

Comprehensive Conservation & Management Plan  
for Alabama's Estuaries & Coast

2013-2018



In 1972, the Clean Water Act was created to restore and maintain the chemical and biological integrity of the nation's waters so that they can support the protection and propagation of fish, shellfish, wildlife, and recreation in and on the water. In 1987, the National Estuary Program (NEP) was created by the U.S. Congress via amendments to this act to identify, restore, and protect nationally significant estuaries. Authorized under Title 3, Section 320, Public Law 94-117, 33 U.S.C 466, the goal of this program is to protect and restore the water quality and resources of estuaries, designated by the EPA Administrator as "Estuaries of National Significance," and associated watersheds.



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# Acronyms

**ACAMP**

Alabama Coastal Area Management Program

**ACBT**

Alabama Coastal Birding Trail

**ACES**

Alabama Cooperative Extension System

**ACF**

Alabama Coastal Foundation

**ADCNR**

Alabama Department of Conservation and Natural Resources

**ADECA**

Alabama Department of Economic and Community Affairs

**ADEM**

Alabama Department of Environmental Management

**ADPH**

Alabama Department of Public Health

**AFC**

Alabama Forestry Commission

**AFS**

American Fisheries Society

**ALDOT**

Alabama Department of Transportation

**AMSA**

Association of Metropolitan Sewer Agencies

**ANS**

Aquatic Nuisance Species

**AOS**

Alabama Ornithological Society

**APHIS**

Animal and Plant Health Inspection

**As** Arsenic

**AUMERC**

Auburn University Marine Extension Research Center

**AWW**

Alabama Water Watch

**BMPs**

Best Management Practices

**BRC**

Business Resources Committee

**CAC**

Community Action Committee

**CACWP**

Coastal Alabama Clean Water Partnership

**CAFO**

Concentrated Animal Feeding Operation

**CBCP**

Coastal Bird Conservation Program

**CCA**

Coastal Conservation Association

**CCL**

Construction Control Line

**CCMP**

Comprehensive Conservation and Management Plan

**CHCT**

Coastal Habitats Coordinating Team

**CMP**

Corridor Management Plan

**CRI**

Community Resilience Index

**CSO**

Combined Sewer Overflows

**CWA**

Clean Water Act

**DIN**

Dissolved Inorganic Nitrogen

**DIP**

Dissolved Inorganic Phosphorous

**DISL**

Dauphin Island Sea Lab

**DO**

Dissolved Oxygen

**DRCR**

Dog River Clearwater Revival

**EFH**

Essential Fish Habitat

**EPA**

Environmental Protection Agency

**EPCRA**

Emergency Planning and Community Right to Know Act

**FAMP**

Fisheries Assessment and Monitoring Program

**FERC**

Federal Energy Regulatory Commission

**GMP**

Gulf of Mexico Program

**GNC**

Government Networks Committee

**GOMA**

Gulf of Mexico Alliance

**GSA**

Geological Society of America

**GSA**

Geological Survey of Alabama

**GSMFC**

Gulf States Marine Fisheries Commission

**HABs**

Harmful Algal Blooms

**Hg** Mercury

**LID**

Low Impact Development

**LLPS**

Little Lagoon Preservation Society

**MASGC**

Mississippi Alabama Sea Grant Consortium

**MAWSS**

Mobile Area Water and Sewer System

**MBAS**

Mobile Bay Audubon Society

**MBK**

Mobile Baykeeper

**MBNEP**

Mobile Bay National Estuary Program



<b>MC</b> Management Committee	<b>NAS</b> Non-indigenous Aquatic Species	<b>NRCS</b> Natural Resource Conservation Service	<b>SARPC</b> South Alabama Regional Planning Commission	<b>USACE</b> United States Army Corps of Engineers
<b>MCHD</b> Mobile County Health Department	<b>NAWQA</b> National Water-Quality Assessment	<b>NRDA</b> Natural Resource Damage Assessment	<b>SAV</b> Submerged Aquatic Vegetation	<b>WES</b> Waterways Experiment Station Service
<b>MCWCA</b> Mobile County Wildlife and Conservation Association	<b>NCCA</b> National Coastal Condition Assessment	<b>NRHP</b> National Register of Historic Places	<b>SEAMAP</b> Southeast Area Monitoring and Assessment Program	<b>USCG</b> U.S. Coast Guard
<b>MDN</b> Mercury Deposition Network	<b>NEMO</b> Non Point Education for Municipal and Elected Officials	<b>NTN</b> National Trends Network monitoring site	<b>SEPMN</b> Southeastern Plankton Monitoring Network	<b>USDA</b> United States Department of Agriculture
<b>MHW</b> Mean High Water	<b>NERR</b> National Estuarine Research Reserve	<b>NWR</b> National Wildlife Refuge	<b>SLD</b> State Lands Division	<b>USFWS</b> U.S. Fish and Wildlife Service
<b>MRD</b> Marine Resources Division	<b>NISA</b> National Invasive Species Act	<b>OAR</b> Office of Archaeological Research	<b>SSO</b> Sanitary Sewer Overflow	<b>USGS</b> U.S. Geological Survey
<b>MWW</b> Muddy Water Watch	<b>NMFS</b> National Marine Fisheries Service	<b>OAW</b> Outstanding Alabama Waterway	<b>SWCD</b> Soil and Water Conservation District	<b>VOCs</b> Volatile Organic Compounds
<b>NADP</b> National Atmospheric Deposition Program	<b>NOAA</b> National Oceanic and Atmospheric Administration	<b>OSAA</b> Organized Seafood Association of Alabama	<b>TMDL</b> Total Maximum Daily Load	<b>WBNERR</b> Weeks Bay National Estuarine Research Reserve
<b>NAFSMA</b> National Association of Flood and Storm Water Management Agencies	<b>NPDES</b> National Pollutant Discharge Elimination System	<b>PIC</b> Project Implementation Committee	<b>TNC</b> The Nature Conservancy	<b>WBWW</b> Wolf Bay Watershed Watch
<b>NARS</b> National Aquatic Resources Surveys	<b>NPS</b> Non Point Source (Pollution)	<b>SABA</b> South Alabama Birding Association	<b>TRI</b> Toxic Release Inventory	<b>WFFD</b> Wildlife and Freshwater Fisheries Division
		<b>SAC</b> Science Advisory Committee	<b>UNEP</b> United Nations Environment Programme	<b>WRATT</b> Waste Reduction and Technology Transfer Program



Three Mile Creek

## Respect the Connect

It is undeniable that in any ecological relationship all the varied pieces and parts are connected. One cannot be changed without it affecting all others. This can be seen in our natural environment as well as in our society.

Systems of all kinds - **cultural, educational, governmental, business & economic systems** - all interact with one another as each connects in unique ways to our environment.

As we set about the task of strategically planning a healthy future for the Mobile Bay watershed and estuary, it is vital to carefully examine the systems surrounding us and fully acknowledge that all are connected, all are important, and all deserve respect.

Likewise, there are connections running along the timeline of life here on the Gulf Coast. Winston Churchill once said, "If we open a quarrel between past and present, we shall find that we have lost the future." It is essential to understand what has come before to clearly see how we arrived at the present in order to plot the best course to the future. Respectfully connecting our past, present and future, along with the systems that run throughout our lives, is truly the only way to create a future where all systems thrive long-term.

**"If we open a quarrel between past and present, we shall find that we have lost the future."**

**- Winston Churchill**

## **Introduction**

When the first Comprehensive Conservation Management Plan (CCMP) was adopted 12 years ago, it had been decades since the northern Gulf Coast had taken a direct hit from a major hurricane. Mobile was the second-largest city in the state, much of Baldwin County was rural and America's economy was stable.

Since then, the coast has survived several catastrophic events including historically significant hurricanes, the Deepwater Horizon incident, an oil spill with uncertain long-term effects, and an economic collapse second only to the Great Depression. Each incident has resulted in population shifts and governments scrambling for revenue. Mobile is now Alabama's third most populous city, and the eastern shore of Mobile Bay has experienced unbridled growth. While there has been growing public awareness of the environment, much still needs to be done to protect and conserve our natural resources.

Throughout the last decade, one thing has stayed the same for coastal Alabama residents: nothing is more important than water. Whether it is to drink, to gather food, to earn a living, to play, to swim, or to simply view, coastal residents value our water.

The Mobile Bay National Estuary Program (MBNEP) was recognized as a program in 1995 at the request of then-Governor Fob James. It is one of 28 federally authorized National Estuary Programs administered and funded by the U.S. Environmental Protection Agency (EPA). The first charge of the MBNEP was to create a Management Conference (MC), a diverse collection of stakeholders representing local, state and federal government agencies; environmental organizations; business and industry; landowners; academic experts; and the general public.

Together, this group identified five major issue areas to be addressed: **Water Quality, Living Resources, Habitat Management, Human Uses, and Education and Public Involvement**. The MC further identified, prioritized, and recommended actions to lead the MBNEP in its second charge of creating its master plan.

The first CCMP was completed and approved in April 2002. It consisted of primary objectives which were, in turn, broken into sub-objectives with specific steps or Action Plans suggested for accomplishing each sub-objective. In total, the 2002 CCMP contained 29 specific objectives with 101 implementable steps on the "Path to Success." As of September 30, 2011, of the 101 actions identified in the plan, 11 had been completed, 88 had been implemented on some level, and three were under reconsideration.

In 2011, the MBNEP initiated a process for updating the first CCMP. Citizen input was crucial for creating "ownership" of the new plan. Through a concerted effort to gather community input using surveys and community meetings to assess environmental attitudes, a set of six values important to living in coastal Alabama were identified. These assessments provided guidance on which environmental issues need to be addressed in the next CCMP. Concurrently, the first CCMP was evaluated to analyze the extent to which that plan was successfully implemented based on an inventory of ongoing or completed activities, what gaps in implementation exist, and what areas required further study and action. Third, an analysis of the historic balance of habitats in the area was conducted to assess which habitat types have been most severely impacted by community growth. These three information sets form the foundation of the second CCMP to ensure the actions outlined in the plan resonate with the community, are achievable and realistic, and are based in science.



Background





## The Landscape > Mobile Bay Watershed

In simplest terms, an estuary is defined as an area “where rivers meet the sea.” They are transitional zones where freshwater rivers meet tidally-influenced marine (or salt) waters. Estuaries are considered environmentally and economically important because of their exceptional biological diversity and productivity. In fact, the whole of an estuary is truly greater than the sum of its parts. These areas support both fresh and saltwater plant and animal species and serve as nursery habitat for many commercially-important seafood species.

The Mobile Bay estuary is the coastal transition zone between the Mobile Bay Watershed and the Gulf of Mexico. The Mobile Bay watershed - the land area that drains into the Bay - covers two thirds of the state of Alabama and portions of Mississippi, Georgia, and Tennessee. It is the fourth largest watershed in the United States in terms of flow volume, and the sixth largest in terms of area. The Mobile Bay and Mobile-Tensaw Delta are subject to an unusually large number of major uses with international implications, including the Tennessee-Tombigbee Waterway, the Port of Alabama, commercial fisheries, industry, tourism and recreation, and coastal development.

### Mobile Bay Watershed Facts

- 1 The Mobile Bay Watershed encompasses 65% of the land area of the state of Alabama, along with portions of Mississippi, Georgia and Tennessee.
- 2 Mobile Bay is the terminus for the Mobile River and the Tombigbee-Black Warrior and Alabama-Coosa-Tallapoosa river systems.
- 3 The Watershed is a vast network of over 250 separate waterways, including rivers, bays, creeks, bayous, lakes, cutoffs, branches, and sloughs.
- 4 Major tributaries to the Bay include the Tombigbee, Tensaw, Apalachee, Blakeley, Mobile, Alabama, Dog, Fowl, Fish, Magnolia, and Bon Secour rivers and Chickasaw, Norton, Three Mile and Eight Mile creeks.
- 5 This Watershed is the 4th largest drainage basin in North America by flow volume and 1st in biodiversity.
- 6 Mobile-Tensaw Delta is the 2nd largest river delta in the United States, comprising 200,000 acres of swamps, rivers, bottomlands, and marshes.
- 7 The tidal shorelines of all coastal bays, rivers, and bayous in Mobile and Baldwin counties encompass over 600 miles. The Mobile Bay shoreline accounts for about 100 of those miles.
- 8 The four major industries in the Gulf and Alabama: seafood, tourism, oil and gas, and shipping; affect every American and much of the world.

**TENNESSEE**

**MISSISSIPPI**

**ALABAMA**

**GEORGIA**

Mobile Bay

**Gulf of Mexico**





## The Landscape > The Bay

**Mobile Bay's average depth is only about 10 feet, which is among the shallowest for a bay of its size. It is approximately 32 miles long from the Mobile-Tensaw Delta to its mouth, 23 miles across at its widest point, and about 10 miles across at the City of Mobile. A combination of wind and tide delivers salty Gulf waters from the south into the Bay that mix with varying amounts of freshwater from the Mobile-Tensaw River Delta. Due to the shallow nature of the Bay, dynamic climatic conditions, and man-made hydrologic modifications, salinity conditions in the Bay are remarkably variable.**

Several factors contribute to the ever-changing salinity conditions which characterize Mobile Bay. Summer thunderstorms and winter cold fronts produce heavy downpours contributing to an average of 66 inches of rainfall annually, the highest average nationally for a city the size of Mobile, along with a relatively high frequency of tropical cyclone landfalls. Consequently, river flows are naturally highly variable. The Bay is influenced by a single daily or "diurnal" tidal cycle with tide changes averaging a little less than a foot and a half and maximum changes exceeding two and a half feet. The resulting hydrology is dynamic, complex, and necessary to support the diversity of plant and animals found in and around the Bay.

The Alabama State Port Authority (ASPA), established in 1928 as a state governmental agency, operates the deepwater port facilities in Mobile Bay. The port complex includes facilities for handling general cargo, such as containers, forest products, and metals, as well as liquid bulk and dry bulk cargo, such as chemicals, coal, iron ore, and steel. The port complex features more than four million square feet of warehouse space and open yards and almost 40 berths for ships. A 75-mile rail line links Port of Mobile facilities and provides connections to major freight railroads. In 2013, the port of Mobile ranked 9th, out of 171 U. S. ports in total metric tons of U.S. exports, 17th in total metric tons of U.S. imports, and 13th in total U.S. volume of trade.

## A little bit of History....

Apparently, Spanish explorers sailed in the area of Mobile Bay as early as 1500, as the bay was marked on early Spanish maps as **Bahia del Espiritu Sancto (the Bay of the Holy Spirit)**. Just 27 years after Christopher Columbus first introduced America to the western world, **Admiral Alvarez de Pineda**, a Spanish explorer, became the first European to sail into the waters of Mobile Bay in 1519. It would be another twenty years before another European would actually take a step in today's Alabama. Between 1539 and 1541, the well-known explorer and marauder **Hernando de Soto** explored the area and encountered and destroyed the fortified Maubilian Indian town of **Mauvila**, from which modern Mobile derives its name. This battle with **Chief Tuskaloosa** and his warriors took place somewhere north of present-day Mobile. While Tuskaloosa himself was neither killed nor captured, virtually all of the inhabitants of Mauvila were killed. Maubilians were Choctaws, who occupied the southwestern and western portions of Alabama and all of Mississippi south of latitude 33°. **The first white colonists in Alabama landed on the shores of Mobile Bay in 1559** under the leadership of **Tristán de Luna y Arellano** following a hurricane which destroyed most of their ships and much of their Pensacola Bay colony.

A Canadian born Frenchman, **Pierre Le Moyne, Sieur d'Iberville**, would be the first European to leave a considerable mark on the history of Mobile. In the late 1600s, the French government was laying plans to settle and claim the mouth of the Mississippi River. The Spanish, upon learning of plans for a permanent French settlement on the

Gulf, quickly scrambled to occupy Pensacola Bay in 1698, denying the French port facilities there. After Iberville's first reconnaissance for a Mississippi settlement in 1699, he returned to the Gulf and began the **establishment of warehouses and port facilities on Mobile Bay's Dauphin Island** because of the presence of a deep water harbor (Pelican Bay) and the strategic importance of slowing the Spanish and English march across the eastern frontier towards the Mississippi River. The French named the island "**Massacre Island**" because of the presence of some sixty skeletons that were found when they landed. By 1701, Dauphin Island had become an important military post of the growing French colony of Louisiana, and Iberville's brother, **Jean Baptiste Le Moyne, Sieur d'Bienville**, succeeded him as Governor of Louisiana, the first of his three such tenures.

Upon Iberville's recommendation, Bienville established the first "Mobile settlement" and the capital of French Louisiana in 1702 at a site upstream from Mobile Bay along the Tensaw River at **27-Mile Bluff**. The settlement was built in proximity to Maubilian Indian villages, and the fort that was its center was called **Fort Louis de la Louisiane de Mobile** in tribute to their Grand Monarch and employer, King Louis XIV. One purpose of locating the original settlement 26 miles upriver was to encourage settlement along the river. Topography was also a consideration, since there were no bluffs considered adequate at the river's mouth. Within two years, in 1704, Fort Louis was the center of the French plans for the region. There were 80 houses in the town and a population of 259. This location allowed better access to the interior, but unfortunately, was susceptible to unpredictable and frequent flooding.

The town **was relocated to the mouth of the Mobile River in 1711**. There were several reasons for the move, including frequent flooding, outbreaks of disease, difficulties providing adequate defenses for the port at Dauphin Island, and to facilitate better communication and commerce with ocean vessels. A new fort, called Fort Conde after the King's cousin, was established, and the town that grew around it evolved into present day Mobile. Two books are recommended by Research Historian Charles Torrey of the Museum of Mobile for detailed histories of colonial Mobile. *Old Mobile, Fort Louis de la Louisiane 1702-1711* (1977) by Jay Higgenbotham, and *Colonial Mobile* (1898) by Peter Joseph Hamilton, a historical study of the Alabama-Tombigbee basin from the discovery of Mobile Bay in 1519 until the demolition of Fort Charlotte in 1821. The French occupied Mobile until the Treaty of Paris in 1763 ceded the Louisiana territory, including Mobile, to England. The English re-named French Fort Conde, **Fort Charlotte**.

In 1780, during the Revolutionary War, Spain, an ally of the fledgling Continental government, attacked the British garrison at Fort Charlotte commanded by Captain Elias Durford. Under attack by troops led by General Bernardo de Galvez, Captain Durford destroyed the entire city of Mobile rendering the houses and shops of the town unable to provide cover for the attacking Spanish troops. On March 13, 1780, the British surrendered Fort Charlotte to de Galvez, ending England's claim to the modern state of Alabama. **Mobile became part of the colony of Spanish West Florida**, and for over 30 years, was controlled from Pensacola until 1813 when it was captured by American forces.

During the War of 1812, American General James Wilkinson took a force of troops from New Orleans to capture Mobile from the Spanish. Following Spanish surrender in April of 1813, the Mobile area was added to the existing Mississippi Territory of the United States. In March, 1817, Mississippi joined the union as a state, splitting the Mississippi Territory in half, and leaving **Mobile, for the next two years, as part of the new Alabama Territory**. After two years as a territory, the **U.S. State of Alabama was formed, and Mobile became a voting region of the United States in 1819**.

Mobile experienced a boom surrounding the export of cotton in the years leading up to the **Civil War**, and following secession in 1861, it was heavily fortified by the Confederates. Union naval forces, under the command of **Admiral David Farragut**, blockaded the bay, leading to the construction and operation of blockade runners that maintained a trickle of commerce into and out of the city. In August, 1864, after fighting past Forts Gaines and Fort Morgan, which guarded the mouth of the bay, Farragut defeated a small force of wooden Confederate gunboats and the ironclad CSS Tennessee in the **Battle of Mobile Bay**, where Farragut is purported to have said, "Damn the torpedoes, full speed ahead." On May 25, 1865, weeks after dissolution of the Confederacy, an ammunition depot explosion killed 300 persons and destroyed a significant portion of the city of Mobile.

## Other historical milestones:

- 1868** Mobile's first municipal sewer lines are laid.
- 1885** Middle Bay Light is built by the U.S. Lighthouse Service.
- 1886** Bienville Water Works is established and later purchased by the city.
- 1888** The Mobile Ship channel is deepened to 23 feet.
- 1902** First street pavement is laid within the City of Mobile.
- 1923** Alabama State Docks are authorized for construction.
- 1926** The Mobile Bay Causeway, later renamed Battleship Parkway, is built between Baldwin and Mobile counties, providing an over-land route across the bay for vehicular traffic, effectively damming one of the major estuaries on the North American continent.
- 1926** The Great Miami Hurricane makes landfall near Mobile on September 20.
- 1932** The 1932 Florida-Alabama hurricane makes landfall near the Mississippi - Alabama border on September 2.
- 1941** The Bankhead Tunnel opens, allowing vehicles to travel under the Mobile River.
- 1950** On August 31, Hurricane Baker struck Gulf Shores as a Category 1 before dissipating inland.
- 1955** First Dauphin Island bridge is completed, marking a transition in transportation to the island from boat to automobile.
- 1964** World War II battleship U.S.S. Alabama is brought to Mobile.
- 1969** Hurricane Camille makes landfall as a Category 5 storm near Waveland, MS.
- 1973** The George C. Wallace tunnel opens on Interstate 10, alleviating traffic congestion inside the Bankhead Tunnel.
- 1979** Hurricane Frederic makes landfall near Dauphin Island on September 12.
- 1981** Jubilee Parkway, known locally as The Bayway, is opened as a route for increasing traffic traveling Interstate 10 across Mobile Bay between Mobile and Baldwin counties.
- 1982** The Gordon Persons/Dauphin Island Bridge is finished, replacing the original bridge destroyed by Hurricane Frederic in 1979.
- 1985** Hurricane Elena passes 30 miles south of Dauphin Island before making a September 2 landfall near Biloxi, MS.
- 1997** Hurricane Danny made a slow landfall in Alabama on July 20 and over several days dropped over 36.7" of rain on Dauphin Island
- 1998** Hurricane Georges made a September 28 landfall in Mississippi before turning east and tracking across the state of Alabama.
- 2004** Hurricane Iuan strikes Gulf Shores on September 16.
- 2005** Hurricane Katrina makes landfall in southeast Louisiana on August 29.



Orange Beach





## The Landscape > The Coast

### Geology

Coastal Alabama has four physiographic subdivisions. The southern pine hills comprise the portions of eastern and western coastal Alabama with elevated or rolling topography. The alluvial plain, deltaic plain, and coastal lowlands are relatively flat. Coastal lowlands are adjacent to Mississippi Sound, and extend along margins of Mobile, Bon Secour, and Perdido bays. Alluvial and deltaic plains extend northward along the Tombigbee and Alabama Rivers. The coastal boundaries of these relatively shallow bays are defined by various barrier islands and spits. The Mississippi-Alabama shelf is a triangular area seaward of the barrier islands extending from the Mississippi River Delta to the De Soto Canyon.

Coastal and offshore Alabama overlie sediments that range from pre-Jurassic to Holocene. These rock units are possibly more than 7,620 m (25,000 ft) thick at the coast and decrease southward by 1.9 to 9.4 m/km (10-50 ft/mi). The topography of the coast and continental shelf result from tidal and current movements, as well as river discharge and delta formation and destruction.

The prominent structural geological features along coastal Alabama include the peripheral faults, Mobile graben, the Citronelle domal anticline, and the Wiggins uplift. Tectonic hazards are not a problem in coastal Alabama because there are no known active faults.

Oil and gas production is well established in coastal Alabama with developed fields at Citronelle, Churchula, Hatter's Pond, and South Carlton. There is a high potential for future gas and oil production.

Coastal Alabama has a dynamic hydrologic system with the focal point of the system being the Mobile River and Mobile Bay into which it flows. Average yearly freshwater discharge from

this system into the Gulf of Mexico is 50 billion cubic meters or 13.2 trillion gallons. Flooding is perhaps the worst natural hazard affecting coastal Alabama and may result from storm surges and heavy rainfall associated with hurricanes and other tropical storms. Flood discharge has a pronounced effect on estuarine water salinity and coastal sedimentation.

### Ecology

According to NatureServe, Inc., Alabama boasts the fifth highest species diversity among the fifty states and the highest of any state east of the Mississippi River. However, Alabama ranks second, following only Hawaii, in the number of species presumed or possibly extinct and fourth in the percentage of a state's plants and animals at risk of extinction.

Ecosystems may be classified according to the physical environment or dominant type of species present. Different habitats are commonly considered ecosystems, but many or most could more accurately be considered components of larger ecosystems. In coastal Alabama, local scientists and resource managers have identified habitats critical to sustain the species diversity along the coast, including: beaches and dunes; submerged aquatic vegetation (SAV); intertidal marshes and flats; freshwater wetlands; oyster reefs; maritime forests; pine savannas; long leaf pine forests; and rivers, streams, and their riparian buffers.

Beaches and dunes draw tourists who drive the economic engine helping to fuel the economies of the coastal region and the state. They also provide habitat for many shorebirds and other sensitive species, the sole nesting area for sea turtles, and some level of protection for inland infrastructure. The main threat to the dune habitat is coastal development, but foot traffic and loose pets are also significant stressors.

SAV is commonly considered the "hallmark of a healthy estuary," due to its role as nursery habitat and refuge for fish and shellfish, nutrient absorption, oxygen provision, and sediment stabilization. Distribution of SAV has declined dramatically in coastal Alabama over the last 60 years. Only 29% of acreage documented in 1940, 1955, and 1966 in the MBNEP study area appeared in 2002 imagery. While some local increases were noted in 2008 and 2009, an additional 1,300 acres were lost over that six-year period. Stressors include sedimentation from stream bank erosion and dredging, nutrient over-enrichment, scarring from boat propellers, and even pressures related to selective fishery harvest.

Wetlands, whether freshwater or salt marsh, provide a host of valuable ecosystem services, including providing complex habitats that support a diversity of species, filtration of nutrients and pollutants, shoreline and sediment stabilization, and protection of upland areas from flooding and storm energy. Gulf coast wetlands loss, and especially that of the state of Louisiana, has been far more dramatic than in other American coastal watersheds. The U. S. Fish and Wildlife Service estimates that over half of Gulf wetlands were lost between 1780 and 1980, and almost 400,000 acres of freshwater wetlands disappeared from Gulf watersheds between 1998 and 2004. Over the last four decades, Alabama has experienced wetlands loss at four times the national average. While significant loss is attributed to hurricanes, storms, saltwater intrusion, and sea level rise, human activities such as construction and development, installation of oil and gas infrastructure, and logging have also contributed to this problem.

Locally, the decline of oyster reef habitat has been attributed to climate influences. Persistent drought conditions and increased

seawater flow through the Katrina-generated cut in Dauphin Island increased the salinity of existing oyster habitat and provided conditions favorable for oyster drills, predatory snails that have decimated the oyster fishery. Like SAV and salt marshes, oyster reefs provide exceptionally complex habitat providing food and refuge for a diversity of species. Since each oyster is capable of filtering over a gallon of water an hour, they contribute to improving water quality, especially when populations are healthy.

Like previously mentioned aquatic habitats, maritime forests, pine savannas, and long leaf pine forests support the diversity of birds, mammals, reptiles, and other upland wildlife species which contribute to our state's exceptional biodiversity and our outdoor-centered quality of life. Development pressures and fire suppression are examples of the human-related stressors fragmenting and eliminating much of these productive habitats. Long leaf pine forests covered 90 million acres of the American southeast when Europeans settled the land. Less than 5% still exists, supporting species diversity which rivals the most productive of earth's ecosystems, and including threatened and endangered species like the red-cockaded woodpecker, indigo snake, gopher tortoise, and many rare plants.

Rivers, streams, and the vegetated areas along their banks called riparian buffers course through other upland habitat types carrying freshwater into the estuaries and providing habitat, food, and water for a rich diversity of both freshwater and upland wildlife species. These areas have been impacted by land-use conversion, and the increased volume and velocity of stormwater runoff triggered by impervious surfaces of development threaten their integrity, erodes their banks, and adds suspended sediments to their waters.





Battleship Park

## The Landscape > The Estuary

**Estuary (és'chū-ér'ē)** is “a partially enclosed coastal body of water, having an open connection with the ocean, where freshwater from inland is mixed with saltwater from the sea.” Estuaries provide some of the most sensitive and ecologically important habitats on earth. They provide sanctuary for many species of waterfowl, provide food and refuge for larval and juvenile marine life, and serve as breeding grounds for many desirable species of marine life. Since estuaries commonly offer excellent harbors, most of the large ports in the United States - like New York, Philadelphia, Baltimore, Mobile, Galveston, Seattle, and San Francisco-are located in estuaries. However, the development of high-density population centers causes deleterious effects destroying the very properties of the estuary that made development of the region desirable. Human impact on estuaries includes reclamation of tidal land by filling; pollution from sewage, solid waste, and industrial effluent; increased sedimentation; and alteration of the estuarine salinity regimes by withdrawal or increased influx of freshwater.

**More simply stated, an estuary is where freshwater from rivers mixes with salt water from the sea.**

Alabama's estuaries are considered environmentally and economically important because of their exceptional biological diversity and productivity. These estuaries, where the fresh water from several rivers meets the salt water of the Gulf of Mexico, support both fresh and saltwater species and serve as nursery habitat for many commercially - and recreationally-important fish and shellfish.





Gulf Shores





## The People > Demographic Profile

Information presented is based on the 2000 and 2010 Census information and The American Community Survey 2006 - 2010. This information was collected from online databases including the U.S. Census Bureau's *American Fact Finder*.



## Municipalities

<b>CITY (BALDWIN COUNTY)</b>	<b>POPULATION 2000</b>	<b>POPULATION 2010</b>	<b>% CHANGE</b>
Bay Minette	7,820	8,044	2.86%
Daphne	16,581	21,570	30.09%
Elberta	552	1,498	171.38%
Fairhope	12,480	15,326	22.80%
Foley	7,590	14,618	92.60%
Gulf Shores	5,044	9,741	93.12%
Loxley	1,348	1,632	21.07%
Magnolia Springs	-	723	-
Orange Beach	3,784	5,441	43.79%
Perdido Beach	-	581	-
Robertsdale	3,782	5,276	39.50%
Silverhill	616	706	14.61%
Spanish Fort	5,423	6,798	25.35%
Summerdale	655	862	31.60%

<b>CITY (MOBILE COUNTY)</b>	<b>POPULATION 2000</b>	<b>POPULATION 2010</b>	<b>% CHANGE</b>
Bayou La Batre	2,313	2,558	10.60%
Chickasaw	6,364	6,106	-4.05%
Citronelle	3,659	3,905	6.70%
Creola	2,002	1,926	-3.80%
Dauphin Island	1,371	1,238	-9.70%
Mobile	198,915	195,111	-1.90%
Mount Vernon	844	1,574	86.49%
Prichard	28,633	22,659	-5.97%
Saraland	12,288	13,405	9.10%
Satsuma	5,687	6,168	8.50%
Semmes	15,389	18,345	19.21%

( Source: 2000 and 2010 Census )

Although the actual watershed for Mobile Bay encompasses more than two-thirds of the State of Alabama and portions of Georgia, Mississippi, and Tennessee, MBNEP's primary target area is limited to southern Alabama, including all of Mobile and Baldwin Counties.

## Population

COUNTY	POPULATION 2000	POPULATION 2010	% CHANGE
Baldwin	140,415	182,265	29.80%
Mobile	399,843	412,992	3.30%
Total	540,258	595,257	33.10%

( Source: 2000 and 2010 Census )

The combined 2010 population for both Baldwin and Mobile counties is 595,257. Mobile County contains the larger population of 412,992 with Baldwin County's population roughly half that at 182,265. Population increased by 29.8% in Baldwin County from 2000 to 2010 and 3.3% in Mobile County for that same period. The total population of both counties increased 33.1% from 540,258 in 2000 to 595,257 in 2010.

## Ethnicity

ETHNICITY	BALDWIN CO. 2010	%	MOBILE CO. 2010	%
Total Population	182,265		412,992	
Caucasian	152,200	83.50%	243,904	59.10%
African-American	16,966	9.30%	142,272	34.40%
Native American and Alaska Native	1,146	0.60%	3,541	0.90%
Asian	1,340	0.70%	7,507	1.80%
Hispanic	7,992	4.40%	9,936	2.40%
Native Hawaiian and Other Pacific Islander	79	0.10%	157	0.00%
Other	2,542	1.40%	5,675	1.40%

( Source: 2010 Census )

The largest ethnic population in both Baldwin and Mobile counties in 2010 was Caucasian, reflecting roughly 67% of the total population. This percentage was higher in Baldwin County, where the population was 83.5% Caucasian versus Mobile County where the population was 59.1% Caucasian.

The second largest ethnic population in both Baldwin and Mobile counties in 2010 was African-American, roughly 28% of the total population. This percentage was higher in Mobile County, where the population was 34.4% African-American versus Baldwin County where the population was 9.3% African-American. Hispanics represent a small portion of the population of both counties, although the percentage in Baldwin County (4.4%) exceeds that of Mobile County (2.4%).

## Age Distribution

ETHNICITY	BALDWIN CO. 2010	MOBILE CO. 2010
Total Population	182,265	412,992
0-19	46,283	115,728
20-34	30,405	82,761
35-54	50,474	111,392
55+	55,103	103,111

( Source: 2010 Census )

The largest age group in Baldwin County in 2010 was the 55+ age range, roughly 30.2% of the total population in the county. The largest age group in Mobile County in 2010 was the 0-19 age range, roughly 28% of the total population in the county.

## Income Distribution

INCOME GROUP	BALDWIN CO. 2010	%	MOBILE CO. 2010	%
Total Households	69,476		153,302	
Less than \$10,000	4,146	6.00%	17,971	11.70%
\$10,000 to \$24,999	11,605	16.70%	30,428	19.90%
\$25,000 to \$49,999	18,864	27.10%	41,314	27%
\$50,000 to \$74,999	13,848	19.90%	27,923	18.20%
\$75,000+	21,013	30.30%	35,666	23.20%

INCOME GROUP	BALDWIN CO. 2010	%	MOBILE CO. 2010	%
Total Population	182,265		412,992	
Persons Below Poverty Level	22,237	12.20%	79,295	19.20%

( Source: American Community Survey 2006 - 2010 )

In 2010, the median household income was \$50,147 for Baldwin County and \$40,996 for Mobile County. The largest household income bracket in Baldwin County was \$75,000+ and in Mobile County was \$25,000 to \$49,999. Mobile County had a greater percentage of the population below the poverty level at 19.2% versus Baldwin County at 12.2%.

## Education

<b>EDUCATIONAL ATTAINMENT</b>	<b>BALDWIN CO. 2010</b>	<b>%</b>	<b>MOBILE CO. 2010</b>	<b>%</b>
Total Population 25 years and older	121,560		263,796	
Less than 9th Grade	4,715	4%	12,877	5%
Grade 9-12 (no diploma)	10,388	9%	33,895	13%
High School Graduate	36,340	30%	90,438	34%
Some College (no degree)	28,248	23%	55,152	21%
Associate's degree	9,264	8%	19,300	7%
Bachelor's degree	22,040	18%	34,528	13%
Graduate/Professional degree	10,565	9%	17,606	7%

( Source: American Community Survey 2006 - 2010 )

In 2010, over 32% of both Baldwin and Mobile counties' residents were at least high school graduates. This is the largest educational attainment group in both counties with 126,778 members of the population 25 years or older. Roughly 22% of both counties had some college education and 14.7% held a Bachelor's degree. The highest concentration with Bachelor's degrees lived in Mobile County, representing 13.1% of the county's population.

## Housing

<b>HOUSING OCCUPANCY</b>	<b>BALDWIN CO. 2010</b>	<b>MOBILE CO. 2010</b>
Total Housing Units	104,061	178,196
Occupied	73,180	158,435
Vacant	30,881	19,761
Owner - Occupied	53,071	106,079
Renter - Occupied	20,109	52,356

( Source: 2010 Census )

In 2010, the total number of housing units in both Baldwin and Mobile counties was 282,257. Of those housing units that were occupied, 68.7 % were occupied by owners, and 31.3% were occupied by renters. In Mobile County, 59.5% of the occupied households in 2010 were occupied by owners. In Baldwin County, 72.5% of the occupied households in 2010 were occupied by owners.

## Employment

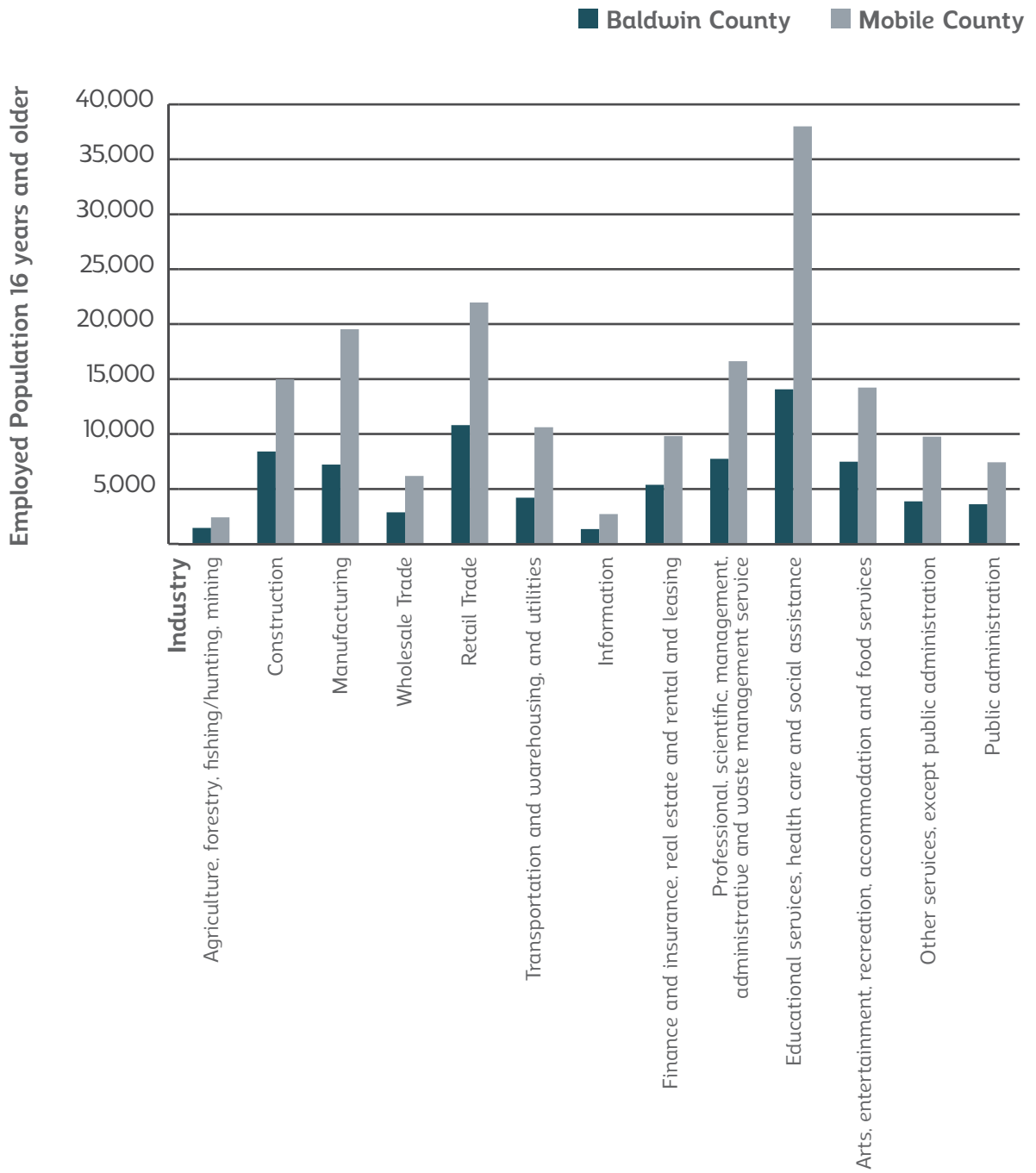
SECTOR	BALDWIN CO. 2010	%	MOBILE CO. 2010	%
Civilian employed 16 years and over	78,520		174,321	
Agriculture, forestry, fishing/hunting, mining	1,462	1.90%	2,430	1.40%
Construction	8,410	10.70%	14,990	8.60%
Manufacturing	7,230	9.20%	19,544	11.20%
Wholesale trade	2,884	3.70%	6,183	3.50%
Retail trade	10,814	13.80%	21,964	12.60%
Transportation and warehousing, and utilities	4,204	5.40%	10,621	6.10%
Information	1,360	1.70%	2,717	1.60%
Finance and insurance, real estate and rental and leasing	5,378	6.80%	9,819	5.60%
Professional, scientific, management, administrative and waste management service	7,749	9.90%	16,631	9.50%
Educational services, health care and social assistance	14,072	17.90%	38,001	21.80%
Arts, entertainment, recreation, accommodation and food services	7,478	9.50%	14,221	8.20%
Other services, except public administration	3,871	4.90%	9,763	5.60%
Public administration	3,608	4.60%	7,437	4.30%

( Source: American Community Survey 2006 - 2010 )

In 2010, the total civilian employed population 16 years of age and older in both Baldwin and Mobile counties was 252,841. The largest employment sector in both counties was Educational Services, Health Care, and Social Assistance, accounted for roughly 20.6% of the total employed population. Separately, this industry consisted of 17.9% of the Baldwin County employed population and 21.8% of the Mobile County employed population.

The smallest industry in Baldwin County, accounting for 1.7% of the employed population, was Information. The smallest industry in Mobile County, accounting for 1.4% of the employed population, was Agriculture, Forestry, Fishing and Hunting, and Mining.

## Employment by Sector 2010



## The People > How the MBNEP Works: The Management Conference

A hallmark of the National Estuary Program is the establishment and convening of a "Management Conference," critical to its ability to facilitate collaborative efforts.

Section 320 of the Clean Water Act outlines how National Estuary Programs are required to establish a Management Conference to develop a comprehensive conservation and management plan (CCMP) and ensure its implementation by stating in part:

**Purposes of Conference** The purposes of any Management Conference convened with respect to an estuary under this subsection shall be to:

- 1 Assess trends in water quality, natural resources, and uses of the estuary.
- 2 Collect, characterize, and assess data on toxics, nutrients, and natural resources within the estuarine zone to identify the causes of environmental problems.
- 3 Develop the relationship between the in-place loads and point and non-point loadings of pollutants to the estuarine zone and the potential uses of the zone, water quality, and natural resources.
- 4 Develop a comprehensive conservation and management plan that recommends priority corrective actions and compliance schedules addressing point and non-point sources of pollution to restore and maintain the chemical, physical, and biological integrity of the estuary, including restoration and maintenance of water quality, a balanced indigenous population of shellfish, fish and wildlife, and recreational activities in the estuary, and assure that the designated uses of the estuary are protected.
- 5 Develop plans for the coordinated implementation of the plan by the states as well as federal and local agencies participating in the conference.



**The Mobile Bay National Estuary Program (MBNEP) was governed historically by a Management Conference (MC) that consisted of a 19-member Policy Committee and a 36-member Management Committee and technical workgroups to help in identifying issues and develop action plans for addressing needs.**

During the summer of 2005, MBNEP initiated a strategic planning process which included an assessment by the MC members of the effectiveness of the program's organizational governance. The results of the assessment indicated that, although overall the MC was regarded as a useful mechanism for guiding the program, MBNEP staff needed to do a better job of:

- > Educating members of the conference on the CCMP and how it relates to them,
- > Identifying ways that members could implement the CCMP actions, whether through financial, in-kind, or other support, and
- > Identifying concrete actions for members to take back to their constituencies.

These comments led MBNEP to further review the existing make up of the committees of the conference and to develop an alternative make up for the MC that would lead to more effective engagement of stakeholders and greater support in implementing the CCMP. MBNEP asked itself the question: What is the role of the MC, and what do we want it to do? Specifically it asked:

- > Is it a tool for helping reach out to target audiences for assistance in implementing the CCMP?
- > Is it a mechanism for promoting continuing dialogue with target audiences?
- > Is it a method of controlling NEP activities?
- > Is it something else or a combination?

**The MBNEP conducted a cursory “SWOT” analysis to clarify the conference’s strengths, weaknesses, opportunities and threats:**

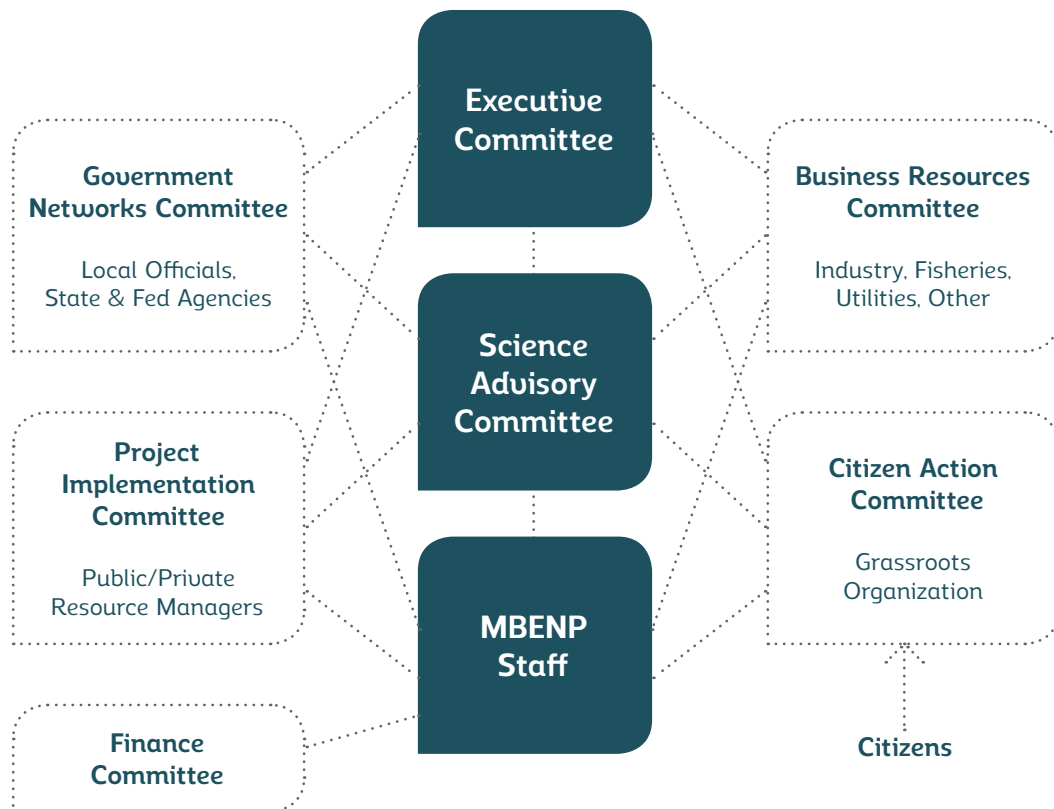
- > Strengths - Ability to bring diverse sectors/ resources to the table, building coalitions, and a strong CCMP.
- > Weaknesses - Public outreach efforts, history, and inability to generate/sustain program support.
- > Opportunities - Increase visibility, reach out to local community groups, tap into new residents, identify needs among coastal cities, and communicate commonalities.
- > Threats - Marketing/outreach, lack of adequate funding, apathy.

**Upon analysis of the SWOT, MBNEP recognized a connection between its strength of bringing diverse sectors and resources to the table, its inability to generate and sustain support for the program, its need to increase visibility and outreach to local community groups, and the constant threat of apathy. MBNEP brainstormed ways of organizing the MC to address the above issues to take advantage of strengths while creating an environment to build sustained support. The following MC requirements provided the basis for this organizational approach:**

- > Adhering to by-laws.
- > Identifying Issues.
- > Having authority to approve action plans.
- > Advocating for environmental needs - federally, statewide, and locally.
- > Affecting policy changes throughout the community.
- > Raising cash and other resources.
- > Undertaking projects.
- > Catalyzing community action.

**MBNEP** acknowledged the **MC** needed to maintain a mix of policy makers, both public and private, implementers who are also both public and private, and grassroots community and citizen groups. Further, the existing **MC** structure did not allow for the broadened participation so necessary for expanding support for **CCMP** implementation or for identifying and tackling emerging issues related to **CCMP** objectives. With that in mind, the following structure of the **MC** was developed.

## **MBNEP Management Conference**



## Executive Committee (EC)

<b>Purpose</b>	Develops policies on issues and funding; Reviews/ Approves work plans, amendments (Finance Committee); Evaluates Director performance (Personnel Committee); Sets financial goals for non-federal share (Finance Committee); other
<b>Identify Issues</b>	NO - Develops policies for program based on identification of issues by other Committees
<b>Authority to Approve Action Plans</b>	YES
<b>Advocating for Environmental Needs- Federally, Statewide, locally</b>	NO
<b>Affecting Policy Changes throughout the Community</b>	NO - YES within the MBNEP Program
<b>Raising cash and other resources</b>	YES - Through Finance Committee
<b>Undertaking Projects</b>	NO
<b>Catalyzing Community Action</b>	NO
<b>Committee Representation</b>	EPA Region 4 Representative: Two representatives from each of the four other committees; One representative from the Science Advisory Committee; at-large members
<b>Governance</b>	Gulf of Mexico Program and ADCNR co-chairs; Simple majority rules
<b>Meetings</b>	Quarterly

**The EC is made up of at least 15 members, including the Marine Environmental Sciences Consortium/Dauphin Island Sea Lab Director, federal and state agency directors or designees, MC committee chairs, and at least four at-large members identified by staff recommendation. This group engages in the following:**

**1** Develop overall by-laws for the conference.

**2** Approve Action Plans/ oversee activities of the MBNEP office

**3** Provide a forum for exchange of information (each meeting would consist of each committee providing a report of its activities/issues)

**4** Appoint and charge Ad Hoc Committees as needed based on recommendations of MBNEP (Issues Advisory Committees)



## Government Networks Committee (GNC)

<b>Purpose</b>	To bring State Agency Heads and regional government administrators together with local officials of the coast to more effectively communicate local needs/ understand agency functions, and to improve government management of our coastal resources
<b>Identify Issues</b>	YES
<b>Authority to Approve Action Plans</b>	NO - But can recommend approval to EC
<b>Advocating for Environmental Needs- Federally, Statewide, locally</b>	YES
<b>Affecting Policy Changes throughout the Community</b>	YES
<b>Raising cash and other resources</b>	YES - Through State Budgetary Process; local budgets
<b>Undertaking Projects</b>	NO - Can establish project priority for individual state depts./local governing entities
<b>Catalyzing Community Action</b>	YES
<b>Committee Representation</b>	OPEN - This committee is open to all public officials as well as all heads of state agencies and aides to U.S. Representatives and Senators; GOMP Director
<b>Governance</b>	Group will elect Chair, Co-Chair, and EC Representatives
<b>Meetings</b>	Quarterly

### The GNC is made up of county commissioners, mayors, and state agency directors. This group engages in the following:

- 1 Discuss how federal and state agencies can work with local governments to cooperatively address local issues (i.e., storm water management, public access, environmentally appropriate affordable housing, habitat protection)
- 2 Educate local officials/ other federal/state/regional agencies about how each agency works or what the main issues are at the local level (opps. for federal and state agencies to present what they do to the group; opps for local communities to discuss major issues with state agencies and other communities)
- 3 Engage in constructive dialogue on ways to partner state agencies with local governments or local governments with other local governments to affect positive results.
- 4 Cooperatively identify tasks/role for MBNEP in addressing issues or galvanizing action.

## Business Resources Committee (BRC)

<b>Purpose</b>	To bring together a balance of interested community leaders from different private sector interests to identify ways of balancing different sector needs and identifying commonalities among sectors; to identify coastal issues that impact their interests
<b>Identify Issues</b>	YES
<b>Authority to Approve Action Plans</b>	NO - But can recommend approval to EC
<b>Advocating for Environmental Needs- Federally, Statewide, locally</b>	YES
<b>Affecting Policy Changes throughout the Community</b>	YES
<b>Raising cash and other resources</b>	YES - Through development of investment strategies and resources among private sector groups/industries
<b>Undertaking Projects</b>	YES - Can recommend project priorities based on emerging issues
<b>Catalyzing Community Action</b>	YES
<b>Committee Representation</b>	OPEN - This committee is open by recommendation/ invitation with commitment of serving required
<b>Governance</b>	Group will elect Chair, Co-Chair, and EC Representatives
<b>Meetings</b>	Quarterly

**The BRC represents a balance of private sector interests identifying common environmental concerns and potential solutions to those concerns. This group engages in the following:**

**1** Discuss/educate on the issues and how they relate to environmental sustainability (i.e., quality of life, economic opportunities, land management, environmental responsibility, preservation of particular ways of life, maintenance of natural resources, and balancing economic development with environmental sustainability).

**2** Educates others on committee about individual organizational efforts to address issues.

**3** Engages in constructive dialogue on ways to partner to effect positive results.

**4** Identifies community resources to effectively aid in addressing issues/challenges.

**5** Cooperatively identifies tasks/role for MBNEP in addressing issues or galvanizing actions.

## Project Implementation Committee (PIC)

<b>Purpose</b>	To bring together resource management agencies and organizations to undertake environmental projects.
<b>Identify Issues</b>	YES
<b>Authority to Approve Action Plans</b>	NO
<b>Advocating for Environmental Needs- Federally, Statewide, locally</b>	YES - As it related to project being implemented
<b>Affecting Policy Changes throughout the Community</b>	NO
<b>Raising cash and other resources</b>	YES - Primarily through bringing organizational resources to bear on CCMP Actions.
<b>Undertaking Projects</b>	YES
<b>Catalyzing Community Action</b>	YES
<b>Committee Representation</b>	OPEN to agencies involved with the implementation of CCMP projects
<b>Governance</b>	Group will elect Chair, Co-Chair, and EC Representatives
<b>Meetings</b>	On a project by project basis; as regularly as once a month; at least quarterly

### Made up of resource managers or those who “put shovels in the ground,” the PIC engages in the following:

**1** Assess restoration needs and resources and prioritize watersheds and projects accordingly.

**2** Uses sediment analyses and watershed planning as a basis for conducting restoration activities.

**3** Identifies projects and plan for their implementation (i.e., water quality monitoring; habitat conservation, restoration, and protection; data management; public access, etc.).

**4** Identifies tasks and citizen input mechanisms to be implemented.

**5** Conducts periodic project status meetings to track progress.

**6** Cooperatively identifies tasks/roles for MBNEP in addressing issues or galvanizing action.

## Community Action Committee (CAC)

<b>Purpose</b>	To bring together grassroots organizations for networking, information sharing, issues development, and cooperative training purposes.
<b>Identify Issues</b>	YES
<b>Authority to Approve Action Plans</b>	NO - But can recommend for approval
<b>Advocating for Environmental Needs- Federally, Statewide, locally</b>	YES - Contacting government officials/advocacy
<b>Affecting Policy Changes throughout the Community</b>	YES - Contacting government officials; educating candidates
<b>Raising cash and other resources</b>	YES - Primarily through volunteer involvement
<b>Undertaking Projects</b>	YES
<b>Catalyzing Community Action</b>	YES
<b>Committee Representation</b>	OPEN to all grassroots groups that have an interest
<b>Governance</b>	Group will elect Chair, Co-Chair, and EC Representatives
<b>Meetings</b>	Quarterly; special issue trainings as determined

### The CAC is made up of place-based, grassroots organization and volunteer association representatives and engages in the following:

**1** Discuss/educate on the issues and how they relate to environmental sustainability (i.e., stormwater management, public access, environmentally appropriate affordable housing, and habitat protection).

**2** Educates others on committee about individual organizational efforts to address issues (opportunities for agencies to present what they do to the group; opportunities for groups to learn new ways of energizing constituencies).

**3** Engages in constructive dialogue on ways to partner with each other to effect positive results.

**4** Identifies community resources to effectively aid in addressing issues/challenges.

**5** Provides increased opportunities for public participation and project involvement (i.e., citizen monitoring, volunteer opportunities, etc.).

**6** Identifies projects and assists with planning for their implementation (i.e., water quality monitoring; habitat conservation, restoration, and protection; data management; public access; etc.).

**7** Cooperatively identifies tasks/roles for MBNEP in addressing issues or galvanizing action



## Science Advisory Committee (SAC)

<b>Purpose</b>	To assess health of the estuary and coastal resources through identification of areas of stress, data and data gaps, research and research gaps
<b>Identify Issues</b>	YES
<b>Authority to Approve Action Plans</b>	NO - But can recommend for approval
<b>Advocating for Environmental Needs- Federally, Statewide, locally</b>	YES - As it relates to data gaps and need for further understanding of issues
<b>Affecting Policy Changes throughout the Community</b>	YES - Through reporting of status and trends
<b>Raising cash and other resources</b>	NO
<b>Undertaking Projects</b>	YES
<b>Catalyzing Community Action</b>	NO
<b>Committee Representation</b>	OPEN to all scientists who have an interest
<b>Governance</b>	Group will elect Chair, Co-Chair, and EC Representatives
<b>Meetings</b>	Quarterly

### The SAC includes scientists and government agency personnel interested in developing mechanisms for measuring ecosystem health and engages in the following:

- 1 Assesses trends to determine where stresses are most acute in the system.
- 2 Develops frameworks and monitoring protocols for measuring changes in ecosystem health.
- 3 Provides technical advice or conducts scientific review of issues/activities requested by other committees.
- 4 Identifies opportunities for public participation and project involvement (i.e., citizen monitoring).
- 5 Identifies projects and assists with planning for their implementation (i.e., water quality monitoring, data management).
- 6 Cooperatively identifies tasks/roles for MBNEP in addressing issues or galvanizing action.

# Management Conference Members

The following agencies are among those that participate in the Mobile Bay National Estuary Program MC

Alabama Coastal Fishermen's Association	Alabama Department of Conservation and Natural Resources - State Lands Division	City of Chickasaw
Alabama Coastal Foundation	Alabama Department of Conservation and Natural Resources - Wildlife & Freshwater Fisheries	City of Citronelle
Alabama Department of Environmental Management	Alabama State Port Authority	City of Creola
Alabama Department of Public Health	Auburn University	City of Daphne
Alabama Department of Transportation	Auburn University Marine Extension & Research Center	City of Fairhope
Alabama Gulf Coast Convention and Visitors Bureau	Audubon Society	City of Foley
Alabama Gulf Coast Restore Council	Baldwin County	City of Gulf Shores
Alabama Power/Southern Company	Baldwin County Environmental Advisory Board	City of Mobile
Alabama State Senate	Baldwin County Soil and Water Conservation District	City of Orange Beach
Alabama State House of Representatives	Bon Secour River Protection Association	City of Prichard
Alabama Department of Conservation and Natural Resources - Marine Resources Division	City of Bay Minette	City of Robertsdale
	City of Bayou La Batre	City of Saraland
		City of Satsuma
		City of Spanish Fort
		Coastal America
		Clark County
		Congressman Bradley Byrne
		Dauphin Island Bird Sanctuaries
		Dauphin Island Sea Lab

Dog River Clear Water Revival	Mobile Airport Authority	Southeastern Wildlife Conservation Group
Eastern Shore Chamber of Commerce	Mobile Area Chamber of Commerce	The Nature Conservancy
EPA Gulf of Mexico Program	Mobile Area Water & Sewer System	Town of Dauphin Island
Fairhope Environmental Advisory Board	Mobile Bay Canoe and Kayak Club	Town of Elberta
Fort Morgan Civic Association	Mobile Bay Kayak Fishing Association	Town of Loxley
Fowl River Area Civic Association	Mobile Baykeeper	Town of Magnolia Springs
Friends of Perdido Bay	Mobile County	Town of Perdido Beach
Friends of the Bon Secour National Wildlife Refuge	Mobile County Soil and Water Conservation District	Town of Silverhill
Friends of the Tensaw	Mobile County Wildlife and Conservation Association	Town of Summerdale
Grand Bay National Estuarine Research Reserve	National Oceanic and Atmospheric Administration	United States Army Corps of Engineers
Grassroots, Inc.	National Resources Conservation Service	United States Environmental Protection Agency
Gulf Fisheries Management Council	Organized Seafood Association	United States Fish & Wildlife Services
Gulf Shores Convention and Visitors Bureau	Partners for Environmental Progress	University of South Alabama, Coastal Engineering
Lake Forest Civic Association	Senator Jeff Sessions	US EPA Gulf of Mexico Program
League of Women Voters	Senator Richard Shelby	Washington County
Little Lagoon Preservation Society	South Alabama Regional Planning Commission	Weeks Bay National Estuarine Research Reserve
Mississippi-Alabama Sea Grant Consortium		Weeks Bay Reserve Foundation



2

Getting to a  
New CCMP





# Assessment of 2002 CCMP Implementation

**One of the first steps taken to create the new 2013-2018 CCMP was to evaluate whether or not we, as a community, achieved what was recommended in the 2002 plan. Over one hundred recommendations, from development of a monitoring program for key species that are proxies of ecosystem health to supporting/employing new technologies to mitigate human impacts on the environment, had to be evaluated as we considered development of future strategic actions.**

The report, "Comprehensive Conservation and Management Plan (CCMP) Review 2012" includes a review of ten years of accomplishments towards realizing the goals the MBNEP MC set forth in the 2002 CCMP. These accomplishments are the results of the synergy created by MBNEP MC members working together in a spirit of cooperation. This synergy has resulted in the realization of objectives and sub-objectives which may not have been individually attainable.

The CCMP Review 2012 not only documents accomplishments; it brings forward sub-objectives and tasks from the current CCMP which were not addressed. This report is available for review at:

[http://www.mobilebaynep.com/images/uploads/library/CCMPEvalfinal\(1\).pdf](http://www.mobilebaynep.com/images/uploads/library/CCMPEvalfinal(1).pdf)

**It contains over  
one hundred  
recommendations  
to consider  
as we develop  
a new, five-year  
plan/CCMP:**

Citizen participation.

Development of a monitoring program for key species that are proxies of ecosystem health.

Improving citizen education with a particular focus on stormwater management.

Identifying/restoring/protecting areas of most stress and least stress throughout the estuary.

Improving estuarine research.

Improving the regulatory framework to support environmental protection.

Improving management of critical habitats that support estuarine-dependent species.

Supporting/employing new technologies to mitigate human impacts on the environment.

# Assessment of Stressor Impacts to the Estuaries and Coast

To ensure the new CCMP is based on sound science, the MBNEP Science Advisory Committee determined what areas of our coastal environment are most stressed and from what cause(s). Over thirty scientists and resource managers from various disciplines evaluated ecosystem services provided by a set of coastal habitats to determine levels of impact from a suite of stressors.







Gulf of Mexico

# The Coastal Habitats

Alabama's extraordinary species diversity is a product of the mosaic of distinct coastal habitats characterizing our region: They include the remnants of vast long leaf pine forests once dominating our landscape to the sea grass beds and oyster reefs fringing our coastlines. The mixture of habitats found here provides ecosystem services which support more different species than found in any state east of the Mississippi River.

## Beaches and Dunes

The sandy coastlines fronting the Gulf of Mexico support herbaceous plants such as sea oats and other salt-spray tolerant grasses and herbs and provide habitat or nesting area for the Alabama beach mouse, sea turtles and a variety of resident and migratory shorebirds. Beaches and dunes provide the first line of defense against tropical storm surge and wave action.

## Freshwater Wetlands

In areas flooded by rivers and streams, groundwater seepage, or containing topographic depressions holding water, these vegetated habitats serve to slow and store floodwater, recharge groundwater supplies, and trap excess sediments and nutrients to enhance water quality. Freshwater wetlands support highly diverse biological communities and are among the most

highly-stressed and historically-altered habitats in coastal Alabama.

## Intertidal Marsh and Flats

These habitats are tidally inundated with salt or brackish water, support a dense herbaceous plant layer with few shrubs, and represent one of the most biologically-productive natural communities known. Tidal marshes and flats act as storm buffers, reduce shoreline erosion, absorb excess nutrients in runoff, and support numerous important fishery populations. Much of the early development of the City of Mobile was built on land created by filling marshes along the Mobile River.

## Longleaf Pine Habitat

Although longleaf pine was the most prevalent landscape in the southeastern U.S. when Europeans first arrived, most had

disappeared by the early 20th century due primarily to harvest and development. Today, restoration of longleaf pine forests is a conservation priority. Longleaf pine provides exceptional wildlife habitat and is relatively tolerant to both fire and strong winds and resistant to many insects and fungal diseases which attack other pine species.

## Maritime Forest

Once a more prevalent habitat along the northern Gulf coastline, these natural areas now occur in discontinuous, narrow bands, covering the more stable portions of barrier islands and coastal dune ridges. Maritime forests stabilize soils, provide storage capacity for groundwater, and provide wildlife habitat favored by many migratory bird populations.



### **Oyster Reefs**

Oysters attach to one another to form dense reefs in brackish to salty waters in middle and lower Mobile Bay.

In addition to being commercially valuable, oyster reefs provide important habitat for a large number of species; filter impurities from the water, improving its quality; and stabilize shorelines and water bottoms by buffering wave action. In recent years, local oyster production has suffered from oyster drill predation stimulated by high salinities related to drought and incursion of salt water into Mississippi Sound through the breach in western Dauphin Island caused by Hurricane Katrina in 2005.

### **Pine Savanna Forest**

These non-riverine lowlands are poorly drained or seasonally wet and principally dominated by loblolly and slash pines with hardwoods occurring in wetter areas. Pine savanna systems are coastal buffers with widely scattered trees and a predominantly grass-herb understory of high-

species diversity. Decreases in their area and distribution are blamed largely on human development.

### **Riparian Buffers**

These are lands directly adjacent to rivers and streams. Riparian buffers help stabilize stream channel structure and protect streams from upland sources of pollution by filtering and trapping sediments, nutrients, and chemicals.

### **Streams and Rivers**

These are natural, flowing watercourses bounded by channel banks progressing from their sources downstream to the estuary and tidal influence. They may be perennial or intermittent and often have beds comprised of unconsolidated sandy or muddy sediments.

### **Submerged Aquatic Vegetation**

These habitats comprise expansive subtidal or intertidal areas occupied by rooted plants, with freshwater species in areas where riverine flow predominates and brackish to marine species

occurring in the lower reaches of watersheds nearer the influence of Gulf waters. SAV beds filter polluted runoff, reduce erosion, and provide food for waterfowl and manatees and habitat for blue crabs, fish, and other aquatic animals. The extent of this habitat in Alabama has been greatly reduced since the mid-20th century, due in part to land-use conversion and associated degradation of water quality.

### **Subtidal Habitats**

These are the submerged areas below mean low tide including open waters and the Gulf of Mexico. They are an important feature of commercial - and recreational-fishing activities along the Alabama coast. Subtidal areas can include different types of bottom habitat, including unconsolidated sediments, hard bottoms, and SAV beds.

# The Ecosystem Services

Ecosystem services are the processes by which the environment produces the resources we value. The most obvious examples are the services provided by plants - they use the energy of the sun to convert carbon dioxide to the food we eat and the oxygen we breathe. They stabilize soil and prevent erosion and provide habitat for the fish, birds, and wildlife we value. Other examples are less obvious. Wetlands reduce excess nutrients, buffer shorelines from the erosive energy of storms, promote species diversity, and contribute to groundwater replenishment. While we often take these natural processes for granted, ecosystem services have monetary value which would become more apparent if it became necessary to replace them.

## Biodiversity

Alabama boasts the greatest biodiversity, or number of different species of plants and animals, of any state east of the Mississippi River. Nationwide, Alabama ranks fifth in biodiversity, enjoyed and valued by hunters; anglers; birders; anyone who enjoys a day on the water, in the woods, or in a field; and the state of Alabama, which depends upon tax revenue to provide human services upon which we depend.

## Carbon Sequestration

All of the organic molecules upon which life depends have complex "skeletons" made of carbon. Carbon sequestration is the process by which the complex molecules created by plants are stored or sequestered to later provide energy and fuel

to drive our automobiles, trains, planes, and economies.

## Fisheries Habitat

The healthy stocks of commercially - and recreationally - important fish and shellfish that we like to catch and eat are a huge component of the economic engine that powers the state's economy and supports our coastal quality of life. The health of these stocks depends upon habitats providing them the food, shelter, and breeding and nursery areas that they need.

## Flood Control

This is an essential service to people who live in a climate that endures over five and a half feet of rain annually along with periodic tropical weather events. Wetlands and water bodies slow and

store floodwaters, retaining and detaining them, preventing damage to development and infrastructure, and providing opportunities for infiltration and recharge of groundwater supplies.

## Groundwater Replenishment

With natural landscapes increasingly converted to impervious cover, areas promoting infiltration of surface water from rain and storms into the ground are necessary to sustain and replenish the aquifers from which we draw water for drinking, industry, and agriculture.

## Nesting Habitat for Birds and Turtles

Birds and turtles, especially valued by coastal residents and tourists, depend upon very specific habitats to lay eggs and raise young to ensure healthy populations

to be enjoyed by current and future generations along the coast.

#### **Oyster Production**

More than just particularly valued seafood supporting coastal heritage and culture, oysters build complex reefs providing optimal habitat for a gamut of aquatic organisms and reduce wave energy which degrades shoreline habitats.

#### **Primary Production**

Plants use the light energy of the sun to convert simple, inorganic carbon dioxide molecules into a complex organic compound called glucose, the primary energy source for living things and the building block for other more complex organic molecules, and the oxygen necessary for aerobic metabolism. Glucose forms the base of the food pyramid.

#### **Sediment and Nutrient Retention and Export**

Sediments and nutrients both cloud the water, blocking the light necessary for primary production and subsequently depleting

our waters of the dissolved oxygen necessary for aquatic life. Plants found in wetlands, riparian areas, and SAV beds capture these sediments and nutrients and reduce their impacts elsewhere in the estuarine and marine ecosystems.

#### **Storm Buffer/Hazard Protection**

The dune systems lining the Gulf of Mexico and wetlands fringing coastal water bodies are the first line of defense for human interests from the effects of tropical weather-related waves and storm surge. Both attenuate and dissipate waves and slow the onslaught of rising water levels which accompany storms on the Gulf Coast.

#### **Water Quality Enhancement**

Coastal habitats enhance water quality by sequestering contaminants in plant tissues and sediments, capturing and entraining the suspended sediments which block light transmission, and incorporating nutrients that would otherwise

promote growth of harmful algal blooms and deplete critical dissolved oxygen supplies.

#### **Wildlife Habitat**

Wildlife habitat is critically important to supporting the exceptional species diversity in the state of Alabama. As natural landscapes are converted to developed lands, remaining wildlife habitat becomes increasingly important in providing this broad range of species places to live, eat, breed, and raise young.

# The Environmental Stressors

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

## Chemical Contamination

Substances harmful to organisms' health, including metals, pesticides, persistent organic pollutants, chlorination by-products, and pharmaceuticals, find their way into estuarine waters through pathways like direct pesticide or herbicide application, storage leaks, accidental releases, or atmospheric deposition. Some waterborne chemical contaminants adhere to suspended silts and sediments and tend to bioaccumulate in tissues of aquatic life, from algae to fish, ultimately threatening the health of humans.

## Dredging/Filling

Filling occurs primarily in urban areas to convert wetlands to urban and industrial land use. Dredging involves removal of accumulated sediments from waterway bottoms to maintain

adequate depth for vessel navigation and operation. Together, these processes can destroy marshes, impact shorelines and bottom habitat by increasing sediment loading or decreasing sediment availability, reduce habitat diversity, and alter natural flow patterns.

## Fire Suppression

Some coastal plant communities require periodic fires to maintain their health and integrity. After extended periods of fire exclusion, trees become stressed by overcrowding, fire-dependent species like long leaf and other pines disappear, and flammable fuels build up to hazardous levels on the forest floor. Prescribed fire technology is used to reduce hazardous fuels, minimize spread of pest insects and disease, remove invasive species that jeopardize native ecosystems, improve habitat for threatened

and endangered species, recycle nutrients into the soil, and promote growth of desirable trees, wildflowers, and other plants.

## Fragmentation

When humans clear habitat for activities such as agriculture, rural development, urbanization, or creation of hydroelectric reservoirs, habitats which were once large tracks of continuous acreage become divided into smaller, separate fragments. Fragmentation reduces biodiversity by directly destroying plants and sessile (permanently attached organisms). It forces animals, especially birds and mammals, into smaller patches of remnant habitat, leading to overcrowding and unnaturally-increased competition for food, space, and other needs.





Joe's Branch



### **Invasive/Exotic Species**

The introduction of non-native species to an ecosystem disturbs established patterns and decreases biodiversity. A species intentionally or unintentionally introduced by humans tends to disrupt an ecosystem by overpopulation, increased predation and competition, habitat reduction, and resource depletion. Dynamics established over time can be quickly disrupted by introduction of species lacking predator control or displace native species from established ecological niches.

### **Land Use Change**

The conversion of natural landscapes to agricultural or urban uses eliminates the ecosystem services they provided. Reduced infiltration of rainwater, water purification, and primary production, along with habitat fragmentation and loss, increased stormwater runoff, stream bank erosion and sedimentation are all consequences of land use change.

### **Nutrient Enrichment**

Delivery of high concentrations of nitrate and phosphate carried into receiving waters from sanitary treatment facilities and fertilized fields, golf courses, parks, and yards by stormwater runoff promotes accelerated growth of algae through a process called eutrophication. Blooms of planktonic algae accumulate and then decompose, consuming much of dissolved oxygen available in the water column. As the decaying organic matter settles near the bottom, waters become hypoxic, with dissolved oxygen levels insufficient to sustain fish and invertebrates, or anoxic, with essentially no dissolved oxygen. The "dead zone" off the Louisiana coast is an example of the effects of nutrient enrichment.

### **Pathogens**

Disease-causing microorganisms, including bacteria, viruses, and other single-celled organisms, are referred to as pathogens. While the vast majority of bacteria are harmless or beneficial, some, like Salmonella, cause human health problems.

Commonly used bacterial indicators of water pollution like Escherichia coli and Enterobacter, normally associated with fecal waste, are used to assess pathogen levels in waters introduced through sanitary sewer overflows, faulty septic systems, or poorly managed livestock operations.

### **Sedimentation**

Another stressor conveyed to waters by stormwater runoff, sediments degrade condition, whether accumulating on the bottom or suspended in the water column. Accumulated sediments smother and disrupt benthic, or bottom, organisms and habitats. Suspended sediments reduce water clarity necessary for growth of submerged aquatic vegetation, disrupt predator/prey dynamics in fish, and affect immune function, physiological condition, and tissue and cellular structure in several estuarine fishes. Sediment delivery is increased and exacerbated by stream bank erosion and poor construction site management.

### **Sea Level Rise**

As sea levels continue to rise, potential environmental effects include increased storm damage to coastal infrastructure, more rapid coastal erosion, shoreline change and potential loss of protective natural barriers, and saltwater intrusion into aquifers and surface waters.

### **Climate Variability**

The impacts of a changing climate on our planet and in our region include greater temperature extremes with higher mean temperatures; rising sea levels; floods; increased risk of drought and fires; changing landscapes; and stronger, more frequent storms and tropical weather events.

### **Freshwater Discharge**

What makes estuaries so important to marine fisheries is their brackishness. Many key commercially and recreationally significant fish and shellfish species depend upon freshwater discharge from rivers to create the brackish condition of estuaries and the plant communities found in them to complete developmental portions of their life cycles. Significantly reduced freshwater discharge related to droughts makes oysters especially vulnerable to predation by oyster drills which thrive in relatively higher salinities. Conversely, particularly high levels of freshwater discharge may push some estuarine species downstream towards the more saline waters of the Gulf.

### **Resource Extraction**

The concept of resource extraction as a stressor to the Mobile Bay estuary includes gas and oil exploration and production, logging, and the harvest of living resources like fish, oysters, shrimp, and crabs. Oil and gas exploration are blamed for significant wetlands loss in southern Louisiana, where digging of canals and installation of infrastructure have exacerbated subsidence-related wetlands loss. Logging makes landscapes more vulnerable to the erosive impacts of stormwater, triggering streambank erosion and sedimentation. Harvest of living resources like oysters and shrimp can degrade habitats important to other estuarine species, and overfishing impacts populations and predator/prey dynamics.

## The Methodology

Understanding which of the different coastal habitats providing critical ecosystem services most threatened by anthropogenically (human-related) stressors was a target of MBNEP's Science Advisory Committee. In June, 2011 over 30 scientists and ecologists were recruited to evaluate the impact of each of a suite of common anthropogenic stressors on provision of important ecosystem services by the various coastal habitat types. For each of the 10 coastal habitat types, each of 13 stressors was rated numerically between zero, for those having absolutely no negative impact, and three for those having the most direct negative impact for each of the 14 recognized ecosystem services. All this information was compiled onto a spreadsheet containing a total of 1,820 cells. In cases where a stressor was unrelated to the provision of a service by a habitat, or where an evaluator felt unqualified to judge, respondents were instructed to leave cells blank. Any blank cells were not incorporated into the analysis.

Data from the respondents were combined and analyzed to provide average scores for each stressor/ecosystem service/coastal habitat type cell. With subsequent concern some averages might represent a small number of responses, the standard deviation of each determined average and number of responses were added and reviewed. This information provided an indication of the level of confidence and the variability for an average response. Where cells contained less than 7 responses for averaging purposes, MBNEP recruited additional respondents with that type of expertise to round out the averages.

The SAC determined any tabulated value of 2.2 or higher indicated significant stress. Response frequency histograms were subsequently generated to tease the validity of cells calculated on a small number of responses. Where those occurred, the SAC sought input from additional experts to resolve questions with confidence.

From this effort, three habitat types - freshwater wetlands, streams, rivers and riparian buffers, and intertidal marshes and flats - were identified as most stressed from dredging and filling, fragmentation, and sedimentation, all related to land use change. As you can see from the accompanying table, these three habitat types and the ecosystem services they provide are related to several, if not all, of the things people value about living in coastal Alabama.

The full evaluation can be found at:

[http://www.mobilebaynep.com/what\\_we\\_do/ccmp/](http://www.mobilebaynep.com/what_we_do/ccmp/)

HABITAT	ECOSYSTEM SERVICES MOST STRESSED	TOP STRESS IMPACTS	CITIZEN VALUES
<b>Freshwater Wetlands</b>	Nesting for birds and turtles Biodiversity Wildlife Fisheries	Land-use Change Fragmentation Dredging and Filling	Access Fish Heritage Resilience Water Quality
<b>Intertidal Marshes and Flats</b>	Biodiversity Fisheries Wildlife Water Quality	Sediment Sea Level Rise Fragmentation	Access Fish Heritage Resilience Water Quality Beaches
<b>Streams and Rivers (Riparian Buffers)</b>	Fish Bio Diversity Water Quality Sediment	Freshwater Dishcharge Land-use Change Sediments	Access Fish Heritage Resilience Water Quality

## What do Citizens Value about Living on the Coast?

In 2010, MBNEP initiated CCMP planning by recognizing a need to use citizen input as a foundation for future planning efforts. By basing the next CCMP on what people value, our hope is to more fully engage our coastal community in taking ownership of our environmental future. MBNEP hired Research Strategies, Inc. to undertake an assessment of what people value most and what concerns them most about living in coastal Alabama.

Five hundred and fifty citizens, randomly selected by zip code across the two counties, participated in this assessment. This study was augmented by a series of community organization meetings with the Saraland Chamber of Commerce, Bay Minette Rotary, Fowl River Civic Organization, North Mobile Rotary Club, both the Baldwin and Mobile County Leagues of Women Voters, Gulf Shores Kiwanis, and Robertsedale Rotary Clubs. In addition, MBNEP held two citizen input meetings for the general public in Mobile and Baldwin counties.

Finally, Auburn University was commissioned to undertake a "community values" mapping study where 264 residents randomly selected from Mobile and Baldwin counties identified areas on a map that were of particular value or concern. These responses were compiled into maps displaying "kernel densities" or "hot spots" throughout the two counties related to those values and concerns. All of these products are available for review at [http://www.mobilebaynep.com/images/uploads/library/Community\\_Assessment\\_GIS.pdf](http://www.mobilebaynep.com/images/uploads/library/Community_Assessment_GIS.pdf)



In sum, these efforts produced input from over one thousand residents. An analysis of this input revealed six common values that are most important to our coastal quality of life:

( *Italics indicates corresponding 2002 CCMP value* )



**Access** to water/open spaces for recreation and vistas (*Human Uses*)



**Beaches and Shorelines** protection, economy, beauty (*Habitat Management*)



**Fish** habitats, abundance, livelihood (*Living Resources*)



**Heritage/Culture** This is a new value aimed at protecting the legacy of the coast



**Resiliency** The capacity of human and natural physical systems to rebound from unforeseen events; protecting beauty (*Human Uses/Habitat Management*)



**Water Quality** Whether drinkable, fishable or swimmable, the public places high value on quality rivers, creeks, and bays (*Water Quality*)

The biggest concerns revealed during this same input process included:

**Stormwater** (including flooding, erosion, trash, polluted runoff, increased sediments).

**Public indifference**

**The following section provides background information on each of the six values identified.**





## Access

Just as it was important 10 years ago, so it is today - having **access** to our coastlines is something about which people care deeply. In the "Human Uses" section of the first CCMP, the original focus was to expand camping and recreational facilities and awareness of those sites. As it was in the "first round," providing more opportunities to access the very ecosystems they value most and educating them about their surroundings is critical to establishing a connection between the public and the environment. It will illuminate the lasting impacts human disturbance and alteration have on our sensitive ecosystems. A balance that must be reached

when people and nature come together, and the issue of trash in and around our waterways again appears as a top concern. Access is an important component of coastal protection because the more connected people are to the resource, the more they will value and protect it.

There are many venues providing access to our coastal environment, including Gulf State Park, Bon Secour National Wildlife Refuge, Weeks Bay National Estuarine Research Reserve, Robinson Island, Orange Beach Canoe/Kayak Trail & Waterfront Park, Five Rivers Delta Resource Center, and various municipal waterfront parks. All support the

public's desire to access nature. However, some, due to their location adjacent to privately-owned properties, provide limited public use, and there are others in disrepair or scarcely used. The 2013-2018 strategies address expanding access to include a broader range of natural experiences and maintenance for existing access points. Increases in public access, while achieving a delicate balance with nature, will require adequate funding and implementation of fair and reasonable regulatory practices. The new CCMP sets forth clear actions to address these issues based on successful models already in practice in other areas.



Arlington Park





## Beaches, Dunes, and Shorelines

Maintaining natural **coastlines**, beaches and dunes is another area of importance being revisited in the new CCMP. Originally included under Habitat Management, this value has been narrowed to focus specifically on intertidal marshes and flats; sandy beaches; armored shorelines; marsh shorelines; and dunes. The first CCMP focused on reducing the loss of beach and dune habitat through regulation changes, determining the impacts

of dredging activities and disposal practices on natural beach erosion processes, researching the extent of shoreline erosion caused by boat wakes and other factors, and reducing the loss of intertidal habitat due to bulkheading or shoreline armoring. Over the past ten years, an inventory of shoreline changes along the Alabama coast since 1979 has been conducted, as has the re-nourishment of 16.5 miles of Gulf-fronting beach in Gulf Shores and Orange Beach

after severe erosion brought on by storms since 1995. A dune restoration project restored 55 acres of primary dune habitat in and around Gulf Shores, Orange Beach and Fort Morgan. Today, following years of research, the issues of establishing more natural shorelines on bays, backwaters, and rivers has become as important as protecting our Gulf-fronting beaches in an effort to restore and protect healthier, resilient, and habitat-rich shorelines.





## Fish

**Fish** and seafood are fixtures along the Alabama coast, valued as an industry, a primary recreational pastime, and a staple of the diets of residents and visitors. Area waters have historically provided a plethora of commercially and recreationally-important fish and shellfish species. However, with reduced landings in recent decades, it has become apparent human impacts on fish populations or the value of fish populations as an indicator of ecosystem health have never been adequately examined. The 2002 CCMP called for research to establish the status and trends of individual species of living estuarine resources and identification of indicators of ecological change. Objectives relating to restoration of habitat and management of these living resources required detailed knowledge of the abundance and distribution of estuarine fishes and invertebrates. Some of that information is now available through reports like the "Analysis of the Long Term Fisheries Assessment and Monitoring Program" derived from the data set collected by the Alabama Department of Conservation and Natural

Resources, Marine Resources Division, and the Fisheries Oceanography of Coastal Alabama's (FOCAL's) long-term baseline survey which concentrates on gathering biological and oceanographic data. With the help of academic/public partnerships like that found in the Dauphin Island Sea Lab's Manatee Sighting Network, the monitoring of key estuarine living resources like this endangered species has been expanded with assistance of volunteers, which not only helps track and study these mammals, but also provides a means to predict ecosystem responses to environmental changes.

Like the estuary itself, the issue of fish is complicated, involving many interconnected facets. For instance, one cannot look at the health of the living resource - fish - without also examining the health of the critical resource needed for all aquatic species to thrive - sea grass. SAV distribution has severely declined in recent decades due to both natural and human-related disturbances. While efforts to reverse SAV loss are underway using wave attenuation techniques, these efforts will only achieve limited success unless the quality of water coming from

upstream is improved. This relationship between fish, habitat, and water is a prime example of the interconnectivity of ecosystem components.

One of the most severely-impacted resources over the past decade has been oysters. A commercial seafood staple, most of the nation's total oyster harvest comes from the Gulf Coast. The massive reefs supporting the Alabama oyster fishery are the foundation of a healthy and resilient coastal ecosystem, not only for the oyster, but also for other species relying upon the reefs for food or shelter. They provide coastline protection from erosion, and they help clean the water of sediments and pathogens. Many acres of oyster reef have been lost due mainly to predation by oyster drills related to drought, tropical weather events, and even increases of sediment in the water due to land use changes. Currently, there are several programs working to restore reefs. The Roads to Reefs and 100-1000: Restore Coastal Alabama public/private initiatives are underway. On Mon Louis Island, a living shoreline restoration included oyster reef restoration as part of the plan.





Bounty from the Gulf of Mexico





Bayou la Batre





## Heritage and Culture

Preserving our coast's **heritage and culture** was identified by the community due to concerns that the bay and estuarine waters providing such pleasure to many as youth will not be there for their grandchildren to enjoy in the future. This subject takes into account the more than 10,000 years of history related to the estuary, as evidenced by ancient oyster shell mounds like those found on Dauphin Island, the deltaic remains of Indian cultures from long ago, sunken Civil War ships scattered across the estuary bottom, and the anglicized names of residents reflecting the French heritage of coastal Alabama. Economies have long thrived because of these natural ecosystems. Alabama's Coastal Connection Corridor

Management Plan identifies, promotes, and enhances the assets, including history, of Alabama's coast through the development and implementation of a corridor management plan and through obtaining both state and national designation as a Scenic Byway. This byway courses across coastal Alabama through communities of residents whose vocations frequently reflect those of generations past: commercial fishermen, shrimpers, crabbers, and oystermen; ship builders and outfitters; seafood processors, farmers, and restaurateurs. The pride in coastal Alabama is tangible, reflected in the numbers who see fit to remain where their ancestors settled, were born, and lived.

**Heritage and culture** are not limited to fishing villages and working waterfronts, but include the concerns of grandparents who remember a clear Dog River unencumbered by shoreline trash; a navigable D'Olive Bay not choked by sediment; a flourishing Delta without dying trees or eroded marshes; and intact, sea oat-covered sand dunes. Preserving these treasures for their grandchildren and future generations could not be more important. **Heritage and culture** is about protecting all of the things long valued in coastal Alabama – to be experienced and not just memories accessible through books or computer screens.



## Resilience

One key component to the preservation of our coastal heritage is to protect our coastal communities - both human and ecological - from a range of natural hazards.

**Resilience** refers to the coordinated actions needed to reduce vulnerability, and develop plans to facilitate a quick response and an effective long-term recovery should a disaster occur. It requires coastal management, emergency response, and community development. It incorporates land use planning, hazards mitigation, resource protection, community cohesiveness, and cultural preservation. Already, on both sides of Mobile Bay, mitigation planning in some urbanized areas has been developed or revised to include hazards

and their historical impacts. These plans establish both short - and long-term mitigation strategies, implementation tasks and goals, and strategies and objectives for minimizing them. Currently, Gulf Of Mexico Alliance (GOMA) Resilience Team projects are underway, providing tools to coastal communities to better understand the risks and impacts associated with coastal hazards, including climate change.

The Community Resilience Index is a tool available to communities to determine their level of preparedness for storms and storm recovery. FEMA's and the National Flood Insurance Program's (NFIP's) Community Rating System

(CRS) is used as a voluntary incentive program recognizing and encouraging community floodplain management activities which exceed the minimum NFIP requirements. Flood insurance premium rates are discounted to reflect the reduced flood risk resulting from community actions to meet the CRS goals. Since many communities across the country have already begun to implement programs to enhance resilience, a Resilience Team project of Mississippi-Alabama Sea Grant Consortium (MASGC) and GOMA is underway to research existing policies guiding coastal development and make recommendations to enhance resilience using best management practices.





Clean Up The Bottom 2011





## Water Quality

Completing the connection of values of the new CCMP is **Water Quality**, without which, none of the above values would exist. The community continues to desire water that is drinkable, swimmable, and productive for marine life. Many challenges faced the waters of the Mobile Bay estuary 10 years ago. In the past, negligent management practices and uninformed development decisions allowed for pollution from point and non-point sources to flow into sensitive habitats. Increased sedimentation from urban development, dredging, and erosion were common. The 2002 CCMP generated many positive changes. Management and monitoring plans,

like those developed for the Weeks Bay NERR and the Bon Secure NWF have contributed to the conservation and restoration of area waters. The Alabama Department of Environmental Management's (ADEM's) Water Quality Program reports water quality conditions to the EPA, provides biennial lists of impaired waters, develops total maximum daily loads (TMDLs) for impaired waters, develops waste load allocations, and includes water quality in planning processes. Several successful community-based volunteer programs like Alabama Water Watch (part of the Global Water Watch program, a citizen volunteer, water-quality monitoring program

covering all of the major river basins in Alabama) have been established.

A common theme voiced throughout the community input process was the issue of trash -on our beaches; at access points throughout the estuary; degrading pristine shorelines; and clogging boat motors, nets, waterways, and shorelines. Trash is more than visual pollution - it threatens our physical and economical coastal environment. Stormwater continues to be a major challenge carrying toxins, nutrients, pathogens and trash into waterways as public resistance to fund implementation of a broad-scale plan persists.



Fowl River





3

The CCMP  
Five Year  
Strategies



# Translating Values into Action

Continuing to develop and refine the CCMP 2013 – 2018 requires an over-arching view of where we are currently, where we wish to be in 5 years and how we plan to get there. Research by diverse teams ranging from scientists to citizens begins to give us the benchmark data as well as important feedback revealing what people most value about life in the watershed. The following four statements helped guide us as we gathered this vital information throughout the Mobile Bay Watershed.

**Vision** Alabama’s estuaries, where the rivers meet the sea, are healthy and support ecological function and human uses.

**Purpose** The 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/promote their implementation.

**Mission** To provide the tools to promote the wise stewardship of the water quality and living resource base of the Mobile Bay estuary and the Mobile-Tensaw Delta.

**Goals**

- Water that is fishable, swimmable, and drinkable (meeting or exceeding state’s designated uses)
- 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
- Participating stakeholders’ capacities are effectively integrated and leveraged

# **MBNEP works within a set of guiding principles to maximize its effectiveness in promoting estuary health.**

## **Those that live it know it**

Citizens, fishermen, boaters, scientists, hunters and others have a unique insight into the environmental challenges we face, what works, and what doesn't. Stakeholder input is vital to developing long-term solutions to local challenges.

## **Economic opportunities must be available**

Our coast is an economic engine, creating significant wealth for our State each year through activities such as trade through the Port of Mobile, recreational and commercial fishing, tourism, hunting and coastal construction. In order to have a healthy economy, we need to have a healthy environment that provides essential natural functions.

## **Environmental Stewardship is interconnected**

Residents, towns, cities, counties, business and industry, academia, community developers, and social services - all have a vested interest in preserving the quality of life derived from Mobile Bay and Mobile-Tensaw Delta estuaries. Coalitions that bring together a diversity of 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**

Involvement of citizens in carrying out activities aimed at improving the Bay and its watersheds is paramount to ensuring the long-term health and vitality of the Mobile Bay estuary. Citizens must be actively engaged in balancing the many uses of the Bay so that we can preserve its unique natural resources for all of our needs.

**The MBNEP believes that everyone deserves the opportunity to experience the beauty and bounty of Alabama's estuaries - its rivers, creeks, bays, and bayous, abounding diversity of fish and wildlife, productive wetlands, and forests, dunes, and beaches. Alabama's estuaries are integral to the common good of our community and economy.**

# Defining the Universe of Possible Actions

Knowing what CCMP actions still need to be addressed, where stresses throughout the coastal region are most acute, and what people value about living in coastal Alabama, the next step in the CCMP process was to define the universe of possible actions that could be taken to protect, restore and conserve Alabama's estuaries and coastal environments. To achieve this, teams were built for each of the six things people value most about living in coastal Alabama. Each of these volunteer teams were led by experts in that particular field. These leads recruited team rosters which included policy makers, representatives of federal and state resource management agencies and non-governmental organizations, as well as others who would contribute to determining five-year priority actions for their team's "value." The teams and team leads were:

## Access

### TEAM LEAD

#### Mr. Phillip Hinesley

Chief, Alabama Department of Conservation and Natural Resources, State Lands Division, Coastal Section

### TEAM LEAD

#### Ms. Colette Boehm

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#### Bruce Coldsmith

Dog River Clearwater Revival

#### Blakeley Ellis

Coastal Conservation Association

#### Walter Ernest

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#### Eva Golson

Mobile Film Office

#### Tracy Holiday

Citizen Representative

#### Cathy Janasie

MASGC Legal Center

#### Eliska Morgan

Congressman Jo Bonner

#### Brittany Petersen

US Fish and Wildlife Service

#### Kelly Reetz

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#### Kristen O'Keefe

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#### Mathew Capps

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#### Jeff Collier

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#### Jeff DeQuattro

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#### Dr. John Dindo

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#### Steve Jones

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**Homer Singleton**  
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**Lee Walters**  
Goodwyn, Mills, Caewood

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**Patti Powell**  
ADCNR State Lands

**Roberta Swann**  
Mobile Bay NEP

**Brenda Lowther**  
Mobile Bay NEP

Once assembled, each team was provided with a "homework packet" that included a "Situation Analysis" of their value; the citizen comments received during the input process; a summary of the SAC stressor assessment pertaining to their value; and the recommendations included in the CCMP Review 2012 included as opportunities in the Situation Analysis. Each team member was responsible for reviewing the information in the homework packet so all members would have a similar level of understanding of the issues associated with their value.

On November 29, 2012, MBNEP convened all value teams at the Arthur J. Outlaw Convention Center in Mobile, AL to begin the process of strategy development, specifically building a data base of potential actions to protect, conserve, or restore each "value." All were asked to identify **priority areas of concern** within their "value" that addressed the following areas of action, *keeping in mind the habitats and ecosystem services under particular stress*:

- a) Status and Trends, including research and monitoring.
- b) Ecosystem restoration, protection, and conservation.
- c) Capacity Development - Professional education/training needs; policy changes related to their particular "value," possible changes in state or local regulations; attainment of state - or federal-level recognition, etc.
- d) Building Community Stewardship, including outreach and education to raise awareness.

In addition each team was asked to define actions that could be taken and potential outcomes that could be achieved over the next five years to address the concerns identified, as well as means of measuring progress.

### **Common outcomes from this process included:**

**Create access to the water and open spaces.**

**Ensure the health and sustainability of our beaches and shorelines.**

**Restore, protect, and conserve habitats supporting an abundance of fish and other wildlife.**

**Protect and promote our heritage and culture as it relates to our coastal environment.**

**Expand environmental health and resiliency.**

**Improve water quality so it is fishable, swimmable and drinkable.**

A list of over 140 actions was compiled through this effort. MBNEP posted a draft of the CCMP for public comment including these actions and sought additional community input to prioritize this long list. Input was received from 232 respondents and, based on their efforts; prioritized actions were assigned to appropriate MC committees for inclusion in five-year strategies.





Mon Louis Island



# Prioritizing Areas of Most and Least Stress

The Mobile Bay watershed is enormous – over 43,600 square miles – and drains most of Alabama and parts of three other states. It comprises many subwatersheds classified numerically by the USGS into Hydrologic Unit Codes, or HUCs. The overall Mobile Bay (or Mobile-Tombigbee) Watershed has a HUC of 0316. It can be divided into two six-digit HUCs (031601 and 031602) or 18 eight-digit HUCs (e.g., 03160101 or 03160205). For planning purposes, the EPA prefers a scale of 12-digit HUCs, the smallest geographical area classified in the USGS schema. There are 98 12-digit HUCs in Alabama’s two coastal counties draining into receiving waters like Fowl River (HUC031602050205), Magnolia River (HUC031602050308), and many others.

Towards developing a five-year ecosystem restoration strategy, MBNEP’s Project Implementation Committee adopted a protocol of watershed management planning at the 12-digit HUC level to guide science-based project implementation. The PIC sought community input to prioritize coastal watersheds to pursue planning and project implementation. To develop an initial “short list” of priority watersheds, MBNEP identified 23 12-digit HUCs in Baldwin and Mobile counties. Each contained patches of at least two of the three habitats determined to be most impacted by a suite of anthropogenic stressors in delivery of services. These watersheds included:

- > Bayou Heron  
Grand Bay Swamp
- > Bayou La Batre River
- > Big Creek (Juniper & Hamilton Creeks)
- > Bon Secour River
- > Cedar Creek (Upper & Lower)
- > Dauphin Island
- > Deer River
- > Dog River (Upper, Lower, & Halls Mills Creek)
- > Eight Mile Creek
- > Fish River (Upper & Lower)
- > Fowl River
- > Halls Creek
- > Hammock Creek
- > Little Lagoon
- > Negro Creek
- > Oyster Bay
- > Perdido Pass (Frontal Gulf of Mexico)
- > Rains Creek
- > Skunk Bayou
- > Tensaw Apalachee River, Grand Bay, The Basin
- > Three Mile Creek
- > Upper Blackwater River
- > West Fowl River
- > Wolf Bay

Each of these watersheds, with two exceptions (Three Mile Creek and Eight Mile Creek), was analyzed and displayed at a February, 2012 public meeting in a series of maps using GIS layers to display different evaluation criteria, some based on the MS-AL Habitat Mapper, which included:

- > Priority Restoration Watersheds
- > Priority Conservation Watersheds
- > Priority Freshwater Wetlands
- > Priority Intertidal Marshes and Flats
- > Priority Areas for Acquisition
- > Protected Lands
- > Outstanding Alabama Waters
- > Impaired Waters
- > Waters with defined Total Maximum Daily Loads (TMDLs)
- > Point Source Discharges (NPDES Permits)
- > Toxic Release Inventory Sites
- > Percent Urbanization
- > ADEM Surveys
- > Watershed Management Plans (old)
- > GSA Sediment Studies Completed
- > Watershed Management Plan (current)
- > ADEM Long-term Monitoring Stations



Because this process was used to inform priorities for watershed planning, three watersheds were not evaluated: D'Olive (including Joes Branch and Tiawasee Creek), Three Mile Creek, and Eight Mile Creek, since each of these watersheds currently have comprehensive management plans in the implementation phase.

Meeting attendees used digital recording keypads to rate the priority of each remaining watershed on a scale of one (lowest) to five (highest) based upon the information provided. The table below shows the response distribution, number of responses, point totals, and mean response value for each of the watersheds evaluated. Watersheds are sorted according to mean response value from highest to lowest.

<b>WATERSHED</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>TOTAL RESPONSES</b>	<b>POINT TOTAL</b>	<b>MEAN RESPONSE VALUE</b>
Fish River	1	0	3	21	31	56	249	4.45
Tensaw Apalachee	1	4	3	17	32	57	246	4.32
Big Creek	1	3	8	12	31	55	234	4.25
Bon Secour	0	1	7	26	22	56	237	4.23
Fowl River	1	4	7	15	30	57	240	4.21
West Fowl River	0	5	8	18	26	57	236	4.14
Dog River	3	4	10	15	26	58	231	3.98
Deer River	1	4	11	21	18	55	216	3.93
Grand Bay Swamp	0	4	8	22	11	45	175	3.89
Graham Bayou	3	7	17	15	13	55	193	3.51
Bayou La Batre River	1	7	22	19	8	57	197	3.46
Oyster Bay	1	6	26	15	9	57	196	3.44
Hammock Creek	3	9	18	11	14	55	189	3.44
Dauphin Island	6	6	18	10	15	55	187	3.40
Little Lagoon	4	11	14	12	12	53	176	3.32
Upper Blackwater	2	8	23	18	5	56	184	3.29
Rains Creek	4	12	19	14	7	56	176	3.14
Halls Creek	9	9	19	11	9	57	173	3.04
Skunk Bayou	6	16	16	13	7	58	173	2.98
Negro Creek	4	17	26	5	2	54	146	2.70
Cedar Creek	9	19	18	9	1	58	142	2.54

The PIC then worked to develop an inventory of resources and needs for each of the prioritized watersheds to guide project implementation. In addition, the PIC agreed to include any other 12-digit HUC with direct tidal influence to the list of priority watersheds because they have a demonstrable connection to the resources potentially injured during the Deepwater Horizon incident, elevating their priority for any possible settlement funds.

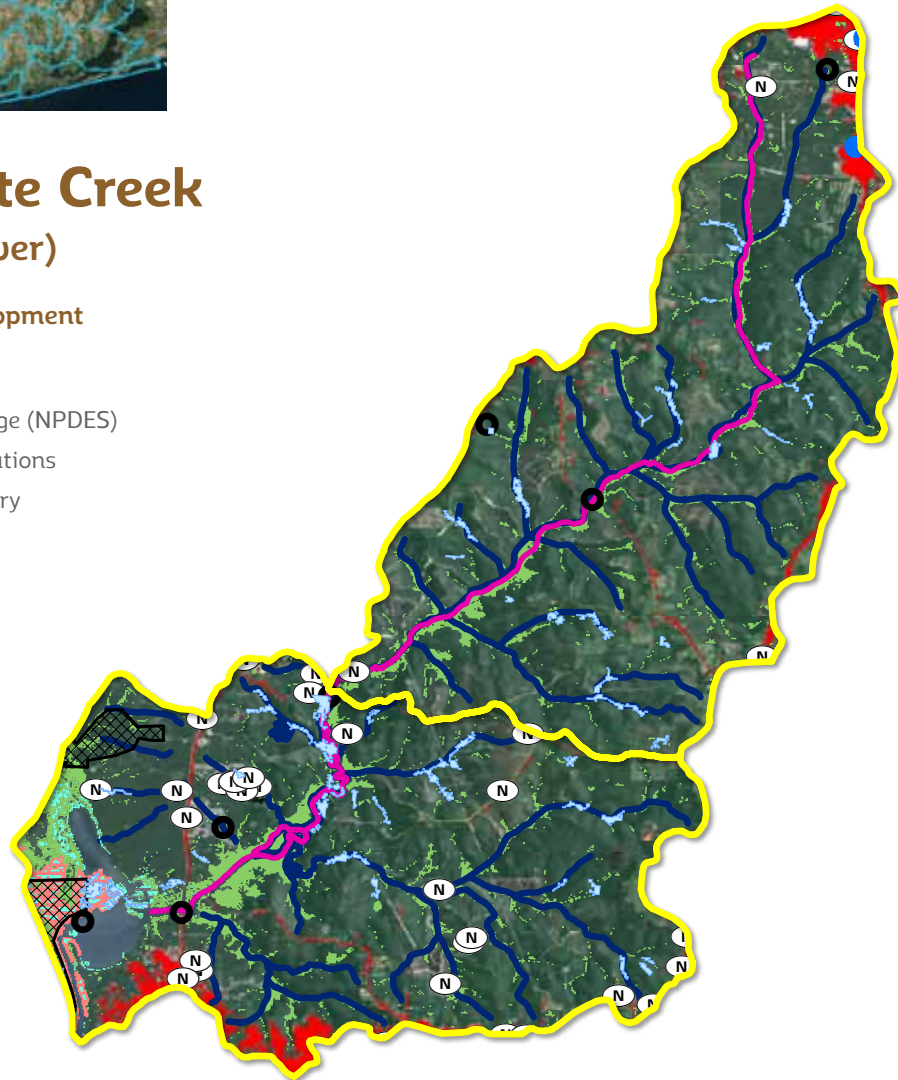
The following inventory of maps with evaluation criteria displayed using GIS layers includes the initial list of PIC-prioritized watersheds. Additional Baldwin and Mobile county watersheds have been subsequently added for consideration due to direct tidal influences. During the evaluation process, some of these watersheds may be grouped due to proximity and similar resources, needs or issues.















# Bay Minette Creek (Upper and Lower)

\* Currently in Development

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Toxic Release Inventory
- 5 Protected Lands
- 6 Prioritized Intertidal Marshes and Flats
- 7 Impaired Waters - Metals (mercury)



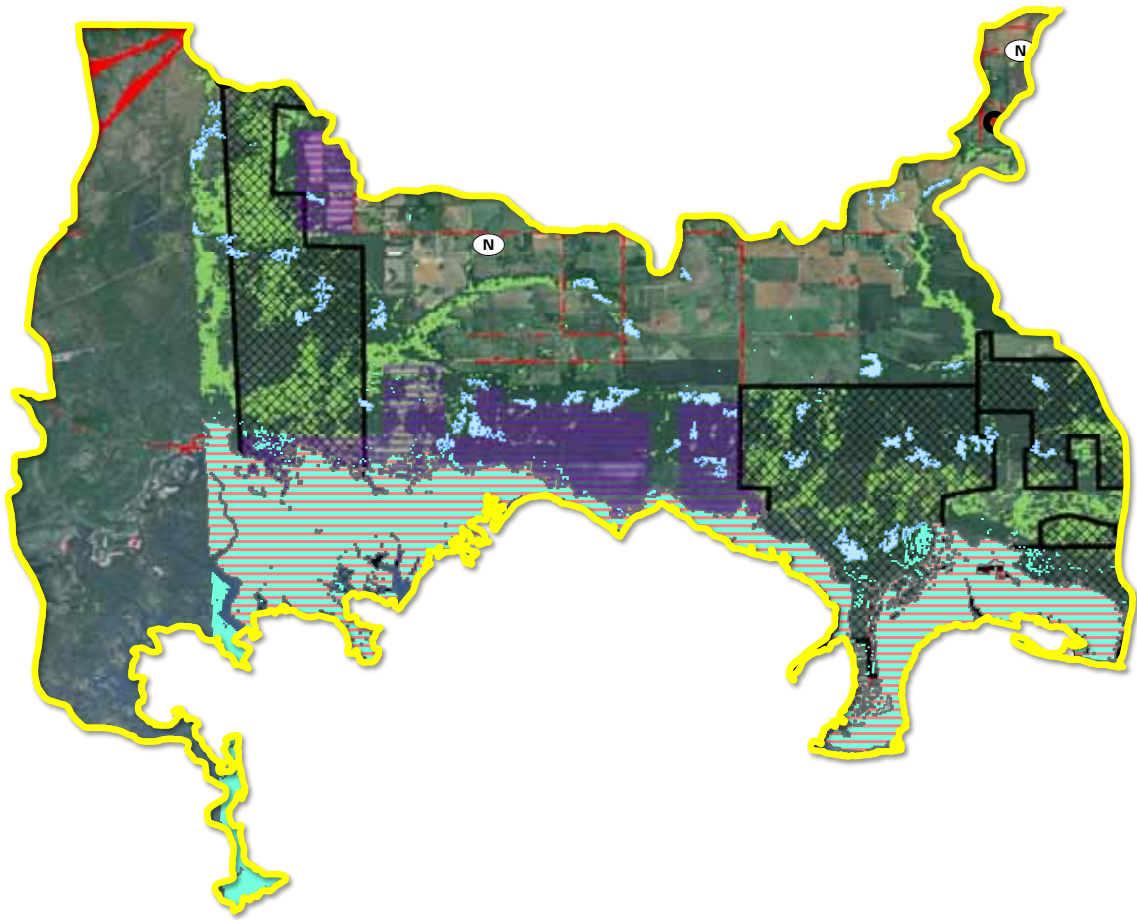
## Legend

	Watershed Boundary		Intertidal Marshes Flats Prioritized Natural Resource Conservation
	Prioritized Wetlands		Intertidal Marshes Flats Prioritized Hazard
	NPDES		Intertidal Marshes and Flats
	ADEM Monitoring Stations		Streams and Rivers
	Toxic Release Inventory		Wetlands
	303d List		Urban Land Use Land Cover
	Protected Lands		













# Bayou Heron, Grand Bay Swamp

- 1 Prioritized Watershed for Conservation
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations
- 5 Prioritized Intertidal Marshes and Flats
- 6 Acquisition Property
- 7 Protected Lands



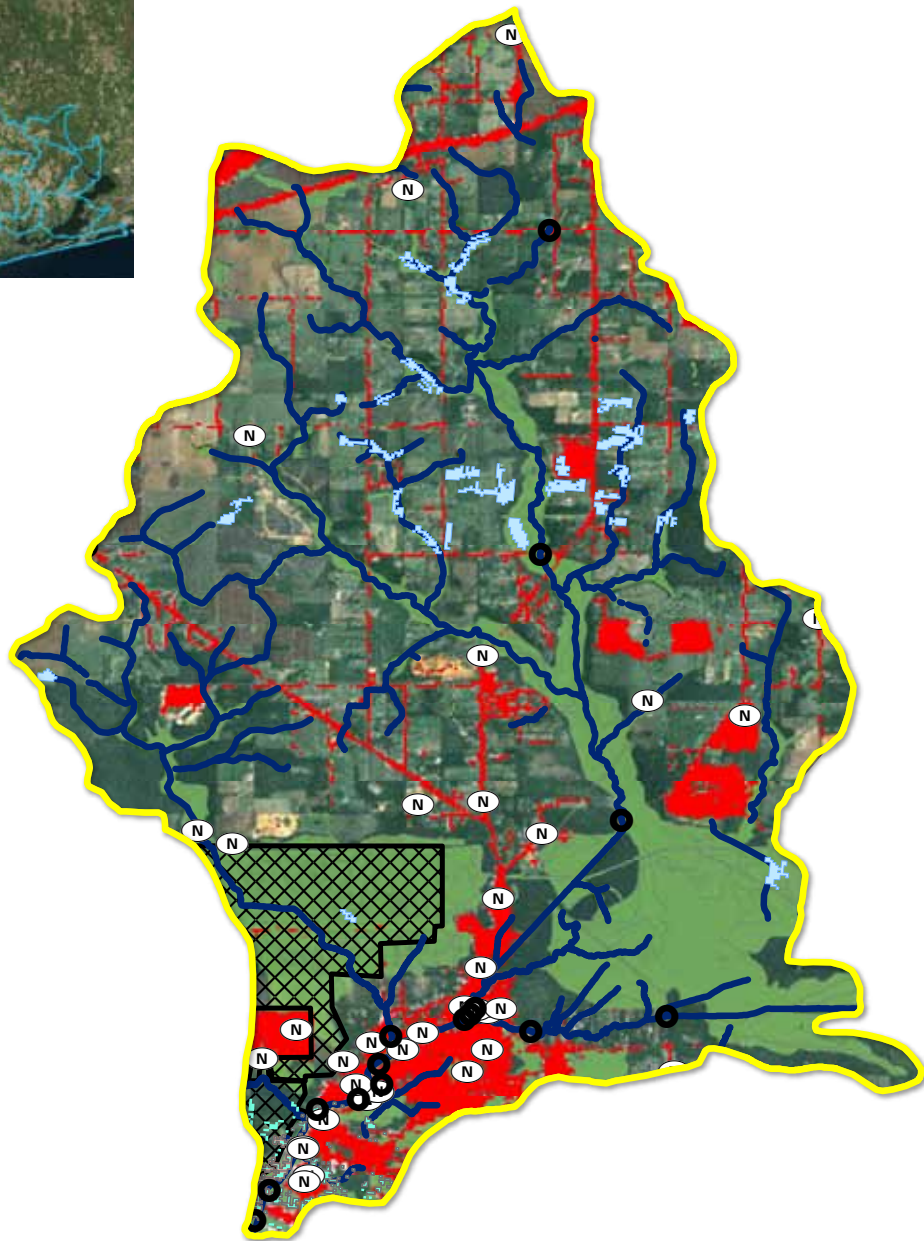
## Legend

- |  |  |
|--|--|
|  Watershed Boundary   |  Intertidal Marshes and Flats |
|  Prioritized Wetlands   |  Acquisition Property         |
|  NPDES  |  Protected Lands              |
|  ADEM Monitoring Stations   |  Wetlands                     |
|  Intertidal Marshes Flats Prioritized Natural Resource Conservation |  Urban Land Use Land Cover    |














# Bayou La Batre River

- 1 Prioritized Watershed for Restoration
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations
- 5 Prioritized Intertidal Marshes and Flats
- 6 Acquisition Property
- 7 Protected Lands
- 8 ADEM Water Quality Survey



## Legend

 Watershed Boundary	 Intertidal Marshes and Flats
 Prioritized Wetlands	 Streams and Rivers
 NPDES	 Acquisition Property
 ADEM Monitoring Stations	 Protected Lands
 Intertidal Marshes Flats Prioritized Natural Resource Conservation	 Wetlands
	 Urban Land Use Land Cover

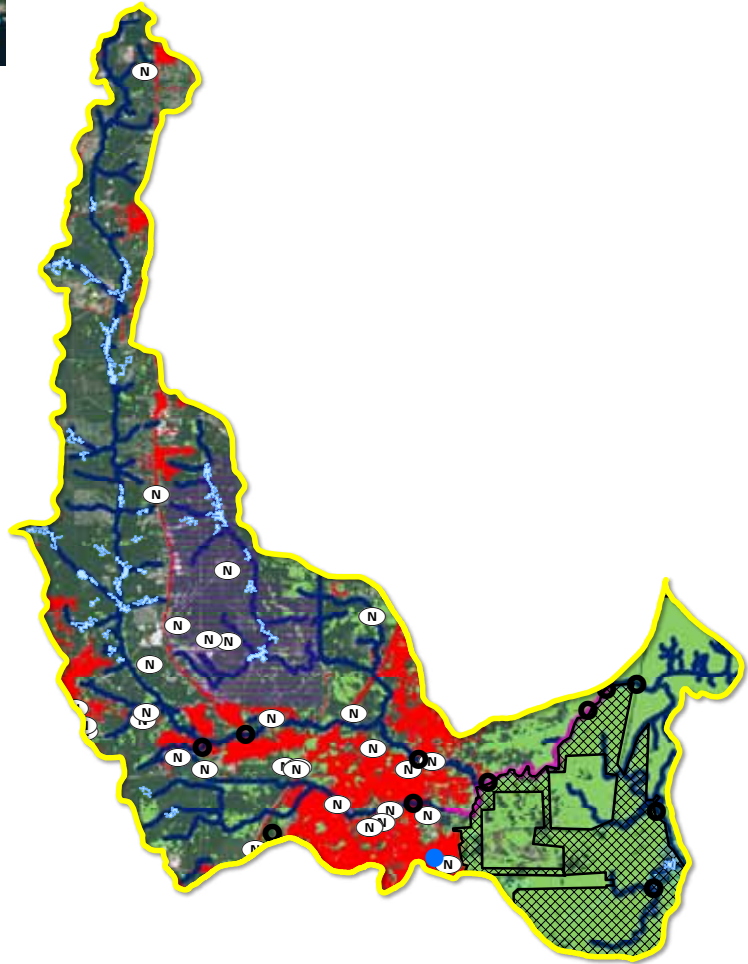

















# Bayou Sara

**\* Currently in Development**

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 Toxic Release Inventory
- 4 ADEM Monitoring Stations
- 5 Prioritized Intertidal Marshes and Flats
- 6 Acquisition Property
- 7 Protected Lands
- 8 Impaired Waters
  - CBOD (carbonaceous biochemical oxygen demand)
  - NBOD (nitrogenous biochemical oxygen demand)



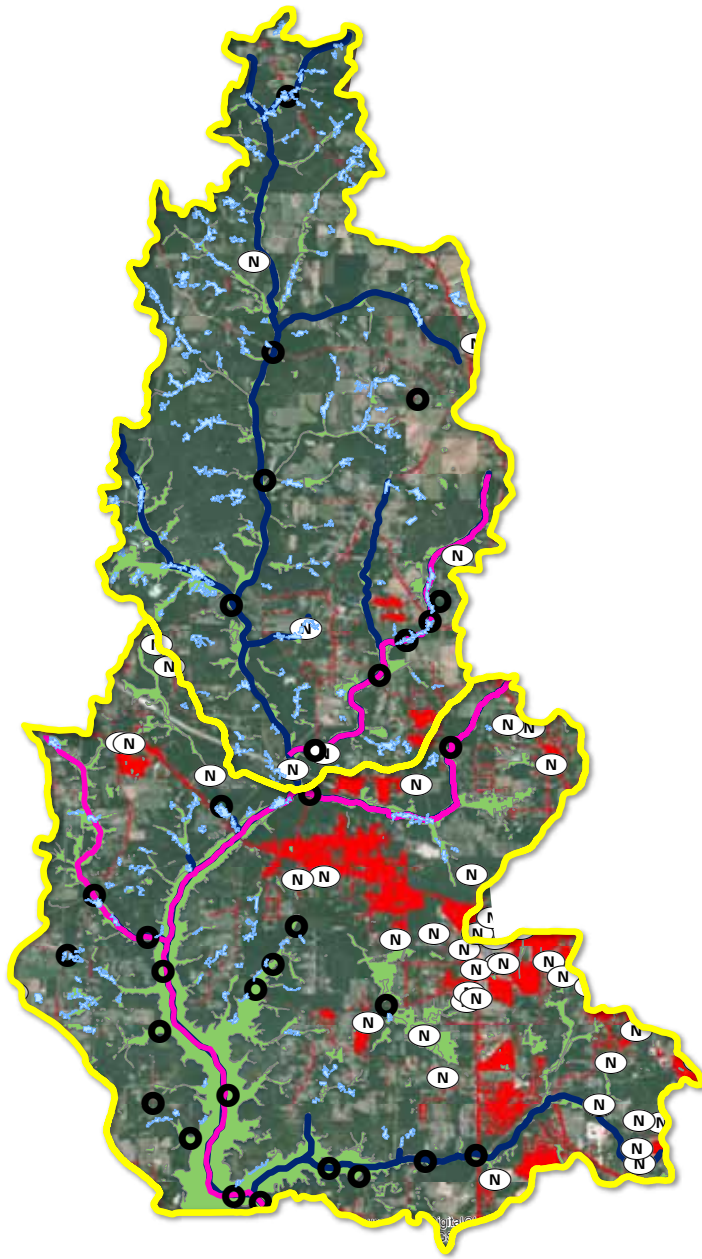
## Legend

- |   |                          |  |  |
|---|--------------------------|--|--|
|  | Watershed Boundary       |  | Acquisition Property                           |
|  | Prioritized Wetlands     |  | Intertidal Marshes Flats<br>Prioritized Hazard |
|  | NPDES                    |  | Intertidal Marshes and Flats                   |
|  | Toxic Release Inventory  |  | TMDL   |
|  | ADEM Monitoring Stations |  | Streams and Rivers                             |
|  | Protected Lands          |  | Wetlands                                       |
|   |                          |  | Urban Land Use Land Cover                      |












# Big Creek (Juniper, Hamilton)

- 1 Prioritized Watershed for Restoration (Hamilton)
- 2 Prioritized Watershed for Conservation (Juniper)
- 3 Prioritized Wetlands
- 4 Point Source Discharge (NPDES)
- 5 ADEM Monitoring Stations
- 6 Watershed Management Plan
- 7 Impaired Waters
  - Metals (mercury, iron, lead, arsenic)
  - Fecal Coliform



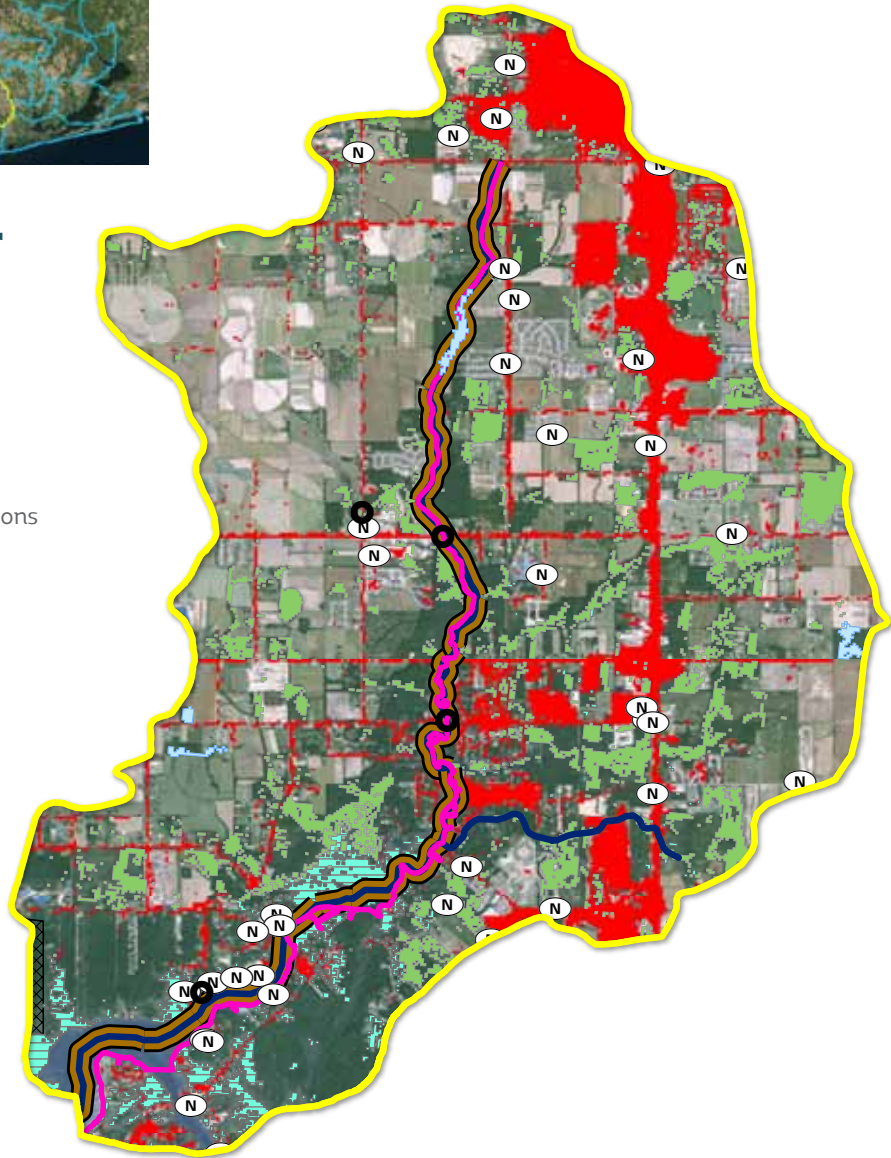
## Legend

	Watershed Boundary		TMDL
	Prioritized Wetlands		Streams and Rivers
	NPDES		Wetlands
	ADEM Monitoring Stations		Urban Land Use Land Cover
	303d List		















# Bon Secour

- 1 Prioritized Watershed for Restoration
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations
- 5 Sediment Study
- 6 Prioritized Intertidal Marshes and Flats
- 7 Protected Lands
- 8 ADEM Water Quality Survey
- 9 Impaired Waters - Atmospheric Deposition



## Legend

	Watershed Boundary		Sediment Study
	Prioritized Wetlands		Wetlands
	NPDES		Intertidal Marshes Flats Prioritized Hazard
	ADEM Monitoring Stations		Intertidal Marshes and Flats
	303d List		Protected Lands
	Streams and Rivers		Urban Land Use Land Cover















# Bridge Creek

\* Currently in Development

- 1 Prioritized Wetlands
- 2 ADEM Monitoring Stations
- 3 Point Source Discharge (NPDES)
- 4 Protected Lands
- 5 Acquisition Property
- 6 Prioritized Intertidal Marshes and Flats



## Legend

- |   |                          |  |  |
|---|--------------------------|--|--|
|  | Watershed Boundary       |  | Acquisition Property                           |
|  | Prioritized Wetlands     |  | Intertidal Marshes Flats<br>Prioritized Hazard |
|  | NPDES                    |  | Intertidal Marshes and Flats                   |
|  | ADEM Monitoring Stations |  | Wetlands                                       |
|  | Protected Lands          |  | Urban Land Use Land Cover                      |

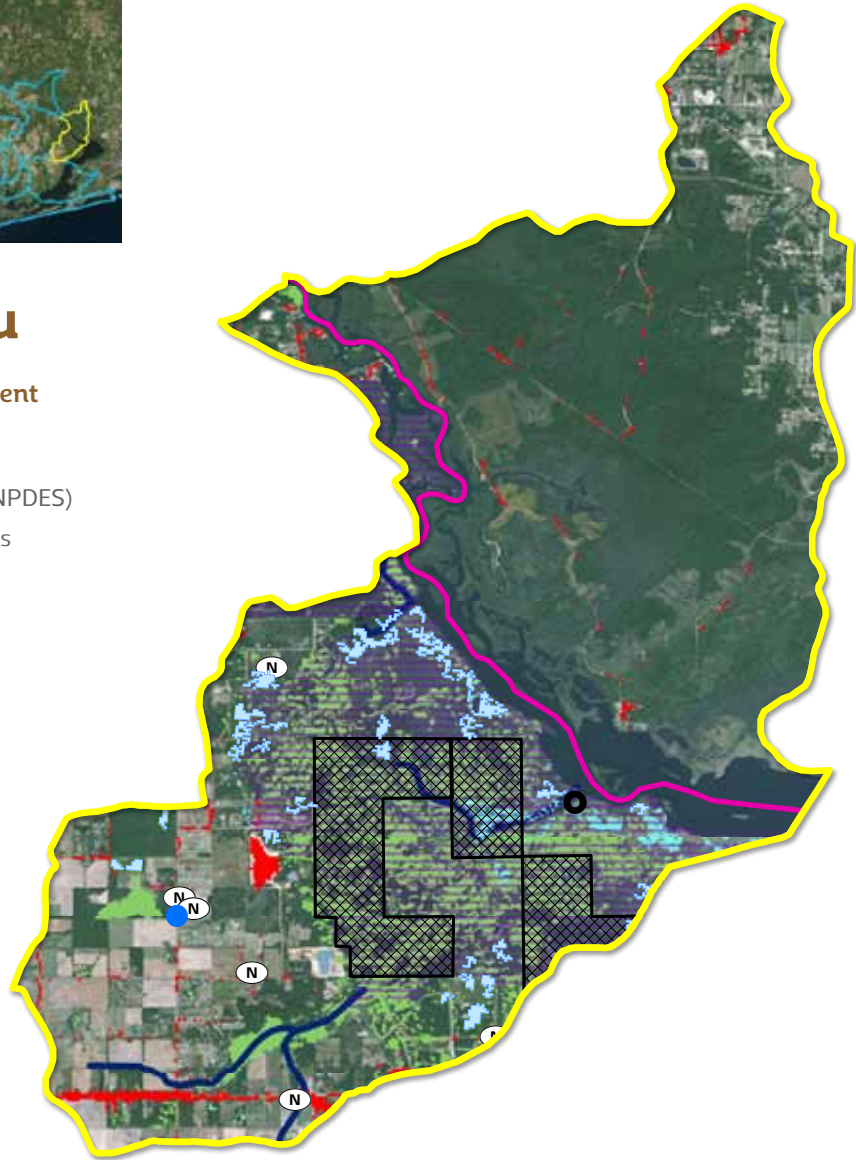

















# Caney Bayou

\* Currently in Development

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Toxic Release Inventory
- 5 Acquisition Property
- 6 Protected Lands
- 7 Prioritized Intertidal Marshes and Flats
- 8 Impaired Waters
  - Atmospheric Deposition



## Legend

	Watershed Boundary		Protected Lands
	Prioritized Wetlands		Acquisition Property
	NPDES		Intertidal Marshes Flats Prioritized Hazard
	ADEM Monitoring Stations		Intertidal Marshes and Flats
	Toxic Release Inventory		Wetlands
	303d List		Urban Land Use Land Cover
	Streams and Rivers		










# Cedar Creek (Upper, Lower)

- 1 Prioritized Watershed for Conservation
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations



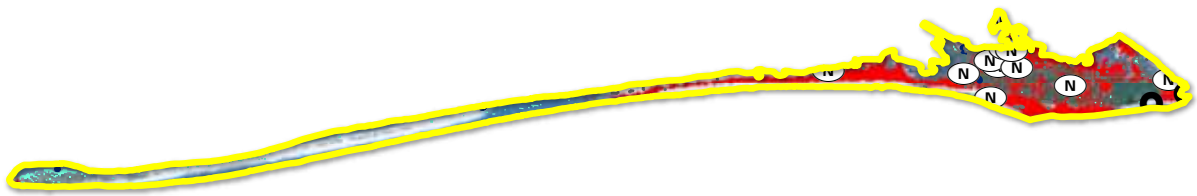
## Legend

	Watershed Boundary		Streams and Rivers
	Prioritized Wetlands		Wetlands
	NPDES		Urban Land Use Land Cover
	ADEM Monitoring Stations		












# Dauphin Island

- 1 Point Source Discharge (NPDES)
- 2 ADEM Monitoring Stations
- 3 Prioritized Intertidal Marshes and Flats
- 4 Protected Lands
- 5 Watershed Management Plan



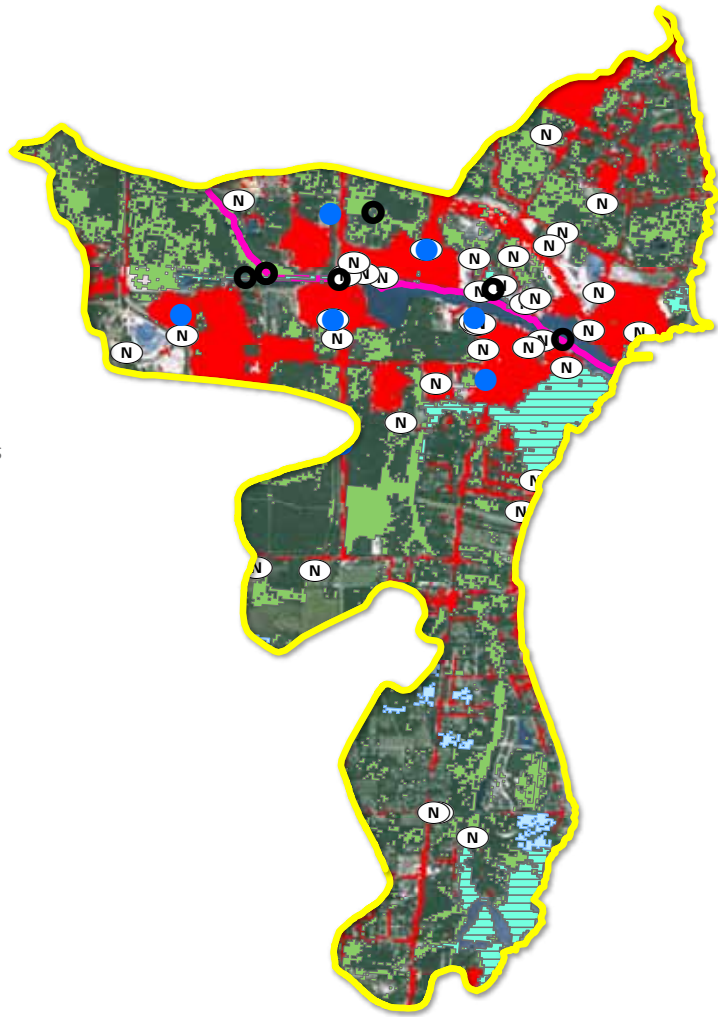
## Legend

- |  |  |
|--|--|
|  Watershed Boundary   |  Intertidal Marshes and Flats |
|  NPDES  |  Streams and Rivers           |
|  ADEM Monitoring Stations   |  Protected Lands              |
|  Intertidal Marshes Flats Prioritized Hazard                        |  Urban Land Use Land Cover    |
|  Intertidal Marshes Flats Prioritized Natural Resource Conservation |  |














# Deer River

- 1 Prioritized Watershed for Restoration
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations
- 5 Toxic Release Inventory
- 6 Prioritized Intertidal Marshes and Flats
- 7 Impaired Waters
  - CBOD (carbonaceous biochemical oxygen demand)
  - NBOD (nitrogenous biochemical oxygen demand)



## Legend

	Watershed Boundary		Intertidal Marshes and Flats
	Prioritized Wetlands		303d List
	NPDES		Streams and Rivers
	ADEM Monitoring Stations		Wetlands
	Toxic Release Inventory		Urban Land Use Land Cover
	Intertidal Marshes Flats Prioritized Hazard		

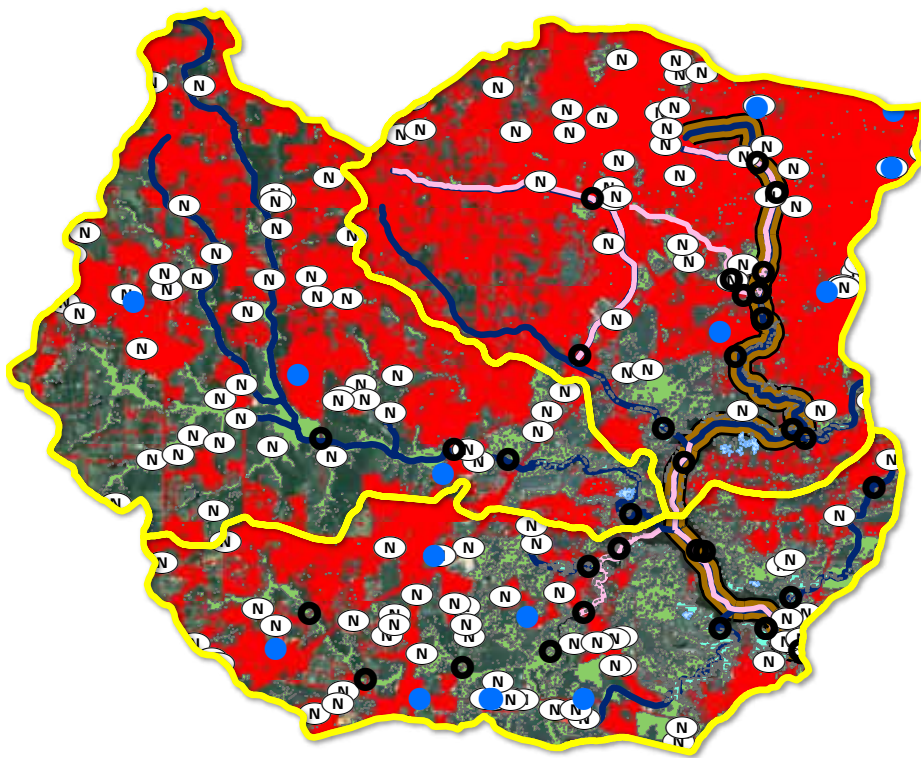
















# Dog River

## (Upper, Lower, Halls Mill)

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Toxic Release Inventory
- 5 Prioritized Intertidal Marshes and Flats
- 6 Sediment Study
- 7 ADEM Water Quality Survey
- 8 Watershed Management Plan
- 9 Impaired Waters
  - CBOD (carbonaceous biochemical oxygen demand)
  - NBOD (nitrogenous biochemical oxygen demand)
  - Fecal Coliform



## Legend

	Watershed Boundary		Intertidal Marshes and Flats
	Prioritized Wetlands		TMDL
	NPDES		Streams and Rivers
	ADEM Monitoring Stations		Sediment Study
	Toxic Release Inventory		Wetlands
	Intertidal Marshes Flats Prioritized Hazard		Urban Land Use Land Cover













# D'Olive

## \* Currently in Implementation

- 1 Prioritized Watershed for Restoration
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Prioritized Intertidal Marshes and Flats
- 5 Sediment Study
- 6 Watershed Management Plan
- 7 Impaired Waters
  - Siltation



## Legend

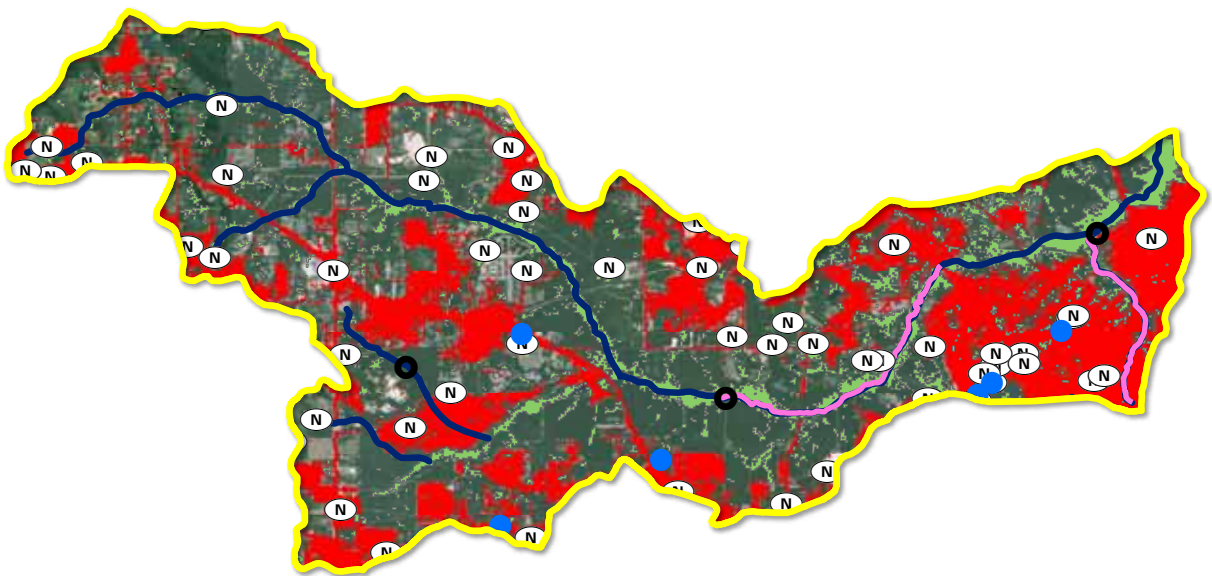
- |  |   |
|--|---|
|  Watershed Boundary                             |  Intertidal Marshes and Flats |
|  NPDES  |  Streams and Rivers           |
|  ADEM Monitoring Stations                       |  Sediment Study               |
|  303d List                                      |  Wetlands                     |
|  Intertidal Marshes Flats<br>Prioritized Hazard |  Urban Land Use Land Cover    |






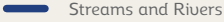




# Eight Mile Creek

**\* Currently in Implementation**

- 1 Point Source Discharge (NPDES)
- 2 ADEM Monitoring Stations
- 3 Toxic Release Inventory
- 4 Watershed Management Plan
- 5 ADEM Water Quality Survey
- 6 Impaired Waters
  - Fecal Coliform
  - Enterococcus



## Legend

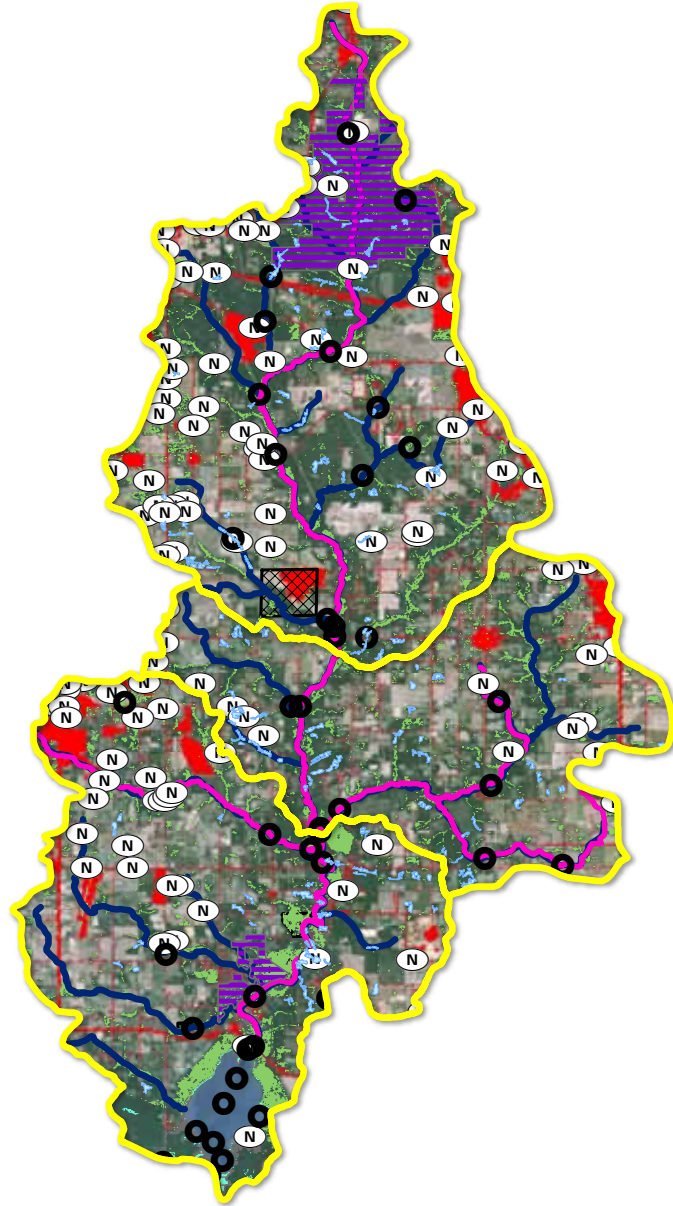
 Watershed Boundary	 TMDL
 NPDES	 Streams and Rivers
 ADEM Monitoring Stations	 Wetlands
 Toxic Release Inventory	 Urban Land Use Land Cover
















# Fish River (Upper, Middle, Lower)

- 1 Prioritized Watershed for Restoration (Upper, Lower)
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations
- 5 Protected Lands
- 6 Acquisition Property
- 7 Prioritized Intertidal Marshes and Flats
- 8 Watershed Management Plan
- 9 Impaired Waters
  - Metals (mercury)
  - CBOD (carbonaceous biochemical oxygen demand)
  - NBOD (nitrogenous biochemical oxygen demand)
  - Pathogens



## Legend

	Watershed Boundary		Streams and Rivers
	Prioritized Wetlands		Wetlands
	NPDES		Intertidal Marshes Flats Prioritized Hazard
	ADEM Monitoring Stations		Intertidal Marshes and Flats
	Acquisition Property		Protected Lands
	303d List		Urban Land Use Land Cover

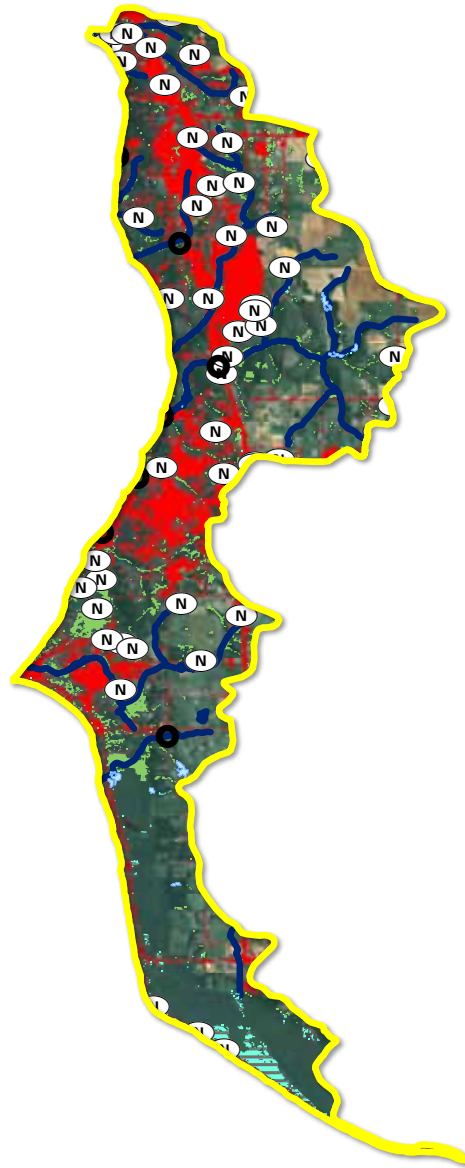





# Fly Creek


\* Currently in Development


- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Prioritized Intertidal Marshes and Flats
- 5 Watershed Management Plan





## Legend


 Watershed Boundary


 Prioritized Wetlands


 NPDES

 ADEM Monitoring Stations

 Intertidal Marshes Flats  
Prioritized Hazard

 Intertidal Marshes and Flats

 Streams and Rivers

 Wetlands

 Urban Land Use Land Cover














# Fowl River

## \* Planning Initiated

- 1 Prioritized Watershed for Restoration
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations
- 5 Toxic Release Inventory
- 6 Prioritized Intertidal Marshes and Flats
- 7 Impaired Waters - Metals (mercury)



## Legend

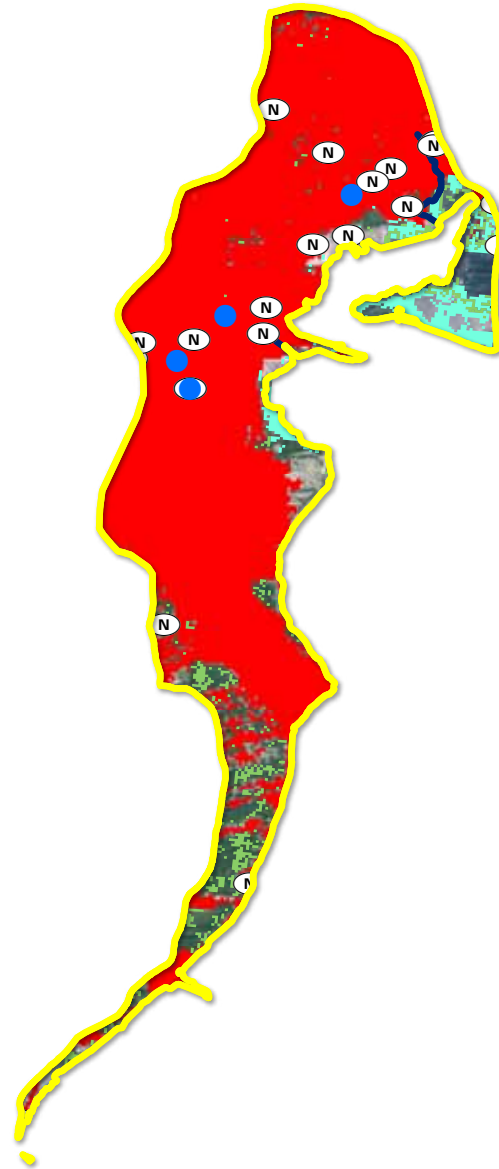
	Watershed Boundary		Intertidal Marshes and Flats
	Prioritized Wetlands		303d List
	NPDES		Streams and Rivers
	ADEM Monitoring Stations		Wetlands
	Toxic Release Inventory		Urban Land Use Land Cover
	Intertidal Marshes Flats Prioritized Hazard		










## Garrows Bend

\* Currently in Development

- 1 Point Source Discharge (NPDES)
- 2 Toxic Release Inventory
- 3 Intertidal Marshes and Flats



### Legend

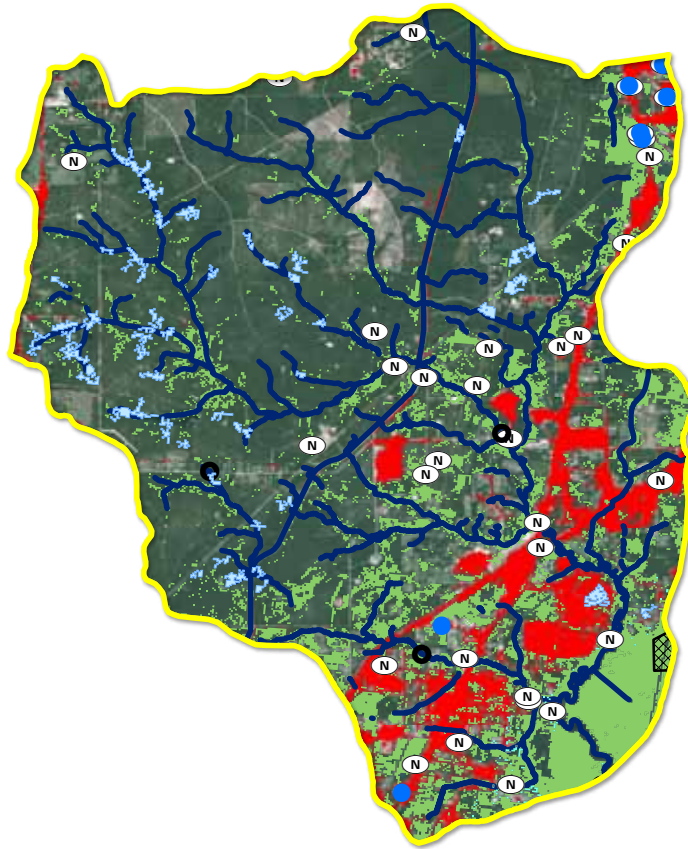
-  Watershed Boundary
-  NPDES
-  Toxic Release Inventory
-  Streams and Rivers
-  Intertidal Marshes and Flats
-  Wetlands
-  Urban Land Use Land Cover














# Gunnison Creek

\* Currently in Development

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Toxic Release Inventory
- 5 Prioritized Intertidal Marshes and Flats
- 6 Protected Lands



## Legend

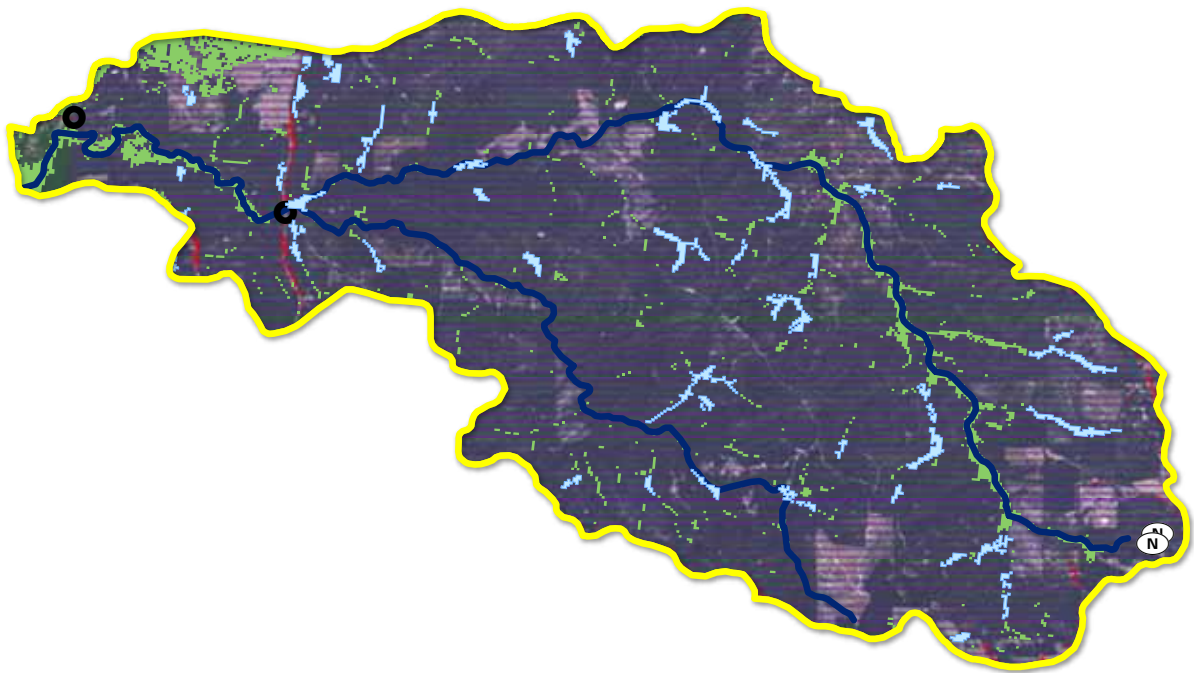
- |  |   |
|--|---|
|  Watershed Boundary       |  Protected Lands                                |
|  Prioritized Wetlands     |  Intertidal Marshes Flats<br>Prioritized Hazard |
|  NPDES                    |  Intertidal Marshes and Flats                   |
|  ADEM Monitoring Stations |  Streams and Rivers                             |
|  Toxic Release Inventory  |  Wetlands                                       |
|  |  Urban Land Use Land Cover                      |





# Halls Creek

- 1 Prioritized Watershed for Conservation
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations
- 5 Acquisition Property



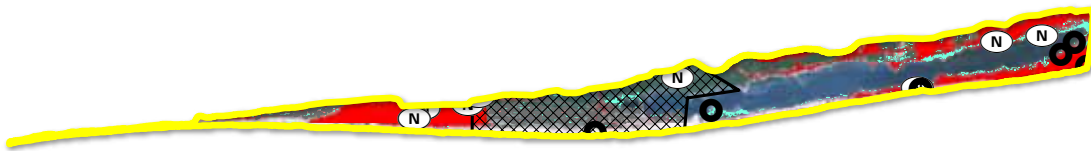
## Legend

- |  |   |
|--|---|
|  Watershed Boundary       |  Streams and Rivers        |
|  Prioritized Wetlands     |  Wetlands                  |
|  NPDES                    |  Acquisition Property      |
|  ADEM Monitoring Stations |  Urban Land Use Land Cover |



# Little Lagoon

- 1 Point Source Discharge (NPDES)
- 2 ADEM Monitoring Stations
- 3 Protected Lands
- 4 Prioritized Intertidal Marshes and Flats
- 5 Watershed Management Plan



## Legend

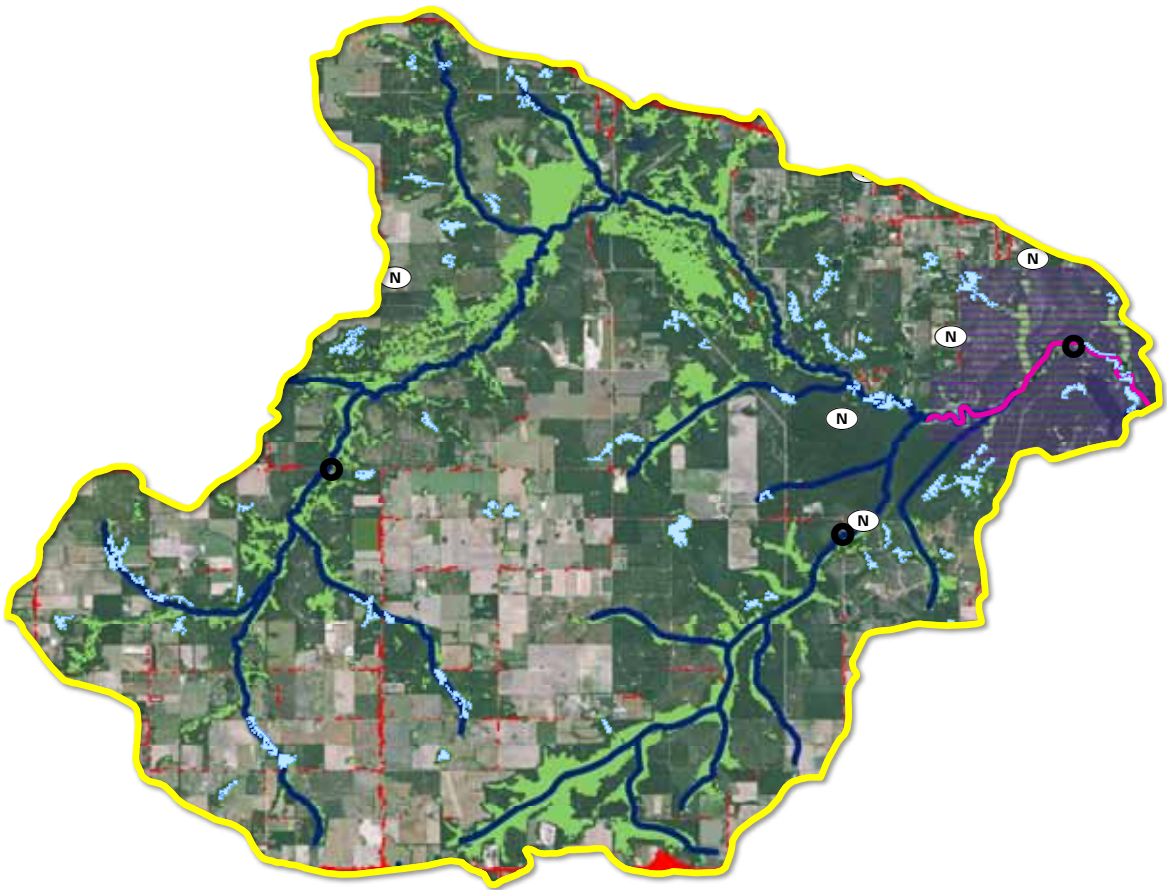
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|---|--------------------------|---|--|
|  | Watershed Boundary       |  | Protected Lands  |
|  | NPDES                    |  | Intertidal Marshes Flats Prioritized Natural Resource Conservation |
|  | ADEM Monitoring Stations |  | Intertidal Marshes and Flats                                       |
|   |                          |  | Urban Land Use Land Cover  |








# Lower Blackwater River

**\* Currently in Development**

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Acquisition Property
- 5 Impaired Waters
  - Metals (mercury)



## Legend

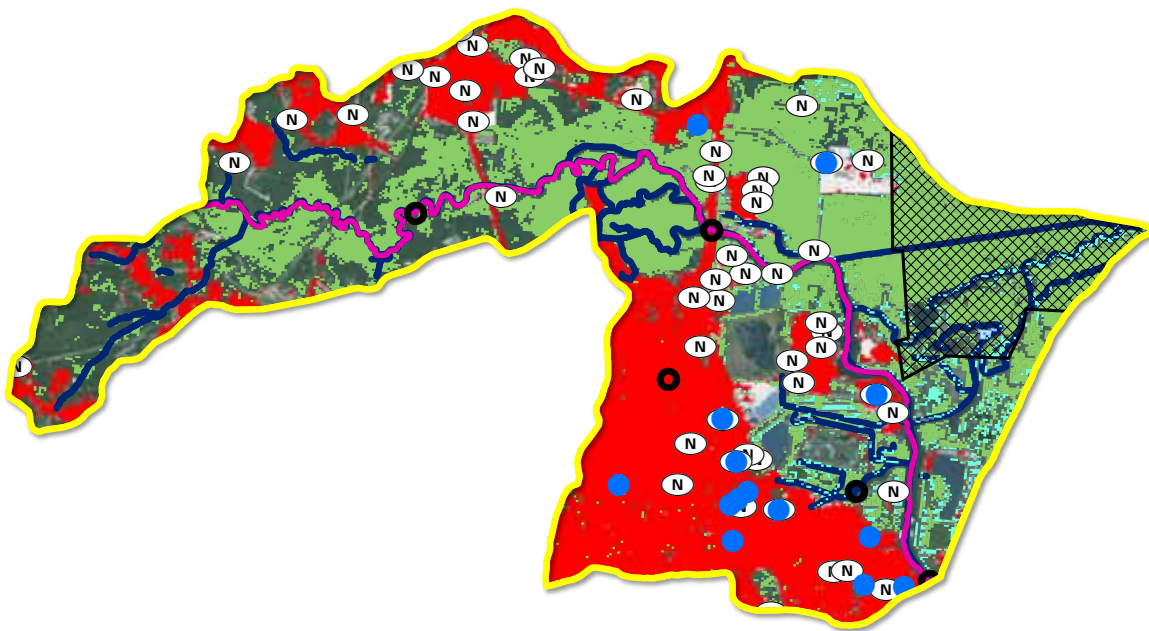
	Watershed Boundary		Acquisition Property
	Prioritized Wetlands		Streams and Rivers
	NPDES		Wetlands
	ADEM Monitoring Stations		Urban Land Use Land Cover
	303d List		















# Lower Chasaw

## \* Currently in Development

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Toxic Release Inventory
- 5 Protected Lands
- 6 Prioritized Intertidal Marshes and Flats
- 7 ADEM Water Quality Survey
- 8 Impaired Waters
  - Metals (mercury)



## Legend

- |  |  |
|--|--|
|  Watershed Boundary       |  Protected Lands                                |
|  Prioritized Wetlands     |  Intertidal Marshes Flats<br>Prioritized Hazard |
|  NPDES                    |  Streams and Rivers                             |
|  ADEM Monitoring Stations |  Intertidal Marshes and Flats                   |
|  Toxic Release Inventory  |  Wetlands                                       |
|  303d List                |  Urban Land Use Land Cover                      |

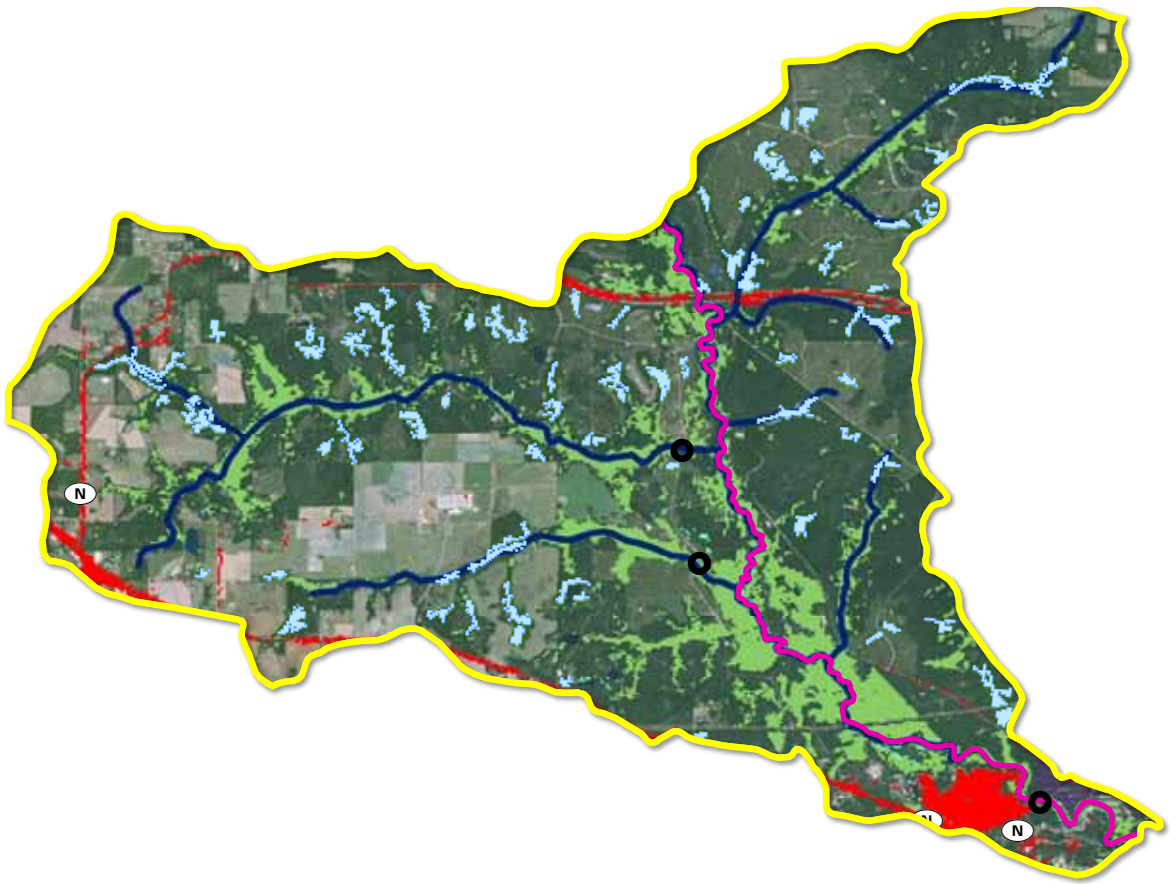




# Lower Styx River

## \* Currently in Development

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Acquisition Property
- 5 Impaired Waters
  - Metals (mercury)



## Legend

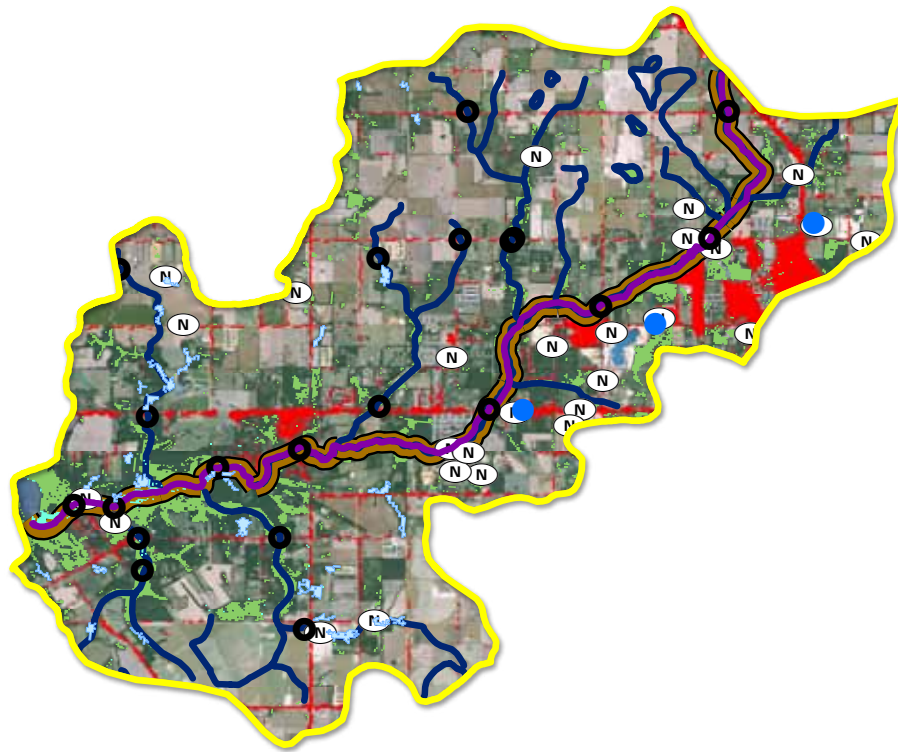
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|--|--|
|  Watershed Boundary       |  Acquisition Property         |
|  Prioritized Wetlands     |  Streams and Rivers           |
|  NPDES                    |  Intertidal Marshes and Flats |
|  ADEM Monitoring Stations |  Wetlands                     |
|  303d List                |  Urban Land Use Land Cover    |














# Magnolia River

\* Currently in Development

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Outstanding Waters
- 5 Toxic Release Inventory
- 6 Sediment Study



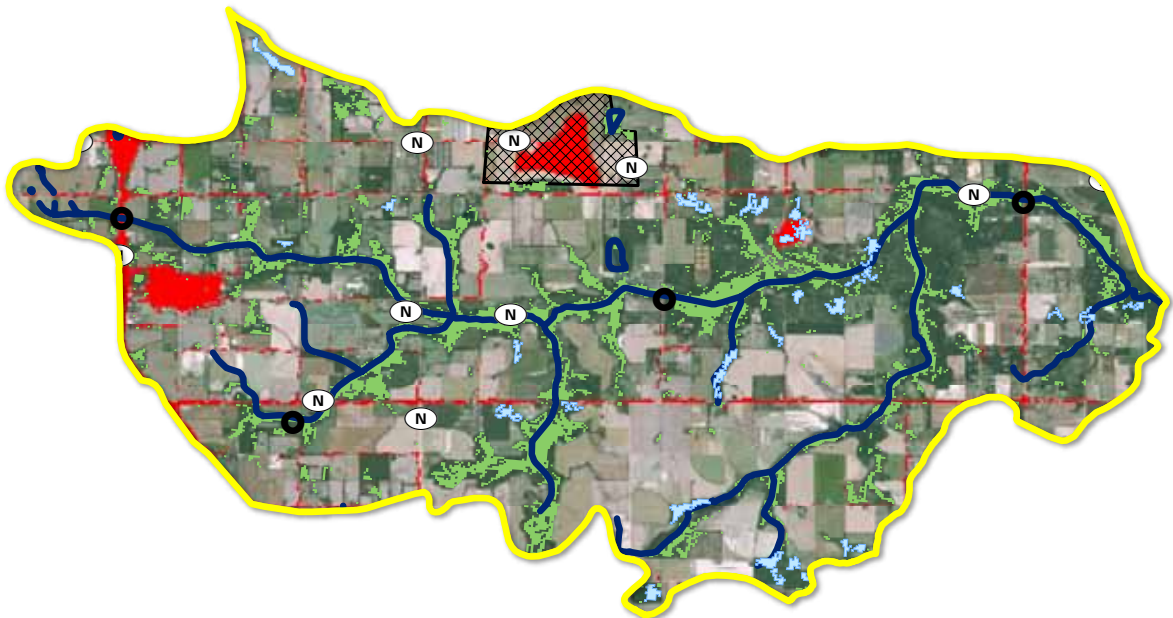
## Legend

- |   |                          |   |                              |
|---|--------------------------|---|------------------------------|
|  | Watershed Boundary       |  | Streams and Rivers           |
|  | Prioritized Wetlands     |  | Sediment Study               |
|  | NPDES                    |  | Intertidal Marshes and Flats |
|  | ADEM Monitoring Stations |  | Wetlands                     |
|  | Outstanding Waters       |  | Urban Land Use Land Cover    |
|  | Toxic Release Inventory  |   |                              |











# Negro Creek

- 1 Prioritized Watershed for Conservation
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations
- 5 Protected Lands



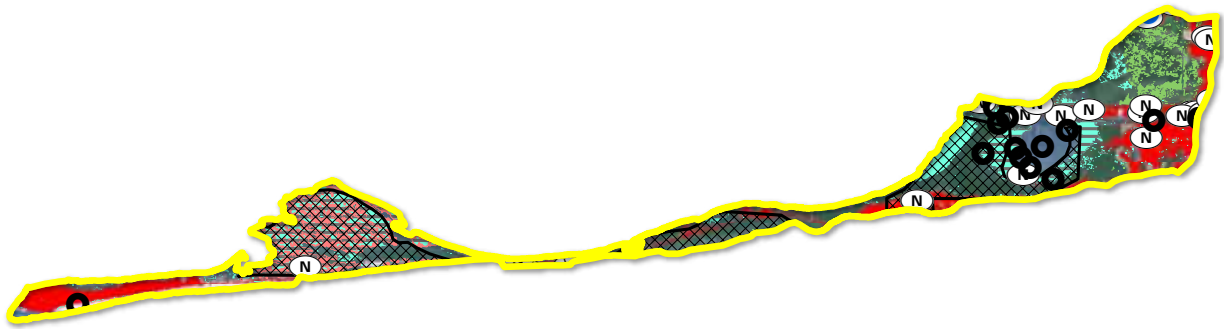
## Legend

- |  |   |
|--|---|
|  Watershed Boundary       |  Streams and Rivers        |
|  Prioritized Wetlands     |  Wetlands                  |
|  NPDES                    |  Protected Lands           |
|  ADEM Monitoring Stations |  Urban Land Use Land Cover |



# Oyster Bay

- 1 Prioritized Watershed for Restoration
- 2 Toxic Release Inventory
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations
- 5 Protected Lands
- 6 Prioritized Intertidal Marshes and Flats



## Legend

- |  |   |
|--|---|
|  Watershed Boundary       |  Intertidal Marshes Flats<br>Prioritized Hazard                        |
|  Toxic Release Inventory  |  Intertidal Marshes Flats Prioritized<br>Natural Resource Conservation |
|  NPDES                    |  Intertidal Marshes and Flats  |
|  ADEM Monitoring Stations |  Wetlands  |
|  Protected Lands          |  Urban Land Use Land Cover   |













# Palmetto Creek

\* Currently in Development

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Intertidal Marshes and Flats



## Legend

 Watershed Boundary	 Streams and Rivers
 Prioritized Wetlands	 Intertidal Marshes and Flats
 NPDES	 Wetlands
 ADEM Monitoring Stations	 Urban Land Use Land Cover






# Rains Creek

- 1 Prioritized Watershed for Conservation
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations
- 5 Acquisition Property



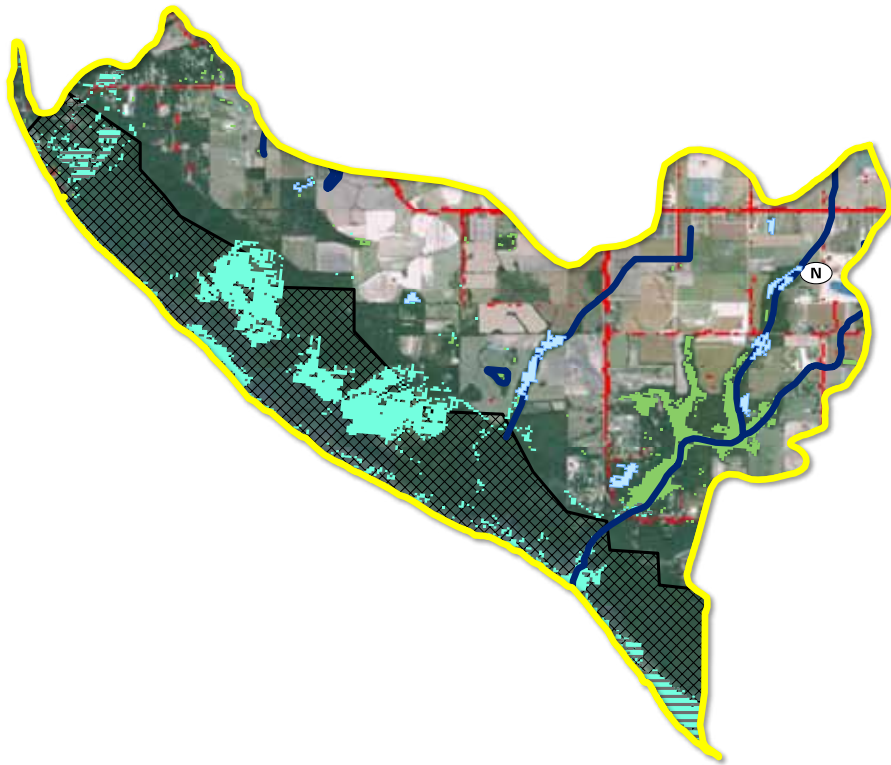
## Legend

- |  |   |
|--|---|
|  Watershed Boundary       |  Streams and Rivers        |
|  Prioritized Wetlands     |  Wetlands                  |
|  NPDES                    |  Acquisition Property      |
|  ADEM Monitoring Stations |  Urban Land Use Land Cover |









# Skunk Bayou

- 1 Prioritized Watershed for Conservation
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 Prioritized Intertidal Marshes and Flats
- 5 Protected Lands



## Legend

- |  |   |
|--|---|
|  Watershed Boundary   |  Intertidal Marshes Flats<br>Prioritized Hazard |
|  Prioritized Wetlands |  Intertidal Marshes and Flats                   |
|  Streams and Rivers   |  Wetlands                                       |
|  NPDES                |  Protected Lands                                |
|  |  Urban Land Use Land Cover                      |


















# Tensaw Apalachee River, Grand Bay, The Basin

- 1 Prioritized Watershed for Restoration (Tensaw Apalachee)
- 2 Prioritized Wetlands
- 3 ADEM Monitoring Stations
- 4 Outstanding Waters
- 5 Toxic Release Inventory
- 6 Point Source Discharge (NPDES)
- 7 Protected Lands
- 8 Acquisition Property
- 9 Prioritized Intertidal Marshes and Flats
- 10 Watershed Management Plan
- 11 Impaired Waters
  - Metals (mercury)
  - Pathogens



## Legend

	Watershed Boundary		Acquisition Property
	Prioritized Wetlands		Intertidal Marshes Flats Prioritized Natural Resource Conservation
	ADEM Monitoring Stations		Intertidal Marshes Flats Prioritized Hazard
	Outstanding Waters		Intertidal Marshes and Flats
	Toxic Release Inventory		Streams and Rivers
	NPDES		Wetlands
	303d List		Urban Land Use Land Cover
	Protected Lands		

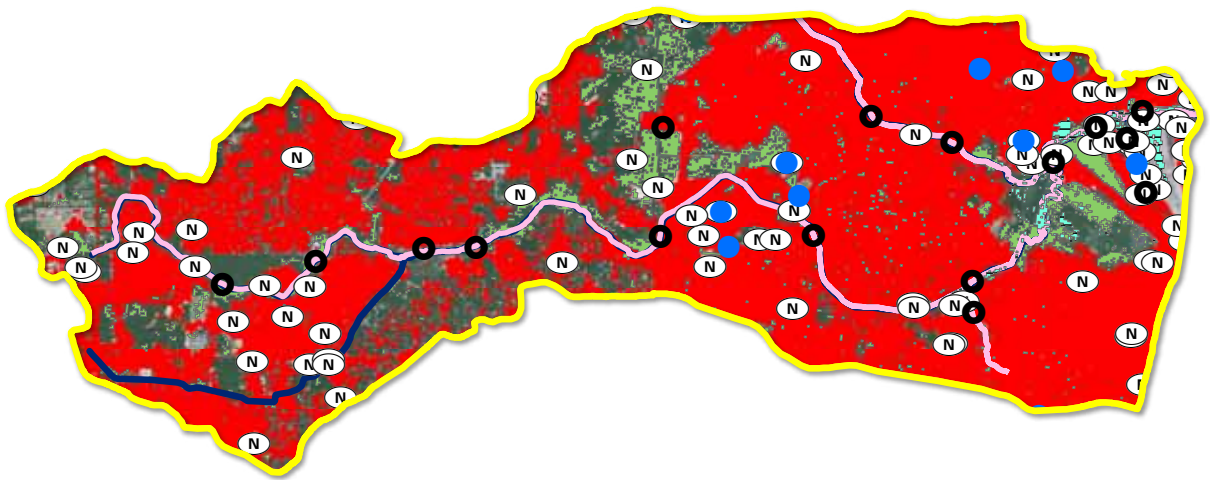















# Three Mile Creek

## \* Currently in Implementation

- 1 Toxic Release Inventory
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations
- 4 Prioritized Intertidal Marshes and Flats
- 5 Watershed Management Plan
- 6 Impaired Waters
  - Pathogens
  - Ammonia
  - Nutrients
  - Enterococcus
  - Fecal Coliform
  - CBOD (carbonaceous biochemical oxygen demand)
  - NBOD (nitrogenous biochemical oxygen demand)



## Legend

- |   |   |
|---|---|
|  Watershed Boundary                          |  Intertidal Marshes and Flats |
|  Toxic Release Inventory                     |  TMDL                         |
|  NPDES                                       |  303d List                    |
|  ADEM Monitoring Stations                    |  Streams and Rivers           |
|  Intertidal Marshes Flats Prioritized Hazard |  Wetlands                     |
|   |  Urban Land Use Land Cover    |










# Upper Blackwater

- 1 Prioritized Watershed for Conservation
- 2 Prioritized Wetlands
- 3 Point Source Discharge (NPDES)
- 4 ADEM Monitoring Stations



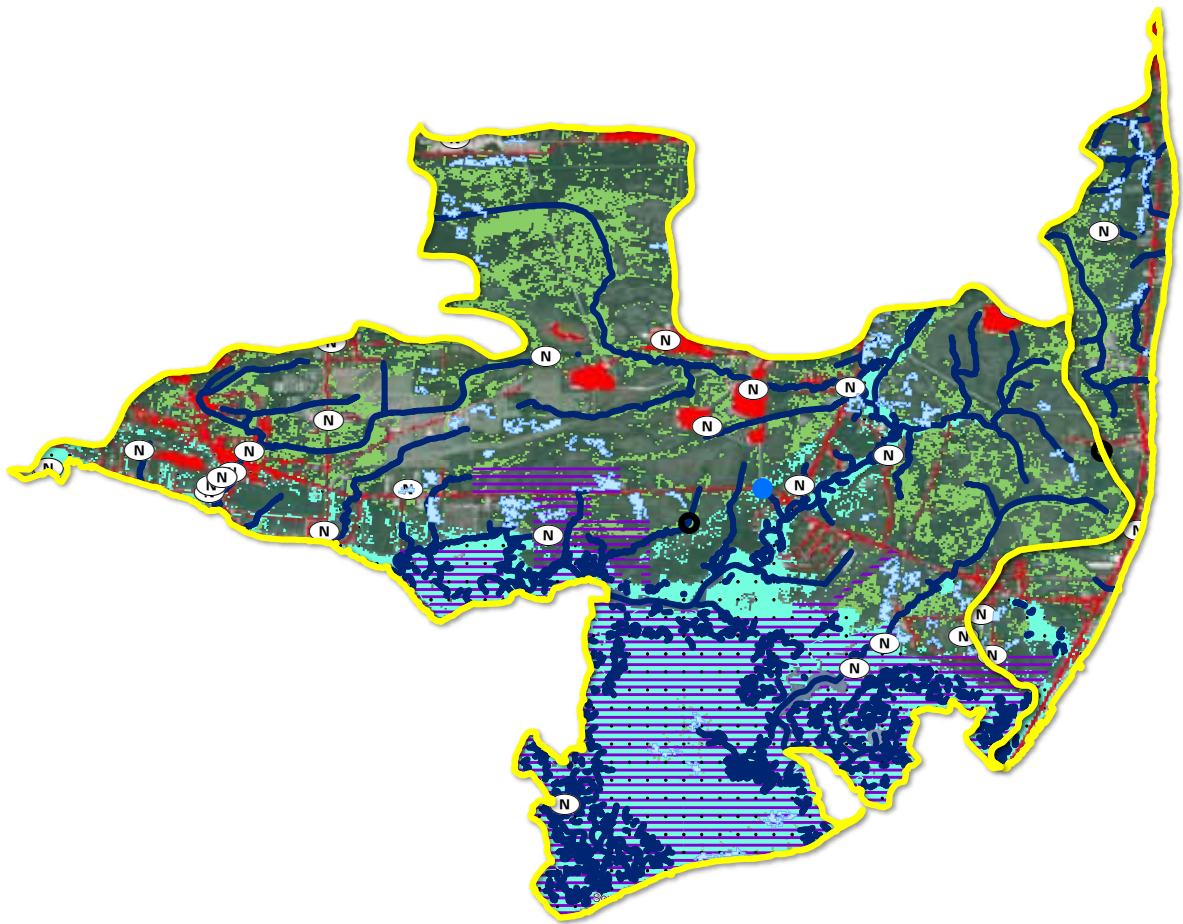
## Legend

 Watershed Boundary	 Streams and Rivers
 Prioritized Wetlands	 Wetlands
 NPDES	 Urban Land Use Land Cover
 ADEM Monitoring Stations	







# West Fowl River (Delchamps Bayou)

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 Toxic Release Inventory
- 4 ADEM Monitoring Stations
- 5 Prioritized Intertidal Marshes and Flats
- 6 Acquisition Property



## Legend

 Watershed Boundary	 Streams and Rivers
 Prioritized Wetlands	 Intertidal Marshes Flats Prioritized Hazard
 NPDES	 Acquisition Property
 Toxic Release Inventory	 Intertidal Marshes and Flats
 ADEM Monitoring Stations	 Wetlands
	 Urban Land Use Land Cover



# Whitehouse Creek

★ Currently in Development

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 ADEM Monitoring Stations



## Legend

- Watershed Boundary
- Prioritized Wetlands
- NPDES
- ADEM Monitoring Stations
- Streams and Rivers
- Wetlands
- Urban Land Use Land Cover

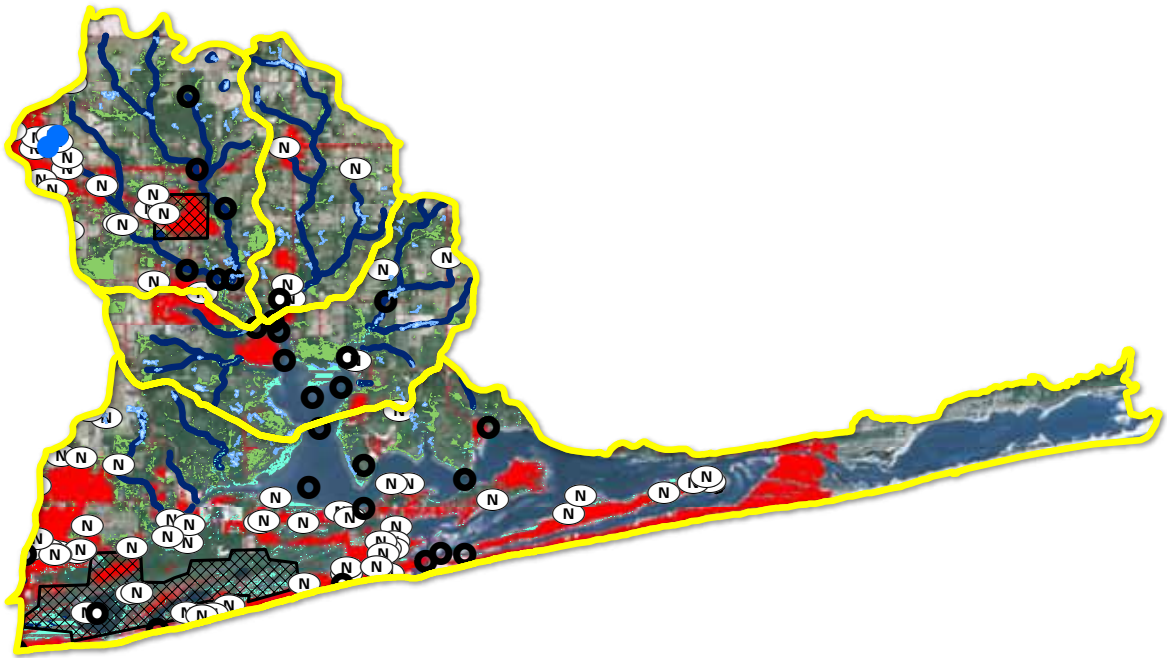




# Wolf Bay

(Sandy Creek, Miflin Creek,  
Graham Bayou, Perdido Pass  
Frontal Gulf of Mexico)

- 1 Prioritized Wetlands
- 2 Point Source Discharge (NPDES)
- 3 Toxic Release Inventory
- 4 ADEM Monitoring Stations
- 5 Protected Lands
- 6 Prioritized Intertidal Marshes and Flats



## Legend

Watershed Boundary	Protected Lands
Prioritized Wetlands	Intertidal Marshes Flats Prioritized Hazard
NPDES	Intertidal Marshes and Flats
Toxic Release Inventory	Streams and Rivers
ADEM Monitoring Stations	Wetlands
	Urban Land Use Land Cover

## The Strategies > Estuary Status and Trends

What does biological integrity look like in the Mobile Bay estuary? What monitoring and research is needed to track environmental conditions through time? How do we reduce stressors and communicate resultant biological changes? One of the charges of the Science Advisory Committee (SAC) is to integrate science into the development of an environmental monitoring program to inform on the status of the condition of the Mobile Bay estuary. It is imperative this monitoring program coincides with what citizens value and data is communicated to the public so progress in improving or protecting conditions has widespread community support.

To construct a robust monitoring program, the SAC is charged with developing recommendations for what research is needed to better understand our estuarine system; identifying what data gaps exist in determining baseline conditions and developing the programs, particularly in the most and least stressed habitats/watersheds; determining what other needs exist in relation to the six things citizens value most; and developing decision-support tools to facilitate citizen access to these data sets.

# Estuary Status and Trends



Goals/Objectives/Suggested Activities	Performance Measure					Outcomes	Indicator	Lead
	Y1	Y2	Y3	Y4	Y5			
<b>EST-1: Increase data related to how the estuarine ecosystem responds to anthropogenic stressors.</b>								
<b>EST-1-1</b> Maintain/improve existing level of coastal monitoring.								
a	x	x	x	x	x	Establishment of data repository for coastal AL environmental conditions	Consistent data on habitat change trends	Science Advisory Committee
b	x					Identify funding and organization to query various agencies on a regular basis for background estuarine data.	Consistent data accessible for coastal resource study and management	
c						Identify data gaps and needs and facilitate increased monitoring by appropriate groups.	Improved continuous monitoring of environmental conditions	
d	x					Conduct high resolution mapping of habitats within the estuary to establish present-day baseline of distribution and coverage, and continue to monitor.		
e						Develop remote sensing strategy to inform coastal monitoring efforts.		
f	x					Monitor acres and species of SAV and wetlands.		
<b>EST-2: Establish Process for measuring change in estuarine condition.</b>								
<b>EST-2-1</b> Build a Biological Condition Gradient Framework for coastal Alabama.								
a	x					Define/refine indicators of ecosystem health.	Trends in coastal resource management	Science Advisory Committee
b	x					Calibrate Landscape Disturbance Index to estuarine conditions (as alternative to impervious cover if deemed necessary).	Improvements in reporting on state of resources	
c						Develop/adopt indices of biological integrity for streams and rivers (and riparian buffers), freshwater wetlands, and intertidal marshes and flats		
d	x					Determine numeric criteria for habitat condition for streams and rivers (and riparian buffers), freshwater wetlands, and intertidal marshes and flats.		
e	x	x	x	x	x	Construct BCG framework and report on estuary condition.		
<b>EST-3: Improve understanding of relationship between biological condition and provision of ecosystem services resulting from improvements in resources.</b>								
<b>EST-3-1</b> Manage system for multiple services.								
a	x	x				Develop and test conceptual model that measures levels of ecosystem services related to changes in stressors utilizing D'Olive watershed restoration.	Improved understanding of ecosystem benefits and value of restoration	Science Advisory Committee
b						Predict changes in fish biomass related to changes in habitat quantity and condition.	Improvements in ecosystem services measured	
c						Predict changes in water quality related to management of ecosystem services.		
d	x	x	x	x	x	Predict impacts of water quantity and withdrawal on the biological condition and ecosystem services provided by the Mobile Bay estuary.		

## The Strategies > Ecosystem Restoration and Protection

Ecosystem restoration refers to returning a damaged ecological system to a stable, healthy, and sustainable state. Although it may be impossible to return an ecosystem to the exact same condition as prior to disturbance, restoration to improve ecosystem function and services will contribute to community health and well-being, protect against sea level rise, provide recreational opportunities, and ensure economic sustainability and community quality of life.

To ensure all restoration efforts are based in science and are part of an overall management program, the PIC has adopted a strategy that includes conducting, where appropriate, sediment analyses as a precursor to comprehensive watershed planning. All watershed plans will be based on US EPA guidance, addressing the following key elements:

- > Identify causes and sources of impairment.
- > Estimate the pollutant load reductions expected from restoration/management measures.
- > Describe non-point source (NPS) reduction measures and critical areas where those measures will take place.
- > Estimate the amount of financial support needed to implement plan recommendations, including monitoring.
- > Create an outreach and education plan to increase residents' understanding of and involvement in the restoration measures and to engage them in long-term implementation of the plan.
- > Provide a schedule for implementing recommended NPS management measures.
- > Describe interim measurable milestones for determining whether NPS management measures or control actions are being implemented.
- > Develop criteria to determine whether pollutant load reductions are being achieved over time and progress is being achieved towards attaining water quality standards, and, if not, develop criteria for determining whether watershed management plans need revision.
- > Develop a monitoring component to evaluate the effectiveness of implementation efforts over time.

In addition to EPA's nine key elements, PIC watershed planning will identify restoration, protection, and conservation opportunities or projects for the three most stressed habitats: freshwater wetlands; streams, rivers and riparian buffers; and intertidal marshes and flats; and address impacts related to changing climates and sea level rise.



# Ecosystem Restoration and Protection



Goals/Objectives/Suggested Activities	Y	Y	Y	Y	Y	Performance Measure	Outcomes	Indicator	Lead
	1	2	3	4	5				
<b>ERP-1: Improve trends in Water Quality in priority watersheds with impairments (either 303[d]-listed or those with approved TMDLs) discharging into priority fishery nursery areas.</b>									
ERP-1j									
a	x		x			# Of sediment analyses prepared	Improved water quality in watersheds with impaired waterways	Trends in water quality improvements	
b		x		x		# Of watershed management plans updated	Improved health of commercial and recreational fishery	Trends in restoration of fishery habitats (Intertidal marshes and flats)	
c	x		x			# Of new watershed plans published	Reduced trash and litter entering waterways	Trends in restoration of freshwater wetlands, streams & riparian buffers	Project Implementation Committee
d						# Of watershed management plans (restoration and conservation projects) implemented			
e	x	x	x	x	x				
f		x	x	x	x				
g	x	x	x	x	x				
h		x	x	x	x				
i			x	x	x				
j			x	x	x				
k			x	x	x				
l				x	x				
m				x	x				

# Ecosystem Restoration and Protection



Goals/Objectives/Suggested Activities	Y					Performance Measure	Outcomes	Indicator	Lead
	1	2	3	4	5				
<b>ERP-2: Improve ecosystem function and resilience through protection, restoration and conservation of habitats including beaches, bays, backwaters, and rivers.</b>									
<b>ERP-2.1</b> Install living shorelines along publicly owned bay, backwater and intertidal waterways where appropriate.									
a						# Of linear feet of living shoreline installed	Increased in "natural" shorelines on bays, backwaters, and rivers	Trends in quality of edge habitats (intertidal marshes and flats)	Project Implementation Committee
b									
c									
d									
e									
f									
<b>ERP-2.2</b> Install 5,000 linear feet of living shorelines along privately owned bay, backwater and intertidal waterways.									
a						# Of linear feet of living shoreline installed	Improved health and resiliency of beaches and dunes	Trends in shoreline resiliency	Project Implementation Committee
b									
c									
d									
e									
f									
<b>ERP-2.3</b> Plant 25 acres of sea oats to stabilize dune system along gulf fronting beaches.									
a						# Of acres dune habitat stabilized	Expanded usage of dredge material in restoring nearshore and intertidal marshes and flats	Trends in restoration of fishery habitats	Project Implementation Committee
b									
c									
d									
e									
f									
<b>ERP-2.4</b> Investigate/implement increased hydrological exchange through the Highway 98 Causeway.									
a						# Of acres restored or enhanced	Improved provision of ecosystem services related to fish nursery, storm surge protection, water filtration	Trends in provision of ecosystem services related to fish nursery, storm surge protection, water filtration	Project Implementation Committee
b									
c									
d									
<b>ERP-2.5</b> Restore 2500 acres of nearshore and intertidal marshes and flats.									
a						# Of acres restored or enhanced	Improved provision of ecosystem services related to fish nursery, storm surge protection, water filtration	Trends in provision of ecosystem services related to fish nursery, storm surge protection, water filtration	Project Implementation Committee
b									
c									
d									

# Ecosystem Restoration and Protection



Goals/Objectives/Suggested Activities		Performance Measure					Outcomes	Indicator	Lead
		Y 1	Y 2	Y 3	Y 4	Y 5			
<b>ERP-3: Restore/Expand human connections.</b>									
<b>ERP-31</b>	Create 10 new access points (at least seven in Mobile County) that couple access with demonstration of restoration techniques.								
a	Project	x					# Of access points created	Increased more environmentally-appropriate access for multiple uses (launches, fishing piers, urban areas, greenspace) in each type of ecosystem. (Restore connections between environment, economy, and community)	Project Implementation Committee
b	Project		x						
c	Project			x					
d	Project		x		x				
e	Project	x		x		x			
<b>ERP-32</b>	Protect/conserv priority habitats for public benefit and access through acquisition and conservation easement.								
a	Develop Coastal Habitat Protection and Conservation Plan.	x	x				# Of acres		
b	Develop outreach materials to educate about conservation easement benefits and value.			x					
c	Promote/support acquisition project submissions consistent with Habitat Plan (current, future)	x	x	x	x	x			
e	Track land conservation activities.	x	x	x	x	x			
<b>ERP-33</b>	Create driving/walking/biking/paddling trails on historical, ethnic, and religious themes (Native American, African-American, Civil War, etc.) to encourage eco-heritage tourism around and on the estuary.								
a	Project	x					# Linear feet of trails		
b	Project		x						
c	Project			x					
d	Project				x				
e	Project					x			
f	Track usage.		x	x	x	x			

## The Strategies > Technical Assistance and Capacity Building

The purpose of providing technical assistance and supporting efforts to build community capacity is to enhance the scientific knowledge, technical capacity, and skills of those professionals and elected officials or those who have an ability to affect decisions about how the resources of Alabama's estuaries and coast are managed. The BRC and GNC have identified goals for the next five years to promote streamlined regulation and balanced business practices that are in the best interests of the region's environmental and economic resources, including but not limited to:

- > Identifying environmental issues which impact business and government.
- > Educating and promoting the use of environmentally-sound business practices.
- > Recommending coastal management priorities and regulatory improvements.

To support these efforts, MBNEP is committed to developing the tools and training necessary to improve the way our lands and waters are managed so protection, restoration, and conservation activities have the best possible chance of long-term success.



# Technical Assistance and Capacity Building



Goals/Objectives/Suggested Activities	Performance Measure					Outcomes	Indicator	Lead
	Y1	Y2	Y3	Y4	Y5			
<b>TAC-1: Improve business community understanding of how coastal natural resources and estuaries contribute to economic, cultural, and community well-being.</b>								
<b>TAC-11</b>	Conduct 15 tours for the private sector highlighting the three most-stressed habitats of the estuary and their connection to what people value about living on the coast (5 per habitat).					# Tours/# Attendees each over five-year period	Improved knowledge of coastal environment within the private sector	# Of attendees who have increased knowledge about stressed habitats
a	x	x	x	x	x			
b	x	x	x	x	x			
c	x	x	x	x	x			
d	x	x	x	x	x			
<b>TAC-12</b>	Deliver a series of presentations to a minimum of 20 private sector establishments or associations (civic, Chambers, etc.) on Create a Cleanwater Future (CCWF) and estuary value.					# Presentations/# Attendees each over five-year period	Improved recognition of the connection between clean water and the preservation of the assets valued	# Of attendees who improve knowledge about impacts of coastal issues on assets valued
a	x	x	x	x	x			
b	x	x	x	x	x			
c	x	x	x	x	x			
d	x	x	x	x	x			
<b>TAC-13</b>	By 2018, develop and implement the CCWF messaging and marketing campaign to be an identifiable brand to foster private sector stewardship.					# Of business people reached	Increased private sector engagement in environmental restoration and protection of coastal values	
a	x	x	x	x	x			
b	x	x	x	x	x			
c	x	x	x	x	x			
d	x	x	x	x	x			

# Technical Assistance and Capacity Building



Goals/Objectives/Suggested Activities	Performance Measure					Outcomes	Indicator	Lead		
	Y 1	Y 2	Y 3	Y 4	Y 5					
<b>TAC-2: Increase business support for protecting the estuary/coast.</b>										
TAC-2.1	Create a minimum of 10 service opportunities to engage business "teams" in participating in restoration or clean up work as appropriate to each county in supporting the CCWF.									
a	x	x	x	x	x	% Increase in opportunities for business people to get involved	Increased in business sector participation in environmental protection	Business Resources Committee		
b	x	x	x	x	x					
c	x	x	x	x	x					
d	x	x	x	x	x					
TAC-2.2	Identify and connect business partners to a minimum of three existing opportunities celebrating the rich cultural heritage of the estuary.									
a	x					# Of environmental heritage projects supported	# Of private sector interests with established programs for environmental community service	Business Resources Committee		
b	x	x	x	x	x					
c	x	x	x	x	x					
TAC-2.3	Promote improved stormwater management by the private sector.									
a	x	x	x	x	x	# Of businesses and municipalities understanding MS4 process	Stormwater training opportunities are increased (Green infrastructure, LID, traditional development)	Business Resources Committee		
b		x	x	x	x					
c	x									
d	x	x	x	x	x					
e	x	x	x	x	x					
f	x	x	x	x	x					
g	x	x	x	x	x					
									# Of businesses and municipalities employing LID	Local development standards are modified to emphasize LID

# Technical Assistance and Capacity Building



Goals/Objectives/Suggested Activities		Performance Measure					Outcomes	Indicator	Lead
		Y1	Y2	Y3	Y4	Y5			
<b>TAC-3: Conserve and improve working waterfronts and preserve fishing communities.</b>									
TAC-3.1	Create oyster farm enterprise zones to provide alternative livelihood for traditional fishing families.						# Of families engaged in alternative fishing livelihoods		
a									
b									
c									
TAC-3.2	Develop safe harbor in Bayou La Batre and Bon Secour River to support commercial fishing interests.								
a	Conduct feasibility/site assessment to determine best locations.						Preserved coastal Alabama Fishing heritage		
b	Delineate areas for designation of safe harbor status.								
c	Develop local ordinances to establish policies for use.						Preserved coastal Alabama Fishing heritage	Trends in oyster farming	
d	Monitor/Modify policies.		x						
TAC-3.3	Pilot a "model working waterfront" initiative for existing fishermen to promote new commercial fishing business practices.								
a	Collect information on peer lending programs in other fishing communities.					x	Preserved coastal Alabama Fishing heritage	Trends in commercial fishing	Business Resources Committee through Working Waterfronts Coalition
b	Raise money to capitalize loan fund.					x			
c	Recruit pro-bono/discount accounting and legal services.					x	Increased adoption of business practices improving water quality	Trends in new commercial fishing business practices	
d	Recruit fishermen interested in participating.					x			
e	Develop policies for use/loan terms.								
TAC-3.4	Advocate for the assessment, improvements, and designation of estuary ports as "Green Ports."								
a	Conduct Green Port Feasibility Study.						Improved coordination of multiple and diverse uses of marine environment	Trends in marine uses	
b	Advocate establishment of revolving loan fund for green infrastructure improvements.								
TAC-3.5	Develop planning tools to balance conservation, restoration and multiple uses of our fishery resources.								
a	Educate constituencies about how our marine resources are used, and update on better coordination of uses.								
b	Inventory and analyze existing conditions/develop future scenarios.								
c	Build coalition of commercial and recreational fishermen and other marine area users to cooperatively address fishery issues of common interest (use Gulf States Marine Fisheries Commission as model).								

# Technical Assistance and Capacity Building

Goals/Objectives/Suggested Activities		Y 1	Y 2	Y 3	Y 4	Y 5	Performance Measure	Outcomes	Indicator	Lead
<b>TAC-4: Establish longterm capability of local governments to manage and maintain coastal environmental resources.</b>										
Improve elected officials' understanding of issues impacting environmental health and comprehensive land use and water resources management.										
TAC-4.1	a									
	b									
	c									
	d									
	e									
TAC-4.2	a									
	b									
	c									
TAC-4.3	a									
	b									



# Technical Assistance and Capacity Building



Goals/Objectives/Suggested Activities	Performance Measure					Outcomes	Indicator	Lead
	Y1	Y2	Y3	Y4	Y5			
<b>TAC-5: Minimize impacts and amount of contaminated stormwater runoff entering coastal waterways.</b>								
TAC-51	Establish voluntary initiatives to reduce the incidence of non-point source pollution.							
a	x	x	x	x	x	# Of community events focused on non-point source pollution	Increased community desire to improve water entering local waterways	Government Networks Committee
b	x	x		x				
c			x					
d	x	x	x	x	x			
TAC-52	Educate elected officials about existing ordinances and effectiveness thereof for reducing non-point source pollution.							
a						# Of local governments adopting CCWF	Increased capacity and willingness for improving quality of water entering coastal waterways	
	x	x			x	# Of ordinance changes to reduce non-point source pollution		
TAC-53	Establish consortiums in priority watersheds to improve stormwater management through collaboration across geopolitical boundaries.							
a	x	x	x	x	x	# Of watershed consortiums	Increased capacity and willingness for improving quality of water entering coastal waterways	
b	x					# Of local governments supporting water quality through letter, personal communications to state legislators		
c					x			

# Technical Assistance and Capacity Building

Goals/Objectives/Suggested Activities	Y	Y	Y	Y	Y	Performance Measure	Outcomes	Indicator	Lead	
	1	2	3	4	5					
<b>TAC-6: Promote protection and restoration of Gulf-fronting beaches, dunes, and shorelines as a first line of defense in protecting and increase resiliency of coastal communities and economies and habitats providing valuable ecosystem services.</b>										
TAC-6.1	Develop strategy for restoration and protection of beaches, dunes, and shorelines endorsed by elected officials in Mobile and Baldwin counties.									
a	x	x	x			Adoption of Shoreline Protection, Restoration, and Management Plan for Mobile and Baldwin Counties	Increased demand for protection of Mobile and Baldwin Counties from storm damage through beach restoration	*Acres of shoreline restored	Government Networks Committee	
b	x	x						*Acres of saltmarsh restored or protected		
c			x	x						
d	x	x	x	x	x					
e	x	x	x	x	x					



## The Strategies > Building Community Stewardship through Education and Public Involvement

Watershed-based, grassroots organizations are the cornerstone of community-based efforts to promote the wise stewardship of the water quality and living resources of Mobile Bay's estuarine waters. The mission of MBNEP is to provide the necessary tools to support those efforts through the delivery of:

- > Field trips highlighting coastal issues and possibilities.
- > Outreach and awareness campaigns.
- > Decision-support tools and educational opportunities.
- > Volunteer engagement in hands-on learning and stewardship experiences.

These activities cultivate stewardship by connecting people to coastal habitats and waterways and the issues impacting them, providing a basis for greater stewardship of Alabama's coastal resources. The Community Action Committee is committed to engaging residents and visitors in promoting the wise stewardship of the things people value most about living in coastal Alabama: Access to water and open spaces for recreation and vistas; Beach and Shoreline protection to defend critical habitats and human infrastructure; Fish habitats, abundance, related-human livelihoods; Heritage/Culture to protect our coastal legacy; Resiliency of communities and natural systems to rebound from unforeseen events; and Water Quality to ensure Alabama's rivers, creeks, and bays are fishable and swimmable.



# Education and Public Involvement



Goals/Objectives/Suggested Activities		Y1	Y2	Y3	Y4	Y5	Performance Measure	Outcomes	Indicator	Lead
<b>EPI-1: Increase awareness of coastal resources supporting what people value about living in coastal Alabama.</b>										
EPI-1.1	Host at least 50 presentations annually to raise community awareness on what people value most about living in coastal Alabama.									
a	Presentation	x	x	x	x	x	# Of people attending presentations			
b	Presentation	x	x	x	x					
c	Presentation	x	x	x	x					
d	Presentation	x	x	x	x					
e	Presentation	x	x	x	x					
EPI-1.2	Host at least 15 workshops annually to educate citizens and property owners on how to protect and restore what people value most.									
a	Create a reporting mechanism, perhaps a central database, accessible by Community Action Committee (CAC) members.	x	x	x	x		# Of people attending workshops			
b	Create shareable power points to extend reach.	x	x							
c	Develop at list of potential groups to work with to achieve strategy.	x	x							
d	Determine how/if Continuing Education Credits can be earned through these workshops.	x	x							
EPI-1.3	Encourage and coordinate 15 festivals and other events in the watershed to celebrate the cultural/natural connection.									
a	Incorporate heritage themes into Alabama Birdfest.	x					# Of people earning Continuing Education Credits			
b	Incorporate heritage themes into Wolf Bay Watershed Watch Children's Fishing Tournament.	x								
c	Incorporate environmental themes into the Blessing of the Fleet.	x								
d	Incorporate environmental themes into community heritage days.	x								
e	Promote upstream connection to Mobile Bay throughout the greater Mobile Bay watershed.	x	x	x	x	x				
EPI-1.4	Create and support programs that expose more people to local waterways.									
b	Target low-income communities/children.	x	x	x	x		# Of people attending events			
c	Fundraise to get busses/fund the program.	x	x							

# Education and Public Involvement



Goals/Objectives/Suggested Activities	Y	Y	Y	Y	Y	Performance Measure	Outcomes	Indicator	Lead
	1	2	3	4	5				
<b>EPI-2: Improve community ability to participate in ecosystem-based management actions.</b>									
<b>EPI-2.1</b>	Engage grassroots groups in assisting with development and implementation of the Project Implementation Committee's (PIC's) selected watershed management plans.								
a		x				# Of citizens participating in watershed planning efforts	Increased in community engagement in watershed management planning and implementation on activities	Increase # of citizens who are wise stewards	Community Action Committee
b			x						
c				x					
d					x				
e					x				
<b>EPI-2.2</b>	Engage grassroots groups and citizens in collecting data for the PIC's selected watersheds for monitoring and research purposes								
a		x	x			# Of volunteer monitors			
b				x	x				
c				x	x				
<b>EPI-2.3</b>	Educate various non-environmental organizations and the public on programs and volunteer opportunities available								
a					x	% Increase in community participation in volunteer opportunities			
b				x					
c					x				
d		x	x	x	x				

# Education and Public Involvement



Goals/Objectives/Suggested Activities		Performance Measure					Outcomes	Indicator	Lead
		Y 1	Y 2	Y 3	Y 4	Y 5			
<b>EPI-3: Increase citizen actions to mitigate impacts of humans on the environment.</b>									
EPI-3.1	Support one social marketing campaign to increase participation in conservation activities.								
a	Add additional components, including an "Anti Litter" unit, to the Create a Clean Water Future Campaign Tool Kit for use by community groups		x						
b	Expand grassroots group adoption of Create a Clean Water Future (CCWF) Campaign.	x	x	x	x		Improved personal behaviors and respect for water resources	Amount of trash in public parks, parking lots, waterways	
c	Establish a CCWF Day of Service.			x	x	x			
EPI-3.2	Implement at least three programs to increase community stewardship through place-based grassroots groups.						Reduction in amount of pollutants in waterways	Reductions in nutrients, pathogens, and sediment in impaired waterbodies	Community Action Committee
a	Promote Alabama Smart Yards and Healthy Gulf.	x	x	x	x				
b	Promote Muddy Water Watch.	x	x	x	x				
c	Promote Waterwise Habitats.		x	x	x	x	Improved ability of government to manage land and water		
EPI-3.3	Support Government Networks Committee (GNC) and Business Resources Committee in developing programs to reduce the amount of trash in coastal waterways by 20%.								
a	Support enforcement of environmental laws and regulations.	x	x	x	x				
b	Promote the use of reusable bags and containers.	x	x	x	x				
c	Conduct a minimum of 25 Community Clean-Ups.	x	x	x	x				

# Education and Public Involvement



Goals/Objectives/Suggested Activities	Y	Y	Y	Y	Y	Performance Measure	Outcomes	Indicator	Lead
	1	2	3	4	5				
<b>EPI-4: Build Capacity of at least 15 grassroots groups to ensure citizen involvement in creating more resilient and environmentally responsible communities.</b>									
<b>EPI-4.1</b>	Support/Promote three workshops to address organizational development.								
a			X	X	X	# Of operational grassroots organizations	Improved sustainability of grassroots groups	Increase in # of citizens participating in grassroots groups	Community Action Committee
b			X	X	X				
c			X	X	X				
<b>EPI-4.2</b>	Support needed changes to federal, state and local regulations to improve management of coastal resources and promote enforcement of existing regulations.								
a			X			# Of laws and regulations improved	Improved ability of government to manage land and water	Reductions in nutrients, pathogens, and sediment in impaired waterbodies	Community Action Committee
b			X						
c				X	X				
d			X	X	X				



# Credits

## Mobile Bay National Estuary Program Staff

### **Roberta Swann**

Director

### **Tom Herder**

Watershed Protection  
Coordinator

### **Kelley Barfoot**

Community Outreach  
Coordinator

### **Tiffany England**

Business and  
Grants Manager

### **Linda Sierke**

Restoration Project  
Manager

### **Rick Frederick**

Resource Development  
Manager

### **Christian Miller**

Non-Point Source  
Pollution Outreach

### **Debi Foster**

Writer and  
Media Specialist

## Photography Credits

### **Page 6**

**Three Mile Creek**  
Rhoda Vanderhart

### **Page 18-19**

**Gulf Shores**  
Colette Boehm

### **Page 22**

**Battleship Marsh**  
Christian Miller

### **Page 24-25**

**Gulf Shores**  
Colette Boehm

### **Page 48-49**

**Gulf of Mexico**  
Gulf of Mexico  
Foundation

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**Joe's Branch Gully**  
MBNEP

### **Page 62-63**

**Dauphin Island**  
Roberta Swann

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**Arlington Park**  
Christian Miller

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**Gulf Shores**  
Colette Boehm

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**Bounty from the  
Gulf of Mexico**  
W. H. 'Buzz' Sierke Jr.

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**Bayou La Batre**  
Roberta Swann

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**Clean Up  
The Bottom 2011**  
MBNEP

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**Fowl River**  
W. H. 'Buzz' Sierke Jr.

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**Mon Louis Island**  
Roberta Swann

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**Weeks Bay**  
Christian Miller

### **Page 142**

**Dauphin Island**  
W. H. 'Buzz' Sierke Jr.

## Design Credits

### **Max Reed**

Executive Creative Director  
Blink Colony LLC

### **Erin Graves**

Senior Art Director  
Graves Creative



Dauphin Island



