

Volume 1 of 3
April, 2002

COMPREHENSIVE CONSERVATION AND MANAGEMENT PLAN

Mobile Bay National Estuary Program



A CALL TO ACTION

*An overview of the priority environmental
issues affecting the Mobile Bay estuary*



OFFICE OF THE GOVERNOR

DON SIEGELMAN
GOVERNOR



STATE OF ALABAMA

September 10, 2001

STATE CAPITOL
600 DEXTER AVENUE, ROOM N-104
MONTGOMERY, ALABAMA 36130

(334) 242-7100
FAX: (334) 242-0937

The Honorable Christine Todd Whitman
Administrator
U.S. Environmental Protection Agency
1101 A - U.S. EPA Headquarters
Post Office Box 529
Washington, D.C. 20004-2403

Dear Ms. Whitman:

On behalf of all Alabamians and the Mobile Bay National Estuary Program, I am pleased to submit for your consideration the Mobile Bay Comprehensive Conservation and Management Plan. This plan meets the requirements of Section 320 of the Clean Water Act of 1987, as amended, and was developed and endorsed by a Management Conference of citizens, elected officials, business and industry representatives, commercial and recreational resource users and managers. It is intended to help protect and improve the Mobile Bay estuary and balance the human activities that affect it.

This plan was reviewed by Alabama's state and regional agencies and has been determined to be consistent with the state of Alabama's Coastal Zone Management Program. The CCMP met the requirements of Alabama's approved public participation procedures required under Section 306 (d) (14) of the Coastal Zone Management Act. These procedures require all federal actions affecting Alabama's Coastal Zone to be reviewed through the South Alabama Regional Planning Commission as a state clearinghouse and vehicle for public participation. Further, the plan was offered for public comment throughout the MBNEP study area in Baldwin and Mobile counties and was the subject of 13 separate, advertised public meetings.

The Mobile Bay estuary is truly "Alabama's Bay." Its watershed encompasses two-thirds of the state (more than 43,600 square miles). The bay has a major impact on our economy and quality of life. Inclusion of Mobile Bay in the National Estuary Program in 1995 provided a means of focusing and coordinating our actions to protect and preserve the important ecological values of the estuary and its watershed.

I appreciate the Environmental Protection Agency's recognition of the national significance of the Mobile Bay estuary and your continued support for this important environmental partnership.

Sincerely,

Don Siegelman
Governor

DS/me/ke

Enclosures

cc: Mr. Riley Boykin Smith
Ms. Beverly Banister
Mr. James K. Lyons
Mr. Robert B. Howard
Mr. Greg Coliani

A CALL TO ACTION



April 2002

Comprehensive Conservation and Management Plan (CCMP) of the Mobile Bay National Estuary Program

Within this and two companion volumes, you will find the culmination of several years of work by a vast array of area stakeholders to systematically characterize the health of the Mobile Bay estuary, and develop a long-term strategy for conserving and improving the estuary.

The CCMP is divided into three distinct volumes, as follows:

Volume 1 – A Call to Action contains a brief overview of the U.S. Environmental Protection Agency's National Estuary Program (NEP) process, as well as discussion of the priority environmental issues affecting the Mobile Bay Estuary. This volume summarizes scientific characterization studies about the health of the estuary (published separately and inventoried in Volume 3) that have been completed by the Mobile Bay NEP and its contractors. In addition, this volume of the CCMP introduces actions designed by the Mobile Bay NEP Management Conference to address those priority issues deemed to negatively impact the estuary. Finally, the document highlights future opportunities for citizen feedback on this draft, as well as opportunities to help implement the actions within it.

Volume 2 – The Path to Success is a technical reference that contains the complete preliminary Action Plans for restoring and maintaining the Mobile Bay Estuary as developed by the Mobile Bay NEP. Specifically, this document identifies each action, the recommended steps for their implementation, the needed investment, and recommendations on parties responsible for the implementation of each action.

Volume 3 – Working Together contains information about the management structure of the Mobile Bay NEP, members of its program staff and Committees, supporting organizations that have contributed to the process, as well as documentation required by the Environmental Protection Agency. An appendix to the CCMP, this volume contains an inventory of the partners involved in the Mobile Bay NEP process, as well as information about funding mechanisms, monitoring strategies, and a summary of public involvement to date.

We are grateful for the tremendous efforts of the past and encourage a renewed interest and enthusiasm for the full support of a final CCMP for the Mobile Bay Estuary. It is only by working together that this outstanding resource will be maintained for future generations.

– The Mobile Bay National Estuary Program Management Conference

The Mobile Bay National Estuary Program
4172 Commanders Drive
Mobile, AL 36615
Phone: 251/431-6409
Fax: 251/431-6450
www.mobilebaynep.com

**The Mobile Bay National Estuary Program
CCMP, Volumes 1-3, was compiled and
edited by:
Mary Mullins and Hank Burch,
Lewis Communications' Division of
Environmental Public Affairs;
Michael Dardeau, Dauphin Island Sea Lab;
and Dr. Diana Sturm, Mobile Bay NEP.**

A CALL TO ACTION



Table of Contents



The National Estuary Program Process	2
About the Mobile Bay NEP	3
The Mobile Bay Estuary Physical Description.	5
Introduction to the Priority Issues	7
Water Quality.....	8
Water Resources Management Strategy	9
Nutrients	10
Pathogens.....	11
Toxic Chemicals.....	12
Living Resources	13
Status and Trends Needs	14
Exotic Species.....	15
Commercial and Recreational Fisheries.....	16
Habitat Management.....	17
Habitat Preservation.....	18
Submerged Aquatic Vegetation (SAV)	19
Coastal Wetlands.....	20
Natural Shorelines, Beaches and Dunes	21
Nesting Habitat.....	22
Human Uses.....	23
Sustainable Land Use Planning	24
Hydrologic Modification	25
Public Access.....	27
Education and Public Involvement	28
Public Awareness.....	28
Public Participation and Monitoring.....	29
Overview of Action Plans.....	30
Next Steps – Draft CCMP Approval and Implementation.....	38
Local Community Initiatives.....	38
Implementation.....	39



The NEP Process

The National Estuary Program (NEP) was established by the United States Congress under Section 320, an amendment of the Clean Water Act of 1987. Recognizing the importance of our nation's estuarine environments, as well as the inherent and growing threats to these fragile ecosystems, the Act authorizes the Administrator of the U.S. Environmental Protection Agency (EPA) to convene a Management Conference over any estuary of national significance that is potentially threatened by pollution, development, or overuse. Once convened, the Management Conference, which generally represents all stakeholders of the estuary, works to assess the current threats to the estuary and to develop a consensus-based Comprehensive Conservation and Management Plan (CCMP). The CCMP specifically addresses the priority environmental issues affecting the environmental health of the estuary. Once the plan is developed and approved by all stakeholders, the actions within are implemented and success is monitored.

As can be expected, finding consensus among individuals, organizations, and agencies with potentially conflicting interests in an estuary can be very challenging. However, this is also the greatest reward of the

NEP process, as consensus is the only way to effectively develop a sustainable, long range management strategy for the estuary. This process also maximizes coordination among resource management agencies, while minimizing overlap and duplication of efforts.

STEPS OF AN NEP

There are four basic phases to a National Estuary Program:

- **PLANNING** – Building a management and decision-making framework
- **CHARACTERIZATION** – Identifying the priority environmental issues of the estuary, including status and trends of environmental indicators, and probable causes of degradation
- **MANAGEMENT PLAN DEVELOPMENT** – Identifying specific strategies and actions for addressing known problems
- **IMPLEMENTATION** – Carrying out the action items in order to solve existing problems

It is important to note that National Estuary Programs hold no regulatory authority. Instead, the actions of any CCMP are designed to be implemented by the appropriate, committed entity, which may or may not have regulatory authority. A National Estuary Program, serves as an umbrella organization to pull together the key stakeholders who will guide the development and implementation of its CCMP. In essence, a National Estuary Program allows local communities to take responsibility for the future of their own estuaries.

The mission of any NEP – and of the Mobile Bay NEP in particular – is to establish and oversee a process for improving and protecting the Estuary's water quality, while also maintaining the integrity of the whole system -- its chemical, physical, and biological properties, as well as its economic, recreational, and aesthetic values. To date, 29 National Estuary Programs have been formed in the United States.

About the Mobile Bay NEP



Recognizing the importance of the Mobile Bay Estuary and the threats posed to its health by local growth and development, a team of investigators, led by the South Alabama Regional Planning Commission (SARPC), developed a nomination package for Mobile Bay's inclusion in the National Estuary Program (NEP). Alabama Governor Fob James, Jr. then submitted the nomination package for consideration by the U.S. Environmental Protection Agency in March, 1995. In September of that same year, EPA Administrator Carol Browner, having concurred with the justification provided within the nomination package, convened a Management Conference and the Mobile Bay National Estuary Program was created.

The Management Conference of the Mobile Bay NEP consists of a Policy Committee, a Management Committee, and a Community Advisory Committee. The Policy Committee, which is composed of

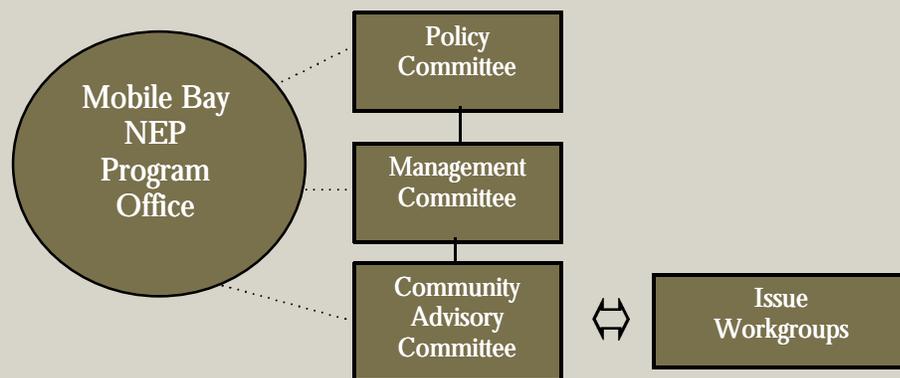
leading representatives of local, state and federal governmental agencies, is responsible for setting direction and policy for the NEP. The Management Committee, composed of a wide-reaching range of citizen and agency stakeholders, is responsible for overseeing routine operation of the NEP. The Community Advisory Committee is comprised of a Technical Advisory Committee (TAC) and a Citizens Advisory Committee (CAC). The Community Advisory Committee provides an open door for program technical support as well as a forum for public involvement.

The Management Conference began gathering information about the estuary in a series of community meetings held in 1995 and 1996 (inventoried in Volume 3 of this series). These meetings resulted in the identification of the following goal for the Mobile Bay NEP:

Mobile Bay NEP GOAL

To promote wise stewardship of the water quality characteristics and living resource base of the Mobile Bay estuarine system.

Schematic of the Mobile Bay NEP Management Conference



In order to achieve this goal, the Management Conference identified five priority issue areas that would become the focus of the NEP's efforts: Water Quality, Living Resources, Habitat Management, Human Uses, and Education & Public Involvement. Separate stakeholder workgroups, made up of Management Conference members, key stakeholders, and citizens, were established to guide work on each priority issue area.

Once priority issue areas were identified, the Management Conference solicited independent characterization studies to assess the status and trends of key environmental indicators, and to provide recommendations regarding issues to be addressed by the NEP. Working under the premise that "the past holds the key to the future," the characterization studies were designed to compile all existing data within a priority issue area. The characterization studies also identified the scope of work of local, state, and federal agencies with regard to specific resources. Another key reason for the characterization studies was to determine areas where existing data are inadequate and to make recommendations for filling those voids.

Based on community input and the recommendations in the characterization studies, issue workgroups began compiling specific actions for improving the Mobile Bay Estuary. These preliminary action items have evolved to become the essence of the CCMP.

It is important to note that the characterization studies were only the beginning of the Mobile Bay NEP's tasks. Another essential component of any NEP Program is public education and outreach. Throughout its existence, Management Conference members and Mobile Bay NEP program office staff have focused efforts on providing the public with factual information about the estuary, while also providing numerous opportunities for citizen involvement in the development of the CCMP. (These opportunities are inventoried in Volume 3 of this series.)

The collection of documents that make up the CCMP represents the cumulative efforts of hundreds of volunteers providing thousands of hours of service to the Mobile Bay National Estuary Program. The greatest reward for these efforts will be the successful implementation of the recommendations within this document. In many respects, the work has only just begun.

Milestones of the Mobile Bay NEP

March, 1995	Alabama Governor Fob James, Jr. submits a nomination package to the Administrator of the Environmental Protection Agency, recommending that the Mobile Bay estuary be included in the National Estuary Program.
September, 1995	EPA Administrator Carol M. Browner announces the establishment of the Mobile Bay National Estuary Program.
July, 1996	The Mobile Bay NEP Policy Committee approves the Management Conference Agreement, outlining the roles and commitments of Management Conference participants in developing a CCMP.
February, 1998	Report, "Final report and recommendations on data and information management systems," submitted to the Mobile Bay NEP for public comment and review.
June, 1998	Preliminary characterization of water quality of the Mobile Bay estuary is submitted to the Mobile Bay NEP for public comment and review.
December, 1998	Preliminary characterization of habitat loss within the Mobile Bay estuary is submitted to the Mobile Bay NEP for public comment and review.
June, 1999	Preliminary characterization of human uses of the Mobile Bay estuary is submitted to the Mobile Bay NEP for public comment and review.
June, 1999	Report, "Toward valuation of the Mobile Bay," completed and submitted for public comment and review.
July, 1999	Preliminary characterization of the living resources of the Mobile Bay estuary is submitted to the Mobile Bay NEP for public comment and review.
August, 1999	<i>Our Water, Our Future</i> , a reader-friendly summary of the characterization studies, which highlights the priority environmental issues of the Mobile Bay estuary, is published for community stakeholders.
August, 2000	Draft preliminary strategy for monitoring success of future NEP actions is submitted to the Management Conference for review.
March, 2001	Draft CCMP is released to the public for comment.
April-June, 2001	Draft CCMP to receive official review and public comment through series of Local Community Initiatives (LCIs).
September, 2001	Final draft CCMP to be approved by Alabama Governor and U.S. EPA.

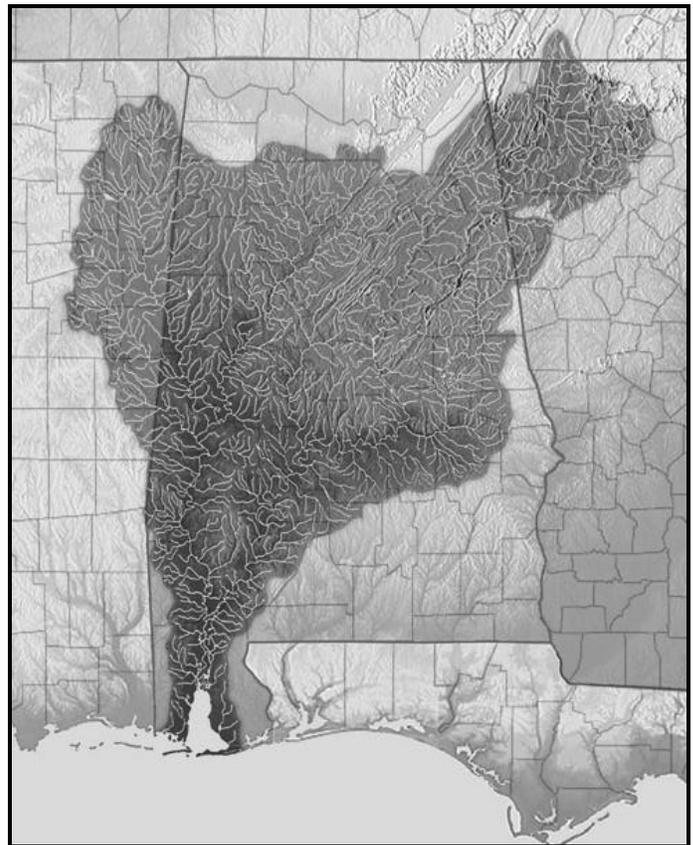
The Mobile Bay Estuary Physical Description



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

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

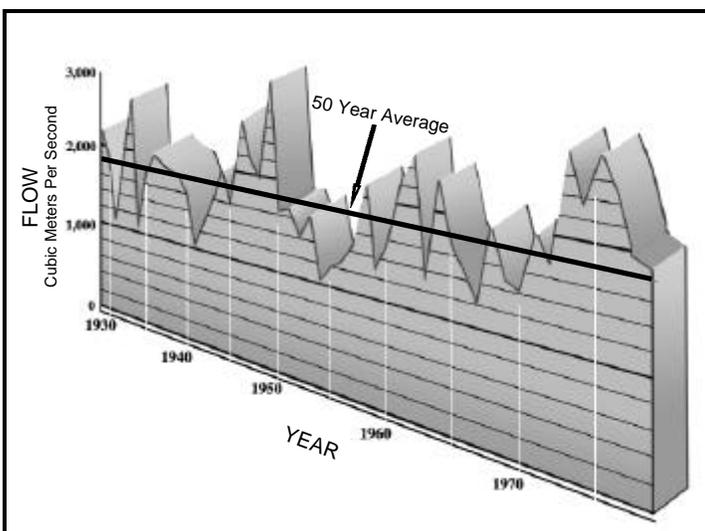
When the Mobile Bay NEP was first established, the Management Conference chose to limit the Program’s management focus to just the portions of the Mobile Bay watershed that lie within Baldwin and Mobile Counties. Specifically, the program boundary includes the portions



The Mobile Bay Watershed

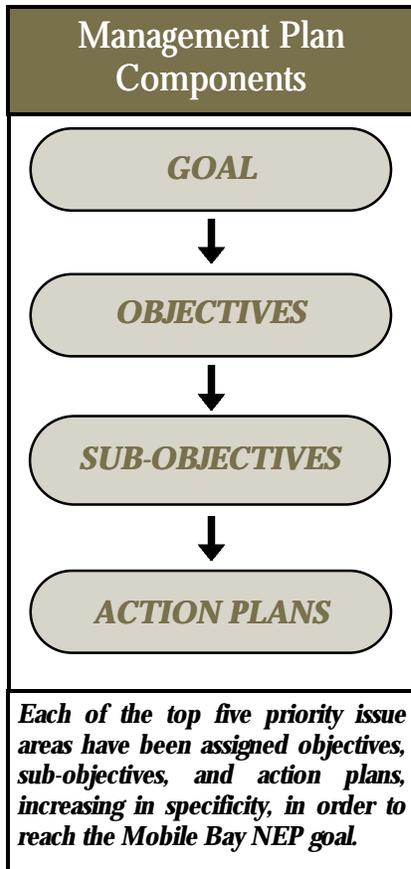
of the two counties that drain into Mobile Bay, as well as the Mississippi Sound westward to the Alabama-Mississippi state line, and the Alabama state marine waters in the north-central Gulf of Mexico, extending three miles south of Dauphin Island and the Fort Morgan peninsula. The northern boundary does not represent any biological or geophysical lines of distinction. From the beginning, however, the Mobile Bay NEP has been cognizant of the role that the rest of the much larger Mobile Basin plays in management decisions within the NEP study area. For example, the northern reaches of the larger watershed area contribute directly to the volume of freshwater that enters the estuary, which, in turn, affects the salinity dynamics of Mobile Bay.

Water runs downhill, and a raindrop that falls in northwest Georgia can, theoretically, eventually enter Mobile Bay, which sits at the bottom of that “hill.” During periods of intense regional rainfall, a large volume of water can enter Mobile Bay at once, carrying



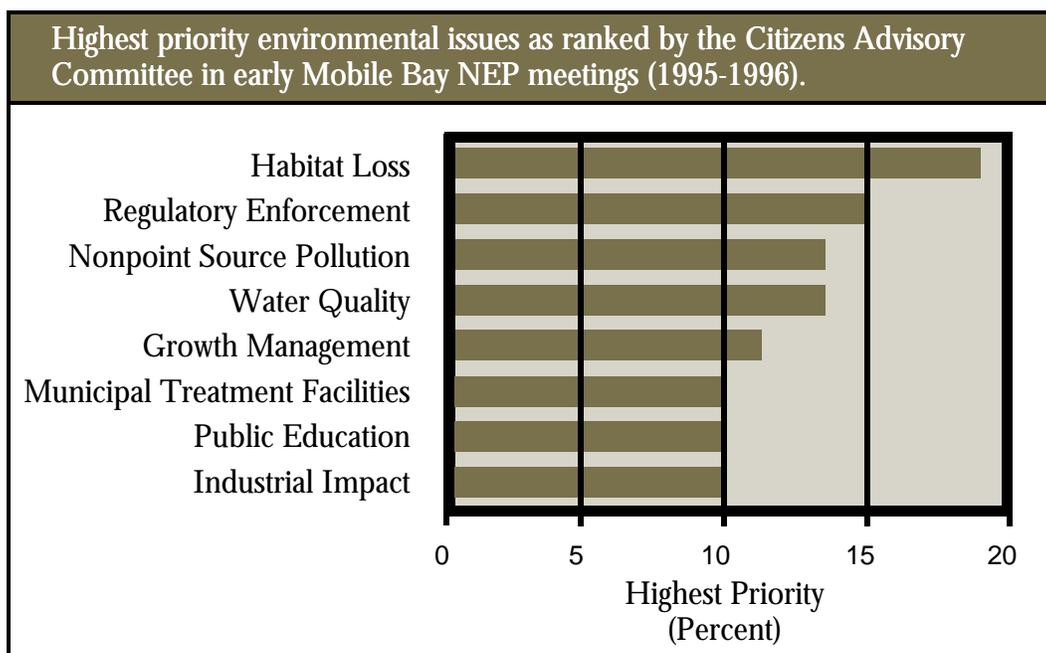
Mobile River System Discharge

Introduction to the Priority Issues



The first step in managing any natural resource is to understand its current status and to identify any existing threats to that resource. The Mobile Bay NEP Management Conference undertook a two-pronged approach to identify priority issue areas by 1) collecting existing research and 2) gathering public opinion. After several public meetings held in 1995 and 1996, key consensus issues emerged. Eventually, five priority issues were identified: Water Quality; Living Resources; Habitat Management; Human Uses; and Education and Public Involvement.

With priority issue areas identified, the Mobile Bay NEP then contracted with various technical experts to develop characterization reports on each of these topics. Specifically, the characterizations were designed to collect and summarize all existing data on each of these topics, identify the existing management framework at the local, state, and federal levels, and identify future management and research needs. This section will summarize each priority issue area and the major findings of those characterization reports.



Water Quality

Water quality is a central issue of any National Estuary Program since so many other issue areas depend upon, or are affected by water quality. According to the National Oceanic and Atmospheric Administration (NOAA), 1990 census data show that 60% of the U.S. population lives within 50 miles of the coast. If water quality diminishes, so, too, does the living resource base and the quality of life residents expect in coastal areas. Without a doubt, if we are to maintain or improve the Mobile Bay estuary, we must begin by managing for sustainable water quality.

Finding the “bottom line” on water quality – as well as the precise causes for its changes – is difficult at best. Water quality is the result of a complex, interactive and dynamic combination of physical, chemical, and biological properties, each of which is affected by both natural and man-made processes. Characterizing water quality in a dynamic estuary, such as Mobile Bay, presents an even more complex challenge.

Physical properties that affect water quality include water clarity, temperature, depth, sediment load, and hydrology. Chemical properties include dissolved oxygen levels, nutrient levels, salinity, and concentrations of organic chemicals, metals, and other toxics. Biological properties include all life forms present in the water, including bacteria, plankton, aquatic vegetation, benthic invertebrates, amphibians, and fish. Taken collectively, these variables comprise a complex, fragile, and dynamic ecosystem in our estuary. If any single property becomes impaired, water quality can diminish.

The Management Conference of the Mobile Bay NEP has adopted the following objective for water quality in the Mobile Bay Estuary:

Attain and/or maintain water quality sufficient to support healthy aquatic communities and designated human uses by 2010.

**Water
Quality
OBJECTIVE**

To achieve this objective, the Conference has identified four components of water quality that must be addressed:

- Development of a Water Resources Management Strategy for the estuary;
- Nutrients;
- Pathogens; and
- Toxic Chemicals.



Maintaining water quality is not only essential to an estuary's health, but also to quality of life.

Throughout the development of the water quality characterization, investigators found inherent weaknesses in the amount and quality of existing data on water quality. Generally, the shortcomings are due to temporal or spatial inconsistencies in data collection, and to the absence of long-term, comprehensive monitoring data. Even our best effort to track the health of the Bay – the Alabama Department of Environmental Management’s (ADEM) contribution to EPA’s **Biennial 305(b) Water Quality Report to Congress** – is complex and sometimes subject to interpretation.

Responding to requirements of the 1972 Clean Water Act, ADEM continues to submit the 303(d) list of impaired state waters to EPA. Several water bodies in the

At a Glance...

WATER RESOURCES MANAGEMENT STRATEGY

Issue: Inadequate comprehensive modeling of water quality with regard to point and nonpoint source loadings.

Probable Causes: Past research has focused on limited areas and time parameters.

Probable Impacts: Uncertainty with regard to best management of existing and future loadings; and incomplete baseline data.

Possible Solutions: Develop a comprehensive water quality model for the estuary that incorporates all known point and nonpoint source loadings of nutrients, toxics, pathogens, and sediment; and incorporate other related strategies as developed under nutrients, pathogens and toxic chemicals sub-objectives.

Aquatic science and fisheries publications, by estuary, for the period 1985-1995:

ESTUARY	PUBLICATIONS
Chesapeake Bay	1893
San Francisco	512
Narragansett Bay	296
Delaware Bay	253
Long Island Sound	245
Tampa Bay	167
Mobile Bay	82

More Data Needed: According to a 1995 survey by Dauphin Island Sea Lab researchers, the Mobile Bay Estuary falls behind in terms of research generated about the estuary. A first step of the CCMP will be to fill the gaps where data are insufficient.

Mobile Bay NEP area are on this list, which requires that total maximum daily load (TMDL) assessments be prepared for the impaired waters. In order to help address the TMDL needs of the 303(d) list and to provide better overall understanding of water quality throughout the Mobile Bay Estuary, the Water Quality Workgroup established a sub-objective aimed at developing a comprehensive, loadings-based water quality model for the entire Mobile Bay NEP study area. It is important to note that a comprehensive loadings model is a major undertaking and will take several years to develop. However, in addition to the comprehensive loadings model and prior to its full development, there are resource management strategies that can fulfill some of these needs.

Recognizing the limitations in existing water resources data, the Water Quality Workgroup established the following sub-objective to guide collection of future data:

Water Quality SUB-OBJECTIVE

Develop allowable water quality-based loadings sufficient to maintain water quality standards (or total maximum daily loads, where required) for pathogens, nutrients, toxic chemicals, and other conventional pollutants, for Mobile Bay and sub-basins, by the year 2003, and incorporate them into appropriate resource management strategies by the year 2008 (beginning in 2004).

Nutrients

Estuaries are naturally nutrient-rich habitats. In fact, the naturally high nutrient levels in estuaries are one of the reasons these special bodies of water are so productive. But it would be unwise to assume that “more is always better.” In fact, it is possible to get too much of a good thing, particularly regarding nutrient loads in estuaries.

The natural balance of life-giving nutrients can be dramatically upset by man-made contributions from fertilizer runoff (from farms and suburban lawns), urban stormwater runoff, municipal sewage treatment overflows, industrial discharges, and failing septic tanks, among other sources.

The primary impact of excessive nutrient loading in estuaries is eutrophication – literally, the over-nourishing of aquatic plants – that can literally choke the life out of the estuary. Eutrophication can result in widespread algal blooms and increased phytoplankton production in the water. These algal blooms can literally clog a waterway, negatively impacting water clarity, flow properties, estuarine productivity, and even recreational enjoyment. If nutrient enrichment persists, aerobic plant and animal biomass literally explodes, leading to increased demands on the dissolved oxygen in the water, particularly at night. In an estuarine system, the interaction between nutrients and dissolved oxygen becomes more challenging and dynamic because of the stratification of salt and fresh waters, which can lead to periods where salty bottom waters become even more stagnant and oxygen deprived. In worst case scenarios, dissolved oxygen levels plummet, stressing marine life. Bottom dwelling, stationary marine organisms, such as oysters, are particularly at risk of mortality from oxygen deprivation.

Key indicators of nutrient loading levels are the measures of microscopic algal biomass, the plant pigment chlorophyll-a, the dissolved oxygen levels in the middle and bottom waters, and levels of mineral and organic nutrients. Overall, enough data exist to provide a general profile of nutrients in the Mobile Bay Estuary and the news is mixed. ADEM rated the estuary “good to fair” in terms of nutrient levels, based upon data col-

lected between 1993 and 1995. And, in 1999, Dauphin Island Sea Lab researchers showed that nutrient levels in Mobile Bay are well within the range of values collected at nine other Gulf of Mexico estuaries.

At a Glance...

NUTRIENTS

Issue: Nutrient and organic matter loading of area waterways.

Probable Causes: Urban runoff; agricultural runoff; faulty septic systems; sewage and wastewater treatment systems; wetland loss; and natural sources.

Probable Impacts: Eutrophication; algal blooms; reduced clarity; reduced navigability; anoxic conditions; changes in species composition and population; and mortality of bottom dwelling organisms.

Possible Solutions: Reduce nutrient loads; and use Best Management Practices (BMPs).

Nevertheless, low dissolved oxygen levels for a large portion of the Bay indicate that this issue is of key concern. Data collected between 1993-1995 show that over 55% of Mobile Bay had bottom dissolved oxygen levels below 4 mg/l, and 30% showed levels below 2 mg/l, both representing substandard conditions. In addition, portions of the following rivers do not fully support their current or proposed water use classifications because of nutrient enrichment and/or low dissolved oxygen: Fowl River, Dog River, Lower Mobile River, Chickasaw Creek, Three Mile Creek, and Tensaw River.

The Water Quality Workgroup has developed the following sub-objective regarding nutrients in the Mobile Bay Estuary:

Reduce nutrient loads in identified, problem sub-basins by 2006, with increased management of both nonpoint and point source nutrient loads in other Mobile Bay NEP sub-basins or from the Mobile River drainage basin as a whole (by supporting efforts of others with jurisdictional authority), until levels are established based on allowable loadings or total maximum daily loads.

**Water
Quality
SUB-OBJECTIVE**

Pathogens

Pathogens are viruses, bacteria, and protozoans that can cause illness or disease in plants and animals, including humans. The presence of pathogens poses the greatest threat to humans when we swim in, or consume shellfish from, contaminated bodies of water. Pathogens commonly found in water can cause such illnesses as gastroenteritis, salmonellosis, hepatitis A, shigella, and cholera. Some pathogens occur naturally in the aquatic system, while many others are directly linked to man's presence.

Potential sources of pathogens include: marine waste from ballast discharges, marine waste from commercial and recreational vessels, municipal sewage treatment

efforts focus largely on commercially important shellfishing areas. ADEM uses fecal coliform bacteria levels as the standard indicator for determining pathogen contamination and has defined acceptable levels of fecal coliform contamination in all waters, with tougher restrictions placed on swimming and shellfishing areas.

At a Glance...

PATHOGENS

Issue: Pathogen contamination of area waterways.

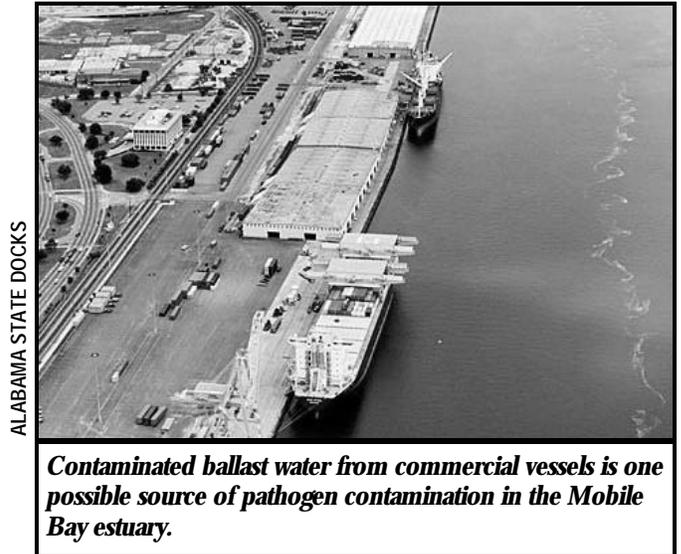
Probable Causes: Ballast water; onsite sewage disposal (septic systems); sewage and wastewater treatment systems; agricultural runoff (particularly from CAFOs); urban runoff; and natural sources.

Probable Impacts: Adverse health effects, shellfish contamination; and closure of shellfishing waters.

Possible Solutions: Ballast water exchange programs; reduction of point source discharges; public outreach; increased pathogen monitoring; BMPs; and reduction of nonpoint source inputs.

facility discharges and overflows, private wastewater treatment system discharges, illegal waste disposal methods, faulty septic systems, domestic pets, wildlife and farm animals (particularly concentrated animal feeding operations [CAFOs]), and upstream inputs.

Although man has been interested in – and concerned about – pathogens for nearly a hundred years, we have only recently begun monitoring pathogen contamination in our estuarine waters, and even our current



Despite recent increases in regulatory and citizen monitoring efforts, existing pathogen data have been deemed insufficient for developing a true status and trends relationship, since existing data have focused on short time frames and narrow geographic regions. ADEM's 1996 **305(b) Water Quality Report to Congress** concluded that 412 of 451 square miles of shellfishing waters in the Mobile Bay NEP study area did not fully support their use classifications due to pathogen indicators. In addition, swimming beaches have not received sufficient monitoring to enable an adequate determination of their health, since the bulk of research and monitoring has focused on commercially important shellfishing areas.

The Water Quality Workgroup established the following sub-objective addressing management of pathogens within the Mobile Bay Estuary:

Water Quality SUB-OBJECTIVE

Minimize introduction of pathogens sufficient to protect public health from in-port ship ballast exchange, marine waste from commercial and recreational vessels, sewage system failures, point source discharges, stormwater/nonpoint source discharges (including urban, agricultural, and other sources), and septic systems by 2010.

Toxic Chemicals

All living systems use and recycle a variety of naturally occurring chemicals. However, a natural or human-induced change in the normal balance of chemical concentrations in an ecosystem can jeopardize the health and reproductive capacity of its organisms.

Some examples of chemicals that have been introduced into the Mobile Bay Estuary are polycyclic aromatic hydrocarbons (PAHs), heavy metals, polychlorinated biphenyls (PCBs), dioxin, herbicides, and pesticides. Sources of these chemicals include paint and surface coatings used in the shipbuilding industry, exhaust from car and boat motors, industrial discharges, municipal sewage treatment facilities, stormwater runoff, tire and brake dust from vehicles, herbicides and pesticides, agricultural runoff, atmospheric deposition of airborne pollutant emissions, landfill seepage, and illegal waste disposal.

Toxics that are slow to break down in the environment, such as mercury, silver, arsenic, DDT, and PCBs, have accumulated in Mobile Bay sediments over the years. Bottom-dwelling animals, such as benthic invertebrates, are particularly exposed to these chemicals, which they ingest and pass through the food web. In certain cases, the toxics bio-accumulate in the tissues of larger predatory animals, such as large-mouth bass, causing great concern about potential health effects from contaminated seafood. Fish consumption advisories are posted for several water bodies in the Mobile Bay NEP area for mercury contamination.

There remains scientific uncertainty (and controversy) regarding the relationship of total chemical contamination concentrations in sediments and adverse effects on aquatic life. To date, most research has focused on bulk chemistry (merely quantifying the presence of a certain chemical) instead of actual toxicity testing or assessment of the bio-availability of the toxics. Costly toxicity testing and sediment quality modeling is necessary to sufficiently address the concerns related to contaminated sediments.

A substantial volume of data exists on the levels of toxics and contaminated sediments in Mobile Bay. The EPA has classified Mobile Bay as an "Area of Probable Concern" with regard to sediment contamination,

classifying sediments in some areas of Mobile Bay as "poor" and acknowledging a great deal of concern about accumulated toxics.

Addressing toxics in the environment should include a combination of point and nonpoint source load reductions, education and outreach, and promotion and provision of proper disposal of household hazardous

At a Glance...

TOXIC CHEMICALS

Issue: Toxic chemical contamination of area waterways.

Probable Causes: Paint and surface coatings used in the shipbuilding industry; exhaust from car and boat motors, industrial discharges (air and water); municipal sewage treatment facilities; stormwater runoff; tire and brake dust from automobiles; herbicides and pesticides; agricultural runoff; atmospheric deposition of airborne pollutants; landfill seepage; and illegal garbage disposal.

Probable Impacts: Bio-accumulation; difficulty obtaining dredging permits; poisoning of fish and wildlife; oyster bed contamination; and compromising human health.

Possible Solutions: BMPs to reduce urban runoff, particularly from parking lots; reductions in point source discharges and emissions; providing responsible hazardous waste disposal for citizens; increased monitoring; and bio-availability assessment.

chemicals. In addition, comprehensive monitoring of toxics in waterways and bottom sediments should continue, including assessment of bio-availability.

The Water Quality Workgroup of the Mobile Bay NEP, recognizing the potential threats to water quality posed by the presence of toxic chemicals in the Mobile Bay Estuary, developed the following sub-objective to directly address management of toxics:

Evaluate the sources and loads of toxic chemicals to Mobile Bay NEP area waters by 2003, and reduce, if necessary, such discharges to meet applicable water quality standards by 2010.

**Water
Quality
SUB-OBJECTIVE**

Living Resources

Just as we are concerned about water quality, so, too, are we concerned about the living resources of the Mobile Bay Estuary. The Mobile Bay NEP area contains four broad natural ecosystems – terrestrial, freshwater, estuarine, and continental shelf. This collection of ecosystems supports an extremely diverse biota that ranges from a freshwater turtle found only in the Mobile Delta to a number of continental shelf species found in oceans around the world. Indeed, the greatest treasure of the Mobile Bay Estuary is its unique and diverse flora and fauna.

Biodiversity is a term used to describe the number of distinct species in a given area. When loosely applied, measures of biodiversity allow us to compare areas of equal size or similar habitat type to determine which supports the most species. It may come as a surprise that the state of Alabama has the nation's fourth highest biodiversity in terms of plant and animal species among all U.S. states. And, in terms of the number of species per square mile, only Florida has more plants and animals than Alabama. The Mobile Bay Estuary plays a vital role in the state's biodiversity.

The Management Conference of the Mobile Bay National Estuary Program identified the following objective to guide development of the Living Resources section of the CCMP:

Living Resources **OBJECTIVE**

Maintain native populations within historical ranges and natural habitat and restore populations that have declined.

Based upon initial technical and citizen input, the Living Resources Workgroup of the Mobile Bay NEP identified the following priority issue areas that need to be addressed in order to attain this objective:

- Additional status and trends needs;
- Exotic species; and
- Commercial and recreational fisheries.

Mobile Bay Estuary Faunal Diversity

<u>Class</u>	<u>Total Number of Species</u>	<u>Number of At Risk* Species</u>
Non-vertebrates	More than 800	Unknown
Fish	337	36
Amphibians & Reptiles	126	30
Birds	355	38
Mammals	<u>49</u>	<u>7</u>
TOTALS:	1667+	111 (known)

****Note: "At risk" not only includes Federal and state protection levels, but also non-regulatory listings by either researchers studying the species or by The Nature Conservancy's Natural Heritage Program, which catalogues rare plant and animal species.***

Status and Trends Needs

In order to fully understand the health of the living resources of the Mobile Bay Estuary, we must understand each species' history, habitat requirements, life cycle, strengths, and weaknesses. This is no small task, as the total number of faunal species (exclusive of insects) thought to inhabit the Mobile Bay NEP area exceeds 1,600.

Our knowledge of the living resources of the Mobile Bay Estuary has changed very little since 1982 for non-vertebrates, while data for some vertebrates, such as birds, have greatly improved. For most species, little can be said about population status or trends and information is limited to that of presence or absence, as indicated in lists of species. The amount of our knowledge about any given species seems directly proportional to both the physical size of the species, and its perceived economic importance. It is no surprise that we know relatively more about those species important to the commercial and recreational seafood industry. But these represent only a small minority of the species in our estuary. For the vast majority of species, it is certain that we have more questions than answers.

One indicator of concern is the population status of 111 species that have been identified by various authorities to be in decline or in need of protection within the Mobile Bay Estuary. Some species are *naturally* rare, having adapted over time to exist only in very specific ecological niches. Others have *become* rare, at least, in

part, because of habitat loss and fragmentation, pollution, and overharvest. We must determine why certain species become rare and plan our management strategies to minimize species loss.

At a Glance...

STATUS AND TRENDS NEEDS

Issue: There is a limited amount of data on living resources of the Mobile Bay NEP area, particularly with respect to non-commercial species.

Probable Causes: Habitat loss; overharvest; water pollution (eutrophication, pathogens, toxics); exotic species introductions; and lack of comprehensive population monitoring.

Probable Impacts: Perceived or real decreases in populations and/or extinction of native species.

Possible Solutions: Increased population monitoring; and conservation.

The Living Resources Workgroup of the Mobile Bay NEP has established the following sub-objective to address species population monitoring:

Gather the information necessary for the conservation of economically and/or ecologically important species, including threatened and endangered species (within the Mobile Bay NEP area) by analyzing 75% of relevant, available data sets by 2003 and by continued monitoring and assessment.

Living Resources SUB-OBJECTIVE

Though Alabama ranks second in the nation for biodiversity of plant and animal species per square mile, we also have one of the fastest rates of decline in biodiversity.

Exotic Species

A side effect of its diversity and wealth of habitat, the Mobile Bay Estuary is also home to a few exotic species of plants and animals that have learned to live a little **too** well here. Most introduced species are fairly harmless, having only minor impacts on the new ecosystem.

At a Glance...

EXOTIC SPECIES

Issue: Non-native plant and animal species pose threats to indigenous species in the Mobile Bay NEP area.

Probable Causes: Human introduction; natural migration (extension of home range); ballast water; and horticulture industry.

Probable Impacts: Negative impacts to native species; habitat destruction; hydrologic modification; and impacts to food web dynamics.

Possible Solutions: Increased monitoring; eradication; education efforts; native plant awareness; and importation restrictions.

Others, however, survive better here than they did in their native land. They often go unchecked in the new habitat, having no natural predators to control their population growth. Trouble occurs when they directly compete with native species for food and habitat. In fact,

exotic species are listed as a contributing factor to the status of nearly half of all endangered or threatened animals and plants. To compound matters, the exotic species generally do not serve all of the roles in the ecological community that native species serve. In short, introduced species may be shortchanging the native ecological community.

In general, humans are responsible for the introduction of exotic species. Since we have the ability to travel anywhere in the world, we often – intentionally or unintentionally – return home with living souvenirs. Primary sources of exotic species include the ballast water of ocean-going commercial ships, plant distribution through the growing horticultural industry, and natural expansion of species' home ranges.

Exotic species have caused particular concern in the Mobile Bay Estuary. Eurasian watermilfoil and water hyacinth, two invasive aquatic plants, have literally clogged some area waterways, altering hydrology and navigation, while also crowding out native submerged and emergent aquatic vegetation. Nutria, an exotic estuarine rodent, is also responsible for the destruction of large areas of marsh vegetation in the Mobile Bay Estuary. In addition, exotic cattle egrets directly compete with native wading birds for nesting habitat.

Recognizing the existing and potentially growing threats posed by exotic species, the Living Resources Workgroup established the following sub-objective aimed at managing this undesirable resource:

Living Resources **SUB-OBJECTIVE**

Prevent, where possible, the introduction of non-native species into native environments; manage, as necessary, the introduction of non-native species used in conservation management programs under controlled circumstances; control/reduce known nuisance and/or introduced species; and gather information on unknowns by the year 2006.

HANK BURCH



Though beautiful, the invasive water hyacinth clogs waterways and chokes out native plants that are the preferred food source for certain waterfowl.

WILLIAM M. TURNER



In just a few decades, the voracious nutria has made its mark on marshes of the Mobile Bay estuary, literally mowing acres of native vegetation.

Commercial and Recreational Fisheries

Commercial and recreational fishing is a vital part of both the economy and quality of life in south Alabama. In fact, fisheries have been an integral part of Mobile Bay's culture for an amazing 10,000 years. Fisheries numbers are astounding. The Alabama commercial seafood industry and its related support industries, such as shipbuilding and marine supply, employ nearly 4,000 workers and generate \$450 million in products annually. Oyster landings, alone, have averaged over one million pounds each year since the 1880s. Blue Crab landings have historically ranged from just over one million pounds to over four million pounds per year, and have been relatively stable at around 2.5 million pounds per year in recent years. The annual shrimp catch from Alabama waters between 1985 and 1994 ranged from 0.7 million pounds to 2 million pounds.

Although much is known about commercial fisheries landings, recreational fisheries are not routinely monitored, and neither fishery is monitored with regard to catch per unit effort (CPUE). Catch per unit effort is the quantity of fish or shrimp caught within a certain time period. There is also very little fishery-independent status and trend data about non-commercial species. And, there is no comprehensive, systematic program to routinely monitor fish populations within the Mobile Bay NEP area. There are a few monitoring programs in existence (e.g., Fisheries Assessment and Monitoring Program [FAMP] and Southeast Area Monitoring and Assessment Program [SEAMAP]), but existing data sets from these programs have not been collectively analyzed, and questions remain about long term trends and ecosystem health. Such research should continue to provide long term data and to identify species that can serve as good indicators of fisheries health and overall water quality.

Based upon characterization studies, the Living Resources Workgroup of the Mobile Bay NEP has determined that there is currently an insufficient systematic program to measure fishing efforts across all user

groups in Alabama, and that there is a perceived, if not real, reduction of fishery resources concurrent with an increase in fishing pressure. In addition, the full effect of bycatch on fish populations in the Mobile Bay NEP is currently unknown.

At a Glance...

COMMERCIAL AND RECREATIONAL FISHERIES

Issue: The cumulative effects of commercial and recreational fishing are not fully understood or quantified.

Probable Causes: Overharvest; lack of fishery independent monitoring; and illegal harvest.

Probable Impacts: Reductions in harvest; decreased populations of species; and altered marine food web.

Possible Solutions: Increased data collection and analysis; increased monitoring; citizens watchdog campaigns; education efforts; and increased fisheries stocks through habitat enhancement.

Another unknown for fisheries managers is the level of illegal harvest in the Mobile Bay NEP area. As a result of the real – or perceived – need for better harvesting regulations and enforcement, discussions within the Living Resources Workgroup have centered upon ways to evaluate the effectiveness of current regulations and enforcement procedures. The group also wants to encourage the implementation of conservation education components and public involvement in the enforcement of harvesting regulations.

The Living Resources Workgroup drafted the following sub-objective to address fisheries resources:

Maintain and/or increase, if feasible, within natural variability, present catch levels of commercial and recreational fisheries resources.

Living Resources
SUB-OBJECTIVE



U.S.F.W.S.

Commercial and recreational fishing contribute heavily to the health, economic well-being, and quality of life of Mobile area citizens.

ADCNR, COASTAL PROGRAMS



Habitat Management

The unique qualities that attract us to the Mobile Bay Estuary are largely related to the wide range of habitats found in such a relatively small area. In a single day, one can explore the soft sediments and seagrass beds just offshore, the dune and inter-dune wetland swales of our barrier islands, fresh and saltwater marshes, pitcher plant bogs, bottomland hardwood forests, wet pine savannas, and upland pine-oak forests. One can see all of this and more without leaving the boundary of the Mobile Bay NEP study area. Without a doubt, it is the wealth of habitat in the Mobile Bay Estuary that has contributed to our living resource base.

The fundamental difference between the Mobile Bay of today and the Bay of a few centuries ago is population growth. Every person that has moved to the Bay area requires, at a minimum, food, water, shelter, and community infrastructure. Fulfilling those needs has required the environmental impacts of clearing, development, and alteration of natural habitats. As of 1998, 45% of Mobile County and 32% of Baldwin County had been cleared and developed as urban property, agricultural fields, or pastureland. The remaining area is comprised of natural and managed timberlands, and other natural habitats.

Some natural sources are responsible for alterations to habitat. However, the major sources of habitat degradation, destruction, and conversion are man-made. Development's impact on habitat may be direct (such as filling a wetland), indirect (such as suppression of fire in habitats that depend upon its occurrence), or cumulative (such as fragmentation over time of large habitat parcels into smaller, disconnected parcels that no longer support the entire array of species found in the larger, undeveloped tract).

Just as the natural ecosystem around us is complex and interdependent, so are the social and economic issues related to the use of our surroundings. Our task is to minimize our impact on the habitat around us while also maintaining an expected quality of life. This is accomplished, first and foremost, by understanding the consequences of our actions, and then by planning to minimize our impact on natural habitats.

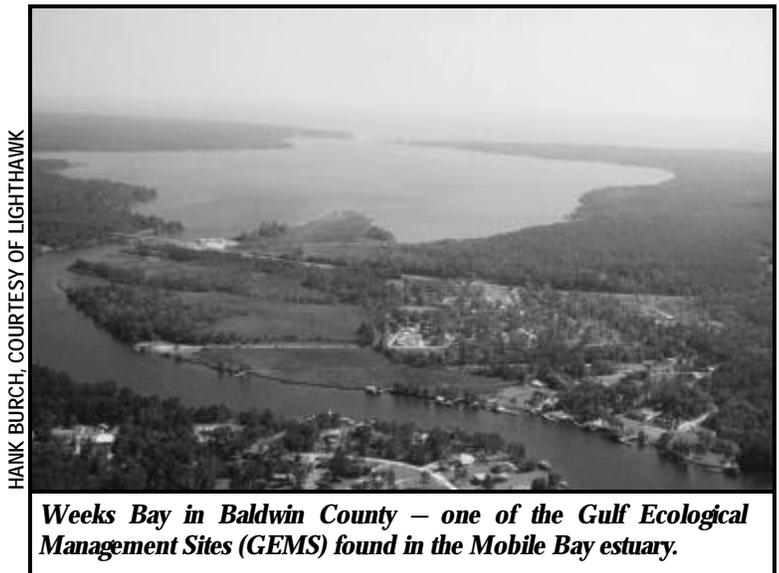
The Management Conference of the Mobile Bay NEP recognized the need to assess the status and trends of estuarine habitats and established the following objective to guide those efforts:

Habitat Management OBJECTIVE

Provide optimum fish and wildlife habitat in the Mobile Bay system by effectively preserving, restoring, and managing resources to maintain adequate extent, diversity, distribution, connectivity, and natural functions of all habitat types.

The Habitat Management Workgroup narrowed the focus of its efforts to the following priority issue areas in order to fulfill the above objective:

- Habitat preservation;
- Submerged Aquatic Vegetation (SAV);
- Coastal wetlands;
- Natural shorelines, beaches and dunes; and
- Nesting habitat.



Habitat Preservation

The Mobile Bay Estuary has a wealth of land that is currently preserved as natural habitat. In addition, there are many other privately-held lands that would be ideal candidates for future preservation activities.

Alabama's Forever Wild Program is single-handedly responsible for the preservation of nearly 50,000 acres of the Mobile-Tensaw River Delta, as well as other properties in the Grand Bay Savanna in south Mobile County. In addition, the U.S. Army Corps of Engineers maintains two wildlife management units in the Mobile-Tensaw Delta that were set aside to mitigate wetland impacts during the construction of the Tennessee-Tombigbee Waterway. The Mobile Bay NEP area is also home to two federally established National Wildlife Refuges (Grand Bay and Bon Secour), a National Estuarine Research Reserve (Weeks Bay NERR), and various state and local park areas.

In addition to land that is currently under preservation, there are a number of sites in the Mobile Bay NEP area that should be considered for protection, as they represent unfragmented tracts of largely undeveloped natural habitat. An effort known as the Gulf Ecological Management Sites (GEMS) is an initiative of the Gulf of Mexico Program and the five Gulf states to provide a regional framework for recognizing ecologically important Gulf habitats in hopes that preservation and conservation will follow. The Coastal Programs Office of the Alabama Department of Conservation and Natural Resources (ADCNR) coordinates the GEMS program in Alabama and has identified the following six sites within the Mobile Bay NEP area that are unique and ecologically significant habitats worth protecting:

- **Cat Island** is a 13-acre island in Mississippi Sound that supports the largest nesting population of tricolor herons in the state of Alabama;
- **Mon Louis Island** is a 25-square-mile island that is over 75% wetland habitat, including a 9,000 acre coastal salt marsh that is the largest contiguous saltmarsh habitat in Alabama;
- The 60,000-acre **Grand Bay Savanna** is one of the largest remaining, relatively undisturbed wet pine savanna habitats in the country;

- The nationally revered, 260,000-acre **Mobile-Tensaw River Delta** is considered the closest thing to a wilderness in south Alabama. Much of the southern Delta is under public management, but parcels still remain to be added;
- The **Weeks Bay National Estuarine Research Reserve** currently has over 3,000 acres under public management, yet additional parcels will ensure that the estuarine system remains largely intact; and
- The **Bon Secour National Wildlife Refuge** consists of five separate parcels totaling 6,400 acres of natural beach, dune, and wetland habitats on the barrier island peninsulas of coastal Alabama. Additional land acquisition will help enhance this important stop-over habitat for birds migrating across the Gulf of Mexico.

At a Glance...

HABITAT PRESERVATION

Issue: Certain high quality coastal habitats within the Mobile Bay NEP are not protected from private development.

Probable Causes: Habitat losses to development.

Probable Impacts: Losses/reduction of species with specific habitat requirements.

Possible Solutions: Protection, management, and preservation of high quality habitat.

Recognizing the need for continued habitat management on existing public lands within the NEP area, as well as the importance of preserving additional habitat, the Habitat Management Workgroup of the Mobile Bay NEP developed a sub-objective to address the need. Land purchases as described in the following sub-objective presumes willing sellers:

Protect, enhance, restore and manage valuable public lands and work with private property owners to accomplish habitat protection goals on important, privately held lands, including the acquisition of 15 additional high priority sites by 2009 through purchase or through other instruments, such as easements.

**Habitat
Management
SUB-OBJECTIVE**

Submerged Aquatic Vegetation (SAV)

Bay bottoms that support Submerged Aquatic Vegetation (SAV), like seagrass beds, are among the richest, most productive, and most important coastal habitats. Seagrass beds help reduce erosion by stabilizing bottom sediments with their root systems. They also reduce the turbidity of water by reducing wave action and subsequent erosion. In addition, and most importantly,

At a Glance...

SUBMERGED AQUATIC VEGETATION (SAV)

Issue: Important SAV habitat within the Mobile Bay NEP area is declining.

Probable Causes: Natural erosion processes; sedimentation; dredging practices; damage from boat propellers; trawling; and exotic species.

Probable Impacts: Loss/reduction of important nursery habitat.

Possible Solutions: Protection, management, and preservation of high quality habitat; increased surveying of SAV; and control of exotic species.

SAV habitat provides essential food, shelter, and nursery habitat for many estuarine animals. In fact, most of our commercially important fisheries species are dependent upon SAV at some point in their life cycles.

Threats to seagrass beds include natural erosion processes, sedimentation, dredging practices, damage from boat propellers, trawling, and exotic species. Eurasian watermilfoil poses a particular threat to SAV in Mobile Bay as it spreads rapidly, decreasing the quality of habitat for native SAV species.

Very little data exist to adequately portray a status or trends for SAV habitat in the Mobile Bay Estuary. In particular, comprehensive, concurrent measurements of SAV acreage in both Mobile Bay and the Mobile-Tensaw Delta are extremely rare. It is strongly recommended that comprehensive SAV surveys be routinely conducted in the future. Research is also warranted to determine the minimal ecological requirements for the native SAV species. Establishment of undisturbed buffer zones around SAV is also recommended to reduce turbidity and propeller scarring impacts.

Recognizing the importance of SAV habitat to the estuarine ecosystem, the Habitat Management Workgroup of the Mobile Bay NEP established the following management sub-objective:

Habitat Management **SUB-OBJECTIVE**

Maintain existing native Submerged Aquatic Vegetation (SAVs) at 2001 levels and increase acreage by 3% of known areas where native SAVs occur by 2006.

Submerged and emergent aquatic vegetation provide many important functions in an estuary, including erosion control, turbidity reduction, and food, shelter, and nursery habitat for estuarine animals.



KIICHIRO SATO © 1999 MOBILE REGISTER

Coastal Wetlands

The ecological importance of wetlands cannot be doubted, since they are home to a disproportionately higher percentage of threatened or endangered species than any other habitat type. Wetlands also perform complex chemical, biological, and hydrologic functions, such as stormwater filtration, groundwater discharge/recharge, and protection from flooding. Coastal commercial and sport fish species depend on estuarine marshes and grassbeds, as well as bottomland hardwood forests, for food, nursery, and spawning grounds. These same wetlands provide year-round habitat for resident birds and breeding grounds, overwintering areas, and feeding grounds for migratory birds, including waterfowl. In addition, nearly every species of amphibian in North America is dependent upon wetlands as breeding habitat. Biologically productive areas with unmatched diversity, wetlands are important habitat for a variety of animal species.

There was a time in history when wetlands were poorly understood and not very highly valued. In fact, there was a time when the federal government would actually pay a landowner to fill wetlands for development purposes. Times have changed, and we now have regulations to protect our remaining wetlands. However, it is imperative that current wetland management practices within the Mobile Bay NEP area be fully evaluated to ensure the sustainability of these precious resources.

Although a great deal of large-scale wetland mapping has been accomplished through the National Wetland Inventory, there has been an inadequate amount of local ground-truthing by which to develop a status and trends model for the entire Mobile Bay Estuary. Statewide and national trends in wetland loss certainly indicate a need for closer local monitoring of wetland habitat. For example, a 1991 study by the U.S. Fish and Wildlife Service, indicated that the state of Alabama lost over 50 percent of its wetland acreage in the 200-year period between 1780 and 1980, and the state continues to have notable wetlands loss even through 1990.

The primary challenges to wetland management are many and include consistency in defining, identifying, and delineating wetlands. Since wetlands are naturally transitional zones, there is rarely an obvious point where upland ends and wetland begins. In addition, there are various interpretations of how wetlands are defined, with

subtle differences existing between biological and jurisdictional definitions. In terms of wetland protection, challenges exist with current permitting and enforcement procedures, as well as manpower. Mitigation procedures are often inadequate, and there is little evidence that created wetlands function as well as natural ones. In addition, certain wetlands are excluded from regulatory

At a Glance...

COASTAL WETLANDS

Issue: Coastal wetland habitat has faced severe decline both within the Mobile Bay NEP study area and beyond.

Probable Causes: Development; dredging; filling; hydrologic modifications; conversion to upland; exotic species; weak regulatory monitoring and enforcement; inadequate mitigation practices; and loss of wetlands under nationwide permits.

Probable Impacts: Loss of habitat; increased flooding; and water quality impairment.

Possible Solutions: Protection, management, and preservation of wetland habitat; improved mapping; and Advance Identification (EPA) programs.

management under nationwide permits. Finally, as discussed above, general characterizations of wetland acreage are inadequate for the Mobile Bay NEP.

Threats to wetland habitat include development activities, land clearing, dredging, wetland filling, hydrologic modification, exotic species invasion, and urban runoff. Local wetlands are particularly threatened by coastal development pressures.

Recognizing the importance of coastal wetlands, the inadequacies of status and trends data, and the developmental pressures facing this habitat, the Habitat Management Workgroup of the Mobile Bay NEP developed the following sub-objective to guide future wetlands management:

Maintain and protect all types of coastal wetlands within the MBNEP study area (including quality, function, and value) and increase acreage by 5% of those types that have declined, by 2006.

**Habitat
Management
SUB-OBJECTIVE**

Natural Shorelines, Beaches and Dunes

The coastal shorelines and near-shore bottom areas of Alabama are constantly changing, due to both natural and man-made activities. Natural processes that affect beaches and dunes include winds, waves, tidal currents, and periodic storm events. In addition, man has often attempted to control and engineer shoreline processes to “improve” existing shoreline and bathymetric configurations to suit development or maritime needs.

Barrier islands, particularly those with intact natural dune systems, protect the mainland from the incessant pounding of Gulf currents and waves. Dune systems are also vital habitat for a number of coastal creatures. Our barrier islands and peninsulas also provide a major stop-over point for migratory birds, allowing them to stop and rest before or after the arduous journey across the Gulf of Mexico. If coastal development is not properly managed, we risk losing these vital biological services.

At a Glance...

NATURAL SHORELINES, BEACHES AND DUNES

Issue: A significantly altered habitat within the Mobile Bay NEP area, natural shorelines, beaches and dunes continue to face development pressures and erosion.

Probable Causes: Development; hydrologic modifications; natural erosion; ship channel creation and maintenance; bulkheading; shoreline armoring; and inadequate coastal engineering.

Probable Impacts: Loss of shoreline, beach and dune habitat; species decline; and increased erosion and sedimentation.

Possible Solutions: Protection, management, and preservation of high quality beach habitat; beach renourishment; removal of bulkheads; use of natural vegetative shoreline buffers; and improvement of existing coastal development regulations and engineering practices.

In addition to the many natural benefits of coastal beaches, they also serve a significant economic benefit. In fact, Baldwin County contributes 20% of the tourism dollars spent in Alabama, and most of this is directly spent in and around coastal beaches.

Human activities that alter natural beach habitat include development, hydrologic modifications, shoreline armoring, tourism and recreation, and certain coastal engineering practices (ship channel maintenance, jetties, etc.). Many of these activities result in increased beach erosion and loss of coastal dune habitat.

Shoreline armoring (bulkheads, jetties, etc.) along area waterways is often implemented in an effort to combat natural shoreline erosion processes and to create managed, seemingly consistent beachfront properties. Unfortunately, shoreline armoring is rarely successful and can have significant negative impacts on the intertidal ecosystem. Bulkheads only temporarily protect the immediate shoreline, and actually increase erosion to adjacent, unprotected shoreline as the wave action is diverted laterally along the coast. In addition, the sediment along the seaward side of bulkheads is often heavily eroded due to the scouring wave action. Instead of installing bulkheads, it is often recommended that coastal residents attempt to establish native shoreline submergent and emergent aquatic vegetation, which is the shoreline’s natural defense against wave action. The benefits are two-fold: reduced erosion and the creation of natural habitat for aquatic animals.

One area of particular concern is the impact of coastal engineering on beach erosion. Shoreline armoring and ship channel creation and maintenance have interrupted natural longshore drift regimes, leading to areas of severe beach erosion, particularly on Dauphin Island. Better engineering practices, coupled with habitat preservation strategies, are important steps to reverse the trend toward loss of beaches.

The Habitat Management Workgroup of the Mobile Bay NEP crafted the following sub-objective to address the protection and maintenance of natural beach and dune habitat:

Protect existing natural shoreline, beach and dune habitat and restore previously altered habitats, where feasible, including the rehabilitation of altered shoreline by 1000 feet per year.

Nesting Habitat

Birding enthusiasts have long recognized the value of the Mobile Bay Estuary in attracting a wide variety and abundance of bird species. This is due both to its geographic location and to the wide variety of habitat and food sources available along the Gulf Coast. Mobile Bay lies within the Mississippi flyway for migratory birds, which serves as a conduit for a variety of bird species to this area. Large numbers of migratory waterfowl congregate in local waters, and our conspicuous colonial wading birds and seabirds are popular with tourists and birders alike. In fact, recreational birding is beginning to be recognized as a significant economic resource on national and local levels.

Certain bird species have rather precise ecological requirements. As a result, their presence or absence serves as a good indicator of habitat quality. Historically, colonial and migratory birds alike have nested within the Mobile Bay NEP area, particularly on isolated sand islands offshore, along the coastal beaches, within the estuarine marshes, or within bottomland hardwood forests. With increased population growth and development pressure along the Gulf Coast, quality bird nesting habitat is becoming increasingly rare.

Due, in large part, to volunteer and enthusiast monitoring (e.g., Audubon Christmas Bird Counts and the North American Breeding Bird Survey), there exists a great deal of information about bird populations for the Mobile area. Unfortunately, there has not been a comprehensive local effort to pool and analyze existing data, particularly with respect to status and trends of nesting populations.

Threats to bird nesting habitat include natural and man-made disturbance, habitat loss and fragmentation due to development and silvicultural activities, exotic plant and animal species, predation, and off-road vehicles. One common characteristic of many nesting areas is seclusion. As development encroaches, the birds will simply move to a more secluded location. A 1995 study of least tern nesting populations in the area identified 103 nests on a shopping center roof, an indication of the seriousness of inadequate natural nesting sites for this species, which typically nests in isolated islands and dune habitats.

At a Glance...

NESTING HABITAT

Issue: Quantity and quality of nesting habitats for colonial and migratory birds in the Mobile Bay NEP area is declining.

Probable Cause: Loss of habitat to development; invasive species; insufficient population monitoring data and analysis; coastal encroachment and development; predation; off-road vehicles; competition; silviculture; and disturbance (natural and man-made).

Probable Impacts: Population reductions; extirpation of native populations; and economic impacts.

Possible Solutions: Creation, preservation, restoration and management of suitable habitat; nesting box and platform programs; reforestation; and increased population monitoring and analysis.

Several efforts are already underway or completed to provide or enhance bird nesting habitat in the Mobile Bay NEP area. Using dredge spoils to create island bird habitat has been extremely successful locally (e.g., Gaillard Island). Efforts to restore and preserve Cat Island are also vital to maintaining a tricolor heron rookery of regional significance. Finally, agency and citizen efforts to provide wood duck nesting boxes and osprey platforms in the Mobile-Tensaw Delta are vital steps in providing much needed habitat.

In order to expand upon past successes and further address nesting habitat needs within the Mobile Bay NEP area, the Management Conference developed the following sub-objective:

Maintain and protect nesting habitat for colonial and migratory birds and reduce declines in nesting habitat due to human disturbance and alteration.

**Habitat
Management
SUB-OBJECTIVE**

Human Uses

The Management Conference of the Mobile Bay NEP recognized very early on that humans are an integral part of the Mobile Bay Estuary ecosystem, and realized that a truly comprehensive management plan must address the needs of various user groups in order to ensure that the estuary sustains expected quality of life for future generations. In essence, the management of natural resources is ultimately the management of human behaviors with respect to those resources.

The Human Uses Workgroup of the Mobile Bay NEP commissioned a characterization study in 1998 to profile the various human interests in the natural resources of the Mobile Bay Estuary. An unprecedented approach by any National Estuary Program, the human uses characterization sought to identify and characterize the current historical data describing the demographic, socioeconomic, and social trends related to the use of the estuary. It also sought to identify human stress factors, such as the dynamic and sometimes conflicting interactions between the users of the estuary and its resources. Finally, the characterization sought to assess perceptions user groups had about the status of resources. The assessment of the sociological factors involved with land use planning and natural resources management offers insight into how the landscape has evolved and identifies common ground among potentially conflicting user groups.

Some key findings of the human uses characterization:

- The report found that there is substantial variation in user group's perceptions of other user groups' impacts on the estuary.
- Five areas of discrepancies in perceived impacts were found: point source pollution, nonpoint source pollution (particularly with land use development), habitat loss, dredging activities, and fisheries resources.
- In every case, a user group's self perception was more positive than said group's perception of other user groups.

Consensus did emerge, however, that comprehensive, sustainable land use planning was essential to resolving the key identified conflicts. The Management Conference of the Mobile Bay NEP adopted the following objective to guide the development of human uses management strategies:

Human Uses **OBJECTIVE**

Provide consistent, enforceable, regional land and water use management that ensures smart growth for sustainable development and decreases the negative impacts of growth-related activities on human health and safety, public access, and quality of life by developing and implementing plans consistent with the CCMP by 2006.

In order to fulfill this objective, the Human Uses Workgroup concentrated on the following priority issues that must be addressed in order to fulfill the above objective:

- Sustainable land use planning;
- Hydrologic modification; and
- Public access.

Sustainable Land Use Planning

If there is one single effort that epitomizes the National Estuary Program process, it is working together to develop a comprehensive, sustainable land use planning strategy. In essence, this portion of the Human Uses Workgroup efforts is a microcosm of the entire Comprehensive Conservation and Management Plan. Comprehensive, sustainable land use planning ensures that natural resources are conserved for future generations without depriving current generations of the quality of life they have grown to expect.

As tourism, industrial development, residential development, and recreation continue to grow, it becomes increasingly important that growth be managed to minimize environmental impact and promote sustainability. The Human Uses Workgroup recognized a significant need for providing consistent, enforceable, and regional land and water use management in order to sustain, if not improve, the quality of life we have grown to expect in the Mobile Bay area. Such planning should include efforts to curb urban sprawl, promote wise land use, encourage redevelopment of existing structures, educate citizens, and coordinate all levels of government with regards to sustainable land use.

The Human Uses Workgroup of the Mobile Bay NEP established the following sub-objective regarding land use planning:

Enhance quality of life by improved planned and managed development.

**Human
Uses
SUB-OBJECTIVE**

At a Glance...

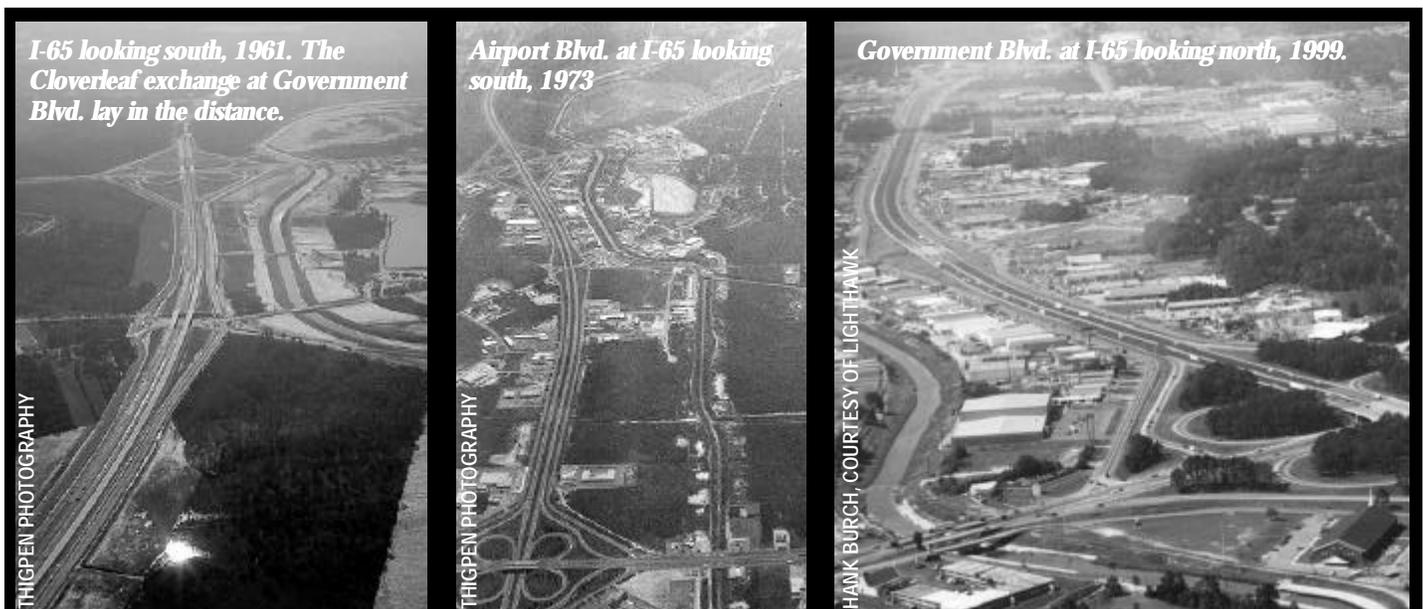
SUSTAINABLE LAND USE PLANNING

Issue: The Mobile Bay Estuary lacks a comprehensive, sustainable land use plan.

Probable Causes: Short-sighted management and lack of home rule.

Probable Impacts: Possible depletion of natural resource base.

Possible Solutions: Develop county-wide land use plans; promote interactions at all levels of government regarding resource management; and encourage redevelopment.



Urban Growth: An area of rapid commercial growth, the former Wragg Swamp area in Mobile highlights the consequences of unsustainable growth.

Hydrologic Modification

Within the Mobile Bay Estuary, there are several examples of past land and resource management practices that fell short of expectations or, quite simply, caused more harm than good. In general, it is recommended that land use practices that negatively impact the environment be reviewed and considerations be presented for reversing or mitigating those impacts.

Hydrologic modifications represent any physical, man-made alteration to the natural environment that affects flow of water in a system, including dams, dikes, shoreline armoring, dredging operations, and causeway bridges. Battleship Parkway (a.k.a. the Mobile Bay Causeway) is a major hydrologic modification that has received a great deal of attention in recent years. A man-made earthen bridge built in 1926-27 between Mobile and Spanish Fort, the Causeway formed an unintended barrier between Mobile Bay and the Mobile-Tensaw



The Mobile Bay Causeway has served as an unintended dam, separating delta waters to its north from the salt waters necessary for its health.

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NASA, JOHNSON SPACE CENTER

Although sedimentation is a natural process in the Mobile Bay estuary, land management practices that increase urban runoff can harm the estuary. This 1974 Skylab photo shows a large plume of sediment coming from D'Olive Bay on the Eastern Shore as a result of rapid residential development in the area.

River Delta, essentially isolating one from the other except for four relatively narrow river channel openings. There are concerns that the Causeway has impacted and continues to negatively impact the water quality of the Mobile Bay Estuary by altering salinity, nutrient and sedimentation regimes in adjacent waters.

Other hydrologic modifications that solicit attention in the Mobile Bay Estuary include:

- An earthen dike across Pinto Pass, which has effectively dammed a once free-flowing channel;
- Impacts from routine dredging and ship channel maintenance operations; and
- Increased impervious surface area that has resulted in increased flooding and stormwater runoff, giving rise to significant water quality concerns.

Another side effect of past land management practices, exacerbated by rapid growth and development within the Mobile Bay watershed, is an increase in natural rates of erosion and sedimentation. These interactive processes have had notable impacts to water clarity, depth, and living resources. Our concerns about erosion and sedimentation are not unique. In fact, the Environmental Protection Agency (EPA) has listed sedimentation as a primary concern in **all** of the nation's estuarine environments.

Factors that contribute to erosion and sedimentation processes include: the amount of denuded landscape in a basin; the amount of impervious surface in the basin; stormwater volume (which is determined by rainfall intensity and duration); topography; hydrologic modifications; soil types and percolation rates; and land development and clearing practices. The potential problems are further compounded by the fine grained and/or unconsolidated nature of the soil and the slopes of rolling hills and coastal ravines. In addition, climatic conditions of the central Gulf Coast region produce the highest rainfall erosive factors in the United States.

At a Glance...

HYDROLOGIC MODIFICATION

Issue: Existing hydrologic modifications, including unnatural rates of erosion and sedimentation resulting from development practices within the Mobile Bay Estuary, have altered natural hydrologic conditions.

Probable Causes: Construction of dams; earthen bridges; Mobile Bay Causeway; dredging activities; shoreline armoring; impervious surfaces; land clearing practices; dirt roads; and natural erosion regimes.

Probable Impacts: Altered hydrologic regimes; turbidity; diminished navigation; loss of SAV habitat; oyster reef impacts; and water quality impacts.

Possible Solutions: Restoration activities; BMPs; vegetative buffers; mitigation; and improved engineering.

As upland landscapes erode, bottomlands, including the Mobile Bay Estuary, serve as receiving basins for these sediments. The increased silt, while suspended, can cause water clarity problems and can also have negative impacts on aquatic plants and animals. When the sediment eventually settles out, it can further affect navigational ability, as well as the health of bottom dwelling organisms and habitats, particularly oyster reefs and submerged aquatic vegetation (SAV).



ADCNR, COASTAL PROGRAMS

The area's "poster child" for turbidity caused by urban runoff is D'Olive Bay in Baldwin County.

Comprehensive studies, including quantitative data on erosion and sedimentation are very limited for the Mobile Bay NEP area. It is generally assumed that if soil erosion is controlled, then sedimentation will also be controlled. However, it is impossible to eliminate all erosion. Effective management of erosion and sedimentation within the Mobile Bay NEP area will require estimates of **acceptable** sedimentation rates, which can be used to calculate acceptable soil loss under various land management programs (e.g., construction, forestry, and farming). Best Management Practices (BMPs) could then be better employed to keep erosion in check.

Recognizing that certain past land use practices within the Mobile Bay watershed have negatively impacted the Mobile Bay Estuary, the Human Uses Workgroup of the Mobile Bay NEP crafted the following sub-objective to address reversing or mitigating those effects:

Reduce the negative hydrologic effects of inadequately planned and/or managed development on human health and safety, specifically:

- (1) Maintain or adjust stream flows to minimize the negative effects of flooding, erosion, and adverse changes in estuarine salinity, as necessary and where feasible.
- (2) Protect, manage, and/or restore 1000 acres of floodplains by 2006 to minimize upstream and downstream flooding and erosion.
- (3) Protect, manage, and/or restore 5 miles of natural stream banks and bottoms to minimize erosion and loss of natural habitat by 2006.
- (4) Reduce locally-generated sediment loads by 10% in Mobile and Baldwin County waterways by 2006 to reduce loss of navigation and to reduce adverse impacts on water quality, recreational activities, and aquatic communities.

**Human
Uses
SUB-OBJECTIVE**

Public Access

According to researchers at the University of South Alabama (USA), 72% of the Alabama Gulf beachfront was undeveloped in 1970. By 1996, this number had fallen to 39%. As the coastline has continued to develop with both private residences and tourist resorts, public

access to beaches has become more limited. Under state law, all beaches below the mean high tide line are public property. However, difficulties arise in obtaining perpendicular access to the beach, since most of this property is privately owned. While there exist many public access sites in Baldwin and Mobile Counties, efforts to supplement these, as well as increase public awareness of them, are warranted.

At a Glance...

PUBLIC ACCESS

Issue: Public access to water resources is insufficient to support a growing population.

Probable Causes: Private coastal development and a lack of public acquisition or development of easements.

Probable Impacts: Lost sense of ownership of coastal resources; and potential unwillingness to expend tax dollars toward beach restoration and maintenance.

Possible Solutions: Increase number of public access points; provide parking areas; and promote public-private access partnerships.

In a 1999 study, USA researchers referred to the limited public access to beaches as an “insidious threat to the future of Alabama’s beaches.” They suggest that the most cost-effective approach to solving beach problems, such as erosion, is government intervention. The authors liken the situation to highways – tax dollars are spent to create and maintain roads, but **everyone** has **unlimited** access to them. If the public loses its sense of open access to public beaches, it will be less likely to support the expenditure of tax dollars to repair them. Much can be done to restore a sense of coastline ownership for inland dwellers, including increased public purchase of waterfront properties, construction of public parking areas, and increased public access at private properties.

Recognizing the value of adequate public access, the Human Uses Workgroup of the Mobile Bay NEP, crafted the following sub-objective:

Human Uses SUB-OBJECTIVE

Increase public access to water resources.



Daphne's May Day Park (left) and Mobile's Cooper Riverside Park (right) are just two of many public water access sites in Mobile and Baldwin Counties.

Education and Public Involvement

As the Mobile Bay National Estuary Program has evolved over the years, one mandate has risen: Due to the complexity of estuarine environments and the complex impacts from ecological and social interactions, education and public outreach strategies will be fundamental to the successful implementation of the CCMP. As Action Plans were being developed by other issue Workgroups, it emerged that nearly every strategy requires some degree of increased public awareness in order to be successful. In addition, the success of several action items can only be obtained through public involvement in the monitoring and implementation of the action item.

The Education and Public Involvement Workgroup was created by the Mobile Bay NEP Management Conference in the latter stages of CCMP development in order to highlight the need for increased public outreach and involvement for the success of the CCMP, and in order to consolidate all such actions under a single measurable objective, as stated below:

Increase awareness of natural resource issues and promote understanding and participation in conservation and stewardship activities.

**Education and
Public
Involvement
OBJECTIVE**

In addition to this objective, two separate sub-objectives were drafted: one to specifically deal with public awareness; and a second aimed at public participation in resource management, as well as action item implementation and monitoring.

Public Awareness

One driving factor in the development of an education strategy for the CCMP is that there are many varied and often conflicting opinions about the environmental health of the Mobile Bay Estuary. This diversity of public opinion is largely attributed to the inherent complexity of the scientific and sociological issues involved with the management of the estuary, but is also intensified by user group bias.

The User Group Profile that served as a characterization study for the Human Uses Workgroup of the Mobile Bay NEP highlighted major differences among user groups regarding perceptions of environmental health. It also showed that there is no clear understanding or consistent prioritization of the environmental concerns about the Mobile Bay Estuary among different user groups.

Simply put, the inherent complexity of the Mobile Bay Estuary requires that measures be taken to guarantee that consistent, factual information is presented to all citizens, with great care to ensure that the messages are understandable. Recognizing this need, the Education and Public Involvement Workgroup drafted the following sub-objective addressing public awareness:

At a Glance...

PUBLIC AWARENESS

Issue: Inconsistent, often conflicting environmental perceptions exist.

Probable Causes: Lack of formal, comprehensive environmental education and outreach.

Probable Impacts: Increased dispensation of misinformation; and increased misunderstanding.

Possible Solutions: Conduct comprehensive education and outreach programs; and implement a Coastal Environmental Education Campaign.

Increase public awareness of environmental issues among all stakeholders, including local, state and federal political leaders, agencies and citizens, by developing and implementing Coastal Environmental Education Campaigns.

**Education and
Public
Involvement
SUB-OBJECTIVE**

Public Participation and Monitoring

At a Glance...

PUBLIC PARTICIPATION AND MONITORING

Issue: There is a need for increased public participation in resource management and monitoring.

Probable Causes: Resource management agencies are often understaffed to adequately monitor and protect natural resources; and citizen involvement needs improvement.

Probable Impacts: Lack of involvement prevents successful implementation and monitoring of CCMP action items.

Possible Solutions: Provide incentives to increase public involvement in the CCMP implementation; and coordinate existing monitoring and watchdog campaigns.

The best way to ensure long-term protection of estuarine resources is to instill within the general public the desire to monitor and protect our natural resources. Hands-on interaction with estuarine management and monitoring invokes a sense of ownership and pride among the citizenry. Without this, no management plan will fully succeed.

Several local environmental monitoring and watchdog organizations exist within the Mobile Bay NEP area. Part of the challenge will be to coordinate and expand upon these existing efforts in order to maximize their benefits.

The Education and Public Involvement Workgroup of the Mobile Bay NEP drafted the following sub-objective regarding citizen involvement:

Education and Public Involvement SUB-OBJECTIVE

Increase public participation by developing and implementing a comprehensive citizen-based monitoring program.

An easy and often fun way to get involved with the Mobile Bay NEP is through Action Plan Demonstration Projects (APDPs), such as the Weeks Bay shoreline restoration project.



ALABAMA COASTAL FOUNDATION



Overview of Action Plans

Armed with an overview of the priority issues affecting the Mobile Bay Estuary, and the objectives and sub-objectives established by the issue Workgroups, what follows are overviews of the specific actions that will be implemented by the Mobile Bay National Estuary Program over the next several years. On the succeeding pages are brief outlines of the proposed Action Plans within each established Workgroup and the objectives and sub-objectives that have been previously discussed.

These Action Plans represent the culmination of work begun in 1995, when the Mobile Bay NEP was first established. What is presented here in Volume 1 represents a basic overview of these Action Plans – literally highlighting “what” will be done. Detailed information about the steps involved, time frame for implementation, coordinating agencies, and expected costs for each item are covered in the full Action Plan descriptions that comprise Volume 2 of the CCMP.

WATER QUALITY

Management Conference Objective: Attain and/or maintain water quality sufficient to support healthy aquatic communities and designated human uses by 2010.

In order to accomplish the above objective, the Water Quality Workgroup focused on four separate sub-objectives, as follows:

WATER RESOURCES MANAGEMENT STRATEGY

Sub-objective: Develop allowable water quality-based loadings sufficient to maintain surface water quality standards (or total maximum daily loads, where required) for pathogens, nutrients, toxic chemicals, and other conventional pollutants, for Mobile Bay and sub-basins, by the year 2003 and incorporate them into appropriate resource management strategies by the year 2008 (beginning in 2004).

The following action items describe how this sub-objective will be accomplished:

WQ-A1 Assess data to identify problems related to pathogen introduction, toxic chemicals, and nutrient or organic enrichment from various sources (both within and outside the Mobile Bay NEP area).

This Action Plan seeks to both add to the existing water quality data and to develop, where possible, loadings information for all area waterways. Modeling efforts will seek to include impacts from all sources with particular attention to atmospheric deposition of air emissions. In addition, cumulative and synergistic effects will be assessed.

(NOTE: Incorporates former action items WQ-A1, A2, A3, and HU-A4, A5.)

WQ-A2 Incorporate water quality-based loadings information into the National Pollutant Discharge Elimination System (NPDES) permitting process and the nonpoint source control planning process to allow attainment of applicable water quality standards.

This Action Plan is designed to build upon WQ-A1 and incorporate loadings information, once effectively collected and modeled, into the NPDES permitting process. In addition, the loadings information will be used to assist local, state and federal planning agencies in developing stormwater management standards and BMPs.

(NOTE: Incorporates former action item WQ-B1 and B2.)

WQ-A3 Develop a resource management strategy for maintaining groundwater quality.

Since many coastal residents depend upon groundwater supplies for drinking water, it is important to assess groundwater quality. This Action Plan will address the extent of groundwater contamination and saltwater intrusion in the Mobile Bay Estuary and will encourage the development of wellhead protection programs.

(NOTE: Incorporates former action items WQ-C10 and HM-A3.)

WQ-A4 Develop a resource management strategy to ensure added protection and maintenance of high quality waters in the Mobile Bay estuary.

This Action Plan will use available water quality data and loadings models to ensure that existing high quality waters are maintained. In addition, the Plan will develop a management strategy for identifying and nominating additional water bodies for higher designated use classifications.

(NOTE: Incorporates former action item WQ-C13.)



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NUTRIENTS

Sub-objective: Reduce nutrient loads in identified, problem sub-basins by 2006, with increased management of both nonpoint and point source nutrient loads in other Mobile Bay NEP sub-basins or from the Mobile River drainage basin as a whole (by supporting efforts of others with jurisdictional authority) until levels are established based on allowable loadings or total maximum daily loads.

The following action items describe how this sub-objective will be accomplished:

WQ-B1 Reduce or eliminate problems from excessive loadings within the Mobile Bay NEP and individual sub-basins.

This Action Plan will include development of incentive-based ordinances and BMPs aimed at curbing stormwater runoff. In addition, the Action Plan calls for support and additional implementation of existing nonpoint source (NPS) control programs.

(NOTE: Incorporates former action item WQ-C11.)

WQ-B2 Support efforts to reduce nutrient input to the Mobile Bay estuary from the entire 43,662 square mile upstream river basin draining two-thirds of the State of Alabama, and portions of Georgia, Mississippi and Tennessee.

Whereas WQ-B1 focuses its efforts within the Mobile Bay NEP boundary, this Action Plan extends that effort beyond the political boundary to the greater Mobile Bay watershed by supporting state NPS programs, as well as local watershed groups outside the NEP area.

(NOTE: Incorporates former action items WQ-C12.)

PATHOGENS

Sub-objective: Minimize introduction of pathogens sufficient to protect public health from in port ship ballast exchange, marine waste from commercial and recreational vessels, sewage system failures, point source discharges, stormwater/nonpoint source discharges (including urban, agricultural, and other sources), and onsite sewage disposal (septic systems) by 2010.

The following action item describes how this sub-objective will be accomplished:

WQ-C1 Reduce opportunities for pathogen introduction in the Mobile Bay estuary.

Work towards this Action Plan will take measures to reduce, if not eliminate, pathogen inputs from all known or suspected sources, including ballast water from commercial vessels, discharges from sewage treatment systems, improper waste disposal, onsite sewage disposal, and domestic pets, wildlife, and farm animals.

(NOTE: Incorporates former action items WQ-C1, C2, and C5-C9.)

TOXIC CHEMICALS

Sub-objective: Evaluate the sources and loads of toxic chemicals to Mobile Bay NEP area waters by 2003, and reduce, if necessary, such discharges to meet applicable water quality standards by 2010.

The following action items describe how this sub-objective will be accomplished:

WQ-D1 Assess problems related to sediment quality, in terms of contamination, in the Mobile Bay NEP area and reduce and/or eliminate, if possible, toxic chemicals in identified problem areas.

This Action Plan will include steps to identify sources and amounts of toxic chemicals in bottom sediments, assess bio-accumulation and risk factors, identify problem areas, and promote public awareness. In particular, the plan addresses mercury contamination in game fish species. Source assessments will focus particular attention on runoff from parking lots and roadways.

(NOTE: Incorporates former action item WQ-E1, E3, and E4.)

WQ-D2 Offer opportunities for citizens to properly dispose of household and agricultural hazardous waste.

This Action Plan seeks to provide increased future opportunities for residents to properly dispose of household hazardous wastes, motor oil, paints, etc., by facilitating and promoting hazardous waste amnesty days.

(NOTE: Incorporates former action items WQ-F1.)

LIVING RESOURCES

Management Conference Objective: Maintain native populations within historical ranges and natural habitat, and restore populations that have declined.

In order to accomplish the above objective, the Living Resources Workgroup focused on three separate sub-objectives, as follows:

STATUS AND TRENDS NEEDS

Sub-objective: Gather the information necessary for the conservation of economically and/or ecologically important species, including threatened and endangered species (within the Mobile Bay NEP area) by analyzing 75% of relevant, available data sets by 2003 and by continued monitoring and assessment.

The following action items describe how this sub-objective will be accomplished:

LR-A1 Increase the level of monitoring of key living resources within the Mobile Bay NEP area. Steps involved in this Action Plan include examining other effective programs, identifying key living resources that are not being adequately monitored, collecting additional data, and determining status and trends information. In addition, this Action Plan will outline protocols for measuring and monitoring biodiversity and will establish guidelines and monitoring strategies for at-risk species. Finally, the plan addresses management of nuisance species.
(NOTE: Incorporates former action items LR-A1, A2, A3, A7, A14, A15, D1 and H-11, as well as HL-B4.)

LR-A2 Examine state regulations regarding protection of species at risk and recommend expansion of regulations, better enforcement of regulations, and updating of state lists, if warranted. This Action Plan will assess current regulatory protocols dealing with federal or state listed species and design improvements in regulations and enforcement procedures. In addition, the plan calls for the development of GIS maps of listed species and improved consideration of listed species when considering issuance of permits.
(NOTE: Incorporates former action items LR-A11 and A12.)



WILLIAM M. TURNER



DR. GARY GASTON

EXOTIC SPECIES

Sub-objective: Prevent, where possible, the introduction of non-native species into native environments; manage, as necessary, the introduction of non-native species used in conservation management programs under controlled circumstances; control/reduce known nuisance and/or introduced species; and gather information on unknowns by the year 2006.

The following action item describes how this sub-objective will be accomplished:

LR-B1 Identify species and develop management plans for each plant and animal nuisance species to dampen or control negative effects on habitat and/or water quality within the Mobile Bay NEP area, thus restoring ecological relationships.

Aimed at reducing the impacts of invasive, exotic species, this Action Plan will assess available data, identify all known nuisance species, and promote awareness about exotic species. Particular attention will be paid to impacts of exotic species on threatened or endangered native populations. Finally, the Plan will assess existing regulations and recommend improvements for the sale and distribution of exotic species.

(NOTE: Incorporates former action items LR-A12, and A-15, as well as HL-C2.)

FISHERIES

Sub-objective: Maintain and/or increase, if feasible, within natural variability, present catch levels of commercial and recreational fisheries resources.

The following action items describe how this sub-objective will be accomplished:

LR-C1 Examine how to efficiently measure commercial and recreational fishing effort.

Fundamentally important to fisheries management is the ability to adequately monitor Catch Per Unit Effort (CPUE). This Action Plan will examine opportunities for developing an effort-based monitoring program for commercial and recreational fisheries.

(NOTE: Incorporates former action item LR-A4.)



CCA, MOBILE

LR-C2 Examine the possibility of increasing fisheries resources.

Whereas Action Plan LR-C1 focuses on management of fish harvest, this Action Plan focuses on increasing the existing fisheries stock through artificial habitat creation, water quality improvements, habitat improvements, and restocking efforts.

(NOTE: Incorporates former action items LR-A5.)

LR-C3 Examine the possibility of decreasing or controlling effort as needed (e.g., limited entry for stressed fisheries in concert with commercial fishers, encourage catch-and-release as a means to control recreational fishing effort).

This Action Plan concentrates efforts toward avoiding overharvest of fisheries resources. This plan will include the development and implementation of conservation education programs as part of commercial and recreational licensing requirements. In addition, this plan will assess the effectiveness of current regulations and enforcement procedures. Finally, this plan will address the effects of incidental bycatch on fish populations.

(NOTE: Incorporates former action items LR-A6, A8, and A13.)

HABITAT MANAGEMENT

Management Conference Objective: Provide optimum fish and wildlife habitat in the Mobile Bay system by effectively preserving, restoring, and managing resources to maintain adequate extent, diversity, distribution, connectivity, and natural functions of all habitat types.

In order to accomplish the above objective, the Habitat Management Workgroup focused on five separate sub-objectives, as follows:

HABITAT PRESERVATION

Sub-objective: Protect, enhance, restore and manage valuable public lands and work with private property owners to accomplish habitat protection goals on important privately held lands, including the acquisition of 15 additional high priority sites by 2009 through purchase or through other instruments, such as easements.

The following action item describes how this sub-objective will be accomplished:

HM-A1 Identify and prioritize sites of particular sensitivity, rarity, or value in the Mobile Bay NEP area for potential acquisition and/or restoration, maximizing the contributions of existing preservation and management sites and the capabilities of all agencies and organizations involved in these programs.

Develop a non-regulatory, incentive-based program for habitat restoration, management, and protection, utilizing a multi-species approach.

This Action Plan creates a Coastal Habitats Coordinating Team to facilitate the development of a strategy for identification, prioritization, and long-term management of properties for potential acquisition and/or restoration within the Mobile Bay NEP area. The Team will use regulatory and non-regulatory approaches to habitat management, including conservation easements and tax incentives. In addition, this plan will determine the legislative and other infrastructural requirements for implementing new incentive programs, drafting incentives-based measures and facilitating incorporation into local ordinances, and integrating coastal habitat acquisition, restoration, and preservation strategies.

(NOTE: Incorporates former action items HL-A2 and A3.)

SUBMERGED AQUATIC VEGETATION (SAV)

Sub-objective: Maintain existing native Submerged Aquatic Vegetation (SAVs) at 2001 levels and increase acreage by 3% of known areas where native SAVs occur by 2006.

The following action item describes how this sub-objective will be accomplished:

HM-B1 Protect or restore SAV habitats in the Mobile Bay NEP area.

This Action Plan will identify and prioritize SAV sites in need of restoration, promote volunteer planting efforts, develop opportunities for including SAV restoration in mitigation strategies, monitor restoration efforts, provide education and outreach about SAV protection, develop maps of SAV areas, and produce and post signage marking SAV habitat.

(NOTE: Incorporates previous action plan HL-A5 and C1.)



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COASTAL WETLANDS

Sub-objective: Maintain and protect all types of coastal wetlands within the MBNEP study area (including quantity, function, and value) and increase acreage by 5% of those types that have declined, by 2006.

The following action items describe how this sub-objective will be accomplished:

HM-C1 Maintain and/or improve beneficial wetland functions within individual watersheds of the Mobile Bay NEP area by: a) reducing the loss in quality and quantity of existing wetlands; b) preparing a strategic mitigation plan for coastal Alabama; and c) restoring degraded marsh habitats.

This Action Plan will use a multi-agency task force to develop baseline information on wetland coverage and function within individual watersheds, determine the cause and extent of wetland function loss, examine the effectiveness of existing regulations, and develop a mitigation strategic plan and restoration prioritization strategy for coastal Alabama.

(NOTE: Incorporates previous action plans HL-A6, A7, D1, and D2.)

NATURAL SHORELINES BEACHES AND DUNES

Sub-objective: Protect existing natural shoreline, beach and dune habitat and restore previously altered habitats, where feasible, including the rehabilitation of altered shoreline by 1000 feet per year.

The following action item describes how this sub-objective will be accomplished:

HM-D1 Reduce the loss of beach and dune habitat through development of coastal regulations that examine projects for impacts on beach and dune habitat.

The purpose of this Action Plan is to build support for revisions to the Alabama Coastal Area Management Plan (ACAMP) to examine projects for impacts on beach and dune habitat to implement better management practices and planning strategies for coastal developments.

(NOTE: Incorporates previous action plan HL-B2.)



ED ORTH

HM-D2 Determine the impacts of dredging activities and disposal practices on natural beach erosion processes and develop alternative dredge material disposal techniques to improve shoreline areas.

This Action Plan creates a Coastal Dredge Material Task Force to address shoreline erosion impacts from channel maintenance dredging, beneficial uses of dredge materials, and alternative disposal methods.

(NOTE: Incorporates previous action plan HM-B1.)

HM-D3 Research the extent of shoreline erosion due to boat wakes and other factors and reduce the loss of bay/sound/bayou intertidal habitat due to bulkheading and the impacts of bulkheads.

This Action Plan addresses the negative environmental impacts of shoreline bulkheading by calling for a full analysis of the extent of bulkheading in the area, assessing the impact of boat wakes, developing incentive-based alternatives to bulkheading, and determining the need for improved boat wake regulations in sensitive areas.

(NOTE: Incorporates previous action plans HL-B5, F1, and F2.)

NESTING HABITAT

Sub-objective: Maintain and protect nesting habitat for colonial and migratory birds and reduce declines in nesting habitat due to human disturbance and alteration.



DR. JOHN DINDO

The following action item describes how this sub-objective will be accomplished:

HM-E1 Prevent the decline in nesting habitat for colonial and migratory birds and reduce declines in nesting habitat due to human disturbance and alterations.

This Action Plan will coordinate existing efforts to identify, prioritize, acquire, and manage nesting habitat for colonial and migratory birds. Where possible, the plan seeks alternative ways to create and restore suitable habitat. In addition, the plan will assess current regulations and monitoring of nesting habitat. Finally, this plan makes specific recommendation for preservation of the Cat Island rookery.

(NOTE: Incorporates former action plan HL-A1.)

HUMAN USES

Management Conference Objective: Provide consistent, enforceable, regional land and water use management that ensures smart growth for sustainable development and decreases the negative impacts of growth related activities on human health and safety, public access, and quality of life by developing and implementing plans consistent with the CCMP by 2006.

In order to accomplish the above objective, the Human Uses Workgroup focused on three separate sub-objectives, as follows:

SUSTAINABLE LAND USE PLANNING

Sub-objective: Enhance quality of life by improved planned and managed development.

The following action item describes how this sub-objective will be accomplished:

HU-A1 Develop and implement land use planning that ensures smart growth for sustainable development designed to abate sprawl and loss of aesthetically pleasing environment.

This Action Plan includes efforts to abate urban sprawl and loss of aesthetically pleasing environment, through redevelopment of existing structures, preservation of high-quality lands, and implementation of managed cluster developments that incorporate greenspace. In addition, this plan will create a multi-agency task force to develop and implement a plan for green belts, riparian corridors, stream fisheries habitat, and non-fragmented habitats within subwatersheds of the Mobile Bay NEP.

(NOTE: Incorporates former actions HU-B2, B3, B5, C1, D1, and HL-A8.)



DR. GEORGE CROZIER

HYDROLOGIC MODIFICATION

Sub-objective: Reduce the negative hydrologic effects of inadequately planned and/or managed development on human health and safety, specifically:

- (1) Maintain or adjust stream flows to minimize the negative effects of flooding, erosion, and adverse changes in estuarine salinity, as necessary and where feasible.
- (2) Protect, manage, and/or restore 1000 acres of floodplains by 2006 to minimize upstream and downstream flooding and erosion.
- (3) Protect, manage, and/or restore 5 miles of natural stream banks and bottoms to minimize erosion and loss of natural habitat by 2006.
- (4) Reduce locally-generated sediment loads by 10%

in Mobile and Baldwin County waterways by 2006 to reduce loss of navigation and to reduce adverse impacts on water quality, recreational activities, and aquatic communities.

The following action items describe how this sub-objective will be accomplished:

HU-B1 Assess and remediate negative hydrologic effects of past land management decisions.

Through this Action Plan, the Mobile Bay NEP will create a hydrologic review panel to assess cumulative impacts, hydrologic impacts of past land management practices, and develop remediation strategies where possible. In particular, the panel will review existing engineering design criteria and land use ordinances in order to develop holistic, watershed-based approaches to minimize hydrologic impacts of future development practices.

(NOTE: Incorporates former actions HU-A1, A2, A3 and HM-B2.)

HU-B2 Restore to more natural hydrological conditions, where feasible, Mobile Bay NEP waters that have been adversely impacted by artificially created structures.

This Action Plan includes steps to address existing major hydrologic modifications within the Mobile Bay NEP area. Specifically, the plan contains steps to address and remediate impacts of the Mobile Bay Causeway, navigation channel construction and maintenance operations, removal of an existing dam across Pinto Pass, and the cumulative impacts of hydrologic modifications and upland development on D'Olive Bay.

(NOTE: Incorporates former actions HM-A1, A2, E1, E2, and E3.)

HU-B3 Reduce the impacts of erosion and sedimentation on stream banks and bottoms from construction, road building and unimproved roads, agriculture, silviculture, waterfront property development, dirt and soil mining, and utilities work site runoff.

This Action Plan will establish and evaluate engineering design criteria and land use planning for the Mobile Bay NEP area, while also encouraging watershed-based approaches to water quantity, quality, and flood management. In addition, this plan will develop management strategies, Best Management Practices (BMPs), and incentives for reducing stormwater runoff associated with construction sites (with particular attention to waterfront development), road building, utilities work sites, land clearing, silviculture, agriculture, soil mining, and impervious surfaces.

(NOTE: Incorporates former actions HM-C1, HU-A3, and WQ-D2, D6, and D8.)

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PUBLIC ACCESS

Sub-objective: Increase public access to water resources.

The following action items describe how this sub-objective will be accomplished:

HU-C1 Encourage eco-tourism, increase public access and awareness of sites, and expand camping and recreational facilities in the Mobile Bay NEP area.

This Action Plan will include efforts to increase the number and quality of public access sites through public purchase and public-private access partnerships. In addition, this plan will include steps to publicize existing facilities. Finally, this action item will include a cost/benefit analysis aimed at increasing the availability of camping and recreational facilities, with particular emphasis on public properties in the Mobile-Tensaw River Delta.

(NOTE: Incorporates former actions HU-C2 and C3.)

HANK BURCH



EDUCATION AND PUBLIC INVOLVEMENT

Management Conference Objective: Increase awareness of natural resource issues and promote understanding and participation in conservation and stewardship activities.

In order to accomplish the above objective, the Education and Public Involvement Workgroup focused on two separate sub-objectives, as follows:

PUBLIC AWARENESS

Sub-objective: Increase public awareness of environmental issues among all stakeholders, including local, state and federal political leaders, agencies and citizens, by developing and implementing Coastal Environmental Education Campaigns.

The following action items describe how this sub-objective will be accomplished:

EPI-A1 Continue existing public outreach efforts included in Mobile Bay NEP Workplan while developing and/or enhancing Coastal Environmental Education Campaigns focusing on identified areas of concern and targeted to specific user groups and audiences.

This Action Plan, which is already underway, calls for the continued implementation of the Mobile Bay National Estuary Program public participation and education strategy. In particular, the plan will focus on applying citizen feedback collected through Local Community Initiatives (LCIs) to the implementation process. In addition, this Action Plan will facilitate the development of targeted Coastal Environmental Education Campaigns dealing with all previously defined priority issue areas, including habitat issues, pathogens, erosion and sedimentation, toxic chemicals, waste disposal, exotic species, and conservation, among others.

(NOTE: Incorporates former action plans EPI-1, EPI-2, HL-A4, WQ-C3, C4, D2, B2, HL-B1 and B3, and HU-B4).



U.S.F.W.S.

PUBLIC PARTICIPATION AND MONITORING

Sub-objective: Increase public participation by developing and implementing a comprehensive citizen-based monitoring program.

The following action item describes how this sub-objective will be accomplished:

EPI-B1 Implement a Comprehensive Citizens Monitoring Effort, including a Citizen Reporting System.

The purpose of this Action Plan is to develop a one-call watchdog environmental monitoring system for the Mobile Bay NEP area. The plan will educate citizens about environmental regulations and reporting procedures, and will serve as an environmental clearinghouse for citizens. Particular efforts will be made to apply citizen monitoring to harvesting regulation enforcement and to coordinate existing monitoring programs.

(NOTE: Incorporates former action plans EPI-3 and LR-A10)



ALABAMA COASTAL FOUNDATION



Next Steps

Draft CCMP Approval and Implementation

Although the Draft Comprehensive Conservation and Management Plan for the Mobile Bay National Estuary Program is complete, it is very safe to say that the true work is just beginning. Over the past several months, the draft has undergone public presentation and review through a series of Local Community Initiatives. This review process gave individual citizens, resource management agencies, and other stakeholders the opportunity to provide final input on the CCMP. All comments received regarding the draft CCMP were addressed before this version of the CCMP was issued.

Following public review and incorporation of public comment, the final version of the CCMP will be submitted to Alabama’s Governor for approval and submission to the U.S. Environmental Protection Agency. Once approved, the intensive work to implement the Action Plans of the CCMP will be fully underway. This is truly a landmark achievement and historic milestone for the Mobile Bay Estuary.

At this juncture, citizen involvement becomes even more crucial to the overall success of the plan. This plan belongs to the stakeholders of the Mobile Bay Estuary, and you are strongly encouraged to take ownership of this document and work with the Mobile Bay NEP and cooperating agencies to ensure successful implementation.

Local Community Initiatives

As a public document, the draft CCMP was subject to public review for more than 30 days.

In order to maximize distribution of the document, collect feedback, and answer any specific questions, the Mobile Bay NEP planned a series of 13 Local Community Initiatives (LCIs) in each of the subwatersheds of the Mobile Bay NEP area. The Mobile Bay NEP program staff also held a series of meetings with local political leaders, industry and agency representatives during this time to collect comment and feedback.

The LCIs provided citizens with on-site opportunities to discuss specific issues most applicable within their own watersheds, as well as the CCMP as a whole. Mobile Bay NEP program staff and its agents presented a detailed overview of the draft CCMP, highlighting issues specific to the host watershed. LCIs were open forums where public comment was collected and addressed before issuance of the final draft CCMP. All stakeholders were strongly encouraged to attend the LCI within their watershed. The meeting locations are detailed below:

Local Community Initiatives

<u>Sub-watershed:</u>	<u>Regions Affected:</u>	<u>When/Where:</u>
Mississippi Sound /Bayou la Batre	Grand Bay, Bayou la Batre	Tuesday, April 24/Bayou la Batre
Bon Secour /Ft. Morgan	Bon Secour, Ft. Morgan, Foley	Thursday, April 26/Gulf Shores
Dog River, Lower Mobile River	Mobile	Tuesday, May 1/Mobile-Dog River
	Mobile	Thursday, May 3/Mobile-downtown
Weeks Bay Watershed	Weeks Bay and Magnolia River	Tuesday, May 8/Fairhope
Mobile Tensaw River Delta	North Baldwin County	Thursday, May 10/Bay Minette
Lower Three-Mile Creek	Prichard, Mobile	Tuesday, May 15/Prichard
Eastern Shore	Spanish Ft., Fairhope, Pt. Clear	Thursday, May 17/Daphne
Bayou Sara, Cold Creek /Cedar Creek	Citronelle, Kushla, Chunchulla, Mt. Vernon, Satsuma	Tuesday, May 22/Axis
East Fowl River and Deer River	South-West Mobile County	Thursday, May 24/Environmental Studies Center
Chickasaw Creek	Saraland, Creola, Eight-Mile	Tuesday, May 29/Chickasaw
Lower Three-Mile Creek	Prichard, Mobile	Tuesday, June 5/Prichard
Mississippi Sound/Dauphin Island	Dauphin Island	Thursday, June 7/Dauphin Island

Implementation

Although this volume addresses implementation as a future activity, in many respects, it has already begun. Through annual Workplans, cooperative agreements with resource management agencies, and Action Plan Demonstration Projects, implementation of some items within the CCMP is already underway.

In order to facilitate a smooth transition into implementation and to increase community involvement, the Mobile Bay NEP Management Conference underwent structural changes. The Policy and Management Committees remained intact as currently organized. The Citizens Advisory and Technical Advisory Committees, however, merged into the previously described Community Advisory Committee in early March 2001. This subtle change in operational structure was designed to provide continued input to the issues being addressed by the CCMP during implementation.

The Community Advisory Committee (CAC) will provide volunteer resources to support all levels of Mobile Bay NEP activities and functions. Membership in the CAC is open to all interested stakeholders. The program staff of the Mobile Bay NEP invites you to join this committee and share your input as we continue to implement the CCMP.

As the citizens of the Mobile Bay Estuary implement the actions described in this Compre-

hensive Conservation and Management Plan, the progress will be monitored in several ways. First, each individual Action Plan contains various steps and an approximate timeline for completion. In addition, the Mobile Bay NEP commissioned the development of a monitoring strategy to identify indicators that could be routinely measured to gauge change as a direct result of the CCMP implementation. Finally, the Environmental Protection Agency, which oversees the Mobile Bay NEP, will conduct periodic reviews of the program's success throughout implementation.

In closing, it is important to note that this CCMP— even when signed — represents only a snapshot in time and should be considered a living, working document. New issues will arise in the future that may not be addressed within this document. However, the Mobile Bay National Estuary Program and cooperative stakeholders will be active and will stand ready to address those issues. A fundamental purpose of the Mobile Bay NEP has been — and will continue to be — the empowerment of local communities to take responsibility for maintaining and improving the health of our estuary while maintaining its designated uses. This service will continue as long as there exist citizens interested in maintaining the Mobile Bay Estuary for future generations.

“One thing is certain. We will not achieve our potential if we ignore or abuse nature.”

— M. Wilson Gaillard

Noted Mobile conservationist for whom Gaillard Island is named. From Moving the Earth For a Song (1968)



The Mobile Bay National Estuary Program
4172 Commanders Drive
Mobile, AL 36615
Phone: 251/431-6409
Fax: 251/431-6450
www.mobilebaynep.com

