



*The Comprehensive Conservation Management Plan
Baldwin and Mobile Counties, Alabama
2013-2018*

DRAFT

Mobile Bay National Estuary Program, 2012

A Note from the Director:

This DRAFT Comprehensive Conservation Management Plan (CCMP) 2013-2018 provides a first look at the many actions identified to protect our coastal way of life. Based on a science and extensive community input, this plan offers a well-rounded approach for coastal restoration and long-term environmental management. The plan is structured around six things the community values most about living on the coast: *ACCESS, COASTLINES, FISH, HERITAGE, RESILIENCE, and WATER QUALITY*. The actions within have been crafted to improve how we measure ecosystem health, restore the systems that support its health, build community capacity to better manage our natural and cultural assets, and expand community ownership of our cherished coastal resources.

In the past two years, hundreds of citizens were asked what they valued most and felt were the major environmental challenges of living in coastal Alabama. Concurrently, over 30 scientists assessed where the greatest stresses were on the habitats that provide the ecosystem services critical to our quality of life. These results informed an assessment of where the stresses on these habitats were most at risk. In November, 2012, a team of one hundred community stakeholders rolled up their sleeves to undertake the arduous task of developing strategies aimed at protecting or improving:

- access to the water and open spaces;
- the health and sustainability of our beaches and shorelines;
- populations of fish/ shellfish sustained by healthy habitats, supporting a robust, culturally-important, industry;
- promotion of our heritage and culture;
- our collective environmental health and resiliency; and
- our estuary's waters so that they are fishable, swimmable and drinkable.

This draft is but a first step in laying forth a plan that includes specific, measurable, achievable, realistic, and time bound objectives. Over the course of the month of January, 2013, the Mobile Bay National Estuary Program (MBNEP) will reach out to the team and others to refine priorities and establish the “who”, “where”, and “when” elements of the plan. An online instrument will be created to provide the public with an opportunity to prioritize the identified actions and provide additional input on other suggestions for consideration.

Through these efforts, environmental management goals will be developed; a realistic plan for developing a monitoring program that tracks water quality, habitat change, and living resource abundance will be defined; priority watersheds will be targeted; strategic ecosystem restoration projects that engage and educate citizens will be developed; a strategy for cultivating investment and participation will be prepared; and policy changes needed at the State and local levels will be identified to improve long-term management of our coastal resources. The MBNEP is committed to catalyzing the efforts of many to achieve the successful implementation of this plan. We recognize that these bold actions will necessitate a synergy created by the community as a whole, working together in a spirit of cooperation to achieve what is not individually attainable.

To provide you with a few tidbits, we know that in the coming years it will be imperative to address the issues of trash in our waterways and watersheds, stormwater pollution, and sediment management. We will challenge community stakeholders to forge new partnerships to champion the regulatory and financial support necessary to protect, restore and conserve our coastal resources. Finally, we will seek out new ways of promoting the wise stewardship of the water quality and living resources of the Mobile Tensaw Delta and the Mobile Bay estuary.

Thank you for taking the time to peruse these pages. We hope that what you find excites and propels you to joining our efforts to protect and celebrate what make coastal Alabama so special.

Regards,



Roberta Arena Swann

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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 estuarine resources of estuaries and associated watersheds designated by the EPA Administrator as estuaries of national significance.

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Preface

Imagine that Alabama's estuaries, where the rivers meet the sea, are healthy and support ecological functions and human uses. This is the vision of the Mobile Bay National Estuary Program (MBNEP). The MBNEP's mission is to promote the wise stewardship of water quality and living resources of the Mobile Bay estuary and Mobile-Tensaw Delta. MBNEP's purpose is to catalyze actions of estuary stakeholders, build community based organizational capacity for sound resource management, and leverage commitment and investment in ensuring the estuary's sustainability.

MBNEP's objectives are to 1) engage estuary stakeholders in the development and implementation of a comprehensive conservation management plan (CCMP); 2) expand resources and involvement in the implementation of this CCMP; and 3) educate residents; visitors; lawmakers; local, State, and Federal government agencies; businesses and industries; conservation and environmental organizations; and academic institutions about how to best protect this nationally significant ecological, economic, and cultural resource to ensure its protection and conservation for our lifetime and beyond. 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.

Introduction

When the first Comprehensive Conservation Management Plan (CCMP) was adopted 10 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 disasters including historically significant tropical weather events, an unprecedented oil spill with uncertain long-term effects, and an economic collapse second only to the Great Depression; each has resulted in populations shifting and governments scrambling for revenue. Mobile is now the 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 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 stare, coastal residents value our water.

The Mobile Bay National Estuary Program (MBNEP) was recognized as 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 they 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 Comprehensive Conservation Management Plan (CCMP).

The CCMP was completed and approved in April 2002. It consisted of primary objectives or actions which were, in turn, broken into sub-objectives with steps or Action Plans suggested for accomplishing each objective. In total, the 2002 CCMP contained 29 specific objectives with 101 implementable steps on the "path to success." As of September 30, 2012, of the 101 actions identified in the plan, 11 had been completed, 88 had been implemented on some level, and three are being reconsidered.

Acknowledging the need to be "up-to-date," the MBNEP has initiated a renewed planning process to re-write the CCMP. This 2013-2018 CCMP is a community road map for coastal environmental management and restoration and a plan to arm citizens with knowledge to heighten their sense of ownership and ability to make a personal difference. This new plan is based not only on the recommendations of the 2002 plan, but also on scientific assessments of where the greatest stresses occur on the habitats that provide the ecosystem services that support our quality of life. And it takes a critical step further into the public, basing it on what the community values most and believes to be the major environmental challenges in coastal Alabama. We will challenge community stakeholders to forge new partnerships to champion the regulatory and financial support recommended to protect, restore and conserve our coastal resources.

Demographic Profile

The demographic 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 and American Fact Finder.

City (Baldwin County)	Population 2000	Population 2010	% Change
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%
City (Mobile County)	Population 2000	Population 2010	% Change
Bayou La Batre	2,313	2,558	10.60%
Chickasaw	6,364	3,106	-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, from the eastern border with Florida to the western border with Mississippi. In addition, it extends seaward to the three-mile State jurisdictional limit. MBNEP’s target area also includes Mississippi Sound, up to the Mississippi/Alabama border. Major waterways include the Tombigbee, Tensaw, Appalachian, Blakeley, Escatawpa, Mobile, Alabama, Dog, Fowl, Fish, Magnolia, Bon Secour and Perdido rivers; Chickasaw, Norton, Three Mile, and Eight Mile creeks; and the Intercoastal Waterway, Wolf and Perdido bays, and Little Lagoon. Baldwin County and Mobile counties contain 14 and 11 separate cities, respectively.

Population

County	Population 2000	Population 2010	Percent 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 County 2010	%	Mobile County 2010	%
Total Population	182,265	100%	412,992	100%
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

Age Range	Baldwin County 2010	Mobile County 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 County 2010	%	Mobile County 2010	%
Total Households	69,476	100%	153,302	100%
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%
Poverty				
Total Population	182,265	100%	412,992	100%
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

Educational Attainment	Baldwin County 2010	%	Mobile County 2010	%
Total Population 25 years and older	121,560	100%	263,796	100%
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 or 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 resided in Mobile County, representing 13.1% of the county's population.

Housing

Housing Occupancy	Baldwin County 2010	Mobile County 2010
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

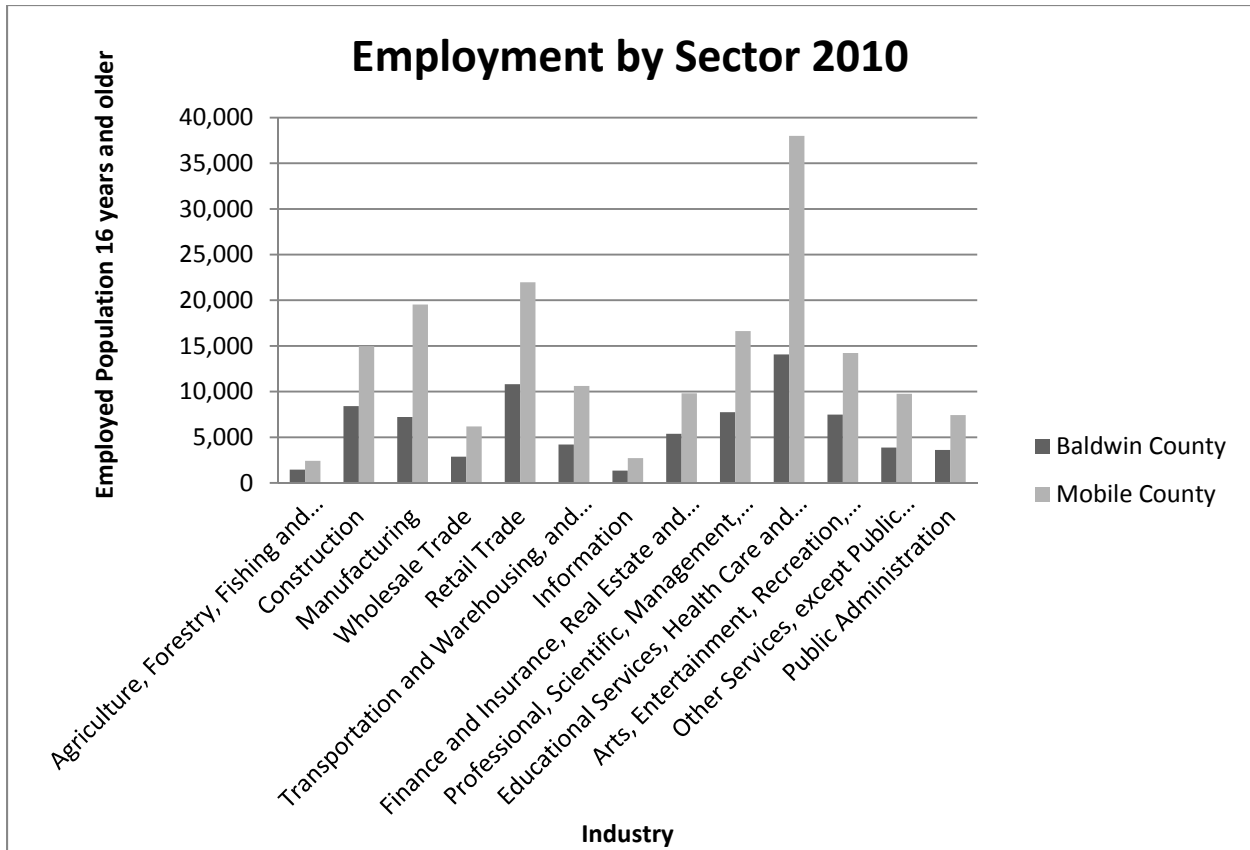
Source: 2010 Census

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 County 2010	%	Mobile County 2010	%
Civilian employed 16 years and over	78,520	100%	174,321	100%
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.

Process

A hallmark of the National Estuary Program is the convening of a “Management Conference” to guide the assessment of trends in water quality, natural resources, and uses of estuary; identification of causes of environmental problems; development of relationships between pollutant loadings to the estuary and potential uses and quality of the estuary; development of the CCMP and other action plans for restoring and maintaining the chemical, physical, and biological integrity of the estuary; and coordination of the collective implementation of the CCMP. The MBNEP MC has repeatedly acknowledged that the value of the Program lies in its ability to facilitate collaborative efforts.

Assessment of 2002 CCMP Implementation

To create an effective plan, we first had to look at ten years of accomplishments towards realizing the goals set forth in 2002. It was necessary to **evaluate** whether or not we, as a community, achieved what was recommended in the first CCMP. 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 recommendations.

The issues these recommendations address include:

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

This report is available for review at: http://www.mobilebaynep.com/what_we_do/ccmp/.

With this evaluation complete, we sought to ensure that the new CCMP could be embraced by the community. By basing new CCMP recommendations on the values and ecosystem services considered most important by the coastal community, our hope is to more fully engage stakeholders in taking ownership of our environmental future.

Citizen Input

In 2010, MBNEP initiated a re-write of the CCMP. Recognizing the need to use citizen input as its guide, MBNEP hired Research Strategies, Inc. to undertake an assessment of what people value most and what are their greatest concerns 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 Robertsdale 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/what_we_do/ccmp/.

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*)

Revealed also during this same input process were their biggest concerns:

- **Stormwater** - flooding, erosion, trash, polluted runoff, increased sediments
- **Public indifference**

This report is available for review at: http://www.mobilebaynep.com/what_we_do/ccmp/

Assessment of Stressor Impacts to the Estuary

To ensure that the next 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). 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. The Ecosystem services, habitats and stressors evaluated are listed below:

Ecosystem Services

- Biodiversity
- Wildlife habitat
- Nesting habitat for birds and turtles
- Sediment and nutrient retention and export
- Primary production
- Water quality enhancement
- Carbon Sequestration
- Storm buffer/hazard protection
- Flood control
- Groundwater replenishment
- Fisheries habitat
- Oyster production

Priority Habitats

- Beaches and Dunes
- Freshwater Wetlands
- Intertidal Marsh and Flats
- Longleaf Pine Habitat
- Maritime Forest
- Oyster Reefs
- Pine Savanna Forest
- Riparian Buffers
- Streams and Rivers
- Submerged Aquatic Vegetation
- Sub-tidal habitats

Stressors

- chemical contamination
- dredging and filling
- fire suppression
- habitat fragmentation
- invasive species
- nutrient enrichment
- pathogens
- sea level rise
- climate variability
- freshwater discharge, and
- resource extraction.

From this effort, three habitat types - freshwater wetlands; intertidal marshes and flats; and streams, rivers and riparian buffers - 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 that people value about living in coastal Alabama.

Habitat	Ecosystem Services Most Stressed	Top Stress Impacts	Citizen Values
Freshwater Wetlands	Nesting for birds and turtles Biodiversity Wildlife Fisheries	Land Use Change Fragmentation Dredging and Filling	Access Fish Heritage Resilience Water Quality
Intertidal Marshes and Flats	Biodiversity Fisheries Wildlife Water Quality	Sediment Sea Level Rise Fragmentation	Access Fish Heritage Resilience Water Quality Beaches
Streams and Rivers (Riparian Buffers)	Fish Biodiversity Water Quality Sediment	Freshwater discharge Land Use Change Sediments	Access Fish Heritage Resilience Water Quality

The results of this evaluation can be found at http://www.mobilebaynep.com/what_we_do/ccmp/.

Developing the Strategies

The next step toward the development of a new CCMP was to **recommend actions** using the information gathered from the aforementioned efforts and a situation analysis that was completed for each value.

These analyses can be reviewed at http://www.mobilebaynep.com/what_we_do/ccmp/. To achieve this, six teams were assembled to craft strategies to protect the things that people value most about living in coastal Alabama. These volunteer teams were led by experts in that value's particular field. The Team leaders were:

- **Access** – Mr. Phillip Hinesley, Alabama Department of Conservation and Natural Resources, State Lands Division, Coastal Section Chief; and Ms. Colette Boehm, Special Projects Director, Gulf Shores and Orange Beach Tourism
- **Beaches and Shorelines**- Dr. Scott Douglass, Assistant Professor, Department of Civil Engineering, University of South Alabama
- **Fish**- Dr. Sean Powers, Professor of Marine Sciences, University of South Alabama & Senior Marine Scientist, Dauphin Island Sea Lab; and Mr. Kevin Anson, Alabama Department of Conservation and Natural Resources, Marine Resources Division
- **Heritage and Culture** – Dr. Greg Waselkov, Professor of Anthropology, University of South Alabama
- **Environmental Health/Resiliency** – Dr. LaDon Swann, Director Mississippi Alabama Sea Grant/Associate Research Professor, Auburn University; Dr. Tracie Sempier, Coastal Storms Outreach Coordinator, Mississippi Alabama Sea Grant
- **Water Quality** – Dr. John Lehrter, Ecologist, U. S. EPA Gulf Breeze Lab; and Mr. Scott Brown, Alabama Department of Environmental Management, Chief – Coastal Unit

Team leads identified members representing policy, Federal and State resource management and non-governmental representatives, as well as others that would contribute to determining five year priorities for their "Value". Each team member was provided with a "Homework Packet" including the situation analysis of their value; the citizen comments received during the input process; a summary of the stressor assessment conducted pertaining to their value; and the recommendations included in the CCMP (2002) review.

Armed with these materials in November, 2012, some 100 elected officials, resource managers and representatives of Federal, State, and local agencies as well as representatives from non-governmental organizations (NGOs) and businesses came together to develop action strategies for undertaking status and trends, habitat restoration and protection, capacity building through policy changes and professional training, and citizen involvement over the next five years. These action strategies have been consolidated into this draft CCMP, which will be released for public comment in January of 2013 for 45 days.

The Things that People Value about Coastal Alabama

The following section provides a summary of the situation analyses prepared for the value teams.



Access

Just as it was important 10 years ago, so it is today that having **ACCESS** to our coastlines is something people care deeply about. Originally part of 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 their environment. It will illuminate the lasting impacts that human disturbance and alteration have on our sensitive ecosystems. With the balance that must be reached when people and nature come together, the issue of trash in and around our waterways again appears as a top concern. It is our hope that by increasing the availability to environmental experiences people will develop a deeper awareness of the level of human imprint they leave behind and move them to change behavior.

There are many venues that provide access to our coastal environment: Gulf State Park, Bon Secour National Wildlife Refuge, Weeks Bay NERR, Robinson Island, Orange Beach Canoe/Kayak Trail & Waterfront Park, Five Rivers, 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 that are in disrepair or are scarcely used. The 2013 CCMP addresses expanding access to include a broader range of natural experiences while securing funding sources for construction of new 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.



Coastlines

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 due to 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 the Gulf Shores, Orange Beach and Fort Morgan areas. 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.

In an effort to build capacity of area marine contractors, programs designed to educate public, state and federal regulatory agencies and private contractors about the benefits of installing natural erosion control structures as an alternative to seawalls and bulkheads will be expanded to support this new focus. The new CCMP recommends the establishment of a program to retrofit the armoring around bays and backwaters with natural materials or living shorelines that enhance the overall health of the estuary by restoring lost estuarine beaches and intertidal habitat. To achieve this goal, education of property owners in addition to officials and contractors and the changing of state regulations are key components in this plan.

With the full impacts of tar mats and residual oil from the Deepwater Horizon oil spill on Alabama beaches as yet unknown, the new plan calls for extensive research. It further recommends the development of strategies for storm protection and restoration as well as research to evaluate the long term success of current restoration measures.

To successfully implement these measures, actions must be taken to acquire ongoing funding from a broad base of sources. The new CCMP endorses collaboration among state agencies and NGOs to seek out these sources and secure funding that will remain available throughout the CCMP period.



Fish

Many of the actions recommended in the 2002 CCMP under “Living Resources” will be addressed in the new CCMP under the value, “**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 that 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 to track and study these mammals but also as a means to predict ecosystem responses to environmental changes.

Like the estuary itself, the issue of fish is a complicated one involving many connected facets. For instance, one cannot look at the health of the living resource – fish, without also examining the health of the critical resource that all aquatic species need to thrive – sea grass. Submerged Aquatic Vegetation (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, much of the nation’s total oyster harvest comes from the Gulf Coast. The massive reefs that support the Alabama oyster fishery are the foundation of a healthy and resilient coastal ecosystem, providing not only for the oyster, but also for other species that rely on the reefs for food or shelter. They provide coastline protection from erosion, and they help to 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 storm 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 Restore Coastal Alabama’s 100-1000 public/private initiatives are underway. On Mon Louis Island a living shoreline restoration includes oyster reef restoration as part of the plan.

To address these issues and more, the 2013 CCMP suggests such actions as restoring headwaters, hydrological streamflows, and freshwater wetlands in priority watersheds to improve watershed discharges to fishery nursery areas and SAV beds, and using the Gulf States Marine Fisheries Commission as a model to build a coalition of Commercial and Recreational Fishermen to cooperatively address fishery issues of common interest.



Heritage and Culture

Heritage is a newcomer to the CCMP, having been identified by the community due to concerns that the bay and estuarine waters that provided such pleasure to many as youth will not be there in the future for their grandchildren to enjoy. 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, sunken Civil War ships scattered throughout the estuary floor, the Deltaic remains of Indian cultures from long ago. Economies have long thrived because of the natural ecosystems.

The Deepwater Horizon Oil Spill clean up has resulted in an international cultural resources monitoring company being contracted by BP to bring in underwater archaeologists and ethnographers to study the impact of the oil spill on traditional community resources like ethnic fishing villages and Native American communities, as well as sea floor sampling and testing. Also, under the value ACCESS, Alabama's Coastal Connection Corridor Management Plan identifies, promotes and enhances the assets, including history, of Alabama’s Coastal Connection through the development and implementation of a Corridor Management Plan and through obtaining both state and national designation as a Scenic Byway.

In 1814, Three Mile Creek was an important source of water for the City of Mobile. By 1940, urbanization within its watershed had degraded the quality of the water, forcing the City to turn to Big Creek Lake for its water supply. By the end of the twentieth century, urbanization had deteriorated the water quality of the Creek to a level only recommended for agriculture and industry and generally not suitable for fishing, bathing, or recreational activities. Channelization and resulting hydrological modification, trash delivered off city streets by stormwater, and increasing presence of invasive species have also contributed to degradation. The planned Three Mile Creek Restoration Project seeks to restore the hydrology and water quality of this historic cultural and environmental resource.

The new CCMP suggests such actions as conducting a “toponymy “or place-names study of the estuary to identify their origins, meanings, cultural themes, ethnic settlement patterns and how communities utilized estuarine resources through time for survival and enjoyment. In addition, it recommends the development of a Heritage Landscapes Inventory for each county to determine the value of different landscapes and to identify issues relating to their preservation. It goes further, to champion the creation of driving/walking/biking/canoe-kayaking trails following historical and ethnic and religious themes to encourage eco-heritage tourism throughout the estuary. Adequate funding remains a key obstacle to the success of these actions.



Resilience

One key component to the preservation of our coastal heritage is being able to protect coastal communities from a range of natural hazards. **RESILIENCE** refers to the coordinated actions needed to reduce vulnerability, and develop response and recovery plans to facilitate a quick response and 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.

The Plan will take into account the varied habitats found in Mobile Bay estuary. Whether beaches and dunes, freshwater wetlands, intertidal marshes and flats, maritime forests, pine savannahs, oyster reefs, or streams/rivers/buffers, or sub-tidal habitats, the new CCMP calls for consideration of land use planning, Smart Growth, disaster preparedness, hazardous material management, solid waste management and vector control to all be brought together in planning for unforeseen problems.

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 and establishes both short and long term mitigation strategies, implementation tasks goals, and strategies and objectives for lessening their adverse impact.

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. In addition, the Alliance will assess coastal hazard risks to the natural, built, and social environments of the Gulf Coast better quantify these risks in the future. Meanwhile, GOMA’s Habitat’s Team is focusing on habitat conservation and restoration.

The Community Resilience Index is a tool that communities can use to determine their level of preparation for storms and storm recovery. FEMA and the National Flood Insurance Program’s (NFIP’s)

Community Rating System (CRS) is used as a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions to meet the CRS goals. And, 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.

The new CCMP recommends the consolidation of hazard data including sea level rise (SLR), temperature, flood and climate forecast impacts to be used by planning bodies and elected officials to secure funding to improve resilience based on actions identified through the Community Resiliency Index process. This capacity building should include working with regional planning commissions and others to identify funding alternatives and agency coordination opportunities.



Water Quality

Completing the connection of values for the 2013 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. Negligent management practices and 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 National Estuarine Research Reserve and the Bon Secure National Wildlife Reserve have contributed to the conservation and restoration of area waters. The Alabama Department of Environmental Management's (ADEM) Water Quality Program reports water quality conditions to the EPA, lists 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, which is part of 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 and waterways. 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 rejection of funding needed for implementation of a broad scale plan persists.

Recommendations in the next CCMP include a renewed focus on improving water quality through the development of watershed management plans in strategic locations; better enforcement of existing regulations; restoration of headwaters, hydrological stream flows, and freshwater wetlands in those priority watersheds to improve watershed discharges to fishery nursery areas and SAV beds; restoration of priority watersheds in urban areas targeting reductions in non-point source pollutants, improving long

term monitoring of water quality conditions; and the pursuit of "Green Port" status for ports within the estuary through assessment of needs and development / implementation of consistent Green Port policies to improve bay sediment and water quality.

Recommended Actions

Hopefully you can see the connection that each of our values has to one another. The inter-connectedness of our estuary's many facets and the people who value it are the focus of the CCMP for the next five years. The aforementioned recommendations are only a sample of the complete 2013-2018 CCMP. We challenge you familiarize yourself with the recommended actions on the following pages. Join us, embrace the connection, respect it, and become an agent of change.

**Mobile Bay National Estuary Program
Comprehensive Conservation Management Plan 2013-2018: DRAFT 1**

Value	OutcomeSum	Type of action	Type detail	Action
Access	Increase awareness	Measuring System Health	Data Gathering	Conduct a gap analysis of K - 12 environmental education curriculum including what is/is not taught regarding environments of Mobile and Baldwin County to inform access planning and interpretive signage messaging
Access	Maximize/improve current access	Measuring System Health	Monitoring	Conduct periodic monitoring of access points to evaluate condition of infrastructure and associated shorelines where applicable
Access	Environmentally appropriate access	Measuring System Health	Research	Conduct a Comprehensive Public Access Needs Assessment (Existing inventory and type/opps for expansion; user groups, inventory of kind and amount of usage, citizen awareness of access issues and stressors , best practices elsewhere, other) to inform future access planning
Access	Environmentally appropriate access	System Restoration	Habitats	Create a greenspace mitigation and acquisition bank for use by Industry and others
Access	Environmentally appropriate access	System Restoration	Habitats	Protect/conserve priority habitats for public benefit through land acquisition (Forever Wild, Coastal land trusts)
Access	Maximize/improve current access	System Restoration	Habitats	Restore living shorelines at current/future access points to mitigate the impacts of boat/other wakes
Access	Environmentally appropriate access	System Restoration	Healthy Communities	Restore working waterfronts (repair launches and others for access use, identify and inventory potential/existing waterfront sites, identify existing/future funding sources)
Access	Maximize/ improve current access	Building Capacity	Policy	Benchmark regulatory practices for environment - identify issues with current regulatory process, establish list of model ordinances already in place in other areas.
Access	Increase funding	Building Capacity	Resource Development	Create South AL task force to leverage available funding for land acquisition
Access	Increase funding	Building Capacity	Resource Development	Develop or identify a one stop shop for funding sources
Access	Ecotourism	Building Capacity	Technical Assistance	Diversify the ecotourism industry through the provision of technical assistance, business support and environmental education training
Access	Increase awareness	Building Capacity	Tools	Update Habitat Mapping tool with enhanced GIS and CMSP data to inform development of access points
Access	Increase awareness	Building Capacity	Training	Develop conservation easement/incentive program to expand key access points in partnership with private property owners/businesses.

Value	OutcomeSum	Type of action	Type detail	Action
Access	Increase awareness	Community Ownership	Outreach	Develop and install interpretive signage at access points to educate users on living shorelines, other access points, bird migration, etc.
Access	Increase awareness	Community Ownership	Outreach	Develop promotional campaign to showcase the diverse opportunities to access the estuary for recreational enjoyment. Promote the availability of public access maps.
Access	Increase awareness	Community Ownership	Outreach	Promote public access points that are designated as Clean Marinas

Value	OutcomeSum	Type of action	Type detail	Action
Coastlines	Healthy, resilient, sustainable beaches and dunes	Measuring System Health	Data Gathering	Identify long-term beach sand resources;
Coastlines	Healthy, resilient, sustainable beaches and dunes	Measuring System Health	Data Reporting	Make shoreline change data available to researchers and other interests
Coastlines	More "natural" shorelines on bays, backwaters, and rivers	Measuring System Health	Monitoring	Conduct periodic monitoring of shoreline change in coordination with monitoring of SAV distribution (at least every five years)
Coastlines	Healthy, resilient, sustainable beaches and dunes	Measuring System Health	Research	Undertake research to define distribution of residual oil impacts/tar mats along AL coast
Coastlines	More "natural" shorelines on bays, backwaters, and rivers	Measuring System Health	Research	Continue research to evaluate the effectiveness of past and future shoreline stabilization measures
Coastlines	Healthy, resilient, sustainable beaches and dunes	System Restoration	Habitats	Expand dune system by restoring vegetation on beaches and adjacent upland areas
Coastlines	Healthy, resilient, sustainable beaches and dunes	System Restoration	habitats	Identify, design and construct HIGHLY visible demonstration projects in different locations and conditions to educate public about natual/living shorelines.
Coastlines	More "natural" shorelines on bays, backwaters, and rivers	System Restoration	Habitats	Pilot experients combining marsh creation with sand beach establishment in strategic locations
Coastlines	More "natural" shorelines on bays, backwaters, and rivers	System Restoration	Habitats	Retrofit armored bay shorelines using living shorelines and pocket beach technologies in bays & backwaters.
Coastlines	Healthy, resilient, sustainable beaches and dunes	Building Capacity	Partnerships	Encourage collaboration between agencies and academia, and stakeholders (ex. community of practice/MBNEP)
Coastlines	Healthy, resilient, sustainable beaches and dunes	Building Capacity	Policy	Change State regulations to allow for placement of fill seaward of MHW
Coastlines	Healthy, resilient, sustainable beaches and dunes	Building Capacity	Policy	Ensure that dredged sand is restored to littoral sand transport system;
Coastlines	Healthy, resilient, sustainable beaches and dunes	Building Capacity	Resource Development	Develop long term funding stream for ongoing shoreline restoration/maintenance
Coastlines	Healthy, resilient, sustainable beaches and dunes	Building Capacity	Technical Assistance	Develop strategy for storm protection and restoration of beaches and shorelines as a first line of defense
Coastlines	Healthy, resilient, sustainable beaches and dunes	Building Capacity	Training	Conduct workshops to educate property owners and contractors on benefits of sustainable shoreline management including use of living shoreline technologies (Coastal AL Living Shorelines initiative)

Value	OutcomeSum	Type of action	Type detail	Action
Coastlines	Healthy, resilient, sustainable beaches and dunes	Community Ownership	Citizen Involvement	Expand volunteer field observer program to monitor populations of beach nesting birds, turtles and other species of concern
Coastlines	More "natural" shorelines on bays, backwaters, and rivers	Community Ownership	Outreach	Identify, design and construct HIGHLY visible demonstration projects in different locations and conditions to natural shorelines.
Coastlines	Healthy, resilient, sustainable beaches and dunes	Community Ownership	Outreach	Develop APP to inform beachgoers about areas of sensitive nesting habitats

Value	OutcomeSum	Type of action	Type detail	Action
FISH	Resiliency	Measuring System Health	Monitoring	Develop ecosystem based monitoring program based on defined ecosystem health indicators (Biological Condition Gradient Framework) that includes high resolution mapping of critical habitats that support fisheries. Establish a centralized location for sharing monitoring data
FISH	Resiliency	Measuring System Health	Monitoring	Improve baseline data on fishery populations including seasonal and spatial occurrence/use by zooplankton/ichthyoplankton
FISH	Preserve Fishing Communities/Access	Measuring System Health	Research	Compare historical fishing sites to historical shoreline with that of today's shoreline and fish production
FISH	Resiliency	Measuring System Health	Research	Conduct a metaanalysis, or systematic review, of historic data, bathymetry, water quality change and other research to develop a status and trends baseline for fishery
FISH	Species of Concern	Measuring System Health	Research	Conduct research for aquatic species of concern, including Tarpon (the State Fish) to identify key habitats, role of estuarine environment in species health, etc.
FISH	Educational Enhancement	Measuring System Health	Research	Conduct research to determine how water quality, bathymetry changes, hydrological dynamics and connectivity affect freshwater and and marine fishery resources
FISH	Preserve Fishing Communities/Access	Measuring System Health	Research	Conduct socioeconomic research on attitudes, perceptions and beliefs related to fisheries (include assessment of business losses both commercial fishing and support services)
FISH	Restore landscape	Measuring System Health	Research	Use vigorous valuation methods to measure ecosystem services provided by fisheries habitats
FISH	Restore landscape	Measuring System Health	Research	Validate Hydrogeomorphic Approach for Assessing Wetland Functions Model (HGM) with on the ground research on pristine and impacted areas
FISH	Restore landscape	System Restoration	Habitats	Develop fresh/brackish water SAV restoration program
FISH	Restore landscape	System Restoration	Habitats	Expand useage of dredge material in restoring nearshore and intertidal marshes and flats (net gain of 100 acres)
FISH	Restore landscape	System Restoration	Habitats	Protect critical habitats that contribute to the health of fishery and water quality through acquisition, conservation easement, or other method
FISH	Improve health	System Restoration	Habitats	Restore D'Olive Bay and its associated tributaries
FISH	Restore landscape	System Restoration	Habitats	Restore hydrology to Choccolatta Bay/ John's Bend/Justins Bay by opening up the Causeway

Value	OutcomeSum	Type of action	Type detail	Action
FISH	Restore landscape	System Restoration	Habitats	Restore oyster productivity through the construction of living shorelines and planting of juvenile oysters on historic/existing reefs.
FISH	Restore landscape	System Restoration	Habitats	Restore priority intertidal marshes and flats with a combination of habitat for nursery sustainability, commercial fishing, recreational fishing, and oyster farming (Kumbaya)
FISH	Improve health	System Restoration	Habitats	Restore streams (including system hydrology where feasible), riparian buffers and freshwater wetlands in priority watersheds to improve watershed discharges to fishery nursery areas and SAV beds
FISH	Preserve Fishing Communities/Access	Building Capacity	Direct Assistance	Develop incentive program for modernizing and improving fishery infrastructure including boats, processing and packaging equipment and training to build a more resilient industry
FISH	Preserve Fishing Communities/Access	Building Capacity	Direct Assistance	Develop safe harbor in Bayou La Batre and Bon Secour River
FISH	Resiliency	Building Capacity	Direct Assistance	Improve access to streams for better monitoring
FISH	Preserve Fishing Communities/Access	Building Capacity	Direct Assistance	Pilot a "model working waterfront" initiative-Include microfinance Program (modeled after Grameen Bank) to provide low interest loans to new or existing fishermen that incorporates comprehensive support such as education of basic biology, fisheries management, licensing, business management/financing and other services to professionalize fishermen
FISH	Peaceful coexistence	Building Capacity	Partnerships	Build coalition of Commercial and Recreational Fishermen to cooperatively address fishery issues of common interest (use Gulf States Marine Fisheries Commission as model)
FISH	Improve health	Building Capacity	Partnerships	Create an "Adopt a Watershed" program with Universities to increase resources available for watershed planning and management
FISH	Educational Enhancement	Building Capacity	Partnerships	Encourage collaboration between agencies and academia, and stakeholders (ex. community of practice/MBNEP)
FISH	Educational Enhancement	Building Capacity	Partnerships	Expand partnerships with the Alabama Cooperative Extension System for developing and conducting training, technical assistance, and other educational programming about the estuary/our fish nursery

Value	OutcomeSum	Type of action	Type detail	Action
FISH	Peaceful coexistence	Building Capacity	Partnerships	Pilot consortiums in priority watersheds to plan for and maintain watersheds through collaboration across geopolitical boundaries
FISH	Resiliency	Building Capacity	Partnerships	Support and expand Alabama Rivers and Streams Network- A statewide partnership including USFWS, CWP, TNC, GSA, ADCNR, NRCS
FISH	Resiliency	Building Capacity	Policy	Adopt AL Aquatic Nuisance Species plan
FISH	Resiliency	Building Capacity	Policy	Adopt slot limits on Speckled trout to build larger average fish stocks
FISH	Restore landscape	Building Capacity	Policy	Develop comprehensive sediment management plan
FISH	Preserve Fishing Communities/Access	Building Capacity	Policy	Develop policies needed to create Fisheries Industry Parks, (including oyster farm enterprise zones) that provide land/water/access for lease and support existing and new business development
FISH	Resiliency	Building Capacity	Policy	Improve management of catches and creel limits on game fish
FISH	Resiliency	Building Capacity	Policy	Support additional State capacity for fishery stock assessments and monitoring (ADCNR-MRD and ALDPH)
FISH	Resiliency	Building Capacity	Resource Development	Develop consistent funding streams for research and monitoring of fisheries
FISH	Preserve Fishing Communities/Access	Building Capacity	Technical Assistance	Identify ways to mitigate the rising cost of insurance for commercial fishermen
FISH	Improve health	Building Capacity	Tools	Develop plans for each HUC - 12 discharging into salt (Bay, Sound, Gulf) waters to identify/remediate negative impacts of upstream inputs on water quality and quantity including improved management of stormwater/ non-point source pollution impacting fishery health (Mobile Tensaw, Mississippi Sound, Bon Secour)
FISH	Restore landscape	Building Capacity	Tools	Develop/update aquatic and upland habitat inventory with identification of potential sites for restoration, protection and enhancement (Habitat Tool)
FISH	Restore landscape	Building Capacity	Tools	Improve Mississippi Alabama Habitats Tool for use in making restoration decisions including but not limited to improve functionality, increase data layers, continue and expand documentation of activities
FISH	Restore landscape	Building Capacity	Tools	Promote the use of decision support tools to local governments and planners to improve coastal resource management actions, including but not limited to TNC's coastal resilience tool, NOAA's Digital Coast, MS AL Habitats Tool

Value	OutcomeSum	Type of action	Type detail	Action
FISH	Peaceful coexistence	Building Capacity	Tools	Use marine spatial planning techniques to more efficiently balance conservation, restoration and multi-uses of our fishery resources
FISH	Resiliency	Building Capacity	Tools	Use model products and other outreach materials to educate local governments and resource managers about Sea Level Rise scenarios and adaptation planning for local fishery resources
FISH	Educational Enhancement	Community Ownership	Citizen Involvement	Create outreach campaign targeting younger adults to connect them to the fishery
FISH	Educational Enhancement	Community Ownership	Citizen Involvement	Develop hands on opportunities and experiences for learning about our fishery resources that are accessible to all and particularly underserved populations
FISH	Resiliency	Community Ownership	Citizen Involvement	Engage citizens in collecting biological and water quality data for monitoring and research purposes
FISH	Peaceful coexistence	Community Ownership	Citizen Involvement	Engage Industry in participating in ongoing restoration and stewardship activities (Both Commercial Fishing and other)
FISH	Educational Enhancement	Community Ownership	Citizen Involvement	Expand access to affordable fishing opportunities including shoreline, pier, and boat access and promote to underserved populations
FISH	Educational Enhancement	Community Ownership	education	Promote the inclusion of an "Alabama Conservation Education" curriculum unit in schools as a core course of study for all grades k-12 to educate about the watershed, estuary, fishery, non-point source pollution including stormwater, erosion and sedimentation and connection between up and downstream environments
FISH	Educational Enhancement	Community Ownership	Outreach	Develop outreach to improve understanding of "wise use" of our fishery resources
FISH	Educational Enhancement	Community Ownership	Outreach	Develop Summer Camp curricula for 12-15 year olds that teaches about the connection between our coastal environment and the seafood industry
FISH	Educational Enhancement	Community Ownership	Outreach	Utilize local TV channels to air short movies that showcase local resources, issues, always including a message of action
FISH	Peaceful coexistence	Community Ownership	Partnerships	Engage recreational and commercial fishermen in collaborating for data gathering
FISH	Educational Enhancement	Community Ownership	Partnerships	Strengthen environmental education programs by building collaboration and partnerships with educational institutions

Value	OutcomeSum	Type of action	Type detail	Action
HERITAGE	Resiliency	Measuring System Health	Data Gathering	Conduct a Heritage Landscapes Inventory for each county to determine the value of each landscape and to identify issues relating to its preservation.
HERITAGE	Collaborate with the business community	Measuring System Health	Research	Compare heritage tourism's economic impact to the impacts of other forms of tourism
HERITAGE	Improve understanding of historic connections to estuary	Measuring System Health	Research	Conduct a (long-term longitudinal) study of the use of the estuary based on primary documentary and archaeological data.
HERITAGE	Collaborate with the business community	Measuring System Health	Research	Conduct a meta analysis of economic studies that quantify value of heritage tourism
HERITAGE	Improve understanding of historic connections to estuary	Measuring System Health	Research	Conduct a toponymy or place names study of the estuary to identify their origins, meanings, cultural themes, ethnic settlement patterns and how communities through time utilized estuarine resources for survival and enjoyment.
HERITAGE	Protect archaeological and historical resources	Measuring System Health	Research	Research best practices for protecting archaeological and historical resources adapting best practices from elsewhere to protect cultural resources.
HERITAGE	Educational Enhancement	System Restoration	Healthy Communities	Create driving/walking/biking/canoe-kayaking trails on historical and ethnic and religious themes to encourage eco-heritage tourism around and on the estuary (Native American, African-American, Civil War, etc.).
HERITAGE	Educational Enhancement	System Restoration	Healthy Communities	Establish human connections to the water by creating new forms of access: boat tours, pocket parks
HERITAGE	Protect archaeological and historical resources	System Restoration	Healthy Communities	Incorporate heritage and cultural significance in restoration planning (Three Mile Creek)
HERITAGE	Protect archaeological and historical resources	System Restoration	Healthy Communities	Restore connections between heritage and culture of the lower Mobile Tensaw Delta through preservation of key sites (Africatown, Indian and civil war artifacts)
HERITAGE	Protect archaeological and historical resources	Building Capacity	Direct Assistance	Develop economic incentives for protection of cultural resources including use of conservation easements and community recognition programs
HERITAGE	Educational Enhancement	Building Capacity	Direct Assistance	In coordination with curriculum coordinators, adapt existing lesson plans to include local estuarine culture/heritage content for multiple grades. Offer lesson supplements on-line/incorporate into Alabama Science and Technology Initiative
Heritage	Mobile Tensaw Delta Federal Designation	Building Capacity	Partnerships	Confer with Alliance of National Heritage Areas (& with Mississippi NHA)

Value	OutcomeSum	Type of action	Type detail	Action
HERITAGE	Educational Enhancement	Building Capacity	Partnerships	Create a collaborative coalition including Dept. of Tourism, Welcome Centers, Mobile Area Lodging Association, Seafood organizations, homeowners' associations, and others to promote cultural/heritage tourism along with natural and recreational attractions.
HERITAGE	Collaborate with the business community	Building Capacity	Partnerships	Develop partnerships with Chambers of Commerce and other who benefit from and can assist with promotion and resource development for the preservation needs related to our culture & heritage.
HERITAGE	Integrate cultural concerns with other environmental concerns	Building Capacity	Partnerships	Establish a collaboration of coastal environmental practitioners and historic preservationists to investigate opportunities for communicating the value of coastal Alabama's heritage to its present day activities and promote preservation and protection actions
Heritage	Mobile Tensaw Delta Federal Designation	Building Capacity	Partnerships	Garner Congressional support by visits to Mobile Tensaw Delta
HERITAGE	Protect archaeological and historical resources	Building Capacity	Policy	Investigate alternatives for mitigation for Section 106 (National Historic Preservation Act) issues
HERITAGE	Educational Enhancement	Building Capacity	Policy	Promote the incorporation of culture and heritage in community, economic, transportation and other planning processes.
HERITAGE	Educational Enhancement	Building Capacity	Tools	Develop a FAQ response to common questions about historical and archaeological sites, artifacts, cemeteries, and historic protection laws and make accessible through electronic media
HERITAGE	Educational Enhancement	Building Capacity	Tools	Incorporate and expand information on cultural sites of interest in the region (linking to Encyclopedia of Alabama) in the Habitats Tool
HERITAGE	Collaborate with the business community	Community Ownership	Citizen Involvement	Create an "Adopt a Cultural Pearl" program that encourages business support and ongoing stewardship for protecting priority cultural properties, archaeological and historical sites, etc.
HERITAGE	Collaborate with the business community	Community Ownership	Citizen Involvement	Create educational opportunities that physically engage the business community in connecting with our estuaries, cultural and natural resources.
HERITAGE	Integrate cultural concerns with other environmental concerns	Community Ownership	education	Add cultural content to the biennial Bays and Bayous conference

Value	OutcomeSum	Type of action	Type detail	Action
HERITAGE	Educational Enhancement	Community Ownership	education	Develop program to educate about the interrelationship of culture and history in the coastal zone to diverse groups, including the local populations, snowbirds, tourists, and recent arrivals in the area
HERITAGE	Educational Enhancement	Community Ownership	Outreach	Develop interpretive signage that will complement electronic GPS/smart phone links to encourage education on-site.
HERITAGE	Improve understanding of historic connections to estuary	Community Ownership	Outreach	Develop outreach program that promotes public contributions to archaeology and cultural knowledge base of the community including an oral history program that solicits interviews with all segments of the community to explore individuals' relationship to the estuary. Establish electronic format for submission of data, opportunities for protection
HERITAGE	Resiliency	Community Ownership	Outreach	Encourage and coordinate festivals and other public activities on the waterways of the area that celebrate the cultural/natural connection.
HERITAGE	Educational Enhancement	Community Ownership	Outreach	Explore non-print media and social media to inform the public on educational and tourism possibilities.
HERITAGE	Educational Enhancement	Community Ownership	Outreach	Promote information on cultural sites of interest in the region through a variety of electronic media

Value	OutcomeSum	Type of action	Type detail	Action
RESILIENCY	Resiliency	Measuring System Health	Monitoring	Conduct periodic monitoring of shoreline change in coordination with monitoring of SAV distribution (at least every five years)
RESILIENCY	planning	Measuring System Health	Monitoring	Develop mechanism for monitoring number of communities that have incorporated adaptation planning and resiliency measures into existing operational frameworks
RESILIENCY	Planning	Measuring System Health	Research	Consolidate hazard data (SLR, temperature, flood, climate) and forecast impacts to be used by planning bodies and elected officials.
RESILIENCY	restoration	System Restoration	habitats	Conserve and restore maritime forests throughout the estuary
RESILIENCY	restoration	System Restoration	habitats	Protect undeveloped lands that contribute to aquifer recharge
RESILIENCY	restoration	System Restoration	habitats	Restore salt marshes
RESILIENCY	Planning	Building Capacity	Policy	Develop and facilitate implementation of model ordinances and incentive packages that institutionalize the use of low impact development practices in communities.
RESILIENCY	Planning	Building Capacity	Policy	Develop plans to protect sensitive habitats through regulation and incentives, including an evaluation plan for tracking progress/success.
RESILIENCY	Resiliency	Building Capacity	Resource Development	Increase amount of local taxes designated for environmental stewardship programs
RESILIENCY	Planning	Building Capacity	Resource Development	Secure funding to implement actions to improve resilience that have been identified by communities that have completed the Community Resiliency Index. Work with Regional Planning Commissions and others to identify funding alternative and agency coordination opportunities
RESILIENCY	Planning	Building Capacity	Tools	Better utilize the habitat prioritization tool
RESILIENCY	Planning	Building Capacity	Tools	Develop/update aquatic and upland habitat inventory for restoration, protection and enhancement (Habitat Tool)
RESILIENCY	Resiliency	Community Ownership	Outreach	Develop (3) social marketing campaigns to increase public stewardship
RESILIENCY	Resiliency	Community Ownership	Outreach	Educate the public about "what is in it for me" to make good decisions about environmental impacts. Educate to increase stewardship, definition of resilience, what are stresses, drivers, increase awareness, increase knowledge
RESILIENCY	Resiliency	Community Ownership	outreach	Organize annual forum to address how residents are utilizing natural resources (Book: Tragedy of the Commons) and how to use them responsibly.

Value	OutcomeSum	Type of action	Type detail	Action
RESILIENCY	Improve Water supply	Community Ownership	Partnerships	Host a joint state watershed management meeting with water management stakeholders to share tools, best management practices, water policy and water supply

Value	OutcomeSum	Type of action	Type detail	Action
WATER QUALITY	WQ Ed. Enhancements K12 and Elected	Measuring System Health	Monitoring	Develop a "Scorecard of Estuary Health" to improve dissemination of status and trends information related to water quality/estuary health. Provide annual updates and publish a comprehensive State of the Bay every 3 years
WATER QUALITY	Monitoring-Bay and Tribs	Measuring System Health	Monitoring	Develop a Mobile Bay water quality monitoring program that targets watersheds based on areas under most and least stress (Build off of Healthy Watersheds Initiative currently in process)
WATER QUALITY	Improve Water Clarity to promote SAV Health	Measuring System Health	Monitoring	Develop Long-term monitoring program of SAV as indicator of status and trends for WQ
WATER QUALITY		Measuring System Health	Research	Characterize nutrients in terms of their sources, transport, fate and effects on the estuary to develop an understanding of the relationships between freshwater inflow, sediments, nutrients, physical processes, and biological communities with the goal of developing nutrient criteria for the State of Alabama
WATER QUALITY	Restore Hydrology	Measuring System Health	Research	Develop a better understanding of water quantity and withdrawal on the overall WQ of Mobile Bay. Determine the minimum amount of freshwater inflow to sustain a healthy estuary
WATER QUALITY	Restore Hydrology	Measuring System Health	Research	Study impacts of causeway/ship channel on hydrologic function of the estuary
WATER QUALITY	Improve trends in Water Quality	Measuring System Health		Develop a quantitative understanding of water quality impairments in priority watersheds
WATER QUALITY	planning-WMP Coastal HUC 12s	System Restoration	Habitats	Develop fresh/brackish water SAV restoration program that coordinates activities with the development and implementation of watershed management plans in Coastal HUC 12s
WATER QUALITY	Improve trends in Water Quality	System Restoration	Habitats	Restore streams (including system hydrology where feasible), riparian buffers and freshwater wetlands in priority watersheds to improve watershed discharges to fishery nursery areas and SAV beds
WATER QUALITY	Improve trends in Water Quality	System Restoration	Habitats	Restore hydrology to Choccolatta Bay/ John's Bend/Justins Bay by opening up the Causeway
WATER QUALITY	Reduce Non-Point Sources- SW,Nutrients,other	System Restoration	Habitats	Restore priority watersheds in urban areas through development and implementation of comprehensive watershed management plans that target reductions in non-point source pollutants

Value	OutcomeSum	Type of action	Type detail	Action
WATER QUALITY	Improve trends in Water Quality	Building Capacity	Policy	Develop and facilitate implementation of model ordinances and incentive packages that institutionalize the use of low impact development practices in communities.
WATER QUALITY	Improve trends in Water Quality	Building Capacity	Policy	Promote the need to emphasize Water Quality as a goal of the State Water Resources Management Plan to government officials/legislators
WATER QUALITY	Improve trends in Water Quality	Building Capacity	Policy	Pursue the development of "Green Port" status for ports within the estuary through assessment of needs and development / implementation of consistent green Port policies to improve bay sediment and water quality
WATER QUALITY	Reduce Non-Point Sources- SW,Nutrients,other	Building Capacity	Resource Development	Develop alternatives for financing stormwater management activities on an ongoing basis and pilot in conjunction with watershed management planning efforts
WATER QUALITY	Improve trends in Water Quality	Building Capacity	Resource Development	Develop mechanism for increasing resources to support additional enforcement of water quality regulations
WATER QUALITY	planning-WMP Coastal HUC 12s	Building Capacity	Tools	Create prioritized list of Watersheds for planning efforts
WATER QUALITY	Monitoring-Bay and Tribs	Building Capacity	Tools	Develop a comprehensive mapping/GIS tool to provide information on water quality by watershed (ex. Florida WaterAtlas.org)
WATER QUALITY	Monitoring-Bay and Tribs	Building Capacity	Tools	Synthesize existing water quality research and monitoring data to establish quantitative baselines for measuring progress and identifying data gaps
WATER QUALITY	planning-WMP Coastal HUC 12s	Building Capacity	Tools	Establish procedure for/prepare Comprehensive Watershed Management Plans at the Hydrologic Unit Code (HUC) 12 scale that are based on quantitative data on impairments/health, address EPA's nine key elements, and include a multi year monitoring plan
WATER QUALITY	WQ Ed. Enhancements K12 and Elected	Building Capacity	Training	Expand stormwater management training opportunities (Green infrastructure, LID, cost of LID v. traditional development) through the use of electronic media
WATER QUALITY	WQ Ed. Enhancements K12 and Elected	Community Ownership	Citizen Involvement	Expand opportunities for community members to participate in protecting water quality through volunteer monitoring activities
WATER QUALITY	Reduce Non-Point Sources- SW,Nutrients,other	Community Ownership	Citizen Involvement	Minimize impacts of contaminated stormwater runoff through voluntary initiatives that reduce the incidence of litter and other sources of non-point source pollution (Stormdrain marking, working with retailers/municipalities to increase trash collection and recycling opportunities; reduce use of single-use plastic bags)

Value	OutcomeSum	Type of action	Type detail	Action
WATER QUALITY	WQ Ed. Enhancements K12 and Elected	Community Ownership	education	Identify and evaluate current educational programs related to water quality, identify the gaps, and create new programs to address those gaps
WATER QUALITY	Reduce Non-Point Sources- SW,Nutrients,other	Community Ownership	Outreach	Create an outreach campaign that brands our coastal quality of life w/ water quality
WATER QUALITY	Reduce Non-Point Sources- SW,Nutrients,other	Community Ownership	Outreach	Promote Alabama Smart Yards/Smart Yard Healthy Gulf

Appendix

The Six Values and Other Strategic Plans

EPA

Mississippi Alabama Sea Grant Consortium

National Estuarine Research Reserves

Natural Resources Conservation Service

US Fish and Wildlife Service

Gulf of Mexico Alliance

State of Alabama Coastal Area Management Plan

Coastal Recovery Commission

Alabama Coastal Foundation

Mobile Baykeeper

Situation Analyses

Access

Coastlines

Fish

Heritage and Culture

Resilience

Water Quality

Value	<p style="text-align: center;">EPA</p> <p style="text-align: center;">FY 2011 - 2015 EPA Strategic Plan</p>
Access	
Beach	<p>Improve Coastal and Ocean Waters (By 2015, working with partners, protect or restore an additional 600,000 acres of habitat within the study areas for the 28 estuaries that are part of the NEP.)</p>
Fish	<p>Fish and Shellfish Safe to Eat (By 2015, reduce the percentage of women of childbearing age having mercury levels in blood above the level of concern to 4.6%)</p>
Heritage/ Culture	<p>Enforce Environmental Laws (Pursue vigorous civil and criminal enforcement that targets the most serious water, air, and chemical hazards in communities. Assure strong, consistent, and effective enforcement of federal environmental laws nationwide.)</p>
Environmental Health/Resilience	<p>Address Climate Change (Reducing greenhouse gas emissions and taking actions to help communities and ecosystems become more resilient to the effects of climate change); Protect Human Health Related to Water (Financing public water system infrastructure to protect and maintain drinking water quality, Strengthening compliance with drinking water standards, Continuing to protect sources of drinking water from contamination, Developing new and revising existing drinking water standards, Supporting states, tribes, territories, and local water systems in implementing these standards.); Promote Sustainable and Livable Communities (Promote smart growth, Emergency preparedness and recovery planning, Brownfield redevelopment, and The equitable distribution of environmental benefits.); Strengthen Human Health and Environmental Protection in Indian Country; Promote Pollution Prevention (Conserve and protect natural resources by promoting pollution prevention and the adoption of other stewardship practices by companies, communities, governmental organizations, and individuals)</p>
Water Quality	<p>Protect and Restore Watersheds and Aquatic Ecosystems (Protect, restore, maintain, and improve water quality by financing wastewater treatment infrastructure, Conduct monitoring and assessment, Establish pollution reduction targets, Update water quality standards, Issue and enforce discharge permits, and Implement programs to prevent or reduce nonpoint source pollution.); Water Safe to Drink (By 2015, 90% of community water systems will provide drinking water that meets all applicable health-based drinking water standards through approaches including effective treatment and source water protection); Water Safe for Swimming (By 2015, maintain the percentage of days of the beach season that coastal and Great Lakes beaches monitored by state beach safety programs are open and safe for swimming at 95%.)</p>
Additional Objectives:	<p>Preserve Land (Conserve resources and prevent land contamination by reducing waste generation, increasing recycling, and ensuring proper management of waste and petroleum products.); Restore Land (Prepare for and respond to accidental or intentional releases of contaminants and clean up and restore polluted sites); Ensure Chemical Safety (Reduce the risk of chemicals that enter our products, our environment, and our bodies)</p>

Value	<p style="text-align: center;">MASGC</p> <p style="text-align: center;">2014 - 2017 Mississippi Alabama Sea Grant Consortium Strategic Plan</p>
Access	<p>2) Ecosystems and their habitats are protected, enhanced or restored (Target number of acres of coastal habitat protected, enhanced or restored as a result of Sea Grant activities =155).</p>
Beach	
Fish	<p>1) Ecosystem services are improved by enhanced health, diversity and abundance of fish, wildlife and plants (Target number of Sea Grant tools, technologies and information services that are used by our partners/customers to improve ecosystem-based management = 10) ; 3) A safe, secure and sustainable supply of seafood to meet public demand (Target number of fishermen, seafood processors and aquaculture industry personnel who modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Sea Grant activities = 4,800); 4) Informed consumers who understand the health benefits of seafood consumption and how to evaluate the safety and sustainability of the seafood they buy (Target number of seafood consumers who modify their purchases using knowledge gained in fisheries sustainability, seafood safety and the health benefits of seafood as a result of Sea Grant activities = 42,000).</p>
Heritage/ Culture	<p>1) An environmentally literate public supported and informed by a continuum of lifelong formal and informal engagement opportunities (Target number of Sea Grant facilitated curricula adopted by formal and informal educators = 28) (Target number of people engaged in Sea Grant supported informal education programs = 74,000)</p>
Environmental Health/ Resilience	<p>1) Ecosystem - based approaches are used to manage land, water and living resources (Target number of ecosystem-based approaches used to manage land, water and living resources in coastal areas as a result of Sea Grant activities = 14) ; 2) Development of vibrant and resilient coastal economies (Target number of communities that implemented sustainable economic and environmental developed practices and policies (e.g., land-use planning, working waterfronts, energy efficiency, climate change planning, smart growth measures, green infrastructure) as a result of Sea Grant activities = 13).; 3) Communities use comprehensive planning to make informed strategic decisions; 4) Resilient coastal communities adapt to the impacts of hazards and climate change (Target number of communities that implemented hazard resilience practices as a result of Sea Grant activities to prepare for, respond to or minimize coastal hazardous events = 12).</p>
Water Quality	<p>1) Improvements in coastal water resources sustain human health and ecosystem services.</p>
Additional Objectives:	<p>1) A future workforce reflecting the diversity of Sea Grant programs, skilled in science, technology, engineering, mathematics and other disciplines critical to local, regional and national needs (Target number of Sea Grant-supported graduates who become employed in a career related to their degree within two years of graduation = 9 to 10)</p>

Value	NERRS NERRS Strategic Plan 2011 - 2016
Access	
Beach	
Fish	
Heritage/ Culture	1) Increase social science research and use of social information to foster coastal stewards that value and protect estuaries.
Environmental Health/ Resilience	1) Increase permanent protection and restoration of key areas in reserve watersheds to improve coastal habitat quantity, quality, and resiliency to climate change impacts. 2) Develop, demonstrate, and evaluate tools and practices at reserves that advance progress on climate change impacts. 3) Improve understanding of the effects of climate change and coastal pollution on estuarine and coastal ecology, ecosystem processes, and habitat function. 4) Enhance the capacity and skills of teachers and students to understand and use NERRS data and information for inquiry-based learning. 5) Increase estuary literacy and promote active stewardship among public audiences through the development and delivery of tools and programs addressing climate change, habitat protection, and water quality. 6) Improve the capacity and skills of coastal decision makers to use and apply science-based information in decisions that affect estuaries and coastal watersheds.
Water Quality	1) Develop, demonstrate, and evaluate tools and practices at reserves that advance progress on water quality. 2) Expand capacity to monitor changes in water quality and quantity, habitat, and biological indicators in response to land use and climate change drivers.
Additional Objectives:	1) Expand biogeographic representation of the Nation's estuaries in the Reserve System by designating new reserves. 2) Characterize coastal watersheds and estuary ecosystems and quantify ecosystem services to support ecosystem-based management of natural and built communities.

Value	<p style="text-align: center;">SWCD/NRCS NRCS 5 Year Strategic Plan 2011 - 2015</p>
Access	
Beach	
Fish	
Heritage/ Culture	<p>Build and strengthen partnerships and coalitions: 1) Strengthen relationships with agriculture, conservation, and community organizations, and other mission stakeholders. 2) Help build and support coalitions of public and private partners based on ecologic and industry needs. Promote an ethic of conservation stewardship among America's farmers, ranchers, forestland owners, and stakeholders: 1) Develop and launch a conservation education initiative to increase public understanding of the value of conservation and natural resource protection. 2) Increase landowner and operator involvement in implementing conservation systems.</p>
Environmental Health/ Resilience	<p>Advance the performance of voluntary, incentive-based conservation solutions: 1) Solve natural resource concerns at local and landscape scales. 2) Effectively deliver conservation technical assistance and programs to agricultural producers and landowners. 3) Improve development and delivery of technical expertise. 4) Help farmers and ranchers comply with existing environmental regulation and obviate the need for further regulation. Proactively recognize and address emerging natural resource issues: 1) Assess the needs of the land in order to strategically deliver products and services at farm and landscape scales. 2) Design standards and deliver assistance to address emerging resource concerns. 3) Accelerate the development and transfer of conservation technologies for use in the field. 4) Support development of markets for environmental goods.)</p>
Water Quality	
Additional Objectives:	<p>Improve quality and accountability to deliver better products and services: 1) Maximize conservation assistance in the field by streamlining the Agency's structure. 2) Simplify and efficiently deliver conservation assistance to customers. 3) Deploy technology, training, equipment to provide more cost-effective service. 4) Improve internal controls for key Agency functions. 5) Incorporate continuous process improvement into the Agency's operations. 6) Improve data integrity and analysis. Strengthen and streamline financial management: 1) Invest in human resources and information technology systems to strengthen and streamline financial management performance. 2) Successfully deliver the Agency's financial audit remediation plan. 3) Achieve a clean audit. Expand opportunities to deliver conservation products and services to new and underserved customers: 1) Deliver flexible outreach strategies to reach traditional underserved customers. 2) Develop flexible outreach strategies to reach urban/suburban stakeholders and international partners. 3) Develop and implement a strategic comprehensive communications plan for external and internal customers. Employ, develop, and retain a highly skilled and diverse workforce: Develop and deploy an innovative Agency recruitment and employee development strategy.</p>

Value	<p style="text-align: center;">USFWS Alabama Ecological Services Field Office Strategic 5-Year Plan 2009 - 2013</p>
Access	
Beach	
Fish	<p>1) Federal Energy Regulatory Commission Re-licensing: Evaluate and implement reintroductions of mussels, snails, and fishes in tail waters and tributaries (within the FERC project boundaries) where flow, water quality, and other habitat parameters are acceptable., Continue exploring FWS fish passage authority at Claiborne and Millers Ferry Lock and dams and other appropriate projects.</p>
Heritage/ Culture	
Environmental Health/ Resilience	<p>1) Avoid, when possible, single species issues in Alabama coastal areas, but instead focus on ecosystem-level protection and enhancement. 2) Assist in search and rescue and provide humanitarian relief during national emergencies. 3) Continue working with State and federal trustee partners to determine the nature and extent of the injuries, recover damages from those responsible, and restore natural resources and their habitats impacted by oil spills or hazardous chemical releases. 4) Continue to conduct and/or coordinate contaminant investigations with partners to better understand the nature, severity, and significance of contaminant impacts to fish, wildlife, and habitat quality and to develop sound policies for managing contamination on local, regional, and national levels. 5) Continue to work with other agencies and the public to identify potential contaminant concerns and to identify measures to avoid or minimize potential impacts. 6) Continue to assist State environmental agencies in the development and implementation of environmental quality standards and remedial activities to promote the restoration and long-term protection of natural resources. 7) Development of a Strategic Habitat Conservation approach to our Service mission.</p>
Water Quality	<p>1) Characterize coastal pollution and habitat quality issues and promote local, regional, and national efforts to restore and protect coastal water quality and habitat integrity. 2) Continue working with the State, federal, and local environmental agencies and the regulated community to adopt and implement protective water quality standards, develop protective discharge limitations, and identify and implement strategies to improve water quality. 3) Continue to assist State and federal agencies and private parties responsible for contaminated site cleanups to ensure that remedial goals and activities are protective of natural resources and to better fulfill FWS obligations under Federal environmental statutes. 4) Continue to be proactive in spill response planning. 5) Federal Energy Regulatory Commission Re-licensing: Continue pre- and post-license monitoring of flow and water quality below dams and the tributaries affected by dam operations.</p>
Additional Objectives:	<p>1) Identify and develop an Alabama Coastal Program biologist, and work toward getting position funded through the USFWS Coastal Program. 2) Focus coastal efforts on migratory birds, sea turtle lighting, Alabama red-bellied turtle habitat and habitat restoration, and where possible, restoration of Alabama and Perdido Key beach mouse habitat on private lands. 3) Migratory Bird Program - facilitate development of birding trails, promote awareness and appreciation of lower Alabama as a major migration corridor/destination of migratory birds, work with response authorities to promote the protection and rehabilitation of migratory birds affected by oil spills and hazardous material releases, seek remedial solutions for environmental contaminant issues that impact migratory birds and their habitats, support migratory bird habitat restoration projects. 4) Section 7 Endangered Species Program: Be involved in the early planning stages of projects in priority areas or those affecting priority species, develop presentation and outreach materials, update data, continue to identify and evaluate species and their habitats for potential listing. 5) Coordinate with state and federal agencies to communicate goals and successes related to projects, species, and habitat concerns to the public. 6) Develop and maintain GIS dataset of mitigation bank locations. 7) Continue to monitor and restore Alabama Beach Mouse population/habitat and educate communities on the Fort Morgan peninsula about the ABM and its habitat.</p>

Value	<p style="text-align: center;">GOMA</p> <p style="text-align: center;">GOMA Governors' Actions Plan II For Healthy and Resilient Coasts 2009 - 2014</p>
Access	
Beach	
Fish	
Heritage/ Culture	<p>1) Increase awareness and promote action among Gulf citizens by engaging in educational outreach activities. 2) Expand public awareness efforts to connect the Gulf and its relevance to the lives of citizens. 3) Increase environmental literacy within the K through 20 audience by developing, implementing, expanding, and enhancing specific environmental education programs. 4) Include the economic value of Gulf ecosystems in environmental education.</p>
Environmental Health/ Resilience	<p>1) Identify sources of mercury in Gulf fishery resources, understand its presence in the Gulf food webs, and develop the ability to reduce the human health risk of exposure. 2) Provide tools to coastal communities to better understand the risks and impacts associated with coastal hazards, including climate change. 3) Prepare an inventory of existing capabilities and tools to address coastal hazards in the Gulf region, identify important gaps, and, where needed, develop new methods to enhance regional and local resilience. 4) Inform communities about the risks associated with coastal hazards and provide access to the tools necessary to increase their resilience.</p>
Water Quality	<p>1) Improve the understanding of waterborne, disease-causing pathogens, including their sources and survival so that coastal managers can make informed decisions that benefit public health. 2) Reduce the effects of Harmful Algal Blooms by improving our ability to detect, track, forecast, and mitigate HAB movement and their effects along the Gulf Coast. 3) Obtain and provide vital information about the conditions of Gulf waters to support better management decisions regarding coastal fisheries, recreation, tourism, public health, and infrastructure. 4) Implement regional nutrient characterization studies to evaluate ecosystem responses and to develop the tools for better characterization of nutrients in coastal waters. 5) Identify common state needs and priorities for the development of nutrient criteria and provide support and technical assistance to facilitate a regional approach to nutrient criteria development and management. 6) Coordinate strategies and provide guidance to better characterize hypoxia and resulting socio econ impacts. 7) Develop management tools and implement nutrient reduction activities in cooperation with local communities tor reduce excess nutrient inputs to estuaries and coastal waters.</p>
Additional Objectives:	<p>1) Identify and engage non-participating relevant US stakeholders with interests in the health and sustainability of the Gulf, and coordinate specific issues with representatives from the Gulf Mexican States. 2) Produce the Gulf of Mexico Master Mapping Plan (GMMMP), a comprehensive plan to collaboratively acquire data on the physical characteristics of the Gulf region, particularly elevation, shorelines, and surface data. 3) Provide resource managers and Alliance partners access to a Gulf-wide data and ecosystem support services system. 4) Provide collaboration opportunities for the various living marine resource organizations to support the management of the Gulf as a large marine ecosystem. 5) Develop an Emergent Wetlands Status and Trends Report to provide scientists and decision makers with regional information to guide management decisions. 6) Determine socioeconomic values of critical coastal ecosystem services in the Gulf region. 7) Address specific public policy issues impeding habitat conservation and restoration. 8) Identify and resolve specific scientific and technical issues so that conservation and restoration of Gulf habitats are more successful. 9) Develop and implement the Gulf Regional Sediment Management Master Plan (GRSMMP) to more effectively use dredged material and other sediment resources for restoration projects. 10) Monitor a Gulf-wide inventory of distribution, gain, and loss of coastal habitats and measure the ecosystem services they provide.</p>

Value	<p style="text-align: center;">ACAMP (State) ACAMP Strategic Plan 2007 - 2011</p>
Access	1) Protect, restore, and enhance public access to coastal resources: Establish a Public Access Plan that maximizes resource benefits using sustainable methods, Fully implement the 306a program by utilizing the full 10% allotment.
Beach	1) Support beach nourishment and proper sand bypassing at inlets.
Fish	
Heritage/ Culture	
Environmental Health/ Resilience	1) Protect, restore, and manage the use of coastal resources through an ecosystem approach to management: Focus resources on reduction of impacts from regulated activities, Examine the effectiveness of the coastal boundary in meeting program goals, Enhance cooperation between ADCNR and ADEM with regard to the ACAMP, Focus resources on identifying and addressing critical issues, improve interagency coordination, Support local government capacity to manage/regulate land use and development, Continue participation in the GEMS program, Continue active participation in the Gulf of Mexico Alliance Regional Restoration Coordination Team, Assist with implementation of the CELCP strategy, Assist with development and implementation of the Alabama Coastal Impact Assistance Program 2) Enhance and manage sustainable economic development in the coastal area: Obtain approval for the Alabama Coastal Nonpoint Pollution Control Program, Fully utilize Coastal Area Management Program Special Use Area capabilities to optimize management of coastal resources, 3) Reduce vulnerability to natural hazards: Support local government participation in hazard reduction programs, Continue active participation in the Gulf of Mexico Alliance Coastal Community Resiliency Team, Promote disaster resistant building practices.
Water Quality	
Additional Objectives:	1) Education and outreach activities will serve as a catalyst to increase citizen protection of coastal resources: Citizen participation in activities to protect coastal resources, Develop ADCNR Coastal Section website that includes information on the ACAMP.

Value	<p style="text-align: center;">Coastal Recovery Commission of Alabama A Roadmap to Resilience 2010</p>
Access	
Beach	Restore barrier islands, beaches and tidal marshes as the first lines of defense and resilience for coastal Alabama's natural and economic resources.
Fish	<p>1) Achieve optimal yield of each individual Gulf fishery (shrimp, oysters, individual fish species, etc.) 2) Creation of an Alabama Gulf Fisheries Marketing and Promotion Board. 3) Independent Seafood Testing. 4) Modernization of the Fisheries Industries. 5) Building resilience through diversification of coastal Alabama's single industry, single dependent economies: Seafood harvesting, seafood processing and tourism.</p>
Heritage/ Culture	Preserving the unique character, culture and economic sustainability of the seafood harvesting communities of south Baldwin and Mobile counties.
Environmental Health/ Resilience	<p>1) Harness resources through a Center for Resiliency Studies and Sustainability. The cross-discipline, multi-institutional facility would be a center for disaster preparedness, response, mitigation, and data collection. 2) Continue the public-engagement-based process begun by the Coastal Recovery Commission to ensure community support for lasting and sustainable improvements to coastal Alabama resiliency. 3) Increasing the resiliency of essential services such as access to safe drinking water, sanitation and public safety. 4) Restore the health of the Gulf while balancing the needs of a working coast and maximizing the sustainable economic yield of Gulf fisheries. 5) Support sustainable, environmentally responsible land use planning and development practices. 6) Create a Coastal Environmental Management Council. The council would have a strong advisory role regarding proposed projects affecting the coastal environment and a mandate to develop a comprehensive coastal resiliency plan.</p>
Water Quality	Work toward having water throughout coastal Alabama that is fishable, swimmable and drinkable.
Additional Objectives:	<p>1) Create a world-class marine and coastal institution - on the level of the Scripps Institution of Oceanography in California or Woods Hole Oceanographic Institution in Massachusetts - focusing on the Gulf. 2) Conduct oil-related health testing 3) Create a disaster response coordinator position for health issues.</p>

Value	ACF ACF Five Year Strategic Plan: 2013 - 2017
Access	
Beach	
Fish	
Heritage/ Culture	Education: To inform and inspire responsible environmental citizens and decision makers - 1) Develop and maintain a sequence of education opportunities for K - 12 and post-secondary students. 2) Provide educational opportunities for government, industry and citizens.
Environmental Health/ Resilience	Ecological Restoration and Sustainability: To preserve and restore Gulf Coast ecosystem - 1) Empower and enable citizens to actively participate in volunteer opportunities that promote coastal protection and restoration. 2) Encourage citizen participation in monitoring ecosystems and mitigating damage.
Water Quality	
Additional Objectives:	Coastal Relations: To encourage and foster relationships among interested stakeholders - 1) Collaborate to support and maintain strategic partnerships. 2) Engage in effective communication and membership outreach to promote the work of the ACF. 3) Research, study and encourage advocacy for the environment. Administration: To ensure ACF has the organizational capacity to achieve the above three goals and to sustain continued growth - 1) Nurture the knowledge, skills and abilities of the Board and staff and ensure they have the commitment to fulfill the organization's mission. 2) Create a functional infrastructure and maintain non-profit best practice policies, procedures and standards. 3) Develop income generating strategies and attract new supporters while continuing to inspire current ones.

Value	<p align="center">Mobile Baykeeper Mobile Baykeeper Strategic Plan 2011 - 2014</p>
Access	
Beach	
Fish	
Heritage/ Culture	
Environmental Health/ Resilience	<p>1) Regulatory/Enforcement/Government Oversight: Improve public participation and transparency regarding the BP Oil Disaster among all involved agencies. 2) Oil and Gas Consumption: Reduce the need for fossil fuels through education and the promotion of conservation practices and eliminate laws and regulations that are a deterrent to clean, renewable energy; Provide community with education materials on how to reduce personal oil consumption on the small and large scale, and ultimately, to transition to clean energy.</p>
Water Quality	<p>1) Watershed vision: Mobile Baykeeper will protect and restore the Mobile Bay watershed, Alabama's waterways and coastal communities to return to ones that are Swimmable, Drinkable, and Fishable. 2) Regulatory/Enforcement/Government Oversight: Successfully remove and/or completely revamp ADEM's federally delegated Clean Water Act authority; Foster an ADEM that is capable of successfully implementing and enforcing the Clean Water Act; Hold the ACE wetlands division accountable for protecting wetlands, focusing on no net loss of coastal wetlands 3) Development/Stormwater: Reduce the impacts of construction, municipal and industrial stormwater in the Mobile Bay watershed; Launch Muddy Water Watch Program and website to educate citizens; Be the lead facilitator of the stormwater discussion statewide and enlarge the Alabama Stormwater Partnership's membership; Increase enforcement actions that are a deterrent for construction stormwater violations; Educate people on the link between stormwater and the loss of oyster beds and sea grasses. 4) Sewage: Ensure wastewater treatment plant compliance with the Clean Water Act; Monitor wastewater treatment facilities; Make people aware of septic issues, Develop a partnership with local organizations that are addressing septic tank issues.</p>
Additional Objectives:	<p>1) Regulatory/Enforcement/Government Oversight: Eliminate barriers created by the state to empower local agencies to enforce existing regulations; Raise county and local regulatory enforcement and monitoring programs to meet minimum federal and state standards; Develop relationships with the local political forces and get involved in development of new contingency plan. 2) Long Term Restoration After Gulf Oil Disaster: The restoration of oyster reef and marsh and sea grasses in Mobile Bay, Mississippi Sound, and other areas of Coastal Alabama; Facilitate the building of 100 miles of oyster reef and plant and promote 1,000 acres of marsh and sea grasses. 3) Communications: Develop a new Marketing/Communications Plan; Engage a national PR firm to help focus Mobile Baykeeper message; Train staff on better methods of handling both media and community; Establish more frequent communication with membership. Board Engagement/Development: Establish diversity on the Board (Geographic, Gender, Expertise, Ethnic, and Industry).</p>

ACCESS: ASSESSMENT OF CURRENT SITUATION

Habitats to Consider

Beaches and dunes; Intertidal marshes and flats; Long leaf pine, Maritime, and Pine savannah forests; Streams and Rivers; Sub-tidal habitats

Issues to Consider

Habitat Protection, eco-tourism, water/waterfront public access, waterfront public facilities, passive recreation opportunities, working waterfronts

Stresses on Habitats that Support ACCESS to Water and Open Spaces

The below tables are the result of an exercise completed by 30 scientists/resource managers to evaluate the level of impact of thirteen stressors on the habitats that provide ecosystem services of value to our coastal community. Although the list of ecosystem services did not include cultural, intellectual, spiritual, or recreational experiences (including ecotourism), many of the habitats assessed do in fact, provide those services and would support ACCESS to water and open spaces. The rating scale was from 0-3 with 0 being no impact and 3 being severe impact. For the purposes of analysis the committee defined significant stress as any average value over 2.0. Those values are highlighted in the table below.

Habitat	Eco_Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Beaches and Dunes	Biodiversity	1.5	1.5	0.4	2.3	1.9	2.5	0.8	1	1.1	1.7	1.6	0.8	1
Beaches and Dunes	Carbon Sequestration	0.6	0.9	0.3	1.2	0.5	1.7	0.4	0.2	0.9	1.2	0.9	0.5	0.6
Beaches and Dunes	Fisheries habitat	0.5	0.6	0	0.4	0.4	0.6	0.6	0.6	0.9	0.6	0.6	0.5	0.3
Beaches and Dunes	Flood control	0.3	1.4	0	1.4	0.4	1.8	0.5	0.4	1.1	1.3	0.9	0.5	0.5
Beaches and Dunes	Groundwater replenishment	0.8	0.5	0	0.9	0.4	1.2	0.5	0.3	0.7	0.9	0.6	0.8	0.7
Beaches and Dunes	Nesting habitat for birds and turtles	1.2	1.9	0.3	2.1	1.3	2.4	0.6	0.7	1.2	1.7	1.7	0.6	1
Beaches and Dunes	Oyster production	0.4	0.4	0	0.1	0.2	0.4	0.5	0.5	0.4	0.3	0.2	0.3	0.5
Beaches and Dunes	Primary production	0.9	0.9	0.2	1.1	0.8	1.6	0.5	0.3	0.6	1.1	1	0.3	0.6

Habitat	Eco_Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Beaches and Dunes	Sediment and nutrient retention and export	0.4	1.4	0.1	1	0.7	1.8	0.7	0.1	1.5	1	0.7	0.4	0.7
Beaches and Dunes	Storm buffer/hazard protection	0.6	1.8	0.2	2	0.5	2.4	0.5	0.5	1.3	1.8	1.3	0.7	0.6
Beaches and Dunes	Water quality enhancement	1.1	1.4	0.1	1	0.5	1.6	1.1	0.9	1.1	0.8	0.7	0.8	0.6
Beaches and Dunes	Wildlife habitat	1.5	1.8	0.8	2.2	1.6	2.4	0.9	1	1.3	1.8	1.6	0.7	1.1
Intertidal Marsh and Flats	Biodiversity	1.7	2.4	0.7	2.2	1.8	2.3	1.6	1.1	2.3	2.3	1.5	1.8	1.2
Intertidal Marsh and Flats	Carbon Sequestration	1.1	1.8	0.6	1.7	1	2.3	1.5	0.7	1.9	1.9	1.4	1.1	0.7
Intertidal Marsh and Flats	Fisheries habitat	1.6	2.6	0.4	2	1.4	2.4	1.7	1.2	2.4	2.3	1.6	1.8	1.3
Intertidal Marsh and Flats	Flood control	0.9	1.9	0.6	1.7	0.9	2.4	0.8	0.5	1.7	1.9	1.4	1.6	0.9
Intertidal Marsh and Flats	Groundwater replenishment	0.8	1.1	0.1	1	0.6	1.5	0.9	0.6	1	1	1	1.2	0.8
Intertidal Marsh and Flats	Nesting habitat for birds and turtles	1.3	2.2	0.9	2	1.5	2.3	1.3	1	2	2.1	1.6	1.3	1.2
Intertidal Marsh and Flats	Oyster production	1.6	2.1	0.4	1.4	0.9	1.6	1.3	1.5	1.8	1.5	1.2	1.7	1.3
Intertidal Marsh and Flats	Primary production	1.2	2.1	0.7	1.6	1.1	2.2	1.7	0.8	2.3	2.1	1.6	1.6	1
Intertidal Marsh and Flats	Sediment and nutrient retention and export	0.8	2.1	0.5	1.8	0.9	2.3	1.6	0.5	2.4	2.1	1.4	1.6	1
Intertidal Marsh and Flats	Storm buffer/hazard protection	0.7	2.1	0.5	1.9	0.9	2.3	0.7	0.6	2	2.2	1.4	1.4	1.1

Habitat	Eco_Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Intertidal Marsh and Flats	Water quality enhancement	1.8	2.2	0.6	1.7	0.9	2.2	1.9	1.5	2.1	1.7	1.3	1.8	1.1
Intertidal Marsh and Flats	Wildlife habitat	1.4	2.4	0.8	2.1	1.5	2.2	1.6	1.2	2	2.2	1.6	1.6	1.1
Longleaf Pine Habitat	Biodiversity	1.1	0.9	2.5	2.4	2.3	2.4	1.1	1.1	0.9	0.9	1.4	0.8	2.1
Longleaf Pine Habitat	Carbon sequestration	0.6	0.9	2.1	1.7	1.9	2.5	1	0.5	0.5	0.8	1.4	0.7	2
Longleaf Pine Habitat	Fisheries habitat	0.4	0.3	0.1	0.6	0.6	0.7	0.4	0.4	0.5	0.5	0.4	0.4	0.4
Longleaf Pine Habitat	Flood control	0	0.9	1.2	2	0.6	2.3	0.2	0	0.6	0.7	0.8	1.1	1.6
Longleaf Pine Habitat	Groundwater replenishment	1.4	1.1	1.1	1.9	1	2.3	1.4	0.9	1.1	0.7	1.2	1.4	1.9
Longleaf Pine Habitat	Nesting habitat for birds and turtles	1.1	1.1	2.4	2.2	2.2	2.4	1.2	1	1.2	1.1	1.5	1.2	2
Longleaf Pine Habitat	Oyster production	0	0	0	0.3	0	0.5	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Longleaf Pine Habitat	Primary production	0.8	1	2	2.3	1.4	2.3	1	0.8	0.9	0.7	1.3	1	2
Longleaf Pine Habitat	Sediment and nutrient retention and export	0.4	1.1	1.6	2.1	1.2	2.3	1.2	0.5	1.3	0.8	0.9	1.2	1.6
Longleaf Pine Habitat	Storm buffer/hazard protection	0.4	1.3	1.3	1.7	0.9	2	0.5	0.3	1	0.8	1	1.1	1.4
Longleaf Pine Habitat	Water quality enhancement	1.1	1.1	1.1	2	0.9	2.1	1.5	0.8	1.6	0.7	1	1.5	1.6
Longleaf Pine Habitat	Wildlife habitat	1.4	0.9	2.5	2.5	2.5	2.4	1.3	1.1	1	1.1	1.8	1.2	2.5

Habitat	Eco_Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Maritime Forest	Biodiversity	0.8	1.2	1.2	2.3	1.9	2.2	1	0.9	0.8	1.2	1.6	0.6	1.5
Maritime Forest	Carbon sequestration	0.5	0.8	0.9	1.7	0.7	2.1	0.5	0.3	0.7	1	1.4	0.3	1.4
Maritime Forest	Fisheries habitat	0.1	0.5	0	0.4	0.2	0.8	0.4	0.1	0.4	0.4	0.8	0.2	0.7
Maritime Forest	Flood control	0.2	1	0.5	2	0.2	1.9	0	0	1	0.7	1	0.7	1.1
Maritime Forest	Groundwater replenishment	1.1	1.2	0.8	1.6	0.8	2	0.6	0.4	1.1	0.9	1.1	1.3	1.5
Maritime Forest	Nesting habitat for birds and turtles	1.4	1.3	1.5	2.3	2.7	2.4	1.3	1.3	1.2	1.4	1.8	0.9	1.4
Maritime Forest	Oyster production	0.3	0.3	0	0.3	0.1	0.5	0.3	0.3	0.3	0.3	0.4	0.5	0.6
Maritime Forest	Primary production	0.6	1	1.1	1.6	1.1	2.1	0.9	0.6	0.9	0.9	1.4	0.8	1.1
Maritime Forest	Sediment and nutrient retention and export	0.4	1.2	1.1	1.6	1.1	2.4	1.3	0.6	1.1	1	1.4	0.8	1.2
Maritime Forest	Storm buffer/hazard protection	0.4	1.1	0.9	2.1	0.8	2	0.4	0.4	0.9	1.2	1.6	0.6	1.2
Maritime Forest	Water quality enhancement	1	1.2	0.6	1.5	0.9	2	1.3	1	1.3	0.8	1.1	1.1	1.2
Maritime Forest	Wildlife habitat	1.1	1.3	1.6	2.3	2.2	2.4	1.2	1.2	1.1	1.3	1.8	1	1.6
Pine Savanna Forest	Biodiversity	1.3	1.6	2.6	2.2	2.4	2.5	1.2	1.1	1.1	1	1.5	1.1	1.8
Pine Savanna Forest	Carbon sequestration	0.5	1	1.7	1.7	0.8	1.8	0.7	0.3	0.5	0.7	1.2	0.6	1.8
Pine Savanna Forest	Fisheries habitat	0	0	0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0	0.1
Pine Savanna Forest	Flood control	0.5	1.4	1	1.7	1	1.9	0.3	0.3	0.6	0.9	1.1	1.2	1.9
Pine Savanna Forest	Groundwater replenishment	1.4	1.3	0.9	1.6	0.5	2	1	0.8	1	0.7	1.1	1.2	1.5

Habitat	Eco_Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Pine Savanna Forest	Nesting habitat for birds and turtles	1.5	1.5	2.1	2.2	2	2.2	1.2	1.1	1.1	1.1	1.5	1.1	1.6
Pine Savanna Forest	Oyster production	0	0	0	0	0	0	0	0	0	0.1	0.1	0.2	0.1
Pine Savanna Forest	Primary production	1	1	1.3	1.7	1.1	2.1	0.7	0.8	0.8	0.7	1.2	0.7	1.5
Pine Savanna Forest	Sediment and nutrient retention and export	0.7	1.4	1.3	2	1.1	2.1	1.2	0.5	1.1	0.8	1.3	1.4	1.6
Pine Savanna Forest	Storm buffer/hazard protection	0.3	1	0.9	1.7	0.5	1.8	0.2	0.2	1	0.9	1.1	1.2	1.1
Pine Savanna Forest	Water quality enhancement	1.5	1.2	1	2	0.9	1.9	1.4	1.3	1.6	0.7	1.3	1.7	1.6
Pine Savanna Forest	Wildlife habitat	1.4	1.6	2.4	2.4	2.4	2.4	1.3	1.3	1.1	1.2	1.6	1.5	2.1
Streams and Rivers	Biodiversity	1.9	2	0.7	1.9	2.2	2	1.7	1.4	2.2	1.2	1.4	2.1	1.6
Streams and Rivers	Carbon Sequestration	0.9	1.1	0.5	0.9	0.9	1.5	1.2	0.5	1.4	0.9	1.1	1.3	1.2
Streams and Rivers	Fisheries habitat	2	2.2	0.4	1.8	2.1	2.2	1.8	1.5	2.3	1.1	1.3	2.2	1.7
Streams and Rivers	Flood control	0.6	1.7	0.4	1.5	0.9	2.1	0.7	0.5	1.6	1.2	1.3	2.1	1.1
Streams and Rivers	Groundwater replenishment	1.1	1.5	0.4	1.2	1	1.6	1.1	0.6	1.3	0.9	1.1	1.9	1.5
Streams and Rivers	Nesting habitat for birds and turtles	1	1.4	0.9	1.2	1.1	1.4	1	1	1.4	1	1.1	1.2	1.1
Streams and Rivers	Oyster production	0.8	0.6	0.3	0.7	0.5	0.6	0.6	0.8	0.8	0.5	0.4	0.9	0.5
Streams	Primary production	1.4	1.5	0.6	1.1	1.5	1.7	1.9	0.8	1.8	0.8	1.1	1.9	1.1

Habitat	Eco_Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
and Rivers														
Streams and Rivers	Sediment and nutrient retention and export	0.8	2.1	0.5	1.5	1.1	2.2	1.6	0.5	2.2	1	1.1	2.2	1.5
Streams and Rivers	Storm buffer/hazard protection	0.8	1.6	0.6	1.3	1	1.7	0.7	0.5	1.7	1.2	1.2	1.8	1.1
Streams and Rivers	Water quality enhancement	1.9	1.7	0.6	1.4	1.1	1.9	1.9	1.7	1.9	0.9	1.2	1.9	1.2
Streams and Rivers	Wildlife habitat	1.5	1.7	0.8	1.5	1.7	1.8	1.4	1.1	1.7	1	1.3	1.6	1.4
Subtidal habitats	Biodiversity	1.6	2.4	0.3	1.3	1.5	1.4	1.7	1.2	2.3	1.2	1.2	2	1.9
Subtidal habitats	Carbon Sequestration	0.6	1.4	0	0.5	0.6	1	1.7	0.4	1.7	0.7	0.8	0.9	1
Subtidal habitats	Fisheries habitat	1.4	2.1	0.3	1.3	1.2	1.4	1.9	1.3	2.2	1	1.3	1.5	1.7
Subtidal habitats	Flood control	0	0.1	0	0.2	0	0.2	0	0	0.2	0.2	0.1	0.1	0.1
Subtidal habitats	Groundwater replenishment	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0
Subtidal habitats	Nesting habitat for birds and turtles	0.1	0.2	0	0.2	0.2	0.3	0.2	0.1	0.4	0.1	0.1	0.4	0.2
Subtidal habitats	Oyster production	1.1	1.5	0.2	0.7	0.8	0.9	1.2	1.2	1.6	0.8	1	1.3	1.3
Subtidal habitats	Primary production	0.6	1.8	0.2	1	0.7	1.2	1.9	0.6	1.8	1	1.3	1.5	1.2
Subtidal habitats	Sediment and nutrient retention and export	0.4	1	0.1	0.7	0.3	1	1.4	0.4	1.6	0.6	0.8	1.2	0.7
Subtidal habitats	Storm buffer/hazard protection	0.1	0.5	0	0.5	0.2	0.5	0.2	0	0.7	0.5	0.5	0.4	0.2
Subtidal habitats	Water quality enhancement	1.2	1.6	0.1	1	0.6	1.2	1.7	1	1.7	0.9	0.9	1.4	1.1
Subtidal	Wildlife habitat	0.9	1.5	0.5	1.1	0.9	1	1.1	0.8	1.6	1.1	1.1	1.1	1

Strengths

What is in place currently that supports the health/sustainability of this value?

Research, Monitoring, Management Plans

1. **Bon Secour NWR CCMP** - The purpose of this management plan is to improve water quality in the Bon Secour River Watershed in order to meet or exceed present use classifications and meet the goals decided upon by the citizens of the Bon Secour River Watershed.
<http://www.mobilebaynep.com/images/uploads/library/Bon-Secour-WMP.pdf>
2. **Alabama's Coastal Connection Corridor Management Plan** - The mission of this project is to identify, promote and enhance the assets of Alabama's Coastal Connection through the development and implementation of a Corridor Management Plan and through obtaining both state and national designation as a Scenic Byway. <http://www.gulfshores.com/stats/Scenic%20Byway%20CMP.pdf>
3. **Weeks Bay System Wide Monitoring Plan** - Develop quantitative measurements of short-term variability and long-term changes in the meteorological, water quality, biological systems, and land-use / land -cover characteristics of estuaries and estuarine ecosystems for the purposes of informing effective coastal zone management.
<http://www.nerrs.noaa.gov/Doc/PDF/Research/2011SWMPPlan.pdf>
4. **ACAMP Program Planning Document and Strategic Plan** – Helps to regulate various activities on coastal lands and waters seaward of the continuous 10-foot contour in Baldwin and Mobile Counties.
<http://adem.alabama.gov/programs/coastal/default.cnt>
5. **Fort Morgan** – The fort is most famous for its role in the Civil War Battle of Mobile Bay.
<http://preserveala.org/fortmorgan.aspx>.
6. **Fort Morgan Natural Resource Assessment** - Baldwin County Parks, Public Access and Conservation Lands Initiative: Staff coordinated expenditures for enhancements on Marlow Ferry Road and Fish Trap water access to improve these public properties.
http://www.co.baldwin.al.us/PageView.asp?edit_id=395
7. **Dauphin Island Comprehensive Plan** –A map for the wise ecological growth of the barrier island.
http://eeeeee.net/dauphin_island/di_interim_report4-07.pdf
8. Islands of Perdido Foundation planning process
9. **ACAMP/ NEP Coastal Marine Spatial Planning** -The purpose of the ACAMP is to promote, improve, and safeguard the lands and waters located in the coastal area through a comprehensive and cooperative program.
http://www.gulfcoastnewstoday.com/area_news/article_9b7dbffe-2e7a-11e2-b755-0019bb2963f4.html
10. **DISL/ NEP Real Time Monitoring Program** - Instrumentation located throughout Mobile Bay (Meaher Park, Middle Bay Light, Weeks Bay and DISL) to take continuous measurements of air and water temperature, relative humidity, wind speed and direction, barometric pressure, precipitation, quantum radiation, water depth, salinity, turbidity, dissolved oxygen and total DO. The data produced by this monitoring station is used by fishermen to inform about conditions for fishing.
www.mymobilebay.com

Ecosystem Restoration, Protection, Conservation

1. **Beach re-nourishment projects** - Alabama has a coastal management program encouragement policy for beach nourishment using sand and sediment for Dauphin Island, Gulf Shores and Orange Beach.

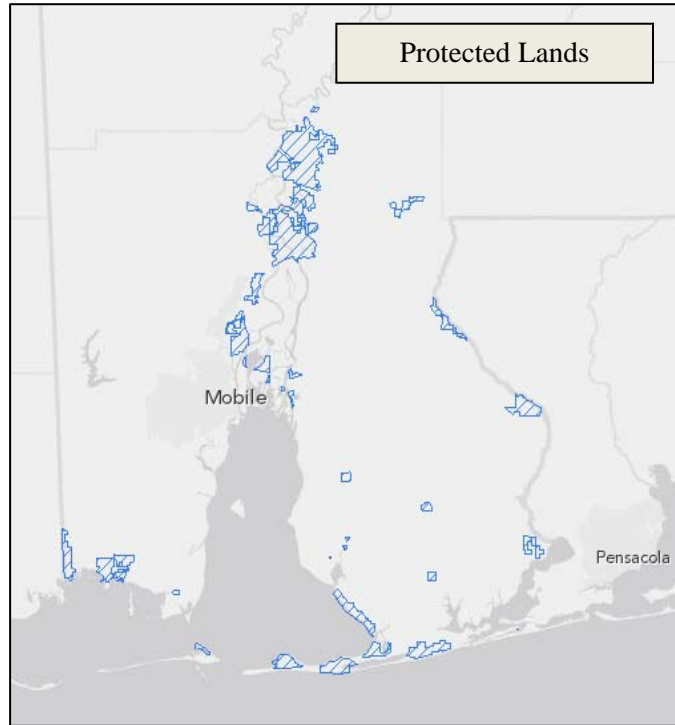
http://www.beachapedia.org/State_of_the_Beach/State_Reports/AL/Beach_Fill

2. **Currently protected areas**- Gulf State Park, Bon Secour National Wildlife Refuge, Weeks Bay NERR, Robinson Island, Orange Beach Canoe/Kayak Trail & Waterfront Park; Five Rivers; municipal waterfront parks.

3. **NOAA Habitat Restoration Grant program** – A community-based Restoration Program (CRP) to bring together interested groups, public, private, tribal and non-profit organizations to implement habitat restoration projects to benefit coastal and marine species and their habitats.

<http://www.habitat.noaa.gov/restoration/programs/crp.html>

<http://www.nature.org/ourinitiatives/habitats/oceanscoasts/howwework/habitatrestoration.xml>



4. **Conservation Easements** - A voluntary agreement that willing landowners make with a conservation agency to permanently restrict the type and amount of development that may take place on their property in the future. <http://www.mobilebaynep.com/images/uploads/library/Coastal-Habitat-Atlas1.pdf> p.4
5. **Forever Wild** –A statewide program to purchase, at appraised price, public land for Wildlife Management Areas, Recreation Areas, Nature Preserves, and State Parks. The cost of managing these lands is endowed by Forever Wild at the time they are purchased. <http://www.outdooralabama.com/public-lands/stateLands/foreverWild/ForeverWildReport.pdf>

Federal, State, Local Regulations and Policies, Technical Training

1. **GSOBT/MASGC Nature Tourism Initiative** - Offers charter boat operators information about their industry and the environment. The program includes classroom training about catch limits, artificial reefs, fisheries research, marine laws and more.

<http://www.masgc.org/sbonline/spring11/charter.htm>

2. **MASGC Working Waterfront Coalition** – To promote and provide leadership in maintaining a sustainable working waterfront. http://masgc.org/pdf/workwater/Southwest_AL_WWF_Inventory.pdf

3. **Municipal Working Waterfront districts** - Commercial facilities that require direct access to or location on, over, or adjacent to Alabama's coastal public trust waters; submerged lands; and inland streams, rivers, and lakes. The term includes water-dependent facilities that may be open to the public, offer access by vessels to State waters and lands, or support facilities for recreational, commercial, research, or government vessels. <http://www.masgc.org/pdf/workwater/WASC-SJR43.pdf>

4. **ACAMP Division 8 Coastal Regulations** – Coastal permitting and beach monitoring <http://adem.alabama.gov/programs/coastal/default.cnt>

Volunteer Programs, Outreach, Education

1. **Ocean Camp** - Provides marine education camps and programs for adults and children. Field trips are scheduled Spring, Fall & Winter. <http://www.gulfshores.com/details/ocean-amp/18316/default.aspx>
2. **Grasses In Classes** - Coordinates and sustains a network of teachers, students, restoration specialists, and other community members to plan and implement restoration of coastal environments in Mobile and Baldwin Counties, Alabama. <http://www.outdooralabama.com/publiclands/stateLands/WeeksBay/Weeks%20Bay/Grasses%20In%20Classes/>
3. **Weeks Bay Foundation** – A non-profit organization to support the Weeks Bay National Estuarine Research Reserve through donations of land and educational exhibits, public awareness and education programs, water quality monitoring efforts, and volunteer programs. <http://www.weeksbay.org/>
4. **Coastal Clean Up** – A part of the International Coastal Cleanup designed to not only remove but document every piece of litter (marine debris) found on a shoreline. <http://www.alcoastalcleanup.com/>
5. **Alabama Coastal Counties Environmental Handbook** – A directory of federal, state and local agencies focusing on natural resource conservation and management.
6. <http://co.baldwin.al.us/uploads/Coastal%20Counties%20Environmental%20Handbook.pdf>

Weaknesses/Threats

What stresses are currently putting negative pressure on the long-term viability of this value?

1. Lack of funding and political will –. At a time of deep financial strains nationwide, environmental projects are vying for any funding possibilities. <http://www.masgc.org/gmrp/documents/GSRFRG-Recommendations.pdf>
2. Development pressure/land values – It is estimated that that by 2050, 75% of the nation’s population will live in the coastal zone. <http://www.mobilebaynep.com/images/uploads/library/State-of-Mobile-Bay-Final.pdf>
3. National Marine Fisheries recreational fishing regulations- <http://sero.nmfs.noaa.gov/>
4. Lack of funding for maintenance of public access facilities/areas
5. Lack of funding for acquisition of open spaces
6. Lack of technical staff for training
7. Lack of adequate boat launch/water access facilities - <http://www.outdooralabama.com/oaonline/boatingaccess12.cfm>
8. Increased demand from a variety of user groups – As population increases in coastal regions so will the need to increase access to shorelines. http://www.data.gov/communities/node/237/data_tools/41761

Beaches and Shorelines : Assessment of Current Situation

Habitats to Consider

Beaches and dunes; Intertidal marshes and flats (including armored shorelines);

Issues to consider

Sand management, sea level rise, erosion, shorebird nesting habitat, fragmentation, habitat protection, public access, waterfront public facilities

Stresses on Ecosystem Services provided by Beaches and Shorelines

The below tables are the result of an exercise completed by 30 scientists/resource managers to evaluate the level of impact of thirteen stressors on the ecosystem services provided by Beaches and Dunes and Intertidal Marshes and Flats that represent the edge between upland and aquatic habitats. The rating scale was from 0-3 with 0 being no impact and 3 being severe impact. For the purposes of analysis the committee defined significant stress as any average value over 2.0. These values are highlighted in the table below. Beaches and Dunes values in the 1.7-1.8 range were highlighted to indicate potential for future stresses.

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Beaches and Dunes	Biodiversity	1.5	1.5	0.4	2.3	1.9	2.5	0.8	1	1.1	1.7	1.6	0.8	1
Beaches and Dunes	Carbon Sequestration	0.6	0.9	0.3	1.2	0.5	1.7	0.4	0.2	0.9	1.2	0.9	0.5	0.6
Beaches and Dunes	Fisheries habitat	0.5	0.6	0	0.4	0.4	0.6	0.6	0.6	0.9	0.6	0.6	0.5	0.3
Beaches and Dunes	Flood control	0.3	1.4	0	1.4	0.4	1.8	0.5	0.4	1.1	1.3	0.9	0.5	0.5
Beaches and Dunes	Groundwater replenishment	0.8	0.5	0	0.9	0.4	1.2	0.5	0.3	0.7	0.9	0.6	0.8	0.7
Beaches and Dunes	Nesting habitat for birds and turtles	1.2	1.9	0.3	2.1	1.3	2.4	0.6	0.7	1.2	1.7	1.7	0.6	1
Beaches and Dunes	Oyster production	0.4	0.4	0	0.1	0.2	0.4	0.5	0.5	0.4	0.3	0.2	0.3	0.5
Beaches and Dunes	Primary production	0.9	0.9	0.2	1.1	0.8	1.6	0.5	0.3	0.6	1.1	1	0.3	0.6

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Beaches and Dunes	Sediment and nutrient retention and export	0.4	1.4	0.1	1	0.7	1.8	0.7	0.1	1.5	1	0.7	0.4	0.7
Beaches and Dunes	Storm buffer/hazard protection	0.6	1.8	0.2	2	0.5	2.4	0.5	0.5	1.3	1.8	1.3	0.7	0.6
Beaches and Dunes	Water quality enhancement	1.1	1.4	0.1	1	0.5	1.6	1.1	0.9	1.1	0.8	0.7	0.8	0.6
Beaches and Dunes	Wildlife habitat	1.5	1.8	0.8	2.2	1.6	2.4	0.9	1	1.3	1.8	1.6	0.7	1.1
Intertidal Marsh and Flats	Biodiversity	1.7	2.4	0.7	2.2	1.8	2.3	1.6	1.1	2.3	2.3	1.5	1.8	1.2
Intertidal Marsh and Flats	Carbon Sequestration	1.1	1.8	0.6	1.7	1	2.3	1.5	0.7	1.9	1.9	1.4	1.1	0.7
Intertidal Marsh and Flats	Fisheries habitat	1.6	2.6	0.4	2	1.4	2.4	1.7	1.2	2.4	2.3	1.6	1.8	1.3
Intertidal Marsh and Flats	Flood control	0.9	1.9	0.6	1.7	0.9	2.4	0.8	0.5	1.7	1.9	1.4	1.6	0.9
Intertidal Marsh and Flats	Groundwater replenishment	0.8	1.1	0.1	1	0.6	1.5	0.9	0.6	1	1	1	1.2	0.8
Intertidal Marsh and Flats	Nesting habitat for birds and turtles	1.3	2.2	0.9	2	1.5	2.3	1.3	1	2	2.1	1.6	1.3	1.2
Intertidal Marsh and Flats	Oyster production	1.6	2.1	0.4	1.4	0.9	1.6	1.3	1.5	1.8	1.5	1.2	1.7	1.3
Intertidal Marsh and Flats	Primary production	1.2	2.1	0.7	1.6	1.1	2.2	1.7	0.8	2.3	2.1	1.6	1.6	1
Intertidal Marsh and Flats	Sediment and nutrient retention and export	0.8	2.1	0.5	1.8	0.9	2.3	1.6	0.5	2.4	2.1	1.4	1.6	1
Intertidal Marsh and Flats	Storm buffer/hazard protection	0.7	2.1	0.5	1.9	0.9	2.3	0.7	0.6	2	2.2	1.4	1.4	1.1

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Intertidal Marsh and Flats	Water quality enhancement	1.8	2.2	0.6	1.7	0.9	2.2	1.9	1.5	2.1	1.7	1.3	1.8	1.1
Intertidal Marsh and Flats	Wildlife habitat	1.4	2.4	0.8	2.1	1.5	2.2	1.6	1.2	2	2.2	1.6	1.6	1.1

Strengths

What is in place currently that supports the health/sustainability of this value?

Research, Monitoring, Management Plans

1. **Coastline inventory** – A scientific assessment of shoreline changes along the Alabama coastline over a 26 year period beginning in 1979.
<http://www.mobilebaynep.com/images/uploads/library/State-of-Mobile-Bay-Final.pdf> pp. 20
2. **Wave Basin** - University of South Alabama College of Engineering - A 20x30x3 foot custom built basin designed to make waves of any shape. It will be used to study waves and their effect on beaches and built infrastructures such as roads, bridges, and breakwaters.
<http://www.usouthal.edu/usacterec/wavebasin.html>
3. **Hydrodynamic modeling** - University of South Alabama Department of Civil Engineering’s computer-based, numerical models of tides, waves, sediment transport, and morphology which explain the impact of natural (e.g., storms) and anthropogenic (e.g., dredging, nourishment, etc.) stressors on beaches and sand resources. Examples:
http://www.mobilebaynep.com/hydrodynamic_modeling/
http://www.mobilebaynep.com/images/uploads/library/CoastalProcesses_MonLouisIsland_DrBretW_ebb.pdf
4. **Coastal Alabama Living Shorelines** – Designed to educate public, state and federal regulatory agencies, and private contractors about the benefits of installing natural erosion control structures as an alternative to seawalls and bulkheads to protect private and public shoreline properties.
<http://masgc.org/pdf/masgp/11-042-07.pdf>
5. **Re-nourishment Program for Gulf Shores and Orange Beach** – A five segment project to dredge offshore water bottom and replace the 5.2 million cubic yards of beach compatible sand along a 16.5 mile stretch of gulf shoreline which has succumbed to severe erosion brought on by storms since 1995.
6. **Beach Erosion and Deposition on Dauphin Island** – This research focused on the recession/accretion/recession pattern on the eastern end of the state’s western-most barrier island in relation to accepted coastal engineering practices.

<http://www.jstor.org/discover/10.2307/4298218?uid=3739920&uid=2129&uid=2&uid=70&uid=4&uid=3739256&sid=21101381976897>

7. **Alabama Beach Bacteria Monitoring Program** – With more than two dozen sites, this program utilizes trained volunteers to test bacteria levels in and around Mobile Bay including the waters of the Gulf of Mexico from sites established in Gulf Shores, Ft. Morgan and Orange Beach. There are also sites along Mobile and Weeks Bay as well as some tributaries like Dog and Fowl Rivers and Cotton Bayou.
<http://adem.alabama.gov/programs/coastal/beachMonitoring.cnt>

Ecosystem Restoration, Protection, Conservation

1. **Regional Sediment Management Study, Gulf of Mexico Perdido Pass**- An evaluation of the ongoing practice and costs of annually moving hundreds of millions of tons of sediment to determine a more environmentally friendly and cost effective procedure.
http://water.epa.gov/type/oceb/oceandumping/dredgedmaterial/upload/5_1Parson.pdf
2. **Living Shorelines** – A program that uses living plant material, oyster shells, earthen material, or a combination of natural structures with riprap or offshore breakwaters to protect property from erosion. The result of wind, water, and wave action, erosion results in loss of residential and commercial property, reduction of storm buffering capacity, aquatic and terrestrial habitat loss, increased suspended solids and water quality degradation. <http://www.masgc.org/page.asp?id=235>
3. **100-1000 Restore Coastal Alabama** - This effort brings together both public and private entities to build 100 miles of oyster reefs along the state’s coastline which will assist in providing the conditions necessary to plant, support and promote more than 1000 acres of coastal marsh and seagrass. Not only will it help replenish needed habitat, but it will also help reduce wave energy, decrease erosion, stabilize sediments and decrease turbidity. <http://100-1000.org/>
4. **Bon Secour Wildlife Refuge** – Originally designed as a coastal dune ecosystem preservation project, it is now one of the largest pieces of undeveloped land on the Alabama Gulf coast. It is home to a number of threatened and endangered species which contributes to its designation as one of the 10 natural wonders of the state. <http://www.fws.gov/bonsecour/>
5. **Alabama Dune Restoration Project** - A collaborative effort from the members of the Coastal Alabama Dune Restoration Cooperative to restore natural resources damaged by the Deep Water Horizon Oil Spill response efforts. The initiative will utilize native dune plants and install dune fencing to assist 55 acres of primary dune habitat in and around the Gulf Shores, Orange Beach and Fort Morgan areas. <http://www.doi.gov/deepwaterhorizon/upload/AlabamaDuneRestorationF.pdf>
6. **Alabama Beach Mouse** -With loss of habitat being the primary reason for its decline, several previously cited efforts like coastal dune restoration and dedicated wildlife refuges are underway to restore and protect the ecosystems that support the health and well being of the endangered Alabama Beach Mouse http://www.wec.ufl.edu/faculty/olim/Reprints_Oli/Oli_et_al_2001_Mice_PVA.pdf

Federal, State, Local Regulations and Policies, Technical Training

1. **ADEM and ADCNR Coastal Permitting**- Projects having the potential to impact Alabama’s coastal resources are subject to review pursuant to ADEM’s Coastal Rules. These project include but are not limited to:
 - a. Construction on Gulf-fronting properties
 - b. Commercial and Residential Development on Properties Greater than 5 Acres
 - c. Projects Impacting Wetlands and/or Water Bottoms
 - d. Construction of new, or expansion of existing marinas

- e. Installation of Groundwater Wells with a Capacity Greater than 50 gallons per minute (GPM)
- f. Siting, Construction and Operation of Energy Facilities
- g. Shoreline Stabilization Projects
- h. Discharges to Coastal Waters

<http://adem.alabama.gov/programs/coastal/coastalPermitting.cnt>

2. **USACE Section 404 Fill Permits** <http://water.epa.gov/type/oceb/habitat/cwa404.cfm#how>
3. **USACE Nationwide Permits**
http://www.usace.army.mil/Portals/2/docs/civilworks/nwp/2012/NWP2012_sumtable_15feb2012.pdf
4. Cities of Orange Beach and Gulf Shores – In efforts to further protect their coastal environment, these Alabama beachfront cities have established their own regulations.
http://www.cityoforangebeach.com/pages/community_development.htm
<http://www.gulfshoresal.gov/building/index.html>

Volunteer programs, outreach, education

1. **Share the Beach** – Aimed at locating sea turtle nests before the eggs hatch and monitoring them until the reptiles successfully complete entry into the Gulf of Mexico.
<http://www.alabamaseaturtles.com/>
2. **Volunteer Field Observer (VFOB)** –Developed in response to the Deep Horizon Oil Spill as a means to document changes that may occur along Alabama shorelines as a result of the accident, the program uses volunteers to regularly assess estuarine shorelines. <http://saveourgulf.org/>
3. **Swim Guide** – Developed specifically for the “technical generation,” swim conditions in area waters are now instantly available by application on many digital devices.
<http://mobilebaykeeper.org/programs/swim-guide.html>
4. **Break the Grip of the Rip** –This coastal program is designed to educate people on the dangers of rip currents which kill more than 100 people every year. Swimmers also learn techniques on how to survive should they find themselves caught in a rip current. <http://www.masgc.org/page.asp?id=236>
5. **Climate Community of Practice** - The Climate Community of Practice brings together extension, outreach and education professionals and community official in the Gulf to learn how coastal communities can adapt to sea-level rise, precipitation changes and other climate-related issues.
<http://masgc.org/cop>
6. **Dauphin Island Sea Lab** – The State of Alabama’s premier marine science education and research facility. The DISL Estuarium, the only public coastal aquarium in the state, is also located on the campus on the east end of the barrier island. <http://www.disl.org/>
7. **Coastal Clean Up** – A part of the International Coastal Cleanup designed to not only remove but document every piece of litter (marine debris) found on a shoreline. In Alabama it is a project of ADCNR SLD and Alabama PALS just celebrating its 25th year, and now the largest volunteer event in the state. <http://www.alcoastalcleanup.com/>

Weaknesses/Threats

What stresses are currently putting negative pressure on the long-term viability of this value?

1. **Sea Level Rise**- The melting of ice sheets and glaciers is adding more water to oceans. Meanwhile, the ocean water is warming and expanding. Both phenomena are resulting in a continued trend of lost shoreline. <http://www.epa.gov/climatechange/science/indicators/oceans/sea-level.html>
2. **Dredge and disposal practices**- related to maintenance of the Mobile Ship Channel have resulted in extreme degradation to barrier islands. <https://www.usm.edu/gcrl/mec/docs/nosb/historical.changes.in.the.MS.AL.barrier.islands.pdf>
3. **Waterfront Development/land use changes** – While development is needed to keep a community viable, there has to be a balance reached between anthropogenic development and protection of the environment. It is estimated that by 2025 the coastal population of Alabama will increase nearly 90 percent. Pg. 5 and 6 <http://www.mobilebaynep.com/images/uploads/library/State-of-Mobile-Bay-Final.pdf>
4. **Increased intensity of storms** – As ocean temperatures rise, so does the intensity of hurricanes, according to many scientists. Regardless of the cause, stronger storms result in significant erosion of beaches, intertidal marshes and many coastal habitats. <http://www.gfdl.noaa.gov/global-warming-and-hurricanes>
5. **Marine debris** – Defined as any man-made object that has somehow found its way into a coastal or marine environment. Last year along Alabama coasts, volunteers removed some almost 1.5 million pounds of marine debris. This global problem affects the economy, environment, navigation, fishing, human health and safety. <http://marinedebris.noaa.gov/>
6. **Technological disasters** – Defined as any disaster partially or wholly caused by human error, intent or negligence resulting in significant injury or death. An example along the Gulf coast would be the Deep Water Horizon oil spill of 2010. <http://www.emdat.be/technological-disasters-trends>
7. **Current state regulations regarding shoreline armoring/bulkheading** of private and commercial property along Alabama bays, bayous and beaches. The effects of the common practice have resulted in the elimination of miles of estuarine beaches and intertidal habitat. <http://www.southalabama.edu/cesrp/Tide.htm>
8. **Lack of access** – As more development occurs along Alabama coastlines, access to water resources for the general public tends to diminish. <http://www.southalabama.edu/cesrp/albeach.htm>

Habitats to Consider

Freshwater wetlands; Intertidal Marshes and Flats; Oyster Reefs; Streams and Rivers; SAV; Sub-tidal habitats

Issues to consider

Sufficient Habitats, Sustaining fish populations, Monitoring status and trends of habitats, species populations and variety of uses (commercial fishing, recreational fishing, other) mitigating anthropogenic and climate change impacts on ecosystems, potential for marine protected areas

Stresses on Ecosystem Services provided by Beaches and Shorelines

The below tables are the result of an exercise completed by 30 scientists/resource managers to evaluate the level of impact of thirteen stressors on the habitats that support the ecosystem services related to fish. The rating scale was from 0-3 with 0 being no impact and 3 being severe impact. For the purposes of analysis the committee defined significant stress as any average value over 2.0.

Eco_Service	Habitat	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Fisheries	Beaches and Dunes	0.5	0.6	0	0.4	0.4	0.6	0.6	0.6	0.9	0.6	0.6	0.5	0.3
Fisheries	Freshwater Wetlands	1.8	2.5	0.5	2.1	2.1	2.4	1.9	1	2.2	1.7	1.8	2.2	1.4
Fisheries	Intertidal Marsh and Flats	1.6	2.6	0.4	2	1.4	2.4	1.7	1.2	2.4	2.3	1.6	1.8	1.3
Fisheries	Longleaf Pine Habitat	0.4	0.3	0.1	0.6	0.6	0.7	0.4	0.4	0.5	0.5	0.4	0.4	0.4
Fisheries	Maritime Forest	0.1	0.5	0	0.4	0.2	0.8	0.4	0.1	0.4	0.4	0.8	0.2	0.7
Fisheries	Oyster Reefs	1.6	2.1	0.3	1.7	1.3	1.5	1.7	1.5	2.2	1.2	1.2	2	2.1
Fisheries	Pine Savanna Forest	0	0	0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0	0.1
Fisheries	Riparian Buffers	1.1	1.8	0.5	1.5	1.2	1.8	1.2	0.9	1.7	1.1	1	1.2	1.3
Fisheries	Streams and Rivers	2	2.2	0.4	1.8	2.1	2.2	1.8	1.5	2.3	1.1	1.3	2.2	1.7
Fisheries	SAV	1	2.2	0.2	1.9	1.4	1.6	2	0.8	2.2	1.3	1.4	1.7	1.1
Fisheries	Subtidal habitats	1.4	2.1	0.3	1.3	1.2	1.4	1.9	1.3	2.2	1	1.3	1.5	1.7

Strengths

What is in place currently that supports the health/sustainability of this value?

Research, Monitoring, Management Plans

1. **Management-** Reductions in numbers of commercially and recreationally important Gulf of Mexico fishes have resulted in limits to how many fish may be caught in federal waters.
<http://dcnr.state.al.us/fishing/saltwater/regulations/>
2. **An Analysis of the Long Term Fisheries Assessment and Monitoring Program Data Set Collected by the Marine Resources Division of the Alabama Department of Conservation and Natural Resources** - This study evaluated species with adequate spatial and temporal coverage of the data set for status and trends analysis; analyzed long term trends in the abundance of targeted species and suggest probable causes of change; summarized status of commercial or recreationally important finfish or shellfish species collected by FAMP based on analysis of the data set (we considered these species to be potential indicators of ecosystem change), and identified species requiring additional management, and made specific recommendations necessary to increase their abundance, including public outreach, habitat manipulation, protection etc.
3. http://www.mobilebaynep.com/images/uploads/library/Revised_Lrdas_final_report-May-18.pdf
4. **The Blue Crab Fishery of the Gulf of Mexico, United States: A Regional Management Plan** - Is intended to provide a framework for conservation of the resource and economic viability of the fishery, and for recommending suitable policies and strategies to each member state. The Blue Crab (*Callinectes sapidus*) FMP is a broad and comprehensive document which addresses all relevant aspects of the biology and fishery. <http://www.gsmfc.org/publications/GSMFC%20Number%20096.pdf>
5. **Gulf of Mexico Fishery Management Council** <http://www.gulfcouncil.org/>
6. **Fisheries Assessment and Monitoring Program (FAMP)**– This monitoring has been conducted by ALMRD since 1981. Its purpose is to show trends in populations of shrimp, crabs, finfish, and other species in order to quantify their abundance at time of sampling. Care is taken to use the same gear, protocol, tow times, locales, and time frames to insure cohesiveness of findings.
7. **Southeast Area Monitoring and Assessment Program (SEAMAP)** - A State/Federal/university program for collection, management, and dissemination of fishery-independent data and information in the southeastern United States. The **organizational structure** of the program presently includes three operational components, SEAMAP-Gulf of Mexico, which began in 1981, SEAMAP-South Atlantic, implemented in 1983 and SEAMAP-Caribbean, formed in 1988
http://www.gsmfc.org/default.php?p=sm_ov.htm
8. **Fisheries Oceanography of Coastal Alabama (FOCAL)** was established in 2006 and is a long-term baseline survey designed to provide critical biological and oceanographic data needed to assess impacts on Alabama's marine fisheries resources. <http://press.disl.org/PDFs/focal.pdf>

9. **Fisheries Research-** University of South Alabama
<http://www.usouthal.edu/marinesciences/faculty.html>
Auburn University <http://www.ag.auburn.edu/fish/research/assessment-and-restoration-of-the-coastal-fisheries-of-alabama/>
10. **ALMRD Management, size and creel and bag limits, fishing gear restrictions.** Few are formalized into a management plan, but actions are designed to maintain sustainable fisheries and habitats.
<http://www.outdooralabama.com/fishing/freshwater/regulations/>
11. **Investigation of Record Keeping Procedures Pertaining to Marine Commercial and Recreational Fishing Harvests among Gulf States.** The report gave recommendations to collect systematic data on a catch per unit effort that is standardized for the entire Gulf of Mexico. This data can be used for better management, resulting in healthier and more stable fish stocks. To date, a standardized trip ticket system has been implemented for all commercial landings in Alabama. This standardized system is being implemented by all of the Gulf states.
http://water.epa.gov/type/oceb/nep/upload/2002_04_Characterization-Reports_CCMP-Final-Volume-2.PDF
12. **Harmful Algal Blooms-** Since scientists started to observe HABs, they appear to be occurring more often. The increased frequency of HABs is a major concern; these events can make people sick when contaminated shellfish are eaten or when people breathe toxic air sprayed from a beach with a harmful algal bloom. HAB events can result in the closure of beaches and shellfish beds, massive fish kills, death of marine mammals and seabirds, and alteration of marine habitats. This hurts commercial and recreational fishing, tourism, and valued habitats, which are important local economies and the livelihood of coastal residents.
http://oceanservice.noaa.gov/websites/retiredsites/sotc_pdf/hab.pdf
<http://habsos.noaa.gov/>
13. **Little Lagoon Water Quality Monitoring** - Trained volunteers and DISL researchers sample four locations in the Lagoon every two weeks. The team gathers field measurements and samples, prepares and analyzes samples, and enters and maintains observations in the SEPMN national data base and the DISL Water Chemistry and Phytoplankton database. <http://littlagoon.org/water-quality/research-and-monitoring-results.cfm->
14. **The Alabama Natural Heritage Program** (TNC) database of rare and threatened species is the state's most comprehensive database of species distribution and Abundance. The Program has provided state and federal agencies, corporations, environmental groups, and the public with the information needed to monitor, preserve and protect Alabama's natural areas and biodiversity.
http://mercury.ornl.gov/clearinghouse/send/xsltText2?full_datasource=anhp&fileURL=d:%5Cmercury_instances%5Cusgs%5Canhp%5Charvested%5Cwww.alnhp.org_metadata_ALNHPEORS.xml

Ecosystem restoration, protection, conservation

1. **Marsh protection/limitations** – While there is no Alabama State prohibition on filling in marshes there are some permitting protections. <http://www.alabamaadministrativecode.state.al.us/docs/con /220-4.pdf>
2. **Roads to Reefs** -A public/private program of recycling old road construction material for use as reefs in Mobile Bay. So far, there are nine such reefs in the estuary. <http://alapark.com/press/release.cfm?ID=69>
<http://www.outdooralabama.com/fishing/saltwater/where/ramps-reefs.pdf>
3. **Oyster Reef Replenishment**– These intermittent projects are undertaken under the direction of the ADCNR Marine Resources Division using local fishermen to place shell on existing reefs. This activity is done to expand these long term reefs within the estuary with a focus on sustaining oyster populations for harvest purposes. Refer to the Marine Calendar for a map of existing reefs. <http://www.outdooralabama.com/fishing/saltwater/tides-weather/2012%20Tide%20Calendar.pdf>
4. **100-1000 Restore Coastal Alabama** - This effort brings together both public and private entities to build 100 miles of oyster reefs along the state’s coastline which will assist in setting up the conditions needed to plant, support, and promote more than 1000 acres of coastal marsh and seagrass. Not only will it help replenish needed habitat but will also help reduce wave energy and decrease erosion, stabilize sediments and decrease turbidity. <http://100-1000.org/>
5. **Point aux Pins** is one of the latest locations for an extensive habitat shoreline restoration project to be undertaken by this public/private partnership which came into being following Hurricane Katrina. http://skimmer.disl.org/pastissues/vol19_no8_2008/article3.html
6. **Habitat Creation and Shoreline Stabilization on Mon Louis Island** -This project involves installation headland breakwaters, clean sand fill, and submerged oyster habitat along the Mon Louis Island-Mobile Bay shoreline and planting of native marsh vegetation in intertidal areas along the shore to create and enhance subtidal and intertidal habitat and stabilize sediments. http://www.mobilebaynep.com/static/mon_louis_island
7. **SAV restoration** – The aerial extent of seagrass meadows has declined globally during the last several decades, with major losses of seagrasses reported along the Atlantic and Gulf coasts of the United States. The positive correlation between the area covered by seagrass and the production of valuable finfish and shellfish has led to a large number of studies designed to determine the causes of seagrass declines. Worldwide, the destruction and loss of critical seagrass habitat is being attributed to both natural and human-induced disturbances. In many cases, deteriorating water quality, especially resulting from excessive nutrient inputs and turbid runoff, has been associated with seagrass loss. Reversing seagrass loss in these cases usually requires large scale changes in land use practices and water treatment. <http://marineecologylab.disl.org/projects.htm>
<http://masgc.org/pdf/masgp/07-011-01.pdf>

8. **Oyster Reef Restoration: Isle of Herbes and Bayfront Park** - Part of a federal economic stimulus program aimed at restoring the nation's coastlines, a plan to build two oyster reefs that would block waves and create fish habitat in South Mobile County. Nearly a mile of underwater reefs along eroding shoreline in two locations: near Bay Front Park in Mobile Bay and in Portersville Bay near Bayou La Batre have been built.
9. **Grand Bay Marsh restorations** –This project at the Bayou Heron boat ramp uses coconut husk fibers (coir) in the form of compacted logs. These logs, backfilled with sand and planted with native black needle rush (*Juncus roemerianus*), provide structure and support to stabilize and rebuild the shoreline.
10. **Farming the Fertile Crescent: Intensification of Oyster Culture in the Northern Gulf of Mexico** - The primary goal of the proposed work is to allow adoption and implementation of intensive oyster culture by coastal citizens within the northern Gulf of Mexico, increasing productivity, creating jobs and providing a safe, sustainable domestic supply. <http://www.masgc.org/page.asp?id=761>
<http://gulfseagrant.tamu.edu/news/oyster-farming.htm>http://www.issc.org/client_resources/gsassc%20presentations/auburn%20university%20shellfish%20laboratory.pdf Additional Aquaculture information-
11. **Brookley Hole** - Brookley Hole disposal site for beneficial use dredge disposal. Numerous alternatives are being considered that could produce productive fish, oyster, or wetland habitat. 650,000 - 1,200,000 cubic yards of dredged sediment would be utilized.
<http://www.arcgis.com/home/item.html?id=b64d3a6695d946ce8176822749a76916>

Federal, State, local regulations and policies, technical training

1. **Essential Fish Habitat designation-**
http://www.gulfcouncil.org/fishery_management_plans/essential_fish_habitat.php
2. **Laws and regulations-** Prohibitions on fishing gear (no oyster dredges on Cedar Point, No trawling Seagrass beds, etc [http://www.outdooralabama.com/images/file/2011-12%20WFF/Comm%20FW%20Fish%20\(R\)%20Code-Regs%207-11.pdf](http://www.outdooralabama.com/images/file/2011-12%20WFF/Comm%20FW%20Fish%20(R)%20Code-Regs%207-11.pdf)
3. **The Marine Regulation Act** - Regulates sewage discharge and marine litter from recreational vessels and residence boats <http://www.outdooralabama.com/outdoor-alabama/attn-boaters.pdf>
4. **Ballast water control-** Ballast water discharged from ships is one of the pathways for the introduction and spread of aquatic nuisance species (ANS). The Coast Guard has established both regulations and guidelines to prevent the introduction and spread of ANS.
<http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp>
5. **Prohibition of species transport from one body of freshwater to another** - One of the greatest challenges facing natural resource agencies is the indiscriminate release of non-native aquatic species, transplanting of an aquatic species from one water drainage to another and the release of native aquatic

species which may be infected with an infectious disease or parasite. These types of aquatic species are often referred to as nuisance species.

<http://www.outdooralabama.com/fishing/freshwater/regulations/unlawful-stockings.cfm>

<http://www.outdooralabama.com/fishing/freshwater/regulations/>

6. **MS-AL Habitats Tool** – This web-based tool provides resources to aid conservation and restoration activities in Mississippi and Alabama, including a Projects Database and a Priority Habitat Mapper. The Projects Database includes information on conservation and restoration projects occurring in the two states. These projects can be visually viewed in the Habitat Mapper, which provides additional conservation planning data for Alabama's Mobile and Baldwin Counties. Included in these data are the priority habitats identified for conservation and restoration that were identified in 2008-2009 by the Mobile Bay National Estuary Program's Coastal Habitats Coordinating Team. Other data sets for further planning purposes include but are not limited to land cover, political boundaries, human uses, and ecological attributes for the two-county area. list of projects with descriptions <http://habitats.disl.org/>

Volunteer programs, outreach, and education Outreach

1. **Zebra mussels** – An educational tool for boaters. <http://www.aces.edu/pubs/docs/A/ANR-1033/>
2. **Apple Snails** – Volunteer effort to remove invasion species from Langan Park in the City of Mobile. http://www2.wkrg.com/news/2012/jun/27/help-needed-fight-apple-snale-invasion-ar-4049662/http://www.fox10tv.com/dpp/news/local_news/mobile_county/Invasive-snails-could-cause-problems
3. **Dock Watch**- Volunteers along the coasts of Alabama and Mississippi collect environmental data and visual observations of jellyfish species and numbers. <http://dockwatch.disl.org/overview.htm>
4. **Manatee Sighting Network** – Is designed to track and study these mammals to not only bring about awareness of their dwindling numbers but also to use them as a means by which to predict ecosystem responses to environmental changes. <http://manatee.disl.org/>
<http://southeasternwildlifeconservation.org/index.html>
5. **Dauphin Island Sea Lab- Discovery Hall Program** - Offers a variety of programs for children during the summer, ranging from single-day programs to residential camps and academic courses. <http://dhp.disl.org/studentopps.htm>
6. **Coast Watch** – A volunteer program that trains volunteers to form a community watch on area waters to help enforce marine laws is part of a three part plan to better enforce and prosecute those who violate marine resource regulations. <http://www.ifish.net/board/showthread.php?t=232310>
7. **ADEM Water Watch** – A program dedicated to providing citizen volunteer monitoring of Alabama's lakes, streams and wetlands. <https://aww.auburn.edu/Docs/manuals/chem-qaqc.pdf>
8. **Mobile Bay Oyster Gardening** joins volunteers together with science and nature to grow these vital members of estuarine ecology. <http://www.aces.edu/pubs/docs/A/ANR-1207/>

9. **SAVing the Gulf: Submerged Aquatic Vegetation** – A guide to the underwater grass beds that populate our coastal waters. It describes environmental benefits, offers ways for students and volunteers to become involved in their restoration, shares easy tips to aide in protection and gives step-by-step instructions for how to take measurements from natural and restored beds in order to learn about the benefits they provide. <http://www.mobilebaynep.com/images/uploads/library/SAV-Manual-final-proof.pdf>
10. **Grand Bay Marsh Restoration** – Students from a neighborhood public school were used in this project. <http://grandbaynerr.org/restoration-science>
11. **The Voices from the Fisheries Database** is a central repository for consolidating, archiving, and disseminating oral history interviews related to commercial, recreational, and subsistence fishing in the United States and its territories. Oral history interviews are a powerful way to document the human experience with our marine, coastal, and Great Lakes environments and our living marine resources. <http://www.st.nmfs.noaa.gov/voicesfromthefisheries/>

Weaknesses/Threats

What stresses are currently putting negative pressure on the long-term viability of this value?

1. **Limited enforcement of current regulations, size and creel and bag limits, fishing gear restrictions.** Few of these are formalized into a management plan, but current actions are designed to maintain sustainable fisheries and habitats. [http://www.outdooralabama.com/images/file/2011-12%20WFF/Comm%20FW%20Fish%20\(R\)%20Code-Regs%207-11.pdf](http://www.outdooralabama.com/images/file/2011-12%20WFF/Comm%20FW%20Fish%20(R)%20Code-Regs%207-11.pdf)
2. **Further regulations needed to protect marshes**
http://www.alabamaadministrativecode.state.al.us/docs/con_/220-4.pdf
3. **Sedimentation, Stormwater Polluted Runoff** - Stormwater runoff cause increasing impervious surfaces like pavement and rooftops causes flooding and erosion and carries pollutants like dirt, clay, oil, chemicals, pet waste, and fertilizers into our streams, rivers, and bays without any kind of treatment or purification. It causes a typical city block to produce more than five times as much runoff as a woodland area of the same size rather than allowing it to seep, or infiltrate, into the ground. <http://www.mobilebaynep.com/stormwater1/>
4. **Habitat impacts** – The anthropologic causes of loss of natural habitat are many and include, but are not limited to recreational and commercial fishing gear such as gill nets.
http://www.outdooralabama.com/images/File/Weeks_Bay/Preliminary_Character_of_Habitat_Loss_Mobile_Bay_NEP.pdf
<http://habitats.disl.org/>
5. **Bycatch from commercial and recreational fisheries** – The adverse effects of net fishing to fish and mammal species. http://blog.al.com/live/2011/12/alabamas_rich_fish_harvest_unq.html
<http://www.outdooralabama.com/fishing/saltwater/regulations/Rec%20Gill%20Net%20Regs.pdf> <http://msucares.com/pubs/infobulletins/ib324.htm>

6. **Lack of education about state of the fishery -**
<http://www.outdooralabama.com/search/index.cfm?q=public+awareness+species+threats>
<http://gulfofmexicoalliance.org/community/tools.html>
7. **Invasive species** - The spread of exotic or non-native species through intentional or inadvertent transport by man has become an extremely serious threat to native plants and animals worldwide. Negative economic effects of invasions or introductions of non-native species in the US alone were estimated at 97 billion dollars in 1991. <http://nsgl.gso.uri.edu/flsgp/flsgpg05001.pdf>
8. **Need for Ballast Water Control-** both regulations and enforcement
<http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp>
9. **Increased oil/gas drilling** means more impact to ocean floor –
http://www.outdooralabama.com/images/File/CIAP/CIAP_Plan_Volume_1_-_update.pdf
10. **Adverse effects of removal of derelict rigs** -http://blog.al.com/live/2012/08/post_220.html
<http://m.caller.com/news/2012/aug/01/outrage-mounts-over-rig-removal-policy/>
11. **Technological accidents** like that of the Deep Water Horizon can take many forms but as population increases so does the likelihood of accidents. –
http://www.gulfofmexicoalliance.org/pdfs/GOMA_2012_All_Hands/GoMRI_CS0_presentation.pdf
12. **Marine debris:** Marine debris resulting from storms and other natural events disturbs benthic communities, as well as, creates problems and hazards for individuals using Alabama's marine resources. Damaged and deteriorating structures found area waters produce hazards that threaten public safety. In addition, debris can destroy habitat and result in economic hardships to fishermen by damaging or destroying valuable fishing gear when encountered.
<http://www.outdooralabama.com/public-lands/stateLands/landsCoastal/309%20Assessment%202006%20Final.pdf>
13. **Climate Change-** Increased intensity of storms, drought, sea level rise -
<http://www.epa.gov/climatechange/science/overview.html>
14. **Lack of biological monitoring of key species-** Need invertebrate and/or other key species list for early indication of stress. (Shrimp, blue crab, menhaden)
<http://www.outdooralabama.com/research-mgmt/cwcs/Chapter1.pdf>
<http://www.outdooralabama.com/research-mgmt/cwcs/Chapter5.pdf>
15. **Barriers to Fish Movement-** Hydroelectric and navigational dams in major river systems – Damming a river dramatically alters a stream ecosystem by replacing a flowing water system with a relatively still water system, creating a migration barrier for many aquatic species, and changing the hydrology of the stream. Flowing water generally absorbs more oxygen than the calmer water of reservoirs or lakes. Without flowing water, many species of fish, mussels, and aquatic insects cannot survive, and these species are replaced by species that tolerate standing water (lake) conditions. The operation of some hydropower dams result in a wide range of water releases from very high flow when generating to almost no flow when generators are off-line. The frequency and wide variation in flows can adversely impact fish and other aquatic organisms below the dam.
<http://www.aces.edu/pubs/docs/A/ANR-0911/www.bama.ua.edu/~joshua/archive/aug06/Bennett%20and%20Howell.pdf>
http://www.mobilebaynep.com/images/uploads/library/03-05_Implementationfinal.pdf

16. **Mercury and other chemical concentrations** exceed acceptable levels in multiple areas of south Alabama and warrants further investigation and analysis.
<http://www.mobilebaynep.com/images/uploads/library/mercury-final-report.pdf>
17. **Nuisance Species Management** – No plan ALANSTF (Plan for Aquatic Nuisance Species in AL)

Heritage and Culture: Assessment of Current Situation

Habitats to Consider

Beaches and Dunes, Freshwater Wetlands, Intertidal Marshes and Flats, Long Leaf Pine, Maritime Forests, Oyster Reefs, Pine Savannahs, Streams/Rivers/Buffers, Subtidal habitats

Issues to Consider

Historic Places and Ways dependent on water resources, Working Waterfronts, Vistas, Scenic Byways, Festivals

Stresses on Habitats that Contribute to Heritage and Culture

The below tables are the result of an exercise completed by 30 scientists/resource managers to evaluate the level of impact of thirteen stressors on the habitats that provide ecosystem services of value to our coastal community. Although the list of ecosystem services did not include cultural, intellectual, spiritual, or recreational experiences, many of the habitats assessed do in fact, provide those services and would contribute to HERITAGE AND CULTURE. The rating scale was from 0-3 with 0 being no impact and 3 being severe impact. For the purposes of analysis the committee defined significant stress as any average value over 2.0. These values are highlighted in the table below.

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Beaches and Dunes	Biodiversity	1.5	1.5	0.4	2.3	1.9	2.5	0.8	1	1.1	1.7	1.6	0.8	1
Beaches and Dunes	Carbon Sequestration	0.6	0.9	0.3	1.2	0.5	1.7	0.4	0.2	0.9	1.2	0.9	0.5	0.6
Beaches and Dunes	Fisheries habitat	0.5	0.6	0	0.4	0.4	0.6	0.6	0.6	0.9	0.6	0.6	0.5	0.3
Beaches and Dunes	Flood control	0.3	1.4	0	1.4	0.4	1.8	0.5	0.4	1.1	1.3	0.9	0.5	0.5
Beaches and Dunes	Groundwater replenishment	0.8	0.5	0	0.9	0.4	1.2	0.5	0.3	0.7	0.9	0.6	0.8	0.7
Beaches and Dunes	Nesting habitat for birds and turtles	1.2	1.9	0.3	2.1	1.3	2.4	0.6	0.7	1.2	1.7	1.7	0.6	1
Beaches and Dunes	Oyster production	0.4	0.4	0	0.1	0.2	0.4	0.5	0.5	0.4	0.3	0.2	0.3	0.5
Beaches and Dunes	Primary production	0.9	0.9	0.2	1.1	0.8	1.6	0.5	0.3	0.6	1.1	1	0.3	0.6
Beaches and Dunes	Sediment and nutrient retention and export	0.4	1.4	0.1	1	0.7	1.8	0.7	0.1	1.5	1	0.7	0.4	0.7
Beaches and Dunes	Storm buffer/hazard	0.6	1.8	0.2	2	0.5	2.4	0.5	0.5	1.3	1.8	1.3	0.7	0.6

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
	protection													
Beaches and Dunes	Water quality enhancement	1.1	1.4	0.1	1	0.5	1.6	1.1	0.9	1.1	0.8	0.7	0.8	0.6
Beaches and Dunes	Wildlife habitat	1.5	1.8	0.8	2.2	1.6	2.4	0.9	1	1.3	1.8	1.6	0.7	1.1
Freshwater Wetlands	Biodiversity	1.9	2.3	0.9	2.3	2.4	2.6	1.6	1.1	2.2	1.6	1.8	2	1.6
Freshwater Wetlands	Carbon Sequestration	1	2	0.7	1.7	1.5	2.3	1.4	0.7	2.1	1.5	1.5	1.5	0.9
Freshwater Wetlands	Fisheries habitat	1.8	2.5	0.5	2.1	2.1	2.4	1.9	1	2.2	1.7	1.8	2.2	1.4
Freshwater Wetlands	Flood control	0.6	2.4	0.5	1.9	1.1	2.4	0.8	0.5	2.2	1.8	1.4	1.9	1.1
Freshwater Wetlands	Groundwater replenishment	1.3	2.1	0.4	1.8	0.9	2.2	1.3	1	1.7	1.7	1.4	2.1	1.2
Freshwater Wetlands	Nesting habitat for birds and turtles	1.7	2.5	1.2	2.5	2.1	2.7	1.5	1.3	1.9	2	1.7	2.1	1.5
Freshwater Wetlands	Oyster production	0.8	1	0.2	0.8	0.8	1.1	1	0.8	1	0.6	0.7	1	0.6
Freshwater Wetlands	Primary production	1.3	2.1	0.8	1.9	1.9	2.6	1.9	0.7	2.1	1.7	1.5	1.9	1.2
Freshwater Wetlands	Sediment and nutrient retention and export	0.9	2.3	0.6	1.9	1.2	2.6	2.1	0.6	2.6	1.5	1.5	2	1.6
Freshwater Wetlands	Storm buffer/hazard protection	0.7	2.4	0.5	2.2	1.1	2.7	0.8	0.4	2.2	1.8	1.7	1.6	1.2
Freshwater Wetlands	Water quality enhancement	2	2.5	0.6	2	1.2	2.4	2.4	1.6	2.1	1.4	1.3	2	1.7
Freshwater Wetlands	Wildlife habitat	1.7	2.5	1.1	2.3	2.3	2.5	1.8	0.9	1.9	1.8	1.6	1.9	1.6
Intertidal Marsh and Flats	Biodiversity	1.7	2.4	0.7	2.2	1.8	2.3	1.6	1.1	2.3	2.3	1.5	1.8	1.2
Intertidal Marsh and Flats	Carbon Sequestration	1.1	1.8	0.6	1.7	1	2.3	1.5	0.7	1.9	1.9	1.4	1.1	0.7
Intertidal	Fisheries habitat	1.6	2.6	0.4	2	1.4	2.4	1.7	1.2	2.4	2.3	1.6	1.8	1.3

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Marsh and Flats														
Intertidal Marsh and Flats	Flood control	0.9	1.9	0.6	1.7	0.9	2.4	0.8	0.5	1.7	1.9	1.4	1.6	0.9
Intertidal Marsh and Flats	Groundwater replenishment	0.8	1.1	0.1	1	0.6	1.5	0.9	0.6	1	1	1	1.2	0.8
Intertidal Marsh and Flats	Nesting habitat for birds and turtles	1.3	2.2	0.9	2	1.5	2.3	1.3	1	2	2.1	1.6	1.3	1.2
Intertidal Marsh and Flats	Oyster production	1.6	2.1	0.4	1.4	0.9	1.6	1.3	1.5	1.8	1.5	1.2	1.7	1.3
Intertidal Marsh and Flats	Primary production	1.2	2.1	0.7	1.6	1.1	2.2	1.7	0.8	2.3	2.1	1.6	1.6	1
Intertidal Marsh and Flats	Sediment and nutrient retention and export	0.8	2.1	0.5	1.8	0.9	2.3	1.6	0.5	2.4	2.1	1.4	1.6	1
Intertidal Marsh and Flats	Storm buffer/hazard protection	0.7	2.1	0.5	1.9	0.9	2.3	0.7	0.6	2	2.2	1.4	1.4	1.1
Intertidal Marsh and Flats	Water quality enhancement	1.8	2.2	0.6	1.7	0.9	2.2	1.9	1.5	2.1	1.7	1.3	1.8	1.1
Intertidal Marsh and Flats	Wildlife habitat	1.4	2.4	0.8	2.1	1.5	2.2	1.6	1.2	2	2.2	1.6	1.6	1.1
Longleaf Pine Habitat	Biodiversity	1.1	0.9	2.5	2.4	2.3	2.4	1.1	1.1	0.9	0.9	1.4	0.8	2.1
Longleaf Pine Habitat	Carbon sequestration	0.6	0.9	2.1	1.7	1.9	2.5	1	0.5	0.5	0.8	1.4	0.7	2
Longleaf Pine Habitat	Fisheries habitat	0.4	0.3	0.1	0.6	0.6	0.7	0.4	0.4	0.5	0.5	0.4	0.4	0.4
Longleaf Pine Habitat	Flood control	0	0.9	1.2	2	0.6	2.3	0.2	0	0.6	0.7	0.8	1.1	1.6
Longleaf Pine Habitat	Groundwater replenishment	1.4	1.1	1.1	1.9	1	2.3	1.4	0.9	1.1	0.7	1.2	1.4	1.9
Longleaf Pine Habitat	Nesting habitat for birds and	1.1	1.1	2.4	2.2	2.2	2.4	1.2	1	1.2	1.1	1.5	1.2	2

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
	turtles													
Longleaf Pine Habitat	Oyster production	0	0	0	0.3	0	0.5	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Longleaf Pine Habitat	Primary production	0.8	1	2	2.3	1.4	2.3	1	0.8	0.9	0.7	1.3	1	2
Longleaf Pine Habitat	Sediment and nutrient retention and export	0.4	1.1	1.6	2.1	1.2	2.3	1.2	0.5	1.3	0.8	0.9	1.2	1.6
Longleaf Pine Habitat	Storm buffer/hazard protection	0.4	1.3	1.3	1.7	0.9	2	0.5	0.3	1	0.8	1	1.1	1.4
Longleaf Pine Habitat	Water quality enhancement	1.1	1.1	1.1	2	0.9	2.1	1.5	0.8	1.6	0.7	1	1.5	1.6
Longleaf Pine Habitat	Wildlife habitat	1.4	0.9	2.5	2.5	2.5	2.4	1.3	1.1	1	1.1	1.8	1.2	2.5
Maritime Forest	Biodiversity	0.8	1.2	1.2	2.3	1.9	2.2	1	0.9	0.8	1.2	1.6	0.6	1.5
Maritime Forest	Carbon sequestration	0.5	0.8	0.9	1.7	0.7	2.1	0.5	0.3	0.7	1	1.4	0.3	1.4
Maritime Forest	Fisheries habitat	0.1	0.5	0	0.4	0.2	0.8	0.4	0.1	0.4	0.4	0.8	0.2	0.7
Maritime Forest	Flood control	0.2	1	0.5	2	0.2	1.9	0	0	1	0.7	1	0.7	1.1
Maritime Forest	Groundwater replenishment	1.1	1.2	0.8	1.6	0.8	2	0.6	0.4	1.1	0.9	1.1	1.3	1.5
Maritime Forest	Nesting habitat for birds and turtles	1.4	1.3	1.5	2.3	2.7	2.4	1.3	1.3	1.2	1.4	1.8	0.9	1.4
Maritime Forest	Oyster production	0.3	0.3	0	0.3	0.1	0.5	0.3	0.3	0.3	0.3	0.4	0.5	0.6
Maritime Forest	Primary production	0.6	1	1.1	1.6	1.1	2.1	0.9	0.6	0.9	0.9	1.4	0.8	1.1
Maritime Forest	Sediment and nutrient retention and export	0.4	1.2	1.1	1.6	1.1	2.4	1.3	0.6	1.1	1	1.4	0.8	1.2
Maritime Forest	Storm buffer/hazard protection	0.4	1.1	0.9	2.1	0.8	2	0.4	0.4	0.9	1.2	1.6	0.6	1.2

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Maritime Forest	Water quality enhancement	1	1.2	0.6	1.5	0.9	2	1.3	1	1.3	0.8	1.1	1.1	1.2
Maritime Forest	Wildlife habitat	1.1	1.3	1.6	2.3	2.2	2.4	1.2	1.2	1.1	1.3	1.8	1	1.6
Oyster Reefs	Biodiversity	1.8	2.3	0.3	1.5	1.5	1.5	2	1.8	2.4	1.3	1.4	2.2	1.9
Oyster Reefs	Carbon Sequestration	0.8	1.2	0.2	0.9	0.7	1	1.1	0.9	1.3	0.8	0.8	1.2	1.3
Oyster Reefs	Fisheries habitat	1.6	2.1	0.3	1.7	1.3	1.5	1.7	1.5	2.2	1.2	1.2	2	2.1
Oyster Reefs	Flood control	0.4	0.8	0.2	0.8	0.6	0.9	0.6	0.4	0.8	0.7	0.4	0.7	0.9
Oyster Reefs	Groundwater replenishment	0.2	0.2	0	0	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Oyster Reefs	Nesting habitat for birds and turtles	0.2	0.2	0	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2
Oyster Reefs	Oyster production	2.1	2.2	0.3	1.8	1.5	1.5	2	2.2	2.8	1.7	1.7	2.2	2.5
Oyster Reefs	Primary production	0.9	1.2	0.3	0.9	0.8	1.3	1.4	0.9	1.4	0.9	0.9	1.3	1.3
Oyster Reefs	Sediment and nutrient retention and export	0.7	1.6	0.3	1.1	0.7	1.5	1.2	1	1.9	1.2	1.1	1.7	1.6
Oyster Reefs	Storm buffer/hazard protection	0.6	1.5	0.2	1.2	0.8	1.3	0.8	0.9	1.5	1.2	0.9	1.2	1.5
Oyster Reefs	Water quality enhancement	1.9	2.1	0.4	1.5	1.1	1.7	2.1	1.9	2.4	1.3	1.2	2.1	1.9
Oyster Reefs	Wildlife habitat	1.2	1.4	0.2	1.1	0.9	1.2	1.2	1.2	1.6	1.1	1.1	1.4	1.2
Pine Savanna Forest	Biodiversity	1.3	1.6	2.6	2.2	2.4	2.5	1.2	1.1	1.1	1	1.5	1.1	1.8
Pine Savanna Forest	Carbon sequestration	0.5	1	1.7	1.7	0.8	1.8	0.7	0.3	0.5	0.7	1.2	0.6	1.8
Pine Savanna Forest	Fisheries habitat	0	0	0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0	0.1
Pine Savanna Forest	Flood control	0.5	1.4	1	1.7	1	1.9	0.3	0.3	0.6	0.9	1.1	1.2	1.9
Pine Savanna Forest	Groundwater replenishment	1.4	1.3	0.9	1.6	0.5	2	1	0.8	1	0.7	1.1	1.2	1.5
Pine Savanna Forest	Nesting habitat for birds and	1.5	1.5	2.1	2.2	2	2.2	1.2	1.1	1.1	1.1	1.5	1.1	1.6

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
	turtles													
Pine Savanna Forest	Oyster production	0	0	0	0	0	0	0	0	0	0.1	0.1	0.2	0.1
Pine Savanna Forest	Primary production	1	1	1.3	1.7	1.1	2.1	0.7	0.8	0.8	0.7	1.2	0.7	1.5
Pine Savanna Forest	Sediment and nutrient retention and export	0.7	1.4	1.3	2	1.1	2.1	1.2	0.5	1.1	0.8	1.3	1.4	1.6
Pine Savanna Forest	Storm buffer/hazard protection	0.3	1	0.9	1.7	0.5	1.8	0.2	0.2	1	0.9	1.1	1.2	1.1
Pine Savanna Forest	Water quality enhancement	1.5	1.2	1	2	0.9	1.9	1.4	1.3	1.6	0.7	1.3	1.7	1.6
Pine Savanna Forest	Wildlife habitat	1.4	1.6	2.4	2.4	2.4	2.4	1.3	1.3	1.1	1.2	1.6	1.5	2.1
Streams and Rivers	Biodiversity	1.9	2	0.7	1.9	2.2	2	1.7	1.4	2.2	1.2	1.4	2.1	1.6
Streams and Rivers	Carbon Sequestration	0.9	1.1	0.5	0.9	0.9	1.5	1.2	0.5	1.4	0.9	1.1	1.3	1.2
Streams and Rivers	Fisheries habitat	2	2.2	0.4	1.8	2.1	2.2	1.8	1.5	2.3	1.1	1.3	2.2	1.7
Streams and Rivers	Flood control	0.6	1.7	0.4	1.5	0.9	2.1	0.7	0.5	1.6	1.2	1.3	2.1	1.1
Streams and Rivers	Groundwater replenishment	1.1	1.5	0.4	1.2	1	1.6	1.1	0.6	1.3	0.9	1.1	1.9	1.5
Streams and Rivers	Nesting habitat for birds and turtles	1	1.4	0.9	1.2	1.1	1.4	1	1	1.4	1	1.1	1.2	1.1
Streams and Rivers	Oyster production	0.8	0.6	0.3	0.7	0.5	0.6	0.6	0.8	0.8	0.5	0.4	0.9	0.5
Streams and Rivers	Primary production	1.4	1.5	0.6	1.1	1.5	1.7	1.9	0.8	1.8	0.8	1.1	1.9	1.1
Streams and Rivers	Sediment and nutrient retention and export	0.8	2.1	0.5	1.5	1.1	2.2	1.6	0.5	2.2	1	1.1	2.2	1.5
Streams and Rivers	Storm buffer/hazard protection	0.8	1.6	0.6	1.3	1	1.7	0.7	0.5	1.7	1.2	1.2	1.8	1.1

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Streams and Rivers	Water quality enhancement	1.9	1.7	0.6	1.4	1.1	1.9	1.9	1.7	1.9	0.9	1.2	1.9	1.2
Streams and Rivers	Wildlife habitat	1.5	1.7	0.8	1.5	1.7	1.8	1.4	1.1	1.7	1	1.3	1.6	1.4
Subtidal habitats	Biodiversity	1.6	2.4	0.3	1.3	1.5	1.4	1.7	1.2	2.3	1.2	1.2	2	1.9
Subtidal habitats	Carbon Sequestration	0.6	1.4	0	0.5	0.6	1	1.7	0.4	1.7	0.7	0.8	0.9	1
Subtidal habitats	Fisheries habitat	1.4	2.1	0.3	1.3	1.2	1.4	1.9	1.3	2.2	1	1.3	1.5	1.7
Subtidal habitats	Flood control	0	0.1	0	0.2	0	0.2	0	0	0.2	0.2	0.1	0.1	0.1
Subtidal habitats	Groundwater replenishment	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0
Subtidal habitats	Nesting habitat for birds and turtles	0.1	0.2	0	0.2	0.2	0.3	0.2	0.1	0.4	0.1	0.1	0.4	0.2
Subtidal habitats	Oyster production	1.1	1.5	0.2	0.7	0.8	0.9	1.2	1.2	1.6	0.8	1	1.3	1.3
Subtidal habitats	Primary production	0.6	1.8	0.2	1	0.7	1.2	1.9	0.6	1.8	1	1.3	1.5	1.2
Subtidal habitats	Sediment and nutrient retention and export	0.4	1	0.1	0.7	0.3	1	1.4	0.4	1.6	0.6	0.8	1.2	0.7
Subtidal habitats	Storm buffer/hazard protection	0.1	0.5	0	0.5	0.2	0.5	0.2	0	0.7	0.5	0.5	0.4	0.2
Subtidal habitats	Water quality enhancement	1.2	1.6	0.1	1	0.6	1.2	1.7	1	1.7	0.9	0.9	1.4	1.1
Subtidal habitats	Wildlife habitat	0.9	1.5	0.5	1.1	0.9	1	1.1	0.8	1.6	1.1	1.1	1.1	1

Strengths

What is in place currently that supports the health/sustainability of this value?

Research, Monitoring, Management Plans

Alabama Register of Historic Places, Alabama Historical Commission - The Alabama Register of Historic Places is the state's official list of cultural resources, 50 years or older, including districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and culture at the local, state, and/or national level. The ARHP lists 49 properties in Mobile and Baldwin counties. <http://preserveala.org/alabamaregister.aspx>

National Register of Historic Places - The National Register (NR) of Historic Places is the nation's official list of cultural resources, 50 years or older, including districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and culture at the local, state, and/or national level. The NR is part of a nationwide program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archaeological places. List of properties in Alabama included in the National Register of Historic Places: <http://preserveala.org/nationalregister.aspx>

National Historic Landmarks Program - National Historic Landmarks are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. <http://www.nps.gov/history/nhl/>

Alabama State Archaeological Site File - The Office of Archaeological Research (OAR) maintains the Alabama State Site File and Report Archives for all archaeological sites and Section 106 reports in the state of Alabama. Hard copies of site forms, topographic maps and Section 106 reports, as well as other pertinent archaeological literature are housed at OAR reference room, located at Moundville Archaeological Park. <http://museums.ua.edu/oar/assf.htm>

Deepwater Horizon Oil Spill Clean Up Support, Cultural Resources Monitoring, HDR Inc. – International company HDR, Inc. is the contracted company for BP that has brought in underwater archaeologists and ethnographers to study the impact of the oil spill on traditional community resources. The monitoring includes ethnic fishing villages and Native American communities as well as sea floor sampling and testing. <http://www.hdrinc.com/sites/all/files/content/books/book-files/5062-hdr-sustainability-corporate-responsibility.pdf> pp14.

Ongoing Coastal Research, Center for Archaeological Studies, U of South AL Ground-breaking research at sites like Old Mobile and Port Dauphin has revealed much about Alabama's earliest colonial history. The rapid pace of modern development has also led us to sites like Bottle Creek, the Exploreum, and Dog River Bridge, where Indians and French, British, Spanish, and Early American settlers left their marks on the landscape. <http://www.southalabama.edu/archaeology/center.html>

Alabama's Coastal Connection Corridor Management Plan - The mission of this project is to identify, promote and enhance the assets of Alabama's Coastal Connection through the development and implementation of a Corridor Management Plan and through obtaining both state and national designation as a Scenic Byway. <http://www.gulfshores.com/stats/Scenic%20Byway%20CMP.pdf>

Fort Morgan's Master Plan – Deals specifically with Ft. Morgan State Historic Site, which preserves a broad array of important natural and cultural resources on state property at the mouth of Mobile Bay, administered by the Alabama Historical Commission. <http://openmeetings.baldwincountyal.gov/sirepub/cache/2/1bej3m55ymrrlm45sh401r55/17340511102012124635546.PDF>

Working waterfronts - Coastal Alabama residents have relied on access to the water for their livelihood for generations. Towns like Bayou La Batre and Orange Beach operate fishing boats, seafood processing facilities, boat yards, charter fishing operations, and support industries.

<http://www.mobilebaynep.com/images/uploads/library/2010ProceedingsFinal.pdf>

The Alabama Natural Heritage Program State database of rare and threatened species is the most comprehensive database of species distribution and abundance. The Program has provided state and federal agencies, corporations, environmental groups, and the public with the information needed to monitor, preserve and protect Alabama's natural areas and biodiversity.

http://mercury.ornl.gov/clearinghouse/send/xsltText2?full_datasource=anhp&fileURL=d:%5Cmercury_instances%5Cusgs%5Canhp%5Charvested%5Cwww.alnhp.org_metadata_ALNHP-eors.xml

Ecosystem Restoration, Protection, Conservation

Three Mile Creek -This creek and its surrounding watershed present an extraordinary opportunity to turn what is now a community liability, due to its degraded condition, into a community amenity similar to "river walks" in other cities. By restoring the hydrology and water quality of this historic cultural and environmental resource, property values within its watershed would be enhanced, Three Mile Creek would become a unique urban ecotourism destination, and area economic development prospects would be improved. The watershed planning process is getting under way.

http://www.mobilebaynep.com/what_we_do/current_initiatives/three_mile_creek_watershed/

The Marsh Island (Portersville Bay) Restoration Project - Involves the creation of a 50-acre salt marsh along Marsh Island, a state-owned island in the Portersville Bay portion of Mississippi Sound, Alabama. Once known as the "Coney Island of the South," it was a popular tourist and fishing spot in the early 20th century. <http://www.doi.gov/deepwaterhorizon/upload/AlabamaMarshIslandF.pdf>

Africatown – Currently awaiting NRHP status, Africatown (AfricaTown; African Town) is the site of the arrival of the last documented slave ship to reach the United States. Aboard the famed ship Clotilda, was the community's co-founder Cudjo Lewis, who achieved notoriety when he was interviewed about his experiences in Africa, his journey to Mobile on the slave ship, and his life after he regained his freedom. The Africatown settlement is located on a hill north of the city beside the Alabama River in the area known as Plateau and Magazine Point. <http://www.encyclopediaofalabama.org/face/Article.jsp?id=h-1402>

Shell Mound Park, Dauphin Island – Located on the north shore of the barrier island, these massive shell middens date to A.D. 1100 - 1550. Formed by the accumulation of debris from repeated meals of roasted oysters, fish and other delicacies by early Native Americans, the mounds were built by people from the Bottle Creek site, a major Mississippian mound center to the north in the Mobile-Tensaw Delta, as a place to visit during winter to gather and roast oysters. <http://www.exploresouthernhistory.com/shellmound.html>

The Rochon-De Muy Plantation on Dog River – Prior to construction of the new Dog River Bridge, research at the site told much about Alabama's earliest colonial history. <http://www.usouthal.edu/archaeology/center.html>

Blakeley State Park – A part of the Civil War Discovery Trail, Blakeley State Park preserves multiple historic sites nestled in pristine woodlands and marshes along the Tensaw River. <http://www.blakeleypark.com/>

Ft. Gaines Park – Guarding the western entrance to Mobile Bay for more than 150 years, the Town of Dauphin Island preserves this Civil War citadel and adjacent property. <http://www.exploresouthernhistory.com/fortgainesal.html>

Ft. Morgan Historic Park – Still showing the scars from shell impacts, the fort, located on the east side of the mouth of Mobile Bay, is one of the most historic sites in Alabama. Built in 1833, it's known as an important stop for Creek Indians during the historic Trail of Tears as well as playing a vital role in the famed 1864 Battle of Mobile Bay. <http://www.exploresouthernhistory.com/fortmorgan.html>

Ft. Mims Historic Park – Visitors can take a step back to the days of the Creek War of 1813-1814 particularly, the Redstick Creek attack on this settler refuge in August 1813 triggered a military response by the United States that led to destruction of the Creek Nation and the cession of 21 million acres of land for American settlement. <http://www.exploresouthernhistory.com/fortmims1.html>

Federal and State-owned lands in the Mobile-Tensaw Delta – Bottle Creek and Battery Huger are two of the many significant archaeological sites offered protection on state and federal lands in the Delta. <http://www.outdooralabama.com/public-lands/stateLands/foreverWild/ForeverWildReport.pdf>
<http://www.usace.army.mil/Library.aspx>

Oyster Reef Replenishment– These intermittent projects strictly utilize waterbottoms/substrates that support oysters development. Establishment of these reefs is beneficial to shorelines and marshes resulting in economic benefit. Historical Commercial harvest is the purpose.

Oyster Reef Restoration - Part of a federal economic stimulus program aimed at restoring the nation's coastlines, a plan to build two oyster reefs that would block waves and create fish habitat in south Mobile County. Nearly a mile of underwater reefs along eroding shoreline in two locations: near Bay Front Park in Mobile Bay and in Portersville Bay near Bayou La Batre have been built.

Federal, State, Local Regulations And Policies, Technical Training

1. **ADEM and ADCNR Coastal Permitting** – Projects having the potential to impact Alabama’s coastal historical resources are subject to review pursuant to ADEM’s Coastal Rules.
2. <http://adem.alabama.gov/programs/coastal/coastalPermitting.cnt>
3. **USACE Section 404 Fill Permits** <http://www.sam.usace.army.mil/rd/reg/section404.htm>
4. **USACE Nationwide Permits** <http://www.sam.usace.army.mil/rd/reg/nwp.htm>
5. **National Historic Preservation Act, Section 106 Review Process** - Requires Federal agencies to take into account the effects of their undertakings on historic properties, and affords the Advisory Council on Historic Preservation a reasonable opportunity to comment.
6. <http://www.achp.gov/106summary.html>

Volunteer programs, outreach, education

Mobile Bay Oyster Gardening joins volunteers together with science and nature to grow these vital members of estuarine ecology. <http://www.aces.edu/pubs/docs/A/ANR-1207/>

Dauphin Island Sea Lab – The State of Alabama’s premier marine science education and research facility. The DISL Estuarium, the only public coastal aquarium in the state, is also located on the campus on the east end of the barrier island. <http://www.disl.org/>

USA Archaeology Museum Educational Programs - Educational Programming at the Archaeology Museum pulls from Alabama’s curriculum to emphasize historical awareness and critical thinking. Tours aim to inspire awe and generate curiosity about archaeology and the region’s past making history meaningful to students today. <http://www.usouthal.edu/archaeology/museum-education.html>

USA Center for Archaeology Studies – Offers hands-on volunteer opportunities. <http://www.usouthal.edu/archaeology/education.html>

Weaknesses/Threats

What stresses are currently putting negative pressure on the long-term viability of this value?

1. **Waterfront Development/Land Use Changes** – While development is needed to keep a community viable, there has to be a balance reached between anthropogenic development and protection of the environment. It is estimated that by 2025 the coastal population of Alabama will increase nearly 90 percent. Pg. 5 and 6 <http://www.mobilebaynep.com/images/uploads/library/State-of-Mobile-Bay-Final.pdf>
2. **Digging for Artifacts** – Uncontrolled metal detecting, artifact collecting, and digging on archaeological sites in the area removes artifacts from historical contexts, degrades the information potential of the archaeological record, and damages sites integrity. These activities are illegal when they occur on publically-owned sites and on private property without landowner permission. Digging for artifacts is an increasing threat to our archaeological resources. <http://www.nps.gov/archeology/tools/Laws/arpa.htm>
3. **Increased Intensity of Storms** – As ocean temperatures raise so does the intensity of hurricanes, according to many scientists. Regardless of the cause, stronger storms result in significant erosion of beaches, intertidal marshes and many associated ecosystems. <http://www.gfdl.noaa.gov/global-warming-and-hurricanes>
4. **Sea Level Rise**- The melting of ice sheets and glaciers is adding more water to oceans. Meanwhile, the ocean water is warming which means expansion. Both indicators are resulting in a continued trend of lost shoreline and coastal archaeological sites are being impacted. <http://www.epa.gov/climatechange/science/indicators/oceans/sea-level.html>
5. **Poor Resource Visibility and Recognition** – Many archaeological sites are unobtrusive and not recognized by the public as important resources deserving of preservation and protection. Encouraging interest and education at a local level would help attract attention and support for historical markers and other ways to highlight the presence of important sites.

RESILIENCE: Assessment of Current Situation

Habitats to Consider

Beaches and Dunes, Freshwater Wetlands, Intertidal Marshes and Flats, Long Leaf Pine, Maritime Forests, Oyster Reefs, Pine Savannahs, Streams/Rivers/Buffers, Subtidal habitats

Issues to Consider

Landuse Planning, Smart Growth, Disaster Preparedness, Hazardous Materials, Solid Waste Management Vector Control

Stresses on Habitats that Contribute to Heritage and Culture

The below tables are the result of an exercise completed by 30 scientists/resource managers to evaluate the level of impact of thirteen stressors on the habitats that provide ecosystem services of value to our coastal community. The rating scale was from 0-3 with 0 being no impact and 3 being severe impact. For the purposes of analysis the committee defined significant stress as any average value over 2.0. These values are highlighted in the table below.

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Beaches and Dunes	Biodiversity	1.5	1.5	0.4	2.3	1.9	2.5	0.8	1	1.1	1.7	1.6	0.8	1
Beaches and Dunes	Carbon Sequestration	0.6	0.9	0.3	1.2	0.5	1.7	0.4	0.2	0.9	1.2	0.9	0.5	0.6
Beaches and Dunes	Fisheries habitat	0.5	0.6	0	0.4	0.4	0.6	0.6	0.6	0.9	0.6	0.6	0.5	0.3
Beaches and Dunes	Flood control	0.3	1.4	0	1.4	0.4	1.8	0.5	0.4	1.1	1.3	0.9	0.5	0.5
Beaches and Dunes	Groundwater replenishment	0.8	0.5	0	0.9	0.4	1.2	0.5	0.3	0.7	0.9	0.6	0.8	0.7
Beaches and Dunes	Nesting habitat for birds and turtles	1.2	1.9	0.3	2.1	1.3	2.4	0.6	0.7	1.2	1.7	1.7	0.6	1
Beaches and Dunes	Oyster production	0.4	0.4	0	0.1	0.2	0.4	0.5	0.5	0.4	0.3	0.2	0.3	0.5
Beaches and Dunes	Primary production	0.9	0.9	0.2	1.1	0.8	1.6	0.5	0.3	0.6	1.1	1	0.3	0.6
Beaches and Dunes	Sediment and nutrient retention and export	0.4	1.4	0.1	1	0.7	1.8	0.7	0.1	1.5	1	0.7	0.4	0.7
Beaches and Dunes	Storm buffer/hazard protection	0.6	1.8	0.2	2	0.5	2.4	0.5	0.5	1.3	1.8	1.3	0.7	0.6

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Beaches and Dunes	Water quality enhancement	1.1	1.4	0.1	1	0.5	1.6	1.1	0.9	1.1	0.8	0.7	0.8	0.6
Beaches and Dunes	Wildlife habitat	1.5	1.8	0.8	2.2	1.6	2.4	0.9	1	1.3	1.8	1.6	0.7	1.1
Freshwater Wetlands	Biodiversity	1.9	2.3	0.9	2.3	2.4	2.6	1.6	1.1	2.2	1.6	1.8	2	1.6
Freshwater Wetlands	Carbon Sequestration	1	2	0.7	1.7	1.5	2.3	1.4	0.7	2.1	1.5	1.5	1.5	0.9
Freshwater Wetlands	Fisheries habitat	1.8	2.5	0.5	2.1	2.1	2.4	1.9	1	2.2	1.7	1.8	2.2	1.4
Freshwater Wetlands	Flood control	0.6	2.4	0.5	1.9	1.1	2.4	0.8	0.5	2.2	1.8	1.4	1.9	1.1
Freshwater Wetlands	Groundwater replenishment	1.3	2.1	0.4	1.8	0.9	2.2	1.3	1	1.7	1.7	1.4	2.1	1.2
Freshwater Wetlands	Nesting habitat for birds and turtles	1.7	2.5	1.2	2.5	2.1	2.7	1.5	1.3	1.9	2	1.7	2.1	1.5
Freshwater Wetlands	Oyster production	0.8	1	0.2	0.8	0.8	1.1	1	0.8	1	0.6	0.7	1	0.6
Freshwater Wetlands	Primary production	1.3	2.1	0.8	1.9	1.9	2.6	1.9	0.7	2.1	1.7	1.5	1.9	1.2
Freshwater Wetlands	Sediment and nutrient retention and export	0.9	2.3	0.6	1.9	1.2	2.6	2.1	0.6	2.6	1.5	1.5	2	1.6
Freshwater Wetlands	Storm buffer/hazard protection	0.7	2.4	0.5	2.2	1.1	2.7	0.8	0.4	2.2	1.8	1.7	1.6	1.2
Freshwater Wetlands	Water quality enhancement	2	2.5	0.6	2	1.2	2.4	2.4	1.6	2.1	1.4	1.3	2	1.7
Freshwater Wetlands	Wildlife habitat	1.7	2.5	1.1	2.3	2.3	2.5	1.8	0.9	1.9	1.8	1.6	1.9	1.6
Intertidal Marsh and Flats	Biodiversity	1.7	2.4	0.7	2.2	1.8	2.3	1.6	1.1	2.3	2.3	1.5	1.8	1.2
Intertidal Marsh and Flats	Carbon Sequestration	1.1	1.8	0.6	1.7	1	2.3	1.5	0.7	1.9	1.9	1.4	1.1	0.7
Intertidal Marsh and Flats	Fisheries habitat	1.6	2.6	0.4	2	1.4	2.4	1.7	1.2	2.4	2.3	1.6	1.8	1.3

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Intertidal Marsh and Flats	Flood control	0.9	1.9	0.6	1.7	0.9	2.4	0.8	0.5	1.7	1.9	1.4	1.6	0.9
Intertidal Marsh and Flats	Groundwater replenishment	0.8	1.1	0.1	1	0.6	1.5	0.9	0.6	1	1	1	1.2	0.8
Intertidal Marsh and Flats	Nesting habitat for birds and turtles	1.3	2.2	0.9	2	1.5	2.3	1.3	1	2	2.1	1.6	1.3	1.2
Intertidal Marsh and Flats	Oyster production	1.6	2.1	0.4	1.4	0.9	1.6	1.3	1.5	1.8	1.5	1.2	1.7	1.3
Intertidal Marsh and Flats	Primary production	1.2	2.1	0.7	1.6	1.1	2.2	1.7	0.8	2.3	2.1	1.6	1.6	1
Intertidal Marsh and Flats	Sediment and nutrient retention and export	0.8	2.1	0.5	1.8	0.9	2.3	1.6	0.5	2.4	2.1	1.4	1.6	1
Intertidal Marsh and Flats	Storm buffer/hazard protection	0.7	2.1	0.5	1.9	0.9	2.3	0.7	0.6	2	2.2	1.4	1.4	1.1
Intertidal Marsh and Flats	Water quality enhancement	1.8	2.2	0.6	1.7	0.9	2.2	1.9	1.5	2.1	1.7	1.3	1.8	1.1
Intertidal Marsh and Flats	Wildlife habitat	1.4	2.4	0.8	2.1	1.5	2.2	1.6	1.2	2	2.2	1.6	1.6	1.1
Longleaf Pine Habitat	Biodiversity	1.1	0.9	2.5	2.4	2.3	2.4	1.1	1.1	0.9	0.9	1.4	0.8	2.1
Longleaf Pine Habitat	Carbon sequestration	0.6	0.9	2.1	1.7	1.9	2.5	1	0.5	0.5	0.8	1.4	0.7	2
Longleaf Pine Habitat	Fisheries habitat	0.4	0.3	0.1	0.6	0.6	0.7	0.4	0.4	0.5	0.5	0.4	0.4	0.4
Longleaf Pine Habitat	Flood control	0	0.9	1.2	2	0.6	2.3	0.2	0	0.6	0.7	0.8	1.1	1.6
Longleaf Pine Habitat	Groundwater replenishment	1.4	1.1	1.1	1.9	1	2.3	1.4	0.9	1.1	0.7	1.2	1.4	1.9
Longleaf Pine Habitat	Nesting habitat for birds and turtles	1.1	1.1	2.4	2.2	2.2	2.4	1.2	1	1.2	1.1	1.5	1.2	2
Longleaf Pine	Oyster	0	0	0	0.3	0	0.5	0.2	0.1	0.2	0.1	0.2	0.1	0.2

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Habitat	production													
Longleaf Pine Habitat	Primary production	0.8	1	2	2.3	1.4	2.3	1	0.8	0.9	0.7	1.3	1	2
Longleaf Pine Habitat	Sediment and nutrient retention and export	0.4	1.1	1.6	2.1	1.2	2.3	1.2	0.5	1.3	0.8	0.9	1.2	1.6
Longleaf Pine Habitat	Storm buffer/hazard protection	0.4	1.3	1.3	1.7	0.9	2	0.5	0.3	1	0.8	1	1.1	1.4
Longleaf Pine Habitat	Water quality enhancement	1.1	1.1	1.1	2	0.9	2.1	1.5	0.8	1.6	0.7	1	1.5	1.6
Longleaf Pine Habitat	Wildlife habitat	1.4	0.9	2.5	2.5	2.5	2.4	1.3	1.1	1	1.1	1.8	1.2	2.5
Maritime Forest	Biodiversity	0.8	1.2	1.2	2.3	1.9	2.2	1	0.9	0.8	1.2	1.6	0.6	1.5
Maritime Forest	Carbon sequestration	0.5	0.8	0.9	1.7	0.7	2.1	0.5	0.3	0.7	1	1.4	0.3	1.4
Maritime Forest	Fisheries habitat	0.1	0.5	0	0.4	0.2	0.8	0.4	0.1	0.4	0.4	0.8	0.2	0.7
Maritime Forest	Flood control	0.2	1	0.5	2	0.2	1.9	0	0	1	0.7	1	0.7	1.1
Maritime Forest	Groundwater replenishment	1.1	1.2	0.8	1.6	0.8	2	0.6	0.4	1.1	0.9	1.1	1.3	1.5
Maritime Forest	Nesting habitat for birds and turtles	1.4	1.3	1.5	2.3	2.7	2.4	1.3	1.3	1.2	1.4	1.8	0.9	1.4
Maritime Forest	Oyster production	0.3	0.3	0	0.3	0.1	0.5	0.3	0.3	0.3	0.3	0.4	0.5	0.6
Maritime Forest	Primary production	0.6	1	1.1	1.6	1.1	2.1	0.9	0.6	0.9	0.9	1.4	0.8	1.1
Maritime Forest	Sediment and nutrient retention and export	0.4	1.2	1.1	1.6	1.1	2.4	1.3	0.6	1.1	1	1.4	0.8	1.2
Maritime Forest	Storm buffer/hazard protection	0.4	1.1	0.9	2.1	0.8	2	0.4	0.4	0.9	1.2	1.6	0.6	1.2
Maritime Forest	Water quality enhancement	1	1.2	0.6	1.5	0.9	2	1.3	1	1.3	0.8	1.1	1.1	1.2
Maritime Forest	Wildlife habitat	1.1	1.3	1.6	2.3	2.2	2.4	1.2	1.2	1.1	1.3	1.8	1	1.6

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Oyster Reefs	Biodiversity	1.8	2.3	0.3	1.5	1.5	1.5	2	1.8	2.4	1.3	1.4	2.2	1.9
Oyster Reefs	Carbon Sequestration	0.8	1.2	0.2	0.9	0.7	1	1.1	0.9	1.3	0.8	0.8	1.2	1.3
Oyster Reefs	Fisheries habitat	1.6	2.1	0.3	1.7	1.3	1.5	1.7	1.5	2.2	1.2	1.2	2	2.1
Oyster Reefs	Flood control	0.4	0.8	0.2	0.8	0.6	0.9	0.6	0.4	0.8	0.7	0.4	0.7	0.9
Oyster Reefs	Groundwater replenishment	0.2	0.2	0	0	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Oyster Reefs	Nesting habitat for birds and turtles	0.2	0.2	0	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2
Oyster Reefs	Oyster production	2.1	2.2	0.3	1.8	1.5	1.5	2	2.2	2.8	1.7	1.7	2.2	2.5
Oyster Reefs	Primary production	0.9	1.2	0.3	0.9	0.8	1.3	1.4	0.9	1.4	0.9	0.9	1.3	1.3
Oyster Reefs	Sediment and nutrient retention and export	0.7	1.6	0.3	1.1	0.7	1.5	1.2	1	1.9	1.2	1.1	1.7	1.6
Oyster Reefs	Storm buffer/hazard protection	0.6	1.5	0.2	1.2	0.8	1.3	0.8	0.9	1.5	1.2	0.9	1.2	1.5
Oyster Reefs	Water quality enhancement	1.9	2.1	0.4	1.5	1.1	1.7	2.1	1.9	2.4	1.3	1.2	2.1	1.9
Oyster Reefs	Wildlife habitat	1.2	1.4	0.2	1.1	0.9	1.2	1.2	1.2	1.6	1.1	1.1	1.4	1.2
Pine Savanna Forest	Biodiversity	1.3	1.6	2.6	2.2	2.4	2.5	1.2	1.1	1.1	1	1.5	1.1	1.8
Pine Savanna Forest	Carbon sequestration	0.5	1	1.7	1.7	0.8	1.8	0.7	0.3	0.5	0.7	1.2	0.6	1.8
Pine Savanna Forest	Fisheries habitat	0	0	0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0	0.1
Pine Savanna Forest	Flood control	0.5	1.4	1	1.7	1	1.9	0.3	0.3	0.6	0.9	1.1	1.2	1.9
Pine Savanna Forest	Groundwater replenishment	1.4	1.3	0.9	1.6	0.5	2	1	0.8	1	0.7	1.1	1.2	1.5
Pine Savanna Forest	Nesting habitat for birds and turtles	1.5	1.5	2.1	2.2	2	2.2	1.2	1.1	1.1	1.1	1.5	1.1	1.6
Pine Savanna Forest	Oyster production	0	0	0	0	0	0	0	0	0	0.1	0.1	0.2	0.1
Pine Savanna Forest	Primary production	1	1	1.3	1.7	1.1	2.1	0.7	0.8	0.8	0.7	1.2	0.7	1.5

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Pine Savanna Forest	Sediment and nutrient retention and export	0.7	1.4	1.3	2	1.1	2.1	1.2	0.5	1.1	0.8	1.3	1.4	1.6
Pine Savanna Forest	Storm buffer/hazard protection	0.3	1	0.9	1.7	0.5	1.8	0.2	0.2	1	0.9	1.1	1.2	1.1
Pine Savanna Forest	Water quality enhancement	1.5	1.2	1	2	0.9	1.9	1.4	1.3	1.6	0.7	1.3	1.7	1.6
Pine Savanna Forest	Wildlife habitat	1.4	1.6	2.4	2.4	2.4	2.4	1.3	1.3	1.1	1.2	1.6	1.5	2.1
Streams and Rivers	Biodiversity	1.9	2	0.7	1.9	2.2	2	1.7	1.4	2.2	1.2	1.4	2.1	1.6
Streams and Rivers	Carbon Sequestration	0.9	1.1	0.5	0.9	0.9	1.5	1.2	0.5	1.4	0.9	1.1	1.3	1.2
Streams and Rivers	Fisheries habitat	2	2.2	0.4	1.8	2.1	2.2	1.8	1.5	2.3	1.1	1.3	2.2	1.7
Streams and Rivers	Flood control	0.6	1.7	0.4	1.5	0.9	2.1	0.7	0.5	1.6	1.2	1.3	2.1	1.1
Streams and Rivers	Groundwater replenishment	1.1	1.5	0.4	1.2	1	1.6	1.1	0.6	1.3	0.9	1.1	1.9	1.5
Streams and Rivers	Nesting habitat for birds and turtles	1	1.4	0.9	1.2	1.1	1.4	1	1	1.4	1	1.1	1.2	1.1
Streams and Rivers	Oyster production	0.8	0.6	0.3	0.7	0.5	0.6	0.6	0.8	0.8	0.5	0.4	0.9	0.5
Streams and Rivers	Primary production	1.4	1.5	0.6	1.1	1.5	1.7	1.9	0.8	1.8	0.8	1.1	1.9	1.1
Streams and Rivers	Sediment and nutrient retention and export	0.8	2.1	0.5	1.5	1.1	2.2	1.6	0.5	2.2	1	1.1	2.2	1.5
Streams and Rivers	Storm buffer/hazard protection	0.8	1.6	0.6	1.3	1	1.7	0.7	0.5	1.7	1.2	1.2	1.8	1.1
Streams and Rivers	Water quality enhancement	1.9	1.7	0.6	1.4	1.1	1.9	1.9	1.7	1.9	0.9	1.2	1.9	1.2
Streams and Rivers	Wildlife habitat	1.5	1.7	0.8	1.5	1.7	1.8	1.4	1.1	1.7	1	1.3	1.6	1.4
Subtidal habitats	Biodiversity	1.6	2.4	0.3	1.3	1.5	1.4	1.7	1.2	2.3	1.2	1.2	2	1.9
Subtidal habitats	Carbon Sequestration	0.6	1.4	0	0.5	0.6	1	1.7	0.4	1.7	0.7	0.8	0.9	1

Habitat	Eco-Service	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Subtidal habitats	Fisheries habitat	1.4	2.1	0.3	1.3	1.2	1.4	1.9	1.3	2.2	1	1.3	1.5	1.7
Subtidal habitats	Flood control	0	0.1	0	0.2	0	0.2	0	0	0.2	0.2	0.1	0.1	0.1
Subtidal habitats	Groundwater replenishment	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0
Subtidal habitats	Nesting habitat for birds and turtles	0.1	0.2	0	0.2	0.2	0.3	0.2	0.1	0.4	0.1	0.1	0.4	0.2
Subtidal habitats	Oyster production	1.1	1.5	0.2	0.7	0.8	0.9	1.2	1.2	1.6	0.8	1	1.3	1.3
Subtidal habitats	Primary production	0.6	1.8	0.2	1	0.7	1.2	1.9	0.6	1.8	1	1.3	1.5	1.2
Subtidal habitats	Sediment and nutrient retention and export	0.4	1	0.1	0.7	0.3	1	1.4	0.4	1.6	0.6	0.8	1.2	0.7
Subtidal habitats	Storm buffer/hazard protection	0.1	0.5	0	0.5	0.2	0.5	0.2	0	0.7	0.5	0.5	0.4	0.2
Subtidal habitats	Water quality enhancement	1.2	1.6	0.1	1	0.6	1.2	1.7	1	1.7	0.9	0.9	1.4	1.1
Subtidal habitats	Wildlife habitat	0.9	1.5	0.5	1.1	0.9	1	1.1	0.8	1.6	1.1	1.1	1.1	1

Strengths

What is in place currently that supports the health/sustainability of this value?

Research, monitoring, management plans

1. **MASGC's research program** – A part of the consortium's strategic plan, the research program includes the NOAA Coastal Storms Program and a variety of resilience projects. <http://masgc.org/page.asp?id=17>
2. **NOAA sentinel sites in Weeks Bay and Grand Bay NERRS** – The Sentinel Program establishes a place-based strategy to track the status of ecosystem integrity and socioeconomic health indicators for

specific management issues using existing NOAA infrastructure and resources. The data collected by the program will inform management response and adaptation planning related to stressor impacts on ecosystems, NOAA Trust Resources, and human communities.

http://nerrs.noaa.gov/Doc/PDF/Research/NOAA_SSP_PPISubmission.pdf

3. **NOAA/Sea Grant Sea Level Rise Projects** - The sea-level-rise funding area is designed to utilize a regional sea-level-rise visualization tool under development by the NOAA Coastal Services Center. The tool is currently available for Texas, Alabama, Florida and Mississippi and will soon be available for the entire Gulf of Mexico region. <http://csc.noaa.gov/digitalcoast/tools/slrviewer/> Extension, outreach and education for this effort will occur through the Gulf of Mexico Climate Community of Practice <http://masgc.org/climate/cop/index.html> Three projects were funded for 2012-2014. <http://masgc.org/page.asp?id=735>
4. **Hazard Mitigation Planning** – Urbanized areas throughout the estuary have developed or revised their hazard mitigation and comprehensive plans.
 - **Mobile County** – A major revision of the Multi-Hazard Mitigation Plan includes the hazards, the historical impacts of these hazards and establishes goals, strategies and objectives for lessening their adverse impact. Each community has developed an action program to become more disaster resistant and resilient. <http://www.mcema.net/HazardMitigationPlan.aspx>
 - **Baldwin County** – The plan addresses all natural disasters deemed to threaten property and persons in the county. It presents both short and long term mitigation strategies, implementation tasks, and funding alternatives. <http://www.co.baldwin.al.us/uploads/EOC%20Mitigation%20Plan.pdf>
5. **Gulf Of Mexico Alliance Resilience Team projects** – Are designed to provide tools to coastal communities to better understand the risks and impacts associated with coastal hazards, including climate changes. In addition, the Alliance will assess the risks of coastal hazards to the natural, built, and social environments of the Gulf Coast and increase infrastructure to better quantify these risks in the future. While **GOMA's Habitat's Team** focuses on habitat conservation and restoration. http://www.gulfofmexicoalliance.org/pdfs/GOMA_2012_All_Hands/PITS/All%20Hands%20WQ%20PI%20Presentation%20v1%202012.pdf
<http://www.gulfofmexicoalliance.org/issues/resilience.php>
6. **The Nature Conservancy Resilience Projects** – Aimed at increasing the resilience of local communities that historically depended upon oyster reefs for a plethora of reasons, these projects rebuild reefs. <http://www.nature.org/ourinitiatives/regions/northamerica/oyster-restoration-study-kroeger.pdf>.
7. Coastal Resilience Tools and Resources- <http://coastalresilience.org/gulfmex>

Ecosystem Restoration, Protection, Conservation

1. **USACOE Lines of Defense Concept** - The strategy proposes that two essential elements of the coast be managed and perpetuated, which together can economically sustain the coast. It suggests using natural and manmade features (lines of defense) that directly impede storm surge or reduce storm damage and establish and sustain habitat goals. <http://ascelibrary.org/doi/abs/10.1061/40968%28312%2972>
2. **Regional Sea Grant Ecosystems Services Valuation Research** - Estimates ecosystem service values for specific habitat types at National Estuary Program (NEP) sites in the northern GOM. Values will be estimated from primary (survey) and secondary (private market transaction records) data using integrated SP (contingent valuation, choice experiments) and RP (hedonic pricing) methods in order to cover the full range of potential use and non-use values. <http://www.masgc.org/page.asp?id=762>

3. **Community Resilience Index** - A MSSGC tool that communities can use to examine how prepared they are for storms and storm recovery. To complete the index, community leaders get together and use the tool to guide discussion about their community's resilience to coastal hazards. (<http://masgc.org/ri>)
4. **Community Rating System** – This joint program of FEMA and the National Flood Insurance Program uses the CRS as a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions to meet the CRS goals. <http://www.fema.gov/national-flood-insurance-program/community-rating-system>
5. **Policies Guiding Gulf Coastal Development** – A Resilience Team project of MASGC and GOMA to research existing policies guiding coastal development and make recommendations to enhance resilience using best management practices. http://masgc.org/bb2012/Abstractspdf/CHR_PDFs/CHR_Pace_Niki_abstract_final.pdf
http://masglp.olemiss.edu/Advisory/GOM_States'_Coastal_Land_Use_Planning_Laws.pdf
6. **Coastal Code Supplements** (for building using LID) a Coastal Code supplements mandates such cost savings measures as a Sealed Roof Deck and Roof Deck Attachment Requirements for all new homes and re-roofs. http://masgc.org/bb2012/Abstractspdf/CHR_PDFs/CHR_Cary_Alex_abstract%20final.pdf

Volunteer Programs, Outreach, Education

1. **Sea Grant and GOMA Resilience Benchmarking for the North Central Gulf Coast**- The Gulf Regional Planning Commission (GRPC) in Mississippi, the Gulf of Mexico Alliance (GOMA), and the Mississippi-Alabama Sea Grant Consortium (MASGC) are expanding the work underway through the Mississippi *Plan for Opportunity*. This project will create a framework for assessing resilience across critical systems by expanding the existing Community Resilience Index (CRI) assessment tool used by communities around the Gulf of Mexico Region.
2. **Gambling Against Mother Nature** – A three part television series about life in coastal watersheds. <http://ms.stormsmart.org/2009/08/25/new-tv-program-on-storm-and-insurance-airs-tonight/>
 - “Wind and Water” about hurricanes, storms and impacts on coast
 - “Water Runs Down Hill” about coastal watersheds
 - “Hedging Our Bets” about storms and insurance
3. **Sea Level Rise and Inundation** In December of 2009, a workshop brought together leaders from a range of these communities to discuss and develop a framework on coastal inundation and sea level rise in order to help guide where investments should be made to enable states and local governments to assess impacts and initiate adaptation strategies over the next decade. <http://www.csc.noaa.gov/publications/inundation-workshop.pdf>
4. **Living Shorelines** –A program that uses living plant material, oyster shells, earthen material, or a combination of natural structures with riprap or offshore breakwaters to protect property from erosion. The result of wind, water, and wave action, erosion results in loss of residential and commercial property, reduction of storm buffering capacity, aquatic and terrestrial habitat loss, increased suspended solids and water quality degradation. <http://www.masgc.org/page.asp?id=235>
5. **Clean and Resilient Marinas** – This GOMA project produced a guidebook for use by marina owners and operators to give guidance on pre-design or upgrade considerations, berthing facilities, landside facilities, boat storage, mooring and tie-down strategies, and natural shoreline erosion control measures.

<http://stormsmart.org/wp-content/blogs.dir/1/files/group-documents/20/1352147149-11163110512RPT01R01DGuidebookataGlanceVolumeI.pdf>

6. **Coastal Resilience Index** – The purpose of this self-assessment is to provide community leaders with a simple and inexpensive method of predicting if their community will reach and maintain an acceptable level of functioning after a disaster. Experienced local planners, engineers, floodplain managers or administrators can complete this self-assessment using existing sources of information from their community. <http://www.masgc.org/pdf/masgp/08-014.pdf>
7. **Smart Home America**- Organization focused on building safer, smarter and stronger communities through education of best practices for fortifying buildings. <http://www.smarthomeamerica.org/>

Weaknesses/Threats

What stresses are currently putting negative pressure on the long-term viability of this value?

1. Research – Lack of information on the short- and long-term cost benefits for proactive policies to increase resilience.
2. Monitoring – And data collection that track salinity levels within Mobile Bay are needed.
<http://www.al.com/specialreport/mobileregister/index.ssf?delta/i-intro.html>
<http://www.mymobilebay.com/stationdata/stationinfomiddlebay.asp?jday=&property=&chartyear=&StationID=188>
3. Management Plans – long-term planning efforts that do not include the effects of climate change. Examples would be the State's water plan and oyster management plans
4. No state building code
5. Current mitigation programs do not address fortified homes
6. Insufficient support for extension, outreach and education programs to help improve community resilience and implement mitigation strategies.
7. Lack of overall coordination of resilience work

WATER QUALITY: Assessment of Current Situation

Habitats to Consider

Freshwater Wetlands, Intertidal Marsh and Flats, Longleaf Pine Habitat, Maritime Forest, Oyster Reefs
Pine Savanna Forest

Issues to Consider

Freshwater discharge, Aquifer recharge, Point source Pollution, Ports, Industry, Non-Point Source Pollution,
Stormwater, Litter/Trash, Sediment, Pathogens, Waste water treatment alternatives, Atmospheric disposition

Stresses on Habitats that Contribute to Water Quality Ecosystem Services

The below tables are the result of an exercise completed by 30 scientists/resource managers to evaluate the level of impact of thirteen stressors on the habitats that provide ecosystem services of value to our coastal community. The rating scale was from 0-3 with 0 being no impact and 3 being severe impact. For the purposes of analysis the committee defined significant stress as any average value over 2.0. These values have been highlighted in the table below.

Eco_Service	Habitat	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Water quality enhancement	Beaches and Dunes	1.1	1.4	0.1	1	0.5	1.6	1.1	0.9	1.1	0.8	0.7	0.8	0.6
Water quality enhancement	Freshwater Wetlands	2	2.5	0.6	2	1.2	2.4	2.4	1.6	2.1	1.4	1.3	2	1.7
Water quality enhancement	Intertidal Marsh and Flats	1.8	2.2	0.6	1.7	0.9	2.2	1.9	1.5	2.1	1.7	1.3	1.8	1.1
Water quality enhancement	Longleaf Pine Habitat	1.1	1.1	1.1	2	0.9	2.1	1.5	0.8	1.6	0.7	1	1.5	1.6
Water quality enhancement	Maritime Forest	1	1.2	0.6	1.5	0.9	2	1.3	1	1.3	0.8	1.1	1.1	1.2
Water quality enhancement	Oyster Reefs	1.9	2.1	0.4	1.5	1.1	1.7	2.1	1.9	2.4	1.3	1.2	2.1	1.9
Water quality enhancement	Pine Savanna Forest	1.5	1.2	1	2	0.9	1.9	1.4	1.3	1.6	0.7	1.3	1.7	1.6
Water quality enhancement	Riparian Buffers	1.7	1.9	0.9	2.1	1	2.4	1.7	1.3	1.8	1.2	1.5	1.8	1.7
Water quality enhancement	Streams and Rivers	1.9	1.7	0.6	1.4	1.1	1.9	1.9	1.7	1.9	0.9	1.2	1.9	1.2
Water quality enhancement	Submerged Aquatic Vegetation	1.1	2.3	0.1	1.8	0.7	1.7	2.1	0.8	2.2	1.1	1.3	1.6	1.1

Eco_Service	Habitat	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Water quality enhancement	Subtidal habitats	1.2	1.6	0.1	1	0.6	1.2	1.7	1	1.7	0.9	0.9	1.4	1.1

Strengths

What is in place currently that supports the health/sustainability of this value?

Research, Monitoring, Management Plans

1. **ADEM Water Quality Monitoring Strategy** - ADEM's current Monitoring Strategy is a coordinated monitoring approach designed to characterize water quality, to identify impacts from a variety of sources, and to provide a systematic and integrated framework for gathering necessary information to support the decision-making process.
<http://www.adem.state.al.us/programs/water/wqsurvey/2010WQMonitoringStrategy.pdf>
2. **ADEM Coastal Waters Monitoring Program** - Alabama's 2010 Integrated Water Quality Assessment and Monitoring Report combines information about Alabama's surface and ground water resource management programs with a comprehensive listing of state waters consistent with EPA's 2006 Integrated Reporting Guidance. The guidance requests that states report on the condition of all surface waters by categorizing rivers, streams, lakes, estuaries, and coastal waters according to their designated uses and the degree to which water quality is supporting those uses. <http://www.adem.state.al.us/programs/water/waterforms/2010AL-IWQMAR.pdf>
3. **Coastal Alabama Recreational Waters Monitoring Program** - The monitoring and assessing of coastal recreational waters and the prompt notification of the public when applicable water quality standards are not being met. <http://adem.alabama.gov/programs/coastal/beachMonitoring.cnt>
4. **Fish Tissue Monitoring Program** – A statewide screening of bioaccumulative contaminants in fish tissue which is provided to the Alabama Department of Public Health with data needed to determine any potential risk to those that consume fish from Alabama waters.
<http://adph.org/tox/assets/FishTissueMonitoring.pdf>
5. **National Pollutant Discharge Elimination System (NPDES) Program** –Regulations for the implementation and control of erosion and sedimentation following Construction Best Management Practices associated with regulated construction sites.
<http://www.adem.state.al.us/programs/water/permitting.cnt>
6. **DISL/ NEP Real Time Monitoring Program** - Instrumentation located throughout Mobile Bay (Meaher Park, Middle Bay Light, Weeks Bay and DISL) to take continuous measurements of air and water temperature, relative humidity, wind speed and direction, barometric pressure, precipitation,

quantum radiation, water depth, salinity, turbidity, dissolved oxygen and total DO.
http://www.mobilebaynep.com/images/uploads/library/03-05_Implementationfinal.pdf p.8

7. **Little Lagoon Water Quality Monitoring** - Trained volunteers and DISL researchers sample 4 locations in the Lagoon every two weeks. The team gathers field measurements and samples, prepares and analyzes samples, and enters and maintains observations in the SEPMN national data base and the DISL Water Chemistry and Phytoplankton database. <http://littleglagoon.org/water-quality/research-and-monitoring-results.cfm>
8. **Alabama Marine Environmental Sciences Consortium** – The purposes of the consortium are to provide educational programs in marine sciences on both the undergraduate and graduate levels, to promote and encourage pure and applied research in marine sciences and related areas, to promote and encourage communication and dialogue among those interested in marine sciences. <http://research.gulfresearchinitiative.org/research-awards/block-grants-year1/alabama-marine-environmental-science-consortium/>
9. **Dauphin Island Sea Lab** - Is Alabama's marine science education and research laboratory whose mission includes marine science education, marine science research, coastal zone management policy and educating the general public through the Estuarium, DISL's public aquarium. <http://www.disl.org/>
10. **Mobile Bay National Estuary Program** - The mission of the MBNEP is to promote wise stewardship of the water quality characteristics and living resource base of the Mobile Bay estuarine system. It is a non-regulatory program that brings together citizens; local, state, and federal government agencies; businesses and industries; conservation and environmental organizations; and academic institutions to implement a Comprehensive Conservation Management Plan for the estuary. <http://www.mobilebaynep.com/>
11. **Mississippi-Alabama Sea Grant Consortium** – A federal/state partnership that matches NOAA Sea Grant expertise and resources with state academic institutions to enhance the sustainable use and conservation of ocean and coastal resources to benefit the economy and environment in Alabama and Mississippi. <http://www.masgc.org>
12. **National Coastal Condition Assessment (NCCA)** - One of a series of water assessments being conducted by states, tribes, the U.S. Environmental Protection Agency (EPA), and other partners. In addition to coastal waters, the water assessments focus on rivers and streams, lakes, and wetlands in a revolving sequence. The purpose is to generate statistically valid reports on the condition of our Nation's water resources and identify key stressors to these systems. <http://water.epa.gov/type/watersheds/monitoring/upload/ncca-qapp.pdf>
13. **National Aquatic Resources Surveys (NARS)** - A series of surveys of the nation's aquatic resources to provide nationally consistent and scientifically-defensible assessments of the nation's entire water resource (i.e., rivers and streams, lakes, wetlands, or coastal waters). http://water.epa.gov/type/watersheds/monitoring/aquaticsurvey_index.cfm
14. **Bon Secour NWR CCMP** - The purpose of this management plan is to improve water quality in the Bon Secour River Watershed in order to meet or exceed present use classifications and meet the goals decided upon by the citizens of the Bon Secour River Watershed. <http://www.mobilebaynep.com/images/uploads/library/Bon-Secour-WMP.pdf>
15. Weeks Bay NERR - **System Wide Monitoring Plan** - Develop quantitative measurements of short-term variability and long-term changes in the meteorological, water quality, biological systems, and land-

use/land -cover characteristics of estuaries and estuarine ecosystems for the purposes of informing effective coastal zone management. <http://www.nerrs.noaa.gov/Doc/PDF/Research/2011SWMPPlan.pdf>

16. **Grand Bay National Estuarine Research Reserve** - designed to promote estuarine research and education within some 18,400 acres of Mississippi's Coastal Zone and its adjacent ecosystems.

17. <http://grandbaynerr.org/>

NOAA Mussel Watch Program - The longest running continuous contaminant monitoring program in U.S. coastal and Great Lakes waters. The project was developed to analyze chemical and biological contaminant trends in sediments and bivalve tissues collected at over 300 coastal sites from 1986 to present. <http://ccma.nos.noaa.gov/about/coast/nsandt/musselwatch.aspx>

18. **ACAMP/ NEP Coastal Marine Spatial Planning** -The purpose of the ACAMP is to promote, improve, and safeguard the lands and waters located in the coastal area through a comprehensive and cooperative program. http://api.ning.com/files/6VMXe-q-6YNTn*uYDoz9YfHnLDgSBttV-uAY5i-8rIFPxTh1*ttM6dmC4Uoh3IsIsL1JQS4bJ3UgjnLHRUOfmq8J1Hmfkeo/Hinsley_2012ACAMPMeetingPresentation.pdf

19. The **Geological Survey of Alabama's (GSA) - Groundwater Assessment Program** - Investigates the occurrence, availability and quality of the state's waters by employing hydraulic and geologic expertise. <http://www.adem.state.al.us/misc/gwshows2011/06.GeologicalSurveyofAlabama-M.Cook.pdf>

20. **National Atmospheric Deposition Program (NADP)** – Monitors and investigates trends in atmospheric chemical deposition to south Alabama and the nation. <http://nadp.sws.uiuc.edu/>

21. **NASA** – Provides frequent satellite observations (daily to weekly) for assessing the condition of Mobile Bay and coastal Alabama (e.g. <http://modis.gsfc.nasa.gov/>)

22. **USGS** – Provides stream discharge monitoring for many streams and waterways in Mobile and Baldwin counties and in the greater Mobile Bay watershed and conducts biological resource assessments. (<http://waterdata.usgs.gov/AL/nwis/current/?type=flow>)
http://gulfsoci.usgs.gov/gom_ims/pdf/pubs_gom.pdf)

23. **NOAA** – Provides meteorology, tides, currents, model forecasts for Mobile Bay and the northern Gulf of Mexico. http://tidesandcurrents.noaa.gov/ofs/ngofs/ngofs_mobile.html

24. **USACE** – Provides environmental planning and assessment studies related to dredging and water infrastructure projects. <http://www.sam.usace.army.mil/Missions/PlanningEnvironmental.aspx>

Ecosystem Restoration, Protection, Conservation

1. **Alabama Clean Waters Initiative** – Includes such actions as the Alabama Clean Boating Act, the Clean Boating and the Clean Vessel Act dealing with vessel sewage disposal. <http://www.outdooralabama.com/boating/clean-waters/>

2. **Coastal Clean Up** – A part of the International Coastal Cleanup designed to not only remove but document every piece of litter (marine debris) found on a shoreline. In Alabama it is a project of ADCNR SLD and Alabama PALS just celebrating its 25th year, and now the largest volunteer event in the state. <http://www.alcoastalcleanup.com/>

3. **Natural Resource Damage Assessment** - The Oil Pollution Act authorizes the natural resource trustees (federal agencies, states, and Indian tribes) to conduct impact assessments of oil spills, ship groundings, and hazardous substance releases on natural resources. Scientists work together to identify potential injuries to natural resources and lost public uses resulting from the spill.
<http://www.gulfspillrestoration.noaa.gov/assessment/>
4. **Living Shorelines** – A program that uses living plant material, oyster shells, earthen material, or a combination of natural structures with riprap or offshore breakwaters to protect property from erosion. The result of wind, water, and wave action, erosion results in loss of residential and commercial property, reduction of storm buffering capacity, aquatic and terrestrial habitat loss, increased suspended solids and water quality degradation. <http://www.masgc.org/page.asp?id=235>
5. **100-1000 Restore Coastal Alabama** – An example of a living shorelines effort, 100-1000 is an effort to build 100 miles of oyster reefs along the state’s coastline which will assist in setting up the conditions needed to plant, support and promote more than 1000 acres of coastal marsh and seagrass. Not only will it help replenish needed habitat but will also help reduce wave energy and decrease erosion, stabilize sediments and decrease turbidity. <http://100-1000.org/>
6. **SAV restoration** – The areal extent of seagrass meadows has declined globally during the last several decades, with major losses of seagrasses reported along the Atlantic and Gulf coasts of the United States. The positive correlation between the area covered by seagrass and the production of valuable finfish and shellfish has led to a large number of studies designed to elucidate the causes of seagrass declines. Worldwide, the destruction and the loss of critical seagrass habitat are being attributed to both natural and human-induced disturbances. In many cases, deteriorating water quality, especially resulting from excessive nutrient inputs and turbid runoff, has been associated with seagrass loss. Reversing seagrass loss in these cases usually requires large scale changes in land use and water treatment.
<http://marineecologylab.disl.org/projects.htm>
<http://masgc.org/pdf/masgp/07-011-01.pdf>

Local, State, And Federal Regulations And Policies, Technical Training

1. **Weeks Bay and Grand Bay NERRs** – The research reserves provide technical training on issues such as stormwater best management practices and nonpoint source pollution prevention
2. **Alabama Cooperative Extension programs-** <http://www.aces.edu/forestry-nature/water-resources/>
3. **ADEM Water Quality Program** – Administers programs for protecting water quality (Alabama designated uses and water quality standards are codified [ADEM Admin. Code r. 335-6 – April 3, 2012](#)), reporting water quality conditions to congress, listing impaired waters, developing total maximum daily loads (TMDLs) for impaired waters, developing waste load allocations, and water quality planning, monitoring, and modeling (<http://www.adem.state.al.us/programs/water/waterquality.cnt>)
4. **ADEM Environmental Regulations Division 6 and 8** - Projects having the potential to impact Alabama's coastal resources are subject to review pursuant to ADEM's Coastal Rules. Such programs include: Construction on Gulf-fronting properties, Commercial and residential development on properties greater than 5 acres, projects impacting wetlands and/or water bottoms, construction of new, or expansion of existing marinas, installation of groundwater wells with a capacity greater than 50 gallons per minute (GPM), siting, construction and operation of energy facilities, shoreline stabilization projects and discharges to coastal waters.
<http://adem.alabama.gov/programs/coastal/coastalPermitting.cnt>

5. **ADEM MS-4 rules** – Sets forth authorization of discharges of storm water from small municipal separate storm sewer systems (MS4s). <http://www.adem.alabama.gov/programs/water/municipal.cnt>
6. **National Pollutant Discharge Elimination System (NPDES) Program** –Regulations for the implementation and control of erosion and sedimentation following Construction Best Management Practices associated with regulated construction sites.
<http://www.adem.state.al.us/programs/water/permitting.cnt>
7. **USACE Nationwide permits** - <http://www.sam.usace.army.mil/rd/reg/nwp.htm>
8. **USACE Section 404 fill permits** – Dealing with the filling of wetlands.
<http://www.sam.usace.army.mil/rd/reg/section404.htm>
9. **Clean Water Act (CWA)** – Provides the legal structure for regulating pollutants discharged to the waters of the United States and for regulating quality standards for surface waters.
<http://www.epa.gov/lawsregs/laws/cwa.html>
10. **CWA Section 10** – Navigable Waters - Section 1502(10) of Title 33) – Dealing with control of water resources, submerged lands, or navigable waters.
<http://coastalmanagement.noaa.gov/about/czma.html>
11. **CWA Section 319** – Provides assistance for local and state nonpoint source management efforts
<http://water.epa.gov/polwaste/nps/cwact.cfm>
12. **CWA Section 6217** - Under Section 6217, all states with approved coastal zone management programs must develop a Coastal Nonpoint Program to control polluted runoff to coastal waters.
<http://coastalmanagement.noaa.gov/initiatives/legislation.html>
13. **USDA NRCS Programs** – Implement policies and incentive programs to improve water quality
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/>
14. **Clean Air Act** – Provides the legal structure for regulating air emissions from stationary and mobile sources. <http://www.epa.gov/lawsregs/laws/caa.html>

Volunteer Programs, Outreach, Education

1. **Alabama Coastal Foundation** – A non-profit organization working to improve and protect Alabama’s coastal environment through cooperation, education and participation. <http://joinacf.org/>
2. **Alabama Water Watch** – Part of [Global Water Watch](#), AWW is a citizen volunteer, water quality monitoring program covering all of the major river basins in Alabama.
<http://www.alabamawaterwatch.org/>
3. **Dog River Clearwater Revival (DRCR)** - A non-profit group of property owners, recreational boaters, fishermen, businesses, non-profit environmental organizations and citizens who focus is on the water quality of the Dog River Watershed. <http://www.dogriver.org/about-us.html>
4. **Little Lagoon Preservation Society**- <http://littleglagoon.org/>
5. **Mobile Baykeeper** - A nonprofit environmental organization whose focus is Clean Air and Clean Water in the Mobile Bay Watershed. <http://www.mobilebaykeeper.org/>

6. **Wolf Bay Watershed Watch (WBWW)** - A grassroots citizen's advocacy organization whose mission is to protect and preserve the natural resources of Baldwin County's Wolf Bay Watershed. Several members are volunteer water quality monitors. <http://www.wolfbaywatch.org/>
7. **Alabama Forestry Commission's Treasure Forest** –A voluntary program sponsored by the Alabama Natural Resources Council that encourages landowners to implement sound and sustainable, multiple-use forest management practices, using their forests wisely to meet their own needs while at the same time protecting and enhancing the environment. http://www.forestry.state.al.us/treasure_forest.aspx
8. **Baldwin County Grasses in Classes Program** - Coordinates and sustains a network of teachers, students, restoration specialists, and other community members to plan and implement restoration of coastal environments in Baldwin County, Alabama. <http://www.outdooralabama.com/publiclands/stateLands/WeeksBay/Weeks%20Bay/Grasses%20In%20Classes/>
9. **Dauphin Island Sea Lab** – The State of Alabama's premier marine science education and research facility. The DISL Estuarium, the only public coastal aquarium in the state, is also located on the campus on the east end of the barrier island. <http://www.disl.org/>
10. **Volunteer Field Observer (VFOB)** –Developed in response to the Deep Horizon Oil Spill as a means to document changes that may occur along Alabama shorelines as a result of the accident, the program uses volunteers to regularly assess estuarine shorelines. <http://saveourgulf.org/>
11. **Alabama Coastal Counties Environmental Handbook** – A directory of federal, state and local agencies focusing on natural resource conservation and management. <http://co.baldwin.al.us/uploads/Coastal%20Counties%20Environmental%20Handbook.pdf>

Weaknesses/Threats

What stresses are currently putting negative pressure on the long-term viability of this value?

Atmospheric deposition (e.g. nutrients and mercury)- In 1977, U.S. State Agricultural Experiment Stations (SAES) organized a project, later titled the National Atmospheric Deposition Program (NADP), to measure atmospheric deposition and study its effects on the environment. <http://nadp.sws.uiuc.edu/>

Invasive Species- The State of Alabama has a plan for managing aquatic nuisance species but it has not been adopted.

http://www.mobilebaynep.com/images/uploads/library/FINALDRAFTALANS0107_workcopy_reduced.pdf

Water quantity issues associated with water withdrawals, drainage, and stormwater

Rising sea surface temperatures

Ocean acidification

Waste water treatment overflows

Point and nonpoint source pollutant discharge

Wildlife- Wildlife populations can pose a variety of problems to managers of public water supplies. Further, new federal and state regulations governing the management and protection of drinking water supplies require greater consideration and mitigation of these problems.

<http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1021&context=ewdcc6>

Waterfront Development/land use changes – (urbanization and sub-urbanization) While development is needed to keep a community viable, there has to be a balance reached between anthropogenic development and protection of the environment. It is estimated that by 2025 the coastal population of Alabama will increase nearly 90 percent. Pg. 5 and 6 <http://www.mobilebaynep.com/images/uploads/library/State-of-Mobile-Bay-Final.pdf>

Sedimentation, Stormwater Polluted Runoff - Stormwater runoff cause increasing impervious surfaces like pavement and rooftops causes flooding and erosion and carries pollutants like dirt, clay, oil, chemicals, pet waste, and fertilizers into our streams, rivers, and bays without any kind of treatment or purification. *It* causes a typical city block to produce more than five times as much runoff as a woodland area of the same size *rather than* allowing it to seep, or infiltrate, into the ground.
<http://www.mobilebaynep.com/stormwater1/>

Filling of Wetlands – Is another result of increased development. <http://www.outdooralabama.com/public-lands/stateLands/landsCoastal/309%20Assessment%202006%20Final.pdf>

Agriculture - A continuing prime source of nonpoint source pollution in area waterways.
<http://www.outdooralabama.com/research-mgmt/cwcs/Chapter3.pdf>
http://www.outdooralabama.com/images/File/Weeks_Bay/WBWPManagementPlan.pdf

Golf Courses/Groundwater withdrawals -
http://www.outdooralabama.com/images/File/Weeks_Bay/TNC.gulfrestoration.pdf

Marine debris – Defined as any man-made object that has somehow found its way into a coastal or marine environment. Last year along Alabama coasts, volunteers removed some 1,448,488 pounds of marine debris. This global problem affects the economy, environment, navigation, fishing, health and safety.
<http://marinedebris.noaa.gov/>

Dirt Roads – Run off from unpaved roads attributes to increased sediment contamination in the Mobile Bay Watershed.

Storms – As ocean temperatures raise so does the intensity of hurricanes, according to many scientists. Regardless of the cause, stronger storms result in significant erosion of beaches, intertidal marshes and many associated ecosystems. <http://www.gfdl.noaa.gov/global-warming-and-hurricanes>

HABs, appear to be occurring more often. The increased frequency of HABs is a major concern; these events can make people sick when contaminated shellfish are eaten or when people breathe toxic air sprayed from a beach with a harmful algal bloom. HAB events can result in the closure of beaches and shellfish beds, massive fish kills, death of marine mammals and seabirds, and alteration of marine habitats. This hurts commercial and recreational fishing, tourism, and valued habitats, which are important local economies and the livelihood of coastal residents.
http://www.gulfofmexicoalliance.org/pdfs/GOMA_2012_All_Hands/PITS/All%20Hands%20WQ%20PIT%20Presentation%20v1%202012.pdf

Technological disasters – Defined as any disaster partially or wholly caused by human error, intent or negligence resulting in significant injury or death. An example along the Alabama coast would be the Deep Water Horizon oil spill of 2010. <http://www.emdat.be/technological-disasters-trends>

Sea Level Rise – Projections are that the rise will be around 20 cm in the next 50 years (LA Coastal Wetlands Conservation and Restoration Task Force 1998). The influx of salt water is most likely to affect species and communities that require brackish to fresh water and these communities are already at risk from many other stresses. In many places, however, the rates of coastal subsidence are several times greater than the rate of sea level rise; that is, the problem of land sinking is greater than the problem of sea rising.
http://www.outdooralabama.com/images/File/Weeks_Bay/TNC.gulfrestoration.pdf

Lack of stable funding sources undermines ability to consistently address needs