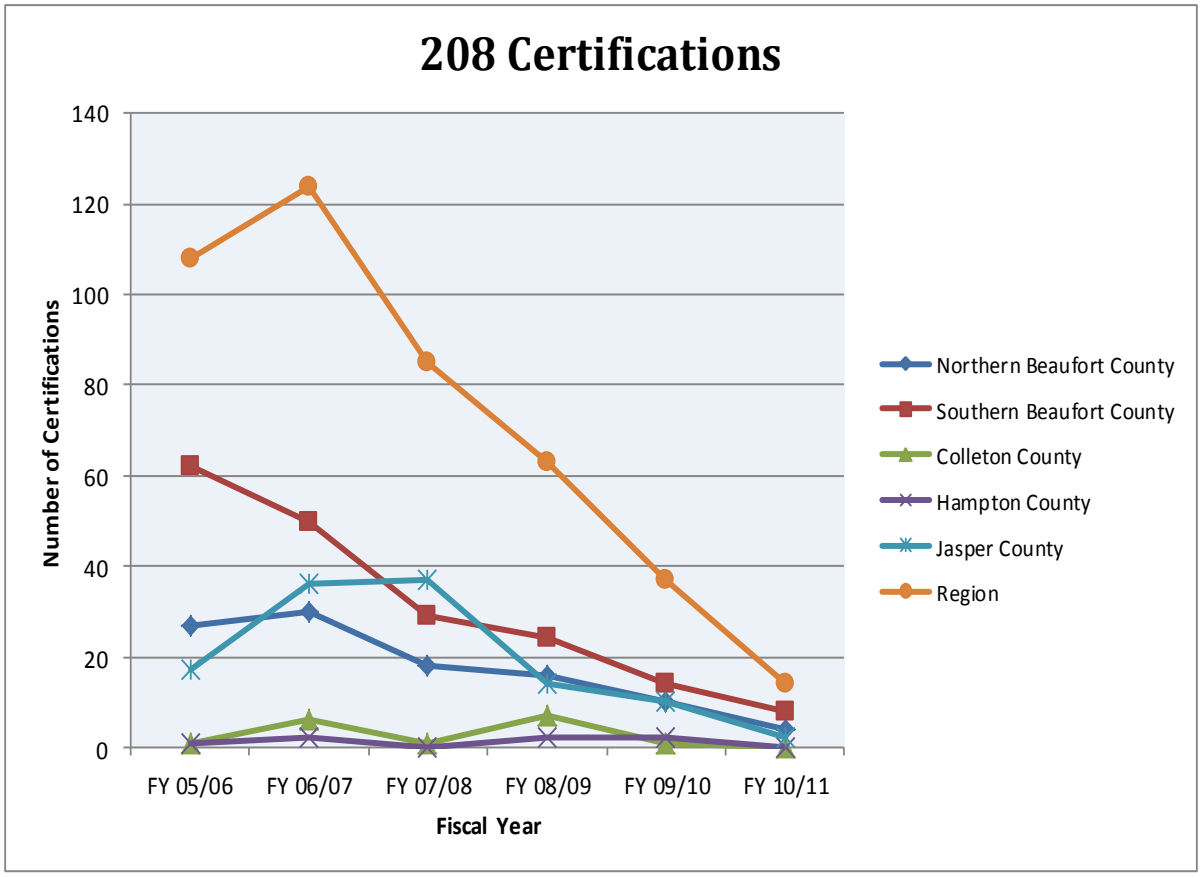


Figure 12: 208 Certifications

(B) Building Permit Development Tracking

Single Family Unit Building Permits and Yearly Value for New Home Construction

Building permits show the build-up over the course of a longer period and demonstrate similar results as the 208 Certifications. Towards the late 2000s, a sharp decline in permits was documented in the Region, particularly Beaufort County as Figure 13 shows. Building permits in Colleton, Hampton, and Jasper Counties have historically been less substantial than that of Beaufort County with permits in the hundreds rather than the thousands confirmed by Figure 14.

The total yearly value of newly constructed single-family homes in Beaufort County peaked at 1.8 billion dollars in 2004. Jasper Count's yearly value of newly constructed single family homes peaked later in 2007 at 45 million dollars. Colleton County peaked in 2006 at nearly 30 million dollars. Hampton County peaked at 10 million in 2008 shown in Figure 16.

These figures correlate with the general time frame of the national housing boom that had implications for the built environment and in turn the natural environment, including water quality. Housing developments undoubtedly add pressure to the delicate nature of the Region's ecosystem. The data provided in the following figures show the build-up of the Region, particularly Beaufort County. Beaufort County is likely more sensitive to the effects of the built environment due to the relative position in relation to the coastal marshes, rivers, tidal creeks, and sounds.

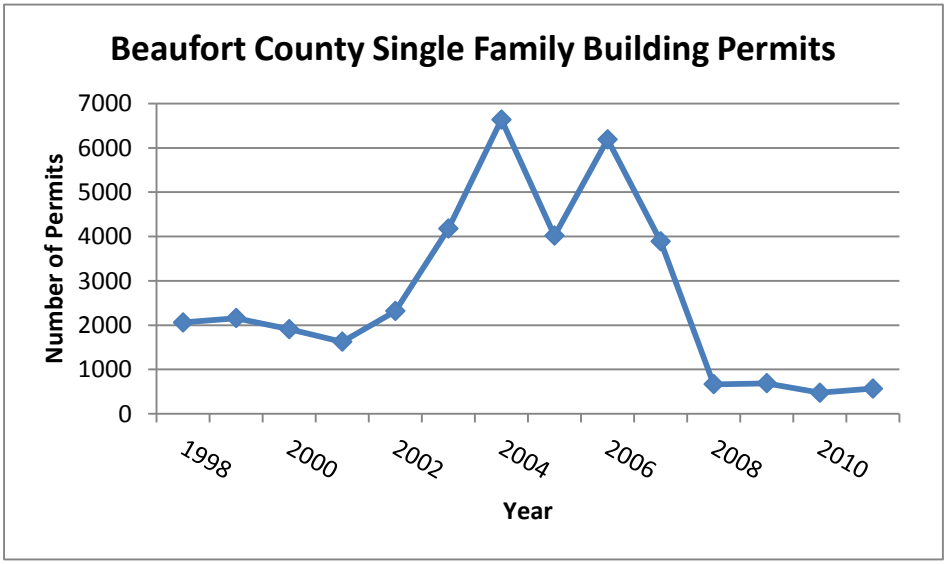


Figure 13: Beaufort County Single Family Building Permits

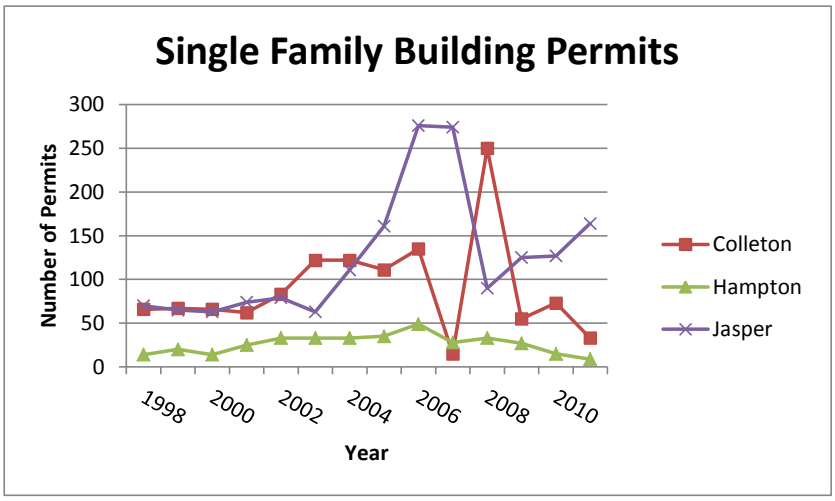


Figure 14: Number of Single Family Building Permits

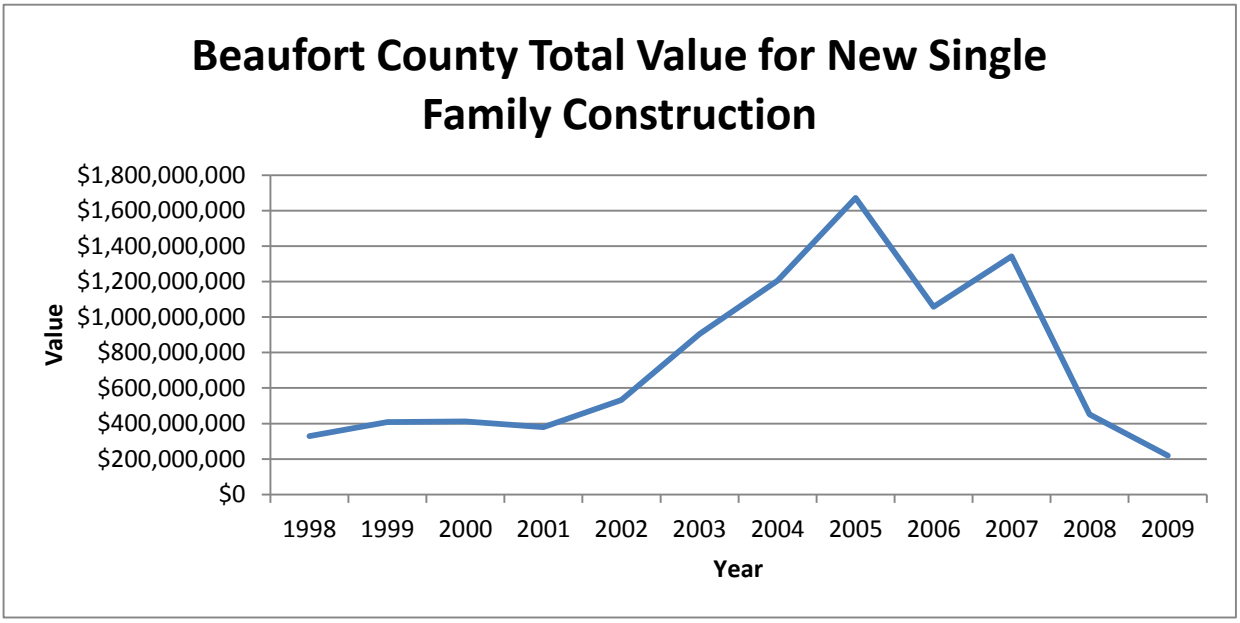


Figure 15: Beaufort County Total Yearly Value for New Single Family Construction

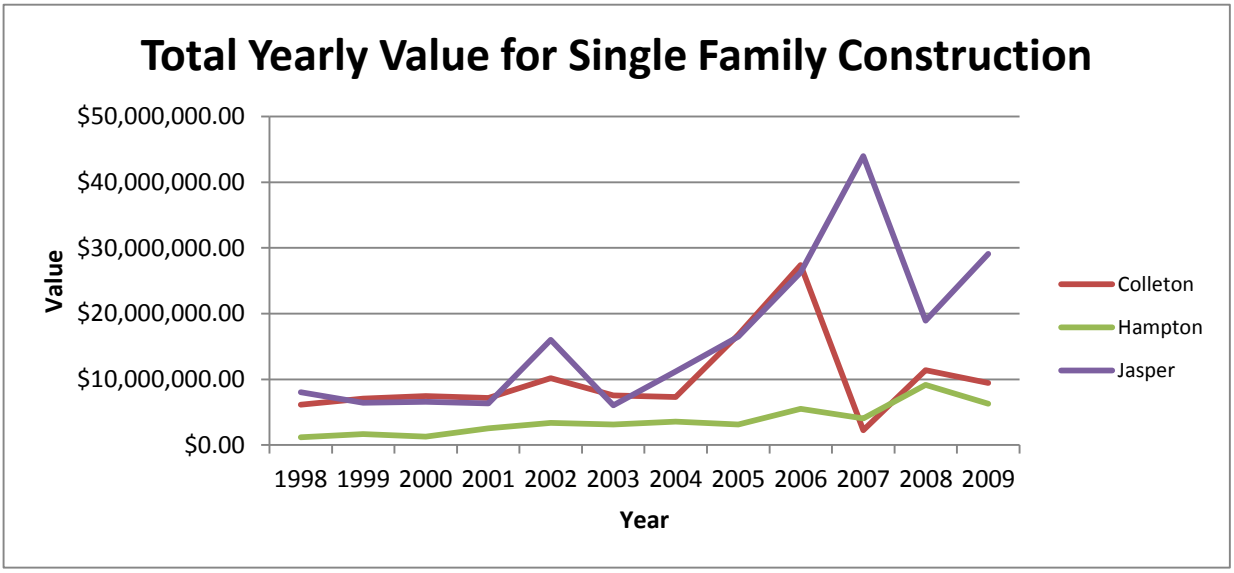


Figure 16: Total Yearly Value for New Single Family Construction

Chapter 4 - Water Quality Data & Issues

Overview

The purpose of this chapter is to provide detailed information about the quality of water in the Lowcountry. It is intended to be a resource summary and should be updated annually in order to effectively catalog all water quality issues, concerns, changes and geographical areas of interest as well as to ensure that this management plan is working to meet the specifications of DHEC.

This chapter contains information pertaining to the river basins and sub basins of the Lowcountry, including all known and suspected points of contamination as well as future potential contamination points. Information as to nonpoint source pollution affecting the Region will also be discussed. Current pollutant limits will also be provided along with future limits and future water quality targets that the Lowcountry and all of its water systems should aim to meet within a given time period.

The chapter is organized to reflect the hierarchy of water systems, as follows:

- The river basin is the largest system on a Regional scale and is comprised of a large river/channel
- The sub-basin is composed of portions of the river basin on a more local scale and contains a portion of the main river/channel, including all of its tributaries
- The watershed, based on the ten digit hydrological unit code (HUC), the smallest water system, is composed of a stream, pond, wetland or combination on an even smaller scale than the sub-basin.

Lowcountry River Basins

A river basin is defined as a large water system of both aquatic and terrestrial areas that collect and distribute water, sediments and dissolved minerals through these areas to a common channel. These areas are typically defined geographically by identifying a large river or channel and then determining its furthest outward points of recharge or collection. This provides a radial area from the central river/channel, which is determined to be the recharge area of smaller rivers, streams, and other water systems and thus, the entire river basin. South Carolina is composed of eight river basins, three of which are located in the Lowcountry including the Savannah River Basin, the Salkehatchie River Basin and the Edisto River Basin. Note: the following Descriptions have been provided by South Carolina Department of Health and Environmental Control (DHEC).

- As the major river basin in the Lowcountry, the Savannah River Basin covers 2.9 million acres with 35 watersheds as it extends across the Blue Ridge, Piedmont, Sandhills, Upper Coastal Plain, Lower Coastal Plain, and Coastal Zone Regions of State of South Carolina (portions of the basin are in North Carolina and Georgia). Within the Savannah River Basin are the Tugaloo River/Seneca River Basin, the Upper Savannah River Basin, and the Lower Savannah River Basin. There are approximately 4,857 stream miles, 106,516 acres of lake waters, and 3,356 acres of estuarine areas in the basin (DHEC 2010).

- Extending from the Upper and Lower Coastal Plain into the Coastal Zone Region, the Salkehatchie River basin covers 2 million acres and contains 25 watersheds. Within the Salkehatchie River Basin are the Salkehatchie River Basin and the Combahee River/Ashepoo River/Broad River Basin. There are approximately 1,820 stream miles, 4,679 acres of lake waters, and 129,683 acres of estuarine areas in the basin (DHEC, 2010).

- The Edisto River Basin (hydrologic units 03060203, 03060204, 03060205, 03060206) is located in Lexington, Aiken, Orangeburg, Calhoun, Edgefield, Saluda, Barnwell, Bamberg, Dorchester, Colleton, and Charleston Counties, and encompasses 3,151 square miles that extend across the Sandhills, Upper and Lower Coastal Plains and Coastal Zone Regions of South Carolina. The Edisto River Basin encompasses 13 watersheds and some 2 million acres of which 37.5% is forested land, 34.3% is agricultural land, 17.9% is forested wetland, 5.5% is urban land, 2.8% is nonforested wetland, 1.8% is water, and 0.2% is barren land. The urban land percentage is comprised chiefly of the City of Orangeburg and a portion of the City of Aiken. There are a total of 5,177.3 stream miles, 11,488.8 acres of lake waters, and 20,614.9 acres of estuarine areas in the Edisto River Basin (DHEC 201

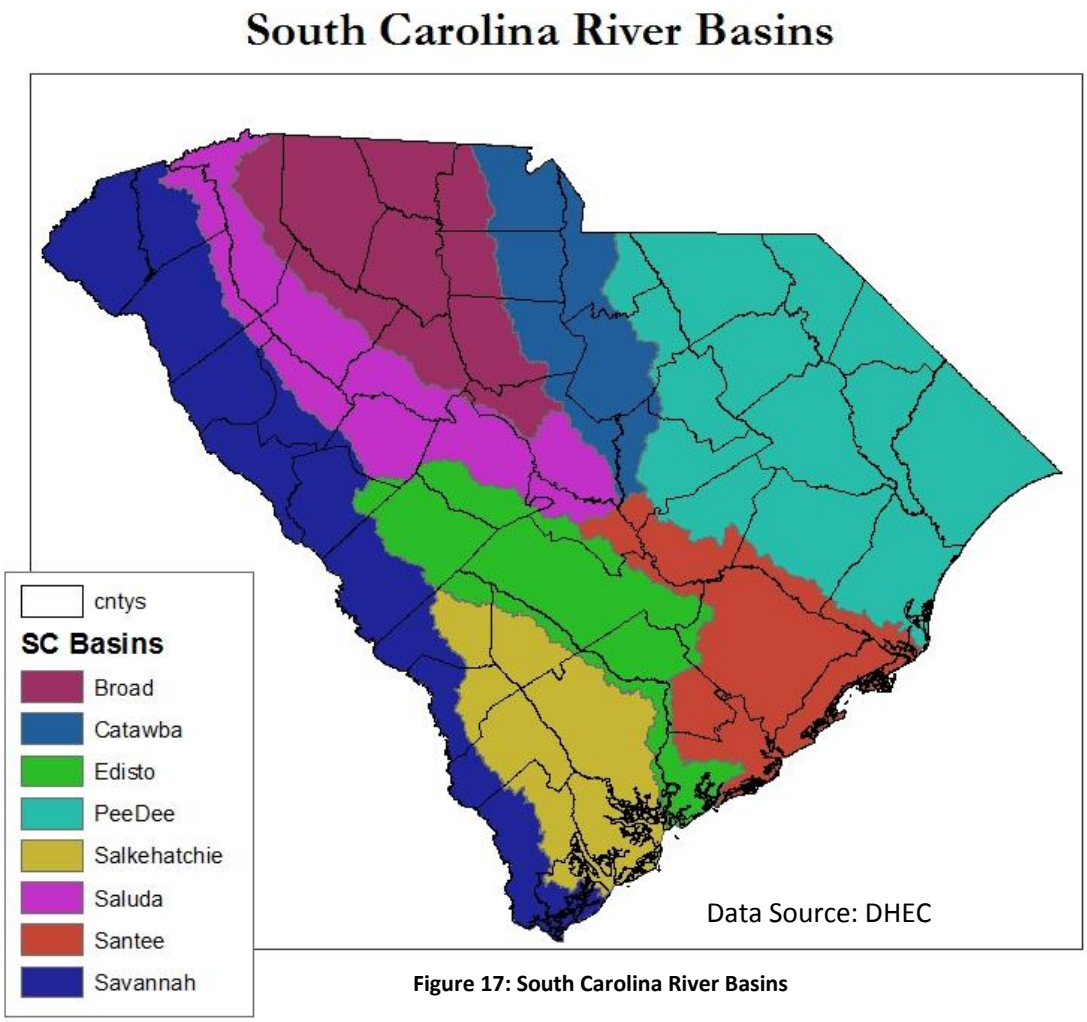


Figure 17: South Carolina River Basins

Lowcountry Sub Basins

The Lowcountry Region is divided into five sub-basins for watershed planning purposes: Lower Savannah River Sub-basin, Salkehatchie River Sub-basin, Broad River/Beaufort River/Port Royal Sound Sub-basin, Coosaw River/Ashepoo River/St. Helena Sound Sub-basin, Salkehatchie Coastal Frontage Sub-basin and the Edisto River Sub-basin. Note: the descriptions for sub-basins have been taken directly from South Carolina Department of Health and Environmental Control (DHEC

Lower Savannah Sub-basin

General Description

The following passage is a general description of the Lower Savannah River Watershed from the Department of Health and Environmental Control (DHEC 2010):

> The South Carolina portion of the **Lower Savannah River Basin (hydrologic units 03060106, 03060107, 03060109, 03060110)** is located in Edgefield, Aiken, Barnwell, Allendale, Greenwood, McCormick, Saluda, Hampton, Jasper, and Beaufort Counties and encompasses 16 watersheds and 2,522 square miles. The basin extends from the Piedmont to the Sandhills to the Upper and Lower Coastal Plains and on into the Coastal Zone Regions of the state. The lower Savannah River Basin extends into Georgia. There are 2,306,099 acres in the extended watershed; 692,120 acres or 30.0% are outside of South Carolina. The extended lower Savannah River watershed consists of 52.2% forested land, 21.0% agricultural land, 15.1% forested wetland (swamp), 9.1% urban land, 3.0% non-forested wetland (marsh), 2.2% water, and 0.6% barren land. The urban land percentage is comprised chiefly of North Augusta, Aiken, Bluffton, and a portion of Hilton Head Island. Federal lands, such as the Savannah River Site and the Savannah National Wildlife Refuge, are sizable portions of this basin. There are approximately 6,010 stream miles, 19,349 acres of lake waters, and 24,788 acres of estuarine areas in this extended basin.
>
> The Savannah River flows out of the Thurmond Dam and is restricted again by the Stevens Creek dam, forming Stevens Creek Reservoir. Stevens Creek accepts drainage from Turkey Creek (Beaverdam Creek) and enters the Savannah River prior to the dam. Downstream of the Stevens Creek dam, the Savannah River accepts drainage from Horse Creek, Hollow Creek, Upper Three Runs, and Lower Three Runs (Par Pond). At the base of the Savannah River Basin, the Calibogue Sound accepts drainage from the May River, the Cooper River, and Broad Creek before joining with the Savannah River as it flows into the Atlantic Ocean near Savannah, Georgia. The Atlantic Intracoastal Waterway (AIWW) connects Calibogue Sound to Port Royal Sound and to the Savannah River crossing the New River (Great Swamp) and the Wright River.

Water Quality

Within the Lower Savannah Sub-Basin, there are five watersheds in the Lowcountry Region. Known contaminants are mercury, zinc, phosphorus and fecal coliform; the watersheds are also known to have naturally occurring low oxygen content. The basin faces fish consumption advisories due to elevated levels of mercury in some species.

- At midstream within the Savannah River Watershed (03060109-01) aquatic life uses are not supported due to excess zinc. A fish consumption advisory has been issued for the watershed due to mercury (DHEC 2010).

- In Jasper County, the Great Swamp Watershed (030601-01) does not support aquatic life uses due to the presence of zinc and recreational uses are only partially supported due to fecal coliform excursions (DHEC 2010).

- The New River Watershed (0360110-02) is located in Jasper and Beaufort Counties. Here there is a significant increasing trend in pH. Recreational uses are only partially supported due to fecal coliform excursions. The New River has a fish consumption advisory for mercury (DHEC 2010).

- Within the Savannah River Basin, the Calibogue Sound Watershed (03060110-03), located in Beaufort County faces issues related to development. The urban land cover accounts for 10.8 percent of the watershed. As the urban surfaces exceed 10 percent, degradation of the waterways begins to occur. The May River monitoring stations indicate an increasing trend in the levels of fecal coliform. At a monitoring station at the Ramshorn Creek, an increasing trend in fecal coliform has been noted, but recreational and aquatic life uses are fully supported (DHEC 2010)

The Town of Bluffton is currently implementing a DHEC issued EPA 319 grant to improve water quality conditions in the May River. The grant and action plan aim to reduce the presence of fecal coliform in the May River through improved stormwater BMPs. The grant also will help fund an overhaul of the Unified Zoning Ordinance.

Sources of Pollution

According to the EPA, point source pollution is, “any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation (CAFO), landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged.” Nonpoint source (NPS) or runoff pollution occurs when rainfall or irrigation runs over land or through the ground, picks up pollutants, and deposits them into rivers, lakes, and coastal waters or introduces them into ground water. It may also come from atmospheric deposition when pollutants settle onto water from the air. NPS pollution also includes adverse changes to the vegetation, shape, and flow of streams and other aquatic systems, called hydrologic modification. The most common measured nonpoint source pollutant in South Carolina is fecal coliform bacteria. Other common ones include nutrients such as phosphorus and nitrogen, pesticides, oil and grease, toxic chemicals, and heavy metals. The Lower

Savannah watershed has experienced increased contamination during the period 1997-2003 via two identified point source pollutants and four identified nonsource pollutants, while the other two watersheds had reported significant decreases in pollution and increases in water quality (DHEC, 2008).

Water Use

BJWSA was originally issued an Interbasin Transfer (IBT) permit under the old Beaufort County Water Authority for a maximum transfer of 60 million gallons of water per day (mgd) from the Savannah River Basin to the Combahee-Coosawhatchie River Basin. Their Chelsea Water Treatment Plant (WTP) has an average daily production rate of 12.55 mgd with a maximum treatment capacity of 26 mgd. Their Purrysburg WTP has an average daily production rate of 8.7 mgd with a maximum treatment capacity of 15 mgd. Their combined average daily production is 21.25 mgd, and their combined maximum treatment capacity is 41 mgd (DHEC, 2010).

BJWSA used over 8 billion gallons of surface water from the Savannah River in 2006. The South Island Public Service District on Hilton Head Island used 1.7 billion gallons of groundwater in 2006 (SCDNR 2006). These three facilities are within the ten largest surface and groundwater supply facilities in the state.

Hilton Head Public Service District # 1 used 1.1 billion gallons of groundwater in 2006 (SCDNR 2006).

Growth Pressures

The potential for growth varies throughout the basin. There is a moderate potential for growth in the Town of Hardeeville in the New River Watershed (003060110-02). Beaufort-Jasper Water Sewer Authority has expanded services within the Hardeeville area. There is a high potential for growth in the Great Swamp Watershed (03060110-01) from the Town of Ridgeland. Ridgeland has expanded its treatment facilities to accommodate growth. The Towns of Bluffton and Hilton Head Island are located in the Calibogue Sound Watershed (03060110-03) -- areas that are considered to have a high potential for growth. Portions of the Towns of Scotia and Furman are located at the top of the basin, where there is a limited potential for growth. The Savannah National Wildlife Preserve and the Tybee Island National Wildlife Preserve are located at the base of this watershed, and would limit growth in these areas (DHEC 2010).

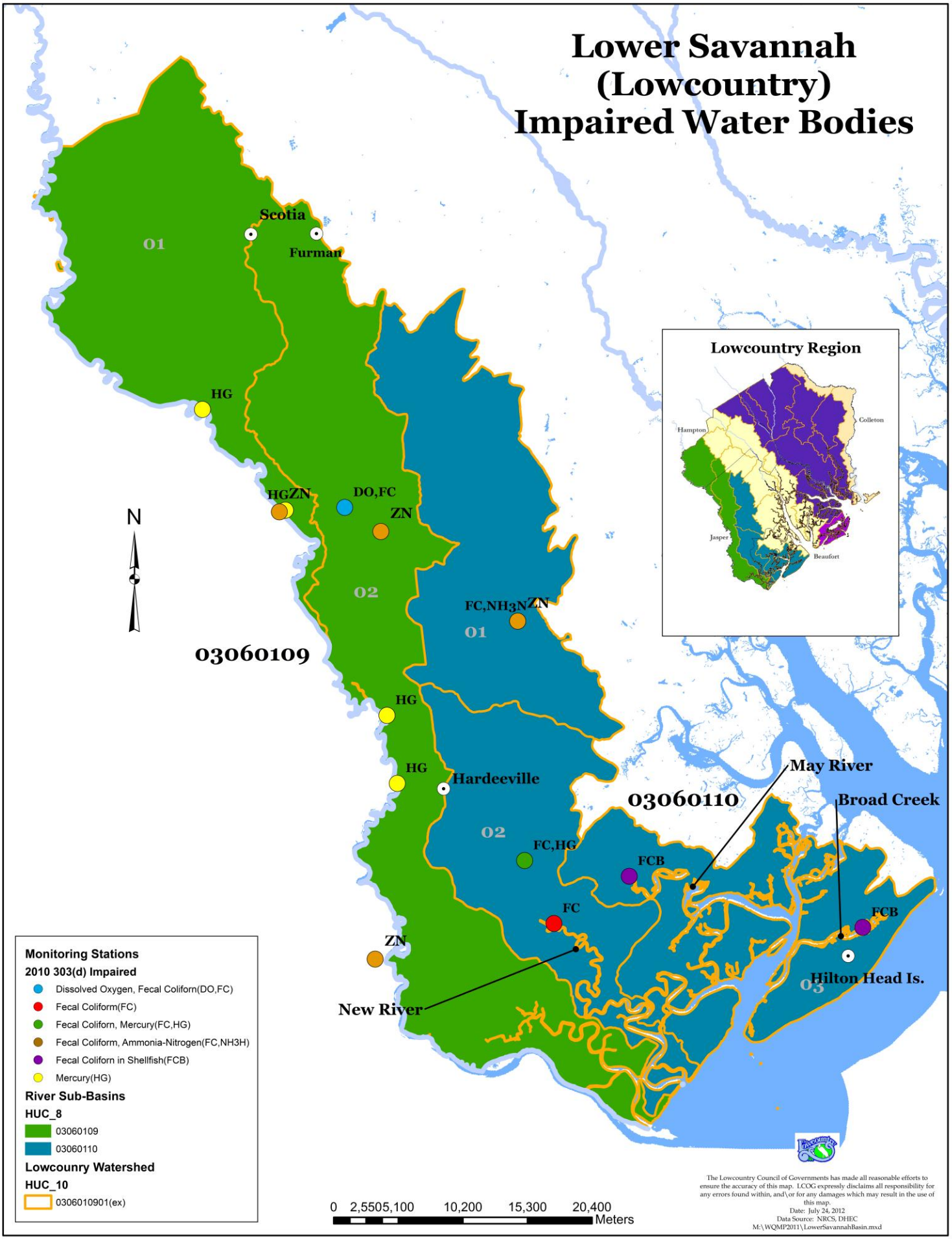


Figure 18: Lower Savannah 303(d) Impaired Water Bodies

Broad River/Beaufort River/Port Royal Sound Sub-Basin

General Description

The following Description of the Broad River/Beaufort/Port Royal Sound Sub-Basin was obtained from the Department of Health and Environmental Control (DHEC):

> The Broad River/Beaufort River/Port Royal Sound Basin (hydrologic unit 03050208) is located in Allendale, Hampton, Jasper, and Beaufort Counties, and encompasses 6 watersheds and 934 square miles. The Broad River/Beaufort River/Port Royal Sound Basin flows through the Coastal Zone Region. Of the 597,659 acres, 32.5% is forested land, 20.7% is agricultural land, 19.4% is forested wetland (swamp), 10.7% is water, 10.2% is non-forested wetland (marsh), 6.4% is urban land, and 0.1% is barren land. The urban land percentage is comprised chiefly of a portion of Hilton Head Island and the Beaufort area. There are approximately 1,482 stream miles, 1,129 acres of lake waters, and 54,485 acres of estuarine areas in this basin.
>
> The Coosawhatchie River originates near the Town of Allendale, and accepts drainage from Black Creek (Lake George Warren) and Cypress Creek before merging with the Pocotaligo River to form the Broad River. The Broad River joins the Chechessee River and the Beaufort River to form Port Royal Sound.

Water Quality

The Broad River/Beaufort River/ Port Royal Sound Basin faces significant water quality issues, especially near the coast in shellfish harvesting areas. Fecal coliform levels have impaired shellfish beds. Areas within the basin have shellfish harvesting bans. The basin has several impaired water bodies due to fecal coliform, dissolved oxygen, total phosphorus, mercury, chlorophyll A, and hydrogen ion concentration. The locations of these sites are mapped in Figure 20.

An EPA 319 grant has been received to implement a number of improvement projects in the Okatie River Watershed. The program began in July of 2010 and will run for three years. The aim of the grant and plan is to reduce the amount of fecal coliform in the river. The strategy includes addressing agricultural practices, boating activities, septic repair and replacement, and stormwater runoff. The Okatie River has restrictions on shellfish harvesting due to elevated levels of fecal coliform as indicated by Figure 19.

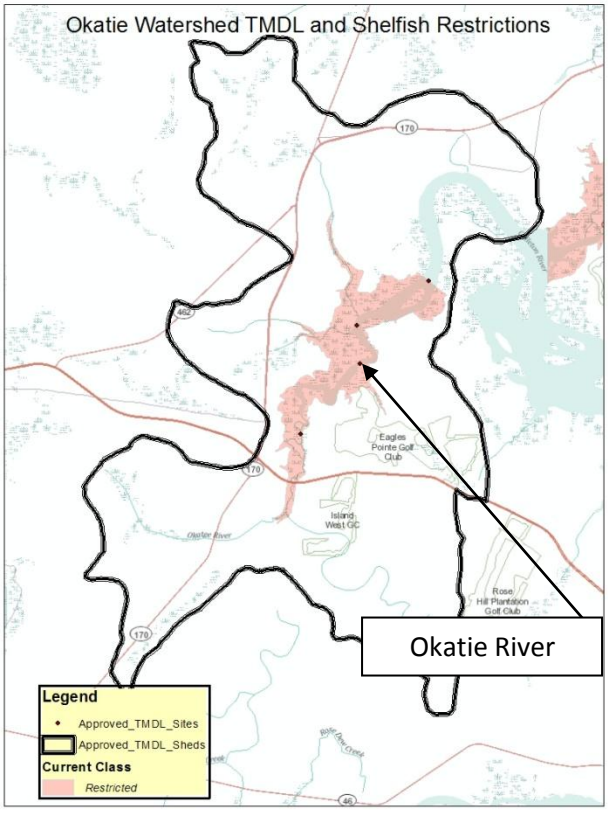


Figure 19: Okatie Watershed and Shellfish Restrictions

A TMDL has been developed for water quality standards within the watershed for fecal coliform will require a reduction of 21 to 51 percent, depending on the location. More information about the TMDL is available at: http://www.DHEC.gov/environment/water/tmdl/docs/tmdl_okatie.pdf.

Dissolved oxygen (DO) TMDL's have been developed for the Beaufort River as well. Reductions have been required for the NPDES permitted facilities that discharge into the Beaufort River with a target of dissolved oxygen depression of no more than 0.1 mg/L (DHEC 2010).

Source Pollution

There are four permitted discharges from minor domestic facilities within the sub-basin. Within the Broad River/Port Royal Sound Watershed (03050208-06), there is one major domestic discharge into the Great Swam Wetland. There are ten minor industrial facility discharges in the sub-basin. Within the Coosawhatchie Watershed (03050208-04) there is one major industrial discharge and one major domestic discharge into the Sanders Branch. Within the Beaufort River/Port Royal Sound Watershed (03050208-05) there is one major domestic discharge facility. Within the Broad River/Port Royal Sound Watershed (03050208-06), there is one major domestic discharge into the Palmetto Hall Plantation Wetlands. Locations of the various NPDES permits are labeled on the watershed maps in the appendix.

Growth Pressures

Within the Coosawhatchie Watershed (030508-04) there is a low to moderate potential for growth from the towns of Varnville and Ridgeland. Ridgeland has made improvements to their treatment facilities.

The Beaufort River Watershed (03050208-05) currently has 12.9 percent urban land cover. As land cover exceeds ten percent, degradation of water bodies begins to occur. This area has a high potential for growth that originates from the Town of Port Royal and portions of the City of Beaufort. Bluffton area developments are also located within the watershed and are expected to expand as the economy improves.

The Broad River/Port Royal Sound Watershed (03050208-06) also has a high potential for growth as portions of the City of Beaufort, Yemassee, Hilton Head Island, and Bluffton are within the watershed (DHEC 2010).

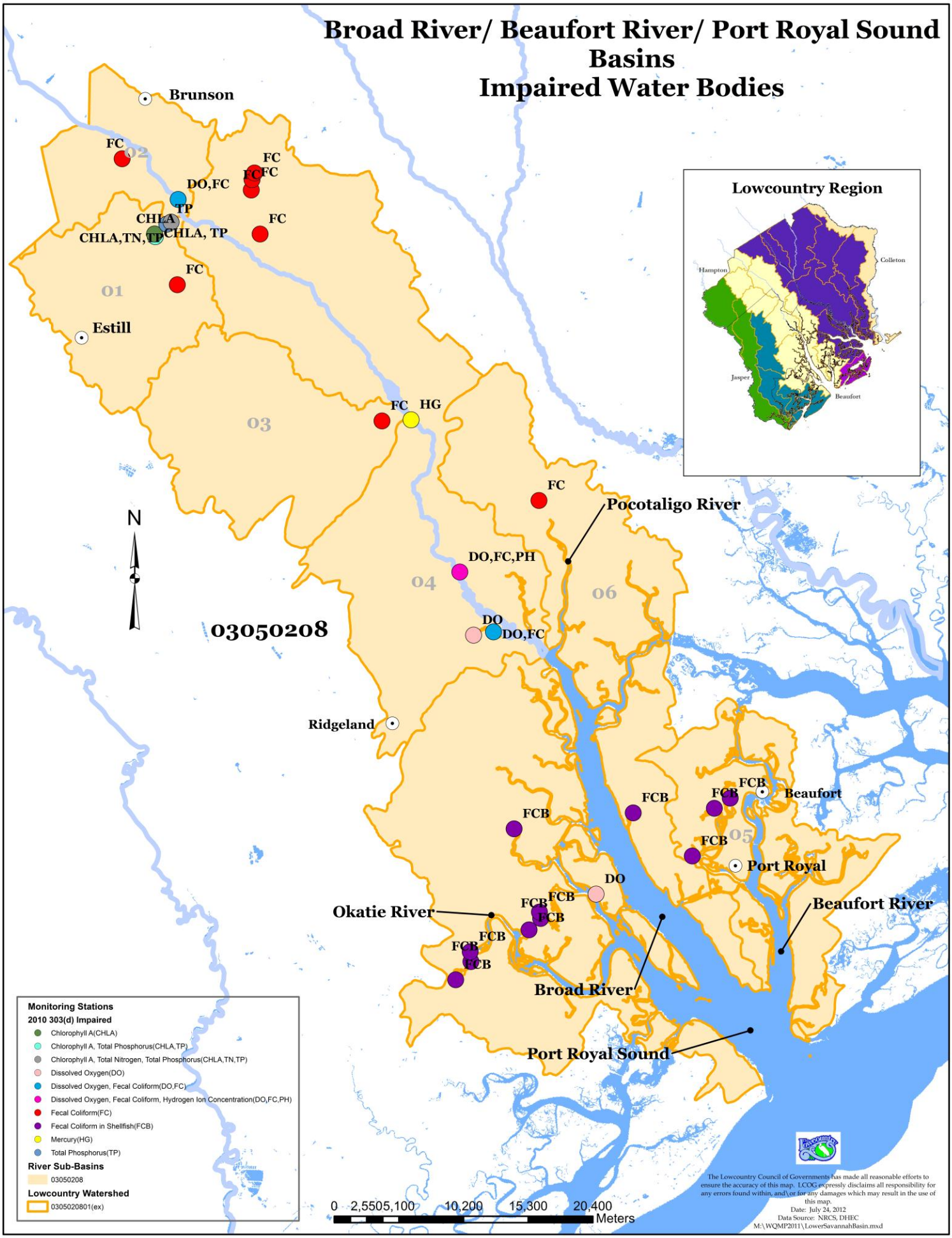


Figure 20: Broad River/Beaufort River/Port Royal Sound Basin 303 (d) Impaired Water Bodies

Salkehatchie River and Coosaw/Ashepoo River/ St. Helena Sound Sub-Basin

General Description

The following general description of the Salkehatchie River Basin was provided by the Department of Health and Environmental Control:

> The ***Salkehatchie River Basin (a portion of hydrologic unit 03050207)*** is located in Barnwell, Bamberg, Allendale, Hampton, and Colleton Counties, and encompasses 1,022 square miles that extends across the Upper and Lower Coastal Plain and Coastal Zone Regions of the State. The Salkehatchie River Basin encompasses 6 watersheds and 653,935 acres, of which 38.2% is forested land, 33.9% is agricultural land, 22.7% is forested wetland, 4.7% is urban land, 0.3% is non-forested wetland, and 0.2% is water. There are approximately 2,354 stream miles and 3,566 acres of lake waters in this basin. The Salkehatchie River originates near the City of Barnwell and accepts drainage from Whippy Swamp before merging with the Little Salkehatchie River (Lemon Creek) to form the Combahee River (DHEC 2010).

Water Quality

The sub-basin has a number of issues related to water quality. Known pollutants include: zinc, mercury, copper, and fecal coliform. Water bodies in the basin also face issues of turbidity.

- In Colleton County, portions of the Little Salkehatchie River Watershed (03050207-05) are only partially supportive of recreational uses due to fecal Coliform excursions. Other sites on the Little Salkehatchie River and the Willow Swam River do not support aquatic life due to the presence of copper and zinc. The Willow Swamp River also has elevated levels of total phosphorus concentration and fecal coliform (DHEC 2010).

- In Beaufort County the Combahee River has seen a decreasing trend in turbidity at one site; however another site on the river has seen an increasing trend in turbidity and total suspended solids with an increasing trend in pH. At midstream, aquatic life uses are not supported due to excursions in dissolved oxygen (DHEC 2010).

- In Colleton County, the Ashepoo River Watershed (03050207-08) the Ireland Creek does not support aquatic life uses due to dissolved oxygen and pH excursions. Recreational uses are not supported either due to high levels of fecal coliform. (DHEC 2010)

- In Colleton County, the Ashepoo River/ St. Helena Sound Watershed (03050207-10) does not support aquatic life and recreational uses due to zinc and fecal coliform excursions in the Ashepoo River. At a site in Rock Creek, aquatic life is not supported due to turbidity (DHEC 2010).

- In Colleton and Beaufort County, The Coosaw River/St. Helena Sound Watershed (030507-11) does not support aquatic life due to turbidity excursions in the Coosaw River, Wimbee Creek, and Tidal Creek. Jenkins creek has seen an increasing trend in turbidity, but aquatic life is currently supported. Sparrow nest Creek Tributary does not support aquatic life due to copper pollution.

Monitoring Station sites, within the sub-basin listed on the 303(d) List of Impaired Water Bodies, are highlighted in Figure 22.

Sources of Pollution

According to DHEC, there are four active minor domestic discharges within the sub-basin. The city of Walterboro discharges into the Ireland Creek from a major domestic facility. The Ashepoo River Watershed has nine minor industrial sites discharging into water bodies within the watershed. There are seven other minor industrial NPDES permits in the sub-basin. Within the Coosaw River/St. Helena Sound Watershed, there is one major industrial permit with discharge in the Campbell Creek to Whale Branch. Locations of the various NPDES permits are labeled on the watershed maps in the appendix.

Growth Pressures

There are very few pressures for growth in this watershed. The Town of Allendale, which is outside the Lowcountry Region, has recently expanded its wastewater treatment facility, but has not been successful in attracting economic development in the past. However, the area of Hampton county that is in close proximity to Allendale could provide inexpensive housing if Allendale were to experience moderate to large economic growth. The Towns of Hampton and Varnville are within 30 minutes of Allendale and could increase in population if some economic growth occurs (DHEC 2010).

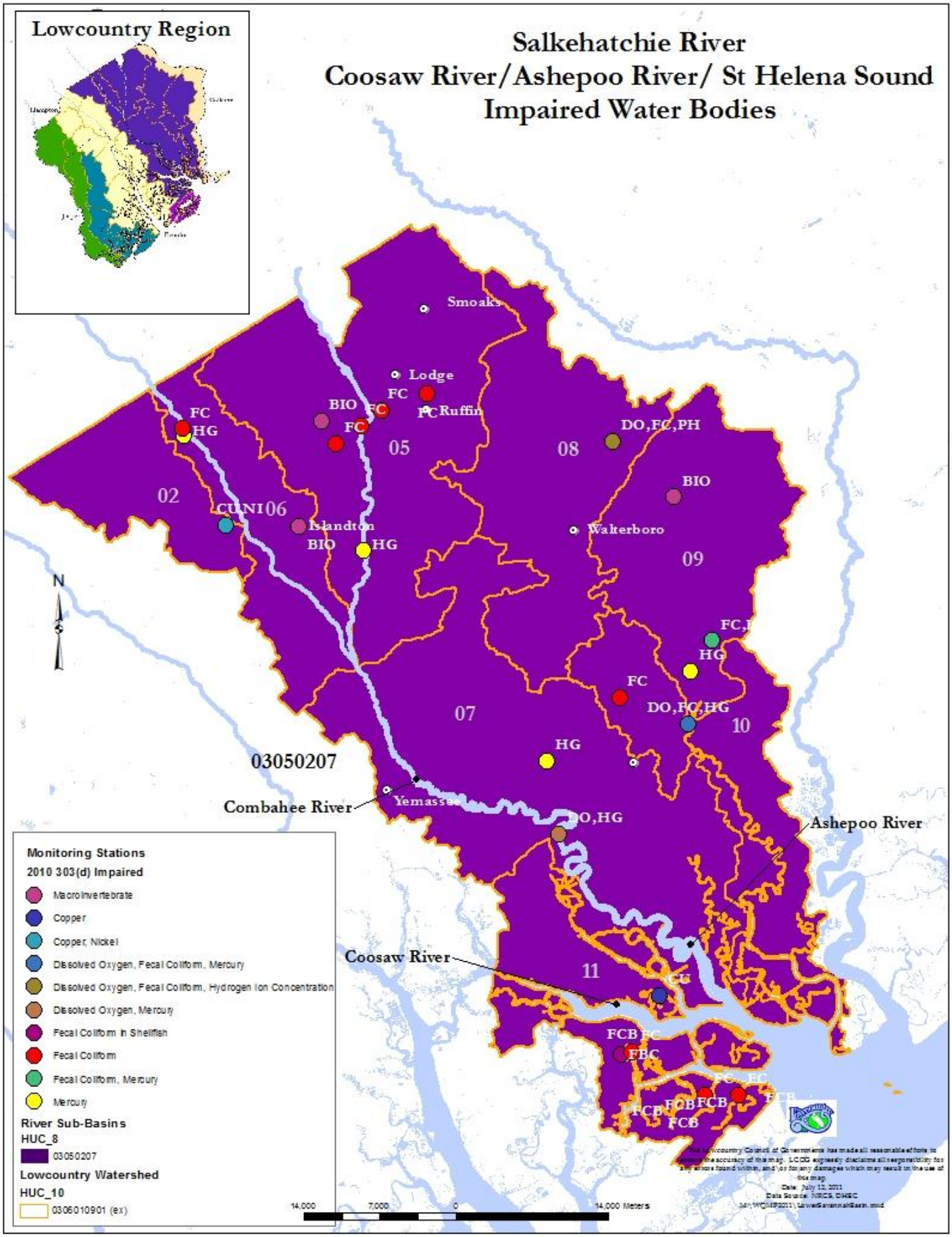


Figure 21: Salkehatchie River/Coosaw River/St. Helena Sound 303(d) Impaired Water Bodies

Salkehatchie Costal Frontage Sub-Basin

General Description

The following general description of the Salkehatchie Coastal Frontage was provided by the Department of Health and Environmental Control (DHEC 2010):

> The ***Salkehatchie Coastal Frontage*** Basin encompasses 1 watershed and 73 square miles that flow through the Coastal Zone Region of Beaufort County. Of the 46,410 acres, 47.2% is non-forested wetland (marsh), 38.4% is forested land, 26.6% is water, 6.2% is agricultural land, 3.4% is forested wetland (swamp), 2.5% is urban land, and 1.6% is barren land. There are approximately 7,682.7 estuarine acres in this basin. The Salkehatchie Coastal Frontage Basin consists of the Harbor River and a series of inlets that drain directly into the Atlantic Ocean. These inlets include Trenchards Inlet, Pritchards Inlet, Skull Inlet, and Fripp Inlet (DHEC 2010).

Water Quality

There are no water bodies within the Salkehatchie Coastal Frontage Basin on the 303(d) Impaired List. At an unnamed creek between Harbor River and Story River, an increasing trend of fecal coliform bacteria has been observed by DHEC. Aquatic life and recreational use are fully supported (DHEC 2010).

Source Pollution

One permit has been issued for a minor industrial discharge into the Harbor River Tributary.

Water Use

Currently no direct water acquisition or pumping stations exist in the Salkehatchie Frontage Sub-Basin.

Growth Pressures

The City of Beaufort, Lady's island, Burton and Shell point may see residential and commercial growth in the future that could cause pressures on the watershed. Sea Islands and Hunting Island State Park make up a majority of the watershed most part the watershed will not be impacted by growth pressures (DHEC 2010).

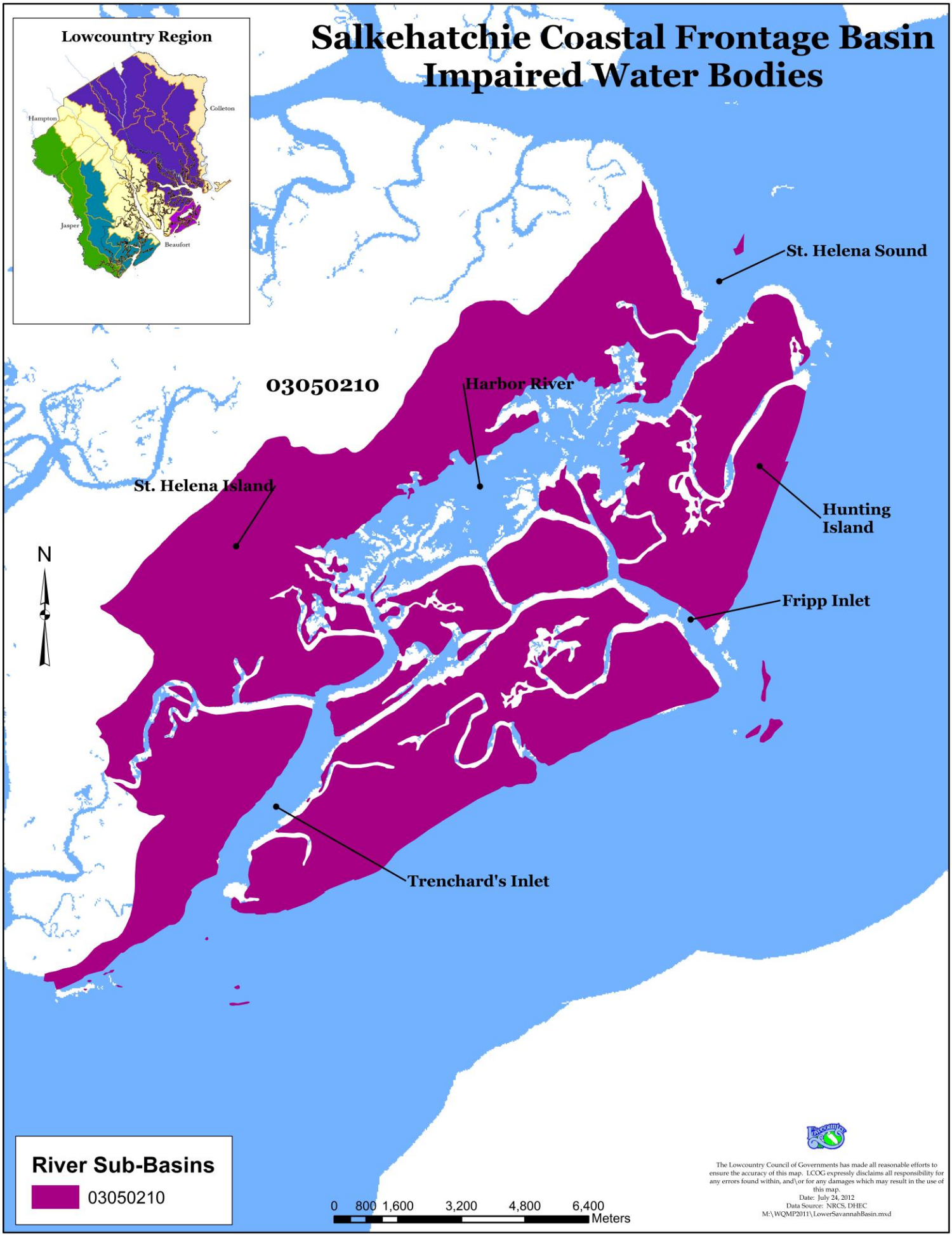


Figure 22: Salkehatchie Coastal Frontage Basin 303(d) Impaired Water Bodies

Edisto River Sub-Basin

General Description

The following description of the Edisto River Sub-Basin was provided the South Carolina Department of Health and Environmental Control:

> The Edisto River Basin (hydrologic units 03060203, 03060204, 03060205, 03060206) is located in Lexington, Aiken, Orangeburg, Calhoun, Edgefield, Saluda, Barnwell, Bamberg, Dorchester, Colleton, and Charleston Counties, and encompasses 3,151 square miles that extend across the Sandhills, Upper and Lower Coastal Plains and Coastal Zone Regions of South Carolina. The Edisto River Basin encompasses 13 watersheds and some 2 million acres of which 37.5% is forested land, 34.3% is agricultural land, 17.9% is forested wetland, 5.5% is urban land, 2.8% is non-forested wetland, 1.8% is water, and 0.2% is barren land. The urban land percentage is comprised chiefly of the City of Orangeburg and a portion of the City of Aiken. There are a total of 5,177.3 stream miles, 11,488.8 acres of lake waters, and 20,614.9 acres of estuarine areas in the Edisto River Basin.
>
> The confluence of Chinquapin Creek and Lightwood Knot Creek form the North Fork Edisto River, which is joined downstream by Black Creek, Bull Swamp Creek, and Caw Caw Swamp. The South Fork Edisto River accepts drainage from Shaw Creek, Dean Swamp Creek, Goodland Creek, and Roberts Swamp before merging with the North Fork Edisto River to form the Edisto River. Downstream from the confluence, the Edisto River is joined by Cattle Creek, Indian Field Swamp, and Four Hole Swamp. Prior to joining the Edisto River, Four Hole Swamp accepts drainage from Cow Castle Creek, Providence Swamp, Horse Range Swamp, and Dean Swamp. Downstream from Four Hole Swamp, the Dawho River enters the Edisto River, and their confluence forms the South Edisto River and the North Edisto River, which drain to the Atlantic Ocean (DHEC 2010).

Water Quality

The Edisto River Basin has several sites on the 303(d) Impaired List for high levels of Mercury. At the southernmost watershed, particularly on Edisto Island, there are issues of elevated levels of fecal coliform. Another site in the southernmost watershed has been specified on the 303(d) list for copper pollution as indicated in Figure 23 on the following page.

Sources of Pollution

There are four point source and five nonpoint source polluters in the sub-basin. The point source polluters are normal industrial activities and two domestic discharges. There is a fairly large amount of nonpoint source pollution coming from mining and other resource extraction activities as well as some agricultural sources.

Growth Pressures

There is low to moderate growth potential for this watershed. In many areas there is very low potential for growth, with the exception of the Cottageville area. This town is located along United States Highway 17A and therefore connected to Charleston. Another small area of growth is the Town of Edisto Beach; however, its growth is seen as mostly tourism-based and therefore only exerts a seasonal influence. A revised municipal comprehensive plan that was developed in 2003 will ensure that all new residential developments are compatible with existing housing types including servicing and utilities as well as promote the removal of unwanted or deteriorated housing for the infill of new residential development (DHEC 2004).

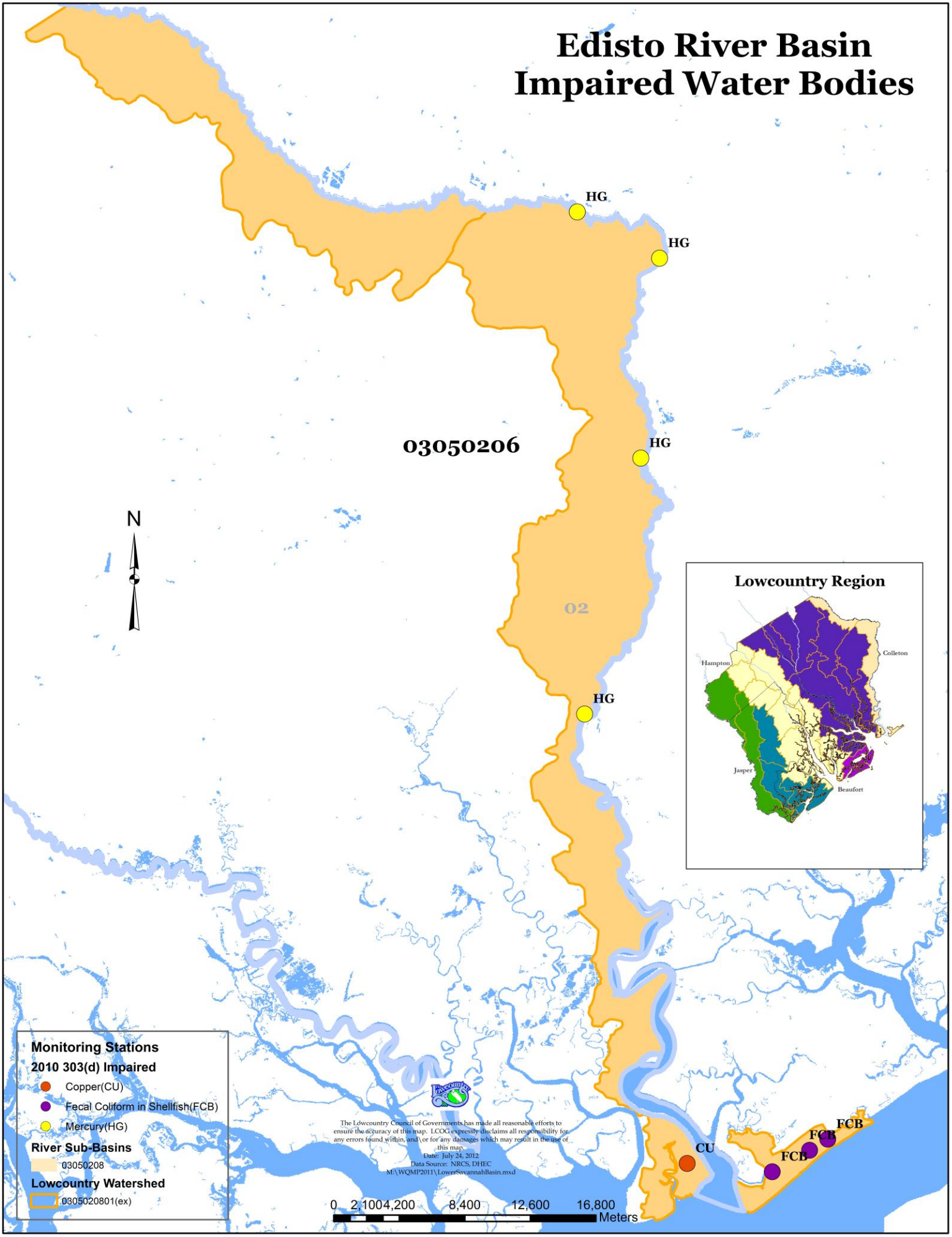


Figure 23: Edisto River Basin Impaired Water Bodies

Chapter 5 - Infrastructure

This chapter identifies and illustrates via Geographical Information System (GIS) mapping the infrastructure that distributes fresh water and removes wastewater from the urban areas located throughout the Lowcountry. As stated previously, much of the Region relies on private wells and septic systems to extract fresh water and remove wastes. They are not included in the public infrastructure maps.

Water Service Areas

Figure 24 provides a graphic description of all urban areas in the Lowcountry that are serviced by public water systems listed as Service Providers in Chapter 2. Most all towns and cities are serviced by public water systems with the exception of some of small municipalities located in the north of the Region. Some of the smaller rural communities are also serviced by public systems especially those located on major transportation routes between large urban centers, such as the small communities located along SC 170. As the urban areas in the Lowcountry expand and the need for public water service continues to increase, more rural areas will be able to tap into these systems and will not have to rely on private wells for water supply. This will provide a greater control over fresh water quality and quantity for those who currently rely on private wells.

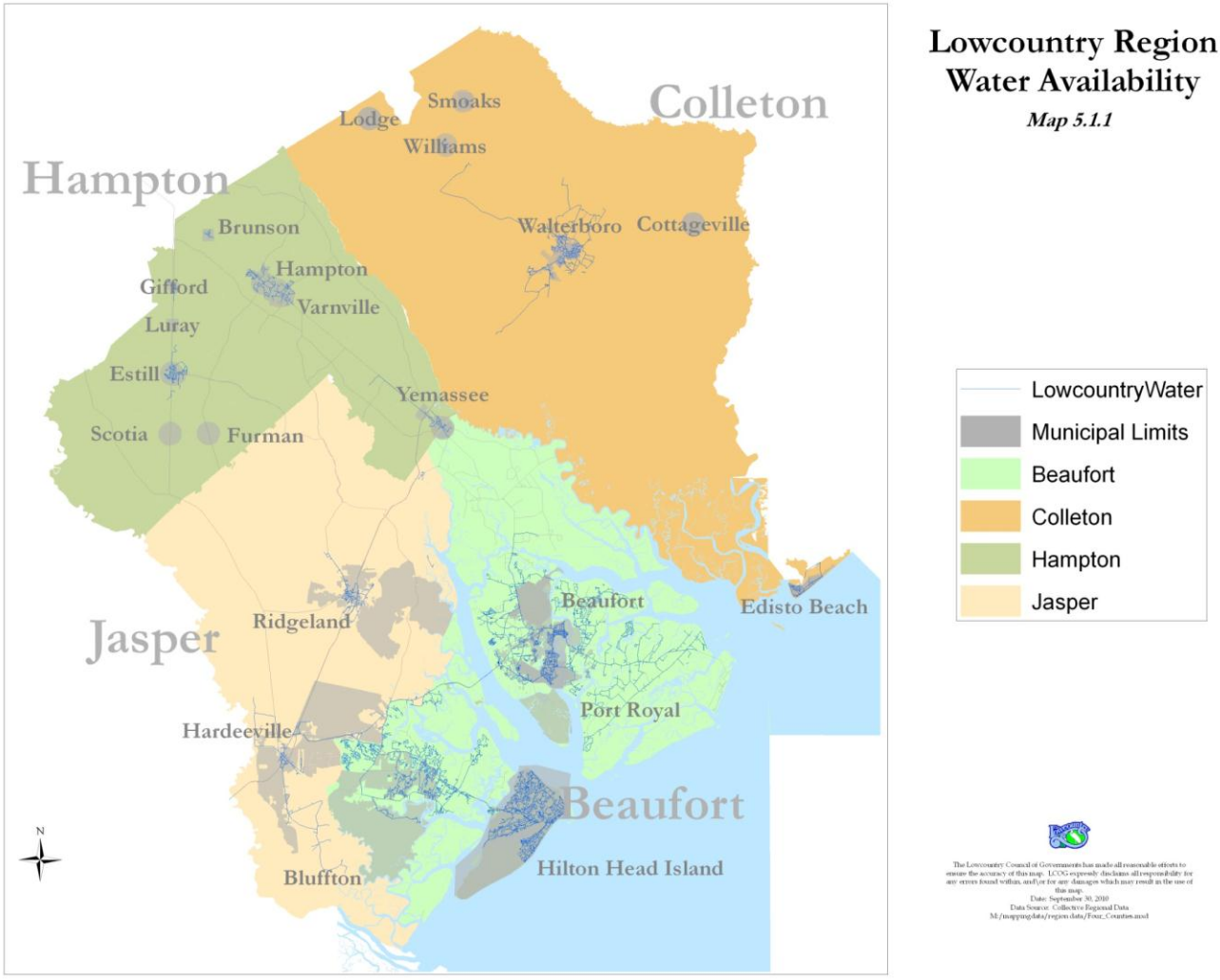


Figure 24: Lowcountry Water Availability

WWTP by BJWSA

Figure 25 provides information with regards to wastewater treatment plants in Beaufort and Jasper counties. These plants are operated by Beaufort-Jasper Water and Sewer Authority (BJWSA). These two counties are very well serviced, and as they continue to grow BJWSA will continue to provide wastewater services as required. However, it is essential that all areas within the Lowcountry that could be made accessible to a public wastewater system be connected. Rural areas that rely on septic systems to treat and dispose of wastewater can pose a threat to the integrity of the Region's ground water. Due to the high water table of the Lowcountry and its proximity near many sensitive ecosystems it is imperative that bacteria and other pollutants that are associated with wastewater not be given the opportunity to enter these natural systems. Note the concentration of systems in the Bluffton area. Often growth is positioned in the areas where sanitary sewer systems, with the associated infrastructure, are located.

Map: Courtesy of BJWSA

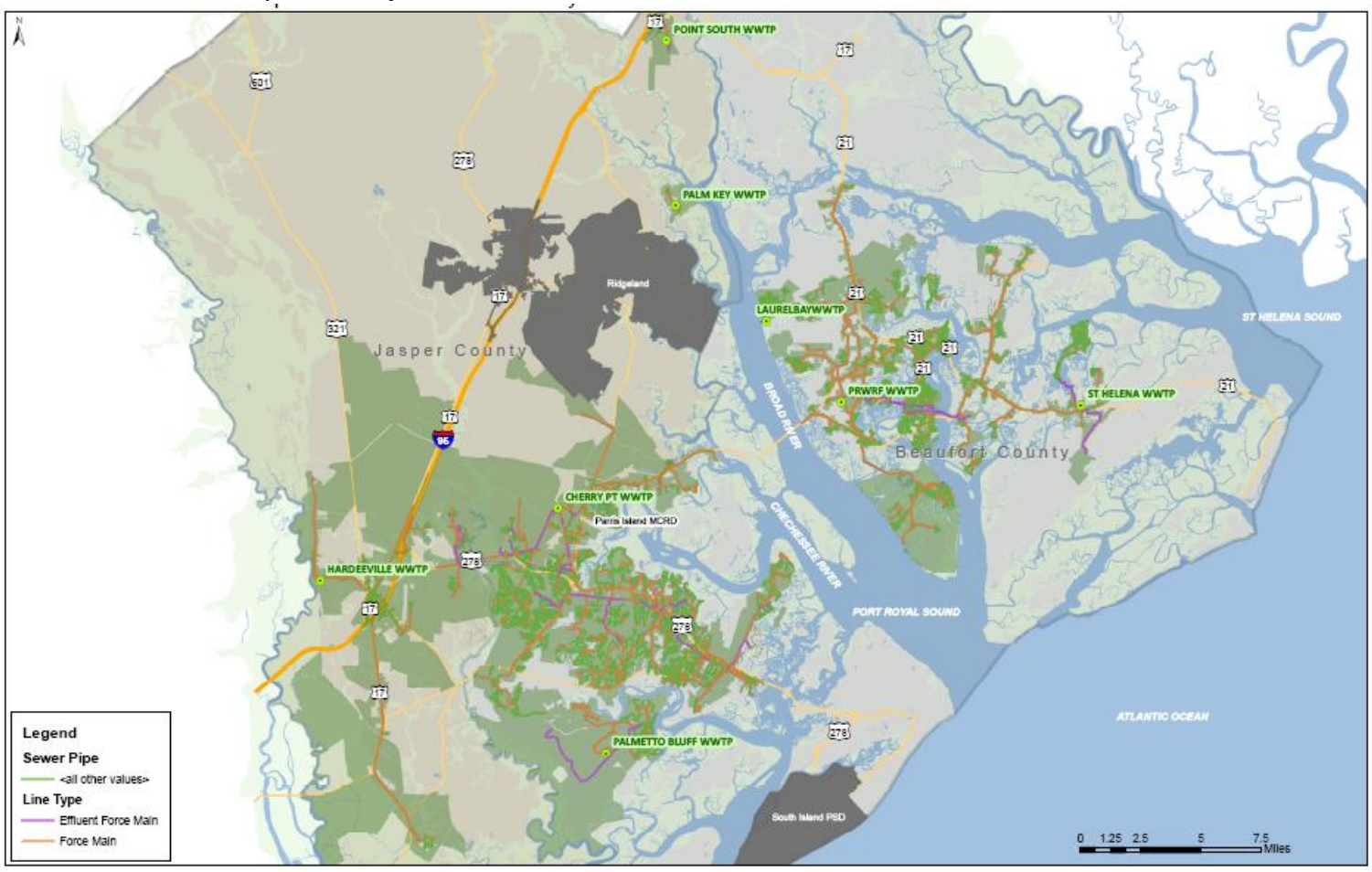


Figure 25: Beaufort & Jasper Wastewater Treatment Facilities

Waste Water and Water Projects

The many waste water systems throughout the Region consistently require upgrading and maintenance to preserve the reliability of the systems. Areas of growth also require expanded services. Current projects include extension of service area, pump station upgrades, and slip lining. The following map (Figure 26) highlights the different projects in the Region.

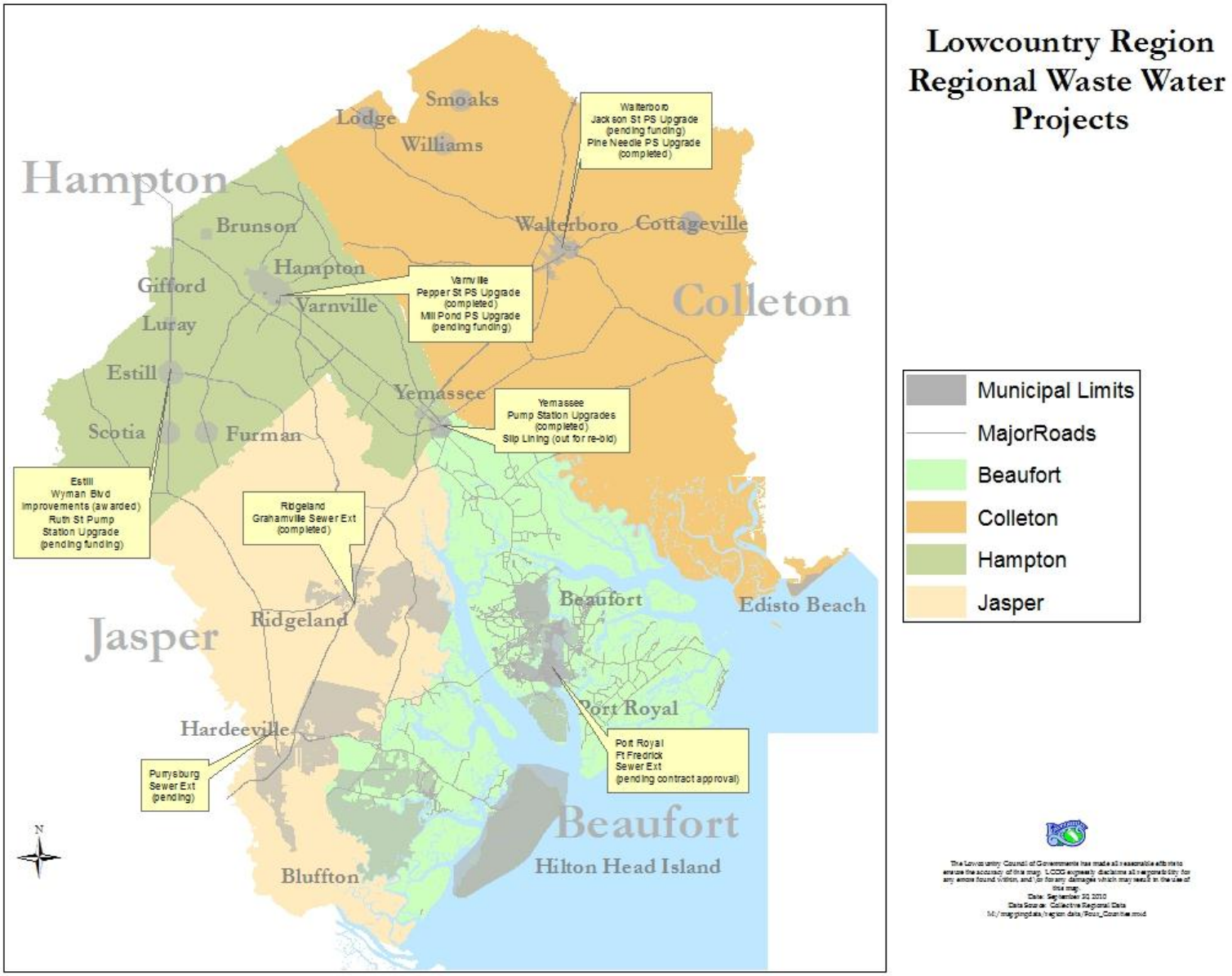


Figure 26: Lowcountry Region Wastewater Projects

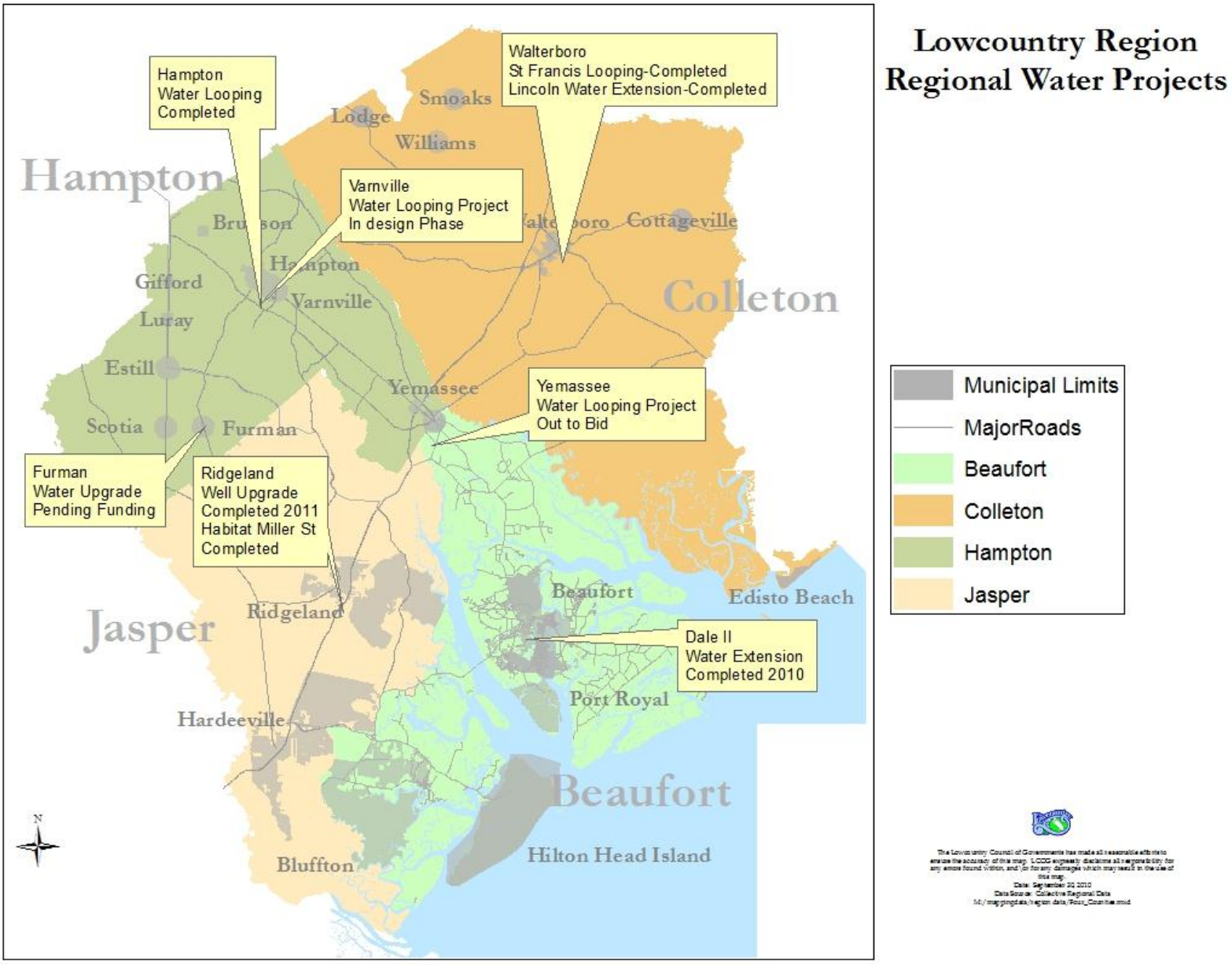


Figure 27: Lowcountry Region Water Projects

Water Projection in the Lowcountry

Many of the urban areas in the four counties had been in a stage of rapid growth, which slowed considerably after 2007. When these places begin to grow again, the public water systems will be required to upgrade facilities and to extend pipelines at the same pace of the development. Also, by upgrading infrastructure, such as water systems, the urban areas will increase their ability to attract commercial and industrial development. With the infrastructure in place and available, additional economic activities are likely to locate to these areas. Residential developers are also more likely to develop in a town or city that has a water system and other infrastructure in place that could support such development. Overall the

continued development of, and increase in, public water systems both in delivery and wastewater treatment methods will positively affect the four counties of the Lowcountry.

Chapter 6 - Goals, Objectives, and Policies

Goals

It is the goal of the Lowcountry Council of Governments to improve the area's water quality while preserving and enhancing pristine water systems for the future by providing policies and recommendations. This is in an attempt to significantly reduce the impacts of inflows, infiltration, point and nonpoint source pollution, and to ensure the continued monitoring of water quality and quantity for the aesthetic, recreational, and economic benefits of the counties of Beaufort, Colleton, Hampton, and Jasper.

Objectives

1.0 Work to ensure the protection of all coastal and inland water systems and basins
2.0 Control discharge from point source pollution to surface and ground water
3.0 Control discharge from nonpoint source pollution to surface and ground water.
4.0 Enhance water conservation practices
5.0 Identify water quality and quantity targets to be met by 2025
6.0 Illustrate the recognition of and the commitment to, the preservation and rehabilitation of the Lowcountry's water systems
7.0 Identify and protect significant hydrological resources

Policies

1.0 Work to ensure the protection of all coastal and inland water systems and basins

1.1 Monitor testing results as available by DHEC, BJWSA, and other agencies and organizations that conduct periodic testing.

1.2 The Lowcountry contains a significant number of estuaries (areas where fresh and salt water ecosystems mix). These areas should be preserved by the designation of "Environmentally Protected Area" (EPA). Each county will be responsible for determining the EPA's within its boundaries and then identifying them in their comprehensive plan. As, such each county will also initiate an open space conservation program that will act to aid in the protection of the outlined EPA's. These areas are to be protected from any further development, encroachment or contamination by human activities. Examples of such initiatives can be obtained from the Trust for Public Lands.

1.3 Estuaries in the Lowcountry Region offer a natural filtering process and absorb many of the harmful contaminants from the fresh water tributaries before it can reach the ocean. Contamination levels in fresh water systems should be reduced and eliminated in order to decrease the filtration work load for the estuaries in the Lowcountry.

1.4 All public schools in the counties of Beaufort, Colleton, Hampton, and Jasper are encouraged to join the South Carolina Water Watch Program. These schools are to participate in the testing of water systems and the building of current water quality data

bases for DHEC and all other public agencies that require such information and also to increase public awareness of area-wide water quality issues and concerns.

2.0 Control discharges from point source pollution to surface and ground water systems.

2.1 All point source pipes or inflows will be in compliance with and subject to the limits of the National Pollutant Discharge Elimination System I or NPDES II when it comes into effect.

2.2 Residential, commercial, industrial, and agricultural land users are responsible for their discharges and related mitigation. 3.4 With regards to the potential for leaky sewage lines and pump stations:

2.3 Service Agencies are encouraged to keep wastewater systems well maintained in order to protect the integrity of the Region's wastewater systems by preventing leakage and overflow due to aged or malfunctioning sanitary sewer lines.

2.4 Where required, all new forms of filtration technology will be adapted and put into place at the management agency's discretion.\With regards to on-site wastewater treatment for light industry, it will be the Region's policy that:

- A site without wastewater service, particularly areas likely to attract such relatively low generators of wastewater as logistics and distribution centers in the corridor along I-95, may utilize systems approved by DHEC that work for light industrial purposes. Examples of such systems include, but are not limited to, Packed Bed Media Filter Treatment Systems, or Membrane Bioreactor Treatment Systems.
    - The Packed Bed Filter Treatment System uses textile media to treat wastewater. This system accommodates small sites, poor soils, nitrogen reduction, and low to medium flows.
    - The Membrane Bioreactor Treatment System works well for sites with size constraints, poor soils, and where high quality effluent is desired.
- For effluent disposal, land application is the desired method due to environmental concerns. Surface water discharge is discouraged as a result of the limited flushing of the upper portions of the Region's waterways during dry periods. The lower portions of rivers are prime habitats for shellfish which are subject to stricter regulatory standards for discharge.
    - The Subsurface Drip Dispersal method allows for the effluent to directly reach the plant root zone and the biologically active layer of the soil. This method also minimizes human and animal contact with the effluent. Subsurface Drip Dispersal allows for the application of the effluent during rain events without concern of runoff.
- URS/BP Barber prepared a report which evaluated the suitability of various systems. The report, "Feasibility Assessment for On-Site Wastewater

Treatment for Logistics and Distribution Center Development in the Lowcountry" is available upon request.

3.0 Control Discharges from nonpoint sources to surface and ground water systems.

3.1 Nonpoint source pollution is to be minimized with respect to agricultural and urban runoff and ground water leachate by the adaptation of sediment ponds, sediment fences, catch basins, berms, buffers, and other best management practices (BMP). Each county will regulate and enforce the usage of BMPs. Each county will also ensure that all nonpoint source BMPs do not over flow and become point source pollution by means of ensuring that all pollution controls are able to withstand a 25-year storm. With regards to potential urban runoff, under no circumstances is any form of harmful or toxic material, both liquid and solid, allowed to be placed or poured on a street, sidewalk, or parking lot regardless of ground cover type. This includes any type of diluting material used to sanitize animal waste in urban areas.

The overarching focus of the two 319 projects (outlined in Chapter 4) within the Region is the reduction of nonpoint source pollution within the watersheds. The general principles, if effective, may be used in other places in the Region. Listed below are methods used in the program:

- Rain gardens to reduce the volume of water leaving developed areas. New guidance indicates that one acre of raingarden can handle up to seven acres of impervious area. The project plans to install three small raingardens in watershed.

- Pond retrofits to evaluate weir changes, with partner POA's, to slow the rate of stormwater runoff from the ponds to allow an increased die-off of fecal coliform and to reduce the washout effect of the excess stormwater volume discharge

- A small-scale stormwater Irrigation system will be installed as a retrofit project in the River Bend section of Sun City. This section has three outfalls going to the Okatie River. It is envisioned that by using ponds for irrigation, the development will actually develop retention in their existing ponds and that for small rainfall events will not have runoff or bacteria load into the Okatie River.

- New off-line retention ponds. Beaufort County is planning water quality retrofits throughout the county, and have two potential sites in the headwaters portion of the Okatie. These ponds will divert and retain peak stormwater flows and add back to natural wetlands during dry periods to increase the percentage of stormwater runoff that goes back to up in the atmosphere.

3.2 All new development and construction sites are also required to eliminate any form of urban runoff or unnatural erosion, by the adaptation of sediment fences and ponds, berms or any other BMP that has been recognized by DHEC to be effective and efficient at achieving the aforementioned. Also with regard to urban runoff, new

developments are required to implement and incorporate new technologies into their design to decrease the possibility of further contamination by ways of nonpoint source pollution once the development is finished and in use. This implementation of new technologies and environmental products are to be incorporated into the overall design of all new developments: to offset the cost of these measures, tax credits should be considered for the developers and land owners of such properties.

To encourage support from developers to both minimize nonpoint source pollution and initiate development that is consistent with Lowcountry city and town existing structures and patterns, incentives can be included effectively in zoning ordinances.

In practice, this could mean that by incorporating green design, storm water treatment baffles, pervious parking and vegetative riparian buffers, developers would be compensated with either such incentives as reduced setbacks or parking and increased densities.

An alternative that some management agencies might wish to pursue instead is incentives in the form of reduced development fees. For instance, the same design provisions mentioned above could result in lower building permit or business license charges.

3.3 In regards to federal storm water regulations:

MS4, or separated municipal storm water systems are primarily the physical infrastructure (i.e. catch, ditches, canals, pipes, and tunnels) that allow water to flow from developed areas into state water bodies. They fall under the National Pollution Discharge Elimination System II (NPDES) regulatory framework, administered by the EPA and DHEC. Although the towns, cities, and counties in the Lowcountry Region do not currently fall under the NPDES MS4 regulations, each jurisdiction should implement a storm water control program to ensure contaminants are not entering the local waterways. The NPDES II MS4 program is expected to expand in the future within the Region as growth continues.

Regulated small area MS4s must be permitted and show the following control measures:

- Public education and outreach
- Public participation/ involvement
- Illicit discharge detection and elimination
- Construction site runoff control
- Post-construction site runoff control

3.4 With regards to septic tanks, it will be the Region's policy that;

- Well-functioning septic systems, otherwise known as decentralized waste water systems, are a viable method of disposing of wastewater in rural areas when properly installed and maintained.

- Septic tanks should be inspected every two years to keep the system functioning properly. Pumping should be conducted as needed, depending on the practices of the homeowner. Homeowners with septic systems should be encouraged to keep a septic tank maintenance log and should provide a copy of such log at county, municipality, or DHEC request.

- Owners that are preparing to install a new septic system are required to apply for a septic tank permit and are required to have their septic site evaluated in order to ensure that the surrounding soils and water systems will not be contaminated by the septic system. Septic tanks that are installed and maintained on behalf of the property owner must be done by licensed contractors recognized by the State of South Carolina and meet all state regulations.

- New septic systems will be installed with a minimum 6 inch buffer between the septic system drainage field and the seasonal high water mark for that area, however a 12 inch buffer is recommended. All new septic systems are required to be installed with a buffer of at least 75 feet from fresh water bodies and 125 feet from tidal waters at high tide. All major repairs are recommended to comply with this policy

- All costs incurred in the testing, preparation, installation, maintenance, and repair are the land owners' responsibility.

- Septic tanks and other individual disposal systems will not be issued permits for new individual sewage treatment and disposal systems if a public sewer is accessible at the proposed site. The possibility of tax credits given to each homeowner decommissioning a septic system and transferring to a public wastewater system should be considered.

- When sewer service is available within an area, existing individual disposal systems and septic systems should be evaluated for continued use. In some cases, the onsite systems should be encouraged to discontinue use and the home should be connected to the wastewater collection system regardless of septic system history, condition, or age.

- Counties, municipalities, and waste water agencies should explore financing options for homeowners to connect to the nearest Wastewater Treatment Plant (WWTP).

- All citizens should be encouraged to report any and all leaks or spills involving or resulting from a failed septic tank to DHEC as soon as possible.

- All septic tanks that have been found to be failing and issued a notice to correct shall complete repairs before the notice to correct will be lifted.

- As a land use changes from vacant or agricultural to residential and commercial, etc., it should be each county's or municipality's policy to evaluate septic systems for appropriateness for such use through building or zoning codes and permitting.

- LCOG will advise the counties of Beaufort, Colleton, Hampton, and Jasper regarding the implementation and enforcement of these policies.

3.5 With regards to aged sewage lines and pump stations:

- Service Agencies are encouraged to keep wastewater systems well maintained in order to protect the integrity of the Region's wastewater systems by preventing leakage and overflows due to aged or malfunctioning sanitary sewer lines.

3.4 With regards to underground storage tanks:

- Storage tank are to be tested annually for leaks and corrosion.

- Storage tanks are required to be installed, maintained, and repaired by certified technicians recognized by the State of South Carolina.

- All costs incurred by the testing, preparation, installation, maintenance, and repair are the land owners' responsibility.

- Any and all leaks or spills caused by or involved with an underground storage tank are to be reported to DHEC within 24 hours of actual incident. Owners are responsible for clean-up of these leaks or spills and must do so immediately following a DHEC inspection.

- All underground storage tanks will require an additional inspection and further certification before they can be used again once a leak or spill has occurred.

- LCOG will advise the counties of Beaufort, Colleton, Hampton, and Jasper in the implementation and enforcement of these policies.

3.5 All agricultural lands are required to partake in the necessary methods in order to ensure that any and all runoff by any activity on that property does not have a detrimental impact on the surrounding water systems. This especially applies to all large-scale agricultural facilities, such as hog farming. These activities will be required to implement all DHEC and county prescribed BMPs to eliminate the possibility of nonpoint source pollution entering area drainage fields and other water resources.

The Okatie 319 Program, described in Chapter 4, addresses agricultural methods within the Okatie Watershed. One area includes manure management in vulnerable areas. Techniques used in the program include:

- Installation and/or enhancement of riparian buffers, fencing, heavy use pad, stacking sheds, composting equipment/facilities, and other fecal coliform reduction practices as appropriate.
- Manure plans for horse farms in the watershed.

3.6 Any and all spills or leaks, on either public or private lands of HAZMAT or oil must be reported to DHEC within 24 hours of such incident.

3.7 All permanent water treatment facilities, including those which regulate drinking water, should take two samples per working day and should break down each of these samples to determine what foreign compounds are in the water. One sample will be taken from the untreated water before it reaches the treatment facility and one sample will be taken from the treated water as it leaves the facility and enters the environment. This will help to determine what types of chemicals and elements are passing through the Regions treatment facilities and in what direction these facilities need to go in order to eliminate any further contamination of the Lowcountry's water basins.

4.0 Enhance Conservation Practices

4.1 A 'rain barrel' program should be initiated in all four counties, with tax credits given to those who purchase and use rain barrels. All new residential developments (of single detached housing style) would be required to allocate one (1) rain barrel per unit as a minimum.

At the current time BJWSA authority works with local vendors to subsidize rain barrels for customers. As part of the two 319 projects underway in the Region, a joint initiative involving more partners is being planned that could be extended outside the boundaries of the two study areas.

4.2 It will be the policy of the Lowcountry to encourage "xeriscaping" practices (that is, landscaping practices that reduce the need for water and other resources) as well as grey water reuse (for large-scale irrigation at golf courses, sod farms, etc.) to help keep waterways pristine. Measures to reduce runoff and nonpoint source pollution are also encouraged. The Lowcountry also supports other environmentally–friendly landscaping.

4.3 During times of drought and low water levels it will be the responsibility of each Regional water service provider (BJWSA, Town of Ridgeland, City of Walterboro, etc. to determine limits as to how much fresh water may be drawn from their system with regards to each land use and facility in their area. The use of grey water during periods of drought is highly recommended for any activity not requiring treated water; this includes but is not limited to; agricultural, industrial, commercial and irrigation uses.

4.4 It is essential that the jurisdictions of the Lowcountry initiate a well head protection program and a source water management plan under supervision of the EPA and South Carolina Rural Water Association (SCRWA). By determining the amount of fresh drinking water the Lowcountry has in reserve at any given point during the year, a pre-drought management plan can be established to ensure that all of the Region's residents will have sufficient water resources available to them. A 1-year, 5-year, 10-year, and 25-year drought level will be incorporated into the source water management

plan to ensure that a sufficient amount of fresh water will be available to the population of the Lowcountry during any of the previous mentioned four drought levels.

4.5 It is the policy of the Lowcountry to initiate a water valve exercise program. This program will ensure that in the case of need, all public water main valves within the counties of Beaufort, Colleton, Hampton, and Jasper will function effectively and that any valve found to be in need of repair will be replaced/repaired as soon as possible.

4.6 Small, public or private domestic wastewater treatment facilities are considered temporary facilities. These are temporary facilities and therefore are NOT to be expanded, unless there is no other alternative available. However, connection to a Regional wastewater collection system, public or private, is encouraged. 4.7 Where deemed acceptable and in the best interest of water treatment effectiveness and efficiency, treatment facilities will be consolidated. This consolidation is to increase water quality and treatment effectiveness, as well as to decrease unneeded temporary facilities and spending.

4.7 All new Comprehensive Plans and other land use plans and zoning ordinances and other relevant codes (both county and city/town) in the four-county Region have provisions to encourage growth near existing built-up areas with wastewater collections systems. This will deter uncontrolled sprawl and eliminate 'leap frog' development, thus discouraging additional residential growth that uses of septic systems.

5.0 Identify water quality and quantity targets to be met by 2025

5.1 DHEC Standards to be met by 2025	
5.2 Outstanding Resource Waters (ORW)	
Items	**Standards**
a. Garbage, cinders, ashes, oils, sludge, or other refuse.	None allowed.
b. Treated wastes, toxic wastes, deleterious substances, colored or other wastes, except those given in (a) above.	None allowed or in combination with other substances or wastes in sufficient amounts to be injurious to reproducing trout populations in put, grow, and take waters or in any manner to adversely affect the taste, color, odor, or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
c. Toxic pollutants	Standards prescribed by DHEC.
d. Storm water and other NPS runoff including that from agricultural uses or permitted discharge from aquatic farms, concentrated aquatic animal production facilities, and uncontaminated ground water from mining.	Allowed if water quality necessary for existing and classified uses shall be maintained and protected consistent with Anti-degradation Rules.
e. Dissolved Oxygen	Not less than 6 mg/l.
f. Fecal coliform	Not to exceed 4/100ml per sample.
g. pH	Between 6.0 and 8.0.
h. Temperature	Not to vary from levels existing under natural conditions, unless determined that some other temperature shall protect the classified uses.
i. Turbidity	Not to exceed 10 Nephelometric Turbidity Units (NTU) or 10% above natural conditions provided existing uses are maintained.

5.3 Trout Waters	
Items	**Standards**
a. Garbage, cinders, ashes, oils, sludge, or other refuse.	None allowed.
b. Treated wastes, toxic wastes, deleterious substances, colored or other wastes except those given in (a) above.	None allowed or in combination with other substances or wastes in sufficient amounts to be injurious to reproducing trout populations in put, grow, and take waters or in any manner to adversely affect the taste, color, odor, or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
c. Toxic pollutants	Standards prescribed by SCDEHC.
d. Dissolved Oxygen	Daily average not less than 5.0mg/l with a single day observation low of 4.0mg/l.
e. Fecal coliform	Not to exceed 4/100ml per sample.
f. pH	Between 6.0 and 8.5
g. Temperature	The water temperature shall not exceed 5 degrees Fahrenheit above natural conditions and shall not exceed a maximum temperature of 90 degrees Fahrenheit as a result of discharge of heated liquids.
h. Turbidity	Not to exceed 50 NTUs provided existing uses are maintained.

5.4 Fresh Waters	
Items	**Standards**
a. Garbage, cinders, ashes, oils, sludge, or other refuse.	None allowed.
b. Treated wastes, toxic wastes, deleterious substances, colored or other wastes except those given in (a).	None allowed or in combination with other substances or wastes in sufficient amounts to be injurious to reproducing trout populations in put, grow, and take waters or in any manner to adversely affect the taste, color, odor, or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
c. Toxic pollutants	Standards prescribed by DHEC.
d. Dissolved Oxygen	Daily average not less than 5.0mg/l with a single day observation low of 4.0mg/l.
e. Fecal coliform	Not to exceed 4/100ml per sample.
f. pH	Shall not vary more than 3/10 of a pH unit above or below that of effluent free waters in the same geological area having a similar total salinity, alkalinity and temperature, but not lower than 6.5 or above 8.5.
g. Temperature	Water temperature shall not exceed 4 degrees Fahrenheit above natural conditions during fall, winter, or spring, and shall not exceed 1.5 degrees Fahrenheit above natural conditions during the summer as a result of the discharge of heated liquids.
h. Turbidity	Not to exceed 25 NTUs provided existing uses are maintained.

5.5 Shellfish Harvesting Waters	
Items	**Standards**
a. Garbage, cinders, ashes, oils, sludge, or other refuse.	None allowed.
b. Treated wastes, toxic wastes, deleterious substances, colored or other wastes except those given in (a).	None allowed or in combination with other substances or wastes in sufficient amounts to be injurious to reproducing trout populations in put, grow, and take waters or in any manner to adversely affect the taste, color, odor, or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
c. Toxic pollutants	Standards prescribed by DHEC.
d. Dissolved Oxygen	Daily average not less than 5.0mg/l with a single day observation low of 4.0mg/l.
e. Fecal coliform	Not to exceed 4/100 ml per sample.
f. pH	Shall not vary more than one-half of a pH unit above or below that of effluent few waters in the same geological area having a similar total salinity, alkalinity and temperature, but not lower than 6.5 or above 8.5.
g. Temperature	Water temperature shall not exceed 4 degrees Fahrenheit above natural conditions during fall, winter, or spring, and shall not exceed 1.5 degrees Fahrenheit above natural conditions during the summer as a result of the discharge of heated liquids.
h. Turbidity	Not to exceed 25 NTUs provided existing uses are maintained.

5.6 SA Tidal Salt Waters	
Items	**Standards**
a. Garbage, cinders, ashes, oils, sludge or other refuse.	None allowed.
b. Treated wastes, toxic wastes, deleterious substances, colored or other wastes except those given in (a).	None allowed or in combination with other substances or wastes in sufficient amounts to be injurious to reproducing trout populations in put, grow, and take waters or in any manner to adversely affect the taste, color, odor, or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
c. Toxic pollutants	Standards prescribed by DHEC.
d. Dissolved oxygen	Not less than 4.0mg/l.
e. Fecal coliform	Not to exceed 4/100ml per sample.
f. pH	Shall not vary more than one-half of a pH unit above or below that of effluent few waters in the same geological area having a similar total salinity, alkalinity and temperature, but not lower than 6.5 or above 8.5.
g. Temperature	Water temperature shall not exceed 4 degrees Fahrenheit above natural conditions during fall, winter, or spring, and shall not exceed 1.5 degrees Fahrenheit above natural conditions during the summer as a result of the discharge of heated liquids.
h. Turbidity	Not to exceed 25 NTUs provided existing uses are maintained.

5.7 SB Tidal Salt Waters	
Items	**Standards**
a. Garbage, cinders, ashes, oils, sludge or other refuse.	None allowed.
b. Treated wastes, toxic wastes, deleterious substances, colored or other wastes except those given in (a).	None allowed or in combination with other substances or wastes in sufficient amounts to be injurious to reproducing trout populations in put, grow, and take waters or in any manner to adversely affect the taste, color, odor, or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
c. Toxic pollutants	Standards prescribed by DHEC.
d. Dissolved oxygen	Not less than 4.0mg/l.
e. Fecal coliform	Not to exceed 4/100ml per sample.
f. pH	Shall not vary more than one-half of a pH unit above or below that of effluent few waters in the same geological area having a similar total salinity, alkalinity and temperature, but not lower than 6.5 or above 8.5.
g. Temperature	Water temperature shall not exceed 4 degrees Fahrenheit above natural conditions during fall, winter, or spring, and shall not exceed 1.5 degrees Fahrenheit above natural conditions during the summer as a result of the discharge of heated liquids.
h. Turbidity	Not to exceed 25 NTUs provided existing uses are maintained.

5.8 These pollutant levels are to be monitored by all wastewater treatment facilities as prescribed by DHEC.

6.0 Illustrate the recognition of, and the commitment to, the preservation and rehabilitation of the Lowcountry's water systems

6.1 All of the counties, cities and towns of the Lowcountry should follow the policies, rules, and regulations to ensure the preservation of water quality and quantity as well as the revitalization of the area's water systems and basins.

6.2 Any persons found to be involved in an activity that does not conform to the policies listed in this section will be encouraged to rectify their problem(s).

6.3 It is the Lowcountry Council of Government's responsibility to update and amend this management plan on a regular schedule of every five years to ensure that all polices are in the best interest of the area's watersheds and basins. It is also the responsibility of the Lowcountry Council of Governments to ensure that all Water Quality Management Agencies and all Service Agencies are adhering to and complying with this Water Quality Management Plan. Each county in the Lowcountry will be responsible for incorporating this 208 Water Quality Management Plan into their County Comprehensive Plan in the form of an appendix.

6.4 All residential, commercial, and industrial land uses and water system users in the Region are responsible for the continued water quality revitalization and are, therefore, accountable for its deterioration.

6.5 LCOG values the relationship between land use planning and water quality management. Proper planning practices will be implemented to reflect that relationship, establish environmental integrity, and ensure the Lowcountry maintains its historical, natural, and cultural character.

6.6 To promote good land use planning and comprehensive plan conformance, proposals will be assessed by LCOG, as the Water Quality Planning Agency, and DHEC to determine what is in the best interests of the surrounding area, including all natural and built environments.

6.7 If a sewer project is located within an area that a local government has determined will not be served by wastewater and this determination is described by an adopted comprehensive plan and supporting ordinances, the sewer project shall be determined to be not in conformance with the Lowcountry Area Wide Water Quality Management Plan. However, septic systems located in the same area will be considered to be in conformance with the Lowcountry Area Wide Water Quality Management Plan. Please refer to Policy 2.7 for further information.

6.8 Where applicable, communities across the region should explore the implementation of regional water authorities to reduce operational costs, strengthen infrastructure, expand services, expand economic development by pooling resources, and consolidating services.

6.9 Water quality will be measured by, at the minimum, the following components;

- Temperature
- Turbidity
- Bacterial counts
- Oxygen levels
- Nutrient levels.

7.0 The identification and protection of significant hydrological resources

7.1 The counties of Colleton, Hampton, and Jasper should take a similar approach to that of Beaufort County and prepare and implement a Special Area Management Plan, or SAMP, in order to determine areas of environmental significance and to protect those lands from development, contamination, and pollution.

7.2 All water bodies that are added to the section 303(d) list are to be classified as top priority for cleanup. Any Total Maximum Daily Loads (TMDLs) for those listed are to be recalibrated immediately. All NPDES permits on these water bodies are also to be reassessed to determine if permits are to be decreased or revoked. As the section 303(d) list is updated every 2 years, it will be the policy of all four counties in the Lowcountry that when each new list is released each county will cross check their water bodies with the 303(d) list and take the appropriate measures as outlined above.

7.3 It is understood that much of the rapid growth and urban sprawl in the Lowcountry has occurred due to the abundance of water resources and environmental setting in the Region. Therefore, any new development or land use in the Region that is to cause uncontrolled detrimental effects to the water systems (this includes the development of environmentally significant areas) of the Lowcountry will not be permitted and that tract of land will not be disturbed.

7.4 Areas of pristine water condition or those located in environmental protection areas (EPAs) will be identified and protected under policy of the WQMP and in conjunction with the Beaufort County Special Area Management Plan (SAMP) and all other county SAMPs to be completed. This will be done by use of restrictive zoning and/or extremely strict inflow and infiltration limits.

7.5 All marine life, (mammal, fish, invertebrates, and vegetation) shall be given the appropriate amount of pollutant-free habitat to positively contribute to the surrounding ecosystems

Chapter 7 - Administrative Procedures

Overview

The administrative procedures of this 208 WQMP are significant in the implementation of the previously explored policies. There are three main procedures that the Lowcountry Council of Governments (LCOG) utilizes in implementing the WQMP:

- public participation,
- conformance review, and
- amendment procedures

Public Participation

Public participation is essential in all aspects of the planning process; with regard to the 208 WQMP, the public is involved in almost all activities outlined in this document, as stated in section 208 of the Clean Water Act. The public are also given the opportunity to participate in any revision or amendment proposed for this 208 WQMP, via public hearings set up by the LCOG planning staff.

As the Water Quality Planning Agency, LCOG will ensure that the public is notified and included in the necessary activities that correspond with the WQMP, these are;

- The creation and implementation of the 208 WQMP
- Any amendments or changes made to the 208 WQMP
- Advertising any proposed developments or projects involving major water quality or quantity impacts in the Lowcountry that do not require amendments
- Advertising any private or public presentation of Lowcountry water quality concerns or issues
- Providing regular reports to the LCOG Board of Directors on water quality issues

LCOG will be responsible for ensuring that the public is given 30 days' notice for any hearing regarding any one or combination of activities previously mentioned. In the event of an amendment that includes the development of a new Wastewater Treatment Facility (WWTF) or the expansion of such facility, the public shall be given ample opportunity to view and comment on the proposed amendment on at least two different occasions. The first being the initial public hearing and a second to allow for the public to view any changes that have been made with respect to the previous public hearing and any professional meetings that have occurred in between. LCOG will also ensure that the 208 Water Quality Committee, (see amendment procedures below) comprised of representatives from the LCOG Board of Directors, representatives of all four counties and municipalities, DHEC representatives (non-voting), and representatives from the Coastal Conservation League be involved in all of the previously mentioned activities of the 208 WQMP. They will also be offered at least two occasions for which to view any proposed large scale development as defined above, and they may also require a third meeting if the proposed development does not successfully satisfy their requirements.

Conformance Review

Before private citizens, municipal or other government authorities, or private companies, may start construction or development on any type of structure requiring wastewater treatment, they must apply for a 208 certification. One of LCOG's responsibilities is to perform conformance reviews for all proposed sewer and sewer-related projects in the Lowcountry.

A 208 certification is required for any and all of the following:

- preliminary engineering reports,
- construction permit applications, plans and specifications, except those listed in Section 67.100.E.8.b of the DHEC R 61-67: Standards for Wastewater Facilities Construction, as outlined below:
  - modifications to wastewater treatment facilities that do not result in increased capacity
  - groundwater remediation projects
  - construction permits within the scope of a previously approved engineering report, which has not expired
  - industrial wastewater facilities, including collection and treatment systems, when 208 Plan consistency has been previously determined
  - relocation of existing sewer lines where the downstream facilities (e.g. the wastewater treatment facility receiving the wastewater) would remain the same, and

When feasible it is in the best interest of the developer and the environment to use public wastewater services, both delivery and disposal. However, in some circumstances it is necessary for a development to use a septic system, or another private on-site treatment system. Although this 208 WQMP deems on-site wastewater treatment practices or septic tanks as a last resort option, in some circumstances they can be used with minimal environmental degradation. In this situation the 208 conformance review is of great importance and must be conducted thoroughly to ensure that the area's watersheds are not detrimentally affected.

Through a memorandum of agreement with DHEC, LCOG certifies project conformance with the 208 WQMP. DHEC requires a five (5) business day turnaround on 208 conformance reviews starting from the date the application is received by LCOG. The turnaround time can be paused by LCOG at any time during the five day period by informing DHEC that additional information is needed or that a plan amendment is required. LCOG's conformance review process consists of three levels:

1. All 208 applications are sent from LCOG to the Management Agency in which the development will reside, to give that agency the opportunity to determine if the proposed development conforms to infrastructure and/or Comprehensive Plan. All jurisdictions that have approved Comprehensive Plans will utilize that document for 208 evaluations. If the development does conform with the Management Agency's plan and to the 208 WQMP, the proposed development will be certified by LCOG within the five day turnaround period. However, if the development conflicts with either the Management Agency's infrastructure or comprehensive plan or the 208 WQMP,changes must be made to the development or an amendment will be required.

2. Projects requiring plan amendments must follow the amendment procedures as well as give second notification to the corresponding Management Agency to provide a second opportunity to review the project or development to determine compliance with their infrastructure or comprehensive plan and to comment before the amendment is voted on by LCOG's Board of Directors. The Management Agencies will have an additional fifteen (15) calendar days to study the project or development and make comments or suggestions before the LCOG Board of Directors are to vote. DHEC's five day turnaround is paused until the board votes on the amendment.

Projects that do not require a plan amendment, but involve the expansion of an existing facility's capacity by less than 25% require that the Management Agency in whose jurisdiction the project is located be notified for a second time and will determine if the project is in conformance with their infrastructure or comprehensive plan. The Management Agency is given an additional fifteen (15) calendar days to determine conformance of the project. The Management Agency must then either give or deny consent to the project before conformance certification. DHEC's five day turnaround is paused until the Management Agency responds to the project consent request.

Amendment Procedures

The 208 WQMP may be amended any time at the discretion of the LCOG Planning Department and LCOG Board of Directors. Plan Amendments must be approved or denied by the LCOG Board of Directors.

Plan amendments are required for the following:

- Conversion or reuse of the whole or any part of a previously operated WWTF that has ceased activity, regardless of total elapsed time from cease of activity.

- Any proposed project or development which conflicts with any one or combination of goals and/or objectives that are outlined in this 208 WQMP.

- Proposals affecting the designated service or planning areas of two or more designated management agencies, which do not include appropriate agreements between those agencies.

- Proposals that require amendment's to the town, city or county's Comprehensive Plan.

- Proposals to designate or de-designate new management agencies, while requiring an amendment to the Plan, are the responsibility of DHEC and will be considered administrative changes and will not be subject to the following procedures.

The following procedures shall apply to projects of developments requiring an amendment to the 208 WQMP:

1. Applicant shall prepare Plan Amendment request to include any information deemed necessary by LCOG staff to complete staff review.

2. The LCOG planning staff shall review the application and issue a staff report and recommendation within fifteen (15) calendar days of the receipt of the application. During that period LCOG will circulate the amendment application to the local management agency or agencies that the amendment will affect. The management agency or agencies shall review the application and supporting information and determine if it is in conformance with any applicable comprehensive plans. Also, if a SAMP is available then a determination of SAMP conformance will be required. When completed, the management agency or agencies will submit a final recommendation to the LCOG planning staff for incorporation in the staff report.

3. LCOG planning staff will present the staff report and recommendations to the Water Quality Management (208) Committee. Based on nearly 10 years of experience with this procedure, for the purposes of endorsing or not endorsing staff recommendations, the voting members of the 208 Committee for any one proposed amendment shall be:

    - Four (4) members of the LCOG Board of Directors, one from each county

    - A representative of the Management Agency in which the project is located

    - A non-voting representative of DHEC

    - A representative of the Coastal Conservation League

All other members of the 208 Committee shall be *ex officio* for that amendment. The committee will decide whether or not to endorse the staff recommendations. The committee's decision will then be forwarded to the LCOG Board of Directors.

4. Prior to review by the LCOG board for action, a public hearing, advertised by a 30-day notice in the appropriate newspaper(s) of record, shall be conducted; LCOG may hold a separate public hearing for high profile or potentially controversial amendments.

5. The LCOG Planning Department will then create a second staff report that will include information from all previously mentioned agency reports/recommendations and all meetings within fifteen (15) days of the final public meeting. This report will be delivered to the LCOG Board of Directors who will make its decision for amendment approval or denial.

6. Finally, the Governor or the Governor's designee shall certify by letter to the Regional Administrator for EPA approval that WQMP major plan updates are consistent with all other parts of the plan. The certification may be contained in the annual State work program.

Chapter 8 - Conclusions

The preparation of this WQMP has involved LCOG as well as local and state agencies. LCOG is the central organization responsible for administering thePlan and coordinating the water quality needs of the four-county Region.

Implementation

Implementing the WQMP involves actions by LCOG, local management agencies, and the State. By and large, these actions consist of continuing the programs already in place for administration of the WQMP, with a renewed emphasis on aspects that may shift the focus of water quality protection. By adopting the 208 Plan Update for 2012 as the Lowcountry WQMP, all previous plan revisions and updates, and all past amendments, will be superseded.

On the Regional level, LCOG is the focal point for administering the WQMP. Its Board has the responsibility to approve and amend the WQMP. The activities related to the Plan performed by the LCOG include, but are not limited to adopting, amending, and updating; establishing Regional policies; and reviewing plans submitted by the management agencies, private utilities, and developers to determine whether they conform to the Plan and the policies of the LCOG.

Because the management agencies own and operate most of the infrastructure systems that affect wastewater management, they are charged with planning, designing, constructing, operating, funding, and administering their systems. Through these actions they implement the recommendations of the WQMP. The Plan sets forth the Regional perspective for wastewater management that is in accord with water quality protection. The management agencies use the Regional perspective to guide formulation of their individual programs. The management

agencies work at a greater level of detail regarding facilities and infrastructure than is provided in the coordinated Regional plan.

Appendix

Acronyms

AIWW – Atlantic Inter-coastal Water Way
BJWSA – Beaufort Jasper Water Sewer Authority
BMP – Best Management Practice
C-CAP – Coastal Change Analysis Program
CNPCP- Coastal Nonpoint Source Pollution Control Program
COG – Council of Governments
DHEC – Department of Health & Environmental Control
EPA – Environmental Protection Agency or Environmentally Protected Area
HAZMAT – Hazardous Material
LCOG – Lowcountry Council of Governments
MLRA – Major Land Resource Area
NPDES – National Pollutant Discharge Elimination System
NPDES II – Nation Pollution Discharge Elimination System Phase II
NPSP – Nonpoint Source Pollution
PSD – Public Service District
PSP – Point Source Pollution
DHEC – South Carolina Department of Health and Environmental Control
SCRWA – South Carolina Rural Water Association
SAMP – Special Area Management Plan
TMDL – Total Maximum Daily Load
USDA – Unites States Department of Agriculture
USGS – United States Geological Survey
WQMP – Water Quality Management Plan
WWTF - Waste Water Treatment Facility
WWTP – Waste Water Treatment Plant

Sediment Ponds – A man made pond created in an area that is currently being developed and is experiencing extensive landscaping. This pond is designed to trap various types and sizes of sediment during periods when the surrounding sediment could experience transportation. This structure therefore, decreases the amount of sediment that could end up in the surrounding rivers and streams, possibly choking out aquatic life.

[Photo: USGS Website]

Sediment (silt) Fence – A short fence, usually 2-3 ft. high made of a fairly dense material that slowly allows water to pass through while trapping various sediments. The fence is located on a slope and is used to decrease if not eliminate sediment transportation from up-slope construction areas to down-slope rivers and streams.

[Photo: www.oli.tafe.net]

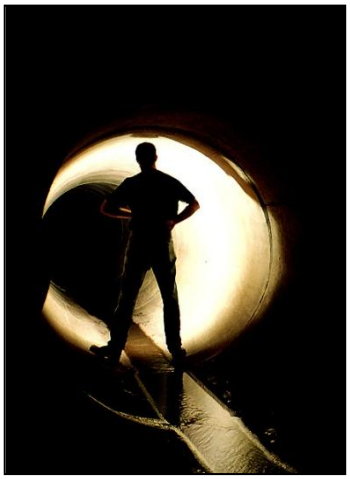
Berm – A berm is a large pile of dirt, used to trap surface runoff and sediments from further transportation. These piles of dirt can be used during preliminary landscaping or construction of an area in order to limit the amount of surface runoff and erosion or they can be created after significant landscaping has occurred to a given area in order to prevent harmful erosion to occur in surrounding areas as a direct result of the new formation or changes to previous landscape. When used in the second situation many such berms are sodded over to be aesthetically pleasing.

Dirt Berm:

Berm with Grass Cover

Carolina Mulch Plus

Catch Basins – A catch basin is a network of channels that directs urban runoff to a wetland or stream in a nearby area. Catch basins are usually found below the curbs of streets and are protected by a large metal grate that only allows water and sediment to flow into the water channels. Catch basins however, do not provide any type of filtration system to stop sediment from entering natural water systems and are thus not the preferred measure for controlling urban runoff.



Inside Catch Basin Water Channels

Catch Basin Flow into Creek/River

[Photos: www.nyx.net]

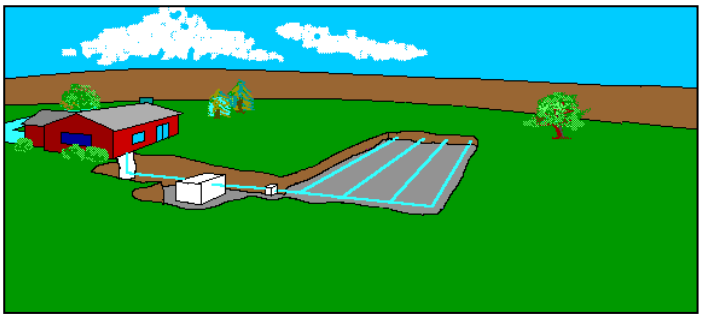
Estuary – A partially closed body of water where fresh water systems and rivers mix with salt water inlets from the ocean. Estuaries are located along the coastal Regions and may be found in the forms of rivers, streams, and/or wetland and marshes. These areas filter out many toxins that are introduced to the fresh water systems before they can reach the ocean. They also provide habitat for a large variety of vegetation, fish, and animal life.

[Photo: www.lavaurs.com]

Rain Barrel – A rain barrel is a large container normally made of plastic that is located directly below the roof gutter down spout of your home. The down spout directly deposits the roof runoff into the rain barrel, thus storing water that would otherwise turn into urban runoff. At the bottom of the rain barrel there is a tap that can be connected to a garden hose allowing the water to be transported and used when needed, thus saving and conserving the water from the public system.

[Photo: www.ne-design.net]

Septic Systems – A septic system is used when a home or other structure requiring wastewater disposal is not attached to a public wastewater system. The septic system is comprised of three main parts. First, a sewer pipe is put in place that connects the house to the septic tank; this pipe transports the wastewater from the building to the tank or holding cell. The waste is then left to settle in the tank, where the solids and the liquids separate. Second, the water effluent is transported by another pipe from the tank to the absorption area. A hydraulic pump is sometimes necessary if the tank is at a lower elevation then that of the absorption area. The absorption area is normally comprised of a series of perforated pipes in a row or column formation. Thirdly, the perforated pipes allow the liquid to slowly be released into the absorption field. Microorganisms in the soil eat the organic pollutants found in the liquid effluent, therefore not allowing these pollutants to enter the surrounding water systems.



[Illustration: EPA]

Cesium-90 (radioactive) You are not likely to experience any health effects that could be related to stable cesium itself. Animals given very large doses of cesium compounds have shown changes in behavior, such as increased activity or decreased activity, but it is highly unlikely that you would breathe, eat, or drink amounts of stable cesium large enough to cause similar effects. If you were to breathe, eat, drink, touch, or come close to large amounts of radioactive cesium, cells in your body could become damaged from the radiation that might penetrate your entire body, much like x-rays, even if you did not touch the radioactive cesium. You might also experience acute radiation syndrome, which includes such effects as nausea, vomiting, diarrhea, bleeding, coma, and even death. A number of people in Brazil, who played with radioactive cesium that was stolen from a medical machine used for radiation therapy, became sick from exposure to the radiation; a few of them died. But people exposed to radioactive cesium that has been widely dispersed in air, water, soil, or food systems following nuclear bombings or accidents have not been exposed to amounts large enough to cause the same effects.

Copper is essential for good health. However, exposure to higher doses can be harmful. Long-term exposure to copper dust can irritate your nose, mouth, and eyes, and cause headaches, dizziness, nausea, and diarrhea. If you drink water that contains higher than normal levels of copper, you may experience vomiting, diarrhea, stomach cramps, and nausea. Intentionally high intakes of copper can cause liver and kidney damage and even death. We do not know if copper can cause cancer in humans. EPA has determined that copper is not classifiable as to human carcinogenicity.

Lead — The effects of lead are the same whether it enters the body through breathing or swallowing. The main target for lead toxicity is the nervous system, both in adults and in children. Long-term exposure of adults to lead at work has resulted in decreased performance in some tests that measure functions of the nervous system. Lead exposure may also cause weakness in fingers, wrists, or ankles. Some studies in humans have suggested that lead exposure may increase blood pressure, but the evidence is inconclusive. Lead exposure may also cause anemia, a low number of blood cells. The connection between the occurrence of some of these effects (e.g., increased blood pressure, altered function of the nervous system) and low levels of exposure to lead is not certain. At high levels of exposure, lead can severely damage the brain and kidneys in adults or children. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

Mercury — The nervous system is very sensitive to mercury. In poisoning incidents that occurred in other countries, some people who ate fish contaminated with large amounts of methyl mercury or seed grains treated with methyl mercury or other organic mercury compounds developed permanent damage to the brain and kidneys. Permanent damage to the brain has also been shown to occur from exposure to sufficiently high levels of metallic mercury. Whether exposure to inorganic mercury results in brain or nerve damage is not as certain, since it does not easily pass from the blood into the brain.

Strontium-137 (radioactive) — The harmful effects of radioactive strontium are caused by the physical effects of radiation and the bone-seeking behavior of strontium. Injection of radioactive strontium (89Sr), which is used medically for treating bone pain for cancers that have spread to

the bone, may reduce blood cell counts. This also occurs in animals exposed by lung or by mouth to radioactive strontium. Radioactive strontium taken up into bone, where it will be retained for a long time, will release particles of energy that damage the tissues nearby. The body has a natural mechanism to repair such damage (which is why exposure to low levels of radiation is not harmful), but in the case of a high exposure to radioactive strontium, the natural repair mechanism may not be able to keep up. At very high exposures, radiation from radioactive strontium in bone damages the bone marrow, which is the major source of blood cells in the body. Numerous problems occur when the number of blood cells is reduced. A loss of red blood cells, anemia, prevents the body from getting sufficient oxygen, so that fatigue may occur. A loss of platelets may prevent the blood from clotting properly, and may result in abnormal bleeding, especially in the digestive tract. A loss in white blood cells harms the body's ability to fight infectious disease.

Zinc —Taking too much zinc into the body through food, water, or dietary supplements can also affect health. The levels of zinc that produce adverse health effects are much higher than the Recommended Dietary Allowances (RDAs) for zinc of 11 mg/day for men and 8 mg/day for women. If large doses of zinc (10-15 times higher than the RDA) are taken by mouth even for a short time, stomach cramps, nausea, and vomiting may occur. Ingesting high levels of zinc for several months may cause anemia, damage the pancreas, and decrease levels of high-density lipoprotein (HDL) cholesterol.

Previous 208 Plan Amendments

- Amendment 5 – Objective 5 added: Support local governments' comprehensive planning efforts. The 208 WQMP is not to conflict with but rather work with all county and municipal comprehensive plans. All county and municipal governments must send LCOG a copy of their comprehensive plans once approved and provide a designated contact for conformance questions and concerns.
- Amendment 6 – The 208 Planning Agencies must prepare an annual report with regards to 208 activities and submit this to DHEC in July of each year.
- Amendment 7 – Town of Bluffton added to Management Agency.
- Amendment 8 (I) – Delta Plantation added to Service Agency and Jasper County added to Management Agency.
- Amendment 8 (II) - Hilton Head Island PSD #1 WWTP is expanded from 3.2 mgd to 6.4 mgd.
- Amendment 9 – Delta Plantation may construct a WWTP with a capacity of 55,000 gallons per day with the City of Hardeeville as owner, operator, and manager of the facility.
- Amendment 10 (I) – Additions to policy 5.2 and 5.3 found in previous plan chapter 5. Changes to policies to strengthen Objective 5 Amendment 5.
- Amendment 10 (II) – Establishment of Objective 6 in Chapter 5 with corresponding strategies and policies. Objective 6 added: Protect water quality and support local governments' infrastructure policies and plans through the location of septic systems.
- Amendment 10 (III) – Fripp Island may upgrade its WWTP to tertiary treatment and capacity from 340,000 to 750,000 gallons per day.
- Amendment 11 – Inverary Development may construct a WWTP with a capacity of 500,000 gallons per day with BJWSA as owner, operator, and manager of facilities.
- Amendment 12 – Wastewater services for Palmetto Bluff may be provided in 3 phases, with the final phase allowing for all wastewater to be sent to BJWSA Cherry Point/Okatie treatment facility.
- Amendment 13 – Town of Bluffton added to Management Agency and BJWSA as Service Agency.
- Amendment 14 – BJWSA WWTP Cherry Point may be expanded from 1.6 mgd to 3.2 mgd to coincide with the closing of Rose Hill WWTP and the eventual closing of Bluffton WWTP.
- Amendment 15 – Improvements to the on-site WWTP at Bonnie Doone Plantation.
- Amendment 16 – Withdrawn and replaced by Amendment 18.
- Amendment 17 – Existing and future customers of BJWSA in Port Royal Island Service Area will be diverted to a new facility, Port Royal WWTP. As such, Shell Point and Southside WWTP will be taken offline and replaced by the new Port Royal WWTP
- Amendment 18 – The Yemassee WWTP may be expanded from 0.26 mgd to 0.5 mgd.
- Amendment 19 – Additional residential units on Bull Point Plantation (number to be determined by DHEC) are to be serviced by a community drip irrigation system on site. Providing that this system meets all DHEC requirements and that the site and WWTF is approved by the Beaufort County Zoning Administrator.
- Amendment 20- The wastewater treatment lagoons at the closed-out BJWSA/Bluffton WWTP may be converted to spray irrigation holding ponds for the BJWSA/Cherry Point WWTP.

- Amendment 21- The Cherry Point Wastewater Treatment Plant may be expanded from a capacity of 3.2 MGD to a permitted capacity of 6.4 MGD.
- Amendment 22- The Point South Wastewater Treatment Plant may be expanded from a capacity of 125,000 GPD to a permitted capacity of 490, 000 GPD. This includes additional spray fields from 17.7 acres to 31 acres and an upgrade of the entire facility; to be completed in two phases.
- Amendment 23 – With approval from the LCOG Board, Amendment 23 will finalize this updated 208 Plan which includes current information, updated objectives, updated maps and figures, and re-formatting.

Lowcountry Watershed Photos

Blue Heron in the New River Watershed

Water discolored by cyanophytes and algal blooms in New River Watershed

Murky, turbid water in a May River Watershed marsh

Great White Heron near dying *Spartina* marsh grass in May River Watershed

Alligators resting near an island in the New River Watershed

Lake Haynes in the New River Watershed

Eroded stream bank due to development in New River Watershed

Oily sludge in the Chechesee River Estuary in the Port Royal Sound Watershed

Oily sludge in the Broad River Watershed marshlands

Turbid waters in the Chechesee River in the Port Royal Sound Watershed

Polluted effluent stream near the Morgan River in the Coosaw River Watershed

Docks intruding upon Lucy Creek in the Coosaw River Watershed

Illegal dumping on a bank of the Morgan River in the Coosaw River Watershed

Polluted stream in the Combahee River Watershed

Oily residue and water stagnation in the Combahee River Watershed

Illegal garbage dumping on the banks of a stream in the Combahee River Watershed

Heavy sedimentation in the Combahee River Watershed

Urbanization along the shoreline of the Atlantic Ocean

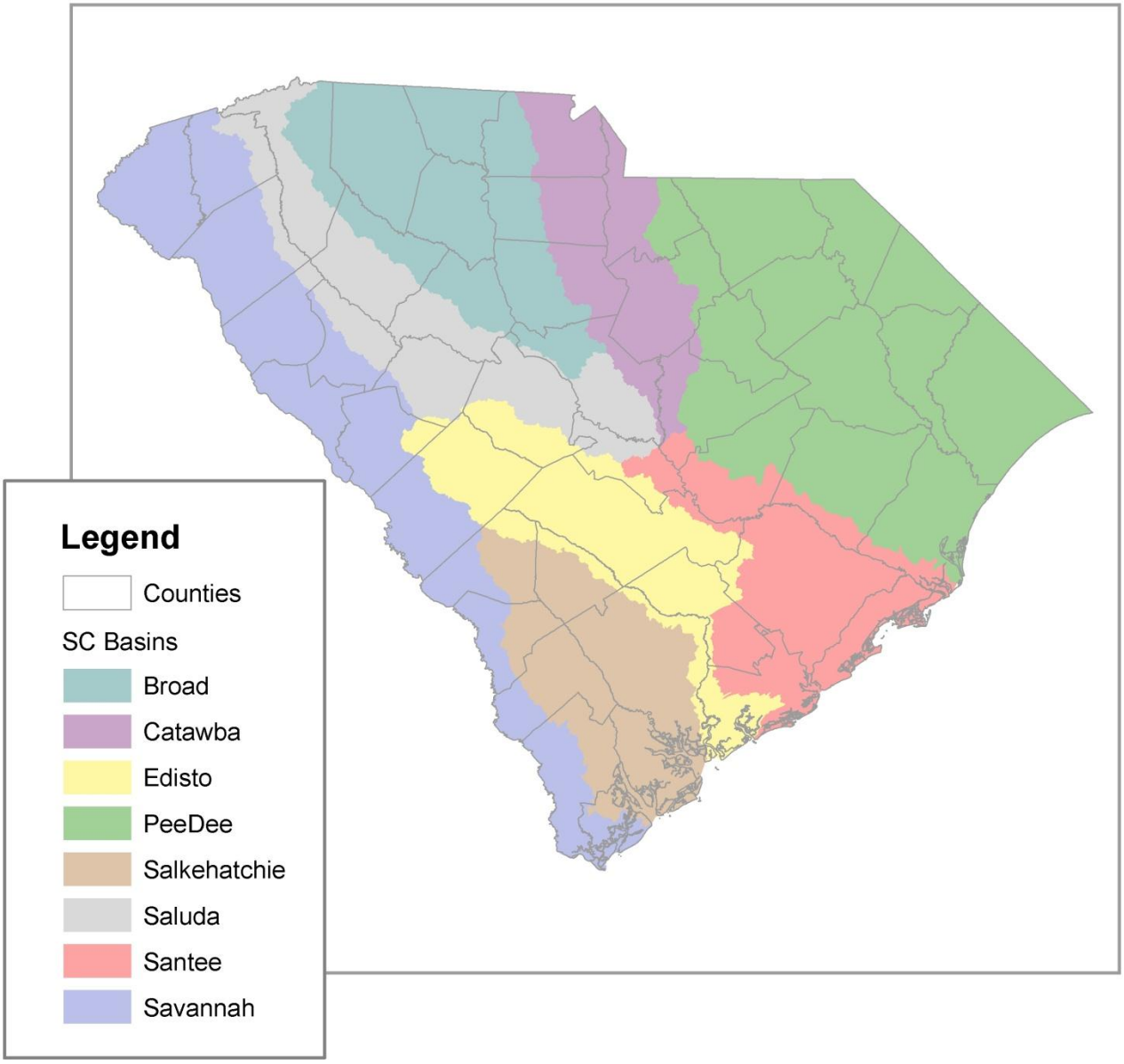
Polluted water due to urban development along the South Edisto River Watershed

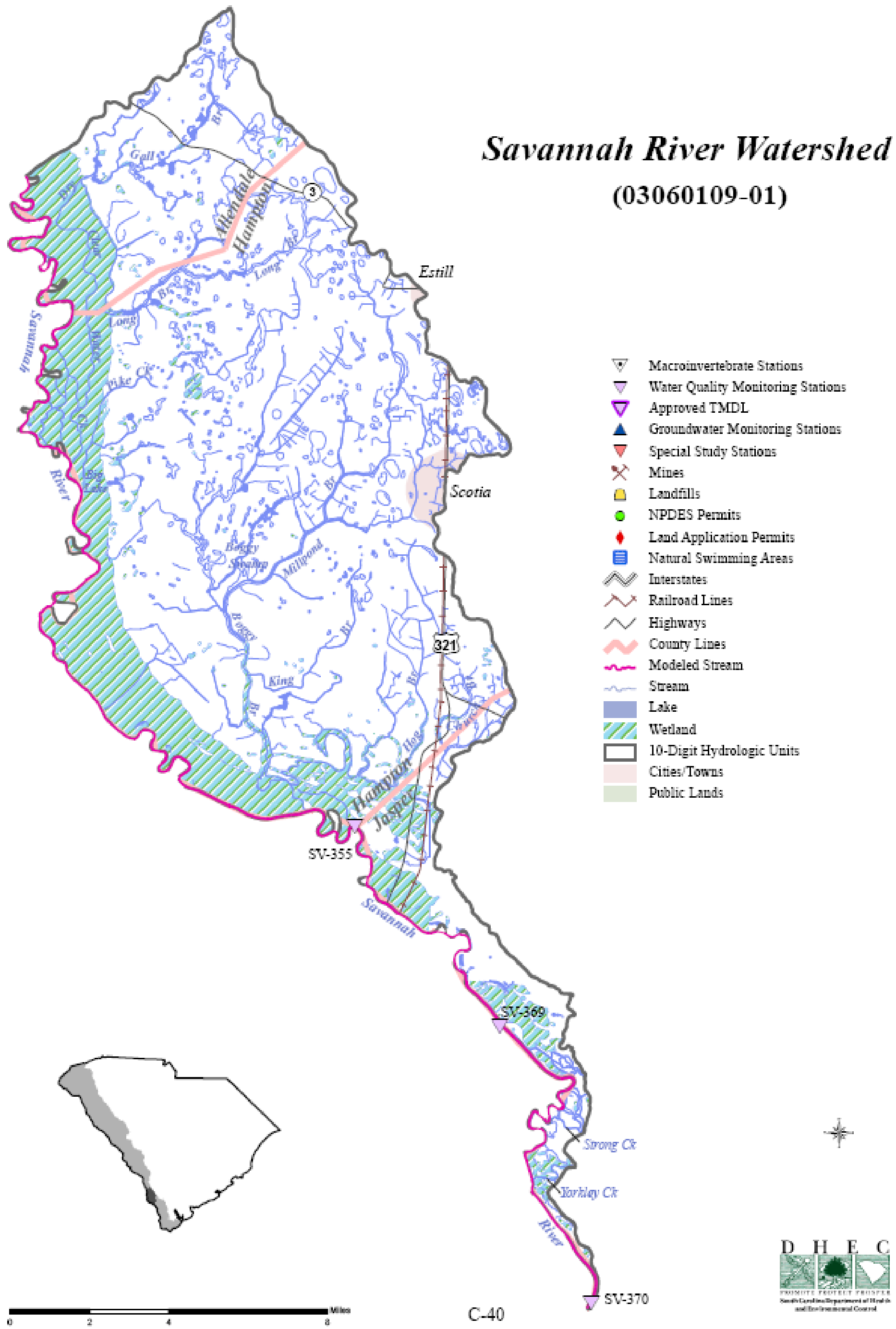
Chehaw River in the Combahee River Watershed

Heavy sedimentation in the Ashepoo River Watershed
(Photos LCOG 2010)

Basin and Watershed Maps

The following maps were produced by the SC Department of Health and Environmental Control.





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Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Wetland
10-Digit Hydrologic Units
Cities/Towns
Public Lands
Estill
Scotia
Allendale
Hampton
Jasper
321
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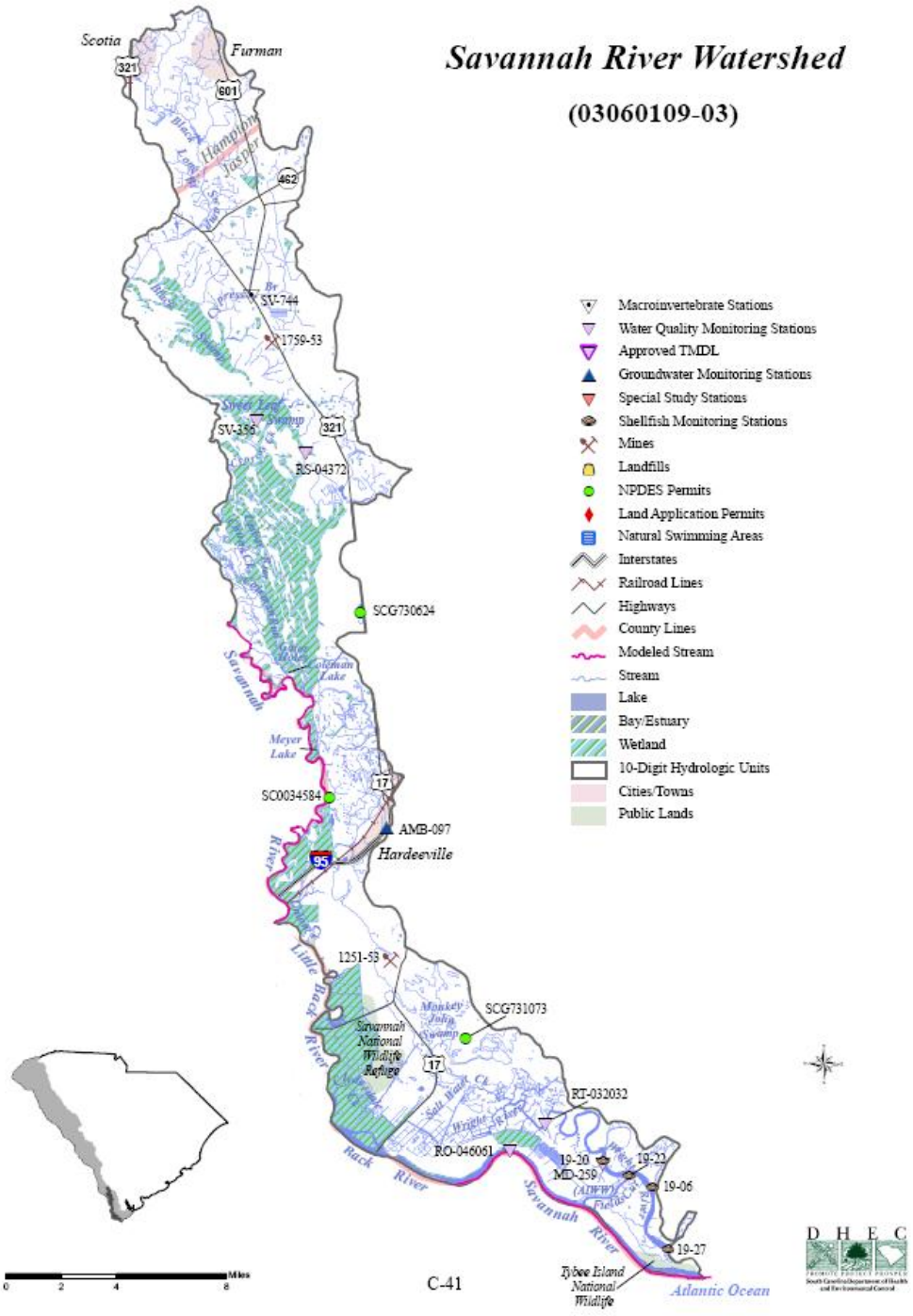
Savannah
River
SV-355
SV-369
SV-370
Strong Ck
Yorkley Ck
Miles
C-40
D H E C

24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321
601
462
Hampton
Jasper
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SV-356
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Meyer Lake
17
SC0034584
AMB-097
Hardeeville
95
1251-53
Little Back River
Savannah National Wildlife Refuge
Monkey John Swamp
SCG731073
17
RT-032032
Salt Bank Ck
Wright River
RO-046051
Back River
19-20
MD-259
(ADFW)
19-22
19-06
Savannah River
19-27
Tybee Island National Wildlife
Atlantic Ocean
C-41
Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Shellfish Monitoring Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
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Lake
Bay/Estuary
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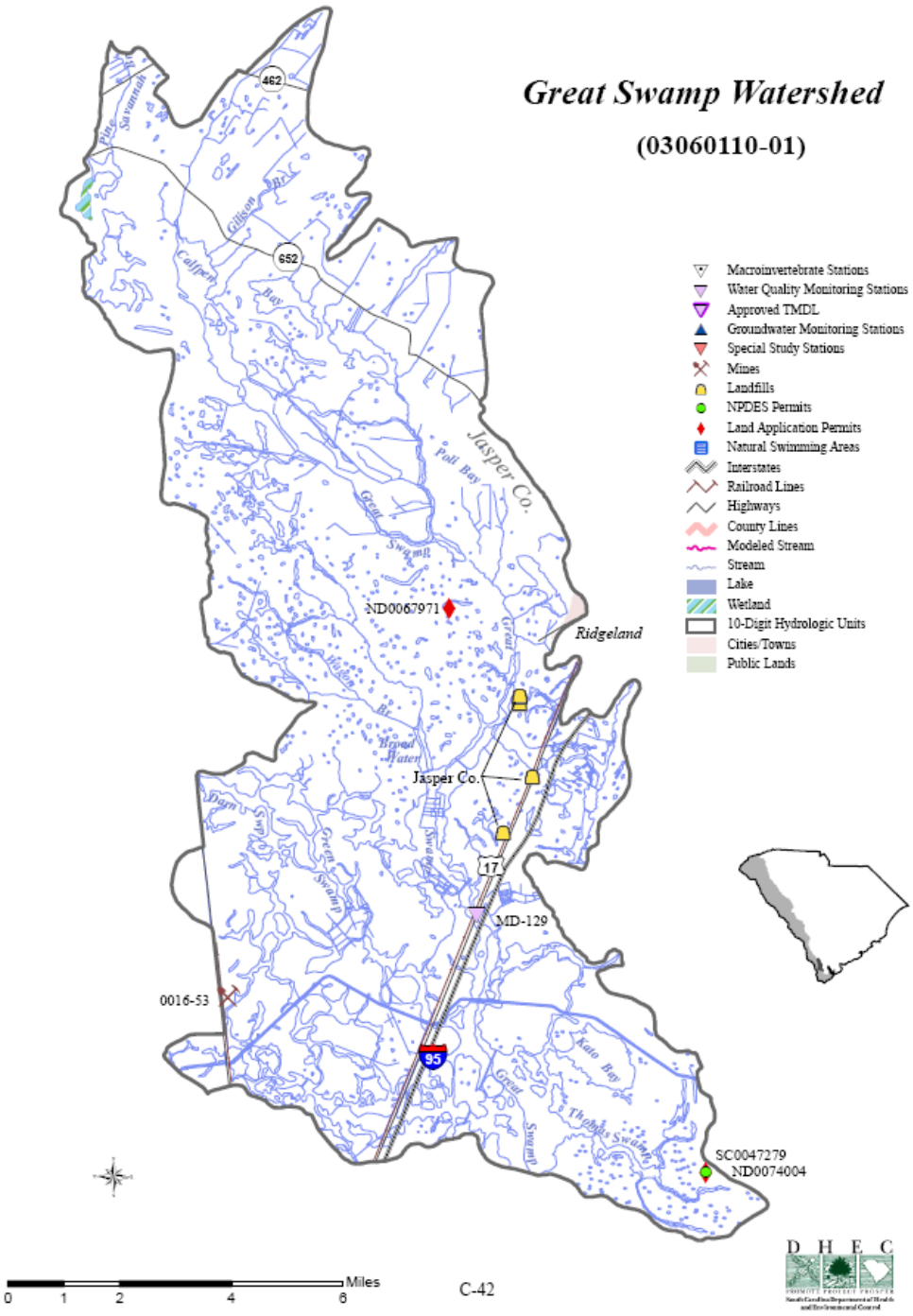
Public Lands
D H E C

25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Approved TMDL
Groundwater Monitoring Stations
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Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Wetland
10-Digit Hydrologic Units
Cities/Towns
Public Lands
462
652
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Poll Bay
Great Swamp
ND0067971
Ridgeland
Broad Water
Jasper Co.
17
MD-129
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Kato Bay
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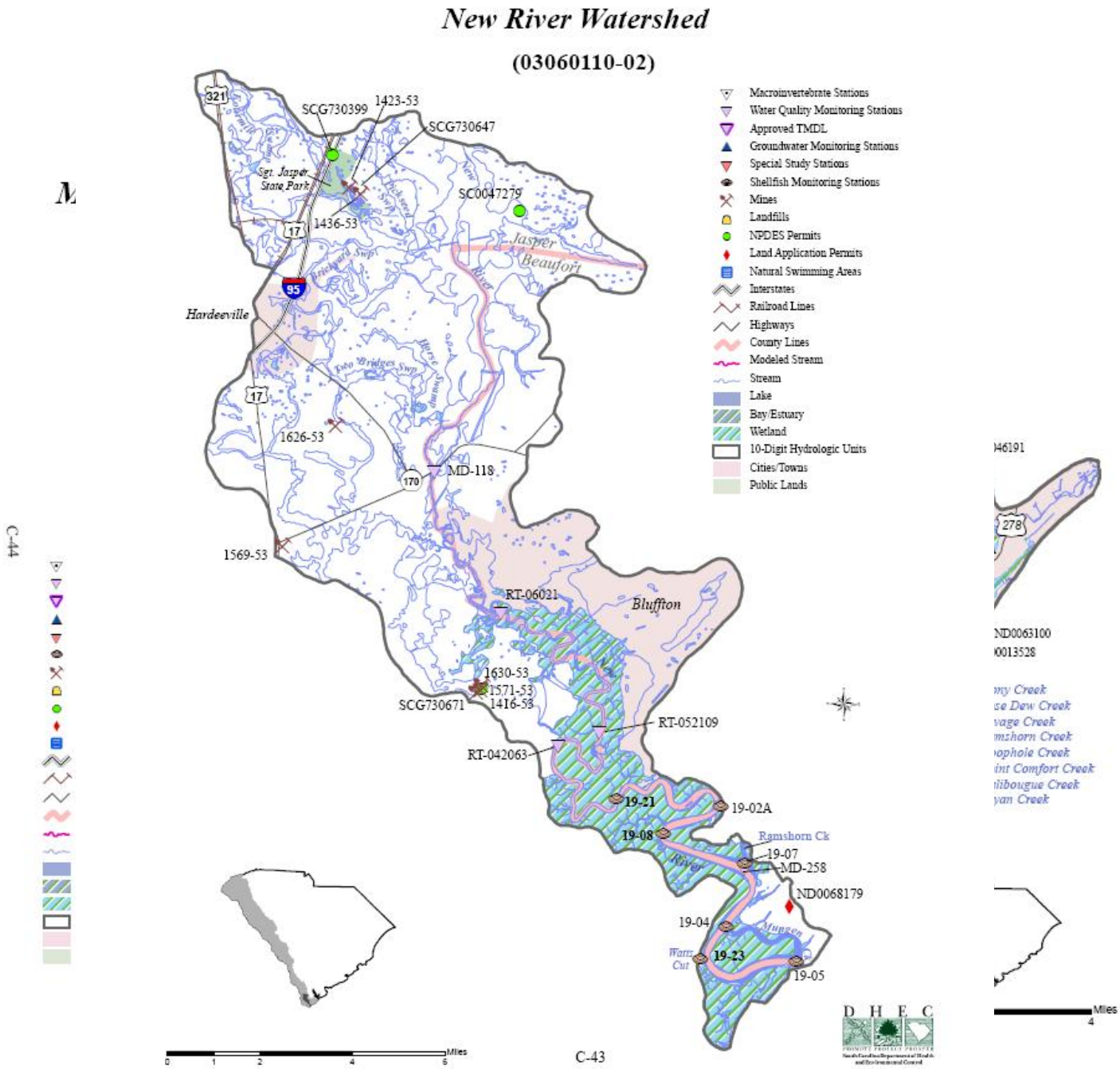
C-42
D H E C

26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Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Shellfish Monitoring Stations
Mines
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Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Bay/Estuary
Wetland
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Cities/Towns
Public Lands
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1423-53
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Sgt. Jasper State Park
Jasper
Beaufort
Hardeeville
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MD-118
1569-53
RT-06021
Bluffton
1630-53
1571-53
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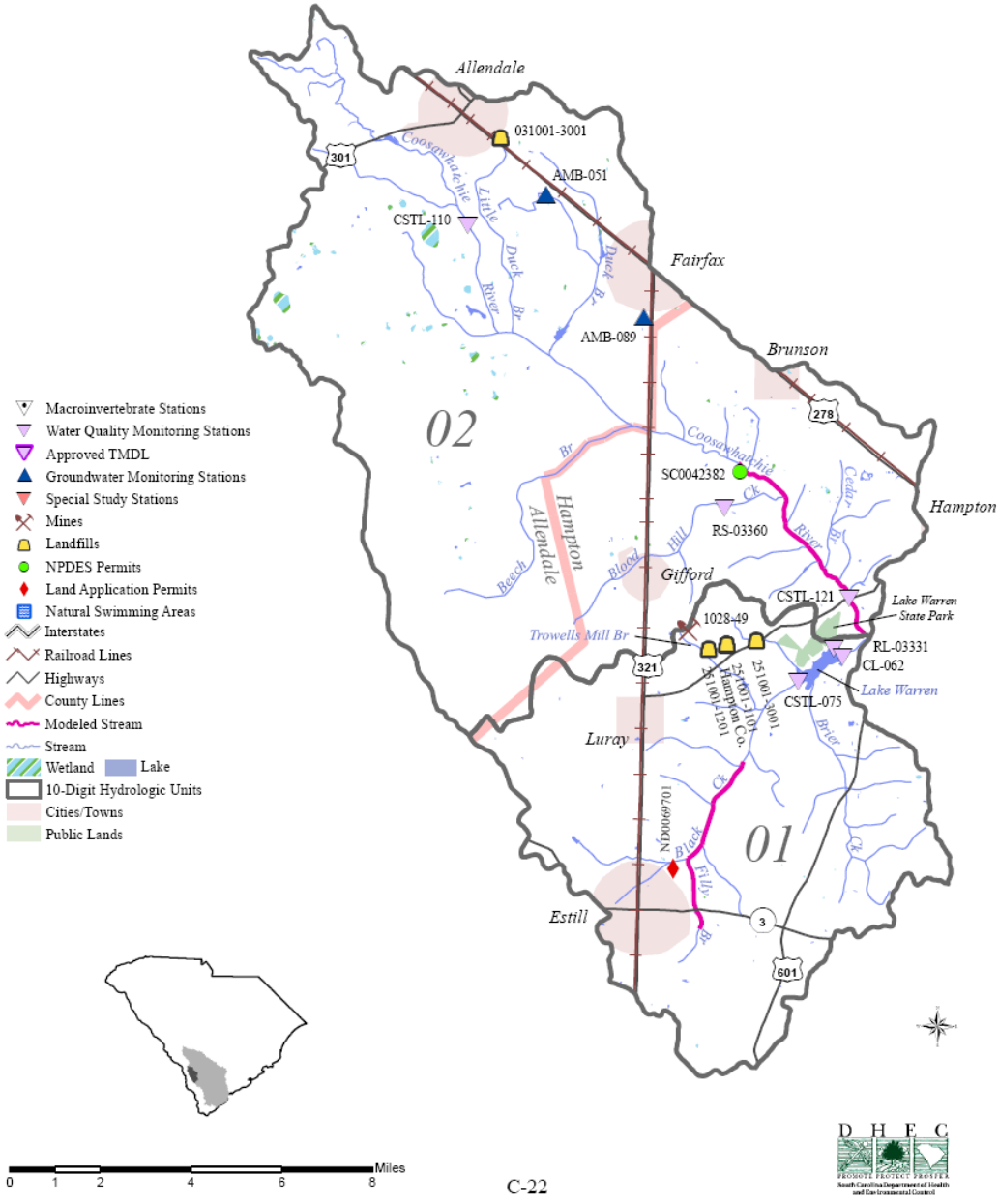
19-02A
19-08
Ramshorn Ck
19-07
MD-258
ND0068179
19-04
19-23
19-05
Watts Cut
Miles
C-43
C-44

Black Creek/Coosawhatchie River Watersheds

(03050208-01,-02)



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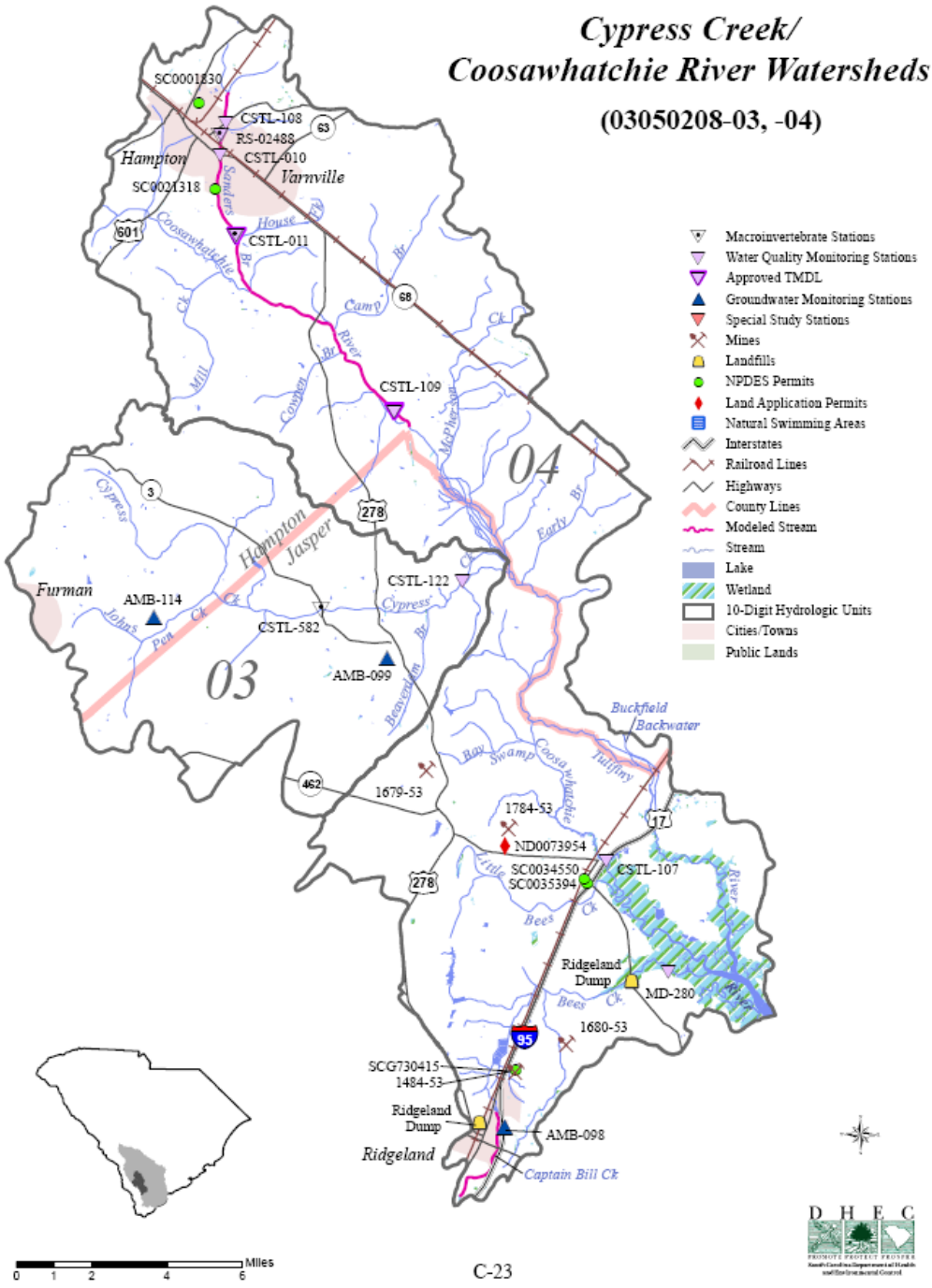
Cypress Creek/
Coosawhatchie River Watersheds
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CSTL-010
Hampton
Varnville
SC0021318
CSTL-011
CSTL-109
CSTL-122
CSTL-582
AMB-114
AMB-099
Furman
1679-53
1784-53
ND0073954
SC0034550
SC0035394
CSTL-107
Ridgeland Dump
MD-280
1680-53
SCG730415
1484-53
Ridgeland Dump
AMB-098
Ridgeland
Captain Bill Ck
Buckfield Backwater
04
03
Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
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Lake
Wetland
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Cities/Towns
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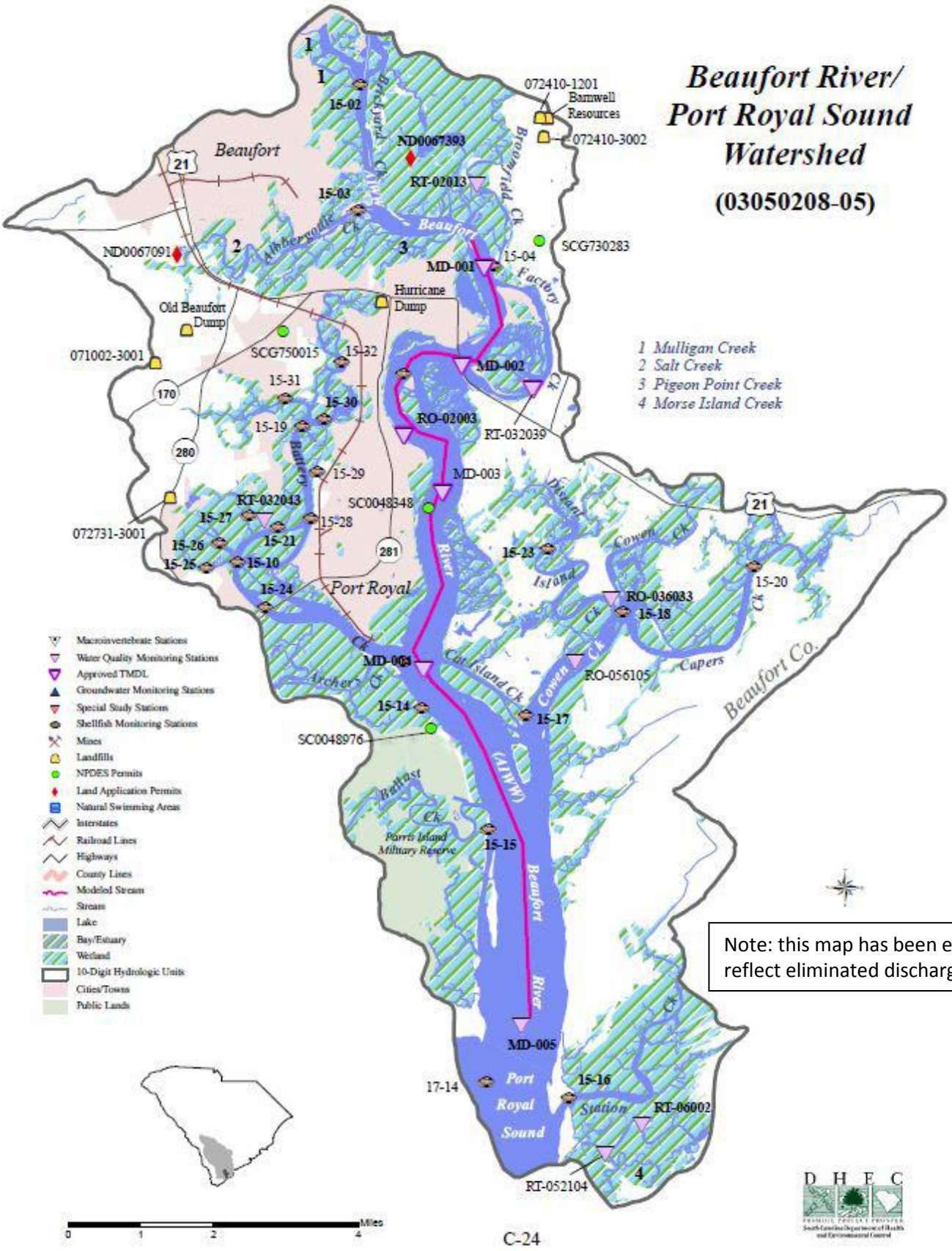
C-23


Beaufort River/
Port Royal Sound
Watershed
(03050208-05)
1 Mulligan Creek
2 Salt Creek
3 Pigeon Point Creek
4 Morse Island Creek
Beaufort
Port Royal
Beaufort Co.
Port Royal Sound
Parris Island Military Reserve
Station
072410-1201
Barnwell Resources
072410-3002
ND0067393
RT-02013
15-03
15-02
15-04
SCG730283
MD-001
Hurricane Dump
Old Beaufort Dump
ND0067091
071002-3001
SCG750015
15-32
15-31
15-30
15-19
MD-002
RO-02003
RT-032039
15-29
MD-003
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15-27
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15-21
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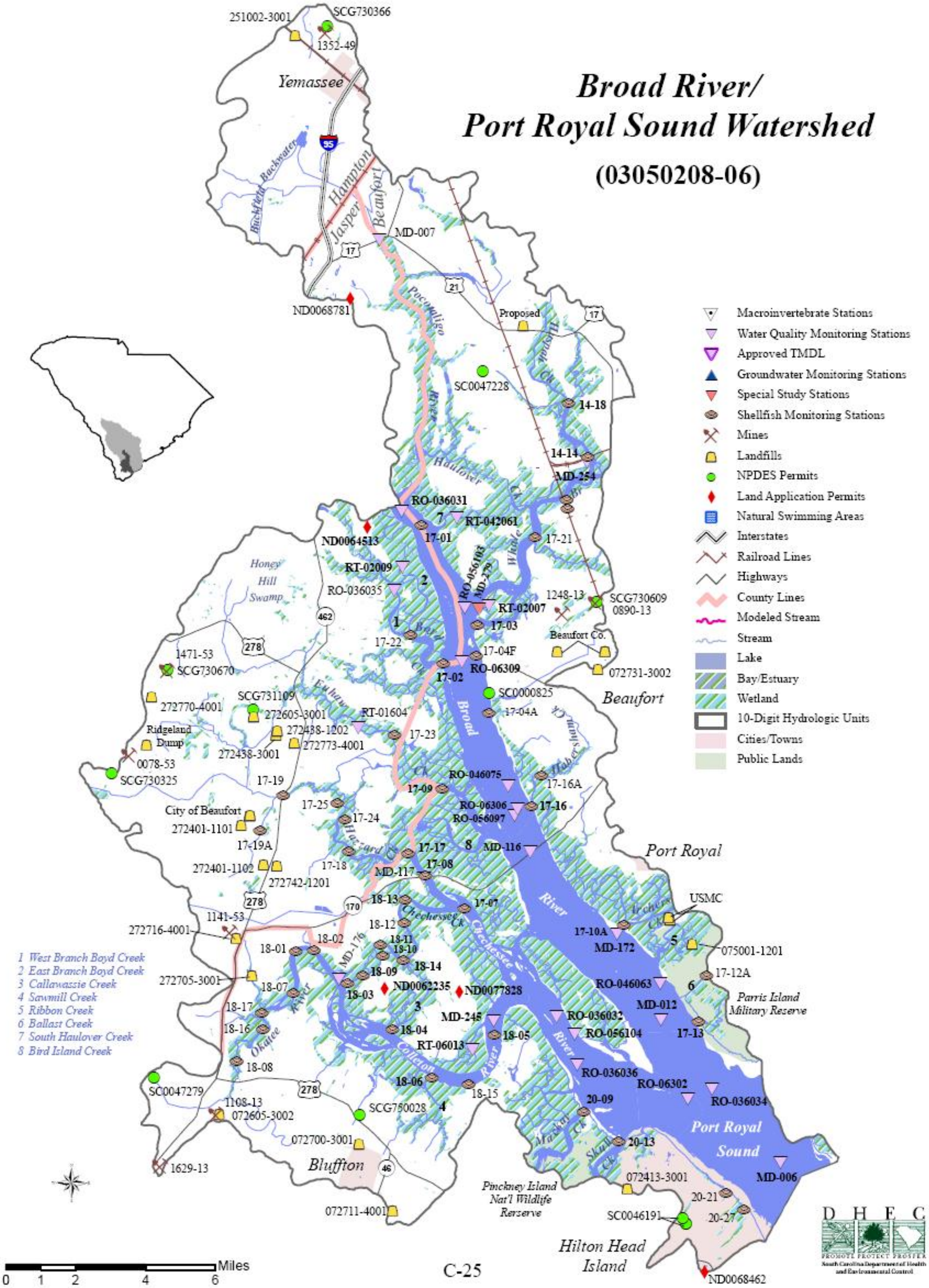
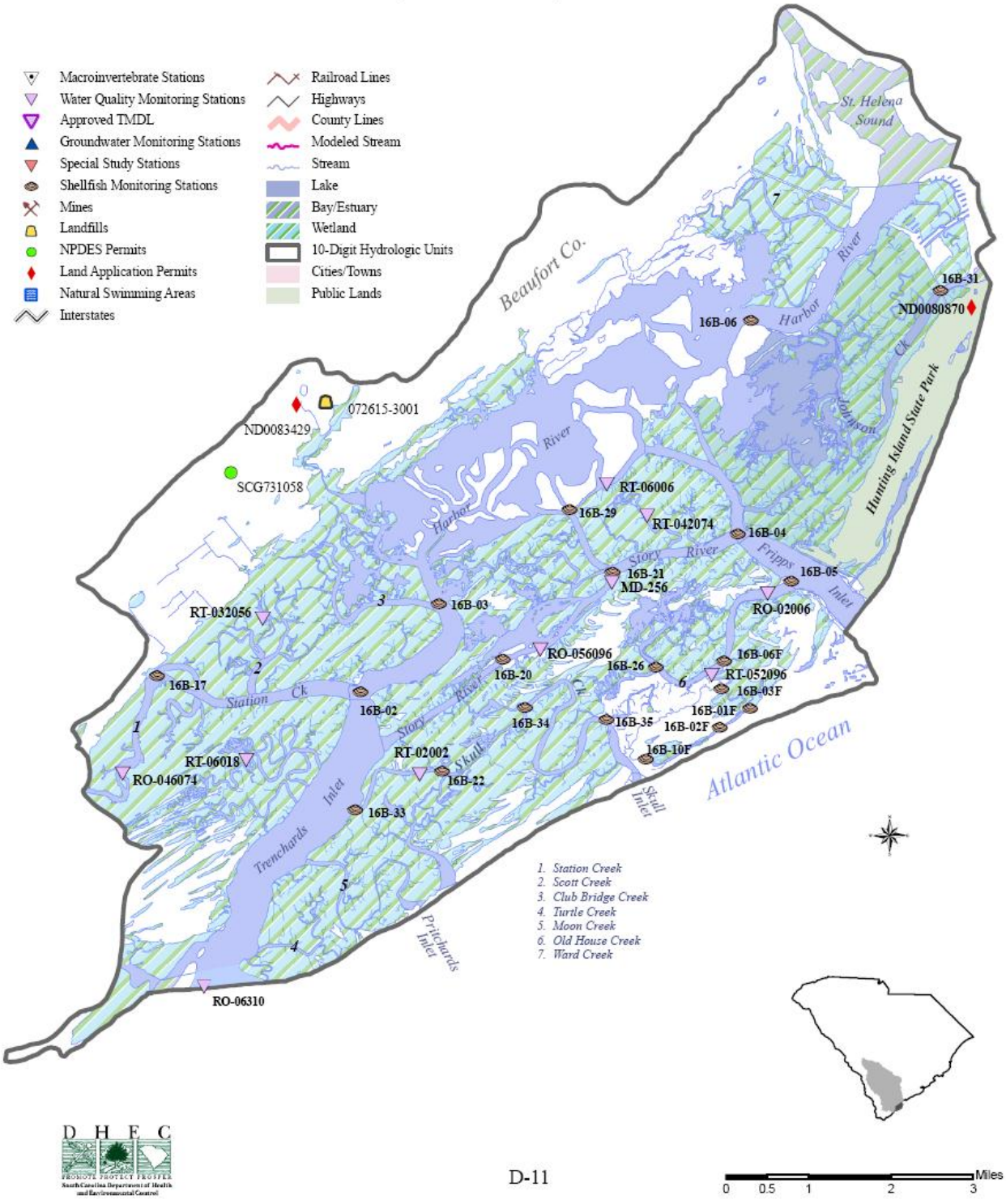
MD-004
RO-056105
15-14
15-17
SC0048976
15-15
MD-005
17-14
15-16
RT-06002
RT-052104
Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Shellfish Monitoring Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Bay/Estuary
Wetland
10-Digit Hydrologic Units
Cities/Towns
Public Lands
Miles
0 1 2 4
Note: this map has been edited to reflect eliminated discharges.
D H E C

C-24

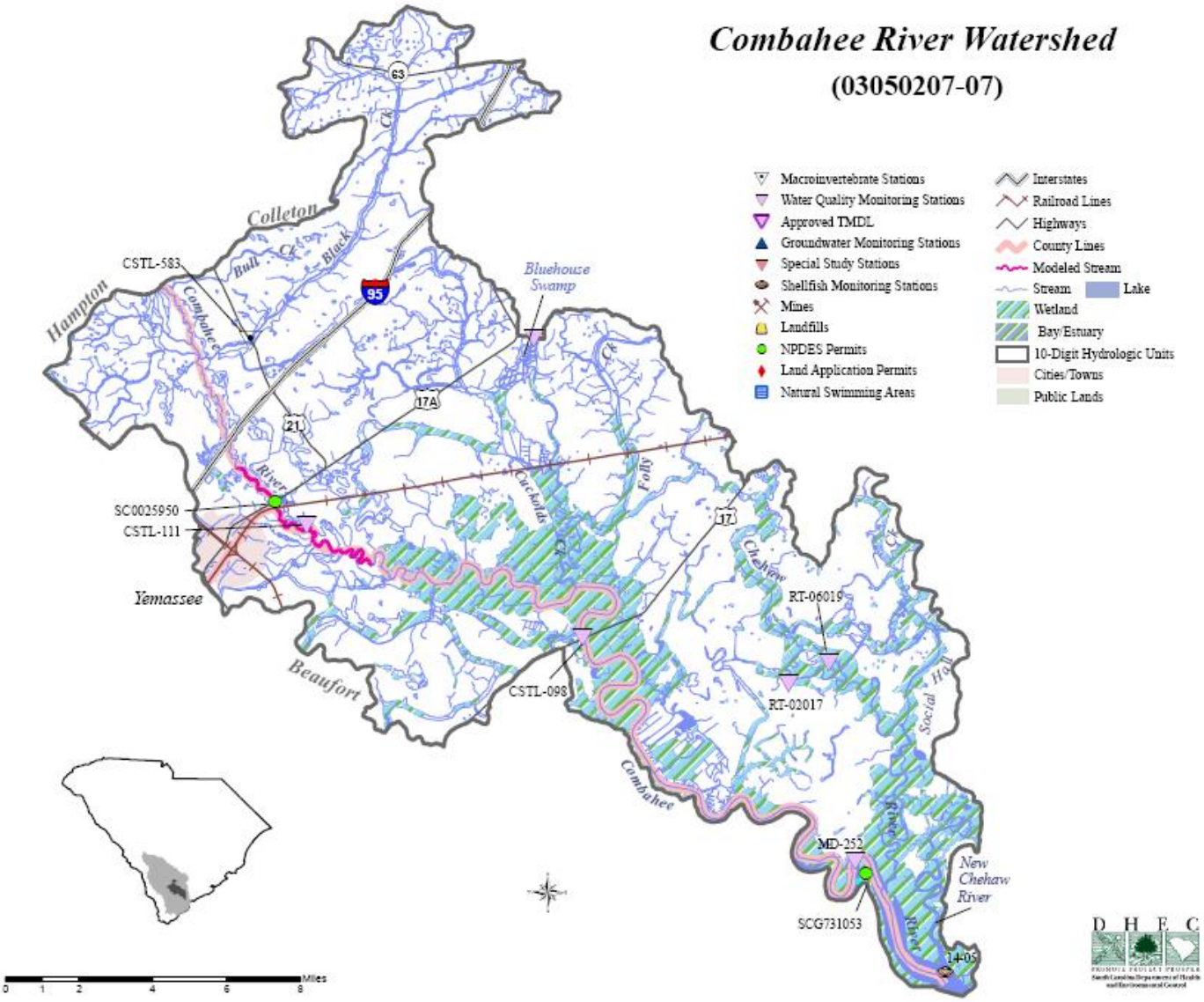

Broad River/
Port Royal Sound Watershed
(03050208-06)
Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Shellfish Monitoring Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Bay/Estuary
Wetland
10-Digit Hydrologic Units
Cities/Towns
Public Lands
1 West Branch Boyd Creek
2 East Branch Boyd Creek
3 Callawassie Creek
4 Sawmill Creek
5 Ribbon Creek
6 Ballast Creek
7 South Haulover Creek
8 Bird Island Creek
Yemassee
Beaufort
Port Royal
Bluffton
Hilton Head Island
Port Royal Sound
Broad River
Parris Island Military Reserve
Pinckney Island Nat'l Wildlife Rerserve
USMC
Honey Hill Swamp
Ridgeland Dump
City of Beaufort
Beaufort Co.
Proposed
Jasper
Hampton
Beaufort
Miles
0 1 2 4 6
C-25

Salkehatchie Coastal Frontage Basin

(03050210-01)



D-11


Combahee River Watershed
(03050207-07)
Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Shellfish Monitoring Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Wetland
Bay/Estuary
10-Digit Hydrologic Units
Cities/Towns
Public Lands
Hampton
Colleton
Beaufort
Jasper
Bull Ck
Black Ck
Bluehouse Swamp
Combahee River
Yemassee
Cuckolds Ck
Folly Ck
Chehaw River
Social Ho Ck
New Chehaw River
CSTL-583
SC0025950
CSTL-111
CSTL-098
RT-06019
RT-02017
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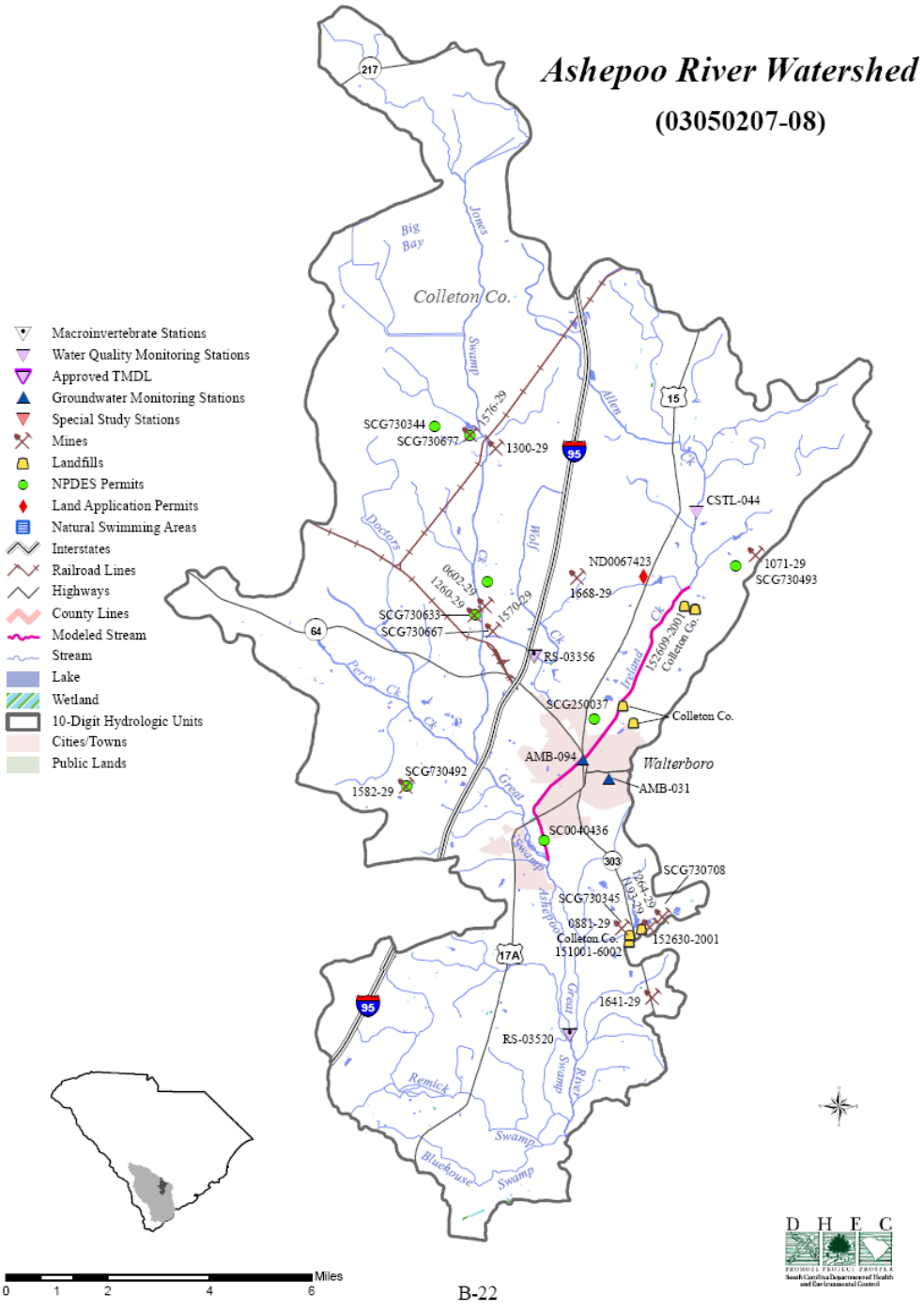
17
Miles
0 1 2 4 6 8

B-21


Ashepoo River Watershed
(03050207-08)
Colleton Co.
Walterboro
Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Wetland
10-Digit Hydrologic Units
Cities/Towns
Public Lands
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1300-29
CSTL-044
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SCG730493
0602-29
1260-29
SCG730633
SCG730667
1570-29
RS-03356
152609-2001
Colleton Co.
SCG250037
Colleton Co.
AMB-094
AMB-031
SCG730492
1582-29
SC0040436
SCG730708
SCG730345
0883-29
Colleton Co.
151001-6002
152630-2001
1641-29
RS-03520
Doctors Ck
Wolf Ck
Parry Ck
Ireland Ck
Allen Ck
Great Swamp
Ashepoo River
Great Swamp
Remick Swamp
Bluehouse Swamp
Big Bay
Jones Swamp
217
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95
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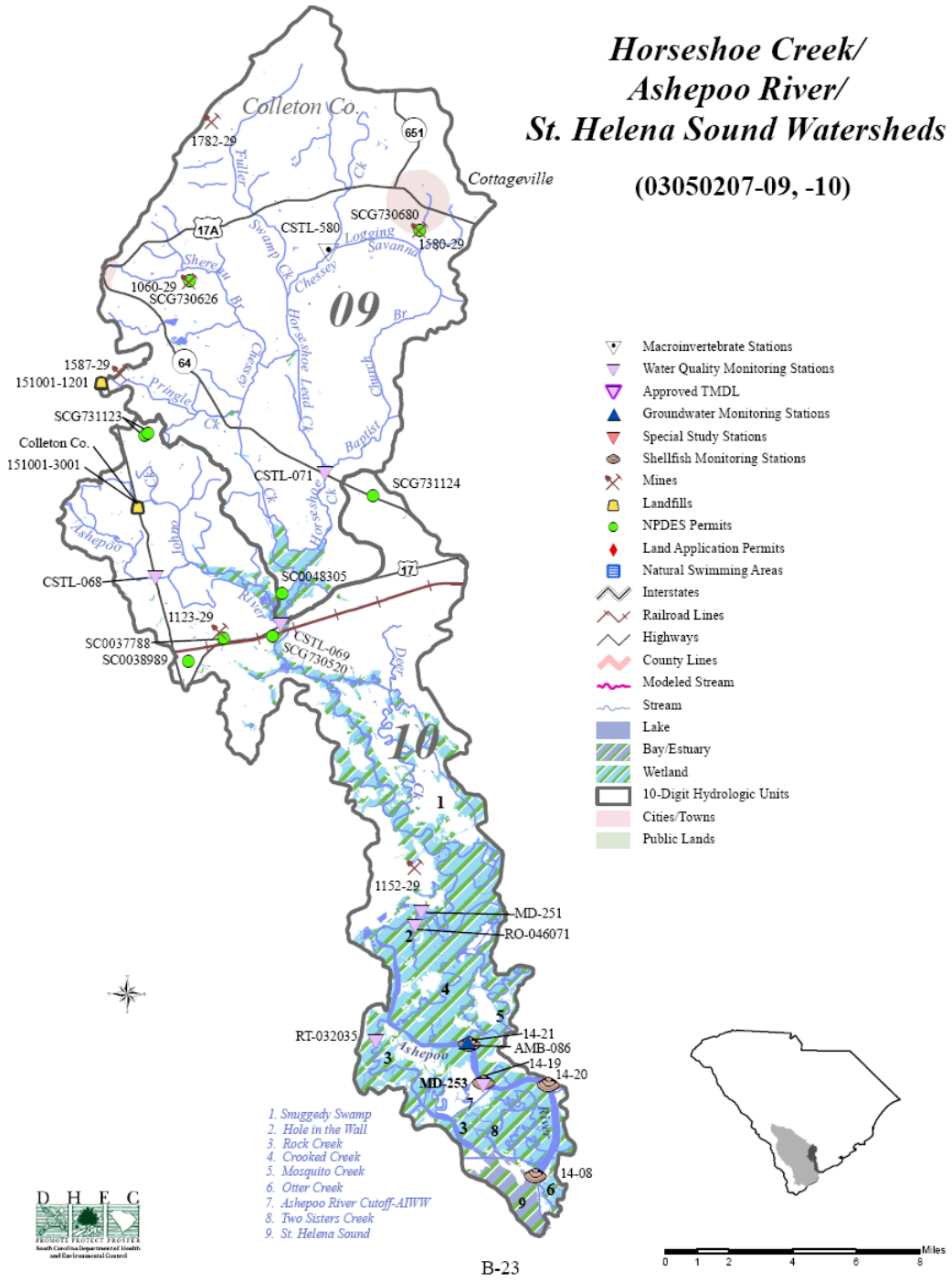
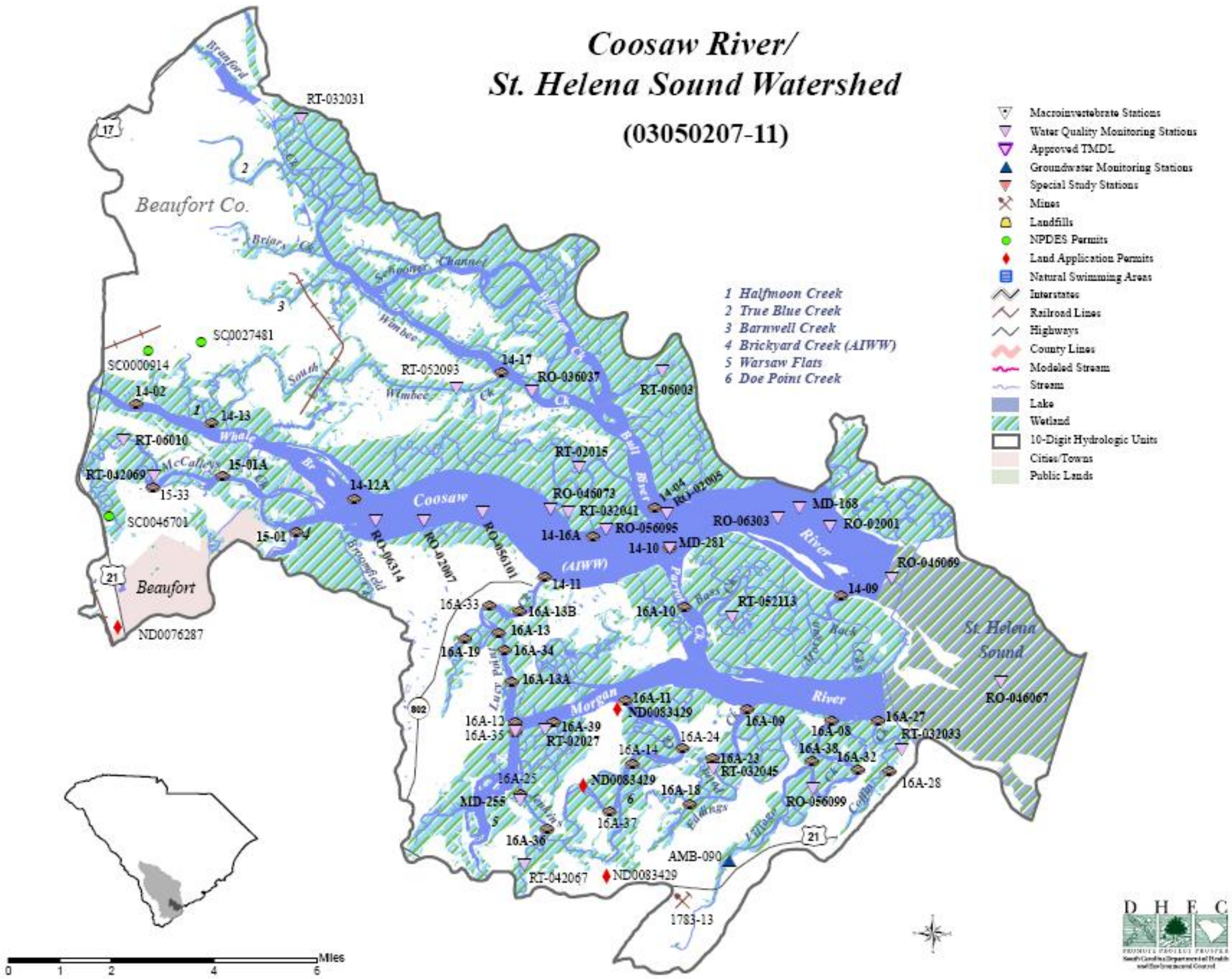
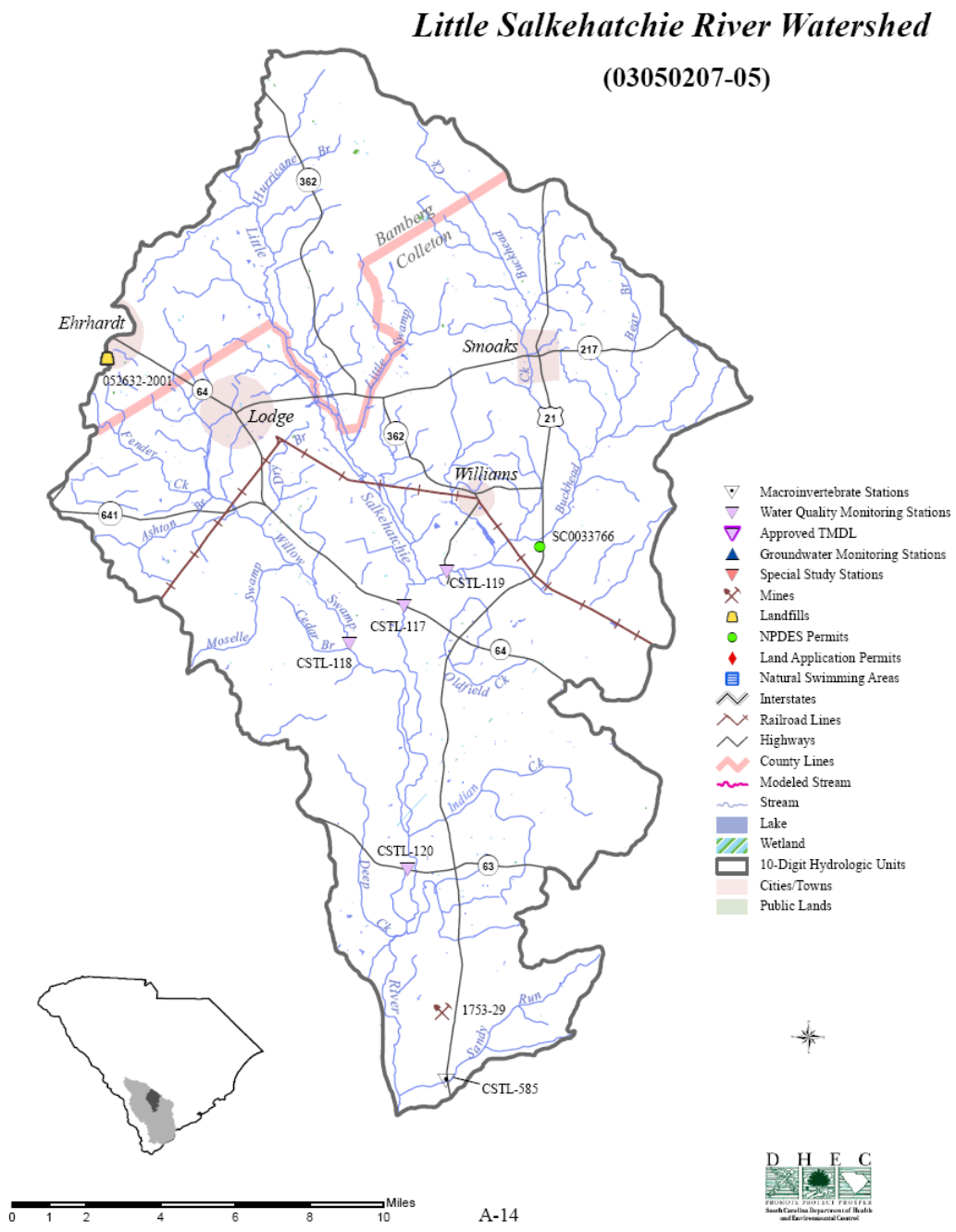
303
17A
Miles
0 1 2 4 6
B-22
D H E C


Horseshoe Creek/
Ashepoo River/
St. Helena Sound Watersheds
(03050207-09, -10)
Colleton Co.
Cottageville
09
10
1782-29
1060-29
SCG730626
SCG730680
1580-29
CSTL-580
1587-29
151001-1201
SCG731123
Colleton Co.
151001-3001
CSTL-071
SCG731124
CSTL-068
SC0048305
1123-29
SC0037788
SC0038989
CSTL-069
SCG730520
1152-29
MD-251
RO-046071
RT-032035
14-21
AMB-086
14-19
14-20
MD-253
14-08
1. Snuggedy Swamp
2. Hole in the Wall
3. Rock Creek
4. Crooked Creek
5. Mosquito Creek
6. Otter Creek
7. Ashepoo River Cutoff-AIWW
8. Two Sisters Creek
9. St. Helena Sound
Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Shellfish Monitoring Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Bay/Estuary
Wetland
10-Digit Hydrologic Units
Cities/Towns
Public Lands
Miles
0 1 2 4 6 8
D H E C

B-23

B-24


Coosaw River/
St. Helena Sound Watershed
(03050207-11)
Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Wetland
10-Digit Hydrologic Units
Cities/Towns
Public Lands
1 Halfmoon Creek
2 True Blue Creek
3 Barnwell Creek
4 Brickyard Creek (AIWW)
5 Warsaw Flats
6 Doe Point Creek
Beaufort Co.
Beaufort
Coosaw
Morgan
River
St. Helena Sound
(AIWW)
Miles
0
1
2
4
6
D H E C


Little Salkehatchie River Watershed
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Ehrhardt
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Lodge
Smoaks
Williams
Colleton
Bamberg
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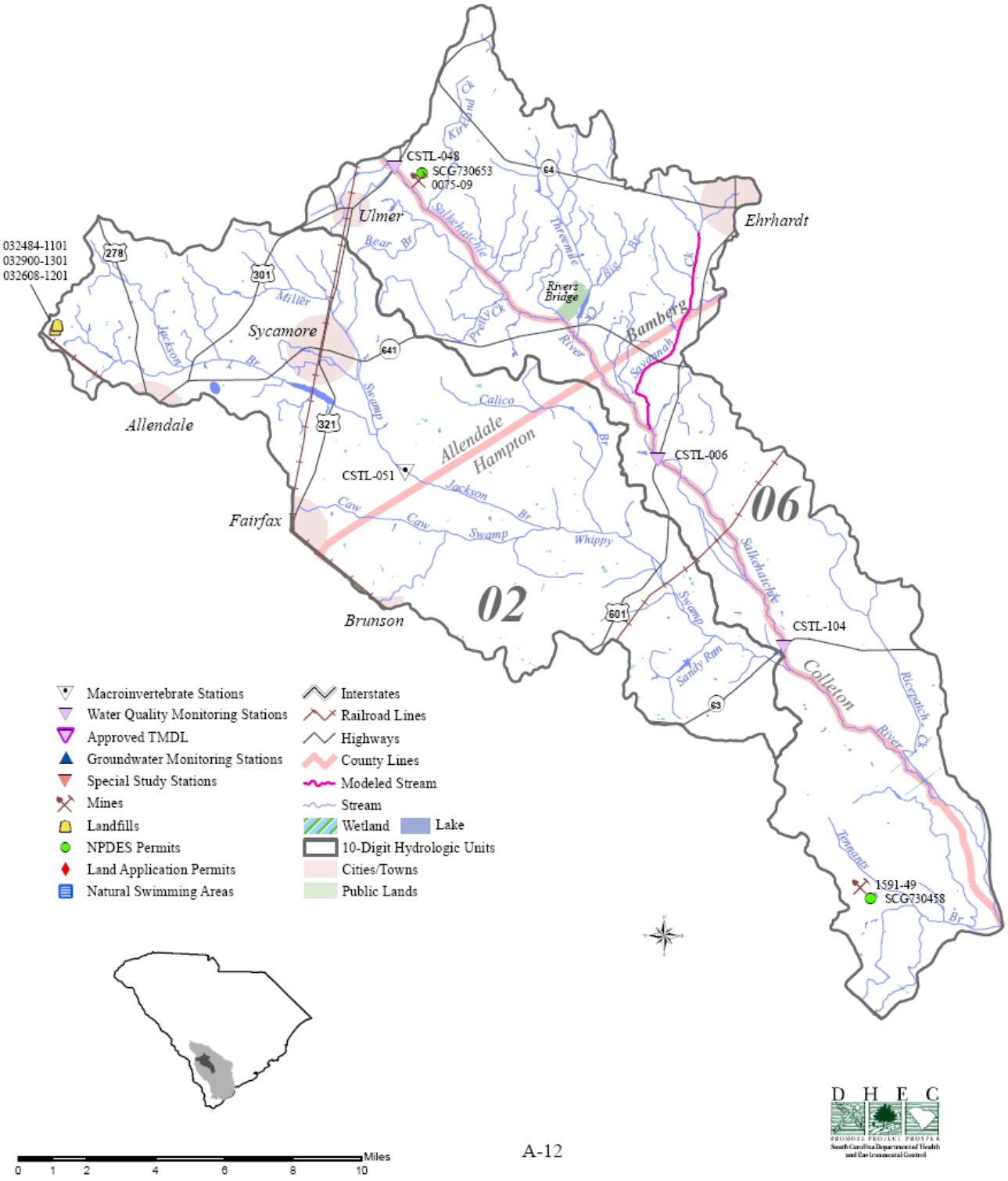
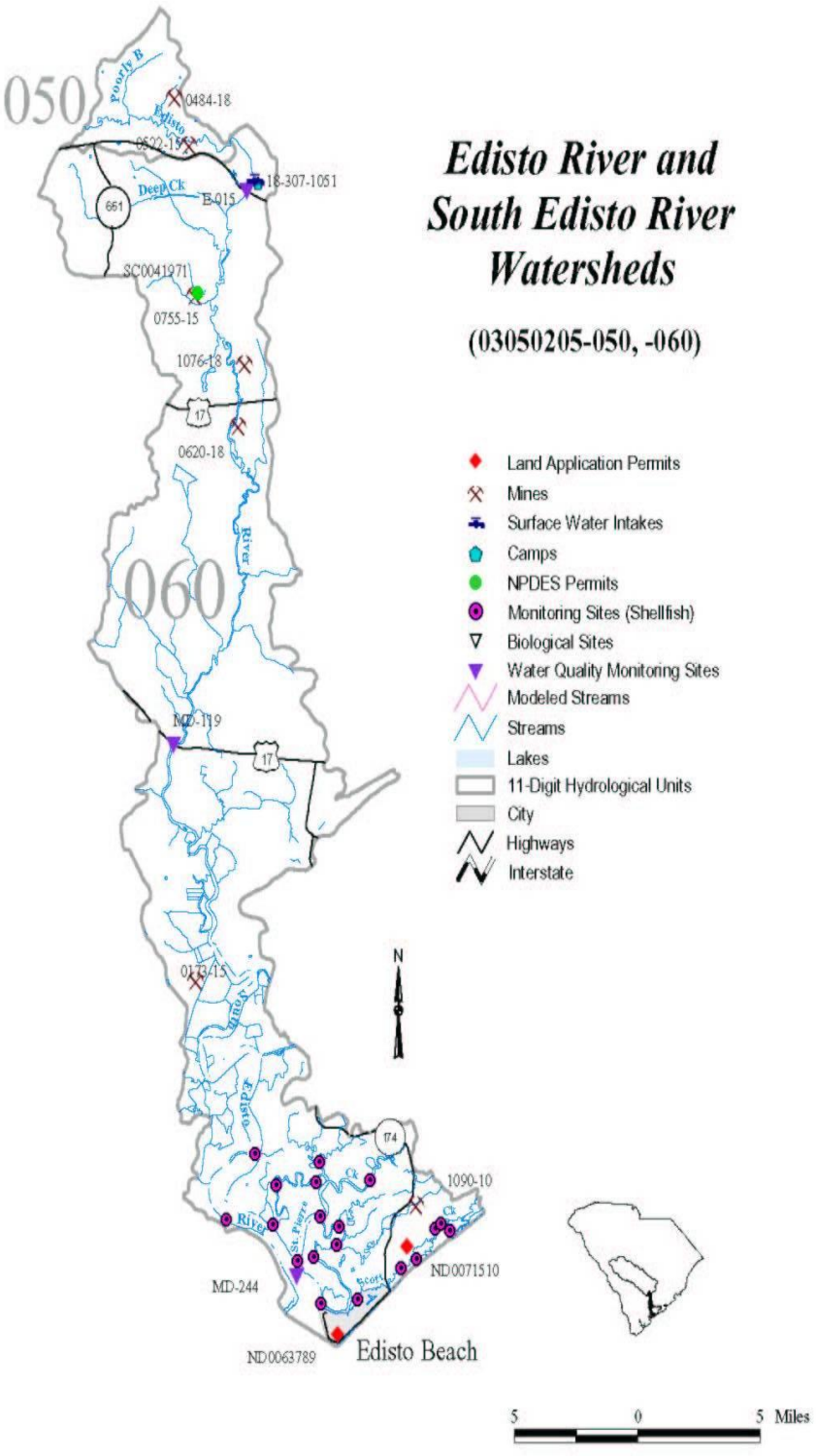
CSTL-117
CSTL-118
CSTL-120
CSTL-585
1753-29
Macroinvertebrate Stations
Water Quality Monitoring Stations
Approved TMDL
Groundwater Monitoring Stations
Special Study Stations
Mines
Landfills
NPDES Permits
Land Application Permits
Natural Swimming Areas
Interstates
Railroad Lines
Highways
County Lines
Modeled Stream
Stream
Lake
Wetland
10-Digit Hydrologic Units
Cities/Towns
Public Lands
0 1 2 4 6 8 10 Miles
A-14

Whippy Swamp/Salkehatchie River Watersheds

(03050207-02, -06)




Edisto River and South Edisto River Watersheds
(03050205-050, -060)
050
060
0484-18
0522-15
18-307-1051
E-015
Deep Ck
661
SC0041971
0755-15
1076-18
17
0620-18
River
MD-119
0173-15
N
174
1090-10
Ck
River
St. Pierre
MD-244
ND0071510
ND0063789
Edisto Beach
Land Application Permits
Mines
Surface Water Intakes
Camps
NPDES Permits
Monitoring Sites (Shellfish)
Biological Sites
Water Quality Monitoring Sites
Modeled Streams
Streams
Lakes
11-Digit Hydrological Units
City
Highways
Interstate
5 0 5 Miles

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