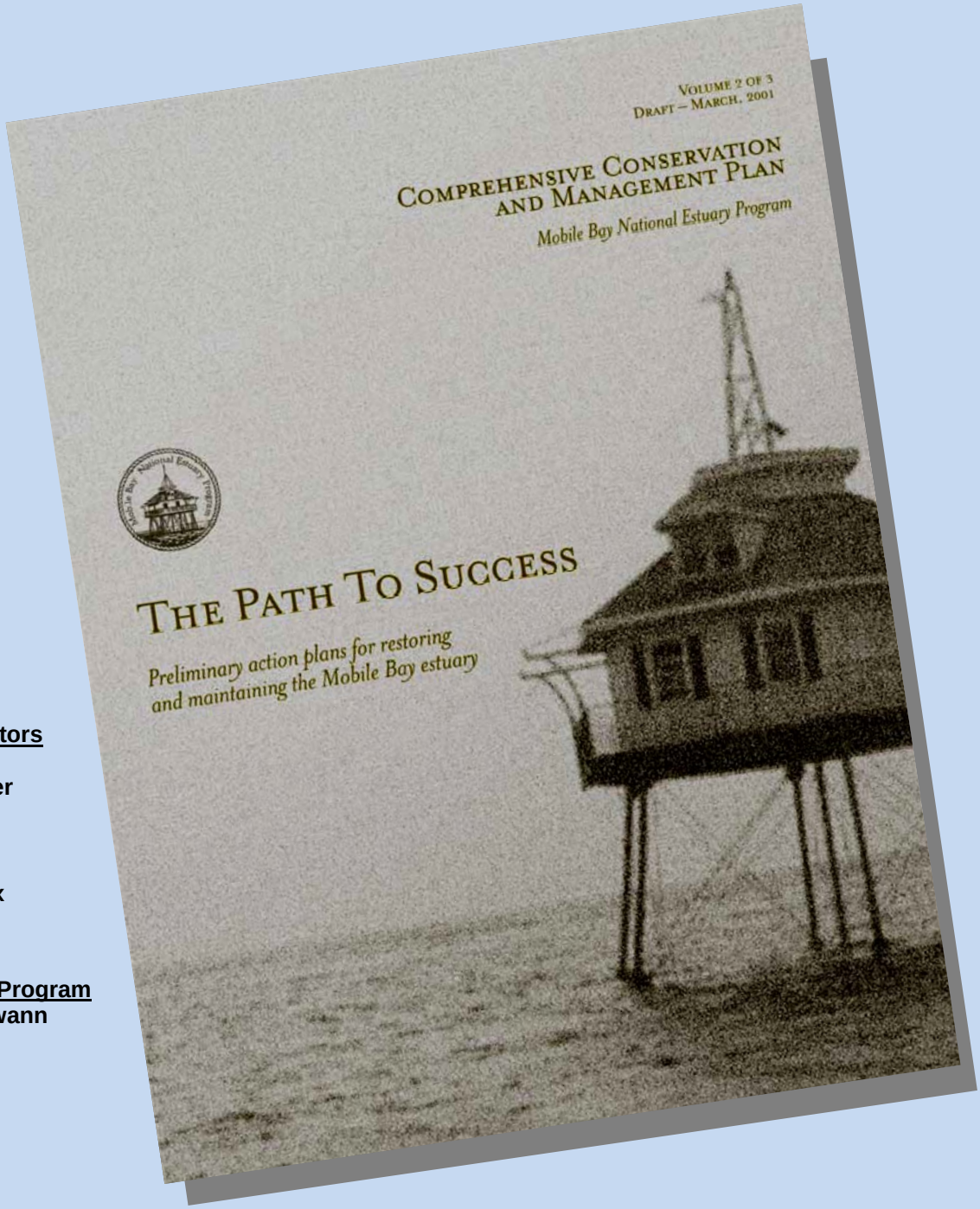
Mobile Bay National Estuary Program
Comprehensive Conservation Management Plan
The Path to Success: A Review of Implementation Efforts

Prepared July, 2012



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A Note from the Director:

The following report, *Comprehensive Conservation and Management Plan (CCMP) Review 2012* represents an overview of ten years of accomplishments towards realizing the goals the Mobile Bay National Estuary Program (MBNEP) Management Conference set forth in the 2002. These accomplishments are the results of the synergy created by the MBNEP Management Conference members working together in a spirit of cooperation. This synergy has resulted in the realization of objectives and sub-objectives that may not have been individually attainable.

The *CCMP Review 2012* not only documents accomplishments- it brings forward sub-objectives and tasks from the current CCMP which were not addressed. These sub-objectives will be combined with a list of recommendations prepared by the many authors of this document. Contributors included Henry Malec, Paul Looney, Brett Webb, and Skeeter McClure of Volkert and Associates, Inc. and John Carlton, Dr. Rick Wallace, Steve Health, Randy Roach, Dr. George Crozier, and Cherie Arceneaux who provided commentary on each of the CCMP objective areas.

This report contains over one hundred recommendations to be considered as part of developing the next CCMP. The issues they address include: citizen participation; development of a monitoring program for key species that are proxies of ecosystem health; improving citizen education with a particular focus on stormwater management; identifying/restoring/protecting areas of most stress and least stress throughout the estuary; improving estuarine research; improving the regulatory framework to support environmental protection; improving management of critical habitats that support estuarine-dependent species and supporting/employing new technologies to mitigate human impacts on the environment.

The next CCMP will be based on the recommendations contained in the following pages, a scientific assessment of where the greatest stresses are on the habitats that provide critical ecosystem services to our quality of life, and on what the community values most and believes to be the major environmental challenges in coastal Alabama. In this next plan it will be imperative to address the issues of trash in our waterways and watersheds, stormwater pollution, and sediment management. We will challenge community stakeholders to forge new partnerships to champion the regulatory and financial support necessary to protect, restore and conserve our coastal resources. Finally, we will seek out new ways of promoting the wise stewardship of the water quality and living resources of the Mobile Tensaw Delta and the Mobile Bay estuary.

On that note I leave you with the words of Henry Ford, ***"If everyone is moving forward together, then success takes care of itself."***

Regards,

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- Also Leopold, from A Sand County Almanac

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BACKGROUND

The National Estuary Program (NEP) is a federally authorized program established by the Clean Water Act (CWA) Amendments of 1987. The NEP is administered and funded by the U.S. Environmental Protection Agency (EPA) with a requirement of matching non-federal funds or in-kind services on a 1:1 ratio for the federal funds. The Mobile Bay National Estuary Program (MBNEP) was added to NEP by EPA in September 28, 1995 with the establishment of its Management Conference.

The MBNEP Management Conference (MC) is a collection of individuals representing local, state and federal government agencies, as well as environmental organizations, business and industry, landowners, academic experts and the general public with the responsibility to identify priority issues and to develop the course of actions to lead the MBNEP. The five issue areas developed by consensus were *Water Quality, Living Resources, Habitat Management, Human Uses* and *Education and Public Involvement.* Subsequent to years of development with hundreds of participants working at various levels, the *Comprehensive Conservation and Management Plan* (CCMP) was completed and approved in April 2002.

An essential component of the 2002 CCMP is *Vol. II - The Path to Success*. This document consists of primary objectives to address the issue areas. These objectives, in turn, are broken into sub-objectives (Action Plans), and steps or tasks are suggested to accomplish each Action Plan. In total, the 2002 CCMP contains 29 explicit Action Plans with 101 steps on the "path to success."

The CCMP was not designed to be rigid. In recognizing the need to adapt to challenges and opportunities unknown in 2002, it was designed to be capable of flexibility - to adjust course if necessary. As a result, the *Comprehensive Conservation Management Plan Prioritization and MBNEP Strategic Plan for Implementation for 2007-2010* was prepared in 2006. Although not officially adopted by the MC, it accomplished a much needed review and helped the MBNEP to focus on its accomplishments and establish priorities within the CCMP. With the intent to increase its ability to function as a community capacity-builder and provide improved public services in the environmental area to our coastal communities, the MC was reorganized to consist of an Executive Committee and five constituent-based committees: Community Action Committee, Community Resource Committee, Government Networks Committee, Science Advisory Committee and Project Implementation Committee.

It has been ten years since the adoption of the CCMP, and five years have passed since the *Comprehensive Conservation Management Plan Prioritization and MBNEP Strategic Plan* was prepared. In the ever-changing world of environmental resources and with ever-increasing anthropogenic impacts upon environmental resources as well as catastrophic events such as hurricanes and the BP Oil Spill, adaptability is essential for planning and management to be valid and successful. Therefore, in acknowledgement of the need to be "up-to-date," the MBNEP will revise its planning processes and renew the CCMP. Specifically, the MBNEP Year 2011-2012 Work Plan states:

MBNEP's major focus for the coming year is to undertake a new comprehensive conservation planning process based on science that will become the community's road map for coastal environmental management and restoration. This planning process will require many steps, including determining our environmental management goals; building a monitoring program that tracks water quality, habitat change, and living resource abundance and diversity; identifying highly impacted watersheds in need of

comprehensive action planning; undertaking strategic ecosystem restoration projects that can be used to engage and educate citizens; cultivating investment and participation among the estuary's key stakeholders; and effecting policy changes at the State and local levels to improve long-term management of the resources.

The foundation for creating a new CCMP consists of three essential elements:

(1) Citizen input is crucial to their "ownership" of the updated CCMP plan. A comprehensive community survey has been conducted to assess environmental attitudes and values. This assessment has been successfully accomplished and will provide guidance on what environmental issues need to be addressed in the next plan.

(2) The MBNEP Science Advisory Committee (SAC) is in the process of establishing a scientific framework for evaluating ecosystem condition that integrates the community's vision for "what ecosystem health means and is" for coastal Alabama with a defined "ideal state" based on science and historical record. The SAC is determining biological conditions of priority habitats in part based on which habitat types have been most severely impacted by community growth.

(3) The Action Plans found in the *2002 CCMP Vol. II The Path to Success* need to be reviewed and evaluated to determine the extent to which this plan will be utilized as a starting point for creation of a subsequent or renewed CCMP. Based upon available information, a determination needs to be made as to the status of what was successfully implemented, is in progress or is completed; what gaps in implementation exist, and what areas require further study and action.

These three sets of information will be brought together in preparing the second CCMP so that the actions outlined in the plan resonate with the community, are achievable and realistic, and are based in science. In addition, MBNEP will continue to participate in the *National Resource Damage Assessment (NRDA*) process and *Coastal Recovery Commission's Road Map to Resilience*, where possible, to reduce duplication of efforts and streamline actions aimed at restoring our coastal environmental resources.

SCOPE OF REPORT

This report has been prepared to review and evaluate the current status of the 29 sub-objectives (Action Plans) contained in the *2002 CCMP Vol. II The Path to Success*. Activities described illustrate significant accomplishments by the MBNEP Management Conference in each Issue Area during the past ten years based upon available information. Gaps identified in the *2006 Comprehensive Conservation Management Plan Prioritization and MBNEP Strategic Plan* are also brought forward as well as the priority designations determined at that time. In addition, an evaluation is offered regarding the extent to which each sub-objective has been completed or whether it needs to be included in a new CCMP.

Opinions of experts familiar with both the MBNEP and the CCMP since origination have been included to correspond to each of the Issue Areas: Water Quality, Living Resources, Habitat Management, Human Uses and Public Education and Involvement. Each author's perception and critique offer invaluable suggestions of ways to improve the next CCMP. The format of the report begins with professional commentaries on each of the objective areas followed by a listing by objective area of the activities that were undertaken to achieve that objective.

Although this report attempts to capture the full range of activities undertaken to advance the objectives of the CCMP, there was no system put into place to document all activities in process or completed to implement the plan over the course of the ten year period. To that extent, the activities highlighted in this report do not represent the sum total of all that has taken place to improve environmental management in Mobile and Baldwin counties; rather they provide an overall picture of a diversity of partnerships, collaborations, and efforts that were accomplished to expand the wise stewardship of the water quality and the living resources of the Mobile Bay estuary.

WATER QUALITY

Commentary by John Carlton

Mr. Carlton served as Chief of the Mobile Branch of the Alabama Department of Environmental Management. Since retirement, Mr. Carlton has provided professional consultations relating to erosion and sediment control and environmental permitting and compliance on both private and public projects. Mr. Carlton currently serves on the Baldwin County Environmental Advisory Board and EPA's Environmental Technology Verification Program's Advanced Monitoring Systems Water Stakeholder Committee.

The author was asked by the MBNEP to provide commentary on his perceived degree of success implementing the Water Quality objectives of the original CCMP (ca. 2002), reflect on the processes employed to develop the original CCMP Objectives, and comment on the future direction of the program and revision of the CCMP. The comments on the "degree of implementation" are based almost solely on the original CCMP documents (April 2002) and the information presented in the *February 2012 draft CCMP Review* document provided by the MBNEP. The statements are the opinion of the author and do not necessarily reflect those of the MBNEP.

The MBNEP is by charter a non-regulatory entity whose only authority is to act as a facilitator and grantor to support and achieve the management goals set by the Management Conference. The success, or lack thereof, of achieving the goals of four out of the five issue areas identified by the program is largely dependent on the ability and willingness of the federal, state and local government entities having statutory management authority over the various resources or stressors. The author is of the opinion that the degree of "buy in" or commitment by these entities varies greatly and is often lacking (ADEM fines local government to compel compliance with MS4 permit requirements), as is the public's (as evidenced by the failed stormwater referendum). Approximately 6 years (1995-2002) were devoted to developing consensus among the myriad of committees and subcommittees on what the issues are and a course of action to address each issue. Having participated in the process on several levels, the author observed that, on occasion, the original issue statements, Objectives and Sub-objectives became less well defined as each "layer" of the Management Conference massaged it into something felt to be more palatable. The adage that "a camel is actually a race horse designed by committee" comes to mind.

The stated Objective for Water Quality was to "attain and/or maintain water quality sufficient to support healthy aquatic communities and designated human uses by 2010." The author believes that this Objective was largely met, even though a number of the stated Sub-Objectives and/or action items in the CCMP were not. This is based mostly on anecdotal information since there were no water quality specific indicators

being monitored to determine the degree of success. Excepting that period of time during the BP oil spill response (summer 2010), human uses of the coastal waters are thought to have been at or near historical, if not record high, levels. Swimming beach health advisories are generally down. There are more water bodies with water use classifications/designations related to high quality waters (7) than there are with less than the fish & wildlife classification (5). However, the stated CCMP Objective is not based on true water quality indicators but other resources so the commentary on the Living Resources and Human Uses issue areas may actually provide greater insight.

Although the February 2012 *Draft CCMP Review* occasionally lists one particular effort under several Sub-Objectives and includes efforts unrelated to a particular Sub-Objective, individually, several of the Sub-Objectives and Actions related to water quality do appear to have been implemented or achieved, to various degrees, since 2002.

By example, Action Plan WQ-A1 was aimed primarily at better definition of water quality problems through assessment of existing data and filling in data gaps. It appears that a number of worthy efforts have been undertaken, some on-going, that relate to this Action even though they were not envisioned during the development of, or included in, the original CCMP (e.g. beach monitoring effort). Other efforts undertaken that are included in the *CCMP Review*, although worthy in their own right, do not directly support the stated Objective or Sub-Objective (e.g. ADEM spill response has been on-going since at least 1974, volunteer water quality monitoring data can rarely be used for scientific or regulatory purposes).

The Watershed Model and Loadings-Budget Analysis produced by Tetra-Tech (2001), although stating that "insufficient in-stream monitoring data were available throughout the basin to perform a thorough calibration and validation", appears to have been a significant accomplishment towards meeting Water Quality objectives of the CCMP. That model, even with limited validation, likely provides the best available estimates on 2001 loadings to the bay and projections of future (2010) loadings. It would be interesting to run the model with more recent data to see how accurate it was in predicting "only minor and/or insignificant pollutant increases" in loadings. However, additional refinements are necessary or desired in order for the model to be utilized in the NPDES permitting process and until this happens, little progress can be made toward achieving portions of WQ-A1 and WQ-A2. Most of the watershed or tributary assessments were completed; monitoring of atmospheric deposition was conducted from 2001 through 2009 (although currently discontinued); and several continuous water quality monitors are being operated around the Bay.

WQ-A2 focuses on incorporating the loadings information (from WQ-A1) into NPDES permits. Although a model was developed, the extent to which it is actually used in the NPDES or TMDL development process is limited. A few NPDES permits within the MBNEP area have been based on waste load allocation modeling; however they are source and segment specific and generally higher in the watershed above tidal influences (ADEM, personal communication). Completion of the full model by MBNEP and EPA Region IV is anticipated in the near future. Additionally, counting the number of stream segments listed on the 303(d) list and the number of TMDLs developed within the MBNEP area, though interesting, provides little scientific evidence that water quality has actually been improved or protected or is in decline. Increased 303(d) listings most often indicates an increase in available water quality data, not necessarily new or increased anthropogenic stressors or impacts. To date 16 water bodies within the MBNEP area have approved TMDLs for either pathogens, over-enrichment/dissolved oxygen, or both.

WQ-A3 sought to address potential groundwater quality issues. It appears that characterization studies have been completed and several "workshops" have been held, but no comprehensive management strategy has been produced or adopted. The lack of statutory authority for anyone to regulate groundwater withdrawal, other than within the ADEM designated coastal zone, is likely a hindrance.

Protection and maintenance of "High Quality Waters", WQ-A4, appears to have been partially achieved. There are currently 7 stream segments or water bodies within the MBNEP area that are designated as ONRW or OAW. However, the author is not aware of any ongoing efforts dedicated to identifying other water bodies that may qualify for such designations.

The "nutrient reduction" Sub-Objective is coincidentally being addressed through several of the efforts undertaken under the previously mentioned "water quality loadings" Sub-Objective, *to wit*: The ADEM watershed studies should identify "problem sub-basins"; WQ-B1, the reduction of excessive nutrient loadings, appears to be the focus of at least 6 of the TMDLs that have been developed. It appears that the MBNEP has done its part supporting initiatives aimed at this Objective through various workshops, support of the CACWP, development of watershed plans and support of NPS activities statewide (WQ-B2). However, very few actual stormwater improvement projects have been completed and those that have been were primarily aimed at mitigating stream and channel erosion, flooding, or habitat restoration but not necessarily nutrient impacts. 303(d) listings and TMDLs for nutrients within the upper portion of the basin should help focus future efforts.

Based on the information in the *Draft CCMP Review*, the Sub-Objective relating to pathogen reduction (WQ-C1) has received a great deal of attention. There is evidence that a large portion (~98%) of Mobile Bay previously listed for pathogens may be delisted based on new information/data that indicates the impaired portion of the Bay is limited to near-shore waters (ADEM, *Final Mobile Bay TMDL*, Dec. 2010). 13 pathogen TMDLs for segments within the MBNEP area have been developed by ADEM and approved by EPA. Swimming beach advisories are down from previous years, particularly when one considers that 50% of the total advisories were at only 2 near-shore locations (within the impaired area listed by ADEM). No Gulf of Mexico beach waters have ever been closed due to pathogens. *Coliform* bacteria (our most commonly used pathogen indicator) inputs to the Bay and its tributaries probably predate human settlement in the region and will likely continue past human extinction. Future efforts should probably be focused on human sources of pathogens in priority areas, i.e. those areas on the 303(d) list and where TMDLs have been developed for pathogens.

Sediment quality is often included under water quality Objectives because no one really knows where to put the issue or how to deal with it. Consequently, little has been accomplished. The stated Sub-Objective is, in the pertinent part, to "evaluate the sources and loads of toxic chemical…and reduce where necessary…to meet water quality standards". Additional sampling has been undertaken as part of other programs (NCA and NSQS) and some assessments have been made based on available data. Of the 18 water bodies on the 2010 303(d) list because of a "toxic chemical", Mercury (Hg), based mostly on fish tissue concentrations, is the culprit in every case with only one of 18 segments listed being due to contaminated sediments (Cold Creek). Atmospheric deposition, not point sources, is suspected in the Hg issue which is at least regional, if not national, in scope.

A more telling review of the degree of success of implementing the CCMP would likely be at the individual Action Plan level (as opposed to the sub-objective level). Determining if the stated Sub-objectives and Action Plans actually attained the desired Objective or Goal is complicated by the lack of appropriate indicators and the lack of a comprehensive monitoring program.

Updating any type of management plan is necessary from time to time and the MBNEP CCMP is no exception. The new approach, as explained by MBNEP staff, appears to be better based in science, or at least has the potential to be. Continued efforts toward problem identification should help focus the limited resources of the various agencies to achieve the greatest environmental improvement.

LIVING RESOURCES

Commentary by Rick Wallace

Dr. Rick Wallace retired as Director of the Auburn University Marine Extension and Research Center in 2008. During his 25 years he worked on a broad range of topics including soft-shell crab production, by-catch reduction, oyster restoration/production and fisheries management issues. He served as a facilitator for the Living Resources Section of the Comprehensive Coastal Management Plan. Mr. Wallace is currently the president of the Weeks Bay Foundation.

The Comprehensive Conservation and Management Plan (CCMP) formulated in 2002 contains 29 explicit Action Plans with 101 steps on the "path to success." The Living Resources section of the CCMP contains 6 action plans ranging from "Improve Monitoring of Key Living Resources" to "Manage Recreational and Commercial Fishing Efforts". These Action Plans came about in large part through citizen input and reflect a wide range of citizen concerns. The Draft CCMP Review lists each of the 6
Action Plans followed by a "To what extent was this sub-objective implemented" section and a "Do further actions or study need to be undertaken to achieve this sub-objective" section. This critique focuses on the question of implementation and suggests improvements for future management plans.
In retrospect, the expectations of citizens exceeded the resources and capabilities of MBNEP. Despite this obstacle, according to the Draft CCMP Review, the MBNEP had a direct and important role in implementing parts of the 6 action plans in the Living Resources section. Programs and activities that are attributable to MBNEP efforts include:

- AMRAT
- Analysis of data for trends in living resources
- Standardization of bird surveys
- Manatee Sighting network
- Oyster gardening
- Measuring fishing effort

The Draft CCMP Review includes a number of other programs and activities that contributed to implementation under each of the 6 action plans. Most of these are attributable to "partner" agencies and organizations and the role of the MBNEP is unclear. This, in part, is due to the scope of the topics that citizens included and unrealistic expectations that the MBNEP would have the resources or "power" to take on activities traditionally lodged in large, long standing agencies and organizations. For example two of the Action Plans ("Increase Fisheries Resources" and "Manage Recreational and Commercial Fishing Effort") fall largely within the responsibility of Department of Conservation and Natural Resources – a department with over 40 years of history and a long record of direct citizen input to that agency through the

Conservation Advisory Board and the State legislature. As a result, the extent to which sub-objectives were implemented was almost entirely in the hands of the Department and the implementations listed in the CCMP Review reflect this. The same could be said of other Action Plans with the addition of other similar agencies and organizations (U.S. Fish and Wildlife Service, Dauphin Island Sea Lab etc.). In other words much of the listed implementation is due to agencies doing the things they would normally be doing to complete their missions.

Living resources, particularly, seafood and birds, are among the most visible and understandable elements that the public can relate to in regards to the MBNEP and the CCMP. Therefore it is important that future CCMPs continue to address living resources but different approaches may be needed given the resources of the MBNEP. The MBNEP might best address living resources in the following ways:

1. Continue efforts to improve or maintain water quality through non-point source programs and storm water programs. There are real opportunities for the MBNEP, with help from the EPA, to educate citizens and policy makers, on these two issues. Future CCMPs should make strong links between water quality and living resources.

2. Similarly, efforts to improve or maintain habitats for living resources will be extremely important. Continue supporting agencies and organizations that have a strong interest in habitats and again emphasize the links between habitat and living resources.

3. The MBNEP has sought for years to find a representative organism or group of organisms that could be monitored for more tangible evidence of trends. There are many problems with this concept particularly in the highly variable environment of Mobile Bay but the effort should continue in partnership with the appropriate agencies/organizations.

4. The MBNEP can continue to serve an important role in bringing scientists, citizens and agencies together to address the Living Resource goal to “Maintain native populations within historical ranges and natural habitat and restore populations that have declined”. This can be done in the more general sense without creating a large number of specific Action Plans that are beyond the resources of the MBNEP to implement.

In summary the CCMP goal in Living Resources is a lofty goal worth striving for but the MBNEP should reduce and narrow the action plans to those that it can realistically implement or realistically influence. The CCMP should play to the strengths of its Federal partner, EPA, and emphasize efforts in water quality as an essential factor for living resources. Habitat conservation and restoration remain crucial to living resources and require strong partnerships.

Commentary by Steve Heath

Steve Heath retired after working for the Alabama Department of Conservation and Natural Resources, Marine Resources Division, for 32 years. He served as the Division's Chief Biologist for twelve years and has been involved with the Mobile Bay NEP on various committees since its designation.

I think that progress has been made on the CCMP over the last ten years. The majority of the progress quoted in the review was accomplished by universities and agencies that would have performed the same

projects even in the absence of the MBNEP. However, I think that the MBNEP was a catalyst that hastened the process with the meeting of the minds they facilitated and the infusion of money in areas that were not otherwise funded. I don't say this to denigrate the MBNEP but to segue into a discussion of what I think is the greatest value of the MBNEP and what I hope will be a major focus in the CCMP for the next ten years.

It would probably be wise for MBNEP to narrow its focus to those goals considered most important in the latest survey of participants in the program. Use whatever funding may come MBNEP's way that is available for efforts to assist universities, non-governmental groups (NGO) or private entities to pursue initiatives toward completion of those goals.

Another and perhaps more important function of the MBNEP would be to act as a liaison among the various groups of citizens, NGO's, universities and state agencies to improve cooperation and understanding among the groups. I think that the MBNEP has done this to an extent during the first ten years, but I think that if this was stated as a defined goal, even greater strides could be accomplished over the next ten years. The MBNEP, in order to do this, must express the commonalities among the various groups rather than merely providing a forum for a dialog of conflict.

I have talked to enough members of the various groups to know that all of us are really interested in maintaining and improving our coastal environment and protecting the resources. However, we all have our own personal axe to grind depending upon where our personal interests lie. But we are willing to compromise and know that this is possible because we have all been forced to do so in some way or another throughout the last ten years.

In the next ten years, I think the MBNEP could make great strides in working for productive compromise rather than consensus; recognizing that each group will have particular needs they will defend rigorously. The MBNEP could fill an important leadership role as a bridge-builder between groups by learning as much as possible about the needs and desires of each group and explaining these to the others in a positive spirit of reinforcement. In this way, hopefully, everyone's understanding of each other's needs would improve to the point that constructive compromise would enable accomplishment of common goals. If the MBNEP can maintain a neutral position in this process, hopefully, it will become the driving force behind a new perspective of realistic and attainable goals.

Finally, the MBNEP might reach the point that it could create a gathering of representatives from each group that would work together to overcome the limitations and difficulties that frustrate each group in their attempts to reach their own goals or fulfill their group's responsibilities.

HABITAT MANAGEMENT

Commentary by Randy Roach

Randy Roach is currently retired having worked for U. S. Fish and Wildlife Service in Maryland, West Virginia, North Dakota, Mississippi and Alabama for 36 years with the last 16 years of service along the Gulf Coast. He is a Governor's appointee on Weeks Bay Technical Advisory Committee where he currently serves as chairman. Roach helped develop the Habitat Management Section of the original CCMP.

The CCMP directive for the Habitat Management section shoots for "optimum fish and wildlife habitat in the Mobile Bay system". While this sounds like a worthy goal, management implies that changes in habitat will be necessary. Some habitats will be preserved and managed either passively or actively over time. Others habitats will be restored. For example, open fields will be restored to longleaf pine or open water bottoms will be restored to submerged or emergent grasses. In each case some species of fish and wildlife will benefit while others will be adversely affected. Few would argue that if we are managing for "optimum fish and wildlife habitat," the two examples given above would not be beneficial changes, but begs the question of how much of each habitat is enough so we know when we reach the "optimum." Simply put, the optimum habitat goals should be linked to the wildlife species goals. Submerged Aquatic Vegetation (SAV) goals could be linked to waterfowl population goals for the North American Waterfowl Management Plan or a stock assessment for estuarine fin fish. Beach and dune habitat goals could be linked to beach mouse, shore bird and sea turtle goals. Longleaf pine habitat could be linked to gopher tortoise, Bachman sparrow and black pine snake goals. However, developing the specifics of these links between species and habitats goes far beyond the scope of this evaluation.

The sub objectives for Habitat Preservation, Coastal Wetlands, Nesting Habitat, Submerged Aquatic Vegetation, and Natural Shorelines, Beaches and Dunes are very specific in terms of number of sites to be acquired, acreage of wetlands and SAV to be increased, and feet per year of shoreline rehabilitated. The degree to which these goals have been met are not specifically covered in the February 2012 Draft CCMP Review. *Are the accounting mechanisms in place to determine whether these goals have been met? From reading this document, apparently there is not a consistent systematic approach to ascertaining whether the goals have been met.* Studies conducted by the Fish and Wildlife Service on wetland changes found some wetland types changed to other wetland types or upland habitat types. Unless a consistent mapping approach is undertaken, only confusing results will be obtained. Therefore, a consistent habitat monitoring program coupled with some analysis of how and why habitats changed over time should be part of any

revised CCMP**.** Unless the causes for the change are determined, corrective actions cannot be effectively undertaken and the goals for increasing wetlands types in decline cannot be achieved.

HM.A1 Develop a Coastal Habitats Coordinating Team- This sub objective is a worthy undertaking as it brings all the resource agencies together to plan for the protection and restoration of priority habitats in a holistic approach to conservation of important fish and wildlife resources. There are numerous examples of partnerships formed to fund acquisition and management of priority sites. One example is the acquisition of the Meadows Tract near Weeks Bay with a partnership with the Conservation Fund, Alabama Department of Conservation State Lands Division, the Weeks Bay Foundation, and Baldwin County Commission. As part of CCMP review, a list of priority sites that were acquired through these partnerships should be accounted for in the document.
The Mississippi-Alabama Habitats Database is a program developed to track habitat restoration projects. The product is complete; however, the data input requires an effort by several resource agencies that already have habitat accounting systems in place. Two of the largest data bases in the Mobile Bay NEP area are the Fish and Wildlife Service's Habitats data base and the NRCS data base. Whether these agencies are willing to provide access to the data due to privacy concerns may be problematic. In any case the Mississippi-Alabama Habitats Data base may be an underestimate of the actual habitat restoration being accomplished.

The GIS tool that created a Prioritization Guide for Coastal Habitat Protection in Mobile and Baldwin Counties appears to be useful in setting priorities. The usefulness of the Emergy Analysis is unclear.
Do further actions/areas of study need to be undertaken to achieve this sub-objective?
There has probably been enough study regarding "how to" prioritize habitats for acquisition and restoration. The next phase of the CHCT should be development of specific projects in priority areas. In each project it takes a willing landowner to either sell or restore habitat, it takes funding, it takes project specific maps of the site, it requires restoration or management plans, it takes partnerships and a whole host of other site specific details too numerous to go into at any length here. The team facilitated by MBNEP should meet at least semi-annually to discuss each agencies site specific plans for future acquisition and restoration to see how they can work together to accomplish mutual goals. Most of the time funding a project is the key. With a very large funding source resulting from the settlement in the gulf oil spill, site specific projects should be ready to go when the funding becomes available.

HM.B1 Protect and Restore SAV Habitat- The first paragraph alludes to a decrease in SAV coverage based on the 2008/2009 mapping effort, but does not specifically state how much was lost. This is important to note since the Habitat Management goal was to increase SAV by 3% by 2006.
Comparison of SAV coverage for years when SAV was mapped to historical precipitation, river flow, and tropical storm events may help explain why SAV declined. However, there may be other causes not being analyzed; for example, storm water runoff pollutants and sedimentation from local streams or pollutants from the Alabama and Tombigbee rivers. In Tampa Bay significant increases in SAV occurred after improvements to sewage treatment plants.

Do further action/areas of study need to be undertaken to achieve this sub-objective?
In addition to the actions/studies outlined, SAV mapping needs to continue to determine whether the goal of increasing SAV by 3% over 2001 levels is being met. Determining the reasons for the decline may be of greater importance than attempting limited planting efforts at this time since the results of the planting

efforts to date have had very limited success. Without continued mapping of SAV and comparative analysis to past years, determining the root causes and cures for the decline may never be known. Planting may not be the answer in restoring SAV. Improvements in water quality increased SAV in Tampa Bay. The SAV recovered on its own following better water treatment.

HM.C1. Maintain or Improve Beneficial Wetland Functions- The report does not clearly indicate whether the marsh restoration at Isle of Herbes was successful and it does not indicate whether the marsh creation project at Choctaw Point was successful.

The effort to establish an estuarine marsh near the Battleship was unsuccessful. While hurricane damage was listed as the cause for the failure in the review, other successful sites on the east and west side of Mobile Bay as well as Weeks Bay in the 1990s by the Fish and Wildlife Service have been very successful and expanded beyond the limits of the actual planting.

Do further actions/area of study need to undertaken to achieve this sub-objective? Perhaps the role of Mobile NEP regarding wetland regulations may be to ascertain data on the amount and type of wetlands lost each year due to loopholes in wetland permitting both at the state and Federal levels. After the data is obtained, revisions in the regulations may be in order. In addition the Coastal Habitats Coordinating Team should determine the success criteria that can be used consistently to evaluate wetland restoration projects. With these criteria in place improvements in restoration techniques can be made over time.
HM.D1. Assess Beach and Dune Habitat Loss- The report does not indicate whether beach and dune habitat has been lost or gained. The report should state where the CCL is in relation to the Gulf of Mexico. [editor's note: the report has been amended to state that the line is determined by state plan coordinates inland from the Gulf]. However, even when you preserve the dunes by building condos landward of the primary dunes, very little wildlife habitat exists water-ward of the construction. Human use will almost completely overwhelm wildlife in densely populated areas.

The Grasses in the Classes project with the Baldwin County School System has planted thousands of dune plants at Bon Secour NWR and Gulf Shores State Park.

Do further actions/areas of study need to be undertaken to achieve this sub-objective? A beach and dune habitat assessment needs to be conducted to determine lost/gained habitat over time as well as beach and dune habitat disturbed by human use. Since an assessment of habitat loss for beaches and dunes was the primary purpose of the sub-objective, the task needs to be completed. The beach and dune assessment should include not only the un-vegetated beach and primary dunes but also tertiary dunes, inter-dune swales and maritime forest. These habitats make up the near coast ecosystem and their functions are interconnected. This ecosystem is critically endangered because it is extremely vulnerable to storm surge, anthropogenic development and sea level rise. The assessment should utilize aerial photography to compare habitat changes that have occurred over the last 20 to 25 years. The assessment should then be conducted at least every 5 years thereafter.

HM.D3 Address Shoreline Erosion- The first paragraph fits better with the beaches and dunes assessment. Do further actions need to be undertaken to achieve this sub-objective? Many landowners as well as private pier and bulkhead contractors are unaware of alternative erosion control techniques. However, landowners want to protect their property with techniques that will work, i.e., stop their property

from eroding. Mobile Bay NEP should consider development of a brochure with proven and time-tested erosion control techniques other than bulkheads that can be provided to landowners, contractors and regulatory personnel. The brochure should then be advertised with news releases and meetings with landowners, contractors and regulatory personnel.

HM.E1 Prevent Nesting Habitat Decline- Documenting colonial nesting bird sites is an action that is required every year as nesting sites change to some extent each year and signage placed the previous nesting season is lost due to storms and other reasons. The ongoing sea turtle monitoring effort has been very successful in protecting sea turtle nests. A similar if not joint-effort with the sea turtle volunteers should be undertaken if it has not been already.

HUMAN USES

Commentary by George Crozier

Although trained originally as a comparative biochemist, Dr. Crozier has spent most of his professional career in Coastal Zone Management, a specialization in applied marine ecology. He became Executive Director of the Dauphin Island Sea Lab in 1979 and recently retired. As the Director of the Coastal Policy Center at the Laboratory, he has been active regionally in many management issues and engaged in the issues emerging from urban sprawl in coastal areas.

The statement establishing the objective for this section refers specifically to impacts on "all existing living resource issues in Mobile Bay." This may be somewhat misleading because the previous section is devoted to Living Resources, but I think that it may actually be most accurate since it inadvertently recognizes the existence of the human component as a living resource, in fact, perhaps the most important factor. It also implicitly recognizes the dependence of "living resources" on both Habitat and Water Quality. The ongoing challenge has been to define those human uses that directly impact those two foundation ecosystem components and the Living Resource base that depends on them! There is an automatic and understandable presumption that the human use of the water and natural landscape is inherently negative as they are largely consumptive. The complexity of the concept of the impact of "human uses" has always been a confounding factor in the discussions swirling around the CCMP and years of reflection have not clarified the issue. For example; it was logical to incorporate some discussion of the roles of both recreational and commercial fishing in Living Resource considerations, one of the most obvious direct human consumptive activities. It also remains one of the most contentious issues!

As a general comment, the "cross-cutting", "over-arching", pervasive nature of human uses may be a conceptual flaw in the structure of the current action plan. It seems to be an effort to give the Citizens' Advisory Committee something to do that is theirs and theirs alone. If wise management of human uses is indeed the solution to the problems afflicting habitat, water quality, and living resources (which includes us, by the way) then it may make more sense to incorporate HU actions as "solutions" in the other sections. The topical work groups are composed entirely of "citizens", whether they have a technical background or are simply concerned "users". The value of the NEP forums has always been the exchange of ideas and positions among stakeholders with differing agendas. The role of the NEP as a neutral arbiter is crucial to its success over the next 10 years.

There is certainly consensus among NEP/CCMP advocates that land use planning which recognizes the advantages of minimal habitat loss or appropriate mitigation efforts would address most of the issues associated with water quality and eventually living resources, including the more nebulous "quality of (our) life." Interestingly, substantial progress has been made in bringing comprehensive planning into the consciousness of the local communities and the NEP has been a leader among others that have pushed this agenda. Those related sub-objectives have been variably successful. But has it improved water quality measurably or positively impacted living resources? It is important to distinguish between actions that are implementation efforts and the achievement of a measurable effect or response from the natural system. *"Agencies…..have always confused process with progress and progress with success"Carl Safina –Song for the Blue Ocean, 1997.*

Specific actions have been taken as catalogued in the report but it is probably too soon to see a real effect on water quality or living resources that can be attributed to those actions as the cause. There is certainly logic to "don't sprawl and it will get better" as in "build it and they will come" but the time frames for making a measurable difference are not well established, to say the least. In general Baldwin County governance appears to have been more responsive than those within Mobile County but positive response within a watershed has not yet been demonstrated. It may make sense to select one of the BC projects and follow implementation to see if there are positive responses from the natural system. Meanwhile, pressure on Mobile County entities must be maintained to reach a level of implementation that could bring about a positive change in our topic areas. At least there is an improved level of appreciation for the valuation of ecosystem services in several levels of the decision-making community on both sides of the Bay.

HUB.1 (Assess hydrologic effects of development) is a perfect example of this issue. As an action this could perhaps more logically be placed in the Water Quality section of the new CCMP. It is clearly not a human use per se. It is a human action designed to assess water quality response to a management action. For example; pressure for the passage of a municipal riparian corridor ordinance would be a logical, better focused short term sub-objective that would capture both a human use, political decision-makers, and presumably improve water quality. Plus, you could measure the existing corridor and monitor progress in one direction or the other.

The other water quality issue that is tractable is the current concern about trash in the urban streams. This is an all too graphic indicator of the lack of appreciation for watershed performance but an issue that has no political support whatsoever. There are several very active cleanup advocates; it is largely an issue for Mobile, city and county, highly visible, and an easily monitored and quantifiable parameter.

HU.B2 (restore hydrology) is clearly a matter of facilitation for the NEP. This sub-objective was overly ambitious from the outset and under current circumstances of funding and interest, should probably be archived. On the other hand, there have been substantial improvements in erosion control BMPs, HU.B3, and this action area should probably be declared a victory and put in the win column with little continued commitment of NEP assets.

HU.C1 may be the most critical activity but as indicated, this could be better positioned within each of the topical areas because public access venues provide the very best opportunities for educating the public concerning habitat, water quality, and living resource issues. The problem for wise and informed

stewardship of our ecosystem has long been the fact that the general public was poorly informed at best. And until this generation there was no particular reason to be concerned about limitations of our natural resource base. That day is long gone and education of the public concerning the value of ecosystem services has become an imperative. Informal education facilities like The Exploreum, the Environmental Studies Center, The Estuarium, and the coming GulfQuest maritime museum all address some or all of these issues but the value of public access points is inarguable. The number of these opportunities is quite limited in both counties but particularly in Mobile County where industry and private ownership have prevented most of the public having access to coastal resources and recreation.

Again, environmental education is not a human use per se but is rather a broadly accepted approach to solving the problems of habitat, water quality, and living resource management. As such this is an action item that belongs in each of the topical areas rather than a separate effort, cross-cutting though it might be!

Recommendations:

- A survey be taken of the Management Conference (every name ever listed) which would select the top two to three sub-objectives (all were, and remain valid but limited resources demands prioritization).
- Convene a facilitated meeting of the Conference (at Shelby Center or 5 Rivers) to debate the survey results and draft the new 10-year plan.
- Reconfigure the working groups to blend technical, environmental activists, and developer/consumers into open forums to develop realistic action items.
- In cooperation with Coastal Programs, re-establish the Interagency Information Exchange Committee.

EDUCATION AND PUBLIC INVOLVEMENT

Commentary by Cherie Arceneaux

Working with the Dauphin Island Sea Lab Coastal Policy Center, Cherie Arceneaux co-authored the grant proposal to the EPA which resulted in the inclusion of Mobile Bay in the National Estuary Program. Over subsequent years, she has produced numerous documents for the MBNEP including this review of the CCMP. As a citizen activist, she helped organize the Dog River Clearwater Revival and is currently a member of several environmental organizations.

To what extent has the CCMP accomplished its directive to "increase awareness of natural resource issues and promote understanding and participation in conservation and stewardship activities"?
The Education and Public Involvement Section of the CCMP has two sub-objectives: *increasing 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*; and *increasing public participation by developing and implementing a comprehensive citizen-based monitoring program.*

Since its beginning, the CCMP has stressed the need for citizens' environmental education and involvement. A Citizens' Advisory Committee was established early in the process and became a major player in developing the objectives and sub-objectives of the CCMP. As part of the 2006 Management Conference re-organization, this committee became the Community Action Committee, comprised of representatives of environmental grassroots organizations. At that time, the Community Resources Committee was also organized to bring together a balance of interested community leaders from industry, business, environmental services, and the non-profit sector.

Before the MBNEP was established, Alabama Coastal Program, Mississippi/Alabama Sea Grant Consortium and Auburn University Marine Extension Center along with other agencies had environmental education and outreach in the services they provided. Local chapters of citizens-based environmental groups including the Sierra Club, The Nature Conservancy and the Audubon Society, among others, also produced environmental programs and information for their members and the public. Since that time, many

associations have organized to address specific environmental issues and subject areas as well as to promote general stewardship of natural resources. These include but are not limited to: Alabama Coastal Foundation, *grassroots inc*, Smart Coast, Mobile Baykeeper, Dog River Clearwater Revival, Little Lagoon Preservation Society, Wolf Bay Watershed Watch, and Weeks Bay Foundation. Over the years, these groups, many with MBNEP assistance, have exposed the public to environmental issues through a wide variety of educational materials ranging from simple bumper stickers through professional – caliber films.

Since the MBNEP and its Management Conference Members as well as other environmental groups have provided environmental education and public awareness, the author has seen attitudes change and understanding develop. As anecdotal evidence: fifteen years ago, the author was derided as a "tree-hugger" against progress; was accused of wanting to lower property values by disclosing an environmental agency's report of pollution in Dog River; and was thought to "hate baseball" when opposed to development of a baseball stadium in a wetland. The author also heard citizens express confusion when "*You are in the Dog River Watershed*" signs began appearing in west Mobile; and when silt fences and other erosion control techniques began to be installed at construction sites, many citizens did not understand the reasons.

Today, because of MBNEP and its Management Conference Members and grassroots organizations' efforts, as well as articles in the *Mobile Press-Register*, more citizens are familiar with issues associated with watershed development. Due to our many and hard rains, a large number of citizens have seen "stormwater run-off" -- especially in Baldwin County, where D'Olive Creek has become the "poster child" for poor development management, and in Dog River where floating trash pollutes the water after every storm. In addition, the author has noted that property developers in past decades considered environmental protection measures as a hindrance. Now "Smart Growth" and "Green Building" have become more than "buzz words" as positive public response has given developments touting these techniques an edge in the market.

Have the years of environmental education and public involvement by MBNEP, its Management Conference Members and grassroots groups made a difference? We do not have a "before" study for comparison, but we have one that can be considered as an "after". The 2011 *Coastal Alabama Community Attitudes Assessment* survey of five hundred and fifty citizens in Mobile and Baldwin Counties reflects heir perceptions and understanding of the most pressing environmental challenges as well as their opinions regarding environmental values, quality of life factors and economic considerations and impacts. Results of this survey show that the community recognizes the need to balance economic growth with environmental protection.

Do further actions/areas of study need to be undertaken to achieve the sub-objective of *increasing public awareness of environmental issues*? MBNEP and its Management Conference Members as well as other environmental groups continue to produce quality education materials, and the author believes they have had a direct impact upon the public. In fact, the existence of so many grassroots groups indicates that more citizens are informed and concerned about environmental issues and their affects upon quality of life factors. The challenge of educational efforts involves the need to vary the medium and the source while keeping the messages consistent.

Citizens' participation in meetings has been more challenging. Regardless of best efforts of staff members and partner organizations, attendance - first in Citizen's Advisory Committee and then the Community

Advisory Committee - has fluctuated over the years. It is not a "problem" specific to MBNEP's citizen committee members however, as other organizations report similar lack of participation from time to time.

Disasters such as storms and the recent BP oil spill certainly do generate public interest and cohesiveness, but after a while, even attendance at these type meetings wanes. It is understanding that in absence of an emergency, a citizen having worked an eight hour day, may find it difficult to attend a meeting. Yet, as evidenced by the *Coastal Alabama Community Attitudes Assessment,* there is clearly a public interest in environmental issues. Perhaps in today's world of electronic communication with MBNEP communicating via "Facebook" and "Twitter", public meetings may need to become "virtual" meetings to keep the citizens' component of the CCMP active. The concept of having delegate representatives from the various grassroots' organizations as members of the CAC is a creative way of developing a conduit for communication. Information can be passed both ways.

Public Participation and Monitoring is another sub-objective of the Education and Public Involvement issue area. This sub-objective was developed to assist resource management agencies which are often understaffed to adequately monitor and protect natural resources. The *CCMP Review 2012* cites Alabama Water Watch (AWW) as a long-standing citizen volunteer water quality monitoring program covering all of the major river basins in Alabama and identifies volunteer water monitoring conducted by many of the local grassroots organizations. C*CMP Review 2012* also cites the monitoring of manatees by DISL's Manatee Sighting Network and the Mobile Baykeeper and ACF's "Volunteer Field Observer Program" which monitors Alabama's tidally- influenced shoreline for oil impacts and other changes.

Do further actions/areas of study need to be undertaken to achieve this sub-objective? Volunteer monitors seem to suffer "burn out" after a period of initial enthusiasm, and MBNEP has noted the need to re-invigorate water quality monitoring efforts. During the 2008 program year, MBNEP proposed to facilitate the creation of a comprehensive water monitoring concept which would include "beginner" groups being trained and learning from those groups already engaged in water monitoring activities. More experienced groups would identify causes and effects of impairments along with potential corrective actions.

The goal of this effort was to increase citizen involvement in hands-on monitoring of local waters as a mechanism for better identification of trends and causes and effects of water quality improvements or degradation. The *objectives* of this project were to: 1) gather data on a regular basis from targeted sampling sites on water quality parameters including temperature, dissolved oxygen, salinity, nutrients, and bacterial pathogens; 2) establish baseline data and/or reveal trends for local water bodies; 3) provide ongoing information through meetings, training, publications, and web sites; and 4) identify and undertake mitigation efforts to correct negative impacts. The *educational priorities* were to build the capacity of these community organizations to lead water monitoring efforts in their local area and to connect citizens to and educate them about the water resources. This project as proposed has not come to fruition. Similar to meeting attendance participation, volunteer monitoring suffers from lack of commitment -- especially in the long term. Investigating the psychology of voluntarism may lead to a way of establishing the personal and societal reinforcements necessary to empower volunteers with a sense of accomplishment necessary to maintain their interests.

CCMP ACCOMPLISHMENTS SUMMARY

Water Quality Action Plans

The original 2002 CCMP Water Quality section had the basic objective to *"Attain and/or maintain water quality sufficient to support healthy aquatic communities and designated human uses by 2010."*

The Water Quality Workgroup of the Mobile NEP developed four sub-objectives to address this objective: Water Resources Management Strategies, Nutrients, Pathogens, and Toxic Chemicals. The specific wording is as follows.

(1) *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 the Bay and Mobile Bay NEP sub-basins, by the year 2003 and incorporate them into appropriate resource management strategies by the year 2008 (beginning in 2004).*

(2) *Reduce nutrient loads in identified, problem sub-basins by 2003, 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.*

(3) *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, storm water/nonpoint source discharges (including urban, agricultural, and other sources), and septic systems by 2010.*

(4) *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.*

WQ.A1: Assess Data to Identify Water Quality Problems

This Action Plan includes assessing data to identify problems, if any, related to pathogen introduction, toxic chemicals and nutrient and/or organic enrichment from various sources (e.g., point and nonpoint sources within the Mobile Bay NEP area, atmospheric deposition, upstream riverine input, etc.) and promoting water quality improvements within the NEP area, as necessary. The plan consisted of developing a Pollutant Loadings Budget Analysis; gathering data to expand on this budget, with particular emphasis concerning the impacts of air emissions on water quality; developing water quality predictive models for a more comprehensive understanding of water quality issues; and development of simple management tools based on predictive models for planners, managers, etc., in order to reduce future point and non-point source (NPS) loadings. In addition, MBNEP was charged with continuing to assess and incorporate newly identified or potential loadings sources within and outside the MBNEP area and, once identified, to develop appropriate new actions, where possible; and to support and actively participate in efforts to examine cumulative or synergistic effects of loadings from various point and nonpoint sources, including air emissions.

To what extent was this sub-objective implemented?

- In 2000 Alabama entered the U. S. Environmental Protection Agency's (EPA's) National Coastal Assessment (NCA) program. This program employs a common set of environmental indicators and sampling protocols across the nation's estuaries to assess conditions at local, regional and national levels. Under this program, ADEM prepared an NCA for the years 2000-2004. This report included an overall water quality index that captured information on five indicators: dissolved inorganic nitrogen (DIN), dissolved inorganic phosphorus (DIP), chlorophyll-a, water clarity, and dissolved oxygen (DO). ADEM conducted sampling at 50 locations, where indicators were ranked good, fair, or poor. For the water quality index, each sampling site was ranked and then those were combined for an overall index.

- In December 2001, TETRA TECH under contract to MBNEP developed a base line loadings budget analysis using existing data and determined that "insufficient monitoring data were available to support a thorough calibration and validation of the watershed model". A subsequent Bay model, to further information regarding the hydrodynamics of the Bay model was developed to represent water quality parameters of interest.

- MBNEP initiated a National Atmospheric Deposition Program (NADP) National Trends Network (NTN) monitoring site and a Mercury Deposition Network (MDN) monitoring site. Information gathered for these areas indicated non-point sources and data from these monitoring sites assessed the amount of loadings from the atmosphere. These data were used in the Mobile Bay NEP's water quality modeling effort by Tetra Tech, Inc. and EPA's REMSAD modeling effort.

- In 2004, MBNEP entered into a contract with ADEM to provide increased funding for water monitoring in tributary streams for Mobile Bay as outlined and identified in MBNEP. This provides a basis for qualitative and quantitative assessment of water quality in these critical, local tributaries. Sub-estuaries include Bon Secour, Bayou La Batre, Dog River, Fowl River and Fish River. Parameters monitored included but were not limited to in situ water chemistry, turbidity, ammonia, DRP (ortho-phosphates), chlorophyll a, and pathogens. In addition sediment sampling was conducted for approximately 15 metals of concern, polyaromatic hydrocarbons and pesticides.

- To increase public awareness and provide valuable water quality information to help the public make more informed decisions concerning their recreational use of Alabama's natural coastal waters, ADEM and Alabama Department of Public Health (ADPH) implemented a program of routine collection of water samples from 25 high use and/or potentially high risk public recreational sites from Perdido Bay to Dauphin Island. The selection of sites and the frequency of sampling are determined using a risk-based evaluation and ranking process. Depending on the site, samples are collected twice per week, once per week or once every other week during the swimming season and once per month during the cooler months. These samples are analyzed for enterococci. The threshold concentration which triggers an advisory, are based on ecommendations provided by the EPA and Alabama Department of Environmental Management.

- The first long-term water quality/meteorological network has been established in Mobile Bay to establish the long needed continuous (24/7) monitoring capability available through the Northern

Gulf of Mexico Coastal Observing System. This monitoring effort, led by MBNEP in partnership with the Dauphin Island Sea Lab (DISL), University of South Alabama Center for Estuarine Studies, and Weeks Bay National Estuarine Research Reserve (WBNERR) includes the establishment of instrumentation at four different sites throughout Mobile Bay (Meaher Park, Middle Bay Light, Weeks Bay and DISL) to take continuous measurements of air and water temperature, relative humidity, wind speed and direction, barometric pressure, precipitation, quantum radiation, water depth, salinity, turbidity, dissolved oxygen and total DO. These four stations continue to be financially supported by MBNEP as part of its commitment to water quality monitoring throughout the estuary. These stations represent the first, continuous and long term hydrologic and meteorological monitoring effort in the Bay. These monitoring sites provide valuable data for validation of TMDL development, creation of several in-progress hydrodynamic models (under ACES research aegis) as well as provide the public information on water quality for educational or recreational uses.

- In response to the April through July, 2010 BP Oil Spill, each of the ADEM Field Offices had staff assigned on a rotating basis to response duties 24-hours per day and 7 days per week. Response activities included incidents involving spills of oil and hazardous materials and fish kills. In addition, ADEM supported local governments in response to actual or potential releases of oil and hazardous material resulting from natural, manmade or technological disasters. ADEM also acted as the technical advisory agency in identifying and directing the containment, treatment, and removal of hazardous materials impacting or threatening the citizens and/or the environment and served as the point of coordination between the state and federal response resources of the EPA. Environmental Protection Agency and the U.S. Coast Guard (USCG).
- Alabama Water Watch (AWW) is a citizen volunteer water quality monitoring program covering all of the major river basins in Alabama and is a part of the Global Water Watch network. The goal of AWW is to foster the development of statewide water quality monitoring by: educating citizens on water issues in Alabama and the world, training citizens to use standardized equipment and techniques to gather credible water information using quality assurance protocols, and empowering citizens to make a positive impact by using their water monitoring data for environmental education, waterbody restoration and protection, and involvement in watershed stewardship. As part of AWW, watersheds including Dog River, Weeks Bay and Wolf Bay have active citizen participants.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

While the majority of the steps or tasks of the 2002 sub-objective have been completed, others remain outstanding and may merit action. Specifically-

The MC recommended the development of water quality predictive models for a more comprehensive understanding of water quality issues and the development of simple management tools based on the predictive models for planners, managers, etc., in order to reduce future point and NPS loadings. In addition, WQ-A1 Step 5 still merits attention: MBNEP will continue to assess and incorporate newly identified or potential loadings sources within and outside the MBNEP area and, once identified, will develop appropriate new actions, where possible. Finally, it was recommended that MBNEP support and

actively participate in efforts to examine cumulative or synergistic effects of loadings from various point and nonpoint sources, including air emissions.

There is clearly a need for the MBNEP and the Coastal Alabama Clean Water Partnership (CACWP) to continue to identify priority streams in the Mobile, Escatawpa and Perdido river basins and develop watershed restoration strategies in cooperation with local communities and watershed interest groups. In order to understand the sources of problems, water quality data gathering by both agencies and citizens and data assessment are inherent elements in developing comprehensive watershed management plans.

WQ.A2: Incorporate Loadings Information into Non-Pollutant National Discharge Elimination System
This Action Plan includes incorporating water quality-based loadings information into the National Pollutant Discharge Elimination System (NPDES) permitting process and control planning process to allow attainment of applicable water quality standards. It included two activities both assigned to ADEM: developing and issuing NPDES permits based on TMDLs; and in conjunction with EPA and NRCS, developing and implementing watershed based NPS control plans based on TMDLs.

To what extent was this sub-objective implemented?

- As noted in WQ.A1., MBNEP, in partnership with the U.S. Army Corps of Engineer and EPA, funded a study with Tetra Tech to continue hydrodynamic model development for Mobile Bay and develop a loading budget to help analyze pollutant contributions to Mobile Bay and to model point and non-point sources of pollution in the Mobile River basin contributing to Mobile Bay. The main objectives of this study included assessing the total load of pollutants and characterizing the distribution of sources within the basin. The study was delivered in 2002 and has been used in TMDL development throughout the basin. The study developed and applied comprehensive modeling platforms (BASINS, Version 2.0 and NPS Model) to analyze nutrient loadings (total nitrogen and phosphorus), BOD5, sediment and metals issues to the Bay and distribution of loadings throughout the Mobile River Basin watershed.

- As of October 2010, ADEM (in association with EPA and support contractors) has developed approximately 207 TMDLS for streams segments in Alabama that do not meet their designated uses. TMDL development is based on models using input from a variety of monitoring programs. Several of the on-going monitoring projects of MBNEP support development and implementation of TMDLs in coastal Alabama ADEM is issuing NPDES permits based on TMDLs. This is an ongoing but slow process. In 2002, there were 30 water bodies in Mobile and Baldwin Counties on the 303(d) list of impaired water bodies; in 2010 there were 48 water bodies on the list. Some water bodies were delisted during this period and ADEM had approved 24 TMDLs within the two counties by September 21, 2010.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

The Non-Point Education for Municipal and Elected Officials, Alabama Clean Water Partnership, and Coastal Watershed Survey Programs are ongoing and should continue. MBNEP could take a leadership role in the establishment and funding of a Water Quality Monitoring Council as recommended by ADEM in their 2010 305(b) report.

WQ.A3: Maintain Groundwater Quality

This Action Plan includes developing a resource management strategy for maintaining groundwater quality through MBNEP encouraging communities within the NEP area to develop and implement wellhead protection programs; MBNEP working with state and federal agencies to better define groundwater resources and properly plan for expanded groundwater withdrawals in order to abate well field development practices that may lead to saltwater intrusion; and MBNEP supporting existing programs that deal with prevention of groundwater contamination.

To what extent was this sub-objective implemented?

- In 2009, the University of Alabama completed a multi-phase groundwater resources study and produced the "Characterization of Groundwater Resources in Southern Baldwin County, Alabama: Geophysical and Geochemical Surveys of Saltwater Intrusion and Groundwater Evolution." The study involved detailed geochemical and isotope study of the aquifers in the region in order to assess primary recharge sources, groundwater ages and associated residence times, and evolution of groundwater along major flow paths. In addition, a geophysical study implementing ground penetrating radar was conducted to refine the extent of the saltwater/freshwater interface to determine areas either experiencing saltwater intrusion directly or most vulnerable to these sources of contamination. The study concluded that southern Baldwin County is susceptible to saltwater intrusion because of the following factors: (1) Groundwater is the county's only source of freshwater for industrial, municipal and private use. (2) The county's freshwater source is subject to overexploitation since it is a popular vacation destination with growing residential and industrial populations. (3) Saltwater spray and coastal flooding of lowland areas as a result of tropical storms and hurricanes in the Gulf of Mexico can increase the salinity of water in the shallow aquifers. The study did not address the potential of sea-level rise.

- MBNEP has coordinated the efforts of the GSA to identify the extent of salt water intrusion in wells in southern Baldwin County as part of a well head protection strategy. Saltwater intrusion has become an increasing problem and concern with the rapid development in Gulf Shores, Alabama as well as along the Bon Secour Peninsula. Conductivity sensors are placed in targeted wells to monitor the problem.

- In 2003, the MBNEP coordinated with the ADEM Ground Water Division, GSA and DISL to host a groundwater quality workshop. This workshop benefitted coastal municipalities through education on groundwater and potential future threats to area freshwater supplies.

- MBNEP also has worked with local municipalities toward their participation in the Groundwater Guardian Program. Alternatives for water conservation (while promoting tourism) have been presented with the overall goal to be proactive in addressing the increasing concerns of groundwater saltwater intrusion.

- Baldwin County has revoked an exception to Water Well Standards which was detrimental to groundwater protection due to the potential for ground water intrusion.

ADEM administers the following programs that have potential to impact groundwater: the AL Hazardous Wastes Management and Minimization Act, the AL Hazardous Substances Cleanup Fund Act, the Alabama Land Recycling and Economic Redevelopment Act, the AL Solid Waste Disposal Act, the Drycleaner Environmental Response Trust Fund Act, a federal facility cleanup program, and the federal Comprehensive Environmental Response, Compensation, and Liability Act.

In 2004, EPA determined that Alabama's revised underground injection control (UIC) program covering hydraulic fracturing of coal bed seams to recover methane gas complied with requirements for Class II wells, rejecting the Legal Environmental Assistance Foundation, Inc., (LEAF) petition filed in 1994 to withdraw Alabama's UIC program, asserting that the State was not appropriately regulating injection activities associated with coal bed methane gas production wells.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Alabama Rural Watershed Association, a non-profit organization of water and wastewater systems professionals has developed a "Wellhead/Ground Water Protection Plan" as a format for communities to follow. This association works with the Groundwater Guardian Program and ADEM and recommends designating a community team, delineation of the area, identifying contaminants and implementation. The MBNEP could utilize this program or adapt it if necessary for the Groundwater Guardian program for South Alabama.

WQ.A4: Ensure Protection and Maintenance of High Quality Waters

This Action Plan includes development of a resource management strategy to ensure added protection and maintenance of High Quality Waters located in the Mobile Bay NEP area including evaluating portions of the Tensaw River for reclassification as an Outstanding Alabama Water (OAW); the identification of other stream segments of exceptional recreational, historical, and ecological significance that would merit consideration of reclassification to OAW or Outstanding National Resource Water (ONRW); the development of local planning teams where those streams existed to determine the level of scientific and public support for reclassification efforts; and working with appropriate county or municipal governments to prepare requests for water use reclassification of identified, high-quality stream segments.

To what extent was this sub-objective implemented?

- With the assistance of interested citizens, ADEM classified the Tensaw River from Junctions of Tensaw-Apalachee River and Briar Lake as an OAW. In addition, the Tensaw River (Briar Lake to Junction of Tensaw Lake), Briar Lake, Tensaw Lake, Wolf Bay, and Magnolia River have also been classified as OAWs.

- After nearly 10 years of monitoring water quality and developing a comprehensive watershed plan and a public awareness campaign, the efforts of the Wolf Bay Watershed Watch (WBWW) resulted in the OAW classification for segments of Wolf Bay from the Intracoastal Waterway to Moccasin Bayou in Baldwin County.

- MBNEP funded and the GSA conducted a study along the Magnolia River in South Baldwin County, Alabama. The information from the final report, which assessed suspended sediment and bed loads, was used by the Town of Magnolia Springs, Alabama to have the Magnolia River re-designated as an OAW.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

The OAW designation brings with it increased recognition, regulation and protection. Clearly, in many areas, this is an achievable goal that should be pursued. As shown by the citizens-driven impact upon these designations, it is also a means for local watershed residents to become more involved and knowledgeable regarding non point source pollution. Plus it increases water quality standards for the OAW to the highest ADEM applies, thereby offering greater protection to the waterbody.

Although during the Strategic Planning process of 2006 the steps related to the development of LOCAL PLANNING TEAMS identifying and preparing requests for water reuse classification were determined to be ineffective and were taken out of the CCMP, this concept should be revisited as something that the Clean Water Partnership or Project Implementation Committee could undertake.

WQ.B1: Reduce Excessive Nutrient Loading Within the Mobile Bay NEP

This Action Plan includes reducing or eliminating problems from excessive nutrient loadings within the MBNEP area and individual sub-basins through the development and implementation of local ordinances and encouragement of additional means for stormwater detention and retention, including BMPs, alternative landscaping and other innovative methods, in order to reduce nutrient and/or organic loadings and MBNEP support of efforts for development and implementation of NPS control programs* (e.g., 319 program, 6217 program, NPDES, proposed concentrated animal feeding operations).

To what extent was this sub-objective implemented?

- In March 2004, the City of Fairhope and MBNEP jointly hosted a local workshop by the National Association of Flood and Storm Water Management Agencies (NAFSMA). NAFSMA represents municipal and public agencies responsible for management of storm-water run-off nationwide and reviews MS4 phase II regulations as they impact storm water run-off control.

- MBNEP, in partnership with Mobile and Baldwin County Soil and Water Conservation Districts, and ADEM, has supported the Coastal Alabama Clean Water Partnership (CACWP) since its inception in coordinating NPS pollution programs in coastal Alabama. CACWP is a public-private group working to protect, improve, and maintain water quality in Alabama's Coastal River Basins. The CACWP focuses its efforts on the Escatawpa River, the Mobile River, and the Perdido River and twelve sub watersheds by supporting water quality improvement projects developed by local communities and other groups. In addition to technical assistance to implement projects, sources of funding are recommended. Members of the CACWP and MBNEP have held well attended Stream Restoration Workshops and continue to develop watershed management plans that identify areas of concern.

- The "Coastal Alabama River Basin Management Plan" was prepared for the CACWP by South Alabama Regional Planning Commission (SARPC) in 2004 to provide a composite report on the watershed efforts at that time and to make recommendations for improvements through NPS pollution control techniques.

- MBNEP has supported several sediment loading analyses conducted by GSA to assess impacts of land use in the watershed. In the Mobile Bay estuarine system, streambank erosion and sediment-loading, causing turbidity that degrades SAV and other bottom habitat, may be an even more significant threat to water quality than nutrient loading. With funding from the MBNEP and ADCNR, GSA analyzed bed- and suspended sediment loading in the D'Olive Watershed, revealing post-development loading between two and two-hundred times the natural geologic erosion rates. The USDA National Resources Conservation Service/Baldwin County Soil and Water Conservation District and City of Daphne have subsequently undertaken several projects to decrease sediment loads from this watershed, and a Comprehensive Watershed Management Plan was developed. In the Magnolia River Watershed, GSA analyses funded by MBNEP and the Town of Magnolia Springs indicated sediment loads that supported to efforts to obtain Outstanding Alabama Water use criteria from ADEM. This designation will be useful in protecting these high quality waters. Increasing urbanization in western and southern parts of the City of Mobile and deterioration of water quality and habitat in Dog River stimulated MBNEP-funded GSA sediment loading analyses of this watershed to identify sources of sediment, establish baseline data and rating curves useful to evaluate future changes in erosion and sediment load transport. This data will be useful in updating the Dog River Watershed Management Plan and inform municipal and state erosion/sedimentation inspection programs.

- MBNEP and MC members support comprehensive watershed management planning as an effective way to address NPS pollution at the grass roots level. Watershed plans for D'Olive Creek, Wolf Bay, Weeks Bay, Dog River and Eight Mile Creek recommend strategies to reduce and control NPS pollution.

- MBNEP and MC members also support development of best management practices (BMPs) for industries and occupations with the potential to create NPS pollution. Several BMP publications exist and are utilized at this time including the "Survey of Coastal Alabama Marinas: An Inventory of Current Best Management Practices" (2007); "Alabama's Best Management Practices for Forestry" (which includes streamside management zones), and Alabama Cooperative Extension Service's "The Citizen's Guide to Reducing Polluted Runoff in Coastal Alabama".

- MBNEP has supported the development and implementation of local ordinances and encouraged additional means for storm water detention and retention, including BMPs, alternative landscaping and other innovative methods to reduce nutrient and/or organic loadings. Both Mobile and Baldwin Counties have adopted and implemented new subdivision regulations limiting and controlling NPS pollution.

- The Alabama Clean Marina Program managed by ADEM and facilitated by the Mississippi-Alabama Sea Grant Consortium was developed as a voluntary program for marina owners and managers to receive recognition for their efforts to control NPS pollution at their facilities by

utilizing best management practices (BMP) developed to address marina related water quality issues.

- The "Alabama Handbook for Erosion Control, Sediment Control and Storm Water Management on Construction Sites and Urban Areas" by the Alabama Soil and Water Conservation Committee is utilized extensively by development interests.

- As a demonstration project, MBNEP brokered an agreement between AltoFina Petroleum Products, the City of Mobile, Alabama Power Company and DRCWR to create a greenway park along a portion of a flood control channelized stream, and line its banks with native vegetation to reduce the impacts of NPS pollution and provide citizen connection to water resources.

- MBNEP and MC members participate in citizen-based efforts to clean trash and debris from waterways and adjacent river banks. These include the recent "Clean the Bottom", event along Three Mile Creek in Mobile and annual Coastal Cleanups. Citizens are also directly involved in other programs such as fishing line recycling (in partnership with the ADCNR, State Lands Division, Coastal Section and the Southeastern Wildlife Conservation Group) and biennial derelict crap trap removals (in partnership with ADCNR, Marine Resources Division, Holcim, Inc., and Mobile Gas).

- The western shore of the Steele Creek Marina in Satsuma is experiencing rapid erosion and recession caused by a combination of storm water runoff and boat wakes. The City of Satsuma approached the MBNEP in 2009 requesting $10,000 and guidance to remediate the shoreline and reduce the impacts. In 2010, Dr. Bret Webb of the Civil Engineering Department of the University of South Alabama delivered conceptual plans to not only stabilize the existing shoreline, in an effort to prevent further erosion, but to provide some level of mitigation for the loss of habitat in the vanishing riparian buffer. The plan was developed so that the city could use its own equipment and personnel to perform construction activities and provide in-kind match for the grant which would be used to purchase riprap to build a toe and clean sand fill to construct a perched terrace, which will be planted with native riparian vegetation with the help of the Satsuma High School Grasses in Classes Program. Construction activities are pending.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

In 2002, 30 water bodies in the two Coastal Counties on the Alabama 303(d) list for not meeting their designated standards criteria. In 2010 48 were listed. Twenty-six were cited for NPS pollutants introduced through storm water runoff. Clearly there is an increasing need to better control NPS pollution.

Baldwin County voters did not approve the creation of a proposed regional storm water utility, and success in Mobile County would be unlikely. Continued education of elected officials, citizens and business and industry leaders regarding the importance of storm water management is a continuing need.

Developing watershed management plans and working at the grass roots level are perhaps the best strategies to control NPS pollution. Continuation of citizens' education efforts may eventually bring understanding of the need to manage stormwater run-off through the adoption of a stormwater utility.

In 2010, MBNEP initiated the Local Restoration Partnership Program, providing grants to local public government entities to undertake projects that address wetlands restoration, stormwater runoff, or sediment management measures. Five projects were funded in the first round: City of Chickasaw, to support wetlands restoration at Brooks Park; City of Daphne, to initiate the use of low impact development and green infrastructure practices and incentives for the City and to recommend policy and subdivision regulations changes; City of Fairhope, to prepare a Volanta Gulley Watershed Management Plan and implement at least two related stormwater management projects; City of Foley, to restore Wolf Creek to its natural channel design, reversing impacts to this section of Wolf Creek caused by stormwater runoff; and City of Orange Beach, to enhance wetlands along Highway 161 to improve water quality in Cotton Bayou, and to develop a Canal Road Overlay District to minimize paved surfaces and promote infiltration, while expanding bicycling and walkability.

WQ.B2: Address Upstream Nutrient Inputs

This Action Plan includes supporting efforts to reduce nutrient input to the Mobile Bay estuary from the upstream river basin through MBNEP support of ADEM's NPS programs statewide (e.g.,319 programs, etc.); MBNEP coordination of efforts with USGS's Mobile River Basin NAWQA study; and MBNEP support and coordination of efforts with local and statewide watershed groups, as feasible.

To what extent was this sub-objective implemented?

- The Mobile River Basin in Alabama, including portions of Georgia, Mississippi, and Tennessee, is one of the 59 study units that are part of the U.S. Geological Survey's National Water-Quality Assessment (NAWQA) Program. The NAWQA Program is designed to assess the status of and trends in the quality of the Nation's ground and surface-water resources and to link the status and trends with an understanding of the natural and human factors that affect the quality of water. Surface-water, ecological, and ground-water studies are done on local (a few square miles to hundreds of square miles) and regional (thousands of square miles) scales to understand the water-quality conditions and issues within a study unit.

- MBNEP supports ADEM's NPS programs statewide (e.g., 319 programs, etc.) by providing support for watershed basin assessments and public outreach through the CACWP, NEMO, coordination of on-site sewage workshops. Management conference members coordinate efforts with statewide watershed groups such as Alabama Rivers Alliance where possible.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

While this Action Item specifically states that MBNEP will support ADEM's NPS efforts state-wide, MBNEP may consider supporting several statewide grassroots efforts to make citizens aware of stormwater issues. These groups include the Alabama Stormwater Partnership which was formed in June 2007 in Birmingham as a way to organize watershed groups and individual citizens to enact policy change in Alabama through improvements in stormwater law, regulations, and enforcement across the state. Members of the Partnership are also heavily involved in educating citizens, developers, and elected officials about stormwater pollution problems focusing on sources of sediment pollution. Muddy Water Watch (MWW) is a statewide education program, run locally by Mobile Baykeeper, which uses citizen volunteers to address

problems associated with stormwater runoff. The goals of MWW are to create an educated public in the state of Alabama, to foster a grassroots support network for improving water quality, and to reduce the amount of stormwater pollutants that reach Alabama's waterways. MWW educates citizens statewide on stormwater and the dangers of increased water volume and velocity and pollution (largely silt) from construction and development pose to Alabama's waterways. MWW coordinates and trains citizens to monitor their local waterways for stormwater runoff. Birmingham - based Alabama Rivers Alliance works with diverse groups and individuals across the state to enrich the river protection movement and has grown its membership to include more than 70 grassroots watershed organizations throughout the state.

WQ.C1: Reduce Opportunities for Pathogen Introduction

This Action Plan includes reducing opportunities for pathogen introduction in Mobile Bay Estuary through the following activities:

- Support for the development of a Gulf-wide ballast discharge policy
- Establishment of incentive programs to reduce or eliminate pathogen introduction due to inadequate or improper disposal methods
- Encouragement of the Coast Guard to monitor ballast salinity randomly to determine compliance with the Maritime Policy agreement; check ship's bridge logs for ballast exchange; review logs for location of ballast activity; and report quarterly to MBNEP, including development of short term monitoring plans if necessary to ensure appropriate ballast exchange
- Reduction of opportunities for potential introduction of pathogens from point source discharges (e.g., sewage treatment systems) and due to inadequate on-site sewage disposal systems by developing appropriate education and incentive programs to encourage use of alternative technologies; and encouragement of technology upgrades including the creation of GIS databases that include parcel identification numbers on permits
- Reduce or eliminate the introduction of pathogens from sanitary collection system breaks and hydraulic overloading
- Reduction of the introduction of pathogens from domestic pets, wildlife, and farm animals by supporting implementation of AFO/CAFO rules and use of agricultural BMPs
- Promotion of pump-out stations at marinas
- Placement of appropriate facilities (e.g., portable toilets, holding tanks, permanent facilities, signage, etc.) at public launches
- Encouragement of legislation dealing with illegal discharge of waste from non-commercial vessels (including houseboats) into State waters
- Encouragement of further development of Environmental Courts in both counties

To what extent was this sub-objective implemented?

- In 2008, ACAMP Section 309 funds were sub-awarded to the Mobile County Health Department (MCHD) and the Alabama Department of Public Health (ADPH), which serves Baldwin County, to enhance their abilities to monitor and track septic systems. The health departments used GIS and GPS hardware and software that were purchased in 2004 with Section 309 funds to develop a spatial inventory of septic tank systems throughout the counties. The MCHD scanned 3,100 historical records into the web-based program enabling the department to send documents

electronically to engineers, surveyors and some property owners. Also, the department entered into a contract with the software company, Garrison Enterprises, to build a "digital health department" for Mobile County and will build the web availability to the data that the department is scanning. Beyond the project period, the MCHD will continue to collect and enter pumper (maintenance) records and will continue to mail out voluntary notices reminding homeowners about proper septic system maintenance.

- The ADPH for Baldwin County continued to collect GPS coordinates on new and existing septic tank systems and enter the data into an onsite sewage disposal system database. With the database, the ADPH is able to conduct the following types of activity: send monthly mailing of report forms to licensed septic pumpers; track pumped systems (630 septic tanks reported pumping during a six month period); track re-inspections of existing systems (55 during a six-month period); track new permits issued (196 during a six-month period); track repair or upgrade permits issued for existing systems (121 during a six-month period); and send reminder letters to homeowners to have tanks checked for pumping (291 mailed during a six-month period).

- In 2008, MBNEP/Clean Water Partnership and the Mobile County Soil and Water Conservation District received funding to conduct activities for pathogen source reduction at Juniper Creek. Specifically pathogen inputs via water quality testing had been linked to a small dairy farm adjacent to the creek and aging septic systems in residential development upstream of the dairy farm. To reduce pathogen inputs associated with the dairy, fencing was replaced to restrict cattle access to the creek and the farm's waste water lagoon was pumped out in July 2009.

- In 2008, MBNEP funded a two-year project with the Weeks Bay Foundation to identify likely sources of pathogens at base flow and high water events in upper Fish River. *E. coli* counts at high water events have been enumerated at periodic intervals. Multiple antibiotic resistances testing by the University of West Alabama was conducted on Fish River samples. Additional source tracking using PCR-based methods were completed in 2010. Additionally, a network of volunteer rainfall monitors has been established and is providing detailed information on rainfall in the upper Fish River.

- In 2004, MBNEP, ADEM, Mobile Engineering LLC and the South Alabama Regional Planning Commission (SARPC) partnered in an effort to remove Eight Mile Creek and Gum Tree Branch from the Alabama 303(d) list through identification of pathogen inputs into this stream. From 2006 through 2008, MBNEP, in partnership with Mobile Engineering LLC (formerly Mobile Group, Inc.) undertook *the Eight Mile Creek Pathogen Source Identification* project. The final report, *Source Assessment Report* for Eight Mile Creek Watershed, provides a detailed baseline of information on the sewer network for this community, as well as information on watershed boundaries, 3-D surface hill shade, existing land use, soil series, hydrologic soils, and a comprehensive source assessment map.

- *Alabama Feeding Operations (AFO), Concentrated Animal Feeding Operation (CAFO) Rules and Use of Agricultural BMP's to Reduce et/Wildlife/Farm Pathogen Introduction* has been produced and is implemented by NRCS. The intent is to reduce introduction of pathogens from domestic

pets, wildlife, and farm animals by supporting implementation of AFO/CAFO rules and use of agricultural BMPs.

- ADEM administers the Federal Clean Vessel Act:, encouraging pump-out stations, placing appropriate facilities (holding tanks, signage, etc.) at public launches and developing maintenance agreements with owners.

- The Alabama State Legislature passed the Marine Sanitation Act, 2002-59, which became effective in 2003. This Act regulates sewage discharge from recreational vessels and residence boats. All recreational vessels and residence boats with marine sanitation devices must be inspected annually by a Marine Police officer or other Dept. of Conservation personnel. A compliance decal is issued if vessel meets the requirements of the Act and Department.

- In response to numerous overflows of untreated sewage attributed to grease, MAWSS introduced a grease recycling program. There have also been sewage overflows in both counties attributed to high rain volume.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

A substantial number of items recommended as steps have been accomplished since 2002. However, shellfish harvesting is halted and swimming advisories are issued periodically due to pathogens. Sewage overflow issues are clearly in need of attention.

WQ.D1: Assess Problems Related to Sediment Quality

This Action Plan includes assessing problems related to sediment quality, in terms of contamination, in the MBNEP area and reducing and/or eliminating, if possible, identified toxic chemicals in identified problem areas by: compiling and analyzing existing data to identify problems and data gaps; supporting efforts to better understand sediment toxic processes factors through the development of new data and risk assessments; evaluating the sources and levels of input of identified toxic chemicals in identified problem areas; developing steps to reduce levels of toxic chemicals in identified problem areas; reducing the impacts of runoff from parking lots, etc., to sediment and/or water quality by encouraging stormwater planning and design to address water quality and quantity management concerns; and promoting highway and road planning and design to address water quality and quantity management concerns.

To what extent was this sub-objective implemented?

- During 2000, ADEM began sampling estuarine sediments for toxicity and fishes for whole-body contaminants as part of the National Coastal Assessment Program.

- In 2004, a National Sediment Quality Survey was conducted to identify probable areas of concern for sediment contamination from over 19,000 sampling stations located in water-bodies throughout the nation. Results of this survey indicate that certain portions of Mobile Bay are “areas of probable concern” due to the presence of mercury and hydrocarbons to hydrogen atoms that include most fuels, solvents and pesticides.

- In 2005 Woolpert Engineering (under contract to MBNEP) completed *An Assessment of Sediment Contamination in the Lower Mobile-Tensas Delta* an analysis of existing data to identify problems and data gaps.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

This sub-objective was rated as a High Priority in the *2006 Comprehensive Conservation Management Plan Prioritization and MBNEP Strategic Plan*. At that time, MBNEP recommended working with the Alabama Department of Transportation (ALDOT) to reduce run-off from roadways. Also it was stated that to better understand toxic sediment processes, available sediment quality data needs be reviewed.

WQ.D2: Provide for Safe Disposal of Hazardous Waste

This Action Plan includes the promotion of opportunities for citizens to properly dispose of household and agricultural hazardous waste by supporting state and local efforts to establish hazardous waste amnesty days for potentially toxic materials (e.g., motor oil - "Project ROSE"; household chemicals; oil-based paints; agricultural chemicals, etc.).

To what extent was this sub-objective implemented?

- The MBNEP and the Alabama Coastal Foundation supported two amnesty days for the collection and proper disposal of motor oil and household chemicals; oil-based paints; agricultural chemicals, etc.

- Keep Mobile Beautiful periodically hosts Electronics/Computer Recycling events.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Hazardous Waste Amnesty Days should become institutionalized events at the county level, occurring on a regular basis.

There are numerous private businesses disposing of and/or recycling hazardous waste now in the Mobile Bay area as collection and proper disposal of hazardous materials is a continuing need. In addition as greater citizens' awareness and alarm has been caused by the BP Oil Spill, specific education regarding hazardous materials would be useful.

Living Resources Action Plan

The CCMP Living Resources section objective is to "*Maintain native populations within historical ranges and natural habitat and restore populations that have declined."*

The Living Resources Workgroup of the MBNEP developed three (3) sub-objectives and six (6) Action Plans in order to reach the Management Conference directive. Sub-objectives focused on areas of Status and Trends, Needs, Exotic Species, and Commercial and Recreational Fisheries.

Within this main objective there are three sub-objectives that are believed to address all existing living resource issues in Mobile Bay. These sub-objectives are summarized as: Establish Status and Trends; Deal with Exotic species; and Work to improve commercial and recreational fisheries. The specific wording is as follows:

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

2) *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.*

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

LR.A1: Improve Monitoring of Key Living Resources

This Action Plan is aimed to increase the level of monitoring of living resources in the MBNEP area by identifying status and trends of living resources in the estuary; recommending key species that offer insight into ecosystem health that are not currently being evaluated in a monitoring program; developing programs for the maintenance of biodiversity and better protection of threatened and endangered species on private and public lands; making recommendations for measuring and monitoring biodiversity; developing programs for better protection of endangered/threatened species on private and public coastal lands; and developing guidance and recommendations to ensure species friendly development.

In addition, this Action Plan included evaluating the current monitoring plan for the American alligator (Alligator mississippiensis); making recommendations for a population characterization study that investigates the general physical health and behavioral characteristics of this species and implementing a pathological study on visual impairment of these animals; developing monitoring programs of known potential vectors of nuisance species introduction; developing a water quality protection and monitoring plan specifically dealing with nuisance HABs; gathering information from relevant institutions to provide data to the Data and Information Management System; and establishing a species advisory committee to serve as a forum for species management issues affecting the Mobile Bay estuary.

To what extent was this sub-objective implemented?

- The Alabama-Mississippi Rapid Assessment Team (AMRAT) began in 2003 and was led by MBNEP in partnership with the University of Southern Mississippi/College of Marine Sciences/Gulf Coast Research Laboratory; Marine Resources Division; WBNEER; DISL; Mississippi-Alabama Sea Grant Consortium; Mississippi Department of Marine Resources; Gulf States Marine Fisheries Commission (GSMFC); and many volunteers, AMRAT consisted of the collection and identification of native and non-native (exotic) animals and plants in Mississippi and Alabama coastal waters in snapshot surveys over a two year period (2003-2004). Results continue to allow researchers and managers to evaluate changes in species distribution and community composition and to assess incidence and abundance of significant exotic species. Reports are provided to the National Aquatic Nuisance Species Task Force (ANSTF) and the Gulf Regional Panel on Aquatic Invasive Species.

- Two analyses of more than twenty years of sampling from the Fisheries Assessment and Monitoring Program (FAMP) of the Marine Resources Division were undertaken to determine status and trends in stocks that included commercially and recreationally important fish and shellfish in our coastal waters. Monitoring abundance of estuarine-dependent species provides data that can be used to assess fisheries status, determine consequences of habitat degradation, evaluate effectiveness of habitat restoration programs, and ascertain impacts of invasive species. Changes in species abundance must be interpreted using long-term data because of intrinsic time lags of cause-effect processes and high year-to-year "expected" variations due to annual changes in the environmental conditions that characterize coastal waters. In an MBNEP-funded study completed in 2006, the DISL evaluated data on selected species (brown shrimp, white shrimp, pink shrimp, blue crab, lesser blue crab, hardhead catfish, Gulf butterfish, white trout, Gulf menhaden, spot, and Atlantic croaker) from 1981 to 2003. Field samples from shrimp trawls, plankton nets, and seines, were used to summarize status, identify species requiring additional management, and make recommendations to increase their abundance.

- In 2008, a team from the Center for Fisheries Research at the University of Southern Mississippi Gulf Coast Research Laboratory completed another statistical analysis, funded by the Mississippi /Alabama Sea Grant Consortium (MASGC), of long-term FAMP datasets from 1981 through 2007 for Alabama and Mississippi (with comparisons to data in Louisiana). Both studies were in agreement that for most species no significant changes in status were revealed over this time frame. Notable exceptions were brown shrimp and blue crabs.

- The Southeast Area Monitoring and Assessment Program (SEAMAP) is a State/Federal/university program for collection, management and dissemination of fishery-independent data and information in the southeastern United States. Surveys reflect distinct regional needs and priorities; however, survey operations in one geographic area often provide information useful to researchers in all three regions. In the Gulf of Mexico, SEAMAP resource surveys include the Fall Shrimp/Groundfish Survey, Spring Plankton Survey, Reef Fish Survey, Summer Shrimp/Groundfish Survey, Fall Plankton Survey and plankton and environmental data surveys.

- ADCNR Wildlife and Freshwater Fisheries Division (WFFD) maintains a long-term sampling program in the Delta to monitor the status of important game species, such as largemouth bass, and makes management recommendations for conservation issues.

- In the spring and summer of 2007 MBNEP and ADCNR State Lands Division - Coastal Section partnered with the National Audubon Society Coastal Bird Conservation Program (CBCP) to conduct the first comprehensive standardized survey of the Alabama coast (including islands) for breeding beach-nesting birds to determine status and trends for management decisions and public information. The sites covered included: Bon Secour National Wildlife Refuge, Dauphin Island, west Dauphin Island, Isle aux Herbes, Pelican (Sand) Island, Cat Island, Gulf State Park, and Barton Island Peninsula. CBCP is currently engaging in discussions to implement protective measures with the cooperation of local state and federal agencies to preserve and enhance habitats for Alabama's small but precious beach-nesting bird population. In the 2008, 2009, and 2010 field season, the MBNEP and Conservation Department supported the CBCP to conduct a second season annual surveying and maintain a monitoring/protective signage program. Sites were identified that support the highest number of focal species and human-created disturbances documented, whether related to oil spill response or not, and any incidence of oiled shorebirds was documented. Signage and materials provided by specific sites/owners/managers were installed to increase protection of birds and habitats. Onsite field training was provided for partners and volunteers interested in assisting with the project.

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Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Elements of the sub-objective that have not been addressed between 2002 and 2012 should be reconsidered to see if they are tasks that should be brought forward in the next CCMP. These include: recommending key species that offer insight into ecosystem health that are not currently being evaluated in a monitoring program; developing programs for the maintenance of biodiversity and better protection of threatened and endangered species on private and public lands; making recommendations for measuring and monitoring biodiversity; developing programs for better protection of endangered/threatened species on private and public coastal lands; and developing guidance and recommendations to ensure species-friendly development; developing monitoring programs of known potential vectors of nuisance species introduction. Note: In the *2006 Comprehensive Conservation Management Plan Prioritization and MBNEP Strategic Plan,* this activity was not designated a priority and was recommended for re-examination for current relevance.

A list of indicator invertebrate species should be developed and monitored as this level of the food web is the first to show stress.

As a result of the 2010 BP Oil Spill, significant monitoring and research is planned to study the long-term effects of the oil spill and its potential impacts on the environment and human health. Specifically, a 10-year program is planned to implement the Gulf of Mexico Research Initiative, with GOMA and a partnership of the states of Alabama, Florida, Louisiana, Mississippi and Texas. The Alliance has worked for several years on issues such as water quality, habitat conservation, ecosystem integration and coastal community resilience. BP has awarded grants to Alliance members including the AUMERC to enable and support sampling and high-priority studies of community distributions, compositions and ecological

impacts of oil and dispersant. In addition, BP will be investing funding for water, sediment, soil, air and other sampling and analysis for study conducted by or with the NRDA to investigate the impact of the incident on natural resources and human use of those resources. These activities should be considered and data evaluated as part of the development of a new CCMP (where possible).

LR-A2: Improve Monitoring of At risk Species

This action plan examines state regulations regarding protection of species at risk and recommends expansion of regulations, better enforcement of regulations and updating of state lists, if warranted**.**

To what extent was this sub-objective implemented?

- The US Fish and Wildlife Service (USFWS) lists species which are threatened or endangered. Alabama also protects fish with state laws and regulations. Alabama state regulations protect Alabama freshwater game fish species with capture methods and limits. Certain Alabama freshwater non-game fish species are protected with specific regulations. Other fish species may be protected by regulations and laws prescribing means of capture.

- The Alabama Natural Heritage Program, an affiliate of The Nature Conservancy (TNC) maintains a database of rare and threatened species including plants, animals and natural communities.

- Alabama Center for Estuarine Studies (ACES) funded the University of South Alabama's Department of Biology's research on the Red-Bellied Turtle: its range, habitat and increasing its numbers.

- The Manatee Sighting Network, managed by the DISL and funded by MBNEP, supports tracking of this endangered species to better understand the ecology that supports its existence.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

In the *2006 Comprehensive Conservation Management Plan Prioritization and MBNEP Strategic Plan* this sub-objective was given a High Priority. Identifying gaps in existing studies and recommending key species that had not been evaluated were recommended.

LR-B1: Develop Management Plans for Nuisance Species

This Action identifies species and develops management plans for each plant and animal nuisance species in order to dampen or control negative effects on habitats and /or water quality within the Mobile Bay NEP area, thus restoring ecological relationships.

To what extent was this sub-objective implemented?

- The Alabama Aquatic Nuisance Species Task Force (ALANSTF), a collaboration of state and federal agencies, academia, research institutes, government and industry entities, port authorities, and environmental enthusiasts, has developed a DRAFT *State Management Plan for Aquatic Nuisance Species in Alabama*. Development of the Plan was led and funded by ADCNR, Wildlife and Freshwater Fisheries Division (WFFD) in 2005. The plan was developed as 1) a guideline for

prevention and educational awareness regarding the impacts of introduced non-native organisms and 2) a practical management plan.

- ADCNR Freshwater Fisheries Division has management plans it implements within the Mobile - Tensaw Delta. TNC's Grand Bay Bio Reserve has developed management plans for cogon grass and other invasive species, and has partnered with other entities (such as Shell Oil) to perform prescribed burns. Similarly, the Weeks Bay NERRS has management plans for invasive species within its boundaries.

- The Mississippi Alabama Sea Grant Extension Program through AUMERC has provided outreach to marinas, boatyards and boaters about the dangers associated with Zebra mussels as well as how to identify them. The USCG has recommended mandatory (instead of voluntary) ballast water control under the National Invasive Species Act (NISA). And the Alabama State Legislature has passed "no discharge" regulations for Alabama waters.

- Research into invasive species is on-going at DISL. An innovative program called "Dock Watch" has been established to assist in the effort of surveying and providing increased education about Australian jelly fish and other species.

- Apple snails have been reported in Mobile Municipal Park and in Three Mile Creek. Eradication efforts were undertaken in 2009 and 2010. The presence of this nuisance species in Three Mile Creek is of particular concern since it drains directly into the Mobile River Ship Channel. Concerns include the possibility of Apple snails invading more than 20,000 acres of Mobile-Tensaw Delta habitat along with the possibility of their introduction to the Tombigbee and Alabama Rivers and ports outside of Alabama by attachment to ships and barges.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?
The State Management Plan for Aquatic Nuisance Species in Alabama should be finalized and adopted with a dedicated funding source established for its implementation.

LR-C1: Efficiently Measure Fishing Effort
The purpose of this Action is to examine how to efficiently measure fishing effort so that better coordination can exist among regulators, researchers, and fishermen.

To what extent was this sub-objective implemented

- AUMERC Report "Investigation of Record Keeping Procedures Pertaining to Marine Commercial and Recreational Fishing Harvests Among Gulf States", funded as an MBNEP 1998-1999 Workplan item, made recommendations that were subsequently implemented for all commercial landings in Alabama. Therefore, this action plan is completed.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Not at this time.

LR-C2: Increase Fisheries Resources

This Action Plan included examining the possibility of increasing fisheries resources by decreasing or controlling fishing 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) by working to improve water quality and habitat (as described in Water Quality and Habitat Management sections of this document), developing and monitoring artificial habitat in appropriate areas of the Mobile Bay estuary through programs such as the "Roads to Reefs", supporting restocking and shell replanting efforts, and examining existing data to determine whether additional limited take and/or no take zones are warranted.

To what extent was this sub-objective implemented?

- The "Roads to Reefs" effort, Alabama's Artificial Reef Program, is the product of a cooperative agreement between the U. S. Army Corps of Engineers (USACE) and the ADCNR Marine Resources Division. This program has placed numerous reefs in locations in Mobile Bay and the Mississippi Sound. Fishermen can find the coordinates on the internet.

- Mobile Bay Oyster Gardening has been a joint effort among MBNEP, MASGC, and AUMERC since program inception in 2001. An annual average of over 53,000 oysters (excluding less productive years in 2004, 2005, and 2010 owing to Hurricanes Ivan and Katrina and the Deepwater Horizon oil spill, respectively) raised by volunteers and supplemented by oysters raised by AUMERC were placed on Boykin Reef off Dauphin Island and Shellbank Reef in Bon Secour Bay. The oyster gardening program is specifically intended for habitat and ecological restoration - not consumption - but more importantly, its educational component teaches citizens that oyster reefs are the estuarine equivalent of coral reefs. Oyster Gardeners have produced nearly 500,000 oysters for restoration and enhancement efforts within Mobile Bay.

- ADCNR received a federal post-Katrina grant to rebuild and repair the damage to the multi-billion dollar seafood industry. ADCNR helped allocate funds for research, habitat restoration and fishermen partnerships. Non-governmental partners included the Organized Seafood Association of Alabama (OSAA), Oyster Farmers Association of Alabama and the Orange Beach Fishing Association. Additionally, the OSAA provided the oversight of the replenishment of shallow water oyster reefs in Heron Bay. Qualified fishermen were paid to transport cultch material from the barge to designated shallow water areas where the material was shoveled, pushed or blown overboard.

- MRD determines the limited "take" or "no take zones" based upon their collected data. This is an on-going responsibility of MRD.

- The National Marine Fisheries Service (NMFS) Gulf of Mexico Fisheries Management Council has the authority to identify waterways as Essential Fish Habitat, or habitat which is "essential to a species' long-term survival and health," for species deemed to be over-fished. ADCNR has the authority to apply conditions to permitted activities and require mitigation measures such as requiring artificial reefs in areas ADCNR identifies.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Not at this time.

LR-C3. Manage Recreational and Commercial Fishing Effort
This CCMP Action requires examination of the possibility of decreasing or controlling effort as needed (e.g., limited entry for stressed fisheries in concert with commercial fishermen, and, encouragement of catch-and-release as a means to control recreational fishing effort).

To what extent was this sub-objective implemented?

- Species specific management plans have been developed successfully and managed by NMFS , the Marine Fisheries Division and the Wildlife and Fresh Water Fisheries Division. Based upon monitoring, limits and/or prohibitions are often placed upon certain species until the agencies determine the population has recovered.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Not at this time.

Habitat Management Action Plans

The CCMP Habitat Management section objective is to *"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."*

Within this main objective there are five sub-objectives that are addressed: Habitat Preservation; Coastal Wetlands; Nesting Habitat; Submerged Aquatic Vegetation, Natural Shorelines, and Beaches and Dunes. The specific wording is as follows:

1) *HABITAT PRESERVATION - 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.*
2) *COASTAL WETLANDS - 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.*
3) *NESTING HABITAT- Maintain and protect nesting habitat for colonial and migratory birds and reduce declines in nesting habitat due to human disturbance and alteration.*
4) *SUBMERGED AQUATIC VEGETATION (SAV) - Maintain existing native Submerged Aquatic Vegetation (SAVs) at 2001 levels and increase acreage by 3% of known areas where native SAVs occur by 2006.*
5) *NATURAL SHORELINES, BEACHES AND DUNES - 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 individual action plans for each are set to further define means for accomplishing the objectives.

HM.A1 Develop a Coastal Habitats Coordinating Team

This Action Plan included the identification and prioritization of 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. It also included the development of a non-regulatory, incentive-based program for habitat restoration, management, and protection utilizing a multi-species approach.

To what extent was this sub-objective implemented?

- The Coastal Habitats Coordinating Team (CHCT) is part of MBNEP's on-going effort to create public/private partnerships to conserve critical habitats throughout the MBNEP area. The overall goal is to improve coordination and cooperation of organizations with habitat protection goals and to better focus individual efforts. Members of the CHCT include: WBNEER, ACF, U.S. Army Corp of Engineers, Faulkner State Community College, ADCNR State Lands Division-Coastal Section, DISL, Alabama Forest Resource Center, The Nature Conservancy, Weeks Bay Foundation, Alabama Power Company, ADCNR State Lands Division Coastal Section, U.S. Army Corp of Engineers, Mobile Bay Keeper, Baldwin County Commission, Trust for Public Land, Dauphin Island Bird Sanctuaries, NRCS, US Fish and Wildlife Service, Grand Bay National

Estuarine Research Reserve, Auburn Marine Extension, Auburn University, ASGC, City of Orange Beach, ADEM/Coastal Facilities Section, ADEM, AL Port Mitigation Bank, Ducks Unlimited, Alabama Power Company, Mobile Bay Sierra Club, South Alabama Regional Planning Commission, EPA GOMP, Alabama Gulf Coast Convention and Visitors Bureau, Bon Secour National Wildlife Refuge, Southeastern Natural Resources Incorporated, Mobile County Parks, The Forum, Partners for Environmental Progress and Coastal Conservation Association.

- The Alabama Department of Conservation has similarly developed plans and priorities under the Coastal and Estuarine Land Conservation Program (CELCP). Lead by ADCNR/State Lands Division, the Alabama CELCP encompasses the federally-defined Alabama Coastal Area, MBNEP boundaries and the Mobile-Tensaw River Delta. Ten "conservation target" habitat types and over 25 sites were selected from a combination of information from CHCT, Alabama Forest Legacy's Assessment of Needs, Alabama Coastal Area Management Program, Forever Wild and other inventories and assessments.

- In 2006, the Mississippi-Alabama Habitats Database was developed by MBNEP in partnership with Mississippi-Alabama Sea Grant Consortium and DISL to track habitat restoration projects in the two-state area that are planned, ongoing, and completed. Database entries include project information such as restoration technique, latitude and longitude, primary funding sources, and partners, fields that dovetail with EPA GPRA reporting and NOAA's NERI. When the database was developed, it included a mapping feature depicting the distribution of projects across the eleven coastal counties of Alabama and Mississippi. However, the map was limited in the amount of data it could communicate.

- In 2008, The Nature Conservancy and NOAA partnered with the MBNEP in an effort to identify priority habitats across Mobile and Baldwin Counties. Using the NOAA developed Habitat Priority Planner as a guide, MBNEP brought the CHCT together over the course of a year to identify related datasets land use, water quality, parcel, and other information to define selection criteria and develop priority habitat patches for 10 different habitat types or "goals". As a result, a GIS-tool called a *Habitat Priority Planner* was created and used to develop a *Prioritization Guide for Coastal Habitat Protection in Mobile and Baldwin Counties.* A set of geospatial layers, the mapper shows habitat priority patches for terrestrial, fresh water, and salt water habitats together with other datasets, including Mobile and Baldwin County parcel data, impervious cover, urbanized areas, and impaired water bodies. This information is of invaluable use to the CHCT in illustrating where restoration and acquisition are currently occurring and where additional focus is needed. The information is also important to other stakeholder groups such as chambers of commerce and transportation and recreation planners in illustrating the information necessary to optimize resource investment and protect critical habitats.

- MBNEP contracted with TAI/Strand Associates to conduct an Emergy Analysis on the value of wetlands in the area of Fish River in Baldwin County. In order to provide a means of calculating the value of both natural and man-made features on an equal basis to indicate their true contribution to the human economy. Emergy is defined as a measure of the available energy required, directly and indirectly to make a product or service. This provides a cost-benefit analysis

of large-scale environmental restoration projects. An Emergy analysis of wetlands, coastal zones and their restoration, and of entire watersheds may lead to the development of sustainable designs in harmony with both man and nature.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Identifying and prioritizing areas for potential acquisition and/or restoration is of continuing importance and should be considered an on-going task. An acquisition strategy should complement the *Prioritization Guide for Coastal Habitat Protection in Mobile and Baldwin Counties.*

Guidance on long-term management and protection of priority sites acquired should be developed to ensure maintenance of natural functions.

The CHCT should continue to emphasize the value of natural habitats as economic resources.

The CHCT should promote the Watershed Management approach in resource acquisition and protection as this holistic planning endeavor also includes non-regulatory, incentive-based programs for habitat restoration, management, and protection.

HM.B1 Protect or Restore SAV Habitat

This Action Plan included protecting or restoring SAV habitat in the Mobile Bay NEP service area by producing a map of major SAV concentrations of occurrence for public distribution; identifying high priority sites for SAV restoration from those areas with healthy or recovering SAV; implementing a coordinated restoration effort to expand the coverage of SAV, utilizing volunteer planting efforts; examining the possibility of incorporating priority SAV restoration sites into area mitigation planning strategies; monitoring and evaluating restoration efforts for success, necessary corrections, and improved techniques; and investigating non-destructive (other than transplanting) methods for developing plant materials for use in SAV restoration; expanding enforceable "no wake" zones to include areas adjacent to SAV beds and posting with signs; and considering the development of regulations for "no motor" zones in sensitive SAV areas.

To what extent was this sub-objective implemented?

Identification of SAV

- MBNEP has supported mapping of Submerged Aquatic Vegetation twice (2002, 2008-2009) which has led to the development of Status and Trend Reports for each. In 2002, MBNEP commissioned the first aerial photographic baseline study for current SAV coverage in Coastal Alabama. Barry Vittor and Associates was contracted to produce aerial true color digital ortho- photo quads along the coast. Certain photographic signatures indicate various plant species. Once identified in aerials, interpretation was "ground-truthed" by physically checking the plants in the field, and maps of SAV coverage were created. In a follow-up study, Barry Vittor and Associates obtained historical aerial photosets of Mobile County from 1940 and Baldwin County from 1955 and 1966 to compare to the 2002 photosets. Between 1940 and 2002, SAV acres in Mobile County decreased from 1924 acres to just 855 acres of SAV. Most of the loss was south of Dog River with 691 fewer acres along

the western shore. Baldwin County analysis revealed 88.3% loss between 1955 and 2002. The 1955 photoset revealed SAV from just north of Point Clear south to Bon Secour Bay. However, in 2002, no SAV were identified from that area. Between 1966 and 2002, the northeastern shore of Mobile Bay lost 328 acres or a 71% decrease.

- In November 2004, the vegetated coastal locations visited by Vittor and Associates in 2002 were re-sampled by Dr. K.L. Heck and D. Byron (DISL) to assess changes in SAV distribution that may have occurred as a result of the effects of Hurricane Ivan. The Alabama Coast was divided into three zones: Grand Bay; Mobile Bay (including Mississippi Sound east of Grand Bay) and Perdido Bay. In addition, two areas that were found to contain newly discovered occurrences of species of SAV were selected for more intensive study. These sites included several locations on the west end of Dauphin Island found to support SAV for the first time, and a location in Little Lagoon, where turtlegrass was reported for the first time in Alabama by Vittor and Associates (2003). Of the original 44 Vittor stations, 36 were still populated with SAV. The west end of Dauphin Island, Little Lagoon and Perdido Bay were heavily impacted by Hurricane Ivan and were considered likely to have experienced SAV damage or loss, but a large loss of SAV at Little Lagoon or Perdido Bay was not observed. However, due to the shifting sediment conditions at the west end of Dauphin Island, a significant loss of SAV in this area was observed.

- In 2008 and 2009 MBNEP, with funding from the Alabama Coastal Management Program, mapped sea grasses in Mississippi Sound and lower Perdido Bay. SAVs in Upper Mobile Bay and lower Mobile-Tensaw River Delta were mapped. Significant differences in sea grass coverage was noted as the mapping effort took place following a number of very active tropical storm seasons and two years of severe drought which impacted SAV coverage on upper Mobile Bay and the lower Mobile-Tensas River Delta. Over 20 species of SAV plants were found from the northern extent of the Mobile Tensaw Delta to the southern portions of Mobile Bay and Mississippi Sound.

- The Dauphin Island Sea Lab, with funding from the Alabama Coastal Area Management Program, is currently preparing an analysis of historic SAV for the purpose of comparing SAV coverage and species composition from 1980-81, 1987, 1994, 2002 and 2008-09 mapping efforts to historical precipitation, river flow and tropical storm event data in order to determine if a statistical relationship exists between these data.

Restoration of SAV habitat

- In 2008, MBNEP received a Five Star Grant from the National Fish and Wildlife Foundation to contract with Dr. Just Cebrian of DISL to restore SAV at Little Lagoon. The restoration site is located at the west end of Little Lagoon within the borders of the Bon Secour National Wildlife Refuge. After several sites were tested, DISL students and volunteers planted 720 plugs of *Halodule wrightii* along the shore of the Bon Secour National Wildlife Refuge in 16 dense patches. The patches act as source populations which will spread out and ultimately cover the area in between them. The restoration will be followed by an extensive monitoring campaign. This project also compares the feasibility and cost-efficacy of several sea grass planting methods.

- During 2011, DISL researched alternatives regarding SAV restoration. The investigation examined if sufficient seed reservoirs exist to restore two common SAV species (commonly called shoalgrass and tapegrass) of the northern Gulf of Mexico as an alternative to the generally ineffective transplant methods used in the majority of seagrass restoration projects. Results will determine if this is a viable strategy for restoring lost SAV acreage.

- "No Motor Zones" have been established to prevent prop scarring in order to restore approximately 35 acres of SAV and to protect an additional 100+ acres in Old River and Perdido Bay in Baldwin County. The Alabama Marine Police are responsible for enforcing the zones, and monitoring efforts are being conducted in partnership with DISL, the City of Orange Beach and The Nature Conservancy.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

During 2009, a new threat to SAVs, the Amazonian apple snail, was discovered in the lake at Mobile's Langan Park and downstream in Three Mile Creek which flows to the Mobile-Tensaw Delta and Mobile Bay. Thus the snails have the potential to cause significant impacts to SAVs in the entire coastal area. WFFD undertook drastic measures to control and/or eliminate the snails in the lake and Three Mile Creek but were not entirely successful. Efforts should continue to eradicate this invasive species.

There is continuing need for additional education and outreach efforts to stress the importance of SAVs and the sensitivity of seagrasses to human impacts.

HM.C1 Maintain and/or improve Beneficial Wetland Function

This Action Plan included maintaining and/or improving beneficial wetland functions within individual watersheds of the Mobile Bay NEP area by reducing the loss in quality and quantity of existing wetlands; preparing a strategic mitigation plan for coastal Alabama; and restoring degraded marsh habitats. More specific actions laid out in this Plan included:

1) *Determine and quantify the current extent of wetlands and the extent of wetlands loss or conversion within the Mobile Bay NEP study area by habitat type, watershed, and cause of loss;*
2) *Produce a GIS map of the information gathered for education and conservation management purposes;*
3) *Develop and implement specific recommendations to alleviate the loss of non-regulated wetland habitats within the confines of the Mobile Bay NEP service area*
4) *Develop baseline information on the level of wetland functions within individual watersheds;*
5) *Determine the extent and cause of beneficial wetland functions loss;*
6) *Establish the threshold acreage needed to sustain baseline wetland functions;*
7) *Examine the effectiveness of existing wetland regulations;*
8) *Develop and implement specific watershed management recommendations to alleviate the loss of wetland functions;*
9) *Identify wetlands' types receiving the greatest permit pressure and development impact;*
10) *Identify priority sites for mitigation, preferably by watershed*

11) Develop guidance on wetland functional assessment and execute moas between regulatory agencies for its implementation;
12) Designate appropriate success criteria that are consistent with replacement of lost wetland functions;
13) Implement a program of regular mitigation site inspections to assure mitigation compliance;
14) Identify needed design corrections, and provide input to better mitigation design;
15) Initiate or improve existing inventories of wetlands in the Mobile Bay NEP service area;
16) Incorporate the above into a strategic mitigation plan for coastal Alabama.
17) Identify high priority sites for marsh restoration within the Mobile Bay NEP service area by watershed;
18) Implement a coordinated restoration effort to expand marsh acreage using the USACE 206 (eco-system restoration) program to restore marsh;
19) Make arrangements with local nurseries to grow marsh plants adapted to Mobile Bay, as opposed to transplanting from donor marshes or purchasing plants from distant sources;
20) Sponsor and coordinate volunteer marsh-planting efforts and monitor and evaluate restoration efforts for success, necessary corrections, and improved techniques

To what extent was this sub-objective implemented?

Habitat Mapping

- The U.S. Geological Survey's (USGS) National Wetlands Research Center (NWRC) has collaborated with the MBNEP through cooperative agreements. These agreements allow the NWRC to acquire aerial photography of Mobile County and to produce Digital Orthophoto quads of Mobile County, and Digital Quadrangles for Baldwin County from aerial photography for use by the USGS, the State of Alabama, Mobile and Baldwin counties, and the MBNEP. The agreements have also included the mapping of wetlands and uplands of Mobile and Baldwin counties from the aerial photography acquired to add to the USGS Gulf of Mexico database, and the National Wetlands Inventory (NWI) geodatabase. In 2007, the MBNEP and the NWRC continued the collaboration of all parties in the development of a series of products from the completed mapping including the development of an accuracy assessment of the wetland and upland habitat mapping.

- In 2008 MBNEP entered into a partnership with NASA Stennis Space Center's Applied Science Program to conduct an analysis of land use and land cover change for Mobile and Baldwin Counties. The analysis included the quantification of geographic changes for agriculture, barren beach lands, open waters urban, upland forest, woody wetland and non-woody wetland (marsh) landscapes over a 34-year period. The estimated quantity of wetlands in Mobile and Baldwin Counties fluctuates from year to year and is significantly lower than the estimate of 437,400 acres stated in the *Wetlands Conservation and Management Initiative (WCAMI) Final Report Vol. 1.*

- Little Bay Finfish and Shellfish Nursery Habitat Restoration was conducted under a Post-Katrina Fish and Shellfish Recovery Grant received by the ADCNR from NMFS. The project consists of a 5,200' riprap and wave attenuation device (WAD) segmented permeable breakwater placed approximately 300' offshore of the existing shoreline. Approximately 130,000 cubic yards of sediment was placed between the existing shoreline and 200' offshore of the existing shoreline.

Sediment elevations are between 1.5' to2.5'. Bagged oystershell was also placed along the northern shoreline. Planting of native vegetation, including transplants from the adjacent marshes and nursery stock, is complete and signs of shoreline stabilization are already evident.

Habitat Acquisition & Restoration

- The United States Fish and Wildlife Service established the Grand Bay National Wildlife Refuge, a wetlands savannah, along the Alabama/ Mississippi state line. The Refuge, encompasses about 14,000 acres, of which about 10,000 acres are owned by the Refuge with other property leased or in conservation easements. The Nature Conservancy has also acquired significant acreage in the Grand Bay Savannah in order to assist in protecting the biodiversity of the area. Restoration is accomplished through controlled burns, removing invasive species and replanting vegetation.

- In 2007, the State purchased the Giddens Tract, a 1,642 acre parcel of piney flatwoods in the Grand Bay Savannah adjacent to existing State of Alabama Forever Wild tracts.

- The Forever Wild Program, administered by the ADCNR Lands Division, was established in 1992. Since its inception, the program has purchased lands for general recreation, nature preserves and additions to Wildlife Management Areas and state parks. The Forever Wild program has acquired over 100,000 acres in both Mobile and Baldwin Counties by combining federal funds with state funding from oil and gas lease revenues. While most of the acreage is in the Mobile/Tensaw Delta, a designated National Natural Landmark, Forever Wild has also acquired 2,622 acres of forested wetlands and uplands along the Perdido River and 2,500 acres near Bayou La Batre.

- The Bon Secour National Wildlife Refuge consists of 6,700 acres of wildlife habitat lying directly west of Gulf Shores, Alabama on the Fort Morgan peninsula and Little Dauphin Island. The USFWS, TNC and the Sierra Club have purchased beach areas for preservation in the Bon Secour Wildlife Preserve and over 27 acres have been purchased for conservation by the City of Gulf Shores and ADCNR.

- The Weeks Bay Foundation, together with the Baldwin County Commission and Alabama's Forever Wild Program, has recently preserved 820 acres of coastal wetland habitat adjacent to Weeks Bay. The property, located within the acquisition boundary of the WBNERR, will be the largest addition to the Reserve since its designation in 1986.

- Local Government partners' habitat acquisition and restoration efforts include: Mobile County's Bay Front Park which includes several wetland habitats and the City of Daphne's acquisition and restoration of approximately 50 acres of Mobile Bay waterfront property.

- From 2006 to 2008, MBNEP partnered with the Baldwin County Commission in the stabilization of Magnolia Springs Park to prevent on-site erosion. Additionally wetland, riparian, and stream habitat were restored to its natural state. These activities were part of a comprehensive plan of the Town of Magnolia Springs to re-classify the Magnolia River as an Outstanding Alabama Water (OAW). That designation was received in late 2009.

- In June, 2008 the MBNEP partnered with the U. S. Fish & Wildlife Service and the Mobile County Wildlife and Conservation Association to establish a salt marsh on a mud flat directly across the Tensaw Channel from Battleship Park. Approximately 4,000 plants, bull tongue (*Sagittaria lancifolia*) and giant bulrush *(Scirpa californica*), and black needlerush *(Juncus romereanus*) were planted to supplement 700 black needlerush planted by the same partnership in November 2007. This project was not successful.

- In 2008, MBNEP began a restoration of the wetlands bordering the developed area of the City of Mobile's Helen Woods Park with a Community Restoration Partnership grant award. After failed attempts to kill the invasive *Phragmites* through burning and herbicide treatments, the area was excavated to reduce the elevation of the marsh by six inches to eight inches. The natural tidal saturation of the marsh with water was restored, which significantly reduced re-sprouting of *Phragmites*. In 2009, almost 13,400 native plants were planted by volunteers on the marsh site, including black needlerush (*Juncus roemerianus*), smooth cordgrass (*Spartina alterniflora*), bald cypress (*Taxodium istichum*), and marsh hibiscus (*Hibiscus moscheutos*). Large patches of native bulrush (*Schoenoplectus* sp.) began to dominate the site along with contiguous patches of some of the mentioned native marsh plants. The marsh is being monitored to determine if the productive native marsh plants establish themselves within the restored site and to manage *Phragmites* re-infestation.

- In 2010, MBNEP initiated the Local Restoration Partnership Program, providing grants to local public government entities to undertake projects that address wetlands restoration, stormwater runoff or sediment management measures, including City of Chickasaw - $20,000.00 to support wetlands restoration at Brooks Park; and the City of Orange Beach - $27,500.00 to enhance wetlands along Highway 161.

Implement a coordinated restoration effort to expand marsh acreage using the USACE 206 (eco-system restoration) program to restore marsh;

- In response to the loss of wetlands due to the development of Mobile's Choctaw Point Terminal, the Alabama State Port Authority and the U.S. Corps of Engineers created almost 60 acres of tidal marsh with nearly 675,000 plants.

- Open to the public in 2003, In order to mitigate for wetland losses resulting from the development of a marine liquid bulk terminal, Alabama State Port Authority selected a 200-acre tract to establish and manage as a mitigation area. The Muddy Creek Wetlands Mitigation Area consisted of upland agricultural fields, fallow fields, upland hardwood and pine forest, and more than 100 acres of forested wetlands. Most of the area was invaded by non-native or exotic plant species. The Port restored the wetland through removal of the exotic species and restoration of native plant communities. In addition, the Port removed debris on the site, and built an interpretive trail and boardwalk, with fencing to control vehicular access to the site. Benefits to the natural environment have included recovery of native plants and greatly improved aesthetics. In addition, the restored

wetland provides opportunities for the community in environmental education, exercise, wildlife watching and solitude.

Sponsor and coordinate volunteer marsh-planting efforts

- In 2003, Mobile Bay NEP received a Gulf of Mexico Program grant for SAV gardening in Little Lagoon. The first attempt at planting SAV failed as no plants were found alive after Hurricane Ivan in 2005. The second attempt occurred after the partnership was expanded to include Gulf Shores High School students as volunteers. Because of the damage at Little Lagoon after Ivan, SAV's were planted at Weeks Bay National Estuarine Research Reserve. The planting was not successful because of high salinity and snails' consumption of the grass.

- The MBNEP, in partnership with local business, Baldwin County School System, local nonprofits, conservation agencies and a youth conservation corps restored wetlands as part of an outdoor classroom and community park adjacent to the newly constructed J. Larry Newton School. The restored wetlands serve as an educational resource for the school as a laboratory as well as providing on-going stewardship for the area. This wetlands project also served as a demonstration project for other local landowners interested in wetlands restoration.

- The Coastal Training Program at Weeks Bay National Estuary Research Reserve significantly increased the number of wetland training activities Two on-going education projects are the Mobile County Grasses in Classes Program established by MBNEP and the Baldwin County Grasses in Classes Program being implemented by the Weeks Bay NERR. Partners in these programs include the Mobile County Public Schools Environmental Studies Center, Baldwin County Board of Education, US Fish and Wildlife Service, DISL, Weeks Bay NERR, Alabama Coastal Foundation, ADNCR State Lands Division and Mobile County Parks and Recreation Department.

- Seventeen high school students visiting from Indiana in March 2009 worked with local contractors and venders to assisting in planting emergent grasses at the Arlington Park wetlands construction project of the Alabama State Ports Authority. Students planted cord grass (*Spartina alterniflora*) along the fringe of the newly constructed marsh.

- From 2007 through 2009, Mobile County Public Schools System’s Grasses in Classes programs and high school students participating in the World Wildlife Fund/Allianz-sponsored Climate Camp undertook marsh plantings along the Brookley shoreline near the Gulf Pines Golf Course. Native intertidal plants were supplemented with student-grown or vendor purchased *Juncus roemerianus* and *Schoenoplectus spp*.

Develop and implement specific watershed management plans to alleviate the loss of wetlands

The following watershed plans have noted specific, as well as general, techniques for wetlands restoration, protection and other habitat protection/enhancement measures.

- D'Olive Watershed: In 2007 the Geological Survey of Alabama in partnership with the ADCNR State Lands Division assessed the impact of land use changes in the D'Olive Creek, Tiawassee Creek, and Joe's Branch watershed. This study determined more than two-to over 200-fold greater annual sediment loads in most of these streams when compared to natural geologic erosion rates (without human impact or alteration). In 2009, a contract was awarded to Thompson Engineering to prepare a Comprehensive Watershed Management Plan for the D'Olive, Tiawassee and Joe's Branch watershed with a coalition of local stakeholders and the D'Olive Watershed Working Group, serving as an advisory board. This Plan was completed and published in August 2010.

- A Watershed Management Plan for Eight Mile Creek was completed by MBNEP with partners that include the City of Prichard, Auburn University, and Prichard Environmental Restoration Keepers (PERK). In additional there are plans to restore a degraded first order tributary to Eight Mile Creek bordering Jackson Reading Park in Whistler. Auburn University is providing engineering design and landscape guidance, a contractor will undertake invasive species removal, the City of Prichard is providing equipment and labor for excavation and grading and PERK is leading community involvement and cleanup efforts.

Coastal Habitats Protection Measures

- Potential impacts to waterbottoms or the dredging and/or filling of wetlands require permits and/or certifications from ADEM, the U.S. Army Corps of Engineers, (in some instances) the State Oil and Gas Board, and/or the DCNR-State Lands Division. ADEM Division 8 Coastal Program rules require a permit for all new commercial and residential developments located wholly or partially within the coastal area which are or will be greater than five (5) acres in size and which: 1) have areas which are or could be delineated as wetlands; 2) are adjacent to coastal waters; or 3) are intercepted by the coastal control line (CCL). The ADEM review of these types of projects is normally initiated when the property owner makes application to the U.S. Army Corps of Engineers. Some of these projects, such as the construction of residential piers and projects involving minimal wetlands impacts, may be permitted under a pre-certified U.S. Army Corps of Engineers General or Nationwide Permit and will not require further review by the Department. Many projects will require an Individual Permit from the U.S. Army Corps of Engineers which will be jointly reviewed by ADEM.

- The Baldwin County Wetland Conservation Plan is an adaptation of the model used previously by Baldwin County in preparing an Advanced Identification of Wetlands (ADID) for a portion of the county's wetlands. Results provided a Wetland Protection Overlay District (WPOD) which was incorporated into County Zoning Regulations; a GIS wetland data layer containing information on wetland location, type, and functional capacity; a wetlands education and outreach program for area stakeholders; and the data to design and implement wetland restoration/construction projects at selected sites in the county. The report document and GIS maps/data can be used by local residents and developers in site selection and planning as well as by permitting agencies in site evaluation. Partners with Baldwin County included: EPA Region IV, USACOE/Mobile District, USFWS, ADCNR/State Lands, and University of South Alabama. In 1995, Baldwin County initiated significant conservation efforts identified in the Baldwin County Commission's Wetland

Conservation Plan. The Plan assessed fresh and saltwater wetland habitat areas that comprise 25% of the county's land area. From the assessments, Baldwin County has determined that 88% of its wetlands (260,000 acres) are suitable for conservation, 10% (30,000 acres) suitable for enhancement and 2 % suitable for restoration.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Although significant efforts to maintain and/or improve beneficial wetland functions have occurred since the inception of the CCMP, there are tasks that could continue and tasks that could be brought forward as the CCMP is updated. These include: 1) threshold acreage needed to sustain baseline wetland functions should be determined 2) a strategic mitigation plan for coastal Alabama should be developed; 3) priority sites for mitigation, preferably by watershed, should be identified and appropriate success, 3) criteria that are consistent with replacement of lost wetland functions should be designed, and 4) mitigation sites should be inspected regularly to assure mitigation compliance; identify needed design corrections; and provide input to better mitigation design.

The effectiveness of existing wetlands protection regulations should be examined. The Alabama Coastal Area Management Program tracks wetlands fill resulting from development through permitting and the Consistency Certification process. While wetlands located inside of the Alabama Coastal Area (basically the 10-foot contour area) are better protected than those outside the coastal area, development pressure in the coastal counties continues to increase with the increased population. As prime locations are acquired and developed, less ideal properties including those with numerous wetlands are under increased development pressure. In addition acres being filled on smaller developments under the Nationwide and General permitting process are not being adequately tracked and have the potential to pose the largest cumulative threat to wetlands and habit loses.

Three Mile Creek was modified in the mid-twentieth century with flood control-related construction of a bypass channel between the current MLK Avenue and Conception Street Road in the City of Mobile. This diverted flow from the meandering, historic stream segment subsequently rendering a 1,800-ft section non-navigable and stagnant by siltation. A 2008 U. S. Army Corps of Engineers Section 1135 Environmental Assessment recommended restoring flow into that stream segment by excavating sediment and removing woody debris. After discussions with local contractors and regulatory agency personnel, both the costs and the negative environmental impacts to the surrounding woody wetlands associated with conventional bucket excavation presented obstacles to implementation. There may be alternatives that should be explored that could bring this project to fruition. Similarly, a public access area was designated and designed but stopped before having all permitting in place. Because so much effort has gone into the project already, and it clearly meets a community need, it should be revisited.

Created wetlands that are mitigation for loss of natural wetlands should be evaluated to determine if the mitigated wetlands are serving the same function in the same watershed as the wetlands lost.

HM.D1 Assess Beach and Dune Habitat Loss

This Action Plan included reducing the loss of beach and dune habitat through the development of coastal regulations that examine all land conversion projects for impacts on beach and dune habitat. Specific tasks were to explore other coastal states' shoreline management practices, and build support for ADCNR

revisions to the Alabama Coastal Area Management Plan (ACAMP) to fully examine all coastal development projects for better management of these shoreline habitats and to develop regulations necessary to implement ACAMP changes as outlined in the first step.

To what extent was this sub-objective implemented?

Mapping

- The Alabama coastline has undergone substantial modifications due to beachfront development, existing hard shoreline defense structures, beach nourishment and tropical weather events. As part of the multi-year "Gulf-fronting Shoreline Monitoring Program", an assessment project conducted by SLD and the GSA, the GSA used existing and historical data and aerial photography to develop an estimate of erosional and accretional trends and produced a GIS layer suitable for use in an Arc GIS 9.1 environment. The GSA report, "Beach Topographic Monitoring", includes topographic profile data for 26 pre-Ivan locations and 18 post-Ivan locations.

- ADEM has acquired GIS hardware and software to increase its capabilities to provide for efficient monitoring of permitted development on beaches and dunes.

- The Alabama Coastal Management Program began funding "State of the Beaches" reports following Hurricane Georges and continues efforts to monitor and evaluate short-termed fluctuations of the beach to determine long-term shoreline changes along the Alabama portion of the Gulf of Mexico.

Protection measures

- U.S. Fish & Wildlife Service is preparing a management plan for the endangered habitats of the Alabama beach mouse and the Perdido beach mouse in response to increased development pressure. In addition, they have purchased 180 acres of Bon Secour for protection for the Alabama Beach mouse habitat. Other efforts include planting of dune vegetation to stabilize dunes and to protect sea turtle and Alabama beach mouse habitat from storm events.

- In June, 2008, Katrina-impacted high school students participating in a World Wildlife Fund/Allianz-sponsored Climate Camp worked with MBNEP and FWS personnel to plant 1,000 dune plants (sea oats, morning glories, and panic grasses) along beaches in the Bon Secour National Wildlife Refuge impacted by erosion from Hurricane Katrina.

- The Grasses in Classes project with the Baldwin County School System has planted thousands of dune plants at Bon Secour National Wildlife Refuge and at Gulf Shores State Park.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Mapping and monitoring of beaches should continue along with beach re-nourishment, as part of a long-term beach management plan to include sand-bypassing at the inlets.

HM.D2 Determine Impacts of Dredging on Coastal Habitats/Regional Sediment Management

This Action Plan includes determining the impacts of dredging activities and disposal practices on natural beach erosion processes and developing alternative dredge material disposal techniques to improve shoreline areas by creating a Coastal Dredge Material Task Force to develop a Coastal Dredge Material Management Plan, based on the Upper Mobile Harbor Dredge Management Plan, and to determine positive and/or negative impacts, if any, associated with dredged material management practices, including, but not limited to: circulation impacts due to dredged material mounding; beneficial uses of dredged material; and "within-bay" disposal for erosion reduction.

To what extent was this sub-objective implemented?

- The Mobile District of the U.S. Army Corps of Engineers is currently developing a Regional Sediment Management (RSM) Plan for the central Gulf of Mexico. The Regional Sediment Management Plan will consist of a calibrated regional sediment budget, a calibrated numerical regional prediction system, and a regional data management and Geographic Information System. These tools will assist in making management decisions and will increase benefits resulting from improved sand management throughout the region. A RSM Technical Working Group (TWG) was established with members from state and federal agencies in Alabama, Florida and academia. The purpose of the TWG is to assist in development and implementation of the RSM Demonstration Program.

- The Mobile District of the U.S. Army Corps of Engineers worked with state, federal and local entities to create a new disposal area for the Perdido Pass Navigation Project. The new disposal area was used for the first time during December 2005.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

The development of a Coastal Dredge Material Management Plan is currently underway, lead by the U.S. Army Corps of Engineers. This this effort will seek opportunities to use dredge materials within close proximity to the dredge site to benefit area wetlands and fishery nursery areas.

HM.D3 Address Shoreline Erosion

This Action Plan includes researching the extent of shoreline erosion due to boat wakes and other factors and reducing the loss of bay/sound/bayou intertidal habitat due to bulkheading and the impacts of bulkheads by increasing information concerning sedimentary dynamics of Mobile Bay and the Mobile-Tensaw River Delta.

To what extent was this sub-objective implemented?

- A three party agreement between the City of Orange Beach, the City of Gulf Shores, and ADCNR has resulted in the "South Baldwin Beach Restoration Project", an effort to replenish beaches after storm events.

- Shoreline change analysis is part of the "Gulf-fronting Shoreline Monitoring Program" a cooperative project by the ADCNR Lands Division Coastal Section and the Geological Survey of

Alabama. Within the past few years, Alabama's border with the Gulf of Mexico has experienced significant impacts from both natural and anthropogenic processes. Hurricane Ivan made landfall on the Alabama coastline in 2004, resulting in catastrophic storm-induced beach erosion. Prior to this, two large-scale beach nourishment projects, the Gulf Shores, Alabama Beach Restoration Project and the West Beach Gulf Shores Emergency Beach Fill Project were completed in 2001 and 2003, respectively.

- The GSA mapped and classified shoreline of all bays and major river systems in the two coastal counties and produced a comprehensive dataset on shoreline armoring and the placement of structures (piers, docks, etc.) on public trust lands (waterbottoms). The GSA mapped the shoreline characteristics of the eastern and northern shorelines of Dauphin Island, Dog River, Fowl River, Mississippi Sound, Mobile Bay Bon Secour Bay, Weeks Bay, Gulf Intracoastal Waterway, Little Lagoon, Wolf Bay, Bayou La Launch, Arnica Bay, Bayou St. John, Perdido Bay, Old River, Terry Cove and Cotton Bayou and all associated tributaries and canals. The final product "Comprehensive Shoreline Mapping Report and Analysis" provides coastal managers with a snapshot of the condition of the shorelines and will enable them to determine how best to proceed with alternative designs and related regulations to achieve resiliency from storms and erosion.

- With shoreline property owners investing thousands of dollars to protect and restore a shoreline impacted by erosion, not only from hurricanes like Ivan and Katrina, but also from the daily impacts of ship wakes and prevailing winds. MBNEP has secured funding to implement the first living shorelines project along multiple private properties on Mon Luis Island. The goal is to employ living shorelines technologies, including installation of wave-attenuating reef structures, to create and enhance habitat while protecting intertidal areas from the impacts of wave energy at a scale that could be independently implemented by private property owners.

- A DISL study examined the potential benefit of restoring shallow subtidal oyster reefs on adjacent nearshore habitats. DISL researchers established a site on a state-owned shoreline adjacent to the City of Mobile's Helen Wood Park where reef utilization by estuarine organisms was monitored. Changes from the addition of artificial oyster reefs to shoreline configuration and quantity of marsh vegetation were documented. The wave attenuators were too far out to affect shoreline. Enhanced presence of finfish and invertebrates (but little oyster settlement) was noted.

- In January 2011, components of the previously installed marsh were relocated as a part of the 100/1000 installation of a quarter mile oyster reef structure.

- In 2009, MBNEP began the site assessment and design of a shoreline restoration project at the City of Mobile's Dog River Park. This restoration, funded by an Association of National Estuary Programs NOAA Community Restoration Project (CRP) grant, included installation of a hybrid design of artificial headlands created by installing clean sand behind seven installed pile-supported timber structures with intermittent pocket beaches planted with emergent marsh vegetation.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

A sediment Budget for the Bay and Delta is being prepared along with a three-dimensional hydrodynamic model for the Bay and Delta to establish baseline sediment conditions and determine the relationship between fringe wetlands and sediment dynamics.

Additional research should be conducted to see how other states have addressed boat wakes and erosion of natural shorelines.

Additional "limited wake" or "no wake" zones need to be identified in areas of high erosion based on monitored rates of erosion in heavy boating areas.

Strategies need to be developed to reduce shoreline loss, particularly from bulkheads.

HM.E1 Prevent Nesting Habitat Decline

This Action Plan includes preventing the decline in nesting habitat for colonial and migratory birds due to human disturbance and alterations by determining factors that are adversely affecting bird nesting habitats and developing action plans based on these findings; developing a GIS-based annual monitoring effort for colonial sea bird and shorebird nesting sites with exact coordinates of the nesting sites to determine status and trends for management decisions and public information; encouraging and supporting improved enforcement of existing state and federal regulations pertaining to colonial and migratory bird nesting habitat; identifying and prioritizing sites for acquisition, improving the management of existing publicly owned sites, and restoring former colonial and migratory bird nesting sites.

To what extent was this sub-objective implemented?

- Bird surveys are conducted by ADCNR Wildlife and Freshwater Fisheries Division to assess the population of both migratory and colonial nesting birds as an indicator of suitable quality and quantity of the critical habitats that support them.

- Colonial Nesting birds were surveyed in 2006 by DISL in partnership with MBNEP. The survey highlighted a disturbing relationship between the frequency of storms including Georges, Ivan, and Katrina and the degradation of suitable habitat for bird nesting.

- In the spring and summer of 2007 MBNEP and ADCNR joined forces with the National Audubon Society through its Coastal Bird Conservation Program (CBCP) to begin annual comprehensive, standardized surveys of the Alabama coast (including islands) for breeding beach-nesting birds The surveyed species included: Snowy Plovers, Wilson's Plovers, American Oystercatchers, Least Terns, Gull-billed Terns, Common Terns and Black Skimmers. The CBCP surveyed all beach-nesting bird habitat or potential habitat on the Alabama coastline. The sites surveyed included: Bon Secour National Wildlife Refuge, Dauphin Island, West Dauphin Island, Isle Aux Herbes, Pelican Island, Cat Island, Gulf State Park, and Barton Island Peninsula.

- In 2008, the CBCP began monitoring and protective signage programs for the surveyed areas. .

- The ADCNR State Lands Division Natural Heritage Section (NHS) monitors marsh birds in the coastal area because past research has determined that these birds are an indicator species of wetland health. Researchers contributed to this effort by establishing a methodology, and then actually surveyed marsh birds during the breading season along the coastal marshes and barrier islands and within the Mobile Tensaw River Delta. The data obtained from the survey resulted in 1,265 geo-referenced database records of the targeted species and an addition 2,379 ancillary records database. The study is ongoing as the NHS continues to document conditions of indicator species in wetland habitats.

- The Dauphin Island Bird Sanctuary Inc. acquired 7.4 acres of upland maritime and wetland forest for conservation purposes.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

A GIS-based annual monitoring effort for colonial sea bird and shorebird nesting sites with exact coordinates of the nesting sites to determine status and trends for management decisions and public information should be developed.

Enforcement of existing state and federal regulations pertaining to colonial and migratory bird nesting habitat should be improved.

An agreement for funding placement of shell in appropriate nesting areas should be developed and GSA and/or BSA should place shell, cavity nesting boxes, and nesting site signs.

The following actions should be investigated:

- acquisition of Cat Island
- an adopt-a-colony effort
- preservation and/or exchange programs for acquisition and/or preservation of maritime forests and scrub/shrub dune habitat for migratory birds

Human Uses Action Plans

The CCMP Human Uses section has the current basic directive, "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."

Within this main objective there are three sub-objectives that are believed to address all existing living resource issues in Mobile Bay. These sub-objectives are summarized as: Sustainable land use planning; hydrologic modification, and public access. The specific wording is as follows.

1) *SUSTAINABLE LAND USE PLANNING - Enhance quality of life by improved planned and managed development*
2) *PUBLIC ACCESS -Increase public access to water resources.*
3) *HYDROLOGIC MODIFICATION-*

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

b) *Maintain or adjust stream flows to minimize the negative effects of flooding, erosion, and adverse changes in estuarine salinity, as necessary and where feasible.*

c) *Protect, manage, and/or restore 1000 acres of floodplains by 2006 to minimize upstream and downstream flooding and erosion.*

d) *Protect, manage, and/or restore 5 miles of natural stream banks and bottoms to minimize erosion and loss of natural habitat by 2006.*

e) *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*

HU.A1 Develop and Implement Comprehensive Land Use Planning

This Action Plan includes developing and implementing land use planning that ensures smart growth for sustainable development designed to abate sprawl and loss of an aesthetically pleasing environment by creating a long-range strategy for consistent, enforceable, regional land and water use management that examines the cost versus benefits for redevelopment compared to new development, includes incentives to encourage redevelopment and preservation of existing environment, supports Brownfields concept and other government efforts designed to encourage reinvestment, encourages landscaping and tree ordinances throughout the MBNEP service area, suggests parking garages as alternatives to conventional parking, incorporates the use of alternative paving methods, focuses on compact development to reduce sprawl and related impacts, and requires engineering, and best management practices that maintain pre-development hydrology, minimize stream, warming, and reduce sediment loading.

In addition it recommends supporting efforts of Mobile/Baldwin United and Envision Mobile Baldwin to develop sustainable development indicators and implementing a recognition program that encourages environmentally sound practices, providing incentives and education promoting environmentally sound business and/or industrial activities; and investigating model incentive-based programs to replicate as feasible.

The plan also addresses ensuring that the newly revised Alabama Coastal Area Management Plan incorporates tourism impacts and protection of beaches and dunes compatible with CCMP objectives by changing parameters of the Coastal Construction Line to include population impacts per foot of beach frontage and develop a shoreline, corridor and greenway plan to decrease and/or halt habitat fragmentation.

To what extent was this sub-objective implemented?

- Baldwin County completed a Comprehensive Land Use Plan in 2008. The plan includes components for natural resource protection, green space and directing development to maintain sustainability of resources. Baldwin County has also developed a Land Use/Land Cover report which includes a trend analysis and update of the land use/land cover classification data using 2009 Color Infrared Imagery.

- The City of Loxley completed a Comprehensive Plan in 2009. The plan includes components for natural resource protection, green space and directing development to maintain sustainability of resources.

- The Town of Magnolia Springs completed and adopted a Comprehensive Plan in 2008-2009. The plan includes components for natural resource protection, green space and directing development to maintain sustainability of resources. The plan also included a drainage/storm water management plan including a comprehensive situation analysis and long-termed recommendations to address drainage basins in and around the town to protect the Magnolia River. The drainage plan was adopted by the town council in September, 2009.

- The Bay Minette and Satsuma comprehensive plans are in final draft for adoption by the cities' planning commissions and will serve as guidance for future legal and policy decisions as determined by the city councils. Both plans were developed with public input through citizen workshops and opinion surveys and with analysis by the South Alabama Regional Planning Commission. The issues of greenspace; development in floodplains, wetlands, and forested areas; water quality; aquifer protection; and connectivity between developments are addressed throughout the plans and are included in more than one of the categories of housing, transportation, land use, natural resources, parks and recreation, downtown and historic resources, etc. Each category has two components: an inventory of the current conditions and a list of proposed recommendations and strategies to achieve desired community goals.

- The City of Chickasaw developed a Three-Year Coastal Community Strategic Vision Plan, 2010-2012. The plan includes components for preserving cultural heritage, natural resource stewardship, green space and low impact development for the sustainability of resources. The Chickasaw strategic vision plan is part of the city's long-termed community planning process. This plan was developed with public input through town hall meetings with analysis by the Auburn University Urban Design Studio. The issues of greenspace, low impact design, cultural heritage, sense of community and civic identity, conservation and stewardship of natural resources, and developing partnerships are addressed in the plan. The strategic vision process identified five top-level areas for the community: governance, commerce and economic development, education, civic

engagement, and communications and marketing. A goal for each area was developed, as well as strategies for implementation of the goal. Success measurement indicators were established for evaluation of success level. Critical success factors were identified to determine what must be achieved or success, as well as barriers that could hinder success.

- The City of Mobile Smart Growth Zoning Ordinances have been adopted to allow for compact development, smaller lot sizes, alternative designs and mixed uses.

- During 2007 MBNEP provided technical assistance and funding to the Town of Dauphin Island in partnership with MASGC and ADCNR to assist the Town with the creation of a Strategic Plan to ensure the long-term community, economic, and environmental sustainability of the island. The Town hired a consultant who completed a community- driven process for addressing infrastructure; economic opportunities including tourism; housing needs/opportunities; recreation, public access, and beach stabilization; environmental sustainability and smart growth land management; and government financing and revenue streams. The Town is now in stages of implementing components of this plan, including actions to address its working waterfront.

- During the 2009 program year, MBNEP contracted with Auburn University to engage the Bayou La Batre community in sustainability planning. The purpose of this project was to create a vision and plan for a sustainable community that promotes the development of neighborhoods and commercial districts, protects the waterfront industry that serves as the foundation of the community, fosters a diversification of the economy, embraces the cultural and environmental assets of Bayou la Batre and recommends future actions.

- A graphical ecological characterization was conducted for the Eight Mile Creek Watershed to complement a watershed planning process undertaken by a group of concerned citizens. In an effort to expand recreational opportunities, community leaders in Prichard raised the necessary resources to develop a passive reading park along a degraded streambed. This effort was an implementation of the City's Comprehensive Plan, specifically, Section 4 which addresses the treatment of natural resources. Of particular note, the plan discusses a need to develop streambank buffers as a means of protecting water quality and to use the buffers for passive recreational activities.

- The Scenic Causeway Coalition, a volunteer group of citizens, elected officials, and business owners, met for over a year to consider ways and means to improve the physical and aesthetic aspects of the Mobile Bay Causeway. The group received support from the Alabama Coastal Management Program and Auburn University School of Landscape Architecture. A report describing the opportunities for improvements was developed. The Causeway was designated an Alabama Scenic Drive, but the Coalition did not go forward with the process to seek National designation.

- There are State Statutes (ADEM Div. 8) protecting dune vegetation, and the ADEM coastal facility section has a regulation for siting construction north of the Construction Country Line which established by state plane coordinates and inland from the Gulf.

- Dauphin Island, Gulf Shores and Orange Beach have adopted the International Building Code which severely restricts building on dunes. Most have also added freeboard elevation standards above the Base Flood Elevation.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Many of the steps suggested to advance the objectives of this Action Plan have been addressed, and continue to be in action. Clearly there is the need to continue promoting sustainable land use planning and its implementation through zoning, land development ordinances and design standards incorporating best management practices.

Steps previously identified that could be brought forward into the next CCMP include implementation of a recognition program that encourages environmentally sound development practices (e.g., Businesses for the Bay).

HU.B1 Assess Hydrologic Effects of Development Practices

This Action Plan includes assessing and remediating negative hydrologic effects of past land management decisions by assembling a hydrologic review panel of government agencies, county and municipal sewer boards, and private entities to assess cumulative hydrologic impacts of past land management practices and to develop remediation strategies where possible. The plan specifically lays out strategy components including but not limited to:

- Emphasize a holistic, watershed-based approach to addressing water quantity, quality, and flood management in the Mobile Bay estuary;
- Develop land use planning principles tailored for the Mobile Bay NEP area using information from other successful programs;
- Evaluate existing engineering design criteria and establish improved or updated criteria, where applicable;
- Prepare land use ordinances modeled after programs in similarly populated areas (notable programs exist in Huntsville and Birmingham);Develop an incentive-based retrofit program emphasizing urban stream retrofitting;
- Acquire and/or preserve municipal riparian corridors;
- Develop solutions to loss of pervious surface, which contributes to localized flooding and infiltration of municipal and/or private sewage systems;
- Promote outreach and technology transfer to smaller communities and unincorporated areas;
- Establish water quality and quantity requirements for the MBNEP service area;
- Develop incentives for reducing stormwater runoff and increasing filtration on development sites; and
- Create non-traditional means for enhanced water quality and quantity provisions.

To what extent was this sub-objective implemented?

- This Action Plan calls for assembling a hydrologic review panel of government agencies, county and municipal sewer boards, and private entities to assess cumulative hydrologic impacts of past

land management practices and to develop remediation strategies where possible. This was not implemented.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

All of the components of the strategy to address and mitigate cumulative hydrological impacts of past land management practices are valid techniques that could be carried forward to the next CCMP.

HU.B2 Restore Natural Hydrologic Conditions

This Action Plan includes restoring to more natural hydrological conditions, where feasible, MBNEP waters that have been adversely impacted by artificially created structures including the man-made, six-mile stretch of Highway 90 (a.k.a. "the Causeway") between downtown Mobile and Spanish Fort; hydrographic impacts associated with navigation channel operations; hydrologic impacts to D'Olive Bay; and the hydrologic impacts of a man-made dike in Pinto Pass.

To what extent was this sub-objective implemented?

- In 2004, MBNEP and partners began funding a multi-year study to collect preliminary data assessing potential impacts of the Causeway on altered freshwater inflow and saltwater interchange on the ecology of the lower Delta. The partnership which included DISL, The Nature Conservancy, Alabama Power Company, and Mobile Bay Watch (now Bay Keeper), acted on concerns of altered hydrology of the estuary due to the mid 1920s construction of the long Causeway that connects the west and east sides of Mobile Bay. Since that time a second year of study by Dr. John Valentine of DISL was funded by the Gulf of Mexico Program (EPA), Mobile Bay Keeper and MBNEP. The Nature Conservancy also conducted analysis of river flow information collected through these projects.

- In 2007, DISL was funded for the third and final year of study, considered necessary to answer questions related to the advisability of changing the hydrology of the lower Delta/upper Bay once again by increasing openings in the Causeway. This year of study was funded through the ADCNR Marine Resources Division. Additional studies recommended an analysis of habitat, landform, and vegetation change. These elements would be useful adjuncts to more fully characterize the impacts of the altered hydrology caused by the Mobile Bay Causeway.

- The Three Mile Creek Bypass Channel, a little over one mile in length, is located in the extreme eastern portion of the Three Mile Creek watershed and flows northward into the historic Three Mile Creek streamway about 0.5 mile upstream of the confluence of Three Mile Creek and the Mobile River. Water flow in Three Mile Creek was altered when the Bypass Channel was constructed in the mid-twentieth century for flood damage reduction and as a result, almost all water flow bypasses a portion of the original channel. With minimum or no water flow, the original channel has reduced water quality as well as an altered aquatic community in and adjacent to the stream. During 2009, the US Army Corps of Engineers began a study to examine the feasibility of restoring natural flow in an old streambed and creating a greenway along other portions of Three Mile Creek. This project is currently on hold due to funding limitations.

- The Mobile division of the US Army Corps of Engineers dredged Dog River in Mobile County in 2002 to correct the siltation problems associated with erosion from development in west Mobile. A seven-foot deep channel was dredged to widen the existing channel 100 feet. Three tributaries of the Dog River were also dredged to improve hydrologic conditions.

- In 2007, a study was undertaken by the Geological Survey of Alabama in partnership with the Alabama Department of Conservation and Natural Resources, State Lands Division to assess the impact of land use changes in the D'Olive Creek, Tiawassee Creek, and Joe's Branch watershed. This study determined more than two- to over 200-fold greater annual sediment loads in most of these streams when compared to natural geologic erosion rates (without human impact or alteration). In 2009, a contract was awarded to Thompson Engineering to draft a Comprehensive Watershed Management Plan for the D'Olive, Tiawassee, and Joe's Branch watershed with a coalition of local stakeholders, the D'Olive Watershed Working Group, serving as an advisory board. When complete, the Comprehensive Watershed Management Plan will identify corrective measures necessary to reduce negative water quality impacts in this highly developed watershed.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

In preparing comprehensive watershed plans, a major goal would be restoring waterways to more natural hydrological conditions.

HU.B3 Better Control Erosion and Sedimentation

This Action Plan includes reducing the impacts of erosion and sedimentation on stream banks and bottoms from construction, road building and unimproved roads, agriculture, silviculture, waterfront property development, dirt/soil mining and utilities work site runoff by undertaking activities including but not limited to:

- Establish criteria for a water body buffer zone on both sides of stream banks;
- Develop and implement a water body bank conservation easement and/or buyout program;
- Establish and encourage the use of development setbacks from water bodies;
- Assess the possibility of requiring drainage plans based on 15-to-25 year or greater storm events;
- Establish side slope requirements not to exceed 1:4;
- Establish slope stabilization requirements, such as erosion control netting or extending concrete beyond crest of slope or bank; and
- Establish erosion control requirements (in stages) within buffer zones and beyond.
- Coordinate with the local legislative delegation to develop and implement legislation giving counties the authority to develop and enforce uniform, performance-based,
- Countywide ordinances to manage and oversee land disturbing activities;
- Support development of bmps designed specifically for rainfall and soil conditions in the MBNEP area and incorporate locally-based bmps into the supplemental building code;
- Support improvement of SARPC's BMP Guidebook; and
- Develop incentives and/or appropriate planning tools to Mobile Bay hydrologic modification reduce sediment and turbidity impacts from waterfront property development and related

runoff (e.g., conservation easements, tax incentives, riparian buffers, removal of low-strength soil from site as soon as possible, use of detention structures, such as sediment traps, during construction, installation of permanent retention structures after construction etc.).

- Support the Alabama Forestry Commission, Alabama Treasure Forest Foundation, and Forever Wild in their education and BMP implementation efforts to reduce sediment and turbidity effects to surface waters from silvicultural runoff;
- Consider potential improvements to surface waters when prioritizing and planning improvements to dirt roads;
- Utilize alternative road surfacing material in appropriate places, if feasible; and
- Prohibit the development of new major subdivisions that use dirt roads (Note: Similar subdivision regulations currently exist in Baldwin County.)
- Support the NRCS, Soil and Water Conservation Districts, and the ACES in continued development and implementation of agricultural education and BMP
- Standards (e.g., establish and encourage buffer zones with perennial vegetation; encourage the use of conservation tillage practices; develop education materials pertaining to conservation practices; etc.); and b) develop and provide for the implementation of grazing plans for livestock operations to protect sensitive areas, such as stream banks, wetlands, ponds, and riparian zones.
- Encourage use of alternative and enhanced efforts to control erosion (e.g., develop impact fees and credits for permeable surfaces, create a "Green Card Program" to encourage environmentally friendly contractors to include awareness of their responsibility in enforcement of bmps on sites, give credits through public bidding processes for certified, environmental friendly builders that take into Mobile Bay Hydrologic account long-term environmental impacts of projects, etc.);
- Develop and/or support incentive programs for maintaining ground cover (e.g., implement a stream bank conservation easement program with tax credit incentives; encourage and support efforts to revise federal inheritance tax laws; etc.);
- Support legislative action addressing reduction of sediment and turbidity impacts on surface water from dirt/soil mining activities (e.g., borrow pits, etc.), requiring use of treated sludge or other material (e.g., "Hydroseed," etc.) To re-establish ground cover in abandoned pits or use of alternative surfacing material to decrease erosion; and
- Encourage the use of alternative practices (e.g., mixed uses that include pervious surfaces.

To what extent was this sub-objective implemented?

- ADEM regulations require erosion control measures for land disturbances in the coastal area. Similarly municipal governments must comply with ADEM and enforce standards to eliminate NPS pollution and erosion from construction sites.

- MBNEP and MC members also support development of best management practices (BMP) for industries and occupations with the potential to create NPS pollution. Several BMP publications exist and are utilized at this time including the "Survey of Coastal Alabama Marinas: An Inventory of Current Best Management Practices" (2007); "Alabama's Best Management Practices for

Forestry" (which includes streamside management zones), and Alabama Cooperative Extension Service's "The Citizen's Guide to Reducing Polluted Runoff in Coastal Alabama".

- MBNEP has supported the development and implementation of local ordinances and encouraged additional means for storm water detention and retention, including BMPs, alternative landscaping and other innovative methods in order to reduce nutrient and/or organic loadings. Both Mobile and Baldwin Counties have adopted and implemented new subdivision regulations limiting and controlling NPS pollution.

- The "Alabama Handbook for Erosion Control, Sediment Control and Storm Water Management on Construction Sites and Urban Areas" by the Alabama Soil and Water Conservation Committee is utilized extensively by development interests.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

The following actions have not been accomplished and should be evaluated to see if the need still exists:

- Establish criteria for a water body buffer zone on both sides of stream banks;
- Develop and implement a water body bank conservation easement and/or buyout program;
- Establish and encourage the use of development setbacks from water bodies;
- Assess the possibility of requiring drainage plans based on 15-to-25 year or greater storm events;
- Establish side slope requirements not to exceed 1:4;
- Establish slope stabilization requirements, such as erosion control netting or extending concrete beyond the crest of slope or bank.
- Establish erosion control requirements (in stages) within buffer zones and beyond.
- Coordinate with the local legislative delegation to develop and implement legislation giving counties the authority to develop and enforce uniform, performance-based, Countywide ordinances to manage and oversee land disturbing activities;
- Support development of BMPs (refer to SARPC guidebook) designed specifically for rainfall and soil conditions in the MBNEP area and incorporate locally-based BMPs into the supplemental building code;
- Develop incentives and/or appropriate planning tools to Mobile Bay hydrologic modification to reduce sediment and turbidity impacts from waterfront property development and related runoff (e.g., conservation easements, tax incentives, riparian buffers, removal of low-strength soil from site as soon as possible, use of detention structures, such as sediment traps, during construction, installation of permanent retention structures after construction etc.).
- Consider potential improvements to surface waters when prioritizing and planning improvements to dirt roads;
- Utilize alternative road surfacing material in appropriate places, if feasible;
- Support the Alabama Forestry Commission, Alabama Treasure Forest Foundation, and Forever Wild in their education and BMP implementation efforts to reduce sediment and turbidity effects to surface waters from silvicultural runoff;
- Support the NRCS, Soil and Water Conservation Districts, and the ACES in continued development and implementation of agricultural education and BMP standards (e.g., establish and encourage buffer zones with perennial vegetation; encourage the use of conservation tillage practices; develop education materials pertaining to conservation practices; etc.); and b) develop

and provide for the implementation of grazing plans for livestock operations to protect sensitive areas, such as stream banks, wetlands, ponds, and riparian zones.

- Encourage use of alternative and enhanced efforts to control erosion (e.g., develop impact fees and credits for permeable surfaces, create a "Green Card Program" to encourage environmentally friendly contractors to include awareness of their responsibility in enforcement of BMPs on sites, give credits through public bidding processes for certified, environmental friendly builders that take into Mobile Bay Hydrologic account long-term environmental impacts of projects, etc.);
- Develop and/or support incentive programs for maintaining ground cover (e.g., implement a stream bank conservation easement program with tax credit incentives; encourage and support efforts to revise federal inheritance tax laws; etc.);
- Support legislative action addressing reduction of sediment and turbidity impacts on surface water from dirt/soil mining activities (e.g., borrow pits, etc.), requiring use of treated sludge or other material (e.g., "Hydroseed," etc.) To re-establish ground cover in abandoned pits or use of alternative surfacing material to decrease erosion and impervious surfaces, etc.)

HU. C1 Increase Public Access and Eco-tourism Opportunities

This Action Plan includes encouraging eco-tourism, increasing public access sites and awareness of sites and expanding camping and recreational facilities in the MBNEP, conducting a cost/benefit analysis of increasing the availability of camping and recreational facilities, investigating camping on State land in the Mobile-Tensaw River Delta during offseason, encouraging new developments to provide access such as boardwalks to beaches or waterfront and develop plans to maintain and/or increase public access throughout the MBNEP service area, including public boat launching facilities.

To what extent was this sub-objective implemented?

- The Alabama Gulf Coast Visitors and Convention Bureau, along with the Alabama Coastal Foundation and the DISL Coastal Policy Center hosted a "Sustainable Tourism Round table" in April, 2002 to initiate discussions with members of the private sector regarding incentives and other means to ensure the protection of coastal resources so that tourists' experiences are quality experiences. The awareness of the market and the needs to sustain eco-tourism was identified as a primary concern.

- One of the incentive or enhancement mechanisms for tourism sustainability is the "Blue Wave" Certification which is available through the Clean Beaches Council as a way to help the public identify the nation's cleanest, safest and most environmentally well-managed beaches in the highly competitive tourism market. MBNEP supports the promotion of this Clean Beaches effort. The City of Gulf Shores was designated a Blue Wave Beach on May 17, 2002 through MBNEP efforts.

- In the past ten years, waterfront public access opportunities have increased significantly. These include waterfront parks managed by municipalities, the counties, and the state; canoe trails throughout the Mobile Tensaw Delta, a paddle-able Dog River Blueway and a Scenic Byway around Mobile Bay. Facilities have been developed or improved at existing or recently acquired sites, especially since the 2004 and 2005 hurricane seasons.

- ADCNR Lands Division Coastal Section performed a public access inventory in 2006 indicating that of the 262,396 acres in the coastal zone, 101,680 are available for public access. According to the inventory, there are 2,273 miles of shoreline available with 653 miles utilized for public access and 43 acres of state/county/local parks in the coastal area including Gulf-fronting beach access points owned and/or operated by state, local and federal governments Public access on Dauphin Island is limited to a few access points. Along Mobile Bay: there are numerous bay-front access points with 59 recreational power boat access sites and 31 access sites for non-power craft. The Dauphin Island fishing pier was converted to a scenic boardwalk due to northward migration of Sand Island to converge with Dauphin Island directly under the pier, rendering the pier unfishable.

- The ADCNR State Lands Division acquired a 600-acre parcel of land in 2009 along the Perdido River using funds from the Coastal and Estuarine Land Conservation Program (CELCP). This parcel is now a part of the 18,000 acre Perdido River Nature Preserve, Recreation Area, and Wildlife Management Area in Baldwin County. Public access uses of these lands will include hiking/biking trails, canoe/kayak trails, as well as bird watching opportunities.

- In Spring 2010, twenty six signs offering descriptive and interpretive information focused on the cultural and environmental heritage of the Alabama coast were installed at key points along the Alabama Coastal Connection Scenic Byway. Working with the Cities of Orange Beach, Foley, and Elberta, the Alabama Gulf Coast Convention and Visitors Bureau, and Wolf Bay Watershed Watch, MBNEP provided funding for the design and construction of these signs to expand ecotourism opportunities in our area.

- The City of Orange Beach's canoe and kayak trail and the State Lands Division's Bartram Canoe Trail through the Mobile-Tensaw Delta offer eco-tourism opportunities.

- The Alabama Coastal Birding Trail (ACBT) consists of 50 stops organized into six loops and spans across Mobile and Baldwin counties. Stops highlight a variety of coastal habitats that are noted for a high diversity of bird species. In 2008, the DCNR State Lands Division accepted oversight and management of the ACBT. After a decade of existence, damage from recent hurricanes, urban development, and land ownership change had taken a toll on the viability of some of the original stops making it necessary to overhaul the existing trail. To address these issues, State Land Division personnel identified new replacement sites with an emphasis on public lands featuring Forever Wild properties, municipal parks, nature preserves and restored mitigation sites.

- The Clean Marina Program contributes to eco-tourism. The boating public – especially out of state cruising boaters are attracted to Clean Marina designees because they are aware of the extra effort made for environmental protection.

- "Dolphin watch" cruises is a growing industry with several participants to attract eco-tourists.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Not at this time.

Education and Public Involvement Action Plans

The CCMP Education and Public Involvement section has the current basic directive, "Increase awareness of natural resource issues and promote understanding and participation in conservation and stewardship activities." Within this main objective there are two sub-objectives that are believed to address education and public involvement issues in Mobile Bay. These sub-objectives are summarized as: Public awareness and public participation and monitoring.
The specific wording is as follows.

1) *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.*
2) *Public participation by developing and implementing a comprehensive citizen-based monitoring program.*

The following individual action plans for each are set to further define means for accomplishing the objectives.

EPI.A1: Enhance Public Education and Outreach

This Action Plan included developing and/or enhancing Coastal Environmental Education Campaigns focusing on identified areas of concern and targeted to specific user groups and audiences through the following activities:

1) Continuing to update, refine, and implement the CCMP Public Outreach Strategy (see Volume 3 of the CCMP for details),
2) Implementing Local Community Initiatives to effectively collect and incorporate public comments on the draft CCMP,
3) Assessing available educational materials and programs for implementation and/or enhancement locally,
4) Identifying gaps in existing educational materials and programs,
5) Coordinating with coastal agencies and educational programs to provide enhanced materials and opportunities for materials delivery,
6) Coordinating citizen-based activities related to Coastweeks, Earth Day, and May as "National Wetlands Month,"
7) Developing and distributing educational materials, programs, workshops, etc., on priority environmental issues geared for targeted audiences;
8) Coordinating outreach efforts with citizen organizations to assure continued citizen input and support.
9) Pooling local environmental education and outreach resources and sharing responsibility or developing and implementing comprehensive Coastal Environmental Education Campaigns to reach targeted audiences and address the priority environmental issues of the Mobile Bay estuary.

To what extent was this sub-objective implemented?

- Citizens have been involved since the inception of the CCMP planning process through participation in workshops and meetings to identify issues of concern. The Citizens Advisory

Committee (CAC) was developed as an integral part of the MBNEP through open meetings participation, but also in specific activities geared to interested citizens at large. Accordingly, the citizens were actively involved in program decision-making and comments regarding the CCMP draft.

MBNEP's Public Participation and Education Strategy was prepared in 2002 and is continually refined as it is implemented. The main three goals of this strategy are: 1) to educate targeted audiences and the general public regarding the history, function and activities of the Mobile Bay National Estuary Program; 2) to involve the community in activities that affect the quality of Mobile Bay and to address the priority issues and action plans established by the CCMP; and 3) to develop a sense of stewardship and shared responsibility in the Mobile Bay community. Priority audiences for MBNEP outreach include municipalities and local elected officials, the business and development community, the scientific and research community, and the general public.

- The Public is invited and encouraged to attend both informal and technical workshops produced by MBNEP and its MC members. The subjects of many over the years have focused on issues of smart growth: zoning and land development, sprawl, long range planning, storm and waste water management; uncontrolled growth, economic development; mixed use development, transportation; green building; regional resource management issues; nonpoint source pollution; streambank restoration, erosion and sedimentation, critical habitat prioritization and environmental indicators development.

- MBNEP, in conjunction with MC members, co-hosts a bi-annual scientific symposium that provides an update on the status of water quality, living resources, habitats, human uses and outreach and education across the northern Gulf Coast. The most recent, which drew over 350 participants, was the 2010 Bays and Bayous Symposium, held at the Arthur J. Outlaw Convention Center in December, 2010.

- Grassroots watershed-based organizations have community presence, local knowledge of environmental resources and their stressors, volunteer leadership-building capacity, and the capacity to enable members to plan, implement and monitor on-the-ground projects to improve environmental conditions and connections to the community. Grassroots organizations are in a position to promote greater community awareness about the importance of the estuarine environment to a community's health, safety, and overall quality of life. MBNEP supports and helps build capacity of these critical groups by providing one-on-one technical assistance, developing outreach and decision support materials for distribution and providing specialized training. Additionally, these groups frequently request speakers from MBNEP and MC partner agencies, academic institutions, and government entities to speak on topics that affect their watershed.

- MBNEP and other management conference members provide presentations to civic groups, non-profit organizations, and local environmental groups regarding Mobile Bay issues and program focus areas.

- MBNEP has utilized a number of ways to communicate targeted media messages to area stakeholders.The MBNEP website was redesigned and content is constantly updated to cover a wide range of current activities, documents, and pertinent program information. MBNEP, in

conjunction with DISL, hosts a real time joint environmental monitoring website with its own domain, "mymobilebay.com".

- *The Alabama Current Connection*, a semi-annual newsletter of the ADCNR State Lands Division, Coastal Section and the MBNEP, is distributed by direct mail and e-mail to the public.

- In December 2008, MBNEP distributed *The State of Mobile Bay – A Status Report on Alabama's Coastline from the Delta to Our Coastal Waters* as a supplement to the *Mobile Press Register* with a circulation of 120,000. This comprehensive report was the culmination of four years of work and is organized into the five sections based on priority issue areas. It also reports on the analysis of 15 representative indicators used to assess the condition or health of the environment.

- MBNEP has funded the installation of interpretive signage at various restoration sites, has participated in Dog River Clearwater Revival's watershed identification signage and storm drain stenciling, and has also partnered with the Alabama Gulf Coast Convention & Visitors Bureau to install interpretive signage along the Alabama Scenic Byway.

- MBNEP has funded and participated in continuing education classes and on-line courses for real estate professionals, engineers and developers. These include *grassroot inc.'s* productions of "Water Runs Down Hill- Innovative Low Impact Design Training", "What in the Heck Am I Gonna Do With This Swamp?" and "Sandcastles,"

- Through its Mini-Grant program, MBNEP has been able to provide a unique source of funding for projects that enable grassroots groups as well as teachers the ability to undertake studies and experiments that otherwise would be difficult to fund. In addition, MBNEP continues to support the development of a coastal Alabama "Waters to the Sea" environmental education program as well as the creation of a 15-minute educational video for K-12 audiences.

- The Alabama Coastal Program has partnered with the Gulf of Mexico Alliance (GOMA) Coastal Community Resilience team and the Mississippi-Alabama Sea Grant Consortium's Coastal Storms Program to create the "Alabama Homeowner's Guide to Natural Hazards".

- MBNEP takes advantage of its MC members' public outreach brochures, fact sheets and other information to avoid duplication of materials. Many organizations produce newsletters or publications that are mailed to subscribers on a monthly to quarterly basis highlighting recent environmental activities and accomplishments. Most also employ web pages to report news and activities in real time, These agencies include but are not limited to MASGC/AUMERC, US Fish and Wildlife Service, Alabama Gulf Coast Convention and Visitors Bureau, Eastern Shore Chamber of Commerce, Little Lagoon Preservation Society, Dog River Clearwater Revival, Weeks Bay Foundation, Mobile BayKeeper and the Fairhope Environmental Advisory Board. Each year, MRD produces a popular calendar that includes a tide chart and information on environmental issues of concern.

- MBNEP participates in many citizens-based activities such as the annual Coastal Cleanup, Coastal Kids Quiz, Baldwin and Mobile County Water Festival, Discovery Day, Coastal Alabama Birdfest, Dog River Clearwater Revival Dog Paddle, and Earth Day.

- As a citizens' participation project, oyster gardening has been undertaken as a joint effort between the MBNEP, the MASGC, and AUMERC since 2001. The oyster gardening program is specifically intended for habitat and ecological restoration, not consumption, but more importantly, its educational component teaches citizens that oyster reefs are the estuarine equivalent of coral reefs.

- "A Redfish Tale," an educational movie produced by Hidden World Productions and MBNEP and funded through a grant from the Gulf of Mexico Program was delivered in April 2011. This film short features a pair of animated redfish, Jimbo and Thibodeaux, who explain the concepts of nutrient over-enrichment, eutrophication, hypoxia, and anoxia along with storm water runoff and watershed dynamics to an elementary through middle school audience. Actors/actresses were recruited from the Alabama School for Mathematics and Science student body and faculty. It will be distributed to area schools, libraries, and educational venues, available on the MBNEP website and offered at interactive kiosks across the Gulf Coast.

Responses to Deepwater Horizon Spill

- During the week following the sinking of the Deepwater Horizon oil rig, nationwide volunteer response consumed staff time, with hundreds of phone calls received in the office daily. MBNEP staff, along with Mobile BayKeeper and ACF staffs, developed a format for collection of contact information from prospective volunteers. MBNEP facilitated a meeting of personnel from MBNEP, ADCNR, State Lands Division, BayKeeper, and ACF to plan pre-impact beach cleanups along all Alabama beaches to reduce potential for contamination of materials when oil makes landfall. With assumption of data collection responsibilities by the Governor's Office of Faith-Based and Community Initiatives (FBCI), MBNEP turned efforts towards outreach activities associated with the event.

- In cooperation with the FBCI, ACF and BayKeeper initiated a Volunteer Field Observer Program to supplement efforts by BP contractors to identify immediate areas of concern along Alabama's shoreline. Volunteer observers monitored State beaches daily during early-morning walks and alerted contractors when contamination was encountered. This activity allowed cleanup crews to an early start towards removing oil contamination before it was encountered by tourists or visitors.

- MBNEP provided staff assistance and outreach In support of three Mississippi-Alabama Sea Grant Consortium-led Community Forums, one in Biloxi on June 2 and two at the Mobile Civic Auditorium on June 2 and 3, 2010. These sessions included representatives from State resource agencies, the Small Business Administration (SBA), National Oceanic and Atmospheric Administration (NOAA) and others to answer questions and share information about the situation in the Gulf. Topics included fisheries and wildlife, monitoring and data, business and personal finance, technological disasters and mental health, and legal perspectives.

- In June, 2010, MBNEP provided a presentation for Alabama Community Foundation chapters to discuss the spill, its impacts, the Natural Resource Damage Assessment, and the Oil Pollution Act of 1990. The same program was presented to the Fairhope Environmental Advisory Board in July, the Gulf and Atlantic States Shellfish Conference in August, and the Association of National Estuary Programs held in November.

- On July 2 and 16, 2011, MBNEP facilitated public meetings with Dr. Paul Anastas, Assistant Administrator for the U. S. EPA Office of Research and Development and Science Advisor to the Agency, at the Five Rivers Delta Resource Center Theater to discuss EPA findings regarding the toxicity of dispersants used in efforts to deal with oil released into the Gulf. The first meeting targeted invited scientists, State health officials, and Federal and State program officials, and the second targeted environmental and community-based organization members.

- MBNEP was invited to sit on the Coastal Recovery Commission of Alabama and helped develop *A Roadmap to Resilience: Towards a Healthier Environment, Society and Economy for Coastal Alabama*, which was delivered in December, 2010.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

MBNEP actively pursues public outreach efforts at many levels through many media, and these efforts clearly should continue.

The challenge faced is maintaining an active Community Action Committee comprised of representatives of environmental grassroots organizations to work together to network, share information, develop issues, and provides cooperative training. As reported in the *2006 Comprehensive Conservation Management Plan Prioritization and MBNEP Strategic Plan*, "this committee has been successful in receiving technical training on grant writing, managing two mini-grant allocations and in implementing a water quality monitoring program using YSI monitors. The challenge with this committee has been lack of participation among outlying groups primarily due to distance from meetings." However, continued citizens' input is both invaluable and essential for the CCMP to be a functional "living plan".

An opportunity exists for MBNEP to take the lead in translating scientific language into easily understandable laymen's' vernacular to avoid "misinformation" and misunderstanding. It is easy for the public to be confused and frustrated if the Natural Resource Damage Assessment (NRDA) process, and information regarding Clean Water Act fines, the Gulf Coast Ecosystem Restoration Task Force, and Alabama's Coastal Recovery are not understood. This will be especially true when the results of scientific studies are forthcoming. One means to accomplish this is through the MBNEP's website, *The Alabama Current Connection* and other outreach resources and by producing non-biased materials and workshops regarding the process and the progress of responses to the B.P. Oil Spill.

EPI.B1: Develop Comprehensive Citizen Monitoring and Reporting Programs

This Action Plan includes increasing public participation by developing and implementing a comprehensive citizen-based monitoring program by working with existing citizen-based environmental monitoring efforts to enhance and support their activities and identifying additional needs and opportunities, as well as appropriate agencies or partners and facilitate efforts to expand existing programs and/or create new ones. In addition, it included establishing a one-stop, comprehensive citizen reporting system to:

1) *Serve as a clearinghouse for citizen environmental concerns;*
2) *Educate citizens on reportable violations and responsible Agencies;*

3) *Reduce nuisance complaints to agencies while increasing effectiveness of 'early warning' calls;*
4) *Track regulatory and public official response to citizen Concerns; and*
5) *Provide additional information to the public and media.*

To what extent was this sub-objective implemented?

- Alabama Water Watch (AWW) is a citizen volunteer, water quality monitoring program covering all of the major river basins in Alabama. AWW is a part of the Global Water Watch network. The goal of AWW is to foster the development of statewide water quality monitoring by: educating citizens on water issues in Alabama and the world, training citizens to use standardized equipment and techniques to gather credible water information using quality assurance protocols and empowering citizens to make a positive impact by using their water monitoring data for environmental education, waterbody restoration and protection, and involvement in watershed stewardship. Volunteer water monitoring is conducted by many of the grassroots organizations that participate in the MBNEP's Community Action Committee. Groups like the Dog River Clearwater Revival, Little Lagoon Preservation Society, and Wolf Bay Watershed Watch train and utilize volunteers to sample water quality and store data with Alabama Water Watch. Other groups, like the Fowl River Area Community Association and the Portersville Bay Revival, are currently working towards establishing Alabama Water Watch volunteer monitoring programs.

- The Dauphin Island Sea Lab's Manatee Sighting Network (DISL/MSN) is entering its fifth year of research on manatees and manatee habitat in Alabama waters and is highly dependent upon citizens' monitoring. DISL/MSN remains the only formal manatee sighting network in the U.S. and is dedicated to receiving and mapping every local manatee sighting. DISL/MSN was established in 2007 as part of a study funded by the ADCNR Wildlife and Freshwater Fisheries Division under Section 6 from the U.S. Fish and Wildlife Service, to begin defining manatee resources in Alabama. The Network has successfully processed more than 600 manatee sightings in the past four years (in contrast, 156 sightings were recorded in the area during the entire 20 years prior).

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- In response to the BP Oil Spill, Mobile Bay Keeper and the Alabama Coastal Foundation coordinated the Volunteer Field Observer (VFOB) Program to monitor Alabama's tidally influenced shoreline for oil impacts and other changes. Through this effort, over 300 volunteers were trained to collect information about ongoing changes resulting from this event and to report citings to ADEM. Citizens continue to monitor for tar balls and tar mats.

Do further actions/areas of study need to be undertaken to achieve this sub-objective?

Steps recommended to accomplish this sub-objective that have not come to fruition may still be valid and merit bringing forward into the next CCMP. These are: serve as a clearinghouse for citizen environmental concerns; educate citizens on reportable violations and responsible Agencies, reduce nuisance complaints to agencies while increasing effectiveness of 'early warning' calls, serve as a clearinghouse for citizen environmental concerns, track regulatory and public official responses to citizen concerns.

Summary

This report reviews the sub-objectives and Action Plans of the *2002 CCMP Vol. II The Path to Success*, in order to establish a starting point for creation of a subsequent or renewed CCMP. Specifically, based upon available information, it provides a snapshot of what was successfully implemented, is in progress or is completed, what gaps in implementation exist, and what areas require further study and action.

This report has been prepared as one of the three components necessary for the development of a second CCMP. The other components are the citizen input through a community assessment survey and other outreach, the MBNEP Science Advisory Committee's establishment of a scientific framework for evaluating ecosystem condition in order to integrate the community's vision for "what ecosystem health means and is" for coastal Alabama with a defined "reference state" based on science.

Although the level of implementation of the *2002 CCMP Vol. II The Path to Success*, is impressive, the anthropogenic and environmental stressors on our coastal estuarine system continue to increase. These include but are clearly not limited to: climate change and sea level rise, continued lack of land use planning, proliferations of invasive species, storm events and unknown and un-imagined problems. Therefore the challenge before the MBNEP as we move forward is to re-initiate a planning process that extends the goals of the CCMP through the next 5-year period with focused strategies and benchmarks that coordinate with other regional and national plans and that truly measure our success.

Acronyms

ACBT	Alabama Coastal Birding Trail
ACES	Alabama Cooperative Extension System
ACES	Alabama Center for Estuarine Studies
ACF	Alabama Coastal Foundation
ADCNR	Alabama Department of Conservation and Natural Resources
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AFO	Alabama Feeding Operations
ALANSTF	Alabama Aquatic Nuisance Species Task Force
ALDOT	Alabama Department of Transportation
ANSTF	National Aquatic Nuisance Species Task Force
AUMERC	Auburn University Marine Extension Research Center
AWW	Alabama Water Watch
BMPs	Best Management Practices
CACWP	Coastal Alabama Clean Water Partnership
CAFO	Concentrated Animal Feeding Operation
CBCP	Coastal Bird Conservation Program
CCL	Construction Control Line
CCMP	Comprehensive Conservation and Management Plan
DISL	Dauphin Island Sea Lab
DRCR	Dog River Clearwater Revival
EPA	U. S. Environmental Protection Agency
FAMP	Fisheries Assessment and Monitoring Program
GOMA	Gulf of Mexico Alliance
MASGC	Mississippi /Alabama Sea Grant Consortium
MBNEP	Mobile Bay National Estuary Program
MC	Management Committee
MCHD	Mobile County Health Department
MDN	Mercury Deposition Network
MRD	Marine Resources Division
MWW	Muddy Water Watch
NADP	National Atmospheric Deposition Program
NAFSMA	National Association of Flood and Storm Water Management Agencies
NAWQA	National Water-Quality Assessment
NEMO	Non Point Education for Municipal and Elected Officials
NISA	National Invasive Species Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NOAA	National Oceanic and Atmospheric Administration
NPS	Non Point Source (Pollution)
NRDA	Natural Resource Damage Assessment
NTN	National Trends Network monitoring site
OAW	Outstanding Alabama Waterway

ONRW	Outstanding National Resource Water
OSAA	Organized Seafood Association of Alabama
SAC	Science Advisory Committee
SARPC	South Alabama Regional Planning Commission
SBA	Small Business Administration (NOAA)
SEAMAP	Southeast Area Monitoring and Assessment Program
SRS	Soil Conservation Service
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TRI	Toxic Release Inventory
USCOE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USCG	U.S. Coast Guard
USGS	U.S. Geological Survey
WBNERR	Weeks Bay National Estuarine Research Reserve
WBWW	Wolf Bay Watershed Watch
WFFD	ADCNR Wildlife and Freshwater Fisheries Division

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COMPILATION OF RECOMMENDATIONS FOR CONSIDERATION IN DEVELOPMENT OF NEXT CCMP

Objective Area	Recommendation	Category
HU	Implement a recognition program that encourages environmentally sound development practices	citizen participation
ADMIN	Re-establish the interagency information exchange committee	citizen participation
ADMIN	Reconfigure the working groups to blend technical, environmental activists and developer/consumers into open forums to develop realistic actions items	citizen participation
EPI	Serve as a clearinghouse for citizen environmental concerns	citizen participation
EPI	Reduce nuisance complaints to agencies while increasing effectiveness of 'early warning' calls	citizen participation
EPI	Serve as a clearinghouse for citizen environmental concerns	citizen participation
EPI	Maintain an active community action committee	citizen participation
EPI	Develop a "speakers bureau" composed of conference members including citizens as an opportunity to address business and civic clubs and advise them of mbnep programs.	citizen participation
WEBSITE	Expand opportunities for input and comments to MBNEP on the CCMP and other activities	citizen participation
LR	Identify key species that offer insight into ecosystem health that are not currently being evaluated in a monitoring program	Develop a monitoring program for key species that are proxies of ecosystem health
LR	Re-examine the relevance of monitoring the american alligator	Develop a monitoring program for key species that are proxies of ecosystem health
OTHER	Consider focus on alabama red-bellied turtle, on-going research and protection plans	Develop a monitoring program for key species that are proxies of ecosystem health
LR	Revisit data information management on monitoring of key living resources, water quality, habitat quality etc.	Develop a monitoring program for key species that are proxies of ecosystem health
LR	Develop protocol for measuring and monitoring biodiversity	Develop a monitoring program for key species that are proxies of ecosystem health
LR	Develop and monitor Indicator invertebrate species as this level of the food web is the first to show stress	Develop a monitoring program for key species that are proxies of ecosystem health

Objective Area	Recommendation	Category
HM	Improve/expand education on catch and release	Educate
OTHER	Develop the Biological Condition Gradient Framework to illustrate and explain the state of the estuary and needs for improvement	Educate
WEBSITE	Develop a full listing of the exotic species found in the estuary and surrounding lands	Educate
OTHER	Develop a species list for fish and bird species found in the estuary that can be readily referenced	Educate
HM	Promote awareness of the value of natural habitats as economic resources	Educate
HM	Educate about the value of protecting Submerged Aquatic Vegetation	Educate
HU	Support educational/BMP efforts of the alabama forestry commission, alabama treasure forest foundation, and forever wild regarding effects to surface waters from silvicultural runoff	Educate
HU	Support the NRCS, soil and water conservation districts, and ACES in continued development and implementation of agricultural education and bmp standards	Educate
OTHER	Increase publicity of www.mymobilebay.com	Educate
WQ	Increase education of the public regarding appropriate disposal of hazardous materials	Educate
WEBSITE	Consider making historic aerial photography of the entire bay and shorelines available on the MBNEP website	Educate
EPI	Translate scientific language into easily understandable laymen vernacular	Educate
WEBSITE	Assemble a bibliography of scientific literature related to the Mobile estuary	Educate
EPI	Educate citizens on reportable violations and responsible agencies	Educate
WEBSITE	Develop a repository for a GIS database of the estuary	Educate
OTHER	Provide information to nursery and home improvement stores that educates the purchasing decision makers concerning exotic species (list them) and their impact to the estuary once they escape cultivation.	Educate
OTHER	Provide the public with effective methods for eliminating exotics/invasives from their property	Educate
EPI	Develop interpretive signage in new or existing parks to educate visitors regarding habitats and living resources.	Educate
EPI	Publish a “State of the Bay” report in 2013. Include BCG efforts, BP oil spill, restoration projects, revised CCMP	Educate
OTHER	Develop curriculum and teaching tools that can be adopted by middle school and high school teachers	Educate

Objective Area	Recommendation	Category
WEBSITE	Maintain website with all completed work/projects	Educate
WEBSITE	Develop website to include information about specific habitat management types: sav's, wetlands, beach and dune.	Educate
WEBSITE	Improve information regarding the status of projects and plans	Educate
EPI	Support/coordinate conferences bringing scientists, agency personnel and citizens together.	Educate
EPI	Target tourism-oriented businesses to promote environmental advocacy campaigns such as the green hotel program and the green golf course program	Educate
EPI	Assess and communicate research lessons learned from other NEPs	Educate
WEBSITE	Develop a web page that contains suggested ideas for middle school and high school science projects and recognize winners who use estuary as their project	Educate
WQ	Continue citizens' education efforts to raise awareness of the need to increase funding for better stormwater management	Educate- Stormwater
WQ	Support several statewide grassroots efforts to make citizens aware of stormwater issues	Educate- Stormwater
WQ	Continue education of elected officials, citizens and business and industry leaders regarding the importance of storm water management	Educate- Stormwater

Objective Area	Recommendation	Category
WQ	Identify "problem sub-basins"	Identify/Restore/Protect areas of most stress and least stress throughout the estuary
HM	Develop guidance on long-term management and protection of priority sites acquired	Identify/Restore/Protect areas of most stress and least stress throughout the estuary
HM	Identify and prioritize areas for potential acquisition and/or restoration	Identify/Restore/Protect areas of most stress and least stress throughout the estuary
HM	Expand restoration and protection of nesting bird habitat	Identify/Restore/Protect areas of most stress and least stress throughout the estuary
WQ	Indentify potential OAW streams and pursue designation	Identify/Restore/Protect areas of most stress and least stress throughout the estuary
WQ	Identify priority streams in the Mobile, Escatawpa and Perdido river basins and develop watershed restoration strategies	Identify/Restore/Protect areas of most stress and least stress throughout the estuary
WQ	Focus efforts on human sources of pathogens in priority areas i.e. Those areas on the 303(d list and where TMDLs have been developed for pathogens	Identify/Restore/Protect areas of most stress and least stress throughout the estuary

Objective Area	Recommendation	Category
HM	Determine on the amount and type of wetlands lost each year due to loopholes in permitting	Improve estuarine research
HM	Evaluate if created wetlands for mitigation are serving the same function in the same watershed	Improve estuarine research
HM	Conduct a beach and dune habitat assessment to determine lost/gained habitat over time as well as habitat disturbed by human uses. The beach and dune assessment should include not only the unvegetated beach and primary dunes but also tertiary dunes, interdunal swales and maritime forest. The assessment should utilize aerial photography to compare habitat changes over the last 20-2 years and should be conducted at least every 5 years thereafter	Improve estuarine research
WQ	Examine cumulative or synergistic effects of loadings from various point and nonpoint sources, including air emissions.	Improve estuarine research
WQ	Develop water quality predictive models for a more comprehensive understanding of water quality issues and the development of simple management tools	Improve estuarine research
WQ	Develop water quality specific indicators being monitored to determine the degree of success	Improve estuarine research
LR	Identify the sources, amounts, and impacts of by-catch on fish species in the estuary ecosystem	Improve estuarine research
LR	Fund research to assist universities, NGOs and private entities to pursue research toward completion of goals	Improve estuarine research
LR	Develop links between water quality and living resources	Improve estuarine research
HM	Investigate the impact of the deepwater horizon incident on beaches and human use of those resources	Improve estuarine research
HM	Undertake an economic study of the tourism affect to justify continuation and expansion of the birding trail	Improve estuarine research
HM	Determine threshold acreage needed to sustain baseline wetland functions	Improve estuarine research

Objective Area	Recommendation	Category
EPI	Track regulatory and public official responses to citizen concerns	Improve management and governance
HU	Support legislative action addressing reduction of sediment and turbidity impacts on surface water from dirt/soil mining activities	Improve management and governance
OTHER	Consider establishing and recruiting a policy committee to advise the management conference and MBNEP staff on sensitive or politically charged issues. The MBNEP Director should be a resource and ex-officio member. Voluntary legal counsel should be included. The policy committee could report directly to the executive committee. Confidentiality will be necessary on certain issues.	Improve management and governance
WQ	Develeop comprehensive groundwater management strategy	Improve management and governance
LR	Assess the need for any changes regarding current state regulations and enforcement regarding sustaining populations of key living resources	Improve management and governance
WQ	Establish and fund a water quality monitoring council as recommended by ADEM in their 2010 305(b) report	Improve management and governance
WQ	Expedite the development of TMDLs for impaired waterbodies	Improve management and governance
WQ	Creation of a bi-county team for home rule related to sustainability	Improve management and governance
LR	Developing programs for the maintenance of biodiversity and better protection of threatened and endangered species on private and public lands	Improve management and governance
WQ	Support the development and promotion of more sustainable transportation alternatives	Improve management and governance
WQ	Develop strategies for reducing sewage overflow issues	Improve management and governance
WQ	Adapt the Alabama Rural Watershed Association's, a non-profit organization of water and wastewater systems professionals, “wellhead/ground water protection plan”	Improve management and governance
HU	Promote sustainable land use planning and its implementation through zoning, land development ordinances and design standards incorporating best management practices	Improve management and governence

Objective Area	Recommendation	Category
HM	Determine the success criteria that can be used consistently to evaluate wetland restoration projects	Improve management of critical habitats that support estuarine dependent species
HM	Map and monitor beaches on a regular basis	Improve management of critical habitats that support estuarine dependent species
HM	Examine existing wetlands protection regulations and recommend modifications to improve protection	Improve management of critical habitats that support estuarine dependent species
HM	Develop a sand management policy for coastal Alabama	Improve management of critical habitats that support estuarine dependent species
HU	Establish and encourage the use of development setbacks from water bodies;	Improve management of critical habitats that support estuarine dependent species
HU	Assess the possibility of requiring drainage plans based on 15-to-25 year or greater storm events;	Improve management of critical habitats that support estuarine dependent species
HU	Establish side slope requirements not to exceed 1:4;	Improve management of critical habitats that support estuarine dependent species
HU	Develop and implement legislation giving counties the authority to develop and enforce uniform, performance-based, countywide ordinances to manage and oversee land disturbing activities;	Improve management of critical habitats that support estuarine dependent species
HU	Support development of BMPs designed specifically for rainfall and soil conditions	Improve management of critical habitats that support estuarine dependent species
HU	Develop eco-tourism guidelines to ensure protection of the coastal resources	Improve management of critical habitats that support estuarine dependent species
HU	Establish criteria for a water body buffer zone on both sides of stream banks;	Improve management of critical habitats that support estuarine dependent species
HU	Develop and implement a water body bank conservation easement and/or buyout program;	Improve management of critical habitats that support estuarine dependent species
HU	Develop and/or support incentive programs for maintaining ground cover	Improve management of critical habitats that support estuarine dependent species
HM	Use the watershed management approach in resource acquisition and protection	Improve management of critical habitats that support estuarine dependent species

Objective Area	Recommendation	Category
HM	Support efforts to eradicate amazonian apple snail	Improve management of critical habitats that support estuarine dependent species
HM	Link optimum habitat goals to the wildlife species goals	Improve management of critical habitats that support estuarine dependent species
HM	Link beach and dune habitat goals to beach mouse, shore bird and sea turtle goals.	Improve management of critical habitats that support estuarine dependent species
HM	Link Longleaf pine habitat to gopher tortoise, bachman sparrow and black pine snake goals	Improve management of critical habitats that support estuarine dependent species
HM	Restore Three Mile Creek and improve its use category	Improve management of critical habitats that support estuarine dependent species
OTHER	Develop plan for identifying the potential nutria population, a means for reducing or eliminating the species, or educating the public	Improve management of critical habitats that support estuarine dependent species
HU	Encourage use of alternative and enhanced efforts to control erosion	Improve management of critical habitats that support estuarine dependent species
HU	Develop watershed management plans with implementation strategies that will result in better control of development within the watersheds	improve management of critical habitats that support estuarine dependent species
HM	Develop a strategic mitigation plan for coastal Alabama, that identifies sites for mitigation by watershed, provides a consistent inspection schedule to assure mitigation compliance, and establishes criteria that are consistent with replacement of lost wetland functions	Improve management of critical habitats that support estuarine dependent species
HM	Develop action plan for reducing shoreline loss	Improve management of critical habitats that support estuarine dependent species
HM	Develop plan for Beneficial uses of dredged material for shoreline sustainability	Improve management of critical habitats that support estuarine dependent species
HM	Undertake consistent mapping and a consistent habitat monitoring program coupled with some analysis of how and why habitats changed over time	Improve management of critical habitats that support estuarine dependent species
HM	Focus on improvements in water quality to increase acreage of SAV	Improve management of critical habitats that support estuarine dependent species

Objective Area	Recommendation	Category
WQ	Support new technology to reduce the impacts of storm and waste water	Support/Employ new technologies to mitigate human impacts on environment
WQ	Improve control of non-point source pollution	Support/Employ new technologies to mitigate human impacts on environment
WQ	Reduce runoff from roadways by working with the alabama department of transportation (ALDOT)	Support/Employ new technologies to mitigate human impacts on environment
WQ	Promote stormwater improvement projects to address nutrient impacts and mitigate stream and channel erosion, flooding etc	Support/Employ new technologies to mitigate human impacts on environment