Respect the Connect: 2019–2021 CCMP Implementation Review

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Contents

SECTION 1
Introduction

The Mobile Bay National Estuary Program (MBNEP) was established in 1995 as one of 28 federally authorized National Estuary Programs administered and funded by the United States Environmental Protection Agency (EPA). MBNEP is non-regulatory and works collaboratively with partners and constituents to protect and restore coastal Alabama's bays and estuaries for people, fish, and wildlife.

MBNEP priorities and actions are defined and guided by a Comprehensive Conservation and Management Plan (CCMP), a science-based, consensus-driven strategic plan prescribing actions to protect and restore coastal Alabama's ecosystems. The Plan characterizes priority problems in Alabama's estuaries and surrounding watersheds, lists and describes actions to address those problems, and identifies partners and entities to implement those actions. The CCMP is developed under the guidance of a Management Conference, which is comprised of federal, state, and local stakeholders, including EPA, Alabama Department of Conservation and Natural Resources (ADCNR), federal, state, and local officials, public and private resource managers, Dauphin Island Sea Lab, Universities, federal and state agencies, and leaders from industry, fisheries, nonprofits, and other grassroots organizations. The Management Conference ensures that the Program's CCMP is tailored to local environmental priorities and conditions and uses a collaborative, consensus-building approach to CCMP implementation. 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 Management Conference is composed of six groups of experts and stakeholders:

- Science Advisory Committee (SAC)
- Government Networks Committee (GNC)
- Business Resources Committee (BRC)
- Project Implementation Committee (PIC)
- Community Action Committee (CAC)
- Finance Committee (FC)

These committees are overseen by an Executive Committee, comprised of leaders from each of the other committees plus the US EPA and three at-large members. The Executive Committee reviews and approves work plans and budgets, sets financial goals for non-federal funding, and develops policies on issues.

MBNEP's first CCMP was a three-volume plan (MBNEP 2001, 2002a, 2002b) developed and approved in 2002. It focused on five actions areas including water quality, living resources, habitat management, human resources, and education and public involvement.

The original CCMP was updated in 2013 (MBNEP 2013) to include new scientific understandings and management approaches. The most profound change featured taking a watershed-based approach to coastal ecosystem management. This approach focuses on planning and management actions within drainage area boundaries, not political jurisdictions, to ensure water entering Alabama's estuaries is high quality and meets its ADEM use classification. It also ensures restoration projects are scientifically defensible and components of an overall environmental management program at the local level. Another significant change involved linking management priorities and activities to the things people value most about living on the Alabama coast, including water quality, fish and wildlife, environmental health and resilience, access, heritage and culture, and beaches and shorelines.

The most recent CCMP update occurred in 2018 (MBNEP 2018a). This Plan is composed of four Action Plans:

- Ecosystem Status and Trends (EST)
- Ecosystem Restoration and Protection (ERP)
- Technical Assistance and Capacity Building (TAC)
- Public Education and Public Involvement (EPI)

It includes a total of 18 goals, 39 objectives, 55 performance measures, and 158 suggested activities (Table 1-1). Suggested activities are included in the CCMP as examples of work that could guide the implementation of each objective but are not necessarily prescriptive. MBNEP plans and initiates activities based on available opportunities, collaborators, funding, and capacity. This flexibility allows MBNEP to be responsive to emerging issues, changing partner priorities, and collaborative or funding opportunities over the five-year lifespan of a CCMP update. Activities are prioritized annually during development of the Work Plan.

Table 1-1. Number of goals, objectives, performance measures, and suggested activities in the 2018–2023 MBNEP CCMP.

TABLE 1-1
2018-2023 CCMP STRATEGY BY THE NUMBERS

Action Plan	Goals	Objectives	Performance Measures	Suggested Activities
TAC	5	16	33	63
EST	3	5	8	29
ERP	5	8	13	35
EPI	5	10	12	31
Total	18	39	66	158

Purpose and Goals of this Implementation Review

The purpose of this *Respect the Connect: 2018–2023 Comprehensive Conservation and Management Plan Implementation Review* is to review MBNEP and partner progress and accomplishments in implementing 2018–2023 CCMP goals and objectives and to make recommendations for consideration during development of the 2024 CCMP Update. Challenges to accomplishing objectives and alternative approaches were noted where relevant.

This Review is based on 1) evaluations of MBNEP project draft and final reports, watershed management plans, Work Plans, Program website including document library, project websites, grant reports, NEPORT data, Current Connections newsletters; 2) partner project reports, communications, and websites; and 3) multiple interviews and fact-finding sessions with MBNEPs Executive Director and staff.

By reviewing implementation progress and accomplishments of the 2013–2023 MBNEP CCMP and making recommendations for consideration during development of the next CCMP, this review will be foundational in guiding that development. This review should be considered together with MBNEPs recent exercise in synthesizing common needs and recommendations identified in comprehensive watershed management plans across the Alabama Coast (MBNEP 2023).

Organization of the Implementation Review

This Review is organized following that of the 2019–2023 CCMP, addressing progress and accomplishments at the goal and objective levels for each of the four Action Plans. Key deliverables over the past five years for each Action Plan are compiled in appendices (Appendices 1–4) and a summary matrix (Appendix 5) provides a quick reference to the status of goals, objectives, performance measures, and suggested activities.

SECTION 2

Ecosystem Status and Trends Action Plan

The Ecosystem Status and Trends Action Plan (EST) identifies goals, objectives, and suggested activities to promote collection, analysis, and communication of data on the status and trends of environmental conditions, including environmental response to stressors and restoration activities.

Activities in support of the goals and objectives of EST are generally accomplished on two scales. At the watershed scale, baseline conditions are determined and used to monitor ecosystem changes, including those attributable to changing land uses and development, climate change, and restoration efforts. On a broader ecosystem scale, MBNEP promotes and supports monitoring of habitats and submerged aquatic vegetation to track systemic changes across coastal Alabama.

Efforts at both of these scales produce baseline monitoring data, restoration monitoring data, and support for a watershed condition framework to measure effectiveness of improved management practices over time. These outputs increase our knowledge of environmental status and trends, support adaptive management of resources, and increase community participation and support for protecting and restoring healthy ecosystems and the things people value most about living in coastal Alabama.

EST has three goals:

- **EST-1:** Increase availability and use of data related to how coastal ecosystems and their services respond to manmade stresses.
- **EST-2:** Establish a process for measuring, analyzing, and communicating change in marine, estuarine, and freshwater ecosystem conditions.
- **EST-3:** Model and predict connections between ecosystem condition and the ecosystem services people value.

EST-1: Increase availability and use of data related to how coastal ecosystems and their services respond to manmade stresses.

OBJECTIVES

EST-1.1: Establish a data management and usage strategy.
EST-1.2: Maintain or improve existing level of monitoring and data analysis to assess trends in coastal ecosystem health at a watershed scale.
EST-1.3: Promote consistent system-wide monitoring to assess trends in coastal ecosystem health.

EST-1.1: Establish a data management and usage strategy.

MBNEP and partners pursue a science-based, consensus-driven approach to protecting and restoring the Mobile Bay estuarine system, guided by what people value most about living in coastal Alabama. In order to support this science-based approach, MBNEP and partners work to increase the availability and use of data related to how coastal ecosystems and their services function and how they respond to manmade stresses. Fundamental to using science as a basis for understanding ecosystems is to consistently assemble available science and make it available to interested parties. Increasing availability and access to data promotes more research and data analyses and advances our understanding of ecosystem function and response to impacts and restoration approaches.

Accomplishments

Data Management and Use Strategy: To facilitate effective data management and use, MBNEP developed a Data Management and Usage Strategy. Through this strategy, all data generated through MBNEP activities, are to be:

- Assembled with standardized metadata and uploaded to the Dauphin Island Sea Lab (DISL) repository
- Identified using a unique digital object identifier (DOI), making them easily located and cited
- Made accessible for viewing and download through open online access.

There is a challenge related to a large backlog of data to be assembled and uploaded to the DISL data repository. Many data exist in Microsoft Excel spreadsheets and some data will need to be transferred from maps, technical reports, and other sources that are not automatically transferrable to the repository database. All partners have not formally adopted the strategy and funding is required to prioritize resources to identify, assemble, and upload existing data.

EST-1.2: Maintain or improve existing level of monitoring and data analysis to assess trends in coastal ecosystem health at a watershed scale.

Environmental monitoring is fundamental to developing understandings of ecosystem processes and services, how they are impacted by stressors, and how to best manage them. Monitoring is the foundation of informed, adaptive management and forms the basis for communicating the status of ecosystem services most valued by the public. Restoration monitoring provides important information to help assess the effectiveness of restoration efforts and to determine if adaptive changes are necessary to achieve

management goals. Effective restoration monitoring also helps to establish baseline conditions for future assessments and to identify unaddressed stressors.

Accomplishments

Monitoring Framework: In order to standardize monitoring efforts within and across watersheds, consistent protocols are necessary. In 2015, the MBNEP Science Advisory Committee developed a *Subwatershed Restoration Monitoring Framework* (MBNEP SAC 2015) consisting of protocols designed to standardize data collection for evaluating pre- and post-restoration efforts in Mobile and Baldwin Counties.

The Framework recommends standardized monitoring procedures to help determine:

- Changes in water quality, flow, sedimentation, biology, and habitat quality and quantity resulting from watershed management plan implementation and restoration projects
- Relationships between ecosystem health indicators and ecosystem function and services
- The long-term status and trends in the watershed.

The Framework guides monitoring to align with regional monitoring efforts and to connect restoration investments with what citizens most value. It also promotes data preservation, accessibility, and communication of status and trends to stakeholders and decisionmakers. Since its development, the Monitoring Framework has been incorporated into new watershed management plans and restoration proposals and contracts, is included in all watershed planning packages for reference, and is followed in the collection of any pre- and post-restoration work funded through MBNEP sources.

EST-1.3: Promote consistent system-wide monitoring to assess trends in coastal ecosystem health.

MBNEP and partners promote consistent data collection, monitoring, modeling, and analysis of environmental data to assess ecosystem response to land use changes and restoration as well as systemwide status and trends. MBNEP is a leader in funding monitoring for watershed management planning and works with partners to recommend data collection needs and provide input on monitoring protocols. Consistent data gathering, monitoring, modeling, and analyses are ongoing, including sediment baseline studies, hydrologic modeling, water quality monitoring, bacteria monitoring, benthic community monitoring, groundwater studies, volunteer monitoring, and pre- and post-restoration monitoring.

Accomplishments

Sediment and Other Baseline Studies

Land conversion impacts watersheds in many ways, including through increased sedimentation of waterways and waterbodies. Understanding sedimentation is an important component of watershed

planning. Together with the Geological Survey of Alabama, MBNEP has led efforts to characterize land use, erosion, and sedimentation in coastal watersheds. Significant progress has been made in characterizing bed and suspended sediment loads and in identifying sediment sources from natural and manmade waterway drainages. Precipitation, stream discharges, and physical and water quality parameters are monitored and used in models to assess impacts of changes in land use and to direct resources to areas in greatest need for management and mitigation. Sediment studies are developed for coastal intertidal watersheds and are used to inform watershed planning. As of August 2023, studies have been accomplished for D'Olive, Fowl River, Bayou La Batre, West Fowl River, and Deer River watersheds and the Dog River, Bon Secour River, Weeks Bay, Wolf Bay, Eastern Shore, and Mobile-Tensaw-Apalachee watershed complexes.

Hydrologic modeling

Hydrologic modeling is important to understanding impacts to waterways and waterbodies resulting from development and restoration activities in a watershed. MBNEP continues to be a leader in promoting hydrologic modeling at the watershed scale. Hydrologic models have been completed for the Bon Secour, Wolf Bay, Dog River, Bayou La Batre, Fowl River, West Fowl River, and Tensaw East and West watersheds, and the 12 Mile Creek sub-watershed.

Water Quality

MBNEP and partners utilize water quality data to understand ecosystem status and trends and how ecosystems and their services respond to anthropogenic stressors. The Alabama Department of Environmental Management (ADEM) is the lead Alabama agency for water quality monitoring. The ADEM Water Quality Monitoring Strategy (ADEM 2017) applies to all waters of the State, including wadeable rivers and streams, non-wadeable rivers and reservoirs/lakes, estuaries, coastal waters, wetlands, and groundwater.

ADEM maintains an extensive network of 317 environmental monitoring locations in the MBNEP study area, with 154 sites within Baldwin County and adjacent waters, 163 in Mobile County and adjacent waters, and seven in open ocean locations (MBNEP 2023). ADEM coordinates surface water monitoring to meet multiple objectives, including its Monitoring Strategy, Alabama's Water Quality Listing and Assessment Methodology, the Alabama Nonpoint Source Management Program, the Total Maximum Daily Load Program, and the Standards and Criteria Programs. ADEM monitors surface water at stations within each target basin every three years (ADEM 2023).

Bacteria and Human Health

ADEM's Coastal Alabama Beach Monitoring Program collects water samples from 25 recreational areas along Alabama's coast and analyzes them for the indicator bacteria *Enterococci*. Results are used to increase public awareness and provide valuable water quality information to support public health.

Alabama Water Watch evaluated a new volunteer-based bacteria monitoring methodology using R-cards. MBNEP adopted this and implemented this approach as the methodology that current volunteers use.

Benthic Communities: Submerged Aquatic Vegetation and Oysters

Submerged Aquatic Vegetation (SAV), including seagrass meadows are essential habitats in coastal Alabama. SAV has been impacted over the years in coastal Alabama as result of changes in land use, nutrient pollution, sediment runoff, and scarring from recreational boat propellers. MBNEP partnered with Alabama Department of Conservation and Natural Resources to map seagrass distribution and extent using historical aerials from Mobile County (1940) and Baldwin County (1955 and 1966). Monitoring has occurred in 2002, 2005, 2008–2009, and 2015. Efforts are underway to characterize the species composition, size, abundance, and ecological condition of seagrasses to understand stressor-response relationships.

Oysters provide essential benthic habitat in coastal Alabama and help improve water quality through filtration. Alabama Department of Conservation and Natural Resources Marine Resources Division (AMRD) monitors Alabama's public oyster reefs annually using divers to count oysters along transects (ADCNR 2021).

Groundwater Studies

Groundwater can significantly impact the water quality of surface waters in coastal Alabama. Groundwater programs are managed by a variety of partner organizations working in MBNEP watersheds, including ADEM Land, Field Operations, and Water Divisions, Alabama Department of Public Health, State of Alabama Oil and Gas Board, Alabama Department of Economic and Community Affairs – Office of Water Resources, Geological Survey of Alabama, and the Alabama Surface Mining Commission.

Little Lagoon is a groundwater-dominated coastal estuary with water quality problems due to excess nutrient input, including harmful algal blooms. MBNEP funded a groundwater quality study of the surficial aquifer discharging into Little Lagoon as part of watershed planning in the Gulf Frontal Watershed. The study helped identify two areas with high nutrient concentrations, including one down-gradient of the Baldwin County Sewer Services (BCSS) wastewater treatment plant. Modeling suggested that effluent from the percolation ponds used by the treatment plant were likely the source of high phosphorus. Communication of these results to area stakeholders alerted them to the source problem and motivated them and the Little Lagoon Preservation Society to successfully petition ADEM to deny a permit request to expand treatment capacity at the plant.

Volunteer Monitoring

MBNEP continues to build the capacity of citizens to inform coastal resource management by supporting and expanding volunteer monitoring programs (see TAC-5). The MBNEP Community Action Committee

supports volunteer monitoring by providing training and technical support using protocols and equipment supplied by Alabama Water Watch. Volunteers actively monitor almost 100 sites in coastal Alabama, focusing on Dog River, Fowl River, Wolf Bay, Weeks Bay, Gulf Frontal, and Western Perdido Bay. Data are used by ADEM.

Pre- and Post-Restoration Monitoring

Monitoring outcomes and success of restoration efforts is important to inform restoration best practices and adaptive management as well to provide information for communication to the public about benefits to the things they value most about coastal Alabama. Baseline pre-restoration monitoring is ongoing for restoration projects planned for the Deer River shoreline and marsh system, Fowl River marsh spits, and incised tributaries to Lower Fish River. Environmental Sciences students from the University of South Alabama, under the supervision of Dr. Alex Beebe, have collected data related to stream geomorphology for restoration work in 12 Mile Creek.

Although pre- and post-restoration monitoring efforts have been successfully used to inform restoration best practices and adaptive management or restoration sites, challenges remain. For example, the intended benefits of restoration can significantly lag behind restoration actions. In these cases, early monitoring is unlikely to reveal the scope and scale of final benefits to a system until habitats disturbed during restoration can recover, develop, and mature. For restoration projects where significant earth-moving, stream modification, and plant-removal is prescribed, unintended post-restoration consequences may require additional monitoring and management of erosion, sedimentation, and colonization of invasive exotic species. Challenges can arise in determining if and when corrective post-restoration management actions are required. If intended benefits of restoration take a long time to develop and mature, long-term monitoring may be required, which can be costly.

Monitoring D'Olive Watershed: Restoration work in the D'Olive Watershed has focused on delisting impaired streams from the State of Alabama's 303(d) List of impaired waterbodies. For example, in 2008 the State of Alabama listed Joes Branch as impaired for siltation due, in part, to sediment running off construction sites in the watershed. Since 2011, significant stream restoration efforts have been successful in reducing siltation levels. In 2019, post-restoration monitoring confirmed that the siltation impairment no longer existed for Joes Branch, resulting in its delisting from the State's List of impaired waterbodies in 2020 (ADEM 2020a). This success story motivates continued restoration and monitoring with the goal of delisting D'Olive and Tiawassee Creeks. Alabama Department of Environmental Management is pursuing an Alternative Restoration Approach for the D'Olive Creek Watershed, which may provide a more immediate path to water quality attainment than a Total Maximum Daily Load (TMDL) approach.

Monitoring Mon Louis Island in the Fowl River Watershed: In 2016, MBNEP implemented a restoration project on Mon Louis Island with funding from the National Fish and Wildlife foundation Gulf Environmental Benefit Fund. Restoration activities included constructing a 1,540-ft continuous rock dike breakwater to protect approximately eight acres of restored tidal marsh and construction of an

additional four acres of tidal marsh along the bay side on the northern tip of Mon Louis Island at the mouth of east Fowl River. By 2022, post-restoration monitoring revealed that surveys of fauna associated with the restoration exceeded success criteria and USACE determined that no additional monitoring was required for the project.

Remote Sensing: Remote sensing refers to remote data collection and proxy measures for direct field measurements ranging from analysis of satellite imagery to data collected from field auto-sensors. Monitoring critical resources using remote sensing can be an effective and cost-efficient strategy to increase time series data about an area. Monitoring time series of aerial photos can augment field-based post-restoration monitoring data, especially for larger geographic features, like restored shorelines. Following MBNEP's 2016 restoration of the northern tip of Mon Louis Island, analyses of existing and acquired aerial imagery were used to assess loss or accretion of the shorelines north of the Fowl River navigation channel and shoreline areas adjacent to and south of the rock dike breakwater. Real-time continuous environmental monitoring using auto-sensors continues to provide high-quality data for decision makers, researchers, and the general public. This approach is cost-effective and can monitor waters with high frequency around the clock. The Dauphin Island Sea Lab maintains Alabama's Real-Time Coastal Observing System (ARCOS) network of real-time sampling stations including locations in Bon Secour, Cedar Point, Dauphin Island, Katrina Cut, Meaher Park, Middle Bay Light, West End CP, Fort Morgan, Grand Bay, Mobile River, Orange Beach Buoy, and Weeks Bay (arcos.disl.org).

EST-2: Establish a process for measuring, analyzing, and communicating change in marine, estuarine, and freshwater ecosystem conditions.

OBJECTIVES

EST-2.1: Synthesize monitoring data to develop a watershed condition index to track and communicate trends in watershed restoration and management.

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Establishing a process for measuring, analyzing, and communicating change in marine, estuarine, and freshwater ecosystem conditions is fundamental to successful adaptive management, watershed planning, restoration, and communication to decisionmakers and the public. As part of its leadership role in watershed planning and associated restoration activities, MBNEP recognized a need to develop an objective framework that could be used to measure the management effectiveness of restoration activities.

Accomplishments

In 2019, MBNEP led the development of a Watershed Condition Framework (WCF), using the D'Olive Watershed as a model, that could later serve as a template for other watersheds (MBNEP 2020). The WCF is based on using a Biological Condition Gradient (BCG) to describe the biological condition of habitats along a continuum of stress. It also incorporates information gained from the Wetland Rapid Assessment Procedure (WRAP) and stream bioassessments. Development of the Framework benefited from the leadership and work of multiple partners, utilizing data from baseline and restoration monitoring studies in addition to field assessments including:

- Geological Survey of Alabama sediment load monitoring
- Cities of Daphne and Spanish Fort water quality data (conductivity, temperature, pressure/depth, and dissolved oxygen)
- ADEM/USGS water quality data (flow, conductivity, temperature, pressure/depth, and dissolved oxygen)
- DISL monitoring in D'Olive Bay (TSS, chlorophyll a, CDOM, DO, temperature, and salinity)
- Riparian Buffers - Habitat Health Level Evaluation
- Wetlands – Wetland Rapid Assessment Procedure
- Streams – Rapid Stream Assessment (including ADEM Habitat Assessment and Riparian Habitat Health Level Evaluation).

The WCF was applied across three subwatersheds in the D'Olive Watershed including Joes Branch, D'Olive Creek, and Tiawasee Creek. The Framework revealed numerous and valuable insights into environmental responses to restoration efforts. The WCF generally confirmed improvements to water quality, sedimentation, and habitat due to restoration activities; however, a significant lag between restoration action and intended benefits was prevalent. Conditions are expected to continue to improve naturally as disturbed habitats and those downstream continue to develop and improve.

EST-3: Model and predict connections between ecosystem condition and the ecosystem services people value.

OBJECTIVES

EST-3.1: Manage system for multiple services.

EST-3.1: Manage system for multiple services.

Maintaining connection between the things most valued by people living on Alabama's coast and actions to protect and restore waterbodies and watersheds is key to generating and sustaining public support. Managing the Mobile Bay system for multiple services requires knowledge of the relationships between

environmental health, stressors, and services and the relationship between environmental protection and restoration and our economy and quality of life.

Accomplishments

MBNEP and partners have made progress in modeling and predicting connections between ecosystem condition and the ecosystem services people value.

Development of a Stressor Matrix: Work is underway to understand and plan for changing environmental stressors, including climate change. The MBNEP Science Advisory Committee has begun to develop an enhanced Stressor Matrix that determines what stressors are having the most impact throughout the Mobile Bay estuarine system. A variety of interacting stressors have been identified including habitat fragmentation, land use change, dredging and filling, sedimentation, changes in freshwater flow, resource extraction, pathogens, nutrient pollution, climate change, and fire suppression The top stressed habitats have been identified as intertidal marshes and flats, rivers and streams, freshwater wetlands, pine savannas, and oyster reefs. The Matrix is intended to be used as a rapid decision-making tool to quantify stressors, inform water quality and habitat protection and restoration strategies, and elucidate appropriate estuarine indicators to determine relationships between hydrologic, hydrodynamic, sedimentological, and biological processes.

Climate Planning: Planning for climate impacts to coastal Alabama is underway by MBNEP and partners. Stressors include warmer air and water temperatures, increasing incidences and durations of drought, increasing intensity of storms, and rising sea level.

- Alabama Department of Conservation and Natural Resources (ADCNR), US Army Corps of Engineers (USACE), and the Mississippi-Alabama Sea Grant Consortium (MASGC) developed a science-based, stakeholder-driven comprehensive planning tool to promotes a greater understanding of the social, environmental, and economic landscapes of coastal Alabama. MBNEP supported this effort. *The Alabama Coastal Comprehensive Plan* identifies and highlights coastal Alabama communities' social, economic, and environmental visions for Mobile and Baldwin Counties**;** existing plans that support those community visions and promote resilience**;** areas vulnerable to sea level change and coastal storms and the ability of the area to prepare and plan for, absorb, recover from, and adapt to adverse events; and opportunities to advance the resilience of the region
- An online GIS-based mapping tool was developed for the Plan to help communities visualize multiple vulnerabilities, including cultural sites, oyster suitability and wetland migration, built structures, transportation, and wastewater. MBNEP hosts resources linked to the Plan.
- MBNEP now requires that watershed management plans address climate vulnerabilities. Most plans now include Sea Level Affecting Marsh Models (SLAMM) to model wetland conversions and shoreline modifications and Sea, Lake, and Overland Surges from Hurricanes (SLOSH) models to estimate storm surge elevations resulting from historical, hypothetical, or predicted hurricanes.

MBNEP also recommends using the Coastal Resilience Index tool developed by the MASGC for conducting local vulnerability assessments for watershed planning.

Decadal Study: Work is underway to better understand how anthropogenic and climate stressors can affect keystone coastal species and the feedback between their population dynamics, ecosystem services, economic value, and resource management decisions. The *Building resilience for Oysters, Blue Crabs, and Spotted Seatrout to Environmental Trends and Vulnerability in the Gulf of Mexico Study (Decadal Study)* is working to identify mechanistic and quantitative relationships between the population trends of these critically important species and environmental trends. The study will investigate pathways by which populations are affected by stressor trends, weather and climate, ecosystem services, and resource management. Research products from the study will be used by MBNEP, ADCNR, and other agencies to inform resource management, restoration planning, and efforts to increase coastal resource resilience to environmental trends and variability.

Fowl River Marsh Spit Study: MBNEP first published the Fowl River Watershed Management Plan in 2016. The watershed management planning process identified degraded marshes and spits in the transitional zone between fresh and brackish water as a top priority for study and management. In 2017, the MBNEP Science Advisory Committee initiated productive discussions about designing a study to understand and improve the health and ecosystem function of intertidal marshes and flats in the transitional zone of Fowl River. MBNEP funded the resulting study, which provided a comprehensive characterization of the health of emergent marshes, including factors influencing their health and degradation. Monitoring activities included plant distribution, diversity, density, biomass, and growth rates; sediment grain size, accrual and erosion rates, composition, dynamics, and isotopic analysis; water quality and hydrology; marsh elevation and wave energy.

West Fowl River System Study: A study was conducted in the West Fowl River to identify potential sources of contamination to Fowl River Bay, an area important for shellfish aquaculture. Specific locations along the river were identified as potential hotspots for fecal pollution, which informed development of a pollutant loading model to further refine sources. Studies like this can contribute to improved understanding and identification of water quality hotspots, potential sources of pollutants, and enforcement actions to improve water quality.

EST: Recommendations

Understanding ecosystem status and trends, including environmental response to stressors and restoration activities is fundamental to protecting and restoring healthy ecosystems and the things people value most about living in coastal Alabama. Facilitating the availability and use of data to support measuring, analyzing, modeling, and predicting changes in ecosystems conditions and how these changes affect ecosystem services that people value will continue to be important activities over the next ten years. MBNEP should continue to provide leadership for these activities.

Increasing the availability and use of data related to how coastal ecosystems and their services respond to anthropogenic stressors (EST-1) should remain a focus.

1. Continue to promote a consistent, widely-adopted Data Management Strategy (EST-1.1) for data generated by MBNEP projects, including pre- and post-construction monitoring and environmental data. Considerations could include:
    - Assemble and upload data from completed projects to the DISL data repository.
    - Promote formal adoption of the Data Management Strategy by partners
    - Require all new research and monitoring to follow the strategy
    - Continue to task the Science Advisory Committee to lead this work.
2. Continue to promote, update, and adapt the Modeling Framework (EST-1.2). Priorities could include:
    - Develop a data sharing/data user agreement that is mindful of both academia and resource management data considerations. Convene a SAC subcommittee to further evaluate the needs of all parties.
    - Continue to evaluate and refine the Framework to ensure consistency with other monitoring guidelines throughout the Gulf of Mexico, including those developed by Gulf of Mexico Alliance, The National Oceanic and Atmospheric Administration, and the Gulf of Mexico Coastal Ocean Observing System.
    - Continue to update older watershed management plans to follow the Monitoring Framework. MBNEP should also update the Framework, possibly with the assistance of Alabama Water Watch, to promote best practices for the collection and use of volunteer monitoring data,
    - Update the Monitoring Framework to incorporate volunteer monitoring data.
3. Continue to promote consistent system-wide monitoring to assess trends in coastal ecosystem health (EST-1.3). Considerations could include:
    - **Data use and monitoring support:** Continue to engage with local and state partners to use existing data in decision support and to commit to "trends" monitoring investments.
    - **Habitats and sedimentation:** Continue to conduct baseline and monitoring studies of habitats and sedimentation as an important component of watershed planning.
    - **Hydrologic modeling:** Continue to model hydrology in priority watersheds and calibrate hydrologic models to improve performance and capability.
    - **Bacteria:** Increase efforts to monitor *Escherichia coli*. The leading agency could be the Alabama Department of Public Health or FDA.
    - **Groundwater:** Continue to engage with groundwater monitoring partners in a support role to recommend groundwater data collection needs and help identify potential sources of pollutants to surface waters.
    - **Water Quality (ADEM):** Continue to engage with ADEM and Partners in a support role to recommend water quality data collection needs and provide input on monitoring protocols. Evaluate whether the three-year cycle of surface water monitoring in basins is sufficient to allow timely detection of problems and adaptive management response. Engage county support for key monitoring locations, including areas with known or emerging stressors.

- **Water Quality (Volunteers):** Continue to support volunteer monitoring by partnering with Alabama Water Watch to provide training and technical support. Expand and integrate Alabama Water Watch's capacity to rapidly assess emerging conditions or focus on hypothesis-driven monitoring to supplement and inform ADEM's sampling strategy. Incorporate volunteer monitoring data into the Monitoring Framework and continue to coordinate and refine a monitoring network which mixes volunteer with State resources.
- **Pre- and Post-Restoration:** Continue to prioritize pre- and post-restoration monitoring, especially for major restoration projects like those in the D'Olive Watershed with the goal of delisting more streams with impaired segments. Evaluate needs for post-restoration management, focusing on monitoring that can inform adaptive management of invasive species and other restoration features to ensure success.
- **Remote Sensing:** Develop a more comprehensive remote sensing strategy.
- **Benthic Habitats:** Continue to support seagrass and oyster monitoring.

Improving the process for measuring, analyzing, and communicating change in marine, estuarine, and freshwater ecosystem conditions (EST-2) should remain a focus. Considerations could include:

4. Continue to calibrate and improve the performance of the Watershed Condition Framework to measure benefits of restoration.
5. Utilize the Watershed Condition Framework in additional watersheds under watershed management plan implementation.
6. Utilize the Watershed Condition Framework to help develop State of the Bay reports every five years.

Modeling and predicting connections between ecosystem condition and the ecosystem services people value (EST-3) should remain an important goal over the next ten years. Considerations could include:

7. Continue to quantify impacts of anthropogenic and climate stressors on ecosystem health and services as well as the economic importance of protecting and restoring water and habitat quality for the things people value most about living in coastal Alabama.
8. Promote hypothesis-driven monitoring to better understand connections between ecosystem condition and services.

SECTION 3
Ecosystem Restoration and Protection Action Plan

Conversion of natural landscapes to urban or agricultural uses in coastal Alabama, mostly driven by human population growth, has degraded ecosystem biodiversity, function, resilience, and services. These anthropogenic impacts have been further exacerbated by climate stressors, including higher air and water temperatures, increased intensity of storms, increased drought, and higher sea levels. Restoring and protecting ecosystems can help halt and reverse degradation, recover biodiversity and population abundances, restore higher levels of services, and safeguard the things people value most about living in coastal Alabama.

Since 1995, the MBNEP Management Conference has worked to identify, prioritize, and implement actions to restore and protect ecosystem biodiversity, function, resilience, and services. Through implementation of the Ecosystem Restoration and Protection Action Plan, MBNEP has made tremendous progress in watershed planning, protection and restoration of waterways, watersheds, and coastal habitats, invasive species management, and connecting residents and visitors with nature.

ERP has five goals:

- ERP-1: Develop comprehensive management plans for all coastal watersheds (at the 12-digit hydrologic-unit-code scale).
- ERP-2: Implement comprehensive watershed management plans with a focus on priority habitats.
- ERP-3 Improve ecosystem function and resilience through protection, restoration, and conservation along shorelines of coastal Alabama beaches, bays, and backwaters.
- ERP-4 Improve management of invasive species through coastal Alabama watersheds.
- ERP-5: Restore and expand human connections to nature as a mechanism for improving environmental protection.

ERP-1: Develop comprehensive management plans for all coastal watersheds (at the 12-digit hydrologic-unit-code scale).

OBJECTIVES

ERP-1.1: Develop 12 new coastal watershed management plans for those basins discharging into priority fishery nursery areas.

ERP-1.2: Prioritize watersheds and seek funding for watershed management plans (WMPs) in other non-tidally influenced coastal watersheds.

ERP-1.3: Update existing watershed management plans (WMPs) to include new watershed planning criteria.

ERP-1.1: Develop 12 new coastal watershed management plans for those basins discharging into priority fishery nursery areas.

Since 2013, MBNEP has taken a holistic, watershed-based approach to guiding coastal ecosystem restoration and protection. This approach focuses research, planning, and action on the geographic scale of drainage basins, not political jurisdictions. It aims to ensure freshwater 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 paradigm at the local level. MBNEP is a recognized leader in promoting and developing watershed management plans as the basis for ecosystem restoration and protection in coastal Alabama.

Accomplishments

Watershed Plans

Over the past five years, MBNEP has developed, or is in the process of developing, twelve new watershed management plans at the 12-digit hydrologic-unit-code scale. To expedite planning, some watersheds were grouped into larger complexes (Table 3-1). Plans have been completed for Fly Creek, Little Lagoon/Perdido Pass, Mobile-Tensaw-Apalachee Delta complex, Garrows Bend, Delchamps Bayou/Deer River, Bridge Creek/Palmetto Creek, and Dauphin Island watersheds. Plans are in progress for Bayou Sara, Lower Chasaw Creek, Bay Minette Creek/Whitehouse Creek, and Gunnison Creek/Cold Creek watersheds. A request for proposals has been issued for Grand Bay Swamp watershed planning.

Synthesis of Watershed Issues

In 2023, MBNEP completed an exhaustive synthesis of major concerns and management recommendations across their watershed plans (MBNEP 2023). Priority issues across watersheds include sedimentation, nutrient pollution, pathogens, litter, habitat loss, stream degradation, invasive species, and shoreline erosion. The synthesis also reviewed history, context, and geographic extent of watershed planning, community engagement, monitoring data, regulatory environment, and financing strategies.

Watershed Planning Support

MBNEP augments watershed planning with enhanced outreach and engagement and studies. For example, MBNEP supported a strategically designed virtual forum of technical presentations by the watershed management plan team with breakout sessions for the Mobile Tensaw Apalachee Watershed. MBNEP also conducted a fiscal analysis for Dauphin Island, concluding that tax revenues from the West

End of the island do not offset the cost of maintaining the area and providing public services to those properties. These findings are important for planning, policymaking, and adaptation efforts on the Island.

Table 3-1. MBNEP Watershed Management Plans for coastal watersheds and watershed complexes featuring groups of HUC 12 Watersheds (adapted from MBNEP 2023).

TABLE ERP 3-1
MBNEP WATERSHED MANAGEMENT PLANS

Watershed Plan	HUC 12 Watersheds	Publication Date
D'Olive, Tiawassee, Joes Branch	Sub Basin of Tensaw Apalachee	2010, 2022
Eight Mile Creek	Eight Mile Creek	2011
Three Mile Creek	Three Mile Creek	2014
Fowl River	Fowl River	2016
Dog River Complex	Upper Dog River, Lower Dog River, Halls Mill Creek	2017
Bon Secour Complex	Bon Secour River, Oyster Bay, Skunk Bayou	2017
Weeks Bay Complex	Upper Fish River, Middle Fish River, Lower Fish River, Magnolia River	2017
Bayou La Batre	Bayou La Batre	2018
West Fowl River	West Fowl River	2019
Wolf Bay Complex	Sandy Creek, Mifflin Creek, Graham Bayou	2021
Gulf Frontal Complex	Little Lagoon/Perdido Pass-Gulf Frontal	2022
Mobile Tensaw Delta Complex	Tensaw-Apalachee, Grand Bay, the Basin, Mittlin Lake, Big Chippewa Lake, Farris Creek/Barrow Creek	2023
Western Shore	Garrows Bend, Deer River, Delchamps Bayou	2023
Fly Creek	Fly Creek	2023
Dauphin Island	Dauphin Island	2023
Western Perdido Bay	Bridge Creek/Palmetto Creek	2023
Eastern Delta	Whitehouse Creek, Upper Bay Minette Creek, Lower Bay Minette Creek	2024
Western Delta	Cold Creek, Gunnison Creek, Bayou Sara, Lower Chasaw Creek	2024
Grand Bay Swamp	Grand Bay Swamp	2025

ERP-1.2: Prioritize watersheds and seek funding for watershed management plans (WMPs) in other non-tidally influenced coastal watersheds.

Accomplishments

Though no formal prioritization has been conducted by the PIC, MBNEP has been seeking funding for watershed planning for the nontidal Upper Perdido watershed. Informally, the nontidal Escatawpa River watershed is also a priority.

ERP-1.3: Update existing watershed management plans (WMPs) to include new watershed planning criteria.

Accomplishments

MBNEP Updated the D'Olive Watershed Management Plan in 2022. The Eight Mile Creek Watershed Management Plan Update is in progress as of Fall 2023.

ERP-2: Implement comprehensive watershed management plans with a focus on priority habitats.

OBJECTIVES

ERP-2.1: Develop a Coastal Alabama Habitat Restoration Plan to guide watershed management plan implementation.

An important element of all watershed plans is the identification of restoration and protection actions based on a scientific assessment of the watershed, an analysis of the conditions of priority habitats, a determination about whether stressors can be abated, and consideration of the six things people value most about living in coastal Alabama.

ERP-2.1: Develop a Coastal Alabama Habitat Restoration Plan to guide watershed management plan implementation.

Accomplishments

2019 Habitat Conservation and Restoration Plan for Coastal Alabama

MBNEP and The Nature Conservancy developed the *2019 Habitat Conservation and Restoration Plan for Coastal Alabama* (MBNEP & TNC 2019) to guide conservation and restoration activities in coastal Alabama, including habitat acquisition, conservation, restoration, and other management actions. The Plan used best available science and information from watershed management plans to help identify and prioritize potential projects at a variety of scales. The Plan identified four goals with quantified objectives for the restoration and protection of priority habitats in coastal Alabama. Goals (and habitats) included:

- Restore, conserve, or enhance habitats in the headwaters of tidally influenced watersheds or drainage basins (pine savanna; streams rivers and riparian buffers; freshwater wetlands; and longleaf pine).
- Protect uplands adjacent to coastal habitats to accommodate landward migration of marshes (pine savanna).
- Ensure adequate open space through habitat protection and restoration for storm protection or flood prevention (beaches, dunes, and shorelines; intertidal marshes and flats; maritime forest).
- Restore and protect habitats which play a key role in coastal Alabama's heritage and culture (longleaf pine; submerged aquatic vegetation, subtidal habitats, and oyster reefs).

The Plan is frequently used by MBNEP and partners as an important decision support tool for informing and guiding restoration and protection activities. It ranked habitats most stressed by human activities with the top three including streams, rivers, and riparian buffers; freshwater wetlands; and intertidal marshes and flats. Other stressed habitats included longleaf pine, pine savanna, maritime forest, beaches and dunes, submerged aquatic vegetation, and oyster reefs. Major issues across watersheds include water quality impairments involving sediments, nutrients, pathogens, and litter and habitat degradation issues involving habitat loss, degraded streams, invasive species, and shoreline erosion (MBNEP 2023).

Protecting and Restoring Stressed Habitats

Over the past five years, MBNEP and partners have made significant progress in restoring and protecting the most stressed habitats (Tables 3-2 and 3-3). Approximately 5,880 acres/11,901 linear feet of habitat were protected in the MBNEP program area according to 2019–2022 NEPORT entries. Project funding was mostly derived through competitive grants or sponsored through the Alabama Department of Conservation and Natural Resources (ADCNR) through the National Fish and Wildlife Foundation Gulf Environmental Benefit Fund and the Alabama Department of Environmental Management's (ADEM)

Section 319 Program. Other partners included Baldwin County, Mobile County, MBNEP, Municipalities, property owners, and RESTORE.

Table 3-2. Key stream, wetland, and riparian buffer restoration accomplishments of MBNEP and partners. *Source: MBENP 2023.*

TABLE 3-2

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	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	Baldwin County NFWF Property owners	Channel, stream, and floodplain stabilization in Spring Branch and Magnolia River	1,437 (complete) 4,200 (in design)	TBD	8,518 (sediment) 29 (nitrogen) 14 (phosphorus)
Three Mile Creek	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	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)

Table 3-3. Key intertidal marshes and flats accomplishments of MBNEP and partners. *Source: MBENP 2023.*

TABLE 3-3
KEY INTERTIDAL MARSHES AND FLATS ACCOMPLISHMENTS

Watershed	Key Partners	Accomplishment	Linear Feet Restored	Acres
Bayou La Batre	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	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 protected
Fowl River	NFWF Property owners	Shoreline stabilization and marsh restoration in design of priority coastal spits and marshes in Lower Fowl River.	Design: 12,600 shoreline protected	Design: 52 acres coastal marsh enhanced
Gulf Frontal	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	City of Mobile Mobile County US Army Corps of Engineers State of Alabama NFWF Property owners	Multiple projects under development: • 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

ERP-3: Improve ecosystem function and resilience through protection, restoration, and conservation along shorelines of coastal Alabama beaches, bay, and backwaters.

OBJECTIVES

ERP-3.1: Develop a Comprehensive Regional Shorelines Plan for stabilization and protection.

Shoreline erosion is a priority issue in Bay, Gulf, tidally influenced, and Mississippi Sound watersheds, including Dauphin Island, West Fowl River, Western Shore, MTA Delta, Eastern Shore, Bon Secour, Gulf Frontal, and Western Perdido. Stabilizing shorelines in these developed watersheds requires a delicate balance between protecting the built environment and protecting and restoring natural shoreline functions to support a variety of ecosystem services, including providing essential habitat for native plants

and fish and wildlife. Protecting or restoring softened or "living" natural shorelines where appropriate is one approach that can satisfy both needs.

ERP-3.1: Develop a Comprehensive Regional Shorelines Plan for stabilization and protection.

Accomplishments

Comprehensive Shorelines Management Plan for the Western Shore

MBNEP has obtained funding from the National Fish and Wildlife Foundation National Coastal Resilience Fund to support development of a Comprehensive Shoreline Management Plan for the Western Shore. MBNEP has issued a request for proposals and candidates are under review.

The Plan will be designed to:

- Enhance the resilience of the intertidal habitats along the western shore of Mobile Bay to enhance habitats for oysters, finfish, crabs, and shrimp native to this area.
- Expand protection of critical community assets including Port infrastructure, the Mobile Aeroplex at Brookley, and evacuation routes.
- Increase stakeholder acceptance of nature-based solutions and increase opportunities for their installation to strengthen the shoreline's ability to provide ecosystem services.
- Improve environmental management along the western shore of Mobile Bay by providing government, resource managers, and NGOs with a prescriptive science-based plan for shoreline stabilization and habitat management.

The Comprehensive Shoreline Management Plan for the Western Shore may serve as a template for developing comprehensive shoreline management plans for the Eastern Shore and other locations.

Sustainability of Shoreline Stabilization Investments in High-Risk Coastal Communities

Coastal communities face increasing challenges from climate stressors. Knowledge of the costs and benefits for protecting coastal infrastructure in the face of change is fundamental to understanding the long term sustainability of high-risk coastal development and how best to maximize and allocate resources. The low-lying West End of Dauphin Island provides a good model for study, as its infrastructure is projected to become increasingly susceptible to increased storm events, flooding, overtopping, and erosion. In order to evaluate the long-term sustainability of maintaining infrastructure in this high-risk area, MBNEP commissioned a fiscal analysis to weigh the West End's revenues from property taxes, lodging taxes, and sales taxes against costs (King & Jenkins 2022). The study concluded that revenues from the area did not offset the costs of providing public services and maintaining the West

End area. More importantly, revenues did not offset the costs of future storm damage. This type of analysis is applicable to other coastal areas and can provide crucial information to assist planning, policymaking, and adaptation or mitigation efforts in high-risk coastal areas.

Shoreline Stabilization Projects

State, county, municipalities, and other partners are implementing multiple large-scale shoreline stabilization projects. MBNEP has led important stabilizing efforts, including the Mon Louis Tip, Fowl River Spits, Dauphin Island Causeway, and Deer River (Table 3-4).

Table 3-4. Key MBNEP shoreline stabilization progress and accomplishments

TABLE 3-4
KEY SHORELINE STABILIZATION PROGRESS AND ACCOMPLISHMENTS

Project	Partners	Progress and Accomplishments	Linear Feet	Acres
Mon Louis Tip	MBNEP	Complete: • Shoreline stabilization along the bay side of the norther tip • Protection and reestablishment of critical nursery habitat for commercially and economically important fish and shellfish • Improved access in the shallow Fowl River Navigation Channel • Mitigation of storm hazard vulnerability upstream in East Fowl River	1,540 shoreline protected	• 4 acres salt marsh created • 8 acres salt marsh protected
Fowl River	MBNEP, NFWF-GEBF	In design (60%): Restore coastal spits and wetlands within the transitional reaches of Fowl River, including improving water and habitat quality and preserving coastal hydrology.	Design: 12,600 shoreline protected	Design: 52 acres coastal marsh enhanced
Dauphin Island Causeway	MBNEP (funding for engineering and design through NFWF GEBF and Community Resilience Fund), Mobile County (project lead for engineering and construction)	In design: • Shoreline stabilization • Creation of marsh habitat to support fish, shellfish, and oysters	Design: 10,090 shoreline stabilized	TBD marsh restored
Deer River	MBNEP, USACE (providing 200k cu/yd beneficially sourced, suitable marsh material)	In design (30%): Protect one of the largest intact marsh complexes on the western shore of Mobile Bay threatened by sea level rise and to protect maritime operations and private property • Wave attenuation to protect critical marsh habitat • Hydrologic restoration of tidal creek system to sustain healthy marsh • Creation of additional marsh habitat		Design: • 275 acres marsh protected • 30 acres marsh created

ERP-4: Improve management of invasive species through coastal Alabama watersheds.

OBJECTIVES

ERP-4.1: Develop invasive species management plans (ISMPs) for coastal watersheds.

Invasive exotic species can reduce biodiversity, compete with native species for limited resources, alter habitats, and cause extinctions of native species. Invasive exotic species have impacted natural ecosystems across coastal Alabama and are identified as a priority stressor in Wolf Bay and Mobile Tensaw Apalachee Delta watersheds (MBNEP 2023). Many partners collaborate on invasive species education and control in coastal Alabama, including University of South Alabama, Alabama Cooperative Extension System, USDA, Natural Resources Conservation Service (NRCS), Alabama Division of Wildlife and Freshwater Fisheries, City of Mobile Parks and Recreation, SCA and Gulfcorps, and Mobile Baykeeper.

ERP-4.1: Develop invasive species management plans (ISMPs) for coastal watersheds.

Over the past five years, MBNEP and partners have engaged in activities to advance invasive exotic species management including development of the Three Mile Creek Watershed Invasive Species Control Plan (MBNEP 2019) and field work.

Accomplishments

Three Mile Creek Invasive Species Control Plan

MBNEP funded development of the *Three Mile Creek Invasive Species Control Plan* (MBNEP 2019), which provides a blueprint to remove or control invasive exotic plants and animals in the Three Mile Creek Watershed. Primary elements of the Plan include:

- Identify the location and extent of the most impactful (targeted) invasive species
- Identify priority habitats at risk of being invaded and occupied by targeted invasive species
- Prescribe methods and techniques designed to control invasive species most likely to respond to treatment
- Develop a monitoring plan designed to assess the results of the management activities
- Offer estimated costs to remove or control target invasive species.

Due to its exhaustive nature and the ubiquitous presence of invasive species across coastal Alabama watersheds, the *Three Mile Creek Invasive Species Control Plan* can be used as a template for developing

invasive species management plans for other watersheds, with input from local surveys and mapping activities.

Alabama Aquatic Nuisance Species Management Plan

The Alabama Aquatic Nuisance Species Task Force and the Alabama Department of Conservation and Natural Resources developed the Alabama Aquatic Nuisance Species Management Plan in 2021 (ALANSTF & ADCNR 2021). The Plan addresses the threat of aquatic nuisance species in Alabama and makes Alabama eligible for federal funding to help manage invasive species.

Field Work

The *Three Mile Creek Invasive Species Control Plan* (MBNEP 2019) identified the island apple snail (*Pomacea maculata*) as being the most frequently observed invasive animal in the Three Mile Creek Watershed. The Plan's prescription for controlling the snail has been successfully implemented to reduce snails in ponds in Langan/Municipal Park (Table 3-5; American Sportfish Hatchery & Osprey Initiative 2023). Invasive species management in the D'Olive Watershed has significantly reduced the number of invasive species from 3,642 to 1,441 individuals per acre (MBNEP data).

Table 3-5. Numbers of apple snails and egg clusters removed from Lanegan/Municipal Park.

Table 3-5
Reductions in Apple Snails in Lanegan/Municipal Park

Year	Number of Snails Removed	Number of Egg Clusters Removed
2020	18,210	88,891
2021	2,998	17,037
2022	951	8,587
2023	61	2,173

Ongoing control efforts have also been successful in reducing populations of the primary invasive plant species of concern in the Plan, including Chinese privet, Chinese tallow, camphor tree, and climbing fern. Over 15,000 plants have been removed from priority areas in the watershed.

MBNEP has partnered with NOAA's Gulf Corps, whose personnel have used mechanical and chemical techniques to control or eradicate invasive species across restoration sites in the Three Mile Creek Watershed. Gulf Corps has also worked in the Western Shore watershed to control or eradicate the common reed (*Phragmites australis*) from the Helen Woods Park salt marsh. Partners have used mechanical and chemical techniques to control or eradicate invasive species in priority habitats (Table 3-6).

Table 3-6. Key invasive species control and eradication projects conducted by partners. *Source: MBNEP 2023.*

TABLE 3-6
KEY INVASIVE SPECIES CONTROL AND ERADICATION PROJECTS

Project	Key Entity	Progress and Accomplishments	Acres
Grand Bay National Fish and Wildlife Foundation Gulf Environmental Benefit Funds Invasive Species Treatment	The Nature Conservancy	TNC contracted Wildlife Solutions Inc. to control invasive vegetation species within the Grand Bay Savanna Forever Wild Tract, including along roadsides and accesses.	344
Lightning Point NFWF GEBF Predator Control	The Nature Conservancy	TNC contracted the USDA-Animal and Plant Health Inspection Service to control predators around the restoration project at Lightning Point. 14 feral hogs were removed.	37
Schwarz Park Restoration Project: invasives	Dog River Clearwater Revival	Cogon grass, popcorn tree, Chinese privet, kudzu, coral ardisia were treated mechanically or chemically.	2.68
Weeks Bay Reserve	ADCNR State Lands Division Weeks Bay Reserve	Invasive plants mechanically or chemically removed by Gulf Corps Student Conservation Association crew.	22
Forest Management to enhance habitat	ArcelorMittal-Nippon/Calvert Steel	Invasive species and brush were removed, and timber was thinned to promote fire protection and forest health.	1175

ERP-5 Restore and expand human connections to nature as a mechanism for improving environmental protection.

OBJECTIVES

ERP-5.1: Protect and conserve priority habitats for public benefit and access through acquisition or conservation easement.

ERP-5.2: Create seven new access points, at least five in Mobile County, incorporating environmental and cultural themes into each site's interpretive signage.

Coastal Alabama boasts some of the top beaches in the nation, the second largest river delta, the fourth largest estuary system, over 77,000 miles of rivers, streams, bays, bayous, estuaries, and the Gulf of Mexico coastline, and one of the most biologically diverse areas of land and water in North America. Providing access to these natural assets provides significant economic and public health benefits. It also increases support for environmental protection and restoration. The more connected people are to the

environment, the more they value and protect it. Restoring public connection to the environment is an essential element of coastal ecosystem protection and restoration.

ERP-5.1: Protect and conserve priority habitats for public benefit and access through acquisition or conservation easement.

Accomplishments

Acquisition of Priority Habitats

Between 2019–2022, MBNEP partners have acquired over 2,470 acres to protect and conserve priority habitats for public benefit and access (Table 3-6, NEPORT 2019–2022).

Mobile-Tombigbee and Alabama River Watersheds Atlas

MBNEP completed the Mobile-Tombigbee and Alabama River Watersheds Atlas in 2020, which identified forested headwater parcels of high importance for protection. The Alabama Forest Resources Commission is pursuing protection of the prioritized parcels with a target of protecting 10,000 acres.

Table 3-6. MBNEP partner acquisitions of priority habitats for public benefit and access. *Source MBNEP NEPORT 2019–2022.*

TABLE 3-6

ACQUISITION OF PRIORITY HABITATS FOR PUBLIC BENEFIT

Year	Project Name	Project Description	Habitat Type	Acres	Lead Implementer
2022	Maury Parcel Acquisition	Acquired to be conveyed to WBR/State Lands	Woody wetlands	41	South Alabama Land Trust
2022	Blackwater North Acquisition	Acquired and transferred to ADCNR.	Forested Wetland	1131	The Conservation Fund
2022	Mobile Bay Causeway Acquisition	Acquired to stablize the shoreline and create a City park along the Causeway.	Disturbed	2	City of Spanish Fort
2022	Cypress Point Acquisition	Acquired waterfront and and coastal forest on Bay Minette Basin	Forested upland Pine	142	City of Spanish Fort Partner: ADCNR
2022	Cedar Point Acquisition	Acquired wetland and waterfront access Heron Bay Cutoff including public access fishing pier at Cedar Point.	Tidal wetland	125	Mobile County Partner: ADCNR
2022	Lloyd Parcel Acquisition	Acquired Riparian Buffer on Waterhole Branch	Forested wetland/Estuarine Shoreline	60	ADCNR Partner: South Alabama Land Trust
2022	Graham Creek Nature Preserve Expansion	Acquired to add to Graham Creek Nature Preserve. Walking trails will be incorporated providing passive recreation and wildlife viewing opportunities.	forested wetland	82	City of Foley

2021	Bon Secour River Headwaters Restoration	Acquired for restoration	Riparian	93.16	City of Foley
2021	Graham Creek Land Acquisitions	Acquired to expand protected property at the Graham Creek Preserve/	Forest/ Woodland	78	City of Foley
2021	Perch Creek Properties (multiple acquisitions)	Acquired and placed into conservation easement perform a range of ecosystem services.	Forested Wetland/ Salt Marsh	94.83	City of Mobile
2021	Simmons Tract Acquisition	Acquired to connect other protected properties in the Upper Mobile-Tensaw River Delta.	Forested Wetland	284	ADCNR
2021	Wolf Creek Park Expansion	Acquired for conservation at an existing park, supplementing 20 acres with canoe/kayak launch, fishing pier, picnic areas, and a gravel parking area.	Salt Marsh	2.9	City of Foley
2021	Ziebach Property	The City of Mobile purchased the Ziebach Property for conservation and as a public-use access point to Mobile Bay.	Other	31	City of Mobile
2020	Blakely Land Swap	Value for Value swap of Forever Wild Land Trust Property with Historical Blakely State Park Property to implement habitat protection efforts within the Blakely property.	Forest/ Woodland	3.15	Forever Wild Land Trust
2020	Bon Secour Headwaters Restoration Ph I	Acquired to develop a constructed wetland for habitat and stream restoration.	Riparian	88	City of Foley
2020	East Gateway Acquisition	Acquired for inclusion in the Weeks Bay National Estuarine Research Reserve	Salt Marsh	167	ADCNR
2020	Rigsby Acquisition	Acquired to include in the Mobile-Tensaw Delta management area parcels.	Forested Wetland	40	ADCNR
2019	Fort Morgan Playtime Inc.	Acquired to protect Alabama beach mouse habitat	Dune	0.88	Alabama Coastal Heritage Trust
2019	Gassenheimer Property	Acquired to protect Alabama beach mouse habitat	Dune	1.86	Alabama Coastal Heritage Trust
2019	Henry Property	Acquired to protect Alabama beach mouse habitat	Dune	1.87	Alabama Coastal Heritage Trust
2019	Romar Beach LLC	Acquired to protect Alabama beach mouse habitat	Dune	1.16	Alabama Coastal Heritage Trust

ERP-5.2: Create seven new access points, at least five in Mobile County, incorporating environmental and cultural themes into each site's interpretive signage.

MBNEP and partners work to restore and create new access opportunities in Mobile and Baldwin counties through support of priority habitat acquisitions and creation or improving access sites for all people, including for those with mobility impairments. There are about 243 public access sites with water access or views in Mobile (56) and Baldwin (187) Counties; approximately 206 sites are in good condition with no or minimal accessibility issues and 37 have issues that would prevent them from

receiving future improvement investment. Both counties offer access to boat ramps, small watercraft carry-down access, fishing, and swimming (Table 3-7).

Table3-7. Water access amenities in Baldwin and Mobile Counties. *Source: MBNEP*

TABLE 3-7
WATER ACCESS AMENITIES

Amenity	Baldwin	Mobile
Boat Ramp	30	14
Carry Down	93	23
Fishing	61	24
Swimming	56	9
Pier	38	16

Accomplishments

Public Access

Over the past 9 years, MBNEP partners have created or restored, or are in the process of creating or restoring at least 23 access points or areas, with 12 in Mobile County and 11 in Baldwin County (Table 3-8).

ADA-Compliant Beach Accessibility

MBNEP Management Conference partners created a non-profit organization, the Krewe of Kindness, in part to ensure access to Alabama beaches for physically challenged individuals. MBNEP funded the Krewe to purchase the first ADA-compliant beach mat for Dauphin Island's West End Beach. The 270-foot mat improves beach accessibility for mobility challenged individuals. MBNEP funded purchase of a second mat for to provide access at Gulf State Park's Cotton Bayou Beach Access east ramp in Orange Beach.

Mobile County Blueways

Coastal Alabama has a variety of paddling trails that provide unique opportunities to enjoy white sand beaches and dunes, oyster reefs, freshwater and forested wetlands, and pine savannas. Mobile County has initiated a Blueway project (www.mobilecountyblueway.com) to celebrate and protect waterways while sustainably enhancing and increasing access. The County is developing a comprehensive master plan to detail the implementation, use, and promotion of a recreational paddling trail.

Table 3-8. Public access points created or restored, or in the process of being created or restored in Baldwin and Mobile Counties, Alabama 2014–2023. *Source: MBNEP.*

TABLE 3-8
KEY PUBLIC ACCESS POINTS OR AREAS CREATED OR RESTORED 2014–2023

County	Region	Location
Baldwin County	Eastern Shore Daphne	Daphne Central Park Centennial Park
	Eastern Shore Fairhope	Knoll Park
	Gulf Shores	West 12th Street Beach Access Meyer Park Wetlands Park East Gulf Place Access
	Orange Beach	White Ave Robinson Island Bird Island Park
	Weeks Bay	Jessamine Street Ave
Mobile County	Mobile North	Langan Park Charles Wood Japanese Gardens Three Mile Creek Trail Phase One Escatawpa Hollow Chickasabogue Park Cedar Point fishing pier Lewis Landing Africatown Blueway
	Mobile South	Fry Park Bayfront Park City Docks/Lightning Point Memories on Fowl River

ERP Recommendations

Projected population growth and related development will add to present day impacts to ecosystem biodiversity, function, resilience, and services in coastal Alabama. These cumulative impacts will be further exacerbated by higher air and water temperatures, increased intensity of storms, increased drought, and higher sea levels. Ecosystem restoration and protection will continue to be our best tools to halt and reverse degradation, recover biodiversity and abundance, restore ecosystem services, and safeguard the things people value most about living in coastal Alabama.

Ecosystem management at the watershed scale has a proven track record of success and public support in coastal Alabama. Watershed planning, protection and restoration of waterways, watersheds, and coastal habitats; invasive species management; and connecting people with nature will continue to be important activities over the next ten years. In its role as a catalyst for activities of the Management Conference and other partners, MBNEP is uniquely positioned to continue to provide leadership for these activities.

MBNEP should continue in its leadership role in promoting and developing watershed management plans as the basis for ecosystem restoration and protection in coastal Alabama (ERP-1). Considerations could include:

1. Continue to develop watershed management plans for priority watersheds.
2. Continue to update older watershed management plans to include new watershed planning criteria and to address emerging management priorities. Consider updating Three Mile Creek WMP next.
3. Non-tidally influenced watersheds are important components of the Mobile Bay ecosystem and should be included in MBNEPs watershed-based management approach. Engage the PIC to priority rank non-tidally influenced watersheds as candidates for watershed planning and seek funding to develop plans.
4. Develop criteria for evaluating cost-benefits of updating watershed management plans.

MBNEP and partners should continue to implement comprehensive watershed management plans with a focus on priority habitats (ERP-2). Considerations could include:

5. Continue to restore and protect habitats identified as priorities in watershed management plans.
6. Support stricter habitat protection ordinances and encourage enforcement.
7. Continue to use the Habitat Restoration Plan as a decision-making tool and update it as new information and priorities arise.
8. Not all restoration partners report their full progress in NEPORT once a year. Develop a facilitated, quality-controlled process to encourage partners to report restoration accomplishments regularly and consistently.
9. Communicate restoration progress and accomplishments to the public, private sector, and decisionmakers in meaningful ways and connect project results to the things people value most about living in coastal Alabama.
10. Create opportunities to recognize and congratulate restoration partners for their accomplishments.

MBNEP and partners should continue to improve ecosystem function and resilience through protection, restoration, and conservation along shorelines of coastal Alabama beaches, bay, and backwaters (ERP-3). Considerations could include:

11. Continue to encourage less coastal armoring and more natural shoreline stabilization solutions, especially for priority habitats.
12. Educate the public and developers about the benefits and best practices for living shoreline techniques.
13. Encourage streamlining of regulations for permitting nature-based techniques for shoreline stabilization.
14. Continue to implement shoreline stabilization projects identified in watershed management plans. Prioritize project areas by developing comprehensive shoreline management plans adopted by the State and other local partners.
15. Complete the Comprehensive Shoreline Management Plan for the Western Shore. Consider using it as a template to modify and develop a shoreline management plan for the Eastern Shore and other priority areas.

16. Continue to partner with USACE to coordinate beneficial use of habitat-appropriate fill material for restoration activities, including for marshes.
17. Evaluate the sustainability of maintaining high-risk coastal infrastructure in the face of intensifying storm damage as a tool to assist planning, policymaking, and adaptation and mitigation efforts in high-risk coastal areas.

MBNEP and partners should continue to improve management of invasive species (ERP-4). Considerations could include:

18. Use the Invasive Species Management Plan developed for the Three Mile Creek Watershed as a template together with location-specific surveys and mapping for the development of invasive species management plans for other priority watersheds where invasive species are a top stressor, including Wolf Bay and Mobile Tensaw Apalachee Delta watersheds.
19. Prioritize and map watersheds for invasive species.
20. Support partner efforts to educate private property owners about invasive exotic species and best practices for their management. Partners with established education programs include NRCS, Alabama Soil & Water Conservation Committee, Alabama Forestry Commission, and the Alabama Cooperative Extension System.
21. Support agency, NGO, and private sector partner efforts to control or eradicate invasive exotic species. Focus on priority areas and species identified by watershed plans and on recent restoration project sites with disturbed areas prone to invasive exotic species recruitment and proliferation. Partners include University of South Alabama, Alabama Cooperative Extension System, Alabama Division of Wildlife and Freshwater Fisheries, City of Mobile Parks and Recreation, Student Conservation Association, The Corps Network, NOAA and TNC's Gulfcorps, and Mobile Baykeeper.

MBNEP and partners should continue to restore and expand human connections to nature as a mechanism for improving environmental protection (ERP-5). Considerations could include:

22. Continue to encourage partners to protect and conserve priority habitats for public benefit and access through acquisition or conservation easement. Priority areas have been identified in coastal watershed plans and should be pursued as opportunities arise.
23. Encourage partners to report acquisitions and conservation easements consistently and regularly in the NEPORT database.
24. Continue to create and enhance public access points, especially in areas where access is sparse.

SECTION 4

Technical Assistance and Capacity Building Action Plan

MBNEP provides technical assistance and builds the capacity of water-dependent industries, businesses, local governments, and volunteers to protect and restore coastal Alabama's natural ecosystems. MBNEP creates incentives and decision support tools to integrate environmental protection into community development and economic growth. They also work to improve the regulatory environment to safeguard restoration investment success, provide tools to continuously improve environmental management best practices, and supports volunteer "citizen scientists" to augment professional monitoring efforts and provide timely information to identify emerging issues and assist adaptive management efforts.

TAC-1: Build capacity of water-dependent industries to improve sustainability of working waterfronts and preserve fishing communities.

OBJECTIVES

TAC-1.1: Conduct a comprehensive assessment of the current status of all safe harbors, including, but not limited to, USACE-designated locations.

TAC-1.2: Pilot a peer lending program to support fishing business investment in best management practices.

TAC-1.3: Promote the assessment, improvement, and designation of estuary ports as "Green Ports".

TAC-1.4: Develop planning tools to balance multiple uses of marine, estuarine, and freshwater resources.

Water-dependent industries, including ports, commercial fishing, and aquaculture are significant economic drivers in coastal Alabama. Improving sustainable practices among these industries can protect working waterfronts, coastal culture and heritage, and ecosystem services that sustain the things people value most about living in coastal Alabama.

TAC-1.1: Conduct a comprehensive assessment of the current status of all safe harbors, including, but not limited to, USACE-designated locations.

No progress has been made on this objective over the past five years.

TAC-1.2: Pilot a peer lending program to support fishing business investment in best management practices.

Healthy oyster populations in coastal Alabama benefit the local fishery and seafood wholesale and retail industries. They also support ecosystem health and services, including benefits to water quality, carbon sequestration, and shoreline stability, protection, and resilience. Improving industry best practices among oyster harvesters and farmers can yield additional benefits in terms of reducing impacts on fisheries and supporting habitats.

Accomplishments

MBNEP launched the Coastal Alabama Fisheries Fund in 2022, a revolving pilot peer lending program to support fishery industry investment in best practices (MBNEP 2021a). The program initially targeted Alabama oyster harvesters and farmers interested in starting or expanding commercial oyster tonging or aquaculture operations. Loans from the fund can be used to purchase shell, seed, spat, or equipment. Fisheries Fund partners provide training and business planning to loan recipients. Partners include Alabama Power, 22nd State Bank, Mississippi-Alabama Sea Grant, the Auburn University Shellfish Laboratory, Oyster South, Coastal Alabama Partnership, the Alabama Small Business Development Center network, and MBNEP. Fund partners envision the fund will eventually become peer managed. The Fund also delivers operational support services to oyster catchers and farmers including business plan assistance, technical training, and marketing development. MBNEP helped to develop marketing for the oyster industry through the www.oystersalabama.com website.

TAC-1.3: Promote the assessment, improvement, and designation of estuary ports as "Green Ports".

Accomplishments

Green Marine Program

The Alabama State Port Authority continues to participate in the Green Marine Program, the leading environmental certification program for North America's maritime industry. The voluntary program helps participants reduce their environmental impacts on air, water, and soil quality. Certification is contingent

upon participating in annual performance reviews with external verification, publishing results, and committing to continuous improvement. The Port has integrated a variety of environmentally-beneficial best practices in their operations, including:

- Repowering locomotives to smart idle to reduce particulate matter and nitrogen oxides from diesel emissions
- Adopting a no-idle policy
- Recycling
- Controlling dust
- Inspecting the shoreline and nearshore waters twice-weekly
- Using electric ship-to-shore cranes at three terminals

Beneficial Use of Dredge Material

The US Army Corps of Engineers and the Port dredge approximately six million cubic yards of sediment from Mobile Harbor federal navigation channel and adjacent public berths. Beneficial use of dredged sediments to create wetlands and other natural habitats can be an important tool for protecting and restoring essential coastal habitats. The Port is currently partnering with MBNEP, USACE, and RESTORE on a plan to use dredged sediments to create approximately 1,200 acres of wetlands in Upper Mobile Bay.

TAC-1.4: Develop planning tools to balance multiple uses of marine, estuarine, and freshwater resources.

Accomplishments

MBNEP and partners continue to develop and enhance tools to improve management of environmental resources. The **Shellfish Aquaculture Siting Tool** was developed by the ADCNR Marine Resources Division and MASGC as a decision support tool for siting potential off-bottom oyster farming operations in coastal Alabama. The **Alabama Coastal Marine Planning Tool/Public Viewer** was developed by ADCNR, Sea Grant, and MBNEP to assist in identifying and planning for conflicting uses, while protecting economic opportunities, historic and cultural resources, and the natural environment.

TAC-2: **Build capacity of the business community to support ecosystem protection and restoration.**

OBJECTIVES

TAC-2.1: Engage the business community in support of CCMP implementation.
TAC-2.2: Engage businesses in influencing local resource management decision-making.

TAC-2.1: Engage the business community in support of CCMP implementation.

MBNEP engages the business community in support of CCMP implementation through education, planning, and partnership opportunities. Through multiple engagement pathways, MBNEP builds and strengthens partnerships with and within the business community.

Accomplishments

Business Resource Committee (BRC)

MBNEP convenes the BRC to improve the business community's understanding of how coastal natural resources and estuaries contribute to economic, cultural, and community well-being (see EPI-1). Other educational opportunities include outreach and education campaigns like the Create a Clean Water Future campaign, public meetings, websites, social media, the Alabama Current Connections Newsletter, signage, and videos (see EPI-1). Business leaders are also encouraged to participate in the stakeholder process during development of watershed management plans. Examples of opportunities created for businesses to participate in conservation and restoration activities include the Alabama Power and Greif-Soterra Toulmins Spring Rain Barrel partnership, Ditch the Disposables Partnership, and the Alabama Oyster Shell Recycling Program (see EPI-2).

Osprey Initiative

The success of the Osprey Initiative is a noteworthy example of building the capacity of local businesses to support ecosystem protection and restoration. Following a tactical litter cleanup organized by MBNEP, Partners for Environmental Progress, and Thompson Engineering, one of the participants, Don Bates, designed and built a low-cost, low-maintenance, floating "Litter Gitter" to capture and store waterborne Litter. His prototype "Litter Gitter" was installed and tested with funding from a 2017 EPA Trash Free Waters grant and its success led Bates to form Osprey Initiative, a litter abatement company. MBNEP funded the new company through a 2018 Gulf of Mexico Division Grant to install Litter Gitters in the Three Mile Creek Watershed. Since then, the company has deployed Litter Gitters in the Dog River, D'Olive, and Bon Secour watersheds in Alabama and has expanded its operations into ten other states.

TAC-2.2: Engage businesses in influencing local resource management decision-making.

MBNEP encourages businesses to influence local resource management decision-making through networking opportunities.

TAC-3: Build capacity of local governments to manage and enhance coastal environmental resources.

OBJECTIVES

TAC-3.1: Support implementation of eight coastal watershed management plans.
TAC-3.2: Support establishment and operation of watershed plan partnerships and task forces to ensure local ownership of implementation activities.
TAC-3.3: Improve elected officials', planning commissions', and other land-use decision makers' understandings of the relationship between land use, water resource management decisions, and environmental impacts.
TAC-3.4: Improve regulatory framework to better protect coastal resources.
TAC-3.5: Support actions to protect and restore coastal habitats, increasing community and economic resilience.
TAC-3.6: Inform elected officials and the public about changing climatic conditions and sea level rise.

MBNEPs approach to coastal ecosystem conservation, protection, and restoration is focused on planning and action at both regional and watershed scales. Efforts focused on the watershed scale achieve much of their success due to their responsiveness to location-specific priority issues and community values and preferences. Because watershed boundaries often span multiple geopolitical boundaries, intergovernmental cooperation is an essential element of watershed planning. Strengthening capacities of local governments to manage and enhance coastal environmental resources and to collaborate in watershed partnerships is central to the success of this approach.

TAC-3.1: Support implementation of eight coastal watershed management plans

Adoption of watershed management plans by governments with jurisdiction in those watersheds is an important element of institutional support. MBNEP works with local and county governments to draft and pass resolutions of support for completed watershed management plans. These resolutions lay the foundation for more official adoption of plan recommendations into regulatory frameworks.

Accomplishments

Municipal and county governments in coastal Alabama have passed eight resolutions in support of six watershed management plans (Table 4-1).

Table 4-1. Watershed management plans (WMPs) supported by government resolution.

TABLE 4-2
WATERSHED MANAGEMENT PLANS SUPPORTED BY GOVERNMENT RESOLUTIONS

WMPs	Governments
D'Olive	Baldwin County, City of Daphne, City of Spanish Fort
Three Mile Creek	City of Mobile
Dog River	City of Mobile
Fowl River	Mobile County
Weeks Bay	City of Foley
Bon Secour	City of Foley

TAC-3.2: Support establishment and operation of watershed plan partnerships and task forces to ensure local ownership of implementation activities.

Successful watershed-based management requires effective partnership-building in watershed communities. Intergovernmental cooperation and engagement with stakeholders in watershed task forces and partnerships is essential to ensure organizational leadership in prioritizing and implementing watershed management plan actions. Significant investments in time and resources are required to sustain the functional capacity and motivations of implementation partnerships to advance watershed plan implementation.

Accomplishments

The D'Olive Watershed Intergovernmental Task Force and Plan Lower Alabama Now (PLAN) are models of successful working partnerships. Other groups, like the Fowl River Implementation Task Force and Weeks Bay Watershed Implementation Task Force are experiencing reduced productivity. Others, like the Three Mile Creek Partnership are no longer active.

TAC-3.3: Improve elected officials', planning commissions', and other land-use decision makers' understandings of the relationship between land use, water resource management decisions, and environmental impacts.

MBNEP and partners work to ensure that elected officials, planning commissioners, and other land-use decisionmakers have the best information available to understand relationships between land and water management decisions and environmental health.

Accomplishments

Education, Outreach, and Engagement Tools

MBNEP and partners create and maintain a powerful suite of education, outreach, and engagement tools to ensure decisionmakers have the best information and tools necessary to support informed stewardship (see EPI Action Plan). For example, MBNEP created and hosts an education library accessible on its website that feature videos focusing on watershed awareness and education, environmental initiatives, environmentally-friendly consumer choices and behaviors, stormwater management, dunes, best management practices for detention and retention basins, low-impact development, and litter prevention. Other tools include:

- Community engagement in watershed planning
- Outreach and education campaigns
- Public meetings and presentations
- Bays and Bayous Symposia
- Websites
- Social media
- Alabama Current Connections newsletters
- Signage

Government Networks Committee (GNC)

MBNEP convenes the GNC for local and state officials to learn about environmental issues and solutions and to integrate protection and restoration of ecosystem health into economic development. The GNC also helps to inform people about how government agencies work and how they can contribute to environmental protection and restoration.

Training on Decision Support Tools

MBNEP encourages governments to understand and use watershed management plans, including their hydrologic models to inform resource management and policy. MBNEP conducts training for local governments on the best use of tools and data for decision support annually.

TAC-3.4: Improve regulatory framework to better protect coastal resources.

MBNEP continues to encourage improvements to government regulatory frameworks to better protect Alabama coastal ecosystems.

Accomplishments

South Alabama Stormwater Regulatory Review

In 2021, MBNEP updated its 2018 *South Alabama Stormwater Regulatory Review* to reflect regulatory changes between 2019–2021 (MBNEP 2018b, 2021b). The updated Review surveyed existing laws, regulations, permits, and ordinances related to stormwater runoff, water quality, and wetland, stream, and shoreline protection in Mobile and Baldwin Counties. Improvements in regulatory frameworks included more jurisdictions having post-construction stormwater management requirements, a local wetland or stream protection initiative, and low impact development references in their frameworks. The updated Review also developed a matrix of laws, regulations, permits, and ordinances related to management and enforcement of trash, litter, and recycling.

Integration and Use of Volunteer Monitoring Data

MBNEP continues to encourage local resource management agencies to adopt policies to use data generated by third parties, including volunteer monitoring programs. Volunteer monitoring efforts could be used to supplement existing monitoring efforts, verify existing monitoring results, and alert agencies to emerging problems in locations not covered by existing monitoring.

TAC-3.5: Support actions to protect and restore coastal habitats, increasing community and economic resilience.

Accomplishments

MBNEP and partners continue to support actions to protect and restore coastal habitats through encouraging adoption of living shorelines best practices, beneficial use of dredge materials, and

coordinating watershed planning and floodplain management and mitigation efforts (See ERP Action Plan).

TAC-3.6: Inform elected officials and the public about changing climatic conditions and sea level rise.

Climate change threatens coastal ecosystems, communities, and economies. Climate stressors for coastal Alabama include higher air and water temperatures, increased storm intensity, increased drought, and higher sea levels. These stressors exacerbate the impacts of ongoing anthropogenic stressors. Management will increasingly have to adapt to or mitigate consequences of storm damage, flooding, erosion, degradation or loss of natural and built environments, and saltwater intrusion into aquifers and surface waters.

Accomplishments

Climate Planning

MBNEP has partnered with the US Army Corps of Engineers, Alabama Department of Conservation and Natural Resources, and the Mississippi-Alabama Sea Grant Consortium to develop a science-based, constituent-informed Alabama Comprehensive Plan to identify ways to reduce climate vulnerability and increase coastal resilience.

MBNEP incorporates consideration of climate stressors in its watershed management plans and CCMP. Published plans have documented intensified shoreline erosion and degradation, decreased beach widths, amplified storm surges, reduced stormwater drainage, and coastal inundation and flooding during higher tides and windy days (MBNEP 2023). Planning teams rely on information including the US Army Corps of Engineers Coastal Vulnerability Assessment, MASGC Coastal Resilience Index, and models including Sea Level Affecting Marsh Models (SLAMM) and Sea, Lake, and Overland Surges from Hurricanes (SLOSH).

Climate Education, Outreach, and Engagement

MBNEP and partners continue to inform the public, businesses, and elected officials about changing climatic stressors and vulnerabilities of the natural and built environments. MBNEP incorporates climate information into its education, outreach, and engagement tools including:

- Community engagement for watershed planning
- Outreach and education campaigns, including Create a Clean Water Future Campaign
- Bays and Bayous Symposium
- Websites
- Social Media

- Alabama Current Connections Newsletter
- Signage
- Videos
- Management Conference meetings

TAC-4: Advocate integration of environmental protection into community and economic development.

OBJECTIVES

TAC-4.1: Advocate inclusion of watershed management plan recommendations into local policies, ordinances, and plans.

TAC-4.2: Advocate inclusion of better building practices in long-range planning to improve environmental and community resilience.

MBNEP continues to advocate integration of environmental protection into community and economic development.

TAC-4.1: Advocate inclusion of watershed management plan recommendations into local policies, ordinances, and plans.

MBNEP encourages local governments to pass resolutions supporting watershed management plans (see TAC-3.1). These resolutions can provide the foundation for governments to adopt specific watershed management plan recommendations into local regulatory frameworks. Many local governments have been improving their frameworks to better protect coastal resources, including protections for water and habitat quality (MBNEP 2021b). MBNEP has not formally tracked the number of WMP recommendations incorporated into local policies, ordinances, and plans.

TAC-4.2: Advocate inclusion of better building practices in long-range planning to improve environmental and community resilience.

MBNEP continues to promote the use of low impact development or green infrastructure as part of community development.

Accomplishments

Recommendations for use of green infrastructure are common elements across watershed management plans (MBNEP 2023-ESA). The *MBNEP South Alabama Stormwater Regulatory Update* noted that the

number of local governments with references to low impact development in their regulatory frameworks increased from eight in 2018 to 13 in 2021. Opportunities exist to continue this positive trend. For example, the Update noted that only four local governments have a mandatory LID requirement.

MBNEP continues to promote protection and restoration of living shorelines in freshwater, estuarine, and marine systems. They accomplish this through education, outreach, and engagement (see EPI Action Plan) and through watershed planning (see ERP Action Plan).

TAC-5: Build capacity of grassroots groups and citizens to create more resilient and environmentally responsible communities.

OBJECTIVES

TAC-5.1: Support and promote opportunities to expand grassroots capacity development.
TAC-5.2: Develop comprehensive strategy for volunteer water quality monitoring to expand citizen science and community engagement programs to inform status and trends.

TAC-5.1 Support and promote opportunities to expand grassroots capacity development.

Four grassroots organizations participate in the Management Conference, including Dog River Clearwater Revival, Fowl River Area Civic Association, Little Lagoon Preservation Society, and Wolf Bay Water Watch.

Accomplishments

MBNEP develops powerful education and outreach tools to empower and expand the capacity of grassroots organizations to actively participate in protection and restoration Alabama's coastal ecosystems (see EPI Action Plan). Tools include:

- Outreach and education campaigns, including Create a Clean Water Future Campaign
- Public meetings and presentations
- Bays and Bayous Symposia
- Websites
- Social media
- Alabama Current Connections newsletter
- Signage
- Videos

- Trainings
- Volunteer opportunities

TAC-5.2: Develop comprehensive strategy for volunteer water quality monitoring to expand citizen science and community engagement programs to inform status and trends.

MBNEP promotes the capacity of citizens to engage in coastal ecosystem protection and restoration through supporting and expanding volunteer monitoring programs. MBNEP supports grassroots water quality monitoring by providing education, training, and technical support using Alabama Water Watch protocols and equipment. Alabama Water Watch (AWW) is a volunteer-driven water quality monitoring program that harnesses EPA-approved monitoring protocols with community-based priorities to monitor, analyze, and report water quality status and trends.

Accomplishments

MBNEP assesses and addresses volunteer monitoring needs, maintains a directory of current water quality monitors, and identifies monitoring opportunities and gaps. Between January 2019 and May 2023, MBNEP participated in training 135 volunteer water quality monitors. Between 2019–2022, MBNEP has maintained 45 monitoring kits. Citizen scientists are actively monitoring 98 sites across coastal Alabama with efforts focused in Dog River, Fowl River, Wolf Bay, Weeks Bay, Gulf Frontal, and Western Perdido Bay watersheds.

TAC Recommendations

MBNEP serves an important role as a catalyst for activities of the Management Conference to protect and restore healthy ecosystems in coastal Alabama. The Program should continue to help build community-based organizational capacity by providing technical assistance, tools, and resources to water-dependent industries, businesses, local governments, and volunteers to protect and restore coastal Alabama's natural ecosystems. MBNEP should continue to create incentives and tools to help advance environmental management best practices, volunteer monitoring efforts, and to integrate environmental protection into community development and economic growth.

MBNEP should reevaluate and define its role in building capacity of water-dependent industries to improve sustainability of working waterfronts and preserve fishing communities (TAC-1). Considerations could include:

1. Reevaluate and refine MBNEPs role in its partnership with MASGC to provide technical assistance and build capacity for water-dependent industries to adopt best practices to protect and restore coastal Alabama's natural ecosystems. Define the roles of each organization in terms of sustaining and

promoting the economic, social, and cultural value of water-dependent industries while advancing environmental conservation, protection, and restoration through transformational awareness and adoption of best practices. Programs for role refinement include Safe Harbors, Green Marinas, fishing fleet modernizations, and the Coastal Alabama Fisheries fund.

2. Support reactivating the Working Waterfront Coalition.
3. Develop and implement environmental education and best practices objectives associated with the Coastal Alabama Fisheries Fund.
4. Consider building capacity of water-dependent industries to expand use of low impact development (green infrastructure) on working waterfront properties or other coastal developments.
5. Continue to develop and update planning tools to balance multiple uses of marine, estuarine, and freshwater resources.
6. Continue to partner with the Port of Mobile Alabama Port Authority and USACE to evaluate opportunities for beneficial use of dredged sediments to create wetlands and other natural habitats.
7. Continue to partner with ACCNR, MASGC, and others to develop and enhance planning and decision-support tools to inform management of environmental resources.

MBNEP should continue to help build the capacity of the business community to support ecosystem protection and restoration (TAC-2). Considerations could include:

8. When developing the next CCMP, consolidate education and outreach objectives and activities for businesses, elected officials, grassroots organizations, and the general public into one Action Plan.
9. Continue to engage the business community in support of CCMP implementation through:
    - **Education:** Consider working with businesses to codevelop educational materials that feature business voices, address business concerns, and feature business solutions. Consider joint-publishing environmental business related articles in *Alabama Current Connection* and area business magazines. Continue to feature businesses and their leaders that provide multiple benefits to the environment and economy. Develop social media, web content, videos, and newsletter articles.
    - **Collaborative planning:** Increase efforts to include business leaders during development and implementation of watershed management plans and the CCMP.
    - **Partnership opportunities:** Pursue private-sector and public-private sector partnerships to develop capacity of the private sector to develop initiatives or start businesses that provide multiple benefits to the environment and environmentally-friendly economic development.
    - **Business Resource Committee:** Continue to use the BRC to improve the business community's understanding of how coastal natural resources and estuaries contribute to economic, cultural, and community well-being. Utilize meetings to identify and define discrete problems. Engage the committee to develop potential solutions through private sector or public-private partnership initiatives.

MBNEP should continue to build the capacity of local governments to manage and enhance coastal environmental resources (TAC-3). Considerations could include:

10. Continue to encourage municipal and county governments to pass resolutions supporting completed watershed management plans.
11. Continue to build local government partnerships to prioritize and incorporate watershed management plan recommendations into their regulatory frameworks.
12. As an alternative to community-led watershed task forces, consider institutionalizing task force roles and responsibilities within local government.
13. Continue to regularly update the *South Alabama Stormwater Regulatory Review*. Identify opportunities to identify barriers and achieve progress in jurisdictions lagging behind their peers. Communicate trends identified in the Review to wider audiences, including elected officials.
14. Continue to improve understanding of the dredge management process and investigate ways to beneficially use dredge materials for restoration purposes, including developing upslope migratory pathways for coastal ecosystems vulnerable to sea level rise.
15. Continue to inform elected officials and government staff about changing climatic conditions, vulnerabilities, adaptation and mitigation measures, and cost-benefits of activities including costs of no action.
16. Encourage creation of dune overlay or other protections. Encourage protection of beach wrack as habitat and a source of food for coastal species.
17. Continue to advocate for and facilitate protocols and policies for state agencies to use volunteer monitoring data. Identify opportunities for volunteer monitors to provide value to state and local governments, including independently verifying results from existing monitoring efforts and alerting agencies to emerging problems in locations not covered by existing monitoring efforts.
18. Encourage developers and elected officials to increase the use of green infrastructure practices as part of community development. Develop case-study educational materials demonstrating multiple benefits for including LID in developments, including environmental, financial, and aesthetic.
19. In areas vulnerable to impacts from poor building practices, continue to inform local officials and contractors on the benefits of better building practices through outreach materials and workshops.
20. Continue to promote use of a Living Shorelines Manual as a key component of education and training for contractors to better understand the value of and best practices for installing living shorelines.
21. Continue to create and deploy education, outreach, and engagement tools targeting elected officials.
22. Consider consolidating education and outreach objectives and activities for elected officials and government staff, grassroots organizations, businesses, and the general public into one Action Plan during development of the next CCMP.
23. Continue to convene the Government Networks Committee (GNC) for local and state officials to learn about environmental issues and solutions and to collaborate on integrating environmental protection and restoration into community and economic development. Utilize GNC meetings to build and strengthen partnerships for grant-writing and initiatives.
24. Continue to increase the technical capacity of government personnel to understand and use decision-support tools developed in watershed management plans to inform management and policy.

MBNEP should continue to advocate for integration of environmental protection into community and economic development (TAC-4). Considerations could include:

25. Continue to encourage and facilitate more formal adoption of watershed management plan recommendations into local government regulatory frameworks.
26. Track the number of WMP recommendations incorporated into local policies, ordinances, and plans. Identify which recommendations are most commonly or easily incorporated by government partners and prioritize those recommendations for inclusion into frameworks for other governments.
27. Continue to promote improvements to water quality though use of green infrastructure for new and retrofit development. Develop targeted education and outreach to inform governments and developers about the multiple benefits of green infrastructure and best practices for installation. Explore creating incentives through local government partners. Explore creating demonstration green infrastructure projects with interpretive signage in high visibility locations on public lands.
28. Continue to promote protection and restoration of living shorelines, including education and training to contractors about the value and best practices for installation. Explore creating incentives through local government partners. Explore creating demonstration living shorelines with interpretive signage in high visibility locations on public lands.

MBNEP should continue to build capacity of grassroots groups and citizens to create more resilient and environmentally responsible communities (TAC-5). Considerations could include:

29. Continue to develop powerful education and outreach tools to empower and expand the capacity of grassroots organizations to actively participate in protection and restoration of Alabama's coastal ecosystems.
30. Continue to support and expand volunteer monitoring programs by providing education, training, equipment, and technical support. Continue to collaborate with and support Alabama Water Watch efforts. Continue to assess and address volunteer monitoring needs and identify monitoring opportunities and gaps. Continue to advocate for and facilitate protocols and policies for state agencies to use volunteer monitoring data. Identify opportunities for volunteer monitors to provide value to state and local governments, including independently verifying results from existing monitoring efforts and alerting agencies to emerging problems in locations not covered by existing monitoring efforts.
31. Consider consolidating education and outreach objectives and activities for grassroots organizations, elected officials, businesses, and the general public into one Action Plan for development of the next CCMP.

SECTION 5
Education and Public Involvement Action Plan

The Education and Public Involvement Action Plan (EPI) was developed to increase public and private sector understanding, support, engagement, and actions benefiting conservation and restoration initiatives. The Plan builds upon and reinforces the connection between healthy ecosystems and the things the public values most about living in coastal Alabama. The suite of tools maintained and developed for education, outreach, and engagement are used across EPI Goals. They are listed and described first below, followed by an implementation review for each EPI Goal.

Education, Outreach, and Engagement Tools

Comprehensive Toolkit Maintained and Developed 2019-2023

Over the past five years, MBNEP and partners have maintained and refined a suite of ongoing education, outreach, and engagement tools and developed important new ones to help accomplish the goals, objectives, and activities of the EPI Action Plan (Table 5-1).

Table 5-1. Education, Outreach, and Engagement Tools developed and deployed by MBNEP to help accomplish goals, objectives, and activities of the EPI Action Plan.

TABLE 5-1
TOOLS USED TO ACCOMPLISH EPI GOALS

Outreach Tool	EPI-1	EPI-2	EPI-3	EPI-4	EPI-5
Watershed Planning Community Engagement	✓	✓	✓		✓
Outreach and Education Campaigns	✓	✓	✓	✓	✓
Public Meetings and Presentations	✓	✓	✓		✓
Bays and Bayous Symposium	✓		✓		
Websites	✓	✓	✓	✓	✓
Social Media	✓	✓	✓	✓	✓
Alabama Current Connections Newsletter	✓		✓		
Signage	✓		✓		
Videos	✓		✓	✓	
Field Trips and Volunteer Opportunities	✓	✓	✓		✓
Management Conference Meetings and Communications	✓	✓	✓		✓

Watershed Planning Community Engagement

MBNEP follows a holistic watershed-based approach in conserving and restoring coastal Alabama. This approach has many benefits, including the ability to focus management actions exclusively within a drainage basin and to engage with local communities in meaningful and culturally responsive ways to identify priority issues and to collaboratively develop acceptable solutions.

Over the past five years, MBNEP has worked closely with coastal communities and watershed planning firms to develop a robust process to involve the public and private sector in watershed planning. The process not only provides opportunities for communities to learn about and provide input on watershed issues and proposed solutions, but also builds community trust in and ownership of plans, which is essential for their implementation. Community-based planning varies across watersheds based on the unique character of the communities living in them, but generally involves engaging a diverse group of stakeholders with local watershed knowledge and perspectives from across all sectors of the community. Stakeholder participation is facilitated through a variety of formats, including general and targeted meetings, educational workshops, cleanups, volunteer water quality monitoring, online surveys, and videos.

Over the past five years, public and private sector participation in watershed planning was solicited and facilitated during development of 11 MBNEP Watershed Management Plans:

- West Fowl River (published 2019)
- Wolf Bay Complex (2021)
- Gulf Frontal Complex (2022)
- D'Olive (Update 2022)
- Mobile Tensaw Delta Complex (2023)
- Western Shore (2023)
- Fly Creek (2023)
- Dauphin Island (2023)
- Western Perdido Bay (2023)
- Eastern Delta (expected 2024)
- Western Delta (expected 2024)

Outreach and Education Campaigns

MBNEP develops and implements popular education and outreach campaigns that are widely shared among collaborating and implementing partners.

Create a Clean Water Future. MBNEP developed the *Create a Clean Water Future* (CCWF) campaign to inform residents about sources of stormwater pollution and its impacts, build community support for improved stormwater management, and promote stewardship actions at the individual and community scales to reduce stormwater pollution and improve water quality. The CCWF is ongoing (see EPI-4).

Ditch the Disposables. Styrofoam and single-use plastic containers make up a significant proportion of water-borne litter in coastal Alabama. While efforts to remove these items from the environment are ongoing, reducing consumer demand for them is a more permanent solution for keeping them out of the environment. MBNEP developed the *Ditch the Disposables* campaign to reduce Styrofoam and single-use plastic pollution by teaming up with local restaurants to explore and adopt environmentally friendly alternatives. MBNEP partnered with four restaurants in Mobile County, including Big White Wings in Prichard, Miguel's Beach'n Baja on Dauphin Island, Mary's Southern Cooking in Mobile, and Bama Bob's BBQ in Mobile. The campaign supplied partner restaurants with plant-based biodegradable packaging to replace their Styrofoam and single-use plastic items. After their meal, restaurant customers were surveyed about their preferences and willingness to pay extra for the more environmentally friendly items. Of the 729 customers surveyed, 87% indicated that they were willing to pay more for their meals to help defray the costs of using biodegradable packaging.

Trash Blows, Stow It! MBNEP developed the *Trash Blows, Stow It!* campaign to raise awareness about litter blowing out of truck beds. The campaign provides detailed information about the environmental and economic impacts of truck bed trash blowing into Alabama's watersheds and waters and encourages businesses and truck owners to adopt best practices to reduce this type of litter. The campaign features a pledge for truck owners to be aware of trash in their truck bed, stow it in a receptacle before driving, pick up trash when they see it, and encourage others to do the same. Other actions include installing a trash receptacle in their vehicle, having trash receptacles available near parking areas, refusing Styrofoam and plastics from take-out restaurants, and participating in a "Green Team" of fellow business or community members to participate in litter cleanups. Key partners include Partners for Environmental Progress, Dog River Clearwater Revival, and the Town of Dauphin Island (see EPI-4.1).

Public Meetings, Presentations, Field Visits, and Tours

MBNEP hosts meetings and develops presentations for civic organizations, government agencies, counties and municipalities, business leaders, and local media outlets to share environmental status and trends, identify areas of concern, and introduce specific conservation and restoration priorities and projects. Over the past five years, MBNEP has made 37 presentations at conferences and meetings (see Appendix EPI Key CCMP Deliverables).

Between 2019–2023, MBNEP conducted 26 tours, including boat tours and walking tours of drainage areas and restoration projects for the business community, policymakers, and the general public (see Appendix EPI Key CCMP Deliverables). During tours, stakeholders were provided first-hand opportunities to learn about watershed planning, view problems, discuss potential solutions, and observe restoration projects underway and completed. These and other activities experientially connect the public and private sector to their watersheds, local waters, and the fish and wildlife they support. Curated experiences can build support for conservation and restoration management actions and can nurture a stewardship ethic that informs and internalizes behaviors beneficial to coastal Alabama's natural environment.

Bays and Bayous Symposium

Bays and Bayous is a regional environmental symposium organized by MBNEP and Mississippi Alabama Sea Grant Consortium. The symposium delivers information about the latest science, management, and education in the northern Gulf of Mexico through oral presentations, posters, and networking opportunities. Bays & Bayous is held every other year and rotates between host cities in Alabama and Mississippi.

2020 Bays & Bayous Symposium. The 2020 symposium's theme was Sound Science, Sound Policy: A 2020 Vision for the Future. The Symposium was organized around five research and coastal issues, including Disasters and Disruptions, Healthy Coastal Ecosystems, Living Marine Resources, Resilient Communities and Economies, and Water Quantity and Quality. Due to public safety concerns during the COVID-19 pandemic, the 2020 Bays and Bayous Symposium was hosted as a free online event. The 392 participants viewed 160 presentations from scientists, engineers, resource managers, local government leaders, NGOs, agency professionals, and students. The innovative online platform allowed attendees to create personalized schedules, chat live during presentations, and participate in a virtual social hour.

2023 Bays & Bayous Symposium. The 2023 symposium's theme was Finding Balance: Ecology, Economy, and Community. It was organized around five themes: Understanding Coastal Ecosystems, Improving Coastal Management, Strengthening Coastal Landscapes, Sharing Coastal Knowledge, and Emerging Coastal Issues. The Symposium engaged 465 attendees, including 118 students. The two-day event featured six concurrent sessions with 170 oral presentations and 65 posters. Keynotes Dr. Tyrone Hayes and Aimeé Christensen shared perspectives on environmental science and public policy.

Websites

MBNEP maintains and updates educational websites designed to inform the public and private sector about ecosystem status and trends, priority issues, conservation and restoration progress, watershed planning, opportunities for engagement, and actions individuals and communities can take to improve ecosystem health. Websites are a cost-effective tool for reaching large audiences across diverse segments of the community 24 hours a day, seven days a week. Websites are also ideal for hosting and distributing libraries of educational resources, including video and interactive content. Over the past five years, MBNEP has hosted, updated, and created content for the Create a Clean Water Future website (cleanwaterfuture.com), the Mobile Bay National Estuary Program website (mobilebaynep.com), and the Oysters Alabama website (oystersalabama.com). New and updated content includes watershed management plans, brochures, newsletters, guides, presentation slide decks, static and interactive maps, reports, videos, symposia proceedings, environmental calculators, and signage.

Social Media

MBNEP maintains an active Facebook page featuring informative posts about environmental issues, projects, volunteer opportunities, events, and MBNEP and partner news. In addition to posts, the page

includes reels, photos, and videos. As of September 2023, the MBNEP Facebook page has 13,715 Followers and has received 9,491 Likes.

Alabama Current Connections Newsletter

The *Alabama Current Connection* newsletter is co-produced by MBNEP and the ADCNR State Lands Division, Coastal Section. The popular newsletter highlights content related to current coastal issues, projects, and initiatives, MBNEP Management Conference and partner activities, coastal businesses and watershed leaders making a difference, volunteer and citizen science accomplishments and opportunities, and other issues of interest to coastal residents. MBNEP invests significant resources into translating technical language into communication that is meaningful, easy to understand, and actionable for all stakeholders. Over the past five years, MBNEP and ADCNR have published nine *Current Connections* newsletters (see Appendix EPI). Between 1,800–3,000 copies of each issue are printed and distributed.

Signage

Informational signage is a cost-effective, location-based communication tool passively reaching large numbers of people over time, especially in high-traffic areas. MBNEP and partners develop and install educational and interpretive signs in public places to convey information about watersheds and their issues, conservation and restoration activities and accomplishments, local fish and wildlife, and other topics. Over the past five years, MBNEP and partners have created and deployed 18 signs in coastal Alabama, including watershed awareness signs for Bayou La Batre, Magnolia River, West Fowl River, Fowl River, Wolf Bay, Bayou Sara, Bon Secour, D'Olive Creek, Oyster Bay, Three Mile Creek, Eight Mile Creek, Lower Chasaw, and Tiawasee Creek Watersheds (see Appendix EPI Accomplishments). MBNEP has also installed interpretive signs at Dog River Park, Helen Wood Park, Brooks Park, Steele Creek Lodge, and Prichard's Jackson Reading Park.

Videos

MBNEP has built a strong reputation for producing highly engaging and entertaining educational videos. Videos encourage the public to support management priorities and activities and to make choices and take actions to contribute to conservation and restoration. Over the past five years, MBNEP has produced 15 videos focusing on watershed awareness and education, environmental initiatives, behaviors that contribute to improved ecosystem health, stormwater management, dunes, best management practices for detention and retention basins, low-impact development, and litter prevention (see Appendix EPI Accomplishments—Videos). MBNEP also produces annual videos to share Program activities, challenges, and accomplishments. MBNEP hosts links to videos on its website and posts videos on YouTube. As of September 2023, MBNEP has 17 videos posted on YouTube. They have enjoyed 22,909 views since 2019. The top five videos in descending order are *A Virtual Tour of Mobile-Tensaw River Delta, The Dunes of Dauphin Island, Apple Snail Removal: Volunteer How To Guide, Unintended Consequences of Convenience - A Story About Coal Ash in Alabama,* and *Altering the Course.*

The Unintended Consequences of Convenience - A Story of Coal Ash in Alabama, which focuses on the story of coal ash in Alabama, is one of the most impactful videos MBNEP has produced in the last five years. The video, which benefited from significant research by MBNEP staff and two consulting firms, provided much needed information to the community and elected officials about the issue.

MBNEPs acclaimed film *Flight of the Frigate Bird* is hosted on PBS.

Volunteer Opportunities and Citizen Science

MBNEP supports volunteer water quality monitoring by providing education, training, and technical support by partnering with Alabama Water Watch and using their protocols and equipment (See TAC-5.2). MBNEP assesses and addresses volunteer monitoring needs, maintains a directory of current water quality monitors, and identifies monitoring opportunities and gaps. Volunteer water quality monitors learn to collect, analyze, and understand their data to become better informed about their local waterways and empowered to make positive impacts. Their raised awareness of water quality issues helps to instill and promote behaviors and personal choices that are beneficial to Alabama's natural environment. It also helps build support for implementation of local, priority management actions. Citizen scientists actively monitor 98 sites across coastal Alabama with efforts focused in Dog River, Fowl River, Wolf Bay, Weeks Bay, Gulf Frontal, and Western Perdido Bay watersheds.

Management Conference Meetings and Communications

MBNEP hosts quarterly meetings of Management Conference committees (see Introduction). Development and implementation of the EPI Action Plan is guided by BRC and CAC committees, with assistance from GNC for engaging local government in the *Create a Clean Water Future* campaign.

Business Resources Committee (BRC). The BRC convenes leaders from business, industry, and environmental services to identify pathways to balance business needs and environmental priorities. MBNEP staff and BRC members work to improve the business community's understanding of how coastal natural resources and estuaries contribute to economic, cultural, and community well-being (EPI-1). They also endeavor to increase the business community's involvement in and support for protecting the estuary and coast (EPI-2). MBNEP staff work with BRC, GNC, and CAC committees to help implement the Create a Clean Water Future campaign (EPI-4) as a framework to encourage actions by business, government, and the general public that improve water quality.

Community Action Committee (CAC). The CAC convenes leaders from grassroots organizations, volunteer associations, and place-based organizations to increase public awareness, understanding, and engagement on environmental issues and actions to advance conservation and restoration in coastal Alabama. MBNEP and the CAC work to improve community understanding of how estuaries and coasts support what people value about living in coastal Alabama (EPI-3). They also work together to use the Create a Clean Water Future campaign for encouraging actions to improve water quality (EPI-4) and to

increase community involvement in and support for stewardship, volunteer, and other engagement opportunities (EPI-5).

EPI-1: Improve The Business Community's Understanding Of How Coastal Natural Resources And Estuaries Contribute To Economic, Cultural, And Community Well-Being.

OBJECTIVES

EPI-1.1: Conduct 15 tours to introduce the private sector to watersheds.

EPI-1.2: Develop outreach to improve business community understanding of opportunities for environmental protection.

EPI-1.1: Conduct 15 tours to introduce the private sector to watersheds.

Accomplishments

Between 2019–2023, MBNEP conducted 26 tours. Common repeating tours include the D'Olive Watershed Tour, Three Mile Creek Tour, and Oyster Aquaculture Tour.

EPI-1.2: Develop outreach to improve business community understanding of opportunities for environmental protection.

Accomplishments

Over the past five years, MBNEP and partners have developed and implemented outreach to the business community through involvement in watershed planning, public meetings, the MBNEP website, Create a Clean Water Future campaign and its website, social media, Alabama Current Connections newsletter, signage, videos, field trips, volunteer opportunities, and BRC meetings. MBNEP conducted 12 presentations and tours to businesses and government.

EPI-2: Increase the business community's involvement in and support for protecting the estuary and coast.

OBJECTIVES

EPI-2.1: Create a minimum of five service opportunities to engage business "teams" in participating in restoration or cleanup efforts.
EPI-2.2: Identify and connect business partners to a minimum of three existing projects celebrating the cultural heritage of Alabama's estuaries and coast.

EPI-2.1: Create a minimum of five service opportunities to engage business "teams" in participating in restoration or cleanup efforts.

MBNEP and partners create a variety of opportunities for businesspeople to participate in conservation and restoration activities.

Accomplishments

Alabama Power and Greif-Soterra Toulmins Spring Rain Barrel Partnership

MBNEP helps coordinate a private-sector partnership between Alabama Power and local land management company Greif-Soterra to provide rainwater harvest systems to minority, low-to-moderate income residents living in the flood-prone Toulmins Spring Branch Sub-watershed of the Three Mile Creek Watershed. The 55-gallon rain barrel systems are a low-impact development tool to capture rainwater and reduce the volume and velocity of area stormwater. Rain barrels can reduce neighborhood flooding, improve water quality in receiving waters, and save residents money by providing a free source of non-potable water. Grief-Soterra has donated 398 barrels and Alabama Power has funded supplies and equipment. Volunteer members of Alabama Power's Plant Barry Environmental Stewardship Team and members of Greif Soterra install the systems with other partners at targeted residences in the watershed. The project, originally initiated by Coastal Alabama Conservation Corps, has installed 119 systems as of 2023.

Ditch the Disposables Partnership

MBNEP has partnered with local restaurants to replace Styrofoam and single-use plastics with environmentally friendly alternatives (see Education, Outreach, and Engagement Tools—Outreach and Education Campaigns). Restaurant partners in the project include Big White Wings in Prichard, Miguel's Beach'n Baja on Dauphin Island, Mary's Southern Cooking in Mobile, and Bama Bob's BBQ in Mobile.

Alabama Oyster Shell Recycling Program

MBNEP helps promote the Alabama Oyster Shell Recycling Program through its newsletter and website. The program, created by the Alabama Coastal Foundation (ACF), charges area seafood restaurants to recycle their shells. Restaurants save money from reduced waste management and contribute to oyster restoration projects. Participants learn about the value of oysters in improving water quality, providing habitat, and limiting erosion.

EPI-2.2: Identify and connect business partners to a minimum of three existing projects celebrating the cultural heritage of Alabama's estuaries and coast.

Accomplishments

MBNEP connects business partners to the cultural heritage of Alabama's estuaries and coast through projects, the Current Connections newsletter, and videos. Over the past five years, projects occurred in the City of Prichard and D'Olive and Three Mile Creek watersheds.

EPI-3: Improve community understanding of how estuaries and coasts support what people value about living in coastal Alabama.

OBJECTIVES

EPI-3.1: Create and support recreational and educational programs and events that connect more people to local waterways, fish, and wildlife.
EPI-3.2: Educate youth about watersheds, water quality, and environmental issues relevant to the CCMP's six values.

EPI-3.1: Create and support recreational and educational programs and events that connect more people to local waterways, fish, and wildlife.

Accomplishments

Over the past five years, MBNEP and partners have developed and implemented programs to improve community understanding about how healthy estuaries and coasts support what they value most about living in coastal Alabama. Primary tools used to accomplish this goal include a public process during watershed planning, public meetings, MBNEP's website and the Create A Clean Water Future website, social media, Alabama Current Connections newsletter, signage, videos, field trips, volunteer opportunities, and CAC meetings.

MBNEP participated in a variety of events over the past five years, including Alabama Rivers Alliance Water Rally, Bayside Great Day of Service, Discovery Day, Alabama Deep Sea Fishing Rodeo, Creekfest, and Boo at Bellingrath.

EPI-3.2: Educate youth about watersheds, water quality, and environmental issues relevant to the CCMP's six values.

Accomplishments

MBNEP develops and offers opportunities for Alabama's youth to learn about how healthy ecosystems support the things they and their families value most about living in coastal Alabama. Over the past five years, youth were engaged by MBNEP and partners using a variety of tools, including outreach and education campaigns, field trips, lectures, videos, and educational resources.

MBNEP maintains and updates the Create a Clean Water Future campaign website, which provides educational resources about the causes of stormwater pollution and curates a suite of recommended actions that can be adopted by individuals and organizations to reduce or eliminate sources of pollutants (See EPI-4). The website has a dropdown menu that specifically curates activities accessible to children and young adults.

MBNEP hosts educational resources on the MBNEP website for use inside and outside of the classroom, including *A Redfish Tale* and *A Redfish Tale 2*, with supplementary materials including lesson plans, tests, and classroom activities.

MBNEP promotes an entertaining anti-litter campaign created by the Coastal Conservation Corps called the "Trash Mob". The campaign adapts the pop-culture phenomenon of a "flash mob" to raise awareness and encourage behavior change to reduce littering. Trash Mob participants meet in crowded spaces and perform a dance routine to a catchy song "Pick Up the Trash" with an anti-littering message.

EPI-4: Use the Create a Clean Water Future campaign as a framework for encouraging actions to improve water quality.

Improved understanding and increased awareness of stormwater issues is fundamental to building support for management investments and encouraging personal behaviors favorable to cleaner water. MBNEP launched and maintains the *Create a Clean Water Future* (CCWF) campaign to improve public understanding of stormwater pollution and its impacts, build support for improved water quality through enhanced stormwater management, and to promote stewardship actions at an individual and community scale to reduce stormwater pollution. Campaign partners produce and distribute educational materials on the CCWF website (cleanwaterfuture.com), meetings, and events. their easy adoption.

OBJECTIVES

EPI-4.1: Support Partners for Environmental Progress in launching the CCWF campaign through its business members.
EPI-4.2: Engage local government in adopting the CCWF campaign to promote improved stormwater management and quality of water flowing throughout the Mobile Bay Watershed and into coastal waters.
EPI-4.3: Create a strategy for implementing the CCWF campaign at the community level.

EPI-4.1: Support Partners for Environmental Progress in launching the CCWF campaign through its business members.

MBNEP and Partners for Environmental Progress (PEP) share a vision for a local business community that prioritizes environmentally sustainable practices that foster economic growth and healthy natural ecosystems. PEP is a CCWF partner that participates in the development and implementation of the campaign. Through CCWF, PEP equips local businesses with the knowledge and resources to adopt or improve workplace best practices to be more protective of water quality.

Accomplishments

Seventeen businesses have signed up as CCWF partners.

PEP partners with MBNEP's *Trash Blows! Stow It!* campaign to reduce litter that blows out of the beds of trucks (see Tools: Outreach and Education Campaigns). As part of the *Trash Blows! Stow It!* campaign, MBNEP partnered with Dog River Clearwater Revival and PEP to launch a Truck Bed Trash Can Competition, which challenged individuals to design a prototype trash receptacle for truck beds in 2020. In association with local television station WKRG, MBNEP produced and televised a 30-minute segment about the competition to raise awareness of truck bed litter. The competition was publicized and shared on MBNEP social media platforms and is available for streaming on WKRG's website https://www.wkrg.com/truck-bed-trash-can-design-competition. Total reach for the contest included six truck dealerships, four college classes, 500,000 individuals on media platforms, and 11,000 live stream views.

EPI-4.2: Engage local government in adopting the CCWF campaign to promote improved stormwater management and quality of water flowing throughout the Mobile Bay Watershed and into coastal waters.

Accomplishments

MBNEP and CCWF Partners engage with ten local government partners to adopt and implement the CCWF campaign, including Daphne, City of Foley, Mobile, City of Fairhope, City of Gadsden, Madison, Jacksonville, City of Oxford, Calhoun County, and Mobile County.

EPI-4.3: Create a strategy for implementing the CCWF campaign at the community level.

Accomplishments

Thirteen nonprofits help implement the CCWF campaign at the community level, including MBNEP, PEP, Mississippi-Alabama Sea Grant, Keep Mobile Beautiful, Alabama Coastal Foundation, Alabama State Lands Division, Mobile Baykeeper, Pelican Coast Conservancy, South Alabama Land Trust, Weeks Bay National Estuarine Research Reserve, Mobile United, The Peninsula, and Wolf Bay Watershed Watch.

EPI-5: Increase community involvement in and support for stewardship, volunteer, and educational opportunities.

OBJECTIVE

EPI-5.1: Promote environmentally friendly public events (e.g., parades, sporting events, fishing tournaments, etc.).

MBNEP has a long-term commitment to increasing community involvement and support for conservation and restoration actions by promoting and supporting volunteer, stewardship, and other experiential engagement opportunities. Tools used to promote and support public involvement include watershed planning, outreach and education campaigns, public meetings and presentations, social media, Alabama Current Connections newsletter, MBNEP's website and the Create a Clean Water Future website, videos, field trips, volunteer opportunities, and CAC meetings. Through these tools, MBNEP empowers coastal residents to learn about and participate in actions to improve ecosystem health.

MBNEP promotes and partners with other leading environmental organizations on volunteer water quality monitoring (see TAC-5 water quality monitoring), community litter cleanups, and environmentally friendly public events.

EPI-5.1: Promote environmentally friendly public events (e.g., parades, sporting events, fishing tournaments, etc.).

MBNEP promotes and supports environmentally friendly events as an opportunity to inform and engage the public about priority environmental issues, build public support for management priorities and actions, and to encourage and facilitate individual and community choices and actions that contribute to environmental improvement. Tools used to promote and support events include the MBNEP and *Create a Clean Water Future* websites, social media, CAC meetings, and the *Alabama Current Connections* newsletter.

Accomplishments

Community Clean Ups

MBNEP encourages participation in coastal cleanups using its website, *Create a Clean Water Future* website, social media, and *Current Connections* newsletter. Raising public awareness of the extent of litter in their communities can be an effective motivator for residents to adopt behaviors that prevent litter from escaping into the environment, including choosing more environmentally friendly alternatives. Alabama's largest annual volunteer event is the *Alabama Coastal Cleanup* where volunteers clean up neighborhoods, parks, streets, and storm drains. Since 1987, over 108,000 volunteers have participated. The 2023 event is being coordinated by Alabama People Against a Littered State (PALS) and ADCNR.

Event Support

Over the past five years, MBNEP has directly supported a diversity of environmentally-related events, including:

- Soil & Water Conservation Annual Meeting
- Green Coast Council Sustainability Summit
- Alabama Coastal Cleanup
- Bays & Bayous Symposiums
- CreekFest
- DISL Graduate Student Symposium
- Forks & Corks
- Mike DeGruy Movie
- Cocktails with Critters Silent Auction
- Dauphin Island Native American Festival
- MLK Day of Service
- Mobile Chamber Business Expo
- Gulf Coast Land Conservation Conference
- Coastal Kids Quiz

- JAGServes! Career Fair
- Alabama Coastal Birdwatch
- Stan Mahoney Fishing Tourney
- Auburn University Plant Identification Course

EPI Recommendations

MBNEP should continue to work toward achieving the vision of an informed, engaged public that supports management priorities and activities and makes choices and takes actions that contribute to increased conservation and restoration. Fundamental to accomplishing this vision should be goals and objectives that continue to build upon and reinforce the connection between healthy ecosystems and the things the public values most about living in coastal Alabama.

MBNEP should continue to develop and provide outreach, education, and engagement tools and support community-based efforts to promote the wise stewardship of the water quality and living resources of Alabama's estuarine waters. MBNEP should continue to provide outreach, education, and engagement for the general public, business community, and elected officials. Considerations include:

1. Involve the community and private sector in watershed planning
2. Develop and implement outreach and education campaigns
3. Host and facilitate public meetings
4. Host the Bays and Bayous Symposium
5. Develop content for and maintain the MBNEP and *Create a Clean Water Future* websites
6. Develop content for and engage the public through social media.
7. Produce the *Alabama Current Connections* newsletter
8. Create and install signage
9. Produce and share videos
10. Support field trips and volunteer opportunities
11. Engage the community through CAC and BRC committees.
12. Develop content and engagement opportunities for *Create a Clean Water Future* and build partnerships for implementation

SECTION 7
Moving Towards a New CCMP

Detailed recommendations for consideration during development of MBNEPs new CCMP are articulated at the end of each Action Plan section in preceding sections of this *2019–2023 CCMP Implementation Review*. High-level, more overarching considerations are detailed in this final component of the Review.

Guiding Tenants, Principles, and Values

MBNEP has built a strong reputation for its leadership in developing effective science-based, consensus driven Comprehensive Conservation and Management Plans to protect and restore healthy coastal ecosystems in Alabama. Over its history of creating these community-based plans, MBNEP has developed a powerful set of tenants, principles, and values to ensure its CCMP is effective in protecting and restoring Alabama's coastal ecosystems for nature and people. MBNEP should continue to utilize and build upon these successful tools during development of its new CCMP.

Tenants

MBNEP should continue to be guided by the following tenants during development of its new CCMP (MBNEP 2018):

- **Vision:** Alabama's estuaries are healthy and support ecological function and human use.
- **Purpose:** MBNEP brings together an engaged and diverse community committed to integrating environmental health with community and economy to develop consensus on what our ecosystem priorities are, how to achieve them, and how to facilitate or promote their implementation.
- **Mission:** MBNEP provides the tools to promote the wise stewardship of water quality and living resources of the Mobile Bay Estuary and the Mobile-Tensaw Delta.
- **Goals:**
    - Water meets or exceeds its state's designated uses, including fishable, swimmable, and drinkable.
    - Conservation, restoration, and protection of critical habitats.
    - Community who understands and supports the value of our coastal resources.
    - Integration of environmental health with a balanced economy.
    - Effective integration and leveraging of participating stakeholders' capacities.

Principles

MBNEP should continue to work within its set of principles (MBNEP 2018) during development of the new CCMP:

- **Those who live it know it:** Stakeholder input is vital to developing long-term solutions to local challenges.
- **Economic opportunities must be available:** Many jobs depend on coastal water quality, healthy populations of fish and wildlife, and a mosaic of habitats that provide essential ecosystem services.
- **Environmental stewardship is interconnected:** Coalitions that bring together diverse stakeholder interests are critical to comprehensively addressing the challenges of balancing economic development with environmental protection.
- **It happens in the river, in the sea, and on the street:** Citizens must be actively engaged in balancing the many uses of our natural resources so we can preserve our unique coastal ecosystems and the services they provide.

Values

MBNEP should link the priority management actions in the new CCMP to the things people value most about living in coastal Alabama (MBNEP 2013), including:

- **Access:** to the water and open spaces for recreation and vistas
- **Beaches and Shorelines:** Protection, economy, beauty
- **Fish and Wildlife:** Habitats, abundance, livelihoods
- **Heritage and Culture**: Promoting our area's historic identity and protecting this legacy for future generations
- **Resilience:** Protecting the capacity of human and natural systems to rebound from unforeseen events
- **Water Quality:** Whether drinkable, fishable, or swimmable, the public places high value on quality rivers, creeks, and bays

Watershed Planning Approach

MBNEP should continue its leadership role in watershed planning in coastal Alabama. It should integrate considerations of the common issues and recommendations found across watershed management plans into its new CCMP (MBNEP 2023). Though they may change in priority, leading issues include:

- Sedimentation
- Litter

- Pathogens
- Nutrients
- Stream degradation
- Habitat conversion and loss
- Shoreline erosion
- Invasive species

The Next Ten Years

This *Implementation Review* carefully tracked progress and accomplishments of the 2019–2023 CCMPs 18 goals, 39 objectives, 55 performance measures, and 158 suggested activities. From a technical perspective, MBNEP should consider a simplified approach to progress tracking that relies on fewer, more carefully formulated performance measures where the means and method of measurement are routine for the responsible party. Ideally, MBNEP should consider posting the most enlightening metrics as a live dashboard on its website so that the community and partners can understand and track progress and accomplishments.

Over the past five years, MBNEP has made extraordinary progress in implementing its plan. As the Management Conference looks ahead to the next ten years, ongoing and new impacts from population growth, development, and climate stressors will likely reaffirm the priority of many existing goals and objectives. New issues and opportunities may change the relative importance of others.

Developing a new CCMP provides opportunities for MBNEP to reevaluate the scope of its activities to determine where and how to focus effort on what is achievable. The Management Conference can consider whether MBNEP should focus the next ten years of collaborative efforts on a few critical and achievable goals targeting a few key stakeholders groups, or whether to take a more comprehensive overarching collective approach to the myriad goals and objectives that serve the diverse interests and needs of the community and partners. Developing a new CCMP also provides opportunities for MBNEP and partners to reevaluate and refine their leadership roles within the Management Conference.

Developing a new CCMP is an exciting opportunity for the MBNEP Management Conference, elected officials, and the general public to incorporate new understandings, priorities, and strategies and to reaffirm their collective commitment to protecting and restoring Alabama’s coastal ecosystems.

SECTION 8
Appendices

Appendix 1:
Key EST Deliverables

EST-1

2022 Pre-Restoration Analysis of Groundwater/Surface-Water Interaction, Water Quality, and Land-Use Impacts in the Little Lagoon Watershed, Baldwin County, Alabama

2022 Mon Louis Island Post Construction Monitoring Report

2022 Technical Report: Little Lagoon Watershed Nutrient Assessment and Source Tracking

2021 Post-Construction Bathymetry, Shoreline, and Structural Monitoring Mon Louis Island Restoration Project

2021 Mon Louis Island Marsh Success Report

2021 Multiple Indicators of Wastewater Contamination to Shellfish Farms Near a Tidal River

2021 Pre-Restoration Analysis of Discharge, Sediment Transport Rates, Water Quality, and Land-Use Impacts in Watersheds Along the Eastern Shore of Mobile Bay, Baldwin County, Alabama

2020 Bayou La Batre Watershed Study and Hydrologic Model

2020 Bon Secour River Watershed Study and Hydrologic Model

2020 Dog River Watershed Study and Hydrologic Model

2020 Fowl River Marsh Study

2020 Pre-Restoration Analysis of Discharge, Sediment Transport Rates, and Water Quality in the Deer River Watershed, Mobile County, Alabama

2020 Habitat Assessment Trend Analysis Final Report

2020 ADEM Final Delisting Decision for Joes Branch Siltation

2020 Lake Forest Sediment Trapping Efficiency and Capacity

2020 Mobile Tensaw Delta Watershed Sedimentation and Water Quality Assessment

2020 Mon Louis Island Marsh Success Report

2020 Mon Louis Island Shoreline Monitoring Report

2020 Mon Louis Island USACE Faunal Monitoring Response Letter

2020 Tensaw East Watersheds Study and Hydrologic Model

2020 Tensaw West Watersheds Study and Hydrologic Model

2020 Twelve Mile Creek Hydrologic Study

2020 West Fowl River Watershed Study and Hydrologic Model

2020 Wolf Bay Watershed Hydrologic Modeling

2019 Bank Assessment for Non-point Source Consequences of Sediment Report for 12 Mile Creek

2019 D'Olive Bay Long Term Monitoring Final Report

2019 Analysis of Discharge, Sediment Transport Rates, Water Quality, and Land-Use Impacts in Tributaries of the Mobile-Tensaw-Apalachee Delta Watershed, Baldwin and Mobile Counties, Alabama

2019 Mon Louis Island Construction Annual Monitoring Report

2019 Mon Louis Island Marsh Success Report

2019 Twelve Mile Creek Hydrologic Analysis Report

2019 West Fowl River/Portersville Bay Pathogen Study

EST-2

2020 D'Olive Watershed Condition Framework

EST-3

2023 Alabama Coastal Comprehensive Plan

Appendix 2:
Key ERP Deliverables

ERP-1

Dauphin Island Watershed Plan (2023)

Eastern Shore Watershed Management Plan (2023)

Mobile Tensaw Apalachee Watershed Management Plan (2023)

D'Olive Watershed Management Plan Update (2022)

Gulf Frontal Complex Watershed Management Plan (2022)

Western Shore Watershed Management Plan (2021)

Wolf Bay Watershed Management Plan (2020)

West Fowl River Watershed Management Plan (2019)

Delta Watershed Plan Story Map/Community Engagement

Dauphin Island Fiscal Analysis

ERP-2

Toulmins Spring Rain Barrel Program Outreach Final Report

Three Mile Creek Partnership Website (no longer available)

Three Mile Creek Brochure

Comprehensive Litter Abatement Plan for the Dog River Watershed

Three Mile Creek Litter Gitters Final Report- Osprey Initiative

12 Mile Creek 100% Engineering & Design Plan

ERP-3

Fowl River Spits Marsh and Shoreline Restoration Phase I - Design Alternatives

Fowl River Spits Engineering & Design 60%

Dauphin Island Causeway Design Alternatives Report

Deer River Engineering & Design 30%

ERP-4

2021 Apple Snail Control Report

Three Mile Creek Invasive Species Control Plan

Appendix 3:
Key TAC Deliverables

TAC-1

Shellfish Aquaculture Siting Tool

Alabama Coastal Marine Planning Tool/Public Viewer

Oysters Alabama Marketing Website

Oyster Industry Meeting Newsletter

TAC-3

Clean Water Futures Videos

South Alabama Stormwater Regulatory Review (2018)

South Alabama Stormwater Regulatory Review Update (2021)

D'Olive River WMP Resolution of Support

Three Mile Creek WMP Resolution of Support

Dog River WMP Resolution of Support

Weeks Bay WMP Resolution of Support

Bon Secour WMP Resolution of Support

Appendix 4:
Key EPI Deliverables

Signage

2021 Bayou La Batre Road Signage

2021 Magnolia River Watershed Road Signage

2021 Municipal Langan Park Lake Apple Snails

2021 West Fowl River Watershed Road Signage

2021 Wolf Bay Watershed Road Signage

2019 Bayou Sara Watershed Steele Creek Lodge

2019 Bon Secour Watershed Road Signage

2019 D'Olive Creek Partnership

2019 D'Olive Creek Watershed Road Signage

2019 Daphne Alligator Alley

2019 Eight Mile Creek Jackson Reading Park

2019 Eight Mile Creek Watershed Road Signage

2019 Fowl River Watershed Road Signage

2019 Lower Chasaw Watershed William Brooks Park

2019 Oyster Bay Watershed Road Signage

2019 Three Mile Creek Watershed Road Signage

2019 Tiawasee Creek Watershed Awareness Signage

2019 Tiawasee Creek – Slowing the Flow of Stormwater

Newsletters

2022 Fall Alabama Current Connection: Artists and the Environment

2022 Spring Alabama Current Connection: Interview with Chris Blankenship

2021 Spring Alabama Current Connection: The Lodge at Gulf State Park: Raising the Bar for Resilient Coastal Design

2020 Spring Alabama Current Connection: The Oyster: An Icon of Life on the Alabama Gulf Coast

2020 Summer Alabama Current Connection: We Need You to Help Stem the Tide of Debris

2019 Spr/Sum Alabama Current Connection: Stepping Up! Coastal Alabama Cities Demonstrate Stewardship

Videos

2019 The Absence of Doubt, 2018 Year End Video

2019 The Dunes of Dauphin Island

2019 Three Mile Creek, Mobile's Destination Waterway

2019 Why Is There A Pond in My Backyard, Maintenance Requirements for Detention & Retention Basins

2019 Litter, An Increasing Problem

2019 Preserving the Mobile Bay Estuary Through Headwater Protection

2020 A Virtual Tour of the Mobile-Tensaw River Delta

2021 Protecting Alabama's Waters, Communities Partnering with the US EPA's Nonpoint Source Management Plan

2021 The Unintended Consequences of Convenience, The Story of Coal Ash in Alabama

2021 Alabama's Coast: A Treasure Worth Preserving

2021 There is a Place The Mobile Tensaw Delta

2021 Eastern Shore Watershed Planning

2021 Securing A Clean Water Future for the Perdido Basin

2022 True Grit

2022 Altering the Course: A Journey Toward Trash Free Waters Along the Alabama Coast

Bays and Bayous Symposium

2020 Bays & Bayous Program

2023 Bays & Bayous Book of Abstracts, Finding Balance: Ecology, Economy, and Community

2023 Bays & Bayous Symposium Proceedings

2023 Bays & Bayous Symposium Program

Events

2019 Alabama Rivers Alliance Water Rally

2019 Bayside Great Day of Service

2019 Discovery Day

2019 Alabama Deep Sea Fishing Rodeo

2021 Creekfest

2021 Boo at Bellingrath

Meeting and Conference Presentations

2019 Alabama Water Resources Conference

2019 AWRC LitterGitters

2019 Alabama Water Resources Conference

2019 Eastern Shore Chamber Board of Directors

2019 Daphne Environmental Advisory Committee

2019 Coastal Alabama Chamber - Natural Resources Committee

2019 American Association of Port Authorities' Environmental Committee

2019 AWW Annual Meeting

2019 AWW City of Fairhope

2019 USA Hydrology Class

2019 Wolf Bay Watershed Watch Annual Meeting

2019 Lake Forest Property Owner's Association

2019 Florida Forests & Drinking Water Workshop

2019 Fairhope Environmental Advisory Board

2019 Prichard Housing Authority Leeds St Community Meeting

2019 Fowl River WMP Implementation

2019 Prichard Area Chamber of Commerce

2020 Western Shore WP Pelican Reef

2020 Bays & Bayous

2020 Conservation Biology Class

2020 ACES Invasive Species Control Plan

2021 DISL Foundation Board Retreat

2021 Gulf Coast Creation Care

2021 AL Water Resource Conference

2021 Baldwin County Commission Work Session

2021 Baldwin County Commission Meeting

2022 Restore America's Estuaries

2022 PCI

2022 GomCon 2022

2022 Clear Water Alabama

2022 BASIS/ANEP

2022 Creating a Clean Water Future (PEP)

2022 AL Association of Floodplain Managers

2022 3MC Partnership Strategic Retreat

2022 Dog River Watershed Trash Abatement Program

2022 D'Olive Watershed Management Plan

2023 Alabama Water Resources Conference (three presentations)

2023 Baldwin County Commission

2023 Mobile County Municipal Association

Tours

2019 Three Mile Creek with David Rainer, Outdoor Alabama Writer

2019 D'Olive Watershed with elected officials

2019 Litter Gitter Project with EPA Trash Free Water group

2019 D'Olive Watershed with professional group

2019 D'Olive Watershed with professional group

2019 D'Olive Watershed with Fairhope officials and stakeholders

2019 Mobile Tensaw Delta with Delta stakeholders

2021 Grand Bay Oyster Park with various groups

2021 D'Olive Watershed Tour with New City of Daphne environmental staff

2021 D'Olive Watershed Tour with Baldwin County staff and officials

2021 D'Olive Watershed Tour with city and county Staff

2021 Twelve Mile Creek with engineers

2021 South Mobile County Shoreline with PIC members

2021 Three Mile Creek with various groups

2021 Three Mile Creek with 3MC kayak trip participants

2021 Three Mile Creek with 3MC kayak trip participants

2022 Three Mile Creek with DISL Discovery Hall

2022 South Mobile County Shoreline Restorations with engineers

2022 Three Mile Creek with DISL Discovery Hall

2022 Three Mile Creek with MBNEP

2022 Three Mile Creek with Downtown Mobile Alliance

2022 Three Mile Creek with Mobile Area Chamber of Commerce

2023 D'Olive Watershed with Baldwin County staff

2023 D'Olive Watershed with University of South Alabama

2023 D'Olive Watershed with ADCNR

2023 D'Olive Watershed with Poarch Band of Creek Indians

Appendix 5:
Progress and Accomplishments Matrix

[add hyperlink to Excel Workbook stored on MBNEP server/cloud or website URL]

SECTION 9
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