

Final

MOBILE BAY NATIONAL ESTUARY PROGRAM

Synthesizing Comprehensive Watershed Management Plans
Across the Alabama Coast

Prepared for
Mobile Bay National Estuary Program

September 2023



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SECTION 1

Background

In 1972, Congress passed the Clean Water Act of 1972, codifying America's responsibility to protect and restore the vital waterways that sustain our communities, our economy, and our ecosystems. With a goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters, the Act passes down assistance to each State to address point source and non-point source pollutions in waterways and to maintain the integrity of wetlands. All waters with a significant nexus to navigable waters are covered under the CWA. These include relatively permanent, standing, or continuously flowing bodies of water 'forming geographic features' that are described as streams, rivers, oceans, and lakes.

The CWA requires states to monitor their water bodies and establish Water Quality Standards for them. Water Quality Standards (WQS) are risk-based requirements which set site-specific allowable pollutant levels for individual water bodies, such as rivers, lakes, streams, or wetlands. States set WQS by designating uses for a water body and applying water quality criteria (numeric pollutant concentrations and narrative requirements) to protect the designated uses.

The Alabama Department of Environmental Management (ADEM) is charged with designating uses of the waters throughout the State. Designated uses describe the best uses reasonably expected in a waterbody. These uses include such activities as recreation in and on the water, public water supply, agricultural and industrial water supply, and habitat for fish and wildlife. In Alabama, ADEM conducts waterbody assessments and assigns waters to one of the seven designated uses pursuant to its Administrative Code r.335-6-11. These uses include:

1. Outstanding Alabama Water (OAW)
2. Public Water Supply (PWS)
3. Shellfish Harvesting (SH)
4. Swimming and Other Whole Body Contact Sports (S)
5. Fish and Wildlife (F&W)
6. Limited Warmwater Fishery (LWF)
7. Agricultural and Industrial Water Supply (A&I)

Water bodies that do not meet applicable water quality standards associated with each use classification are placed on the State's Section 303(d) list of impaired waters and ADEM is then required to prepare a Total Maximum Daily Load (TMDL). A TMDL is a calculation of the maximum amount of a pollutant a water body can receive and still meet its use classification. An alternative, or in some cases where a TMDL exists, a complement, to the development of a

TMDL is the development and implementation of a watershed management plan (WMP). Management measures recommended in these plans area identified to achieve pollutant load reductions necessary for impaired waters to meet their use classification once again.

The CWA laws and regulations are primarily administered by the U.S. Environmental Protection Agency (EPA) in coordination with state governments. In 1987, amendments to the Clean Water Act (CWA) established the Section 319 Nonpoint Source Management Program to address the need for greater federal leadership in supporting state and local nonpoint source pollution control efforts. Under Section 319, states, territories, and tribes receive grant money to assist with the implementation of watershed management plans (WMPs to address specific sources of nonpoint pollution. As the State administrator of these funds, ADEM provides grants for watersheds at the U.S. Geological Survey (USGS) 12-digit Hydrologic Unit Code (HUC 12) scale where WMPs have been completed, to assist with implementing management measures necessary for waterbodies to meet their use classification.

As part of the 1987 CWA amendments, Section 320 established the National Estuary Program to create a non-regulatory mechanism for supporting other sections of the act. In 1995, the Mobile Bay National Estuary Program (MBNEP) was born. Administered by the Dauphin Island Sea Lab (DISL), MBNEP receives an annual Section 320 appropriation from the EPA to convene a management conference of community leaders who create and implement a common plan for promoting the wise stewardship of Alabama's estuaries and coast.

Guided by this common plan, or Comprehensive Conservation Management Plan (CCMP), MBNEP brings together citizens; local, state, and federal government agencies; businesses and industries; conservation and environmental organizations; and academic institutions to meet the environmental challenges facing the unique and imperiled resources of the region's coastal estuaries. MBNEP engages these groups to determine how to best manage natural resources, associated coastal waters, and surrounding watersheds to ensure their protection and conservation for our lifetimes and beyond.

In 2013, the MBNEP embarked upon a holistic, watershed-based approach to guide coastal ecosystem restoration and protection measures the MBNEP's Ecosystem Restoration and Protection strategy of the Respect the Connect CCMP initiated this approach (MBNEP 2013) by employing a methodology of watershed management planning and implementation, to aid ADEM in meeting WQS for coastal streams. These watershed management plans (WMPs) focus on drainage areas, not political jurisdictions, to ensure that fresh water entering Alabama's estuaries is high quality and meets its ADEM use classification, and that restoration projects are scientifically defensible and components of an overall environmental management program at the local level.

1.1 Purpose and Goals of this Synthesis

The MBNEP’s purpose is “to bring together an engaged and diverse community committed to integrating environmental health with community development by identifying what our ecosystem priorities are, how to achieve them, and how to facilitate their implementation.” Watershed planning has brought local communities together to learn about their surrounding environment and engage them in prioritizing environmental goals developing action plans to achieve them. **The purpose of this Watershed Plan Assessment** is to guide future MBNEP program development in response to the common needs and recommendations identified across these plans. **The goals** are to:

- Improve delivery of service in the implementation of plan recommendations
- Improve prioritization of investments across all watersheds to address the greatest needs
- Increase the leverage of funds available for implementation by providing a strategic road map for improving environmental conditions across the Alabama coast

By compiling the information of the MBNEP WMPs completed to date this document will be foundational to the development of the next Comprehensive Conservation and Management Plan and will clarify what types of programs will best support resource managers, policy makers, community organizations, and citizens in improving the management and conservation of environmental assets.

1.2 Scale and Scope of Watershed Planning

The scale of watershed planning was determined by the MBNEP’s Project Implementation Committee (PIC) who adopted the HUC 12 scale to guide science-based assessment, planning, and project implementation. The PIC sought community input to prioritize the order of watershed planning based on seventeen different evaluation criteria including, but not limited to, presence priority habitats, impaired coastal waters, monitoring stations, and percent of urbanization. This generated a roadmap for planning in all tidally influenced drainage basins along the Alabama coast.

Following the U.S. Environmental Protection Agency’s (EPA) Watershed Approach Framework (EPA 1996), the development of a WMP is a community-based process bringing stakeholders together to collaborate on the development of a science-based planning document to guide the future management of the Watershed. This framework includes building partnerships, characterizing the watershed, setting goals, identifying solutions, and developing an implementation plan.

The MBNEP’s scope of planning expands upon the EPA framework, requiring each plan to also address **what people value most** about living on the Alabama Coast:

- **Water Quality** – The coastal community continues to desire water that is drinkable, swimmable, and able to support aquatic and marine life.

- **Fish and Wildlife** – Fishery resources are valued as an industry, a primary recreational pastime, and a staple of the diets of residents and visitors.
- **Environmental Health and Resilience** – The coastal community relies upon coordinated actions to reduce vulnerability to and recover from the range of hazards we face, natural and otherwise.
- **Access** – Having access to coastal waters and natural resources is something about which people care deeply.
- **Heritage and Culture** – Preserving heritage and culture is important due to concerns that the bountiful waters that provided such pleasure in the past will not be available to future generations.
- **Beaches and Shorelines** – They provide critical edge habitat to aquatic and terrestrial animals and recreational opportunities for residents and visitors.

Further, each plan includes an assessment of the watershed’s **vulnerability to the impacts of climate change**, including the need to accommodate habitat migration, shoreline stabilization, and community resilience. Finally, MBNEP expands the contents of these plans to focus recommendations for conserving and restoring coastal **habitats most threatened by anthropogenic stress** as identified by the MBNEP’s Science Advisory Committee. These habitat types - freshwater wetlands; streams, rivers, and riparian buffers; and intertidal marshes and flats - were classified as most stressed from activities related to land use change, like dredging and filling, fragmentation, and sedimentation. These habitats and the ecosystem services they provide are related to several, if not all, of the six identified values.

MBNEP’s watershed planning process also conforms to the National Oceanic and Atmospheric Administration (NOAA) Coastal Zone Act Reauthorization Amendment (CZARA) Section 6217 (g) Management Measures. As the State lead on water quality, the Alabama Department of Environmental Management’s (ADEM’s) Alabama Coastal Nonpoint Pollution Control Program (ACNPP) must conform to Section 6217 (g) requirements to be compliant for funding under Section 306 of the Coastal Zone Management Act and Section 319 of the Clean Water Act. These 6217 (g) requirements include the geographic scope of the program; the pollutant sources to be addressed; the types of management measures used; the establishment of critical areas; and technical assistance, public participation, and administrative coordination.

Demonstrating its recognition of the value of having comprehensive watershed plans in place to guide significant investments in coastal restoration, funding for the creation of these plans was provided in large part by the State of Alabama Department of Conservation and Natural Resources, through the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States (RESTORE) Act and National Fish and Wild Federation (NFWF) Gulf Environmental Benefit Fund (GEBF).

Table 1-1 provides a list of watershed management plans completed, in progress, or planned with associated funding for each.

TABLE 1-1
MBNEP WATERSHED MANAGEMENT PLANS

Watershed Plans	WMP Funding Source	Date of Publication
D'Olive, Tiawasse, Joes Branch (update)	ADEM, EPA, MBNEP, MASGC, APCO, Baldwin County, Daphne, Spanish Fort, NFWF-GEBF	2010, 2022
Three Mile Creek	ADCNR, MAWSS, ADEM, Mobile County, MBNEP, EPA	2014
Fowl River	NFWF-GEBF	2016
Dog River Complex	NFWF-GEBF	2017
Bon Secour Complex	NFWF-GEBF	2017
Weeks Bay Complex	NFWF-GEBF	2017
Bayou La Batre	NFWF-GEBF	2018
West Fowl River	NFWF-GEBF	2019
Wolf Bay Complex	NFWF-GEBF/RESTORE	2021
Gulf Frontal Complex	RESTORE	2022
Mobile Tensaw Delta Complex	NFWF-GEBF/RESTORE	2023
Western Shore	RESTORE	2023
Fly Creek	RESTORE	2023
Dauphin Island	RESTORE	2023
Western Perdido Bay	RESTORE	2023
Eastern Delta	RESTORE	2024
Western Delta	RESTORE	2024
Grand Bay Swamp	RESTORE	2025

1.3 Introduction to the Watersheds

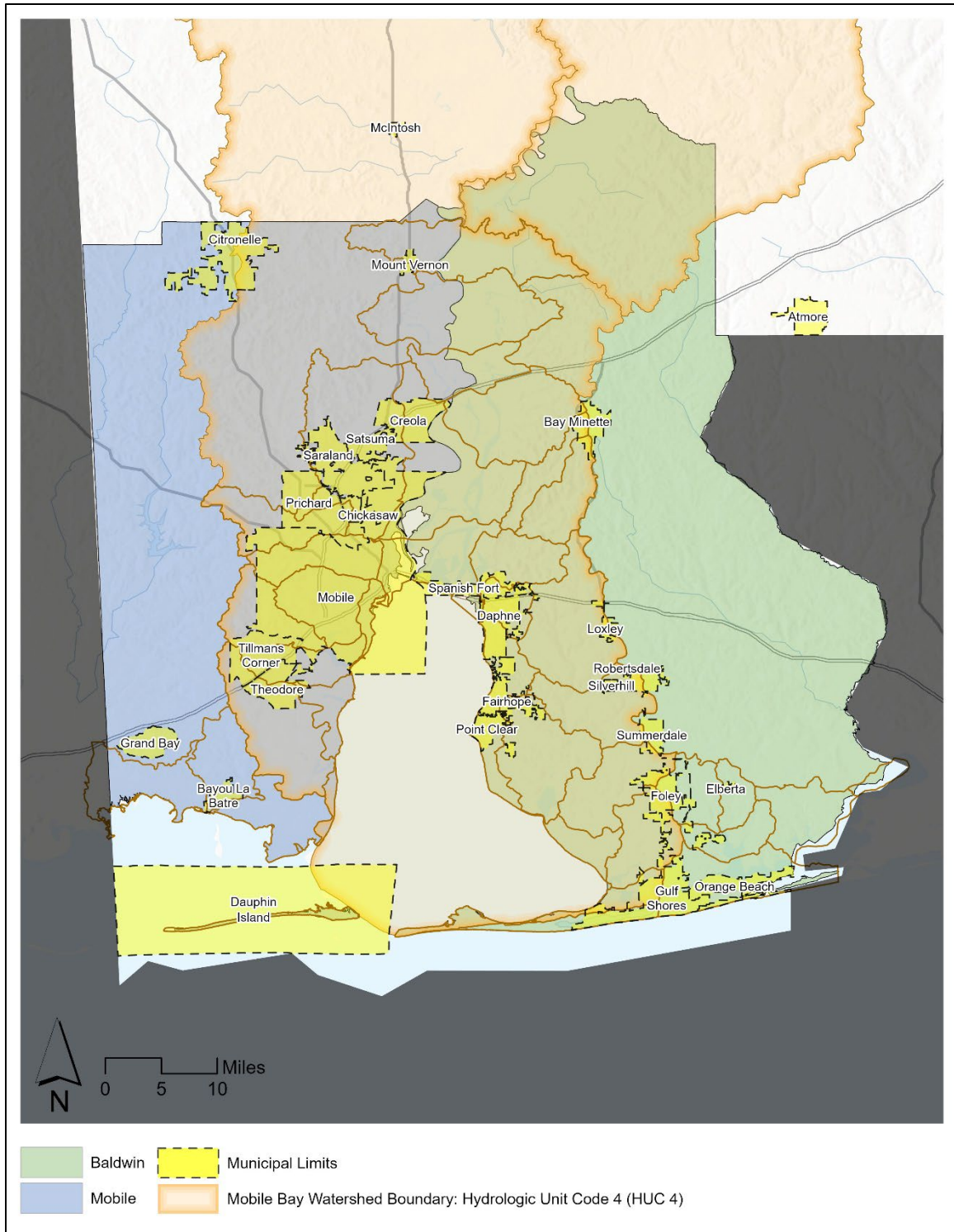
There are 41 HUC 12s across Mobile and Baldwin counties with at least some extent of tidal influence. To expedite watershed planning, some of these were grouped together into larger complexes.

Table 1-2 provides a list of Watershed plans with associated HUC 12s, use classifications and impairments.

TABLE 1-2
MBNEP WMPS AND HUC 12s

Watershed Plans	HUC 12 Watersheds	Use Classification	Impairments
D'Olive, Tiawassee, Joes Branch	Sub Basin of Tensaw Apalachee	F&W	Sediment, Pathogens
Eight Mile Creek	Eight Mile Creek	F&W, PWS	Pathogens
Three Mile Creek	Three Mile Creek	A&I	OE/DO, Pathogens, Nutrients
Fowl River	Fowl River	F&W, S	Pathogens, Hg
Dog River Complex	Upper Dog River, Lower Dog River, Halls Mill Creek	F&W, S	Pathogens, OE/DO, Hg, Sediment
Bon Secour Complex	Bon Secour River, Oyster Bay, Skunk Bayou	F&W, S, SH	Pathogens, Hg
Weeks Bay Complex	Upper Fish River, Middle Fish River, Lower Fish River, Magnolia River	F&W, S, OAW	Pathogens, Hg
Bayou La Batre	Bayou La Batre	F&W, S, SH	Pathogens
West Fowl River	West Fowl River	F&W, S, SH,	Pathogens
Wolf Bay Complex	Sandy Creek, Mifflin Creek, Graham Bayou	F&W S, SH, OAW	Pathogens, Hg
Gulf Frontal Complex	Little Lagoon/Perdido Pass-Gulf Frontal	F&W, S, S H	Pathogens, Nutrients, Hg
Mobile Tensaw Delta Complex	Tensaw-Apalachee, Grand Bay, the Basin, Mittlin Lake, Big Chippewa Lake, Farris Creek/Barrow Creek	F&W, S, PWS, LWF, OAW	Pathogens, Hg
Western Shore	Garrows Bend, Deer River, Delchamps Bayou	F&W, S, H	Pathogens, OE(BOD)
Fly Creek	Fly Creek	F&W, S, SH	Pathogens,
Dauphin Island	Dauphin Island	F&W, S, SH	Pathogens
Western Perdido Bay	2: Bridge Creek/Palmetto Creek	F&W, S, SH	Pathogens, Hg
Eastern Delta	Whitehouse Creek, Upper Bay Minette Creek, Lower Bay Minette Creek	F&W, S	Sediment
Western Delta	Cold Creek, Gunnison Creek, Bayou Sara, Lower Chasaw Creek	F&W, PWS, LWF	Pathogens, Hg
Grand Bay Swamp	Grand Bay Swamp	F&W, S, SH	Pathogens

Because watershed boundaries do not follow geopolitical boundaries, watershed planning requires collaboration between different municipalities and county government. **Figure 1-1** below illustrates the differences between these two types of geographic delineation.



SOURCE: MBNEP

Figure 1-1
Mobile Bay Watershed with County, Municipal, and Watershed Boundaries

1.4 Document Overview

This document is organized into the following:

- **Section 1: Background** provides history and context related to watershed planning and the geographic extent covered by planning efforts.
- **Section 2: Community Engagement** summarizes the public outreach and stakeholder engagement efforts conducted as part of the development of the WMPs.
- **Section 3: Major Concerns Across All Watersheds** presents an overview of common priority concerns across the watershed planning landscape.
- **Section 4: Assessment of the State of Watershed Environmental Monitoring Data** illustrates the distribution of data collection across the two counties and presents areas of continued monitoring needs.
- **Section 5: Assessment of the Regulatory Environment** provides a summary of common recommendations related to regulatory changes for improving environmental management.
- **Section 6: Key Accomplishments** provides a summary of projects by and key accomplishments of MBNEP and its partners.
- **Section 7: Financing Strategies** presents a compilation of suggested financing strategies to implement management measures.
- **Section 8: The Role of the MBNEP Going Forward** presents the top recommendations from this watershed synthesis document and strategies to guide the development of the 2023 CCMP.
- **Section 9: References** lists all sources cited in this document.

SECTION 2

Community Engagement

Community engagement is an important part of the watershed planning process. It provides stakeholders an opportunity to voice concerns, increases awareness of watershed issues, increases ownership in completed watershed plans, and improves community ability to actively participate in watershed-based management actions.



Participants at a community engagement meeting discuss the critical issues and possible solutions for the Gulf Frontal Watershed on February 6, 2020.

2.1 Introduction

Throughout each watershed management plan (WMP), Steering Committees were assembled to help guide development of the WMP and assist in the future implementation of the plans. The goal in building the Steering Committee is to get participation from a diverse set of stakeholders across all sectors of the community with comprehensive knowledge of watershed conditions and community perspectives. Included in these groups are individuals from the business community, civic organizations, environmental groups, and governmental agencies. Steering Committees serve not only as a conduit for the WMP development team to share information and status about planning efforts with the community, but to also bring back community feedback to the Steering Committee and WMP Team to inform the WMP.

2.2 Methodology

During development of each WMP, multiple efforts are undertaken to address the needs of each watershed from a community engagement perspective. The primary mechanisms for community engagement throughout watershed planning include:

- Stakeholder meetings
- Targeted constituent meetings
- Public meetings
- Educational workshops
- Community outreach events
- Community clean-ups

- Volunteer water quality monitoring
- MBNEP website updates
- Online surveys
- Videos

Engagement and outreach methods vary among each watershed, with each tailored to the individual needs and perspectives of the communities within the watershed and its stakeholders with the ultimate goal of creating the buy-in necessary to ensure the successful implementation of completed WMPs.



Bayou La Batre WMP Community Meeting Notice

2.3 Key Citizen Concerns

The stakeholder and public engagement process reveal what is most important to the communities across each watershed. Each watershed is different and comes with its own unique set of concerns and desires for action. For example, the concerns in the Bayou la Batre Watershed centered on impacts associated with flooding and economic development, which differed from what was heard in the Fowl River Watershed where the community galvanized around a desire to protect and restore coastal shorelines in the lower reaches of Fowl River.

To adequately gather stakeholder involvement, Steering Committees helped organize a series of community meetings to gather input and address stakeholder concerns. In addition, online surveys were created and distributed to gather additional input. Survey results were analyzed by project teams and a list of known issues for each watershed was created. They provide a clear picture of public perceptions and overall understanding related to each WMP.

Common areas of concern across watersheds include:

- Stormwater management
- Increased land development
- Access
- Erosion & sedimentation
- Habitat degradation
- Invasive species
- Litter
- Shoreline erosion
- Water quality



Engaging Community Members in Bayou La Batre

During the stakeholder meetings and responses from online surveys, these key themes resonated across a broad spectrum of communities. Ultimately, they all revolve around improving watershed conditions.

2.4 Summary

Community and Stakeholder Engagement Programs were created to connect with communities to build trust, participation, and effectiveness. Throughout the course of each project, each watershed community was kept informed of milestones and accomplishments and was encouraged to participate in community meetings, surveys, and engagement activities. Community engagement is the cornerstone of community-based efforts to promote the wise stewardship of the water quality and living resources of Alabama's estuarine waters.

SECTION 3

Major Concerns Across All Watersheds

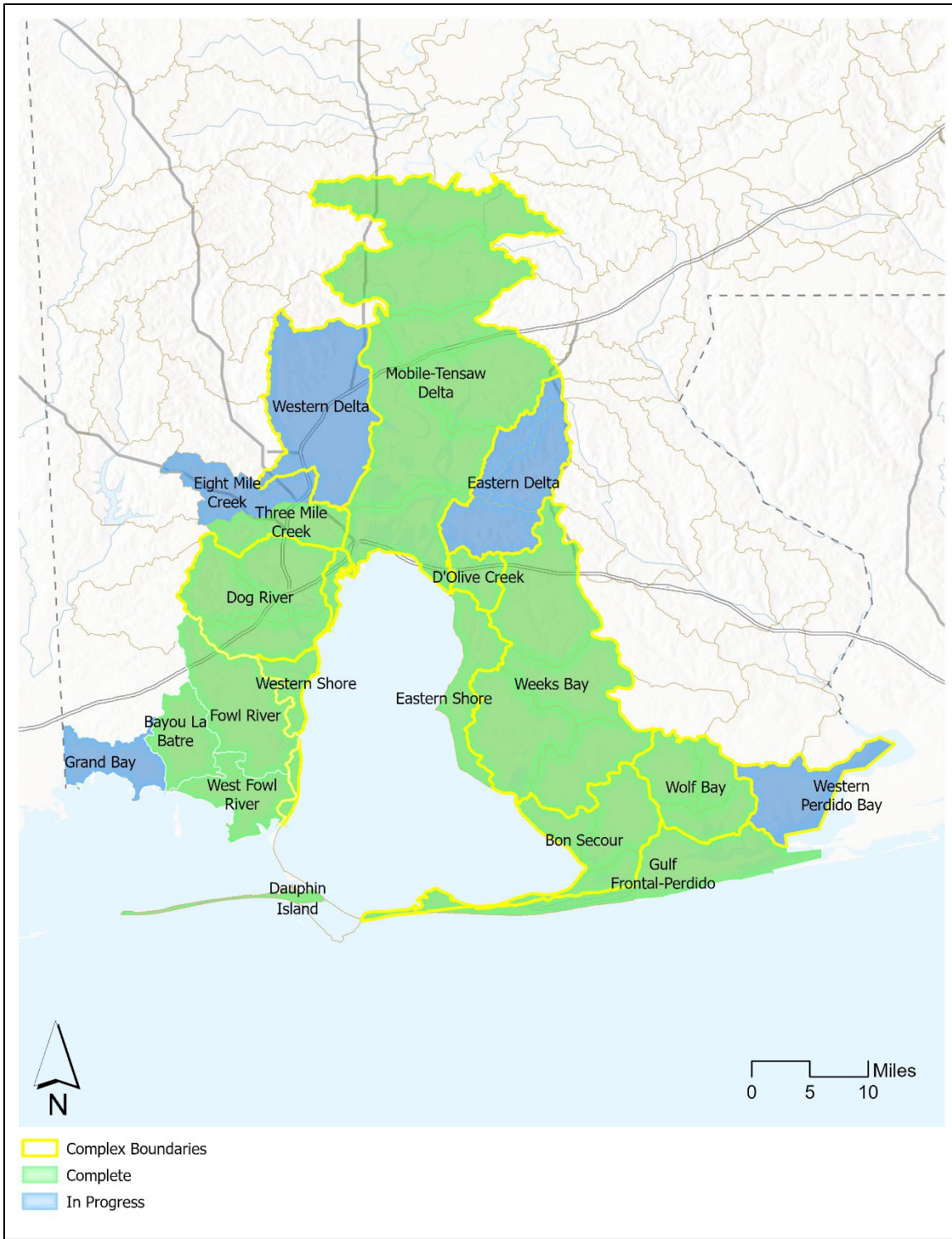
Coastal Alabama has a dynamic hydrologic system with the focal point of the system being Mobile Bay, into which most of its fluvial waterbodies flow. The Mobile Bay Watershed is the sixth-largest drainage basin by area (over 43,600 square miles) with the fourth largest freshwater flow volume (62,000 cubic feet per second on average) in the United States, draining most of the State of Alabama and portions of Mississippi, Georgia, and Tennessee. With outflows from Alabama’s five major rivers– the Mobile, Spanish, Tensaw, Apalachee, and Blakely creating the second largest intact river delta system in the nation, the Mobile Bay estuary and other adjacent estuarine waters in Mobile and Baldwin counties are the focus of the Mobile Bay National Estuary Program.

These estuarine waters, where the fresh water from several Alabama rivers mixes with the salt water of the Gulf of Mexico, produce rich brackish waters supporting both fresh and saltwater species and serve as nursery habitat for many commercially and recreationally important fish and shellfish. The waters are considered environmentally and economically important because of their exceptional biodiversity and productivity. These estuaries are greatly affected by the upstream waters draining to Mississippi Sound, Weeks Bay, Wolf Bay, Bon Secour Bay, and Mobile Bay. The largest of Alabama’s estuaries, Mobile Bay is approximately 32 miles long and 23 miles across at its widest point, and averages only 10 feet of depth.

Figure 3-1 presents an overview of the Mobile Bay Watershed with the Mobile Bay National Estuary Program study area outlined in orange.

The MBNEP program coverage area is 3,671 square miles, encompassing Mobile and Baldwin Counties. This coverage includes waters within Baldwin and Mobile Counties and Mobile Bay from the west at the Mississippi state line to the east at the Florida state line, terminating at the Perdido River. This estuary is greatly affected by upstream waters that flow into it from the expansive Mobile Bay Watershed. Other coastal estuaries in and near Alabama include Mississippi Sound westward to the Alabama-Mississippi State Line, Perdido Bay, and their tributaries. The Mobile Bay National Estuary Program service area includes all of Mobile and Baldwin Counties, as well as Alabama state marine waters in the north central Gulf of Mexico, extending three miles south of Dauphin Island and the Fort Morgan Peninsula.

Alabama’s two coastal counties (Baldwin and Mobile) and these estuaries support 337 species of fish, 126 species of reptiles and amphibians, 355 species of birds, and 49 species of mammals, including over 625,000 humans (US Census 2017). The variety of fish and wildlife species calling coastal Alabama home depends on many different habitats for food and shelter.



SOURCE: MBNEP

Figure 3-1
MBNEP Watershed Planning Status Map

3.1 Watershed Management Plan Key Elements

To gain an understanding of the greater Mobile Bay Watershed and its sub-watersheds, all Mobile Bay National Estuary Program (MBNEP) Watershed Management Plans (WMPs) include an extensive watershed characterization and conditions analysis. This analysis is developed to better understand impacts to the watershed and identify possible causes and sources of impairments. This characterization and conditions analysis is critical to understanding watershed issues and areas of concern and to provide the basis for developing effective management measures and implementation strategies to meet watershed goals. Elements of the characterization and conditions include:

Watershed Characterization:

- Watershed Boundary
- Physical Setting
- Hydrology
- Floodplains and FEMA Flood Zones
- Biological Resources
- Political Institutions
- Demographics
- History and Culture of the Watershed
- Public Access in the Watershed
- Land Use and Land Cover

Watershed Conditions:

- Water Quality Standards
- Potential Sources of Pollutants
- Surface Water Flow
- Sediment Transport
- Water Quality
- Biological Conditions
- Habitat Conditions
- Shoreline Assessment

3.2 Watershed Key Stressors and Issues

Environmental stressors are factors or phenomena negatively impacting habitats, reducing their ability to provide ecosystem services. Some stressors, like hurricanes, droughts, and cold snaps, may be naturally occurring and independent of human activity. The stressors evaluated by MBNEP are those related to anthropogenic or “human-caused” factors.

3.2.1 Key Stressor: Landscape Conversion

Conversion of natural landscapes to agricultural or urban uses eliminates the ecosystem services they once provided. Land-use changes reduce primary production, rainwater infiltration, and water purification and retention, while causing habitat fragmentation and loss, increased volumes and velocities of stormwater runoff, stream bank erosion, and sedimentation.

Population

The driving force for most landscape conversion/land-use change is human population growth. With 40% of the American population living in coastal counties occupying only 10% of the nation’s land area, coastal land use conversion is an acutely important factor in managing our

estuarine waters and resources. Between 2000 and 2019, populations have increased in Alabama's coastal counties, Baldwin and Mobile, by 57.9% and 3.3%, respectively, with a total increase of 94,895 persons. The addition of this many people cannot be accommodated without significant conversion of previously natural landscapes to residential, commercial, and industrial land uses.

Table 3-1 and **Figure 3-2** present an overview of watershed size and current and projected population estimates contained in the WMPs. Notably, the highest projected population increases are in Baldwin County in the Weeks Bay, D'Olive, Bon Secour, and Wolf Bay Watersheds.

TABLE 3-1
WATERSHED AREA AND POPULATION STATISTICS

Watershed	Total Size (acres/sq mi)	Population (year)	Projected Population (2040)	Projected Population Change (%)
D'Olive	8,739/13.7	*	*	+65.1*
Three Mile Creek	19,264/30.1	99,039 (2010)	**	-0.44**
Bon Secour	43,670/68.2	17,021 (2010)	28,060	+64.9
Dog River	59,705/93.29	146,237 (2014)	153,210	+4.8
Fowl River	39,769/62	19,356 (2010)	21,444	+11.4
Weeks Bay	130,000/203	49,664 (2010)	99,069	+99.5
Bayou La Batre	19,562/30.56	10,533 (2010)	***	+6.2***
West Fowl River	20,489/32.01	2,154 (2010)	***	+6.2***
Wolf Bay	12,670/19.8	15,783 (2010)	23,857	+51.2
Western Shore	16,533/25.8	10,983 (2014)	***	+6.2***
Gulf Frontal	40,320/63	30,729 (2010)	****	+65.1****
Mobile Tensaw Delta	37,000/57.81	68,233 (2016)	****	+65.1****
Dauphin Island	3,262/5	1,778 (2020)	2,290	+28.8
Eastern Shore	21,900/34.21	27,461 (2020)	33,772	+23
Western Perdido Bay	26,864/41.98	13,668 (2020)	****	+65.1****

NOTES:

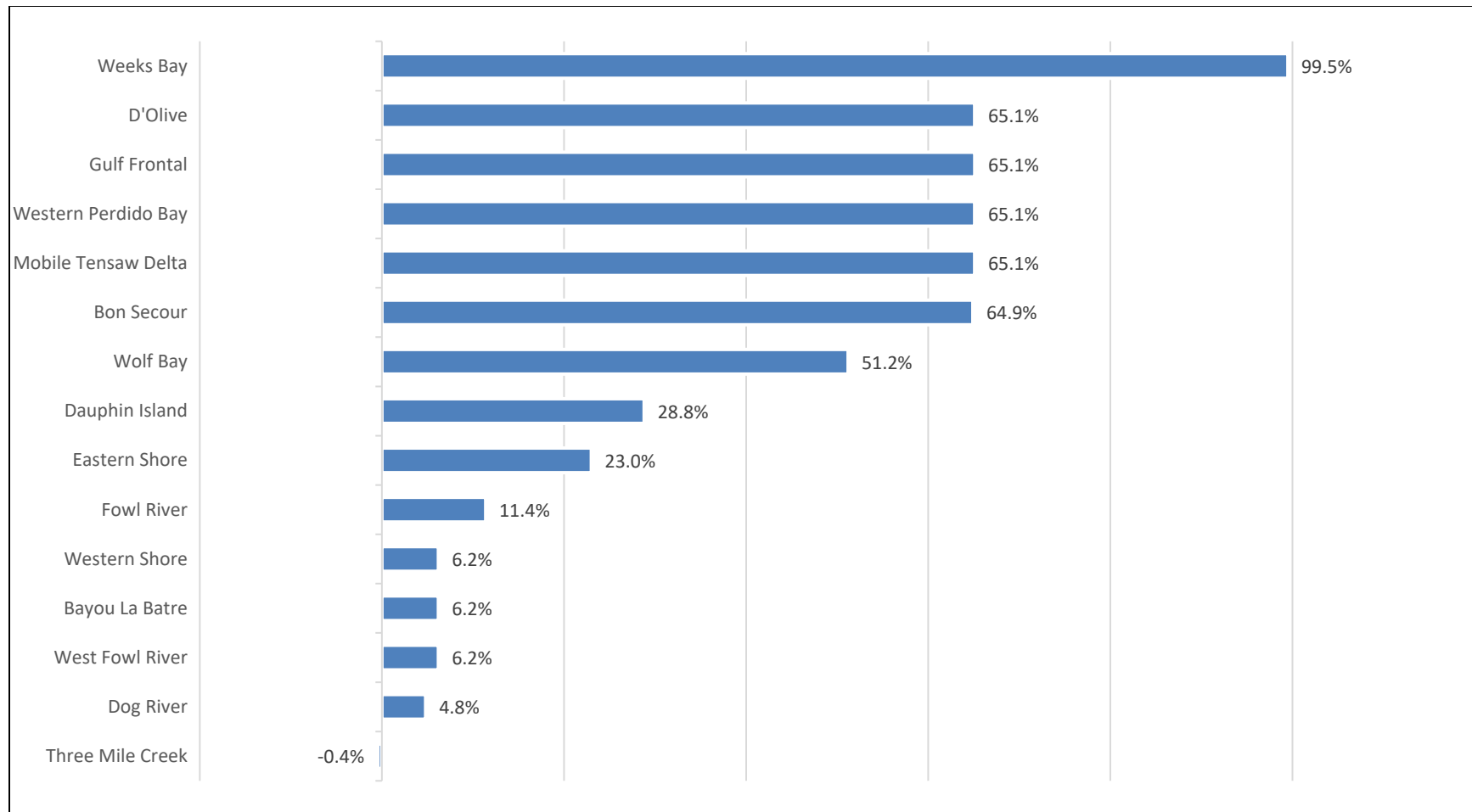
* Population data at the watershed level were not available. Projected population change percent is based on Baldwin County Estimates.

** Projected population estimates at the watershed level were not available. Current percent growth rate is presented for the City of Mobile.

*** Projected population estimates at the watershed level were not available. Current percent growth rate is presented for Mobile County.

**** Projected population data at the watershed level were not available. Projected population change percent is based on Baldwin County Estimates.

SOURCES: Advance Local Media 2015, 2021; Baldwin County Economic Alliance 2021; ESMPO et al. 2015; World Population Review 2023;



SOURCE: MBNEP; Advance Local Media 2015, 2021; ESMPO et al. 2015; World Population Review 2023

Figure 3-2
Watershed Projected Population Change

Conversion of Agricultural Areas

Agricultural areas are facing extreme development pressure, complicating efforts to maintain character and quality of life.

Land Use Planning

Lack of zoning and comprehensive planning leads to unchecked growth that exacerbates the effects of these land use changes. Urban areas are suffering from a range of endemic stressors, including poverty, disinvestment, deteriorated infrastructure, modified stormwater drainage systems, loss of natural habitat, and disconnection from a degraded local environment.

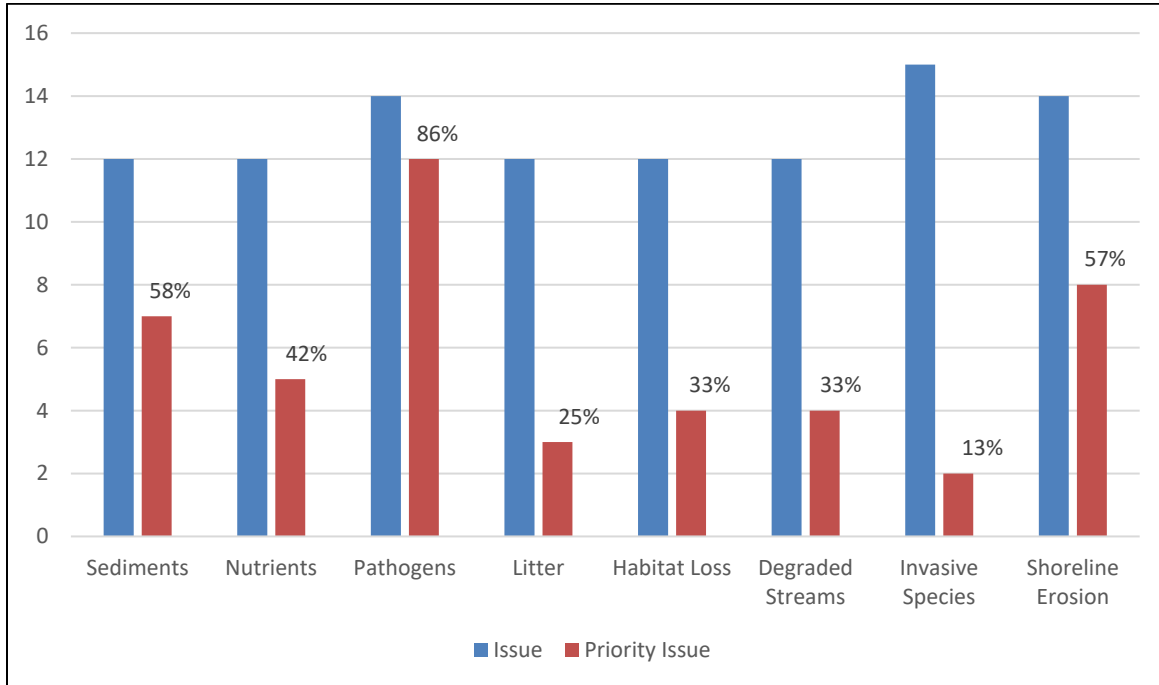
Over time, human population growth and development along Alabama's coast has led to diminished ecosystem function and services resulting in increases in watershed vulnerability. Watershed vulnerability can be defined as a combination of a system's exposure, sensitivity, and adaptive capacity to cope with changes in population and climate (EPA 2023). As watershed vulnerability increases, issues and areas of concern within watersheds increase. **Table 3-2** presents an overview of watershed impairments and issues.

TABLE 3-2
PRIORITY WATERSHED IMPAIRMENTS AND ISSUES

Watershed	Water Quality Impairments				Habitat Degradation Issues			
	Sediments	Nutrients	Pathogens	Litter	Habitat Loss	Degraded Streams	Invasive Species	Shoreline Erosion
D'Olive	P	√	P	√	√	P	√	√
Three Mile Creek	√	P	P	P		√	√	
Bon Secour	P	√	P	√	√		√	P
Dog River	P	P	P	P	√	√	√	√
Fowl River	√	P	P	√	P	√	√	√
Weeks Bay	P	√	P		√	P	√	√
Bayou La Batre	P	√	P	√		P	√	√
West Fowl River			P	P		√	√	P
Wolf Bay	P	√	P	√	√	P	P	√
Western Shore	√	√	√	√	√	√	√	P
Gulf Frontal	√	P	P	√	√		√	P
Mobile Tensaw Delta	√	P		√	P	√	P	P
Dauphin Island			√	√	P	√	√	P
Eastern Shore	P		P		√	√	√	P
Western Perdido Bay		√	P		P		√	P

NOTE: P = Identified as priority issue in watershed management plan (WMP)

Figure 3.3 below presents the total number of WMPs listing the impairments/issues by category, along with the number of those identified as priority and their percentage of the total.



SOURCE: MBNEP

Figure 3-3
Critical Issues in MBNEP Watersheds

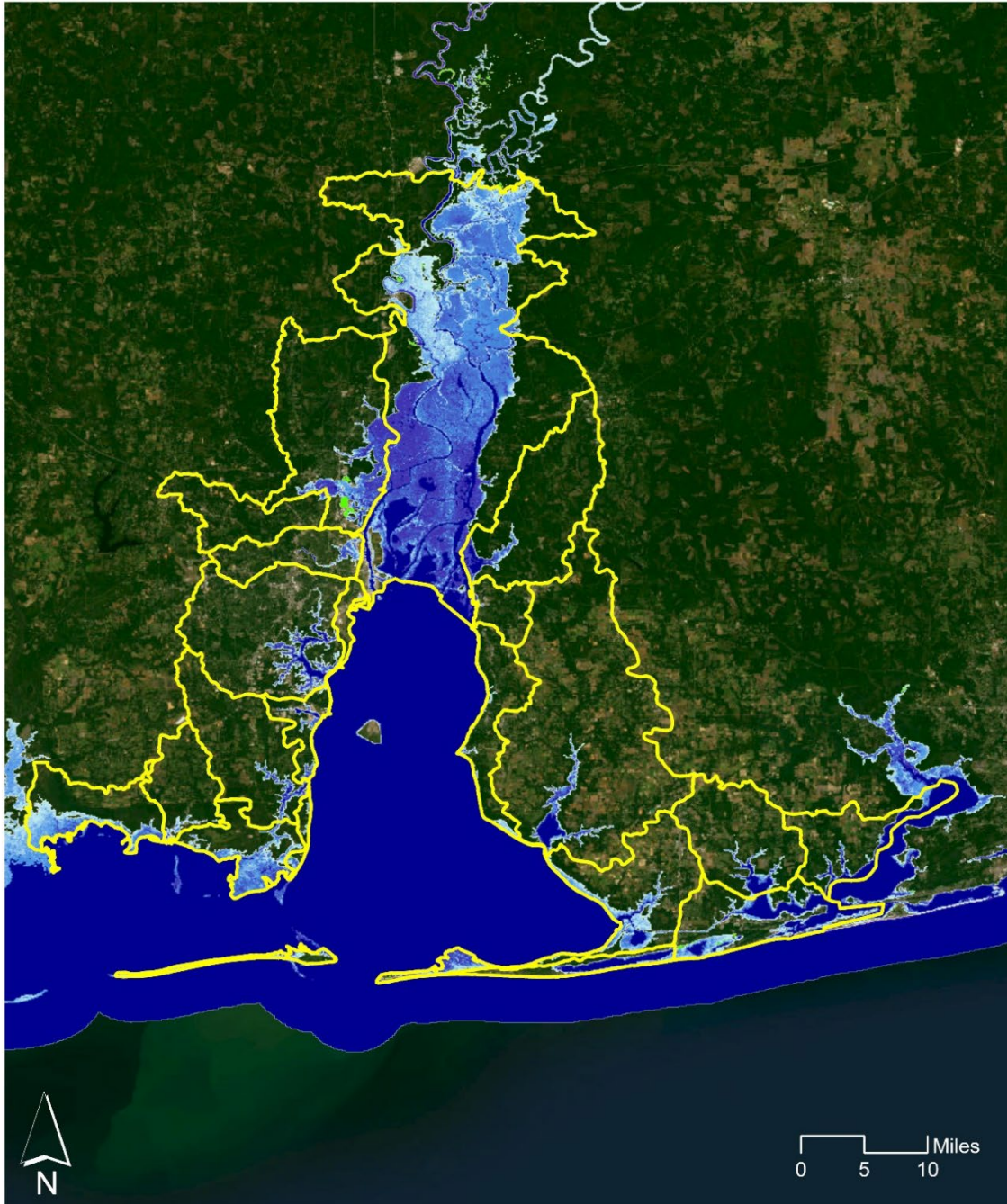
3.2.2 Key Stressor: Climate Change

Along Alabama’s coast climate change is a stressor with potential to greatly impact not only ecologic function but also human development. Issues of particular concern include the ability of natural habitats to migrate in the face of rising sea levels and the need for local governments to plan accordingly when locating critical infrastructure.

Climate variability and sea level rise are both impacts of a changing atmosphere that underlie greater temperature extremes with higher average temperatures; increased frequency and intensity of storm events; increased risk of droughts and fire; higher waters with more rapid coastal erosion, increased flooding, shoreline change, and loss of protective barriers; and saltwater intrusion into aquifers and surface waters.

Climate change impacts exacerbate trends in water and habitat quality across all coastal watersheds as discussed in **Section 3.3**. WMPs have documented where rising sea levels are already increasing physical risks in some watersheds, including intensified shoreline erosion and degradation, decreased beach widths, amplified storm surges, reduced stormwater drainage, and inundation during higher tides and windy days.

Figure 3.4 presents NOAA projections for potential sea level rise inundation of 3 feet above current Mean Higher High Water (MHHW) for the area, impacting most coastal watersheds.



SOURCE: NOAA/ESRI

Figure 3-4
Sea Level Rise Along Coastal Watersheds

3.3 Watershed Trends

As presented in **Section 3.2.1**, population growth is a trend across most watersheds, with the most significant growth occurring and projected in Baldwin County. Twenty-five percent of the completed WMPs in Baldwin County have population growth estimates above 50%. Some of the WMPs were completed over 10 years ago, and their associated watersheds have already

experienced the impacts of accelerated growth including habitat loss, increased runoff, and water quality impacts. The following sections provide a brief overview of the top issues and impacts trending in the WMPs.

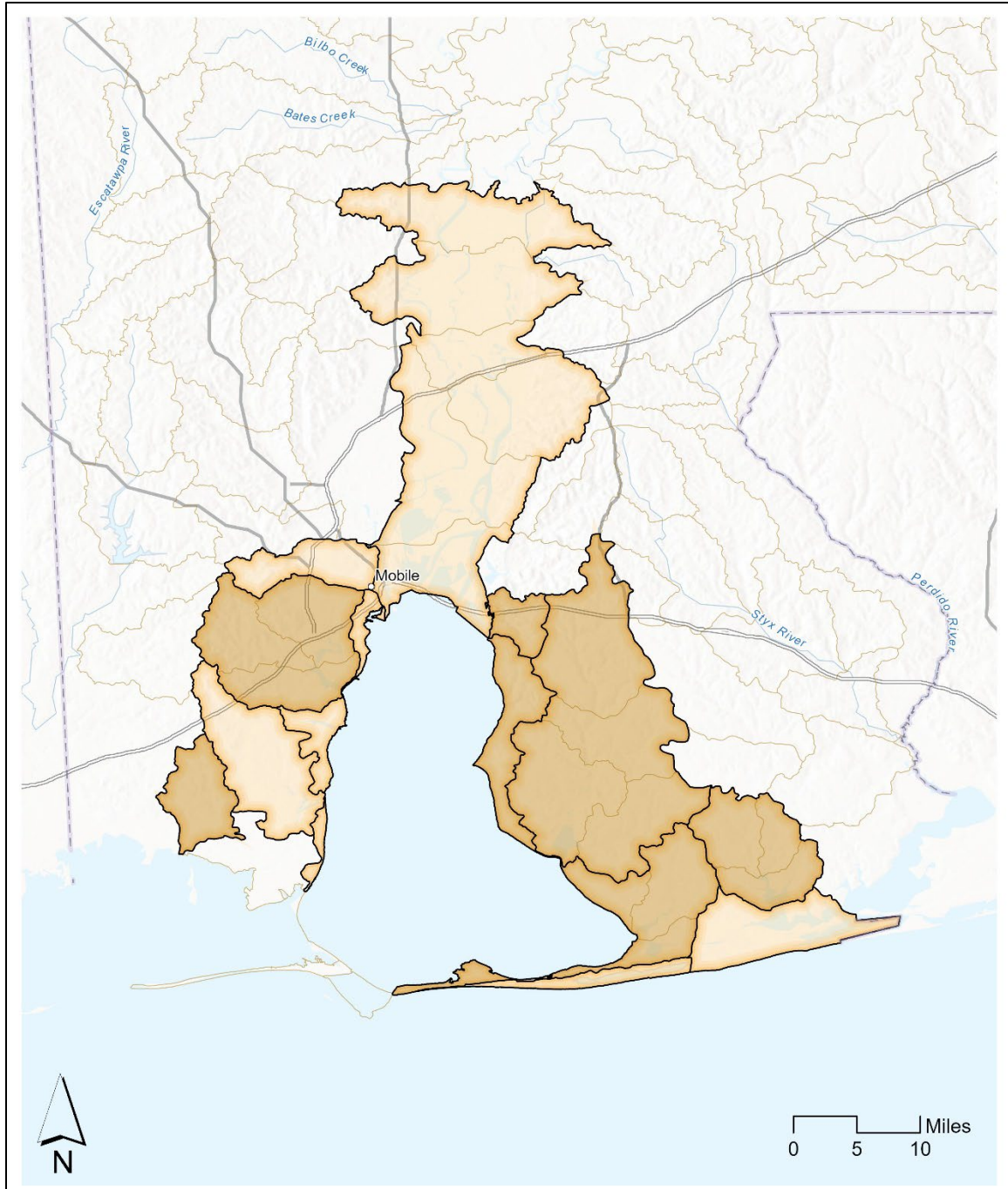
3.3.1 Water Quality

The U.S. Environmental Protection Agency considers polluted stormwater runoff to be the primary threat to the quality of our nation's surface waters. As communities become more developed and impervious surfaces increase, the volume and velocity of stormwater runoff increases and can impact water quality in receiving waters. Water quality impairments were reported as critical issues in the majority of the WMPs. The top impairments included sediments, pathogens, and nutrients.

Sediments

Sediment erosion rates are accelerated by human activities related to agriculture, development, timber harvesting, unimproved roadways, or any activity where soils or geologic units are exposed or disturbed. Acceleration increases with impervious cover, by increasing the volumes, velocities, and erosional energy of stormwater runoff. Excessive sedimentation is detrimental to water quality, destroys biological habitat, reduces the effectiveness of stormwater infrastructure, impedes the usability of aquatic recreational areas, and causes damage to structures. 50% of watersheds identified sediments as a priority issue.

Figure 3-5 presents watersheds with sediment impairments and highlights those identified as a priority issue in the WMPs.



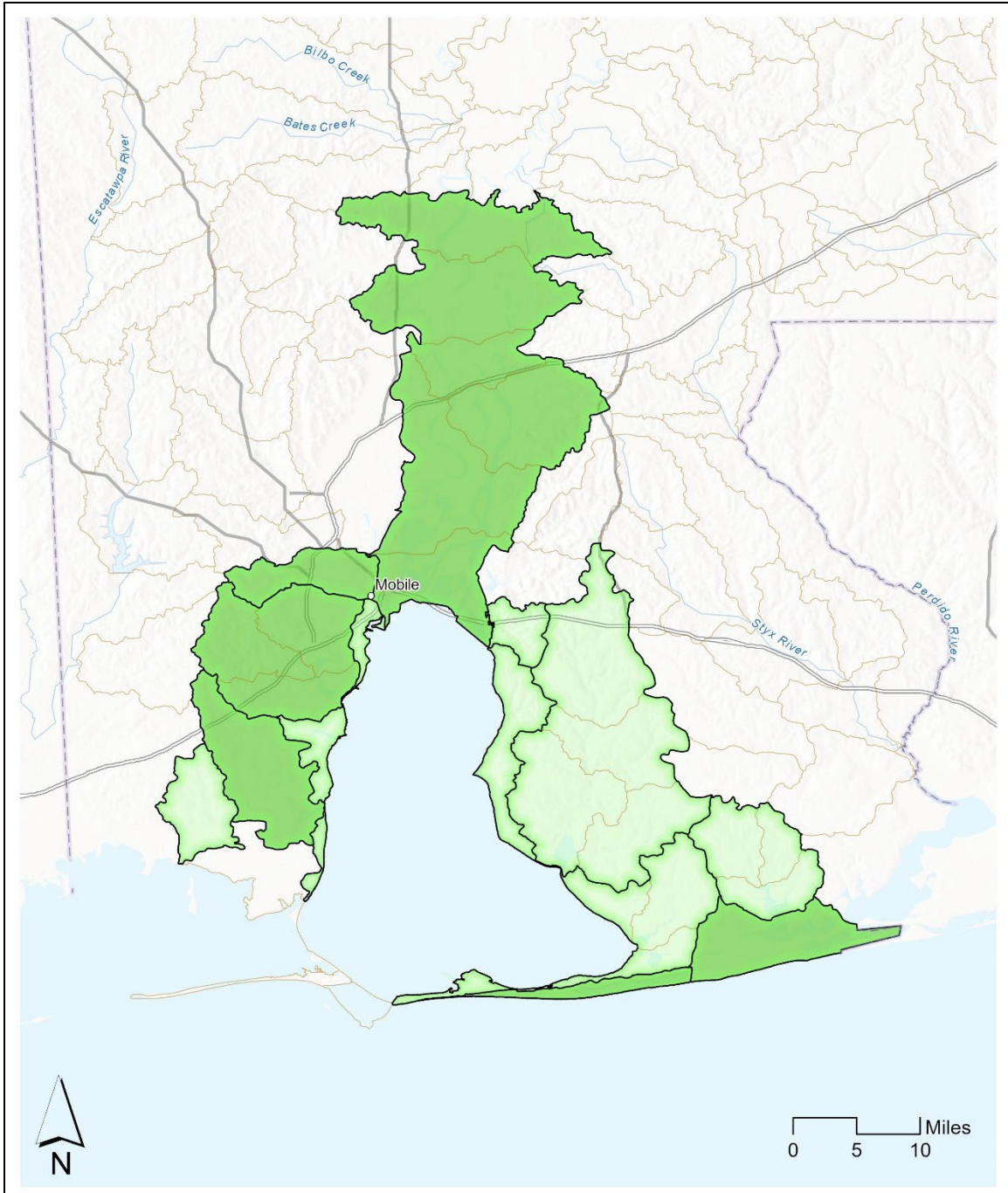
SOURCE: MBNEP

Figure 3-5
Sediment Impaired Watersheds

Nutrients

Stormwater runoff carries nitrates and phosphates into our coastal waters from a variety of sources including fertilized crops, fields, golf courses, parks, and yards; pet, livestock, bird, and wildlife waste; wastewater treatment plant effluent; and organic debris. High concentrations of nutrients in water can have harmful health and environmental effects. Nutrients were reported as a priority issue in 42% of the watersheds.

Figure 3-6 presents watersheds with nutrient impairments and highlights (darker shading) those identified as a priority issue in the WMPs.



SOURCE: MBNEP

Figure 3-6
Nutrient Impaired Watersheds

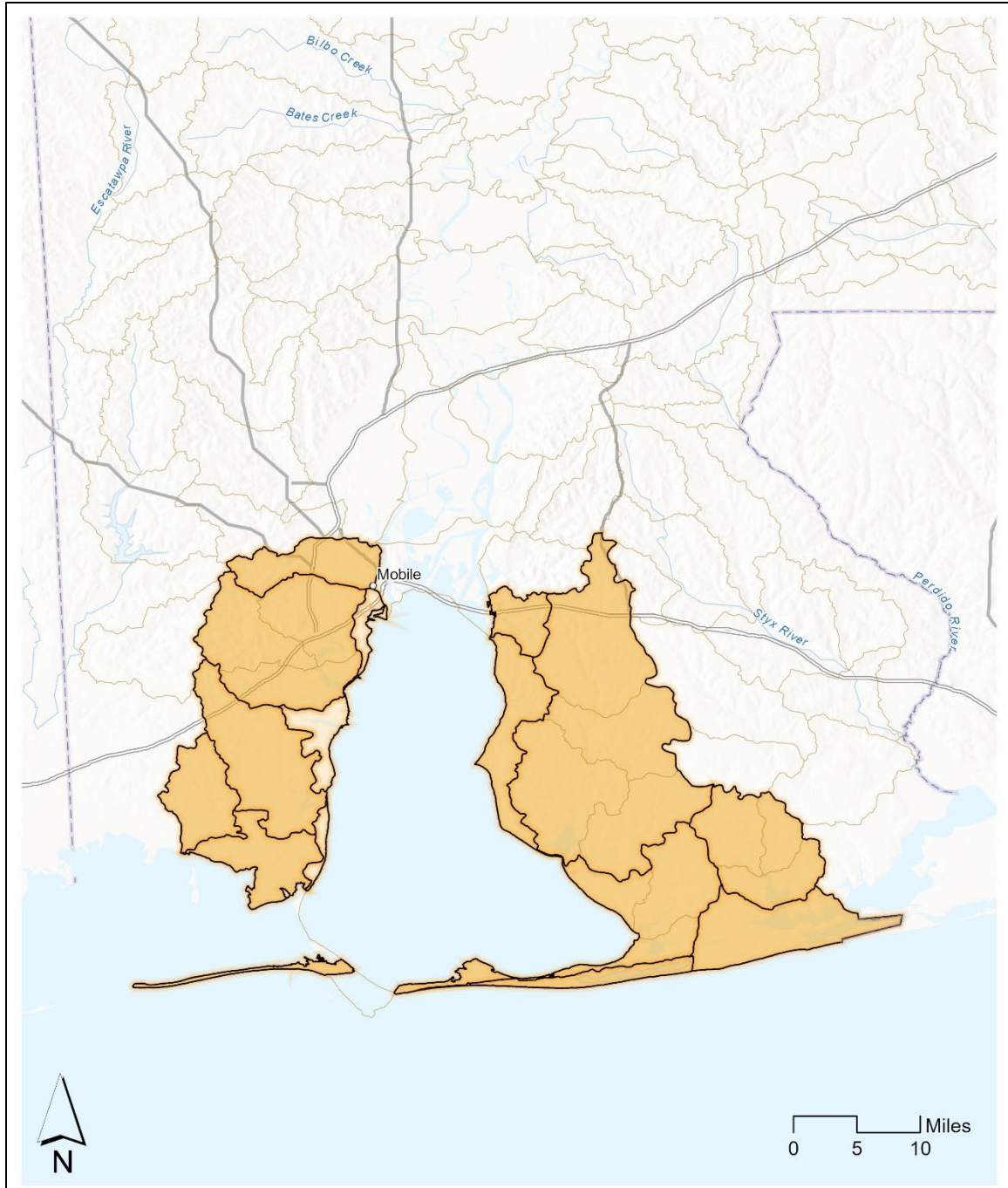
Pathogens

Pathogens are any agent (such as bacteria or viruses) that cause disease and are generally carried to our estuarine waters by stormwater runoff from different sources, including:

- Inadequately treated sewage,
- Sanitary sewer overflows (SSOs),
- Boat and marine waste,
- Medical waste,
- Animals (e.g., swine, cattle, and poultry) operations, and
- Runoff from urban areas, including waste from pets and wildlife (e.g., deer, geese, and racoons) and decaying organic matter.

86% of watersheds identified pathogens as a priority issue.

Figure 3-7 presents watersheds with pathogen impairments and highlights (darker shading) those identified as a priority issue in the WMPs.



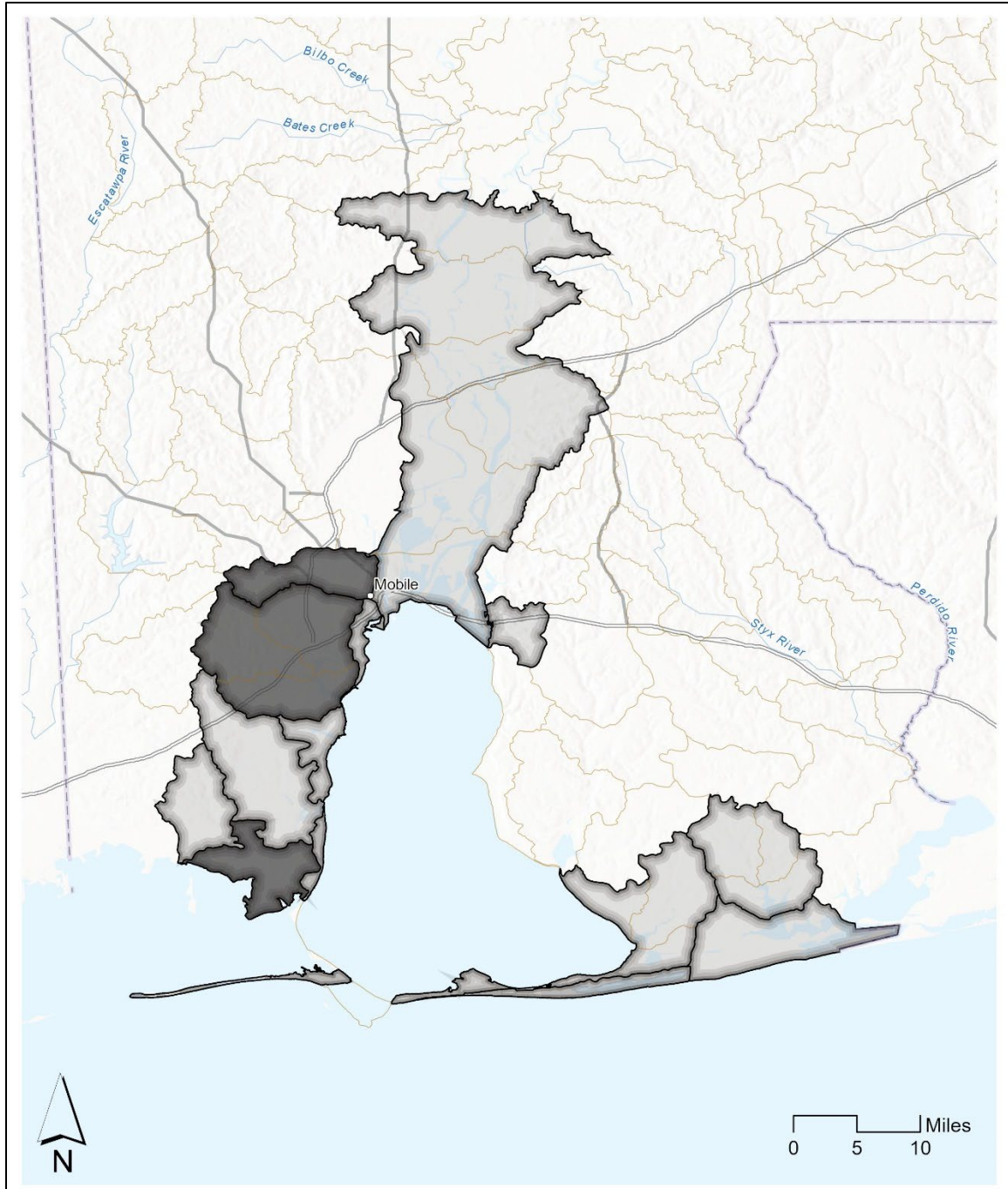
SOURCE: MBNEP

Figure 3-7
Pathogen Impaired Watersheds

Litter

With over half of the people in the United States living in coastal counties, conversion of the natural landscape to hard, developed surfaces has resulted in an increase in stormwater runoff carrying more nonpoint source pollution, including trash. 25% of the WMPs listed litter as one the priority issues in the watershed with most of the litter impacts originating in populated areas.

Figure 3-8 presents watersheds with litter impairments and highlights (darker shading) those identified as a priority issue in the WMPs.



SOURCE: MBNEP

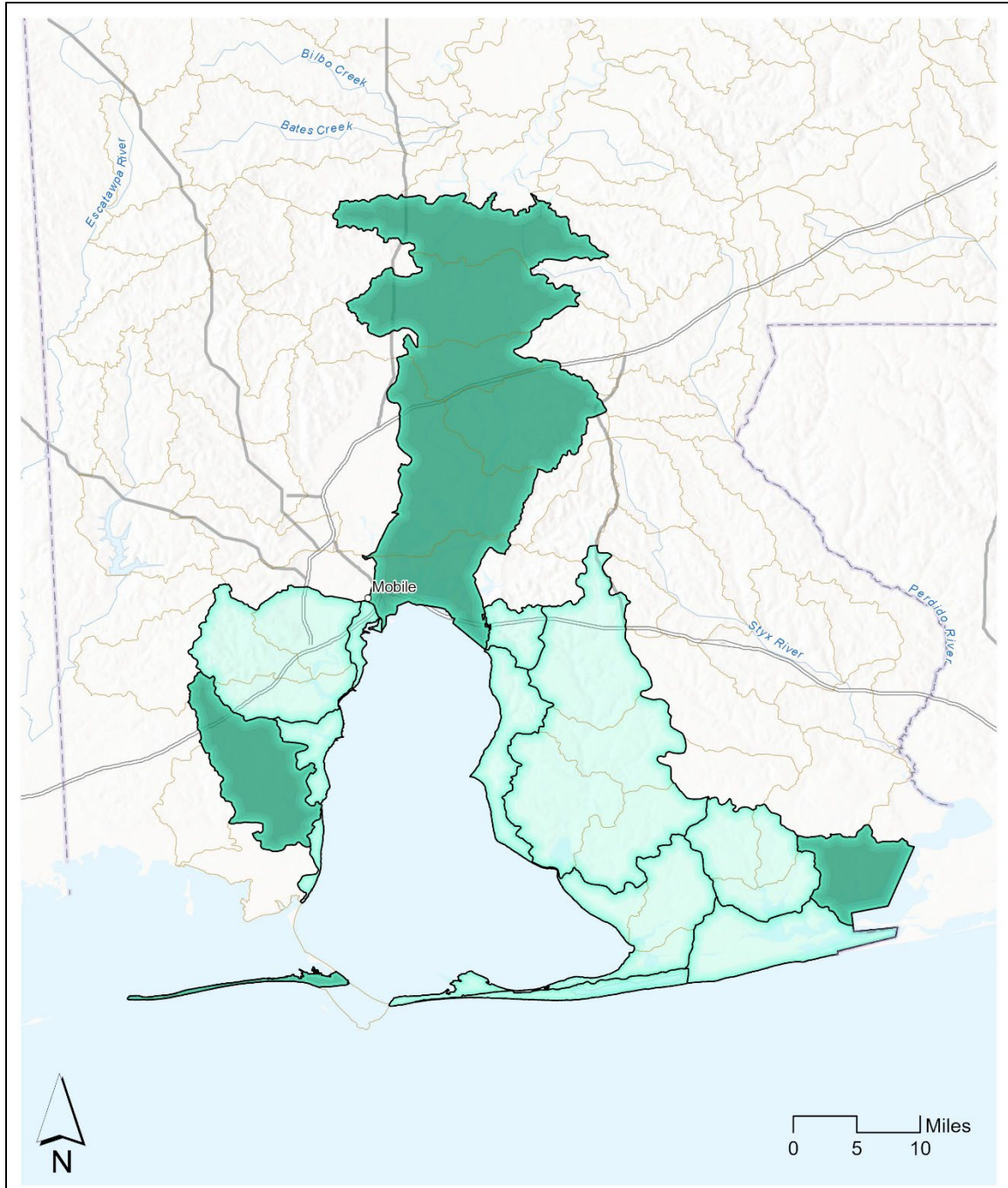
Figure 3-8
Litter Impaired Watersheds

3.3.2 Habitats

Habitat Conversion and Loss

A primary result of converting natural landscapes, fragmentation of habitats is the primary stressor impacting most coastal habitat types. When natural landscapes are cleared for development or farming, large continuous tracts of productive habitat are divided into smaller, separate, “leftover” islands isolated from each other by cropland, pasture, or developed areas. 33% of WMPs reported habitat loss as a priority issue.

Figure 3-9 presents watersheds experiencing habitat conversion and loss, and highlights (darker shading) those identified as a priority issue in the WMPs.



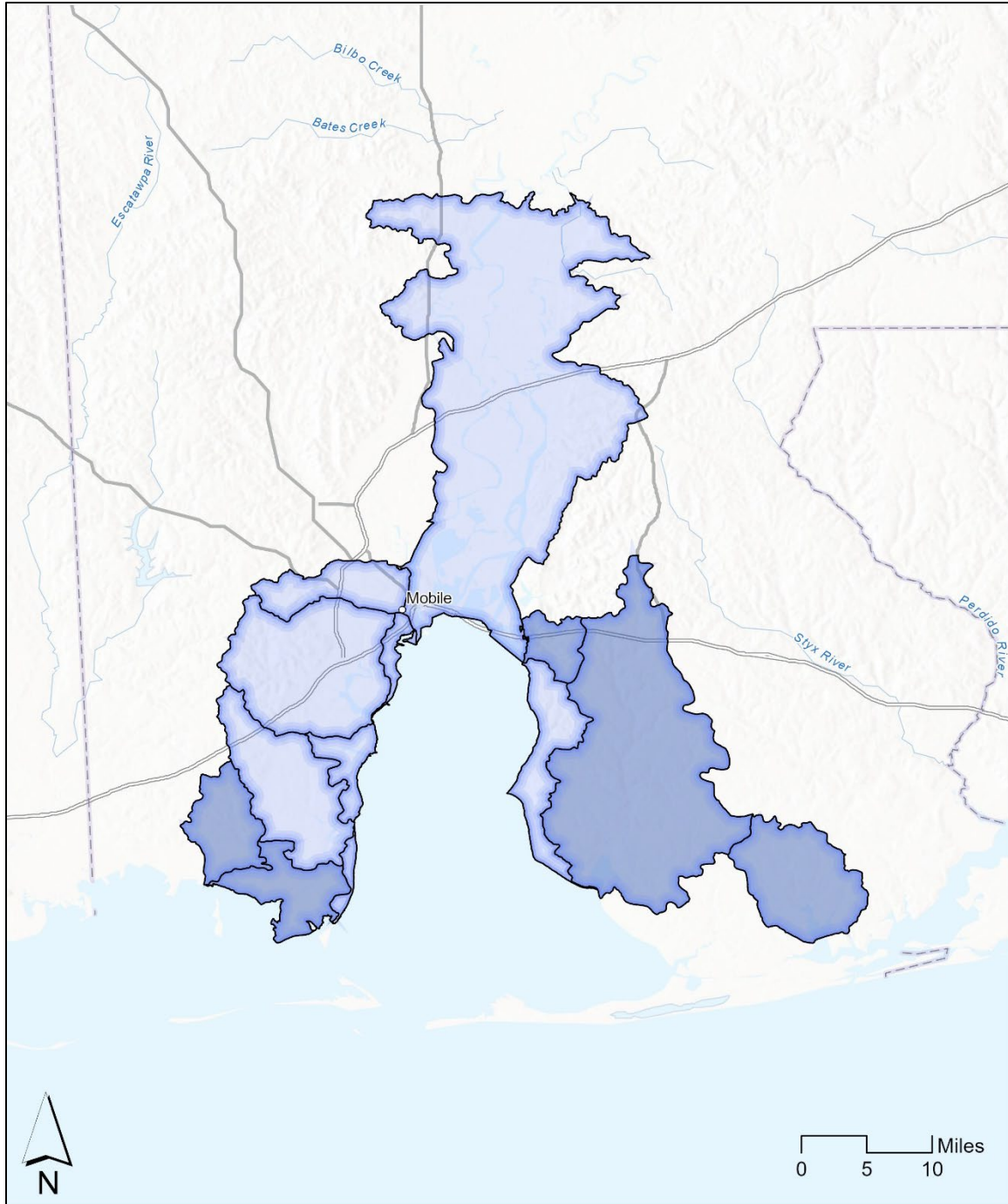
SOURCE: MBNEP

Figure 3-9
Watershed Experiencing Habitat
Conversion and Loss

Stream Degradation

Degradation of aquatic ecosystems occurs when hydrology of a drainage area is altered by large increases in impervious cover. The force of the increased stormwater runoff scours streambeds, erodes and collapses streambanks, damages critical infrastructure, and causes large quantities of sediments and associated pollutants to enter streams every time it rains. This sediment can impact downstream wetlands and fishery habitats, like submerged aquatic vegetation (SAV) (seagrass beds) and oyster reefs. 33% percent of WMPs reported stream degradation as a priority issue.

Figure 3-10 presents watersheds experiencing stream degradation, and highlights (darker shading) those identified as a priority issue in the WMPs.



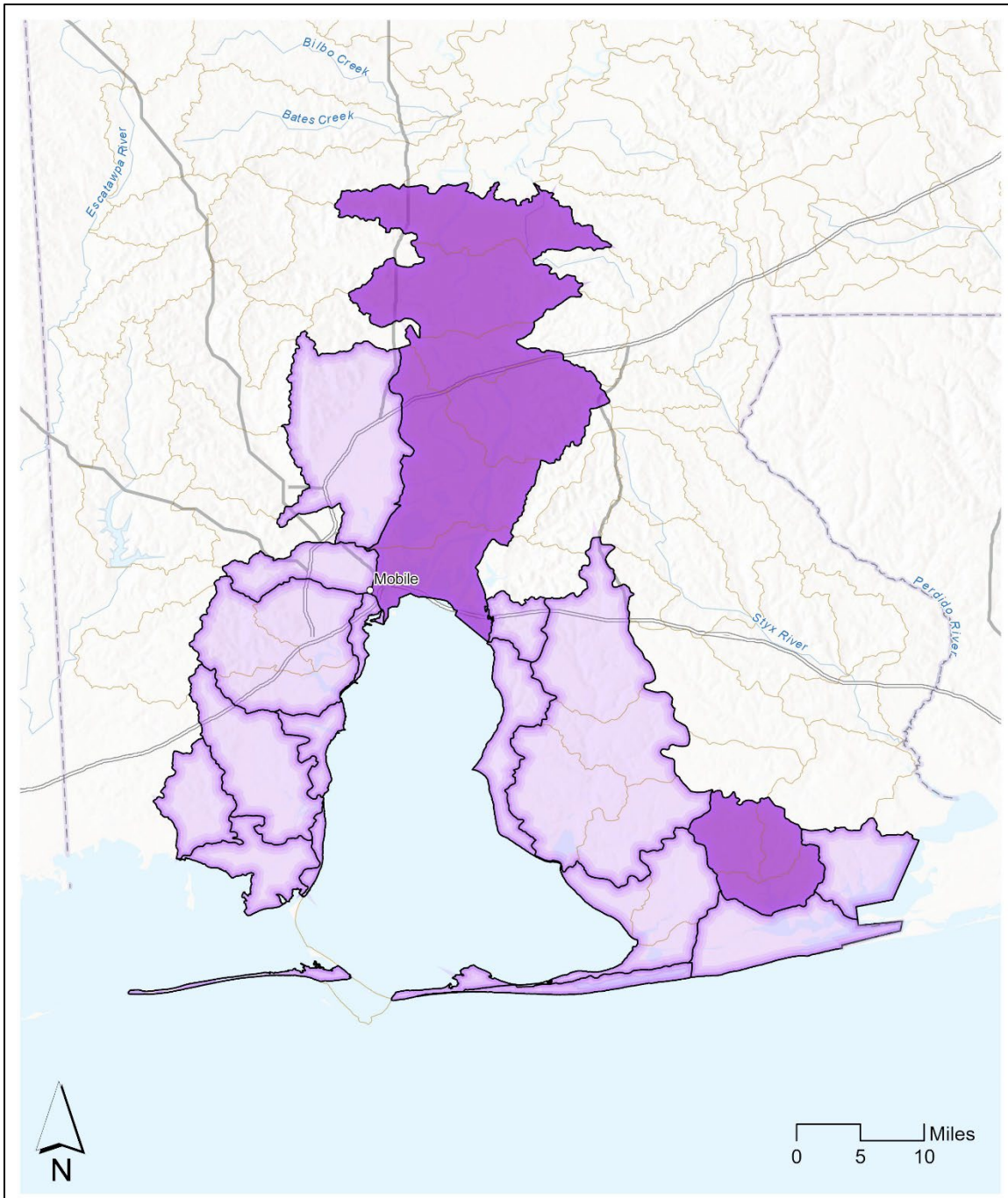
SOURCE: MBNEP

Figure 3-10
Watersheds Experiencing Stream Degradation

Invasive Species

As globalization has increased, a variety of plants and animals have entered the waters and ecosystems of Coastal Alabama. They arrive in myriad ways—in ship ballast, fruit crates, or sometimes intentionally as pets or ornamental plants—to name just a few. Because these non-native species are new, some of them face few, if any, natural predators or diseases to prevent them from becoming established and proliferating unconstrained. Their free spread in turn pushes out native flora and the fauna. Invasive species are among the leading threats to native wildlife globally, as well as here in Coastal Alabama, with almost half of all threatened or endangered species at risk due to invasive species. Human health and economies are also at risk from invasive species. Because much of our fisheries, agriculture, and recreational activities rely on healthy native ecosystems, the impacts of invasive species can cost our economy billions of dollars. Non-native species can spread diseases from other ecosystems, limit access to waterways, and foul water intakes and other infrastructure. 13% percent of watershed identified invasive species as a priority issue.

Figure 3-11 presents watersheds impacted by invasive species and highlights (darker shading) those identified as a priority issue in the WMPs.



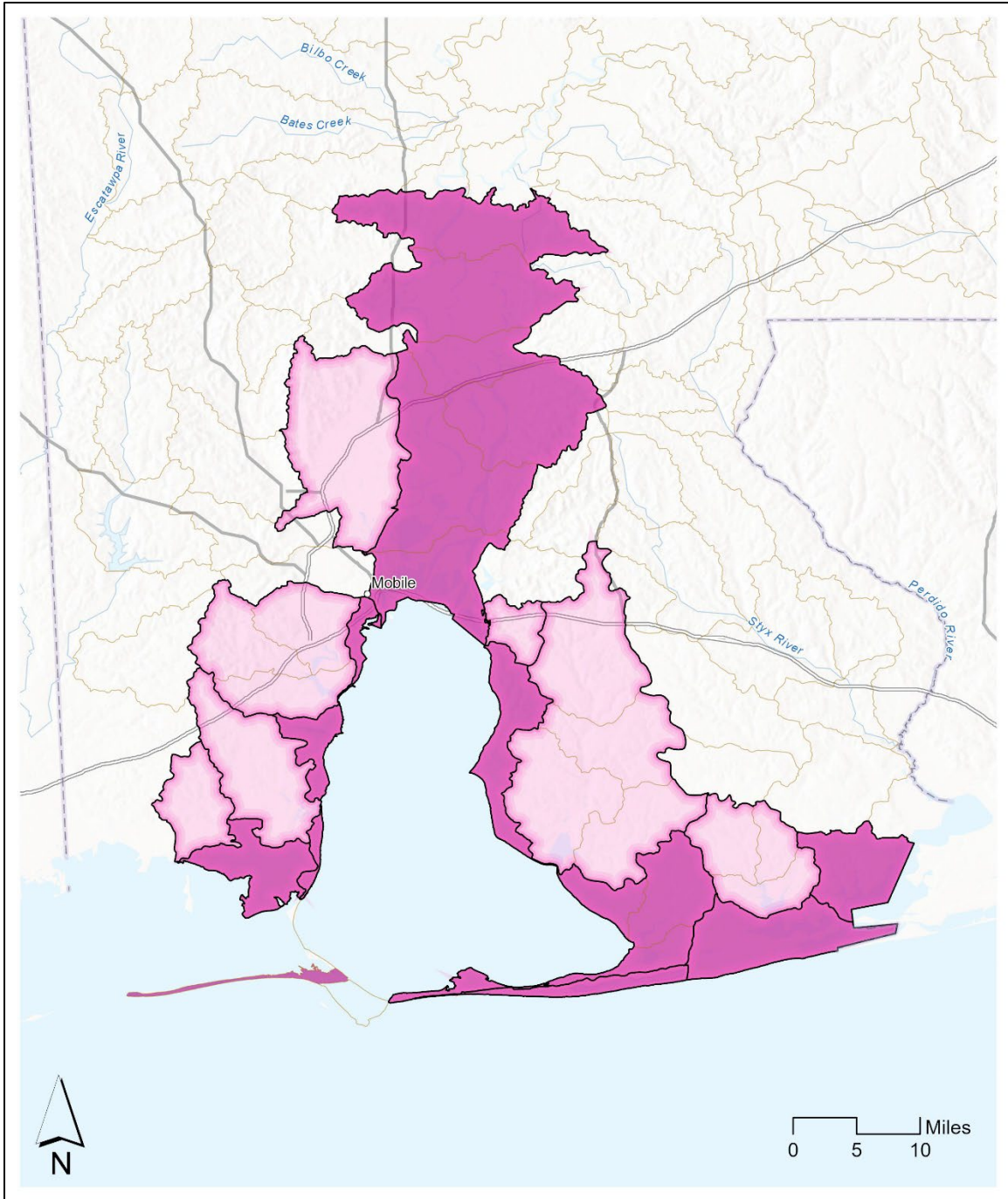
SOURCE: MBNEP

Figure 3-11
Watersheds with Invasive Species Impacts

Shoreline Erosion

Erosion, transportation, and deposition of sediments is a natural process along shorelines, happening gradually as the shoreline adapts to these changes, maintaining a healthy and productive ecosystem. Catastrophic natural or human disturbances may cause accelerated erosion. Natural disturbances include coastal flooding, sea level rise, and storm events. Human disturbances include vegetation removal, dredging, filling, or construction on or near the shoreline. Shoreline erosion was reported as a priority issue in 57% of the watersheds.

Figure 3-12 presents watersheds experiencing shoreline erosion and highlights (darker shading) those identified as a priority issue in the WMPs.



SOURCE: MBNEP

Figure 3-12
Watersheds Experiencing Shoreline Erosion

3.4 Watershed Needs

Characterizing the watershed and analyzing existing conditions forms the basis for watershed plan development and is critical in identifying issues and areas of concern within the watershed. Based on this analysis, the following is a list of needs identified across the WMPs.

- **Water Quality**
 - Increased and expanded water quality data collection
 - Source identification for pathogens
 - Erosion control to reduce sedimentation
 - Nutrient reduction
 - Litter control
 - Reduction in stormwater discharges
 - Improved stormwater management systems
 - Enforcement of stormwater regulations
 - Elimination of Sanitary Sewer Overflows (SSOs)
 - Low Impact development (LID), Best Management Practices (BMPs), and green infrastructure/nature-based solutions
 - Upgrade existing infrastructure
- **Habitats**
 - Invasive species management
 - Stream and wetland restoration
 - Habitat preservation, conservation, and restoration
 - Strengthen and enforce habitat protection ordinances
 - Land use planning and zoning
- **Shorelines**
 - Less armoring and more natural shoreline stabilization solutions
 - Long-term, coordinated shoreline and sediment management program
- **Resilience**
 - Habitat preservation for migration
 - Adaptation planning
 - Reinforcement or relocation of critical facilities
- **Access**
 - More public access points and enhancement of current access points
 - Greenway and blueway trails

- Connect the community with nature
- **Heritage and Culture**
 - Education and outreach programs
 - Protect historic use of natural resources

3.5 Summary

Each MBNEP WMP is centered on connecting communities to the watershed’s natural resources, promoting the region’s historic identity, protecting this legacy for future generations. However, increased pressure from population growth and development is impacting natural systems within the MBNEP study area and future growth projections indicate these issues will become exacerbated. Stormwater runoff and nonpoint source pollution is one of the top challenges for communities in the region as it relates to development. As habitats are converted to communities and bring in more people, there are more nonpoint source pollution impacts, and the cycle continues and worsens.

Cumulative impacts of land cover changes result in altered hydrology, producing increased runoff volumes and peak runoff velocities, greater connectivity between impervious areas, and loss of soils and vegetation previously slowed or reduced runoff prior to development. This causes erosion and sedimentation, habitat degradation, and water quality impairments. Stormwater management and improvements in how land is developed and converted, with the target of a net zero impact, is needed to address growth and development.

In addition, impacts from climate change and sea level rise will also impact the regional watersheds. As temperatures and sea levels rise, there will need to be room for habitats and species to migrate. Developing mitigation measures to address these impacts will be critical as communities are further developed.

SECTION 4

Assessment of the State of Watershed Environmental Monitoring Data

All Mobile Bay National Estuary Program (MBNEP) watershed management plans (WMPs) require a comprehensive monitoring and evaluation program to establish baseline data and track progress over time. The Mobile Bay Subwatershed Restoration Monitoring Framework developed by the MBNEP Science Advisory Committee (SAC), serves as the template for development of the monitoring program. Additionally, a volunteer monitoring component is incorporated into the monitoring program that includes recommended volunteer monitoring locations.

4.1 Overview

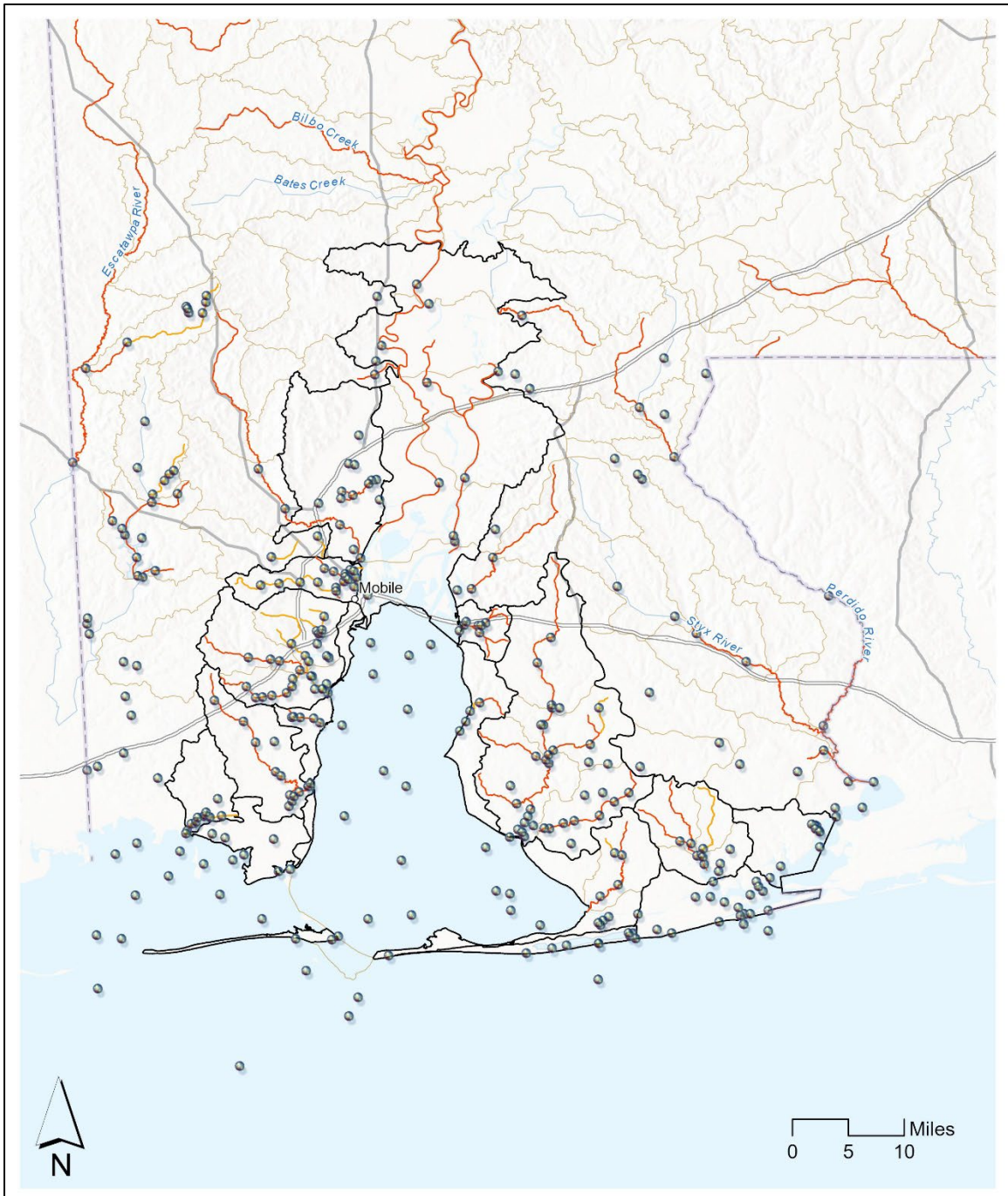
The MBNEP's comprehensive monitoring framework recommends specific monitoring procedures to assist in determining:

- What, if any, changes in water quality, flow, sedimentation, biology, and habitat quantity and quality result from restoration efforts and WMP implementation;
- How potential ecosystem health indicators relate to stressors and ecosystem function/services; and
- The long-term status of the biological condition of the watershed.

The MBNEP closely aligns with regional and Gulf Coast environmental monitoring efforts to collect and analyze data at the watershed level. The MBNEP monitoring framework is designed to coincide with what citizens value, and for the data to be communicated to the public so progress on improving or protecting conditions has widespread community support. The following is a brief overview of some of the monitoring efforts.

4.1.1 Alabama Department of Environmental Management (ADEM)

ADEM has an extensive network of environmental monitoring sites. **Figure 4-1** below presents and overview of their monitoring locations.



SOURCE: MBNEP

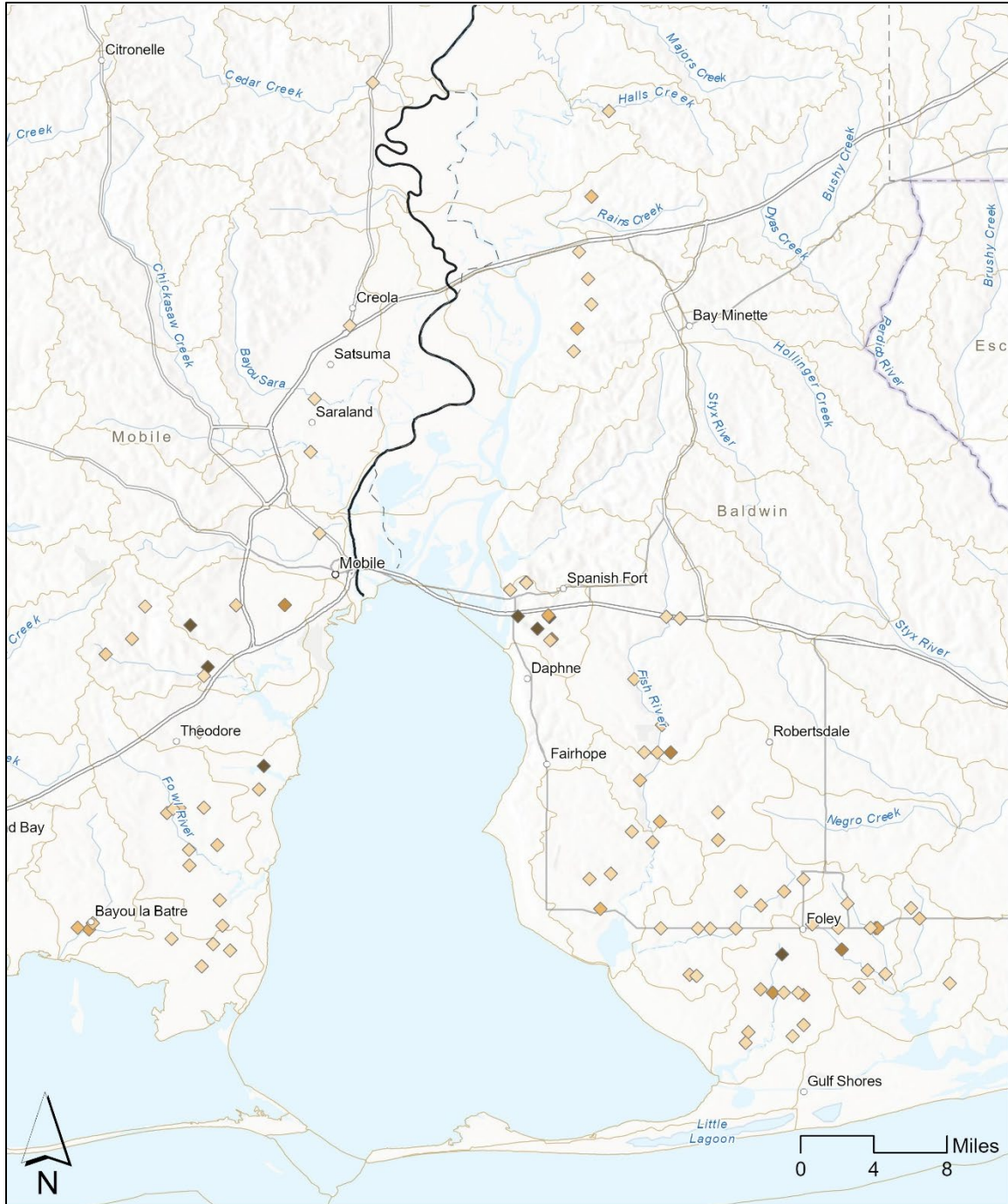
Figure 4-1
ADEM Monitoring Sites (2020)

ADEM has 317 sampling sites within the MBNEP's coverage area. 154 sites are within Baldwin County and adjacent waters, 163 are in Mobile County and adjacent waters, and 7 sites are classified as open ocean, south of central Dauphin Island. Sites within the two counties are sampling locations for many different ADEM programs including: Coastal Program, Rivers and Streams, Rivers and Reservoirs, Wetland Monitoring, and others. Due to logistical constraints, the temporal resolution of data at these sites is relatively low, with each site being sampled once a year or less.

In 2015, The ADEM Coastal Program survey sites were broken into regions (Western, Eastern, and Mobile) to be sampled on a rotating 3-year basis. During a specific region's sampling year, every site in the region is sampled monthly from April to October. As of 2014, sites in the Rivers and Streams Monitoring Program are now sampled every year; prior to then, sites within river basins were sampled once every 5 years.

4.1.2 Watershed Sediment Studies

As sedimentation is a major source of stress in coastal watersheds, one important component of comprehensive watershed planning includes the development of data related to land conversion through time. MBNEP has partnered with the Geological Survey of Alabama (GSA) to characterize land use, erosion, and sedimentation in coastal 12-digit hydrologic unit code (HUC) watersheds. These studies establish sedimentation rating curves to measure bed and suspended sediment loads and to identify historic sources of sediment in coastal streams, providing valuable information on what is natural sedimentation versus what is the result of anthropogenic factors. As of 2018, sediment studies have been completed for the D'Olive, Dog River, Fowl River, Bayou La Batre, West Fowl River, Fish River/Weeks Bay, Bon Secour River, and Wolf Bay watersheds, with normalized load data (tons/ mile² /year) derived from sediment analyses reflected in **Figure 4-2**. Sediment studies are currently being developed for the Mobile Tensaw Apalachee, Deer River, and Fly Creek watersheds. These studies provide a baseline of sediment data prior to restoration actions and are used to evaluate restoration success.



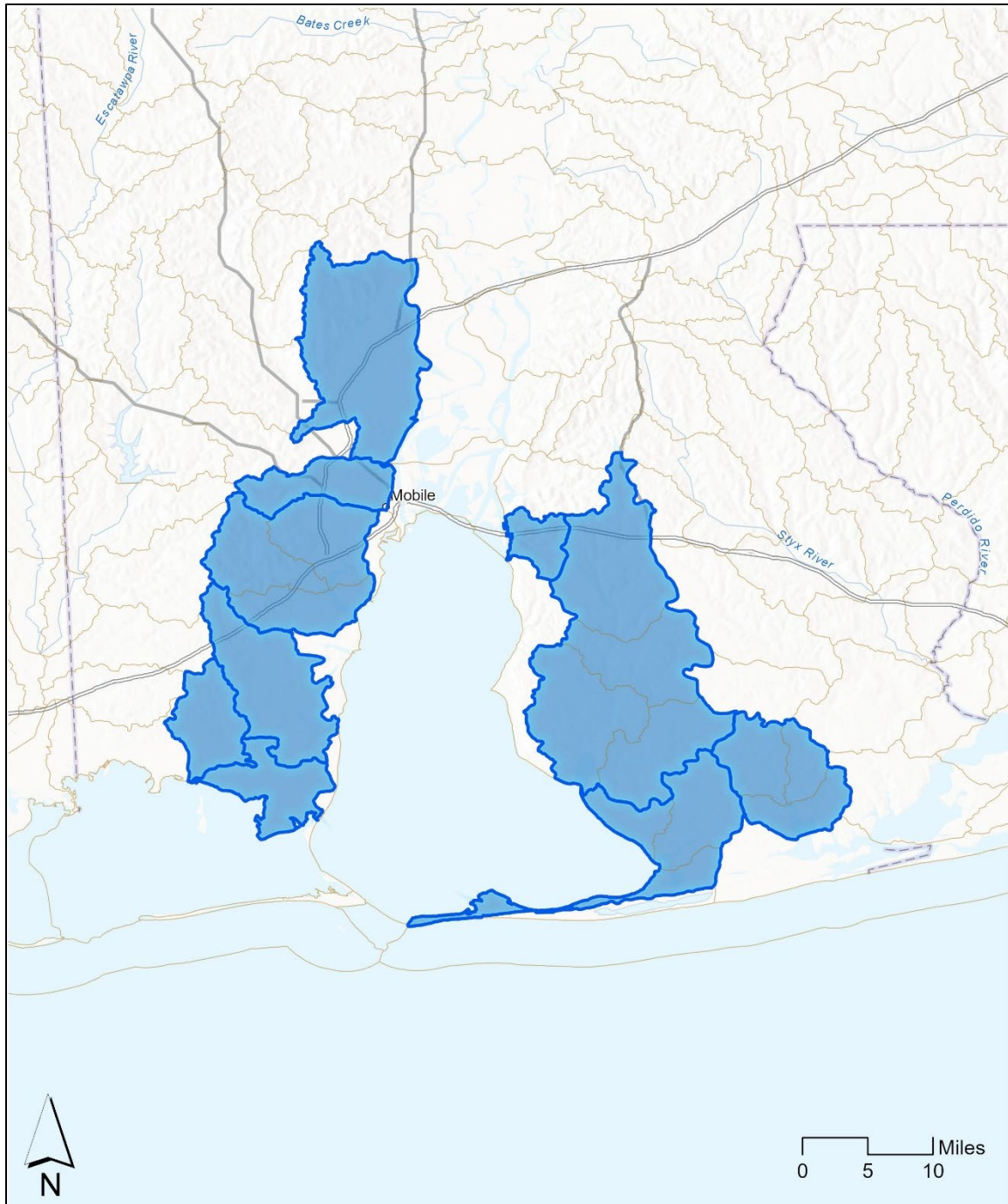
SOURCE: MBNEP

Figure 4-2
Sediment Monitoring Locations

4.1.3 Hydrological Modeling

Hydrologic models provide simulations of real-world systems that aid in explaining, predicting, and managing the flow of waters over landscapes. The MBNEP, the two coastal counties, and engineering contractors have found these computer software tools valuable in watershed or other landscape planning efforts to simulate flow and behavior of water through a watershed to determine where recommended preservation, restoration, and conservation activities will have the greatest impacts for improving the health and resilience of a watershed. Completed models are used to model dynamics of stream segments to inform marsh restoration or shoreline stabilization design.

Just as important, these models provide local planning jurisdictions with a tool for evaluating impacts of future growth (increased runoff or sediment loading, etc.) or proposed developments with respect to compliance with codes or standards. They are also used to evaluate potential retrofit measures in previously developed areas to aid in selection of watershed-specific retention measures or capture target volumes. The models also facilitate quantitative estimation of loadings that simulate both upland runoff and in-stream processes, providing understanding of water movement and sheer stresses along shorelines. **Figure 4-3** presents the watersheds where hydrologic modeling has been conducted to support watershed management planning efforts.



SOURCE: MBNEP

Figure 4-3
Hydrological Modeling Locations.

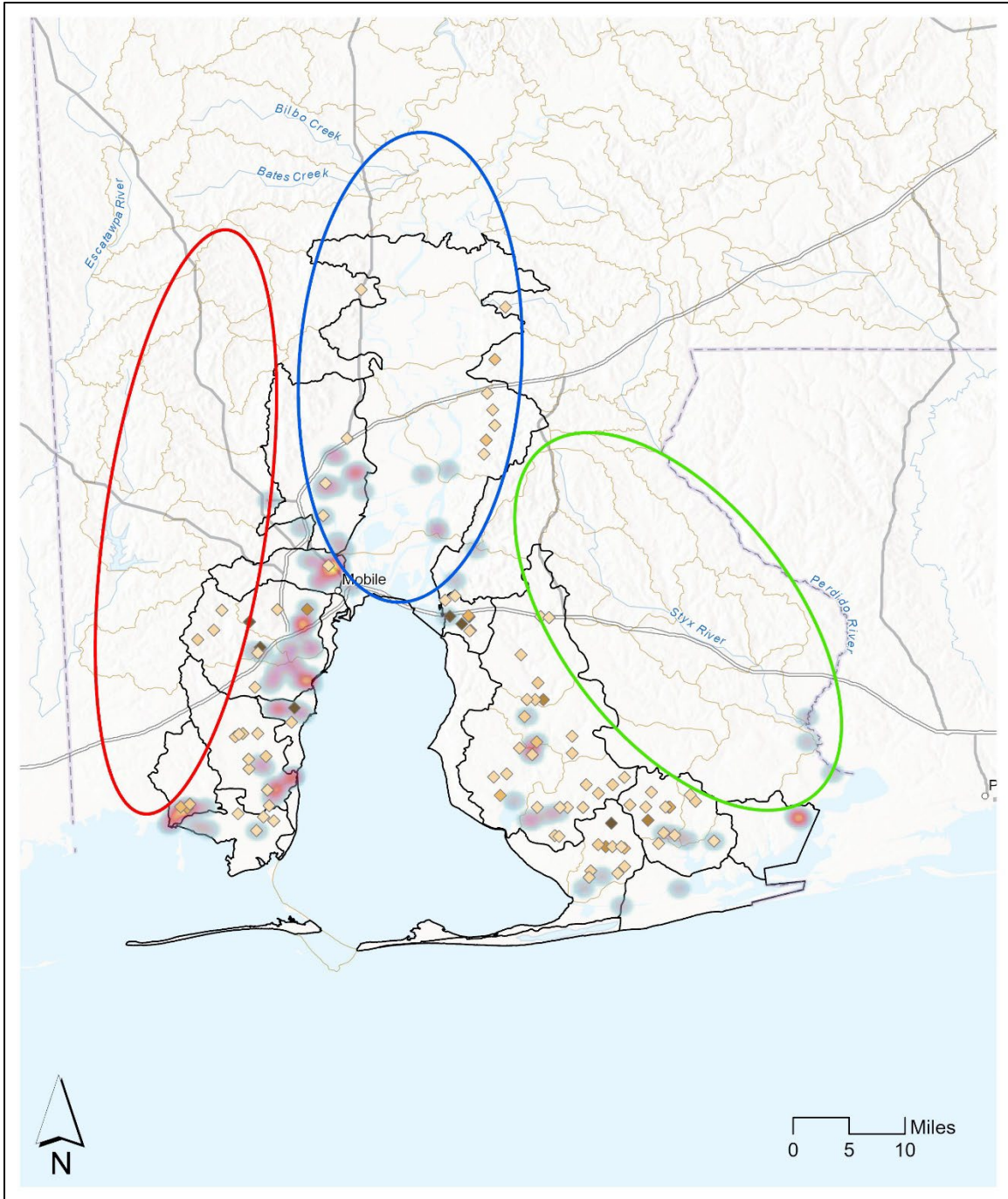
4.1.4 Volunteer Monitoring

MBNEP works to build the capacity of citizens to inform coastal resource management through the expansion and support of volunteer water quality and biological monitoring programs. The MBNEP Community Action Committee supports grassroots water quality monitoring by place-based organizations by providing training and technical support using Alabama Water Watch (AWW) protocols and equipment. **Figure 4.4** shows a map of volunteer water quality monitoring sites in coastal Alabama.

Alabama Water Watch is a citizen volunteer water quality monitoring program which aims to improve water quality and policy through citizen monitoring and action. The AWW educates citizens on water issues and trains them to use standard equipment and approved techniques to collect credible water quality data using quality assurance protocols. It empowers citizens to make a positive impact by using water monitoring data for water education and to guide restoration and protection efforts.

Alabama Water Watch lists 98 active sites (having reported since 2021) across the two coastal counties. Monitoring station hotspots in Mobile County are in Dog River (thanks to the persistent work of Mimi Fearn and the Dog River Clearwater Revival group) and Fowl River, with a younger cluster in Bayou la Batre. In Baldwin County, monitoring hotspots are in Wolf Bay, Orange Beach, and Ono Island, with some sporadic longstanding sites along Fish River and tributaries to Weeks Bay.

Inland areas of the coastal counties are very poorly represented in the AWW monitoring network. There is a dearth of information in the MTA Delta (blue oval), and inland tributaries to coastal bays (red and green ovals). Additionally, the Weeks Bay monitoring network needs revitalization, as many sites in Fish and Magnolia Rivers have become inactive with AWW. These data gaps are being addressed through efforts to expand the current Volunteer Water Quality Network.



SOURCE: MBNEP

Figure 4-4
Volunteer Monitoring Locations. Location of active (post 2021) AWW monitoring sites. Darker highlights indicate longer monitoring report records.

4.1.5 Restoration Monitoring

Restoration monitoring sites for the MBNEP are primarily located in the D'Olive and Fowl River watersheds.

In 2013, efforts to restore various tributaries in the D'Olive Watershed began. Post-restoration monitoring efforts focused on sedimentation and flow, water quality, wetland health, and SAV in D'Olive Bay. Comprehensive monitoring in the D'Olive watershed also enabled calibration of a Watershed Condition Framework (WCF) model for the larger Mobile Bay Estuary. The WCF model will be used to assess and communicate to the public the health of the estuary, using biological information and stressor assessment to measure estuarine status and trends. Findings of the post-restoration monitoring efforts are summarized below:

- Although restoration efforts did not reduce sediment loads in the streams to geologic erosion rate levels, estimated sediment loads in the tributaries were reduced by 98-99% of pre-restoration levels. Stormwater velocities downstream were also greatly reduced.
- Biological condition scores of restored areas were still fairly low due to the short amount of time that had passed following restoration. Plant communities are expected to improve with time and as tree canopy coverage increases at the sites. Stabilization of the streambanks has also yielded better water quality and higher quality habitat for moderately pollution-tolerant macroinvertebrates to reinhabit restoration sites.

In 2017, MBNEP oversaw the restoration of the tip of Mon Louis Island in the Fowl River watershed. As a permit requirement, annual monitoring of site topography/bathymetry, shoreline change, and marsh flora and fauna were required for 5 years post-restoration. Marsh success criteria for faunal communities were exceeded at the site during the 2020 monitoring period and criteria for native vegetative cover were exceeded in 2022.

4.2 Watershed Management Plans

To build on existing data and information, MBNEP WMPs make recommendations for monitoring locations within the watershed, parameters to monitor, frequency and duration of monitoring, adaptive management recommendations, volunteer participation, implementation recommendations, and anticipated costs. **Table 4-1** highlights some of the recommended monitoring elements from the WMPs, in addition to the standard field parameters (i.e., temperature, pH, conductivity, and dissolved oxygen).

TABLE 4-1
WMP MONITORING RECOMMENDATIONS

Watershed	Water Quality Parameters						Other Parameters				
	Sediments	Nutrients/ Organics	Pathogens	Metals	Chlorophyll - a	Litter	Biological Assessments/ Streams	Invasive Species	Shoreline Assessment	Impervious Cover	Stormwater Ponds
D'Olive	√		√				√		√	√	
Three Mile Creek	√	√	√			√		√			
Bon Secour		√	√			√		√	√		
Dog River	√		√	√	√		√		√		
Fowl River	√	√	√	√	√		√		√		
Weeks Bay	√	√	√				√	√	√	√	√
Bayou La Batre	√	√	√	√	√		√		√		
West Fowl River	√	√	√	√	√		√		√		
Wolf Bay	√	√	√			√		√			
Western Shore	√	√	√	√	√	√	√	√	√	√	√
Gulf Frontal	√	√	√		√		√		√		
Mobile Tensaw Delta	√	√	√	√			√	√	√		
Dauphin Island	√	√	√	√	√	√	√	√	√	√	
Eastern Shore	√		√				√	√	√		
Western Perdido Bay			√					√	√		

4.3 Monitoring Needs

The MBNEP WMPs are built upon existing data and research, and while in some watersheds additional data collection was conducted; there is an overall need for more data to better understand these systems. The following needs were presented across the WMPs:

- **Expanded water quality monitoring** – both spatially and temporally. The lack of comprehensive baseline water quality data, combined with accelerated population growth and development occurring in many of the watersheds, amplifies the need to fully assess the water quality and environmental health of the watersheds and analyze spatial and temporal trends over time.
- **Groundwater monitoring** – there is limited groundwater data available in the MBNEP study area.
- **Other parameters** – Table 4-1 presented the most common parameters recommended for monitoring in the WMPs, however, there are other watershed specific parameter recommendations including pesticides and herbicides, harmful algal blooms (HABs), septic tanks, critical species, benthic macroinvertebrates, and others.
- **Management measures monitoring** – there have been numerous management measures planned and implemented across the watersheds. The long-term success and evolution of these efforts should be monitored to compare the results to original project goals and to assess how these projects have addressed the issues and improved the overall ecological health of the watersheds.
- **Volunteer monitoring** – two important components of WMP implementation are monitoring and citizen engagement. Expanding volunteer monitoring programs addresses both of these needs.
- **Adaptive management** – monitoring programs may encounter instances where data analysis is not correlating with physical observations and biological assessments of the watersheds. In such a case, the monitoring program should be re-evaluated, and adaptive management implemented to assess if and where data-gaps may be occurring.

4.4 Summary

Monitoring is an essential component to the success of implementing WMPs. Routine monitoring of the watersheds allows MBNEP and its stakeholders to track progress over time to assess the effectiveness of implemented management measures and determine whether changes or additional actions are needed to achieve the goals and objectives of the WMP. Data collected during the monitoring phase helps establish baseline conditions for future assessments and identifies new watershed issues which may not currently be known, or which may arise in the future.

SECTION 5

Assessment of the Regulatory Environment

A critical component of watershed plan development is a review of regulatory drivers and constraints impacting the ability of resource managers to adequately address critical issues and implement WMP recommendations. This plan component provides a thorough review of all applicable federal, State, and local rules and regulations addressing development, stormwater management, erosion control, Low Impact Development (LID), natural resource protection (e.g., wetland and stream buffers), and shoreline protections. This review also identifies any gaps or inconsistencies that should be addressed and provides recommendations for improving regulatory structures with the goal of managing stormwater and natural resources holistically across political boundaries based on a watershed approach.

In 2018, the Mobile Bay National Estuary Program (MBNEP) published the *South Alabama Stormwater Regulatory Review* to provide local governments with a survey of best practices related to regulatory measures for improving management of environmental resources. It reviewed existing laws, regulations, permits, and ordinances at the federal, State, and local levels for jurisdictions within the immediate MBNEP program area (i.e., Mobile and Baldwin counties). The 27 jurisdictions reviewed include Mobile County and its 11 incorporated towns and cities, Baldwin County and its 14 incorporated towns and cities, and all lands under State and federal jurisdiction. Approximately 50 county and municipal regulations were reviewed relative to factors influencing stormwater runoff, water quality, wetland protection, and stream and shoreline protection. The codified regulations of each local entity were reviewed, and recommendations were made for improving and streamlining regulatory structures across both counties. This review was updated in 2021 to account for any regulatory changes in the interim as well as to include a review of regulations addressing litter, trash, and recycling across all jurisdictions. These coastal regulatory reviews have provided the basis for watershed planning teams developing the regulatory chapters of their respective watershed plans.

5.1 Federal and State Regulations

The primary regulatory drivers associated with stormwater management and natural resource protection are based upon federal law, most notably in the Federal Water Pollution Control Act of 1972 and the Clean Water Act amendments of 1977. In addition, the Coastal Zone Management Act provides coastal states with the opportunity to develop and implement coastal area management programs to manage coastal resources.

Most Federal statutes provide that a state may be delegated the authority to administer the program if they can satisfactorily demonstrate that they have implemented an equivalent state statute and program. The Alabama Department of Environmental Management (ADEM) is the

primary State environmental regulatory agency in Alabama. The Alabama Department of Conservation and Natural Resources (ADCNR) may also have jurisdiction over certain activities that affect State waters, natural resources (such as fish and wildlife), and State lands. The Alabama Coastal Zone Management Act establishes the statutory basis from the Alabama Coastal Area Management Program which was first enacted in 1976 with the stated purpose “*to promote, improve, and safeguard the lands and waters located in the coastal area of this state through a comprehensive and cooperative program designed to preserve, enhance, and develop such valuable resources for the present and future well-being and general welfare of the citizens of this state.*” Currently, coastal program implementation is split between ADEM (regulatory) and ADCNR (planning and administration) and only applies to lands and waters seaward of the continuous 10-foot contour.

A thorough analysis of the various Federal and State laws and regulations that apply to Coastal Alabama can be found in the *South Alabama Stormwater Regulatory Review*.

5.2 Gaps and Inconsistencies

Federal and State requirements are designed to be broadly applicable and may not provide the level of protection needed for a particular watershed or resource and should be considered only as minimum standards. Local governments must fill in the gaps to protect natural resources from both the direct and indirect impacts associated with development. In coastal Alabama, 22 of 27 local jurisdictions (~81%) have their own construction-phase Best Management Practice (BMP) requirements, but within Mobile County the rate is only ~67%. Most of the jurisdictions that do not have specific local construction-phase BMP requirements state that the ADEM permit requirements must be followed. Post construction stormwater management requirements showed the largest improvement from the 2018 review, with ~93% of local jurisdictions now having requirements. Currently, 13 local jurisdictions (~48%), up from 10 jurisdictions in 2018, address post-construction stormwater quality. Coastal resource protection requirements are still only evident in ~44% of the local jurisdictions, although all jurisdictions mention the State and/or federal permitting requirements. The ones mentioning coastal resource protection are generally those that are partially located within the State’s regulatory Coastal Zone Management area. LID and shoreline protection requirements are only evident in about 30% and 15%, respectively (shoreline protection is perceived as less critical in the more inland communities without traditionally navigable waterways). Ten of the 27 jurisdictions are currently covered under a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Program permit.

Regulatory inconsistencies between federal, State, and local authorities are inevitable and can contribute to ineffective management, serve as impediments to restoration efforts, and cause confusion. These inconsistencies between jurisdictions are readily apparent when reviewing the matrix included in the regulatory reviews. One example is requirements related to times required for construction site stabilization which is critical for erosion control and varies from as few as seven to as much as 30 days between jurisdictions. The need for consistent stormwater management practices and policies has been identified as a high priority recommendation in all watershed plans and expressed by both the development community and government

representatives, particularly during the public planning workshop held as part of the Weeks Bay Watershed planning process.

Table 5-1 presents a summary of regulatory responses by local governments.

**TABLE 5-1
2021 SUMMARY OF STORMWATER REGULATORY MATRIX RESPONSES BY LOCAL GOVERNMENT**

Regulatory Category	Baldwin		Mobile	
	Yes	No	Yes	No
Construction Phase BMP Regulations	14	1	8	4
Post Construction Phase Stormwater Management Regulations	14	1	11	1
Coastal Resource Protection Regulations	8	7	4	8
LID Regulations	7	8	5	7
Shoreline Protection Regulations	4	11	0	12
MS4 Permit Changes	4	11	6	6

5.3 Constraints

Cities and towns, as municipal corporations under Alabama law, have the authority to implement zoning, regulate new development, and manage stormwater and natural resources. Historically, some municipalities have exercised their authority to issue permits and enforce regulatory compliance within their extraterritorial jurisdiction (ETJ). However, the State of Alabama has recently enacted Senate Bill 107 (Act 2021-297) which amended several State statutes and effectively limited a municipality’s permitting and code enforcement jurisdiction to its corporate limits, thereby returning permitting of land development in any ETJ to the county. Additionally, Alabama is a “Dillion’s Rule” State which limits statutory authority for counties to enact and enforce similar regulatory protections available to municipalities. Baldwin County does have authority under State law for developing and maintaining a planning and zoning program and subdivision regulations. Currently, Baldwin County is divided into 33 planning districts, of which 22 currently have adopted zoning and regulatory oversight.

5.4 Recommendations

Both the watershed plans and regulatory reviews express the need for continuing education across all sectors of the community. Recommendations include:

- Elected officials and members of planning and zoning commissions should receive regular programming so they may better understand the long-term benefits of wise resource management and potential consequences of poor management decisions.
- Increased communication and coordination between jurisdictions. Successful collaborations, including the D’Olive Intergovernmental Task Force and Plan Lower Alabama Now (PLAN), which arose from the Weeks Bay planning effort, should serve as models for sharing information and facilitating consistency across jurisdictions.

- Homeowner associations (HOAs) should receive education regarding the importance of proper stormwater management and ensuring long-term maintenance and function of their stormwater systems.
- Educating the public on the benefits of good natural resources and stormwater management is necessary to build popular opinion required to encourage political action.

As previously mentioned, a common suggestion across watershed plans is that local governments should be encouraged to set consistent requirements to manage natural resources and stormwater. As evidenced in the regulatory reviews there are a wide range of design standards cited, some of which are more appropriate than others for urban settings. Recommendations to improve consistency and natural resource protection include the following:

- Adopt the latest edition of the *Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas* to ensure common design standards for temporary BMPs implemented during construction.
- Standardize the size of site disturbance that local regulations apply to with urban areas having stormwater regulations in place on disturbed areas smaller than what ADEM requires.
- Construction BMP installation and maintenance should be treated as a critical component of overall project management with required weekly inspections performed and documented by qualified inspectors.
- Reduce and standardize the time allowed for contractors to repair, replace, or maintain construction BMPs.
- Develop and implement watershed-specific buffer and setback requirements.
- A proactive approach is needed to protect, enhance, and preserve natural resources and more emphasis should be placed on requiring mitigation measures take place within the watershed where impacts occur.
- Variability in post-construction stormwater management is partly due to a lack of federal and State requirements and should be considered and managed on a watershed basis making sure regulations are consistent between all jurisdictions within a given watershed.
- Watersheds should be individually evaluated, including the development of hydrologic models, to determine the most appropriate management scenarios for specific watersheds.
- Lack of maintenance of post-construction stormwater infrastructure (e.g., detention/retention basins) is a common problem. Efforts should be made to ensure HOAs are equipped with the information and resources necessary to adequately maintain these facilities and local jurisdictions vested in the proper management of these facilities should consider accepting maintenance responsibilities for these facilities.
- Low Impact Development is still a relatively new concept, and the lack of federal and State requirements or standards is resulting in most jurisdictions not incorporating them into local regulations. A common method for standardizing, requiring and/or incentivizing, and implementing Low Impact Development should be encouraged.

SECTION 6

Key Accomplishments

6.1 Introduction

The MBNEP works to implement ecosystem-based management by characterizing the priority problems in Alabama’s estuaries and surrounding watersheds, developing Comprehensive Conservation and Management Plans (CCMPs) that list and describe actions to address those problems, then identifying partners, including lead entities, to implement the actions. The MBNEP serves as a catalyst for the activities of the Management Conference, helping to build community-based organizational capacity for sound resource management and leveraging commitment and investment to ensure the sustainability of Alabama’s estuaries and coast.

The MBNEP WMPs utilize scientific assessments of the stressors impacting the health of our estuarine ecosystems. Input is captured from citizens, community leaders, resource managers, and scientists throughout Mobile and Baldwin counties and beyond, and actions are identified to conserve, restore, and protect those things valued most by those living in coastal Alabama. This builds community capacity and expands citizen education and involvement, resulting in some noteworthy successes presented below. While we celebrate these accomplishments with our partners, there is always more work to be done.

6.2 Estuary Status and Trends

6.2.1 West Fowl River Pollutant Loading

The West Fowl River system was identified as a potential source of contamination to Fowl River Bay, an area important for shellfish aquaculture. To identify potential sources of contamination, specific locations in the river were identified as likely hotspots for fecal pollution. A pollutant loading model was developed to further refine possible sources and potential sources of water quality variation in Portersville Bay, AL were evaluated, including a wastewater treatment plant outfall, river system, and adjacent shoreline sites. Overall, microbial and nutrient sources to the system were sufficiently different to provide endpoints for future source-tracing studies that include information on dilution and mixing. These studies contribute to the identification and understanding of potential sources of water quality variation, which can inform modeling, further sampling, and enforcement efforts to improve local water quality for recreation and aquaculture.

6.2.2 Little Lagoon Study

Little Lagoon is a groundwater-dominated, coastal estuary with a documented history of harmful algal blooms (HABs) and other water quality concerns. The timing and magnitude of HABs has been correlated to periods of elevated groundwater discharge, suggesting that groundwater-

derived nutrients are in part responsible for eutrophication in this system. To determine whether anthropogenic activities are contributing nutrients, a comprehensive groundwater quality assessment was completed for the surficial aquifer discharging into Little Lagoon.

Two areas of anomalously high nutrients (nitrogen and phosphorous) were identified with one area on the northern, central shore near the Brigadoon subdivision downgradient of the Baldwin County Sewer Services (BCSS) wastewater treatment plant. Spatial, terrain, and drainage modeling evidence suggested that the effluent from the percolation ponds used by the treatment plant is the most likely source of high phosphorus. Results from this study were utilized by area stakeholders and the Little Lagoon Preservation Society to successfully petition ADEM to deny a permit to expand capacity at the BCSS facility.

6.2.3 Volunteer Monitors

MBNEP works to build the capacity of citizens to inform coastal resource management through the expansion and support of volunteer water quality and biological monitoring programs. The MBNEP Community Action Committee supports grassroots water quality monitoring by place-based organizations by providing training and technical support using Alabama Water Watch (AWW) protocols and equipment. There are currently 98 sites being actively monitored across Coastal Alabama with concentrations in Dog River, Fowl River, Wolf Bay, Weeks Bay, Gulf Frontal, and Western Perdido Bay.

6.3 Ecosystem Restoration, Protection, and Stabilization

Restoring and protecting ecosystem function and services is fundamental to safeguarding the things people value most about living in coastal Alabama. MBNEP's Management Conference has made tremendous achievements in watershed planning; environmentally sensitive land acquisition; provision of access to resources; and protection, restoration, and stabilization of waterways, watersheds, and coastal habitats. These have been accomplished at record pace due to historical funding opportunities resulting from fines and criminal penalties made available from the 2010 Deepwater Horizon oil spill in the Gulf of Mexico. For a full list of projects identified across watershed plans to address ecosystem restoration see **Appendix A**.

6.3.1 Stream, Wetland and Riparian Buffer Restoration

Stream and riparian buffers are among the most stressed habitats in the MBNEP study area. These natural systems are most vulnerable to anthropogenic stressors and are impacted by freshwater discharges, land-use change, and sedimentation. Riparian buffers help stabilize stream channel structure by providing root systems resistant to stream bank erosion and by dissipating the energy of flowing waters during flood events. Riparian buffers protect the water quality of streams and rivers by filtering and trapping sediments, nutrients, and other pollutants. Together, streams, rivers, and buffers provide a complex edge habitat that supports a diversity of wildlife, including fish, reptiles, birds, mammals, insects, and crustaceans and other benthic invertebrates.

Freshwater wetlands support highly diverse biological communities but are among the most highly stressed and historically altered habitats in coastal Alabama. Impacts from land use change, fragmentation, dredging and filling, sedimentation, and sea level rise affect these natural systems. These vegetated habitats serve to slow and store floodwater, recharge groundwater supplies, and enhance water quality by trapping excess sediments, nutrients, and other pollutants.

Table 6-1 presents highlights of accomplishments from these areas.

**TABLE 6-1
KEY STREAM, WETLAND, AND RIPARIAN BUFFER RESTORATION ACCOMPLISHMENTS**

Watershed	Key Partners	Accomplishment	Linear Feet Restored	Acres Restored	Anticipated Load Reduction (tons per year)
D'Olive	<ul style="list-style-type: none"> • City of Daphne • City of Spanish Fort • Baldwin County • ADEM • ALDOT • NFWF • Property owners 	Restoration of 18 degraded stream segments Joe's Branch removed from the State's 303(d) list Stronger ordinances to encourage LID and preserve riparian buffers	12,905	75	27,453 (sediment) 88 (nitrogen) 25 (phosphorus)
Lower Fish River	<ul style="list-style-type: none"> • Baldwin County • NFWF • Property owners 	Channel, stream, and floodplain stabilization in Spring Branch and Magnolia River	1,437 (complete) 5,300 (in design)	TBD	8,518 (sediment) 29 (nitrogen) 14 (phosphorus)
Three Mile Creek	<ul style="list-style-type: none"> • City of Mobile • U. South Alabama • US EPA • Property owners 	Riparian restoration in 12 Mile Creek to reduce stormwater volumes and velocities to stem the flow of sediments	1,800 (complete) 8,300 (in design)	3.5	TBD
Wolf Bay	<ul style="list-style-type: none"> • City of Foley • Baldwin County • NFWF • Property owners 	Stream and riparian habitat in the headwaters of Wolf Bay are currently under design for restoration	7,000	36	1,289 (sediment) 19 (nitrogen) 4 (phosphorus)

6.3.2 Intertidal Marshes and Flats

Alabama's 607 miles of tidal shoreline provide important services to coastal residents. They buffer properties from storms and tropical weather events while offering foraging, breeding, and sheltering opportunities for the fish, shellfish, and wildlife. Coastal erosion wears away these shorelines by wave action, boat wakes, tidal or wave currents, storm events, and even stormwater runoff. Traditionally, property owners have turned to hardened structures – bulkheads, revetments, rubble, and concrete seawalls – to stop erosion. This armoring disrupts the ability of a shoreline to carry out natural processes, eliminates habitat opportunities for fish and wildlife and often will actually increase the rate of shoreline erosion.

MBNEP promotes a more natural approach to protecting shorelines while restoring, creating, or preserving valuable intertidal habitat for birds, wildlife, fish, and shellfish. While not completely stopping erosion, these natural systems reduce it in lower-energy situations and restore or enhance natural habitats without cutting connections between upland and aquatic areas.

Table 6-2 presents highlights of accomplishments from this element.

TABLE 6-2
KEY INTERTIDAL MARSHES AND FLATS ACCOMPLISHMENTS

Watershed	Key Entities	Accomplishment	Linear Feet	Acres
Bayou La Batre	<ul style="list-style-type: none"> • City of Bayou La Batre • State of AL • The Nature Conservancy 	Project features shoreline stabilization and marsh creation and protection at Lightning Point with additional recreational access opportunities.	7,920	28 (created) 127 (protected)
Fowl River	<ul style="list-style-type: none"> • NFWF • State of Alabama • Property owners 	Shoreline stabilization, marsh restoration, and tidal habitat protection at the northern tip of Mon Louis Island.	1,540	4 (restored) 8 (protection)
Fowl River	<ul style="list-style-type: none"> • NFWF • Property Owners 	Shoreline stabilization and marsh restoration in design of priority coastal spits and marshes in Lower Fowl River.	Up to 12,600	Up to 40
Gulf Frontal	<ul style="list-style-type: none"> • City of Orange Beach • State of Alabama • The Nature Conservancy 	Restoration of the Lower Perdido Islands (Robinson, Bird, and Walker islands) is focused on Habitat enhancement and recreational access and beneficial use of dredge material from Perdido Pass.	4,800	TBD
Western Shore	<ul style="list-style-type: none"> • City of Mobile • Mobile County • US Army Corps of Engineers • State of Alabama • NFWF • Property owners 	Multiple projects under development: <ul style="list-style-type: none"> • Brookley By the Bay • Bayfront Park Restoration • Dauphin Island Causeway Shoreline Restoration • Deer River Shoreline Stabilization and Marsh Restoration • Western Shore Comprehensive Shoreline Management Plan 	23,480	TBD

6.3.3 Conservation and Acquisition of Priority Habitats

Many high-quality coastal habitats within the MBNEP study area are not protected from certain habitat threats or species loss and reduction. Many of these habitat threats are associated with population growth and include habitat destruction, degradation, fragmentation, water quantity and quality impacts, introduction of non-native species, and the suppression of natural ecological processes such as periodic fire. To address this, one of the MBNEP Comprehensive Conservation Management Plan (CCMP) ecosystem restoration and protection goals is to “protect and conserve priority habitats for public benefit and access through acquisition or conservation easement” with an objective to “acquire and protect open spaces to provide access and preserve Alabama's coastal heritage.”

Table 6-3 presents highlights of accomplishments from this element.

**TABLE 6-3
KEY CONSERVATION AND ACQUISITION OF PRIORITY HABITATS ACCOMPLISHMENTS**

Watershed	Key Entities	Accomplishment	Acres Preserved
Bon Secour	<ul style="list-style-type: none"> City of Gulf Shores South Alabama Land Trust NFWF 	Preservation surrounding Oyster Bay. Restoration actions will include fire management, invasive species control, improvement of hydrologic connectivity and native vegetation plantings.	836
Dog River	<ul style="list-style-type: none"> Mobile County NFWF 	Acquisition of wetland habitat adjacent to Halls Mill Creek	300

6.3.4 Dirt Road Paving

Sediment transport from unpaved roads is a problem in coastal Alabama and can be a significant cause of stream and wetland habitat degradation. Sedimentation can cause increased turbidity and thereby reduce biodiversity and negatively impact water quality. Sedimentation in streams can also reduce flood water storage capacity. Paving dirt roads and stabilizing roadway shoulders and ditches in environmentally sensitive areas eliminates those negative impacts due to sediment transport.

Table 6-4 presents highlights of accomplishments from this element.

**TABLE 6-4
KEY DIRT ROAD PAVING ACCOMPLISHMENTS**

Watershed	Key Entities	Accomplishment	Miles Paved
Weeks Bay	Baldwin County	Multiple segments of road identified in the WMP for paving, including segments of Blueberry and Lauber lanes; Burris, Corte, and Pierce roads; and Magnolia Creek Drive	3.3
West Fowl River	Mobile County	RESTORE funding to pave priority dirt roads identified in the WMP in the south part of the County Additional dirt road paving will take place in the Fowl River and Western Shore Watersheds	1.6
Wolf Bay	Baldwin County	Breman and Roscoe roads were identified in the WMP as priorities for paving	2.5

6.3.5 Litter Abatement

Litter causes a variety of problems to the ecosystem as it enters our streams, rivers, and bays. Much of the litter found in area cleanups is single-use plastic from food and drink containers, but other types of litter include discarded food waste, tires, paper and cardboard trash, and discarded fishing gear.

Litter has wide-ranging negative effects on the environment. While plastics never biodegrade, they slowly degrade into smaller and smaller pieces that can cause significant harm to fish and marine invertebrates that ingest them. Plastics, along with old tires, can also leach harmful chemicals into the water with negative effects. Tires and aluminum cans often provide habitat for mosquitoes and other pest species. The prevalence of these unnatural substances in the environment has a long-term detrimental effect on the ecosystems of the fresh water, estuaries, and oceans that we value.

Table 6-5 presents highlights of accomplishments from this element.

**TABLE 6-5
KEY LITTER ABATEMENT ACCOMPLISHMENTS**

Watershed	Key Entities	Accomplishment
Dog River	<ul style="list-style-type: none"> • City of Mobile • Dog River Clearwater Revival • Partners for Environmental Progress • Mobile Baykeeper 	Pervasive litter was described in the WMP as a priority issue for action. In order to holistically address the issue, the Dog River Clearwater Revival partnered with MBNEP, Partners for Environmental Progress, Mobile Baykeeper, and the City of Mobile to develop a Comprehensive Litter Abatement Plan for the Watershed focused on utilizing tools developed through the WMP to strategically mitigate litter throughout the area.
Three Mile Creek	<ul style="list-style-type: none"> • City of Mobile • US EPA • Partners for Environmental Progress 	The litter problem in “the Bottom” of Three Mile Creek gave rise to the Litter Gitter, a small trash catchment device that was tested and refined in Maple Street canal and later strategically deployed throughout the Watershed. This small litter trap has proven an effective means of removing litter from local waterways and has since been deployed in multiple watersheds (Dog River, D’Olive, Bon Secour) throughout coastal Alabama.
Western Shore	<ul style="list-style-type: none"> • Mobile County • Town of Dauphin Island • Mobile Jaycees 	Dauphin Island Parkway is a main thoroughfare for boaters traveling to Dauphin Island which are a significant source for unsecured litter left in boats and truck beds. To raise awareness of this issue the “Trash Blows” campaign was launched during the Alabama Deep Sea Fishing Rodeo to encourage boaters to stow their trash appropriately in boats and trucks.

6.3.6 Public Access Enhancements

Access to our coastlines is a deeply held value in coastal Alabama and one of the identified values of the citizens of Mobile and Baldwin counties. Access improves quality of life and inspires a connection with nature and connectivity to the region’s heritage and culture.

Table 6-6 presents highlights of accomplishments from this element.

**TABLE 6-6
KEY PUBLIC ACCESS ENHANCEMENT ACCOMPLISHMENTS**

Watershed	Key Entities	Accomplishment	Acres Acquired
Dauphin Island	<ul style="list-style-type: none"> Town of Dauphin Island Krewe of Kindness 	The Town installed the area's first ADA/wheelchair compliant beach mats on the west end public beach. These mats allow people with limited mobility an opportunity to access both the Gulf and Sound side beaches and can be removed and stored in the event of a storm.	N/A
Fowl River	<ul style="list-style-type: none"> Mobile County 	Addressing a need for more recreational access points identified in the Fowl River WMP, the County acquired Memories Fish Camp on Fowl River Rd. for use as a public boat ramp with plans to improve the current site with improvements to the boat ramp and additional enhancements to include restrooms and picnic areas.	2
Gulf Frontal	<ul style="list-style-type: none"> City of Gulf Shores 	The City acquired 53 acres of the former Laguna Cove development with 6,100 feet of shoreline on Little Lagoon with significant wetlands and other critical habitat. Along with the conservation of critical habitat the project will provide passive recreation opportunities including kayaking, bird watching, boardwalks, and interpretive signage	53
Wolf Bay	<ul style="list-style-type: none"> City of Foley 	The City acquired 20 acres along Wolf Creek to provide additional access opportunities. The initial phase of the park will include a canoe/kayak launch, fishing pier, signage, pervious parking area, small pavilion, and picnic areas.	20

6.3.7 Infrastructure Improvements

Across coastal Alabama many communities are faced with a need to replace antiquated, failing, or undersized wastewater and stormwater systems. Sanitary Sewer Overflows (SSOs) are events during which untreated wastewater is discharged from the sewage system to the environment. SSOs may be the result of pipeline blockages, but most often they are the result of aging pipelines becoming inundated with stormwater during rainfall events and pump lift stations incapable of handling excess volumes. Stormwater infrastructure is similarly in constant need of repair and maintenance to function as intended. Recommendations for upgrades to sanitary sewer infrastructure to reduce the impacts of SSO's are prominent in many WMPs, including in Three Mile Creek, Dog River, Bayou La Batre, D'Olive, and Eastern Shore. Improvements to stormwater infrastructure to include the implementation of Low Impact Development, or nature-based techniques, are featured prominently in all of the coastal WMPs.

Table 6-7 presents highlights of accomplishments from this element.

TABLE 6-7
KEY INFRASTRUCTURE IMPROVEMENT ACCOMPLISHMENTS

Watershed	Key Entities	Accomplishment
Dog River	<ul style="list-style-type: none"> • MAWSS • State of Alabama 	Construction of upgraded sewer truck main lines along Halls Mill Creek and Perch Creek along with a new Severe Weather Attenuation Basin with a 20-million-gallon capacity will help alleviate incidences of sanitary sewer overflows into Dog River and its tributaries.
Bayou La Batre	<ul style="list-style-type: none"> • Mobile County • City of Bayou La Batre • State of Alabama 	Construction of an extension of the Bayou La Batre Wastewater Treatment Facility's (WWTF) outfall line to promote better mixing and to reduce shellfish closures when flow rates are exceeded. Implementation of this project to prevent shellfish closures will benefit the overall economy of south Mobile County. And Bayou La Batre Sewer System Upgrades to rehabilitate the collection system and to replace 16 major pump stations. Implementation of this project will result in fewer overflows and an overall reduction of contaminants into local soils and waters.
Three Mile Creek	<ul style="list-style-type: none"> • MAWSS • State of Alabama 	Construction of a upgraded sewer trunk main line and two Severe Weather Attenuation Tanks with a capacity of 10 million gallons each will help alleviate incidences of sanitary sewer overflows into Three Mile Creek.

6.4 Technical Assistance and Community Capacity Building

One of the goals of the watershed planning process is to create ownership of the WMP within the involved watershed communities and stakeholder groups. Throughout the development of the plan, the MBNEP, watershed team, and other partners work to educate the local watershed community, providing them with the knowledge and resources necessary to ensure the successful implementation of any recommendations.

Implementation structures recommended to support watershed management throughout coastal Alabama vary from the creation of watershed-based task forces, hiring of watershed coordinators, and creation of Watershed Management Authorities- a governmental subdivision of the State of Alabama created to develop and implement watershed management plans. The most effective method historically has been to partner with local governments through the development of the plan, which builds capacity at the local level to successfully implement WMP recommendations and allows teams to seize opportunities at an earlier stage of the process.

Building capacity of communities throughout Mobile and Baldwin counties to improve stewardship of natural resources is the cornerstone of watershed planning and is accomplished in a myriad of ways.

- Regulatory analyses completed during WMP development, and the South Alabama Stormwater Regulatory Review, have provided municipal officials with a means to improve resource management holistically, with a watershed-based approach.
- Watershed planning has catalyzed organizational partnerships allowing leveraging of resources, improving communication, and ensuring the successful execution of WMP recommendations.

- Hydrologic models, and routine training for municipal and county staff on how to utilize them, have provided local resource managers with the ability to foresee potential impacts related to development and improve management decisions.
- Educational materials branded under the “Create a Clean Water Future” campaign have provided useful resources for county and municipal staff required to manage stormwater and natural resources in their local communities.

Key Accomplishments

- Established during development of the original D’Olive Watershed Management Plan, the D’Olive Intergovernmental Task Force was integral to the successful implementation of the WMP. Comprised of municipal officials from the cities of Daphne and Spanish Fort as well as Baldwin County, ADEM, and MBNEP, the task force has directed restoration efforts in the Watershed and enhanced regulations to improve the management of stormwater and natural areas across the Watershed.
- Plan Lower Alabama Now (PLAN) is an offshoot of a technical steering committee established to inform development of the WMP for Weeks Bay Watershed, which includes nine municipal governments plus the county. Municipal partners participating in WMP development found so much value in the regular meetings that they formed PLAN and continue to meet monthly to share information and leverage resources.

6.5 Building Community Stewardship

Public education and engagement are paramount to building support for environmental conservation and restoration efforts across coastal Alabama. The watershed planning and implementation process provides ample opportunities for stakeholders to get engaged in activities that build an ethic of stewardship and enhance quality of life by connecting people to their watersheds, estuarine and coastal habitats, and the living things that depend upon them.

- **Field Trips** – Providing stakeholders opportunities to get out in natural areas on paddle trips and guided hikes builds appreciation for these places and a desire to preserve them for future generations.
- **Water Quality Monitoring** – Volunteer water monitoring empowers individuals to take an active role in the health of their waterways and serves as an important conduit of data to local resource managers.
- **Community Clean-ups** – Community Clean-ups have been utilized across coastal Alabama to actively engage stakeholders in improving their local waterways and raise awareness of issues associated with litter and water pollution in general.
- **Watershed signage** – Educational signage is a relatively inexpensive means to raise awareness of watershed-specific issues and provides some context for why conservation and management of natural areas are important.

SECTION 7

Financing Strategies

The MBNEP Finance Strategy consists of leveraging funding sources, management of complex grants, securing community investment in the Program, and soliciting funding from the private sector to support specific initiatives. To support this strategy, all MBNEP WMPs include a financing strategy focusing on novel approaches to funding implementation of recommended actions. The funding of projects and activities on a watershed scale can be a complex process. Watershed boundaries do not follow municipal jurisdictions, therefore successful implementation of the management measures recommended in these WMPs depends on the long-term commitment of significant financial resources and cooperation between federal, state, and local governments; private entities; and the surrounding communities. The following sections provide an overview of the financing alternative recommendations from the MBNEP WMPs.

7.1 Federal

The United States Federal Government offers numerous grants, loans, and revenue sharing opportunities that may be used by municipalities and non-profit groups to conduct studies and construct projects related to watershed protection, stream restoration, and stormwater management. **Table 7-1** presents an overview of federal funding program recommendations across the MBNEP WMPs.

**TABLE 7-1
FEDERAL FUNDING PROGRAMS**

Funding Source	Description	Actions Funded
Department of the Interior	Land and Water Conservation Fund	Financial assistance
Gulf of Mexico Energy Security Act (GOMESA)	Funds coastal restoration projects	Financial assistance
Gulf Coast Ecosystem Restoration Council	Council-Selected Restoration Component of the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (RESTORE)	Financial assistance
Investment in Infrastructure and Jobs Act (IIJA)	Habitat restoration and coastal resilience	Financial assistance
Inflation Reduction Act (IRA)	Coastal resilience	Financial assistance
National Oceanic and Atmospheric Administration	Marine Debris Removal	Financial assistance
	Marine Debris Prevention, Education and Outreach Partnership Grant	Financial assistance, information, and education

Funding Source	Description	Actions Funded
	Gulf of Mexico Bay-Watershed Education and Training (B-WET) Program	Financial assistance, information, and education
	Restore Act Science Program	Financial assistance
	Broad Agency Announcement	Financial assistance, information, and education
	Environmental Literacy Grants	Financial assistance, information, and education
	Community-based Restoration Program	Financial assistance, technical assistance
	Natural Resource Damage Assessments (NRDA)	Financial assistance, technical assistance
National Park Service	National Maritime Heritage Grant	Financial assistance, information, and education
National Science Foundation	Environmental Engineering R&D Grant	Technical assistance, water quality monitoring
National Endowment for the Humanities	Landmarks of American History and Culture Infrastructure and Capacity Building Challenge Grants	Financial assistance, information, and education
U.S. Department of Agriculture, Natural Resource Conservation Service	Environmental Quality Incentives Program	Financial assistance, technical assistance, water quality monitoring
	Conservation Innovation Grants	Financial assistance, technical assistance
	Conservation Stewardship Program	Financial assistance, technical assistance
U.S. Environmental Protection Agency	Agricultural Conservation Easement Program	Financial assistance, technical assistance
	Clean Water State Revolving Funds	Financial assistance, technical assistance
	Section 319	Financial assistance, education, demonstration projects, monitoring
	Section 320	Financial assistance, environmental monitoring
	106 Grant Funds (Water Pollution Control)	Financial assistance, water quality monitoring
	National Wetland Program Development Grants	Financial assistance, technical assistance, water quality monitoring
	Urban Waters Small Grants	Technical assistance, water quality monitoring
U.S. Geological Survey	Gulf of Mexico Division	Financial assistance, technical assistance
	Environmental Education Grants Program	Financial assistance
	State Water Research Act Program	Financial assistance, technical assistance
	Cooperative Matching Funds Program	Financial Assistance
U.S. Fish and Wildlife Service	Partners for Fish and Wildlife	Financial assistance, technical assistance
	Coastal Program	Financial assistance, technical assistance

Funding Source	Description	Actions Funded
	National Coastal Wetlands Conservation Grant	Financial assistance
	State Wildlife Grants Program	Financial assistance
	Urban Wildlife Refuge Partnership	Financial assistance, information, and education
	National Fish Habitat Action Plan	Technical assistance, financial assistance
	Infrastructure and Capacity Building Challenge Grants	Financial assistance
Southeast Aquatic Resources Partnership	Infrastructure and Capacity Building Challenge Grants	Financial assistance

7.2 State

State funding programs presented in the WMPs primarily consist of funding sources provided by the Alabama Department of Conservation and Natural Resources (ADNCR) and the Alabama Department of Environmental Management (ADEM). The funding provided by these State entities is typically used to implement water quality, coastal resiliency, emergency preparedness, and conservation-based projects. Additional funding for stormwater/nonpoint source projects is available through the Clean Water State Revolving Fund (CWSRF). The CWSRF is a loan assistance authority for water quality improvement projects.

7.3 Local

Local government funding presented in the WMPs primarily consists of taxes or fees at the county or municipal levels and their success ultimately depends on the communities supporting these funding initiatives for environmental management. See local funding sources which were presented across the MBNEP WMPs below.

Taxes, Fees, and Assessments

- **Stormwater programs** – sometimes referred to as “rain taxes” these programs are designed to address water quality and drainage issues.
- **Impact fees** – these are paid by developers and are designed to reimburse the government for the additional impact a development may have on the community. They may be for transportation (i.e., increased impact on roads and bridges as a result of construction), water and sewer (i.e., the impact on the system capacity as a result of increased volume and demand), as well as other public infrastructure impacts.
- **Special assessments** – are charges levied for the benefit of a particular property for a specific public improvement. The cost and benefit must be related to the property itself.
- **System development charges** – also known as connection fees or tie-in charges, are one-time fees commonly charged to new customers to cover the costs for additional maintenance or for service extensions. The amount of a new customer’s system development charge is typically calculated based on the potential demand the new customer will place on the system.

- **Property, sales, and other taxes or “general funds”** – these funding mechanisms may be less desirable for use at the local level since environmental projects would have to compete with maintenance and construction projects for funding as well as essential services such as police, fire, and emergency medical.

Districts

- **Capital Improvement Cooperative Districts** – can be formed by one or more governmental entities, including counties, municipalities, public utilities, and public corporations such as industrial or commercial development authorities. Once formed, the districts can finance and construct various capital improvements and can then enter arrangements such as leases or contracts to make the improvements available to users.
- **Alabama Improvement Districts** – are formed by a county or municipality upon application by all the affected landowners. Once formed, they can acquire, construct, and install a wide range of public infrastructure and can assess the landowners for their pro rata shares of the cost of the improvements.
- **Tax Increment Financing Districts** – have not been widely used in Alabama but can be helpful under certain circumstances. They are designed for the redevelopment of blighted areas. In those areas, TIFs can effectively take the tax benefits of incremental increases in the property's value versus the status quo and apply the increases to the redevelopment cost.

Alternative Funding Mechanisms

- **Municipal Bonds** – fund projects such as housing, hospitals, lighting systems, parking ramps, stadiums, factories, and sewer systems.
- **Environmental Tax Shifting** – is an innovative concept proposed by environmental groups to redirect tax code incentives to support energy conservation and to sustain the environment. Examples include: (1) a pay-to-pave tax could be levied on newly paved surfaces on a per-square-foot basis; and (2) the discontinuance of the state tax exemptions for fertilizer and pesticide sales. The income from these measures could then be directed toward environmental projects.
- **Mitigation Banks** - are a designated and approved wetland or stream area created, restored, enhanced, or preserved and set aside in perpetuity to compensate for future unavoidable impacts to wetlands and waters of the United States. Credits are purchased at the bank as compensatory mitigation for other development projects, ideally within the same watershed. Mitigation banking provides opportunities for a county or city to partner with landowners and land trusts, accrue financial resources for community improvements, create natural amenities in an urban setting, and enhance education about restoration and water quality.

Private

Private foundations, corporations, businesses, non-governmental organizations (NGOs), and other entities are potential sources of funding for watershed improvements. These organizations include a wide range of private, environmental, academic, social, educational, religious, medical, and philanthropic institutions benefiting from continued environmental and economic improvement in these watersheds. **Table 7-2** presents several funding sources identified across the MBNEP WMPs.

**TABLE 7-2
LOCAL FUNDING PROGRAMS**

Funding Source	Description	Actions Funded
United States Endowment for Forestry and Communities, Inc.	Healthy Watersheds Consortium Grant Program	Financial assistance, technical assistance, water quality monitoring
Gulf of Mexico Alliance	Gulf Star Grants Program	Information and education, financial assistance, water quality monitoring
Cornell Douglas Foundation Grants	Cornell Douglas Foundation Grants	Information and education, financial assistance
The Home Depot	Community Impact Grants Program	Financial assistance
Gulf Research Program	Gulf Sea Level Variation and Rise Grants	Financial assistance
	Thriving Communities Grants	Financial assistance
National Education Association Foundation	Captain Planet Foundation Grants	Financial assistance, information, and education
National Environmental Education Foundation	Everyday Capacity Building Grants	Financial assistance, information, and education
National Fish and Wildlife Foundation	Conservation Partners Program	Technical assistance, information, and education
	Gulf Environmental Benefit Fund	Financial assistance
	National Wildlife Refuge Friends Program	Financial assistance, information, and education
	Five Star & Urban Waters Restoration Program	Financial assistance, information, and education; water quality monitoring
	Gulf Coast Conservation Grant Program	Financial assistance

7.4 Summary

There are considerable financial support opportunities to fund management measures recommended in the MBNEP WMPs. However, because watersheds do not follow political jurisdictions, a collaborative effort among agencies and potential public-private partnerships may provide additional funding options for watershed management. Additionally, a partnership clearly illustrates to the funding entities the communities' active resolve to serve as vested and committed partners in the watershed management process; significantly enhancing the viability, competitiveness, and position for stakeholders as they pursue federal, state, local, and private grant assistance needed for implementation.

SECTION 8

The Role of the MBNEP Going Forward

In 2013, the Mobile Bay National Estuary Program (MBNEP) embarked on its holistic, watershed-based approach to guide coastal ecosystem restoration and protection measures through watershed management planning. These WMPs have proven invaluable to our State’s decision makers, as they have directed the limited funding available.

Throughout this effort, citizens have been engaged in documenting their community environmental concerns (see **Section 2**), learning about what impacts watershed health and how water runs through a drainage area, developing action plans to improve conditions, and engaging other residents in “being part of the solution” through volunteer monitoring, cleanups, and other activities. Integral to the success of these plans are the partnerships built from the initial stages of plan development and continuing through implementation of WMP recommendations, which will stretch out over decades.

The watershed planning process has reached beyond geopolitical boundaries, bringing differing governing bodies together through intergovernmental task forces or public-private partnerships to manage shared interests and resources on a watershed scale. Creating a sense of ownership by engaging key stakeholders from the outset and incorporating community input and concerns to inform recommended actions generates the momentum that carries the finished WMPs forward. Throughout watershed planning efforts, coastal communities across Mobile and Baldwin counties have been engaged in learning about the areas draining into their rivers and creeks and how natural flows have been altered over time. They are learning about what types and levels of pollutants are impairing or threatening their water quality, why shorelines are eroding, where restoration is most prudent and cost-effective, and when results from lots of hard work will finally pay off in terms of clean water and resilient buffers to storms and stormwater runoff.

The value of the collaboration required and inspired by watershed planning cannot be overstated. These plans have become as much about community development as they are about environmental protection. Creating resilient watersheds will require long-term commitment of governments, businesses, and citizens to responsibly grow their community by balancing development with environmental protection. Managing our coastal resources by watershed is a clear demonstration of how we are connected by water. The watershed approach is instrumental in developing a shared understanding of conservation priorities across many different stakeholder interests, and this understanding is key to informing future land and water management decisions.

8.1 Planning for the Future

On June 15, 2023, MBNEP engaged its Project Implementation Committee (PIC) to receive input in prioritizing actions to address the key stressors and issues identified in **Section 3** of this report. Using Mentimeter polling, the PIC was asked to respond to a series of questions related to effort vs. impact of addressing key stressors and issues and ranking what strategies would be most impactful to address these items. The key stressors and issues were broken out into two categories:

Water Quality Impairments

Sedimentation
Nutrient Enrichment
Pathogens
Litter

Habitat Degradation Issues

Habitat Conversion/Loss
Stream Degradation
Invasive Species
Shoreline Erosion

Table 8-1 presents an overview of the ranking of the most impactful strategies to address the identified stressors/issues.

The PIC was also asked two additional questions related to the key stressors and issues and their ability to address these issues over the next 10 years. Their rankings for water quality impairments based on their ability to reduce these pollutant loads over the next 10 years were:

1. Sedimentation
2. Litter
3. Pathogens
4. Nutrients

Their rankings for habitat impairments based on the PIC's ability to improve ecosystem services and function of the next 10 years were:

1. Stream Degradation
2. Habitat Conversion/Loss
3. Shoreline Erosion
4. Invasive Species

TABLE 8-1
MOST IMPACTFUL STRATEGIES TO ADDRESS KEY STRESSORS AND ISSUES

Ranking	Water Quality Impairments				Habitat Degradation Issues			
	Sedimentation	Nutrient Enrichment	Pathogens	Litter	Habitat Conversion/ Loss	Stream Degradation	Invasive Species	Shoreline Erosion
1	P	P	P	O&E	P	IFP	IFP	IFP
2	O&E	O&E	O&E	P	IFP	P	O&E	P
3	ADCC	IFP	IFP	IFP	O&E	O&E	P	O&E
4	IFP	ADCC	ADCC	ADCC	ADCC	ADCC	ADCC	ADCC

NOTE: P = Policy; O&E = Outreach & Education; IFP = In-Field Project; ADCC = Additional Data Collection/Characterization

8.2 Strategies for Future Success

To best allocate limited resources across Mobile and Baldwin counties, a strategic approach should focus on tackling the most pressing issues in each of Alabama’s tidally influenced watersheds. Although priorities identified in **Table 3-2** are the focus of the following discussion it will be necessary to reevaluate these as new issues emerge and unique opportunities present themselves.

- **Sedimentation-** Erosion and Sedimentation was identified as a Priority issue in the following watersheds: Bayou La Batre, Dog River, D’Olive, Eastern Shore, Weeks Bay, Bon Secour, and Wolf Bay. As many communities across coastal Alabama experience rapid growth, it is imperative that development occurs in a manner that doesn’t exacerbate sediment loading into local waterways.
 - The most effective way to reduce erosion and sedimentation is through improved land and stormwater management policies that seek to proactively manage pre and post construction stormwater on site.
 - Watershed plans recommend consistent land use and development policies – to guide urban planning, zoning regulations, and infrastructure development to prevent erosion, protect riparian zones, and maintain adequate green spaces to minimize watershed impairments and protect ecosystems.
 - Strategic and consistent collection of data to monitor rates of erosion and sedimentation should continue. This information is critical both for establishing baseline conditions and monitoring for post-restoration successes.
 - In-ground projects have been an integral approach to reducing sediment loading into local waters. Watershed plans and pre-restoration watershed assessments have identified priority areas for stream and riparian restorations which should be pursued.
 - Successful efforts to engage and educate coastal constituencies through “Create a Clean Water Future” campaigns, NRCS field days, and erosion control workshops geared towards developers should be enhanced and continued.
 - Additionally, municipal groups such as the Coastal Alabama Stormwater Team and Plan Lower Alabama Now have utilized educational videos on Low Impact Development, MS4 requirements, and watershed management to educate elected officials and the regulated community and would put additions to this catalogue to good use.
- **Litter-** The Three Mile Creek, Dog River, and West Fowl River watershed management plans identified litter as a priority issue to address. Although the focus of these efforts centers primarily in the urban watersheds surrounding the City of Mobile, litter is pervasive across nearly all our coastal watersheds. Significant efforts to mitigate litter impacts have been made across coastal Alabama and should continue.
 - A focus on reducing litter through public awareness campaigns has been ongoing through the Create a Clean Water Future Campaign and could be expanded into other areas. Additionally, community cleanups have proven to be an effective means of raising awareness of the impacts of litter in coastal Alabama and will continue to be utilized going forward.
 - Efforts to improve policy at the State and local levels have been ongoing and should continue. These have included requiring litter and recycling receptacles be made available in commercial developments and increased fines and penalties for littering.

- Considerable investment has been made throughout the City of Mobile in installing instream litter catchment devices throughout the Three Mile Creek and Dog River watersheds. This method has proven successful and could be implemented in other areas where litter is a problem. A concerted effort has also been made by multiple municipalities to invest in roadside litter management programs and improved management in high traffic commercial areas. Multiple watershed plans have identified strategic locations for installation of in-stream trash catchment devices and should be investigated for implementation.
- Tracking the impacts of litter through data collection is a relatively new discipline and coastal Alabama has been at the forefront of using the EPA’s Escaped Trash Assessment Protocol (ETAP) methodology and integrating hydrologic modeling to help target priority areas for litter mitigation activities. As this methodology continues to be refined it will be a useful tool in addressing litter across coastal Alabama.
- **Pathogens-** One of the top issues across all coastal watersheds, excepting the MTA Delta, is a primary source of pathogen loading into local waters from failing sanitary sewer and septic system infrastructure. Compromised sewer infrastructure is often inundated during heavy rain events leading to sanitary sewer overflows into local waterways. A concerted effort to improve wastewater infrastructure by the State and local municipalities and utilities is ongoing and should continue to be prioritized moving forward.
 - The State has prioritized, and should continue, enhancement and expansion of sanitary sewer infrastructure across coastal Alabama through RESTORE, GOMESA, and other funding sources. Additional investments in wastewater infrastructure are needed to meet increasing demand as populations continue to grow. Alternatively, decentralized wastewater treatment systems should be investigated when hooking up to sanitary sewer systems isn’t feasible. Additional funding is available through the State’s Revolving Loan Fund. Administered by ADEM, SRF provides low interest loans, with the potential to be forgiven, for wastewater and Low Impact Development/Green Infrastructure stormwater projects.
 - Educational workshops for homeowners on proper septic system maintenance have proven effective, but opportunities to incentivize connecting to centralized wastewater services or exploring new technologies for decentralized wastewater treatments should also be investigated.
 - Monitoring for elevated levels of pathogenic bacteria in local waters should be expanded and focused on areas of human health including safety of waters for recreation and shellfish harvesting.
- **Nutrients-** Watersheds prioritized for reducing nutrient loadings include Three Mile Creek, Dog River, Fowl River, MTA Delta, and Gulf Frontal. Nutrients can come from a myriad of sources including wastewater, fertilizer, and decaying organic matter. Nutrient enrichment causes eutrophication of coastal waters and can lead to low levels of dissolved oxygen that are not suitable for sustaining healthy finfish and shellfish populations.
 - Many of the same in-ground projects used to reduce sediment loads also have positive impacts on reducing nutrient loading. Stream and riparian restoration should be prioritized for areas that have been identified as hot spots in watershed assessments and WMPs. Additionally, increasing the use of green infrastructure and Low Impact Development have been recommended across all watersheds and would significantly improve water quality.

- Continuing to improve stormwater management regulations to include mandatory LID requirements and stormwater quality (in addition to volume) treatment should be encouraged.
- Alabama Smart Yards is an established outreach program designed to educate homeowners on best practices for residential landscapes, including appropriate fertilizer use. NRCS works with landowners to improve agricultural practices including advanced fertilizer applications that strategically apply fertilizer and reduce nutrient runoff.
- Increased monitoring of nutrient-related data will help provide a baseline for informing post-restoration monitoring and overall environmental condition of coastal waters.
- **Stream Degradation-** Impacts to streams and riparian areas are present in many coastal watersheds but are most notable in the D'Olive, Weeks Bay, Bayou La Batre, and Wolf Bay watersheds, Considerable effort to restore priority stream reaches has been made and the focus should continue along with more proactive efforts like improving regulations, conserving key habitat areas, and outreach to property owners.
 - Targeted stream restoration, including associated wetland and riparian areas, has proven to be a successful strategy for improving ecologic function and reducing stormwater impacts in multiple coastal watersheds (D'Olive, Wolf Bay, Weeks Bay). Multiple hotspots have been identified in watershed planning efforts and should be targeted for restoration using a similar holistic watershed-based approach.
 - In-ground projects should be coupled with improving land use and development policies. To reduce impacts on streams, wetlands, and riparian areas a more proactive effort is needed to guide urban planning, zoning regulations, and infrastructure development to prevent encroachment into sensitive areas, protect riparian zones, and maintain adequate green spaces to minimize watershed impairments and protect ecosystems.
 - Educational opportunities targeted to policy makers, developers, and landowners through field days and workshops provided by NRCS, Extension, and the Soil & Water Conservation Society provide a great opportunity to increase understanding related to protecting critical stream and riparian corridors.
 - Regular assessments of stream and riparian corridors, especially priority areas targeted in watershed plans, are critical to understanding the overall health and function of these systems and prioritizing areas for restoration and conservation activities.
- **Habitat Conversion/Loss-** Although efforts to conserve critical habitats are needed across all coastal watersheds the following watershed plans emphasized the need to conserve habitat loss: Fowl River, MTA Delta, Dauphin Island, and Western Perdido.
 - Land development policies should be structured so critical habitats are protected through stream and wetland buffers and other means. Additionally, required mitigation of habitats lost to development should be targeted as close to the area of impact as possible, preferably within the same drainage basin.
 - Successful efforts to conserve critical habitats are ongoing, and should be expanded moving forward, through the State and its Forever Wild Program as well as multiple other partners including the South Alabama Land Trust and the Alabama Forest Resources Center. Priority areas for conserving habitat have been identified in all coastal watershed plans and should be pursued as opportunities arise.

- NRCS, Extension, Alabama Forestry Commission, and the State Soil & Water Conservation Committee have established programs, which should be promoted and expanded, to educate landowners on improved habitat management practices.
- As development increases pressure on remaining priority habitats across Mobile and Baldwin counties it is important to regularly assess trends in habitat change over time to aid prioritization of habitat conservation efforts.
- **Shoreline Erosion-** Not surprisingly, the watersheds identifying shoreline erosion as a priority issue are those most directly interfacing the Bay, Gulf, and Mississippi Sound: Dauphin Island, West Fowl River, Western Shore, MTA Delta, Eastern Shore, Bon Secour, Gulf Frontal, and Western Perdido.
 - Large-scale shoreline stabilization projects are a visible and effective method for improving the resilience of Alabama’s estuaries and coast. Multiple ongoing projects by the State, counties, municipalities, and other partners are currently in the planning, implementation, and post-construction monitoring phases. Additional areas for restoration have been identified in watershed plans and should be prioritized through the development of comprehensive shoreline management plans adopted by the State and local partners.
 - Development policies should include efforts to protect both shorelines and adjacent upland areas to allow for marsh migration as sea levels rise. Also, regulations for permitting stabilization efforts using living shoreline techniques should be streamlined and made less burdensome to encourage more sustainable practices that improve habitat and ecologic function.
 - An increased educational effort geared to coastal property owners and marine contractors on the benefits of living shoreline techniques is needed. Current efforts underway by Sea Grant and MBNEP should be expanded.
- **Invasive Species-** Pervasive across all watersheds, invasive species control is specifically identified in the following in the Wolf Bay and Mobile Tensaw Apalachee Delta watersheds as a priority issue.
 - An invasive species control plan was developed, and currently under implementation, for the Three Mile Creek Watershed. This plan provides a comprehensive overview of the most critical species impacting the Watershed and provides a strategic approach for long-term management. Due to the ubiquitous nature of most species of concern across coastal Alabama this plan may be modified with additional field work and mapping to implement invasive species management programs in additional watersheds.
 - Expand efforts through NRCS, SWCD, AFC, Extension, and other partners with established programs educating homeowners and landowners on appropriate management of invasive species throughout coastal Alabama.
 - Additional educational materials for the public, including photo identification cards, would be helpful to raise awareness of the impacts of invasive species in coastal Alabama and how to manage and maintain natural landscapes.

8.3 Moving Towards a New CCMP

MBNEP’s mission is to promote the wise stewardship of water quality and living resources of Alabama’s estuaries. MBNEP’s purpose is to catalyze actions of estuary stakeholders, build community organizational capacity for sound resource management, and leverage commitment and investment to ensure the estuary’s sustainability. MBNEP’s objectives are to:

- 1) Engage estuary stakeholders in the development of CCMPs;
- 2) Expand resources and involvement in the implementation of these CCMPs; and
- 3) Promote how to best protect this nationally significant ecological, economic, and cultural resource to ensure its conservation for our lifetime and beyond.

Since 2010, the MBNEP Management Conference has engaged in comprehensive watershed planning for tidally influenced basins across coastal Alabama. These plans have provided a road map for significant investment stemming from the Deepwater Horizon Oil Spill as well as other emerging funding opportunities. More specifically, the plans have provided a mechanism for documenting local environmental conditions and priorities for improved environmental management.

MBNEP looks forward to incorporating the information in these watershed plans into the next Comprehensive Conservation and Management Plan (CCMP) for Alabama’s Estuaries and Coast. As we chart a course for the next 10 years of environmental management improvements, MBNEP renews its commitment to implementing, measuring the success of, and updating these plans. Finally, MBNEP will work with local communities to institutionalize these watershed plans within local government to provide an effective way of managing water, regardless of geopolitical boundary.

SECTION 9

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