Gulf of Mexico Alliance White Paper
Priority Area 4:
Identification and Characterization of Gulf of Mexico Habitats to Support Management Actions in the Gulf of Mexico

Problem Statement/goal

The economy and quality of life in the coastal communities of Florida, Alabama, Mississippi, Louisiana, and Texas are intricately tied to the coast and the marine resources that exist there. However, increasing land development, pollution, recreational use and commercial activities are continuing to threaten the sustainability of these resources. To better manage these important assets, it is necessary that the states begin laying the groundwork for improved ecosystem-based management. In order to do so, each state must identify and characterize the types and extent of habitats that exist in their coastal waters.

Background

Coastal environments in the Gulf of Mexico are comprised of diverse habitat types that provide tangible socioeconomic and ecological benefits. Seagrass beds, oyster reefs, mangrove forests, saltmarsh, hardbottom and soft/hard coral communities support a multitude of plant and animal species. These habitats serve as nursery areas or critical habitat for many fish, shellfish, bird, and rare, threatened or endangered species. In turn some of these species support substantial commercial and recreational fisheries.

Over the past decade, Gulf coastal regions have seen an exponential increase in development as large numbers of people have re-located to the coastal communities to live, work, and visit. In Texas, for example, the population growth is expected to double over the next 30 years and a significant portion of that growth will be in the coastal areas. Other Gulf States are expecting similar growth. This development has resulted in increased pressure on coastal habitats including wetlands, saltmarshes, and submerged aquatic habitats like seagrass beds, shellfish beds, shallow reef systems, etc. Throughout each of the Gulf Coast states, habitat degradation is evident. The U.S. has lost approximately half of its original wetlands, and the Gulf Coast region has seen similar, if not more severe losses. Shallow water reef communities and seagrass beds near urban coastlines are experiencing damage from increased runoff, sedimentation, fishing activities and increased recreational activities. Oil and gas exploration and development has also placed added pressures on many habitats including oyster reefs. Decline in many of these habitats has resulted in an increased concern for the loss of biodiversity and adverse economic impacts to communities along the coast.

In response to the habitat degradation, numerous jurisdictions in Gulf Coastal communities have implemented various protective measures, including regulatory techniques such as planning, zoning, or permitting, and non-regulatory conservation techniques, such as fee simple land acquisitions, easements, or tax incentives/disincentives. Other approaches used by the states to protect, and in many cases improve, these habitats have been through restoration efforts and development of comprehensive regional restoration strategies.

Although the coastal states and communities have implemented the strategies listed above, a significant barrier to conservation, restoration, management and ultimately sustainable development of the coastal regions is simply that many of these habitats have not been adequately mapped and characterized. Where those efforts have been undertaken, it often remains difficult for planners and resource managers to access this valuable information. Standardized and user friendly GIS formats are not necessarily common among agencies and/or states, and accomplishing a universal standardization strategy is not a trivial exercise. Determining the spatial extent and distribution of the various types of aquatic habitats in the Gulf (and elsewhere) is technically more challenging than evaluating the extent and distribution of terrestrial habitats. New technologies are only now becoming available and more economically feasible to assist in this type of mapping and quantifying effort. Additionally, because these habitats often form in large contiguous systems which span numerous jurisdictions, it is often difficult to establish effective conservation, restoration and management strategies given the lack of knowledge pertaining to the spatial extent. A thorough identification and characterization of these habitats would provide a foundation for many regulatory and conservation initiatives, as well as establish priority areas to channel federal and state funding.

Strengths/Progress

Perhaps the biggest strength the Gulf Coast states have in addressing this habitat issue is that each state has a State-level department (i.e., Department of Environmental Protection, Environmental Management, Natural Resources, etc.) and state-run programs that are committed to evaluating and characterizing the habitats of that state. In the past several years, the Gulf Coast states have made advances in the identification of their aquatic habitats. This achievement has primarily been accomplished through federal funding and the formation of partnerships with federal, state, and local entities.

Federal programs have provided significant funding for habitat identification. For example, the Gulf Ecological Management Site Program (GEMS) is an initiative of the EPA's Gulf of Mexico Program and the five Gulf Coast states to coordinate and use existing federal, state, local and private programs and resources to identify GEMS (geographic areas of special ecological significance to the continued production of fish, wildlife, and other natural resources that present unique habitats) in each state. This program will build a database of key information on each of the GEMS (i.e., size, boundaries, ecological characteristics, management strategies etc.) and will foster a cooperative, Gulf-wide conservation of the GEMs.

The National Estuarine Research Reserve System (NERRS) is another example of a federal partnership program between NOAA and coastal states to protect estuarine land and water which provides essential habitat for wildlife and long-term research. Under this partnership NOAA may provide 1) federal assistance monies for the acquisition of land and waters; 2) federal monies for the management and operation of, and the development and construction of facilities which pertain to educational or interpretive activities concerning Reserves; and 3) financial assistance to support research and

monitoring within a Reserve. NERRS has a System-wide Monitoring Program (SWMP) which tracks short-term variability and long-term changes in estuarine waters to understand how human activities and natural events can change ecosystems. The SWMP currently measures physical and chemical water quality indicators, nutrients and the impacts of weather on estuaries. Chlorophyll *a* monitoring is conducted on a monthly basis. The NERRS program is also in the process of expanding the biological (i.e., more habitat-based) mapping efforts including submerged aquatic vegetation (seagrasses, algae) and emergent vegetation (marsh plants) as well as evaluating changes in land use by using remote sensing technologies. The Gulf Coast States occupy four designated biogeographic sub-regions within NERRS and include from east to west: Region 10 West Florida; Region 11 the Panhandle Coast; Region 12 the Mississippi Delta; and Region 13 the Western Gulf. Four reserves have already been established under this program (Rookery Bay, FL; Apalachicola, FL; Weeks Bay, AL; and Grand Bay, MS) with one additional reserve location in the Western Gulf currently being proposed.

Partnership opportunities also exist through the EPA's National Estuary Programs (NEPs) within several of the Gulf Coast states. NEPs within the Gulf Coast states include Charlotte Harbor, Sarasota Bay and Tampa Bay in Florida, Mobile Bay in Alabama, Barataria-Terrebone in Louisiana, and Galveston Bay and Coastal Bend Bays in Texas. Each NEP must establish a Comprehensive Conservation and Management Plan (CCMP) which presents plans for attaining and/or maintaining water quality as well as protection (and propagation) of indigenous fish, shellfish and wildlife and their critical habitats. The NEPs often have ongoing research programs to map, characterize and study the habitats within the boundaries of the NEP. The Mobile Bay National Estuary Program produced a report in 2002 entitled, *Mapping of Submerged Aquatic Vegetation in Mobile Bay and Adjacent Waters of Coastal Alabama in 2000.* In Alabama, the state is an active participant in the Coastal Habitat Coordinating Team, led by the Mobile Bay National Estuary Program. Texas has adopted the *Seagrass Conservation Plan for Texas* that emphasized ongoing status and trends efforts supported by the Galveston and Coastal Bend Bays NEPs as well as Texas Parks and Wildlife Department.

Similar to the NEPs, partnership opportunities also exist through NOAA's National Marine Sanctuary Program. Two of the country's National Marine Sanctuaries are intricately tied to the Gulf of Mexico, Flower Garden Banks National Marine Sanctuary located approximately 110 miles off the coasts of Texas and Louisiana and the Florida Keys National Marine Sanctuary with its' most western boundary bordering the southern region of the Gulf of Mexico. The mission of the Program is to conserve, protect, and enhance the biodiversity, ecological integrity and cultural legacy of these important marine resources. Goals for any given sanctuary may include restoring and rebuilding marine habitats or ecosystems to their natural condition or monitoring and maintaining already healthy areas.

Workshops and committees focused on special habitat issues have been useful in bringing together public/private partners to identify species, systems and natural communities of concern. Through workshops, states and other groups are brought together to help identify habitats of concern, current viability, and threats. Participation in multi-state

groups such as the Gulf States Marine Fisheries Commission (GSMFC) is also viewed as a strength for addressing habitat issues. The objective of the GSMFC is the conservation, development and full utilization of the fishery resources of the Gulf of Mexico. The GSMFC's Habitat Program is a joint program with NOAA's Gulf of Mexico Fishery Management Council. One of the major goals of this program was to develop an Essential Fish Habitat Amendment for the Council. This program currently evaluates protection, restoration and management options for EFH throughout the Gulf. The GSMFC also has a project underway mining existing data and information on the hardbottom coral reefs along the continental shelf from the Florida Keys through Texas.

Another strength of the Gulf Coast states in terms of habitat characterization is the current ability to use new technologies like remote sensing, both aerial and satellite imagery. A 2004 Florida Fish and Wildlife Commission publication provides land cover results from Landsat 2003 imagery including salt marshes and mangroves. Historical Landsat data sets do exist from the 1980s which would allow for some trend comparisons for specific areas where the images are sufficient. Texas has worked jointly with federal agencies (i.e., USGS) to acquire similar imagery to allow for land cover comparisons. Because the use of GIS tools for habitat location, quantification and identification is becoming widespread, many of the Gulf Coast states have the ability to work with this remote sensing data making it available in a standard GIS format to share with their neighboring states. Some states are close to completing marine habitat identification using a combination of remote sensing and verification by ground-truthing.

With the continued accessibility of data and information over the internet, the Gulf Coast states are also able to locate and acquire existing databases from federal, other state or local agencies, private groups, and universities that may contain habitat data for their specific region. The state of Florida currently has a plan and has committed $200,000 to begin a comprehensive biogeographic assessment of the marine habitats in its state's waters. This effort will not collect any new data but will mine existing information from all federal/state/local agencies and groups that have already mapped/identified marine habitats in Florida state waters.

Challenges/Barriers

Although new technologies are available for habitat identification and characterization, these technologies are often very expensive and labor intensive. Additionally, training of existing staff and/or additional resources may be necessary to ensure their successful implementation. Federal assistance would be beneficial in helping the states to adapt and implement these new technologies. Each state needs to remain involved in state-wide and Gulf-wide multi-agency working groups that address specific habitat issues including the collection of necessary habitat information. While this could be feasible through the network of agencies that currently cooperate with the states, there is a lack of funding to supply the appropriate resources. State funding and staff are typically limited; therefore, a majority of habitat classification efforts are supported through federal dollars and even these are more and more limited. Mapping programs are time intensive and labor intensive which equates to high dollars. Ground-truthing remote sensing information can also be costly, particularly since many habitats are in remote areas that simply may not be

easily accessible. Often, the reporting requirements associated with federal grants and additional state/federal bureaucratic requirements divert considerable funds and staff away from on the ground efforts.

Many of the Gulf coast states feel as if they are managing their submerged aquatic resources using very sparse data and information. Although technologies for mapping underwater habitats are becoming more common, at this point in time, detailed maps of marine habitat types, locations, and uses are still lacking, making management difficult. For Example, this lack of detailed information also impacts groups such as the GSMFC in trying to specify essential fish habitat. Often, in areas without detailed maps of the seafloor, EFH is designated based on where various life stages of fish species are observed. Detailed maps would enhance this effort considerably. A comprehensive inventory of available habitat information from other programs, as well as individual researchers, is needed and determination made as to the data's availability and usefulness. If data are acquired from other sources, additional challenges exist including determining the appropriate use of the data (intended user versus intent of use), consistency of formats among different sources, necessary conversions, etc. There is concern among the Gulf Coast states that there is a lack of sufficient data to identify cumulative impacts that will negatively affect key aquatic habitats.

One final and significant challenge the Gulf Coast states face in terms of habitat characterization is the dynamic status of habitats in developing areas. The continued development of the coastal communities is altering habitats in terms of type and extent. The frequency of mapping and delineation efforts required for evaluating these dynamic environments is difficult to determine. Gathering the necessary historic data to make comparisons may also be difficult or unlikely if data do not exist. If historic information is available, rates of loss may be calculated which could help the states in establishing priority areas for conservation and restoration. Overall, this rapid change in habitat due to development is problematic in terms of protection, restoration and management actions.

Opportunities/Potential Solutions

Various opportunities and/or potential solutions have been recognized by the Gulf Coast states for addressing their habitat issues. Foremost, the Gulf Coast states recognize the importance of forming partnerships and developing strategies to explore and obtain additional funding sources.

These partnerships should also maximize the use of funds to prioritize land acquisition in the coastal areas. The Gulf Coast states need to work together to capitalize on the Coastal and Estuarine Land Conservation Program (CELP). CELP, created in 2002 and administered through NOAA, provides grants to states or local units of government for protection and management of coastal and estuarine areas with significant conservation, recreation, ecological, historical or aesthetic values. This program requires a 1:1 non-federal match, which can be in many forms, including site restoration, land value donation, and other acquisitions. Since its creation in 2002, funding has been significantly increased from $15.8 million (FY 2002) to $51 million (FY2004). CELP

funds are currently earmarked for specific locations; however states are actively working to make the CELP a competitive grant program. Once the CELP is established as a competitive grant program, the Gulf Coast states will be able to increase their efforts to identify and highlight areas which qualify under CELP to competitively vie for these grant dollars. As a unified group, the Gulf Coast states should develop scientifically and economically defensible guidelines and prioritize their critical habitats for acquisition.

Mitigation (through permitting) is another opportunity for states to address their habitat issues. Several Gulf Coast states are involved with the permitting process or leasing of state lands and water bottoms. Several use mitigation efforts to create/restore lost marine habitats. To enhance federal and state funding efforts, Mississippi is investigating seagrass restoration opportunities through its permitting process. Applicants would be requested to provide monetary contributions to seagrass restoration activities. In the future, perhaps contributions through mitigation activities could be used to conduct more detailed mapping surveys and/or research in critical habitat areas.

In addition to mitigation, the Gulf coast states are developing their own programs to research and evaluate conservation and restoration activities in their critical habitats. For example, Texas has implemented programs such as the Coastal Erosion Planning and Response Act (CEPRA) program which seeks to protect, maintain and restore coastal shoreline-eroded Gulf and bay beaches and other coastal habitats-along the Texas Gulf coast through the funding of erosion response projects and studies. Funding for this program is generally provided on a cost-sharing match basis through legislative appropriation under the CEPRA act on a biennial basis.

As mentioned above, one of the challenges the Gulf Coast states see in terms of their habitat characterization issues is the availability of data and whether the data will be useful. One opportunity/potential solution for addressing usefulness of data is to standardize mapping techniques, frequencies, and methodologies of reporting the information. Unified methodologies would allow for easy data comparisons and sharing among states. A unified approach would also reduce costs associated with the translation and interpretation of data inconsistencies among states.

Priorities

One of the priorities identified by the Gulf Coast states is to identify gaps in habitat mapping information and develop strategies to acquire the necessary information to address those data gaps. Recent meetings have produced agreement that high resolution bathymetry (LIDAR from 0-120 ft) would be the best first step in habitat mapping as well as modeling water movement along the Gulf shelf. This would, however, be a multimillion dollar effort and would need to be done in prioritized project areas as resources allowed. Once this is complete, the Gulf Coast states can create baseline maps of the marine environment. This baseline data is essential for other priorities which include establishing and maintaining long-term monitoring programs for management organizations to determine the status and trends of marine habitats.

Another priority addresses the rapid increase in coastal development. Private entities such as land owners and land developers must get involved. More educational programs need to be developed to inform the public about habitat conservation and best management practices. As development continues, it will be crucial that the Gulf Coast states begin critically evaluating their laws/regulations to determine if changes are needed.

Needs from State/Federal Partnership

The Gulf Coast states currently partner with many federal agencies to address a multitude of issues concerning the Gulf. These agencies involve U.S. Army Corps of Engineers, U.S. EPA, NOAA and NMFS, U.S. Fish and Wildlife Service and USGS. The Gulf Coast states firmly believe that these collaborations are essential in developing a unified plan for addressing habitat issues Gulf-wide. Continued partnerships and the formation of new partnership are essential for:

- Increasing the Gulf Coast states' success and competitiveness in the grant process. These partnerships among states and federal agencies will treat the Gulf Coast marine environment as an interstate and shared regional resource such as the Great Lakes and Chesapeake Bay and help increase the success of federal grant dollars, which in turn will increase the amount of future federal funding and grant dollars.

- Sharing of data and other information collected with the federal and state programs. Additional remote sensing activities and ground truth data collection activities are needed and continued support from federal agencies familiar with the technologies will be important. Data sharing and more remote sensing information will be critical to addressing overall habitat issues and will also reduce redundancy and duplication of efforts.

- Obtaining useful information derived from data; with assistance from federal agencies. This will allow coastal managers to analyze different data to integrate the information into something that can be readily used and accessed.

- Examining what information is available and having easy access to that information to identify data gaps and developing plans to address those gaps.

- Sharing of information and knowledge regarding the best available technologies will insure that the states will have access to the most up-to-date information.

Governance Implications

The Gulf Coast states agree that a regional ecosystem-based approach is a long-term solution for managing the Gulf of Mexico resources; however, the level of regional cooperation to realize such an approach can be difficult to implement. A "process structure" for implementing a regional approach can be discussed for years, but not until the work on specific issues is conducted do the true structures to support the process fall into place. An important building block to ecosystem based management is up-to-date

and easily accessible GIS-based information. Information layers that are easily meshed across broad geographic reaches and between local, state, and federal jurisdictions are fundamental to this goal. As noted, considerable information exists at state and local levels or within state and federal resource agencies, but often this information is anonymous outside a relatively narrow community of users. A bottom-up approach led by the states should be implemented to make this information accessible and transparent. It is important to note that although cooperative efforts to look at habitat issues regionally are good in theory, it will be critical that there be a strong presence of individuals who know the details of the situations in each state so that desired goals may be accomplished.

Broader Implications

The U.S. Action plan specifically calls for a multitude of actions that will require a better understanding of habitat issues nation wide, including the Gulf of Mexico. One action specifically calls for coordinating ocean and coastal mapping activities. The effort to map and characterize aquatic habitats by each of the Gulf Coast states is directly related to this action. In the U.S. Action Plan Chapter "Enhancing the Use and Conservation of Ocean, Coastal, and Great Lakes Resources" many of the actions call for achieving sustainable marine fisheries. To evaluate any fishery resources, an evaluation of habitat is necessary. Likewise in the chapter "Managing Coasts and Their Watersheds" the U.S. Ocean Action Plan calls for coastal zone management and conservation and restoration of coastal habitats. Again, the efforts being conducted by the Gulf Coast states are directly relevant to these actions.