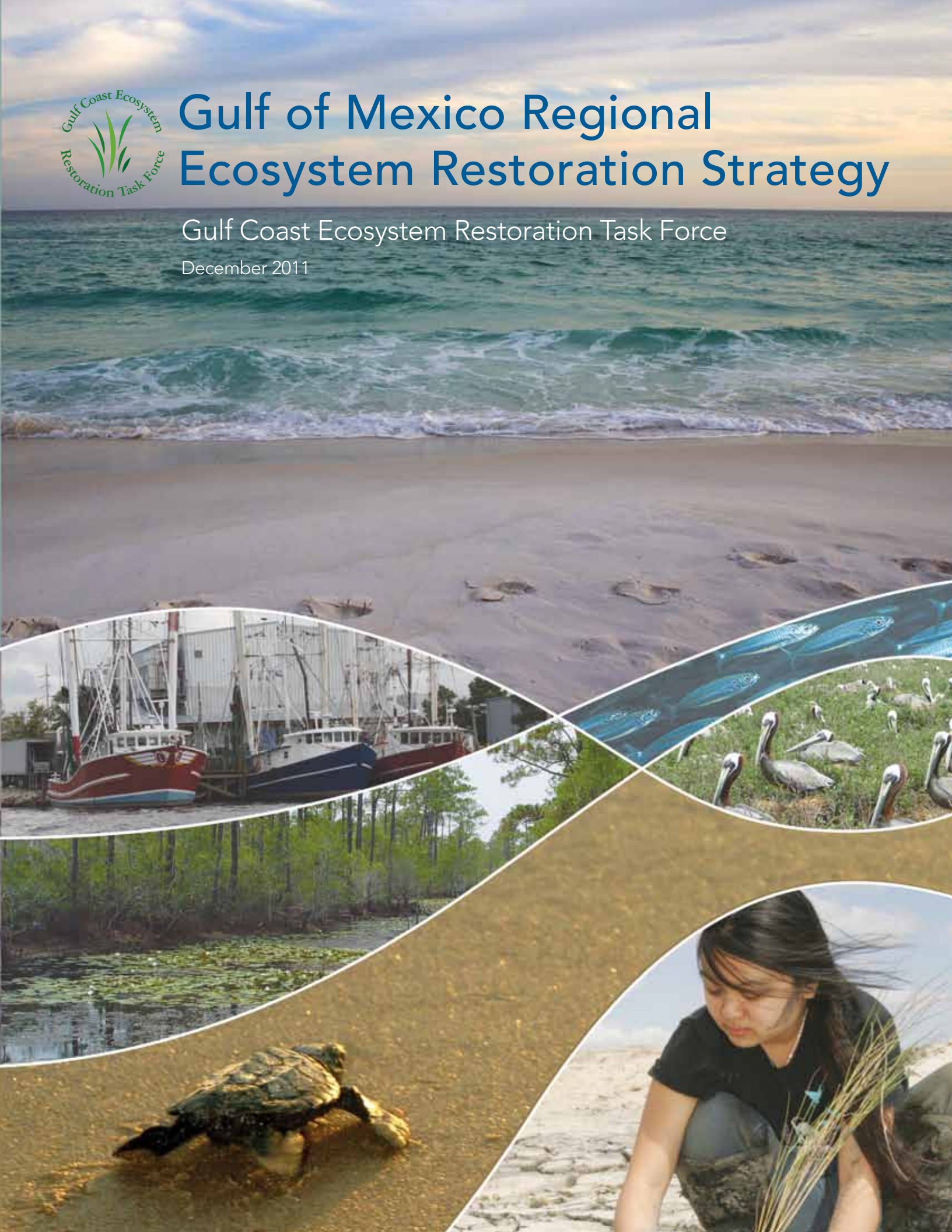
Gulf of Mexico Regional Ecosystem Restoration Strategy

Gulf Coast Ecosystem Restoration Task Force

December 2011



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particularly in near-coastal waters. Nitrogen and other airborne pollutants, such as sulfur in the form of sulfuric acid, alter surface seawater alkalinity, pH and inorganic carbon storage. These effects disrupt natural biogeochemical cycles.[88]

Across the Gulf region, freshwater flows need to be restored to more natural conditions. Rivers and streams provide freshwater inputs that help to maintain salinity gradients and are the source of nutrient and sediment inputs that, in proper combination, produce ecologically sound and healthy estuaries. Hydrologic modifications have affected estuaries throughout the Gulf by altering the amount of freshwater delivered. These estuaries depend on freshwater inflow to sustain their fisheries resources, particularly oysters, as well as to support habitats such as seagrass meadows, near-shore reefs, coastal marshes and mangroves.

Water quality in the Gulf can be most effectively improved by focusing on the principal sources of water quality degradation. Major actions to restore water quality in the Gulf of Mexico are described below.

Major Actions

Decrease and manage excess nutrient levels in the Gulf through the development and implementation of state nutrient reduction frameworks

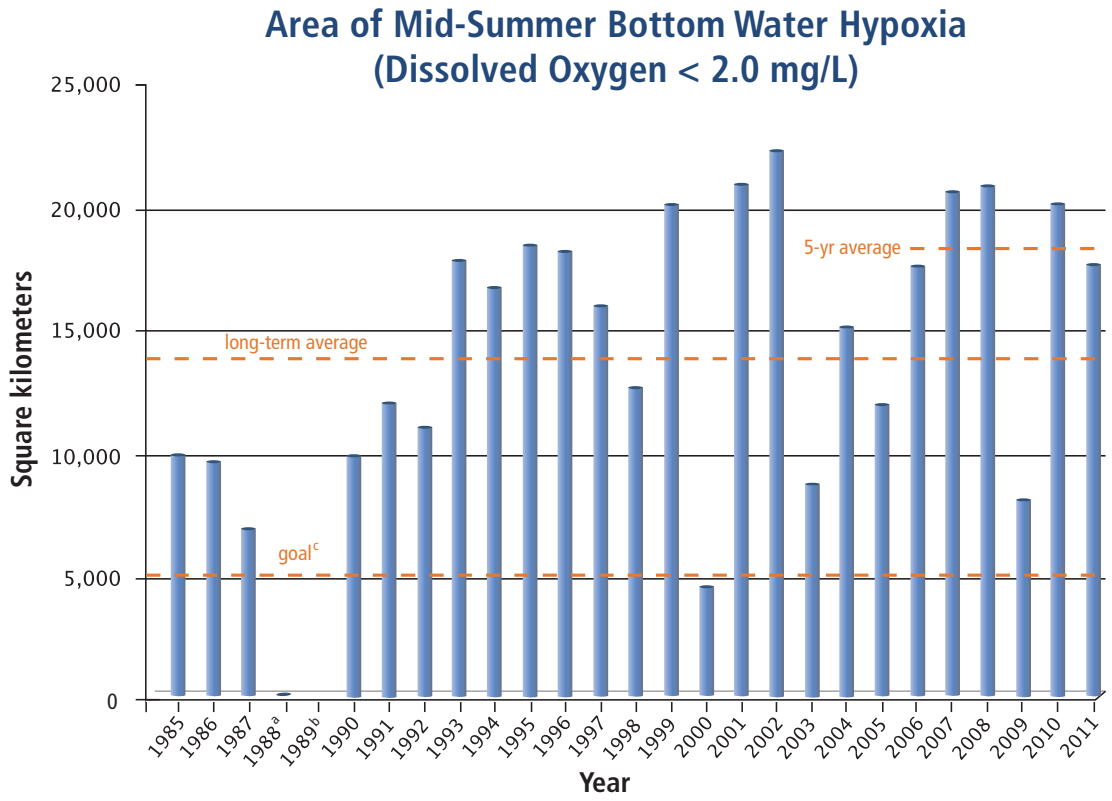
Supporting the development and implementation of state-developed nutrient reduction frameworks in the Gulf and the Mississippi River Basin states will be important for reducing HABs and hypoxic conditions in the Gulf, such as the "dead zone," and improving local water quality conditions.

Beginning with the release of its first Action Plan in 2001, and reaffirmed in the updated 2008 Action Plan, the Hypoxia Task Force established a collaborative interim goal to reduce the five-year running average areal extent of the Gulf of Mexico hypoxic zone to less than 5,000 square kilometers (1,931 square miles).[89] As of the most recent survey (2011), the current five-year average is 17,350 square kilometers, or 6,700 square miles[90] (see "Area of Mid-Summer Bottom Water Hypoxia").

To accelerate progress on and effectiveness of this goal, the Task Force recommends working in cooperation with the Hypoxia Task Force and the Mississippi River Basin states to support the development and implementation of state-developed nutrient reduction strategies. Specifically, the 2008 Action Plan states the objective as:

> Complete and implement comprehensive nitrogen and phosphorus reduction strategies for states within the Mississippi/Atchafalaya River Basin encompassing watersheds with significant contributions of nitrogen and phosphorus to the surface waters of the Mississippi/Atchafalaya River Basin, and ultimately to the Gulf of Mexico.[91]

In combination with this effort, Gulf states not part of the Hypoxia Task Force (Alabama, Florida and Texas) are collaborating, through GOMA, to strengthen supporting science and technical capabilities and to develop their own state nutrient reduction frameworks to restore local water quality conditions.



[a] Only 40 sq km were affected in 1988 (a drought year in the Mississippi Basin).
[b] No data were collected in 1989.
[c] Mississippi River/Gulf of Mexico Nutrient Task Force Hypoxia Action Plan goal.

Data source: N.N. Rabalais, Louisiana Universities Marine Consortium, R.E. Turner, Louisiana State University
Funded by: NOAA, Center for Sponsored Coastal Ocean Research

Building on the states' water quality standards programs, key elements recommended for effective state nutrient reduction frameworks include:

- Prioritizing watersheds on a statewide basis for nitrogen and phosphorus loading reductions.
- Setting watershed load reduction goals based on the best available water quality information.
- Ensuring the effectiveness of point source permits in targeted/priority sub-watersheds.
- Developing more effective reduction measures for nonpoint sources and other point sources of storm water not designated for regulation.
- Partnering with federal and state agencies, NGOs, the private sector, landowners, and other agriculture partners to develop watershed-scale plans and promote adoption of science-based nutrient management conservation practice systems that offer enhanced environmental protection, and may also increase agricultural production.
- Identifying stormwater and septic system tools.
- Establishing accountability and verification measures.
- Conducting annual reporting on load reductions and impacts in targeted watersheds.

Successful implementation of these frameworks could significantly advance the Strategy's goal to restore water quality as it relates in particular to reducing excess nutrients to Gulf of Mexico coastal waters. Consequently, the Task Force, through its coordination

responsibilities with the Hypoxia Task Force, should explore means of providing technical and resource support to this effort.

Recommended actions include:

- Accelerate the development and implementation of the Hypoxia Task Force's state-developed nutrient reduction frameworks by the states in the Mississippi Atchafalaya River Basin.
- Coordinate the Task Force's efforts with the Hypoxia Task Force's next reassessment, scheduled to be completed in 2013. This coordination will help better ensure consistency and focus related to the establishment of performance indicators and supporting actions for the reduction of nutrients.
- Promote the development and implementation of state nutrient reduction frameworks by Gulf states not part of the Hypoxia Task Force (Alabama, Florida and Texas).
- Provide technical assistance and explore additional ways to expand support for implementation of state nutrient reduction frameworks. This includes supporting state-led management efforts such as installation and monitoring of best management practices (BMPs) aimed at reducing excess nutrients flowing into the Gulf.

Focus restoration actions in priority watersheds to address excess nutrients in coastal waters and reduce hypoxic conditions

One of the most cost-effective and efficient ways to reduce sources of excess nutrients is to target program funding and technical assistance for accelerated treatment of areas with the most critical need and in the highest-priority watersheds. This approach, which addresses local water quality and natural resource concerns at a small watershed scale, will contribute to reducing runoff of excess nitrogen and phosphorus on a large scale, and contribute to reducing hypoxia and HABs in the Gulf. As noted above, state nutrient reduction frameworks are useful mechanisms for identifying priority watersheds.

Recommended actions include:

- Using a science-based approach, in collaboration with federal and state agencies, select and target resources for priority sub-watersheds where significant opportunities exist to reduce excess nutrients, sediments and pathogens flowing into the Gulf of Mexico and its estuaries.
- Increase and coordinate conservation practices on agricultural lands to enhance water quality in priority watersheds within the Mississippi River basin and other tributaries in the Gulf states through USDA's Mississippi River Basin Healthy Watersheds Initiative (MRBI) and similar programs (see "Mississippi River Basin Initiative").

Mississippi River Basin Initiative

To improve the health of the Mississippi River Basin, USDA's Natural Resources Conservation Service (NRCS) has established the MRBI. Through this initiative, NRCS and its partners help producers in selected watersheds in the Mississippi River Basin voluntarily implement conservation practices that avoid, control and trap nutrient runoff; improve wildlife habitat; and maintain agricultural productivity.

NRCS dedicated more than $70 million in fiscal years 2010 and 2011 combined to fund conservation projects to improve water quality in priority watersheds throughout the Mississippi River Basin.

- Broaden implementation support for the recommendations in the Conservation Effects Assessment Program (CEAP) in the upper Mississippi River (see "Conservation Effects Assessment Program").
- Increase the number of Comprehensive Nutrient Management Plans (CNMPs) implemented for animal feeding operations and pasture grazing. In conjunction with the CNMPs, implement necessary complementary conservation and BMPs including fencing, hard-bottom cattle crossings, constructed wetlands and other BMPs most appropriate for the individual location and operation to effectively address nutrient transport from agricultural lands. This action would also help to reduce pathogens in the Gulf of Mexico.
- Coordinate among state and federal programs that promote riparian buffer restoration and preservation to better align and maximize efforts.
- Work with agricultural equipment and fertilizer dealers to make precision agriculture equipment and technologies available to private landowners and operators at affordable prices.

Conservation Effects Assessment Project

CEAP is a multi-agency, multi-resource effort led by NRCS to assess the effects of conservation practices on the nation's cropland, grazing lands, wetlands, wildlife and watersheds.

A recent CEAP study, *Assessment of the Effects of Conservation Practices on Cultivated Cropland in the Upper Mississippi Basin*,[92] found that farmers have adopted conservation practices resulting in significant reductions in nutrient losses. However, the study also found that conservation plans that include comprehensive nutrient management are generally lacking throughout the region. According to the report, a suite of practices that includes both soil erosion control and comprehensive nutrient management is needed to simultaneously address soil erosion and nitrogen leaching loss.

Reduce pollutants and pathogens from stormwater flows and other sources

Contaminants carried within stormwater and sewer overflows have the potential to affect both aquatic life and human health. These contaminants can include heavy metals from urban infrastructure like roads, guardrails, and construction materials; fertilizers and pesticides from residential and commercial use; petroleum products and paving compounds such as polycyclic aromatic hydrocarbons (PAHs) from commercial and residential sources; bacteria, viruses, protozoa and parasites from fecal waste; and nitrogen and phosphorus pollution. In the Gulf, these contaminants can impact recreational waters and commercial fisheries, as well as the overall quality of aquatic life. The Task Force supports a region-wide effort to reduce pollutants and pathogens stemming from stormwater flows and other sources entering Gulf Coast waters.

Recommended actions include:

- Promote comprehensive solutions that may include green infrastructure and low-impact development approaches in urban and suburban areas to help reduce combined sewer and sanitary sewer overflows, untreated stormwater runoff, as well as producing natural habitat buffering benefits.
- Facilitate the expansion of municipal stormwater permit programs to include fast-growing suburbs and urban areas not currently covered by these programs.

- Encourage states to restrict phosphorus in lawn fertilizer, following the successful examples of Maine, Maryland, Michigan, Minnesota, New Jersey, New York, Virginia, Washington and Wisconsin.

Improve the quality and quantity of freshwater flow into priority estuaries to protect their health and resiliency

Estuaries, transition zones between the coastal watersheds and offshore marine habitats, serve as barometers of the health of the Gulf of Mexico. They provide breeding grounds, forage and nursery areas for recreational and commercially important species of fish and wildlife; habitat for benthic species such as oysters and bay scallops; and transitional and migratory wildlife corridors between upstream freshwater habitats and offshore marine waters.

Gulf estuaries are affected by multiple stressors, including nutrient loading, other pollution, altered hydrology resulting in unnatural tidal exchange and/or salinity gradients, and upstream dams. While levees are sometimes necessary to enable management of unnatural systems in a manner that mimics nature, barriers to natural tidal flow such as weirs, levees, causeways and artificial canals can cause habitat degradation and loss by disrupting the natural salinity variations necessary to support a diversity of coastal organisms (e.g., oysters, saltmarshes, seagrasses). Moreover, as demand for freshwater resources continues to increase throughout the Gulf Coast river basins and underground aquifers, maintaining sufficient freshwater flow into the bays and estuaries will become increasingly challenging.

Recommended actions include:

- Support state and local government efforts to better protect groundwater supplies and instream freshwater flows by minimizing water loss from leaking water supply systems. Also, develop policy and incentives for water reuse on agricultural lands, urban areas (for watering lawns and golf courses), and other non-drinking uses of freshwater in areas where these resources are limited.
- Develop a science-based freshwater inflow regime and monitoring system to improve the timing, quantity and quality of freshwater inflow within managed river systems. This approach would not only benefit wetlands, but also remove nutrients from direct introduction to Gulf waters and reduce hypoxia, and sustain important fisheries, oysters and protected wildlife.
- Identify and develop means and opportunities to improve water management planning, conservation, land-use planning, and barrier evaluations (to tidal flow) to restore and maintain freshwater resources and estuaries along the Gulf. Consider removal, addition or modification of tidal barriers where cost-effective scientifically supported solutions can be shown to improve and restore estuarine habitat.

Coordinate and expand existing water quality monitoring efforts supporting adaptive management of programs and projects designed to improve water quality

Available water quality data throughout the Gulf of Mexico basin (from inland watersheds to estuaries/nearshore areas and the offshore waters) are insufficient or inadequate as

currently collected to allow for the accurate assessment of status and trends. Incomplete data make it difficult to quantify changes and to determine if restoration and protection measures are successful. The Task Force supports the following actions to better coordinate and expand water quality monitoring to support adaptive management:

- In collaboration with federal and state partners, assess current water quality monitoring information and data. Identify gaps in core information needs and performance measures to develop a long-term water quality monitoring program building on existing efforts, including assessment of nutrients, HABs and other water quality parameters.
- Monitor and assess nutrients in the Mississippi River Basin, to better quantify current nutrient loading to the Gulf and target reduction efforts.
- Leverage existing information management infrastructures of EPA, NOAA, USDA and DOI to integrate and provide monitoring data and information supporting local, state and regional decision needs.

Collaborate with Mexico to assess and reduce emissions from oceangoing vessels in the Gulf that degrade water quality

Water quality, particularly in near-coastal waters, can be negatively affected by pollutants emitted from oceangoing vessels. To protect marine and coastal areas, including the Gulf, the United States and Canada adopted the North American Emissions Control Area (ECA) in March 2010. This initiative will put in place lower sulfur marine fuel standards for oceangoing ships operating in the ECA beginning in August 2012, as well as nitrogen oxide standards for engines on ships built in 2016 and later.[93] It will dramatically reduce air pollution from ships and deliver water quality benefits by reducing atmospheric deposition of pollutants to coastal ecosystems.

Ongoing efforts will continue with Mexico to increase awareness of the health and environmental benefits of reducing emissions from oceangoing vessels. Data from a recent U.S.-Mexico fuel switching demonstration, for example, show that particulates and sulfur dioxide emissions from container ships can be reduced by up to 80 percent and 89 percent, respectively.[94] This plan presents a unique opportunity to increase the benefits of reducing ship emissions in the Gulf of Mexico.

Replenish and Protect Living Coastal and Marine Resources

The Gulf Coast is inhabited by a rich diversity of mammals, birds, reptiles, fish, invertebrates and plants. For example, the coral reef systems support some of the most diverse assemblages of life, including anemones, spiny lobsters, yellowtail snapper and nurse sharks. These species provide the underpinning for economically critical commercial and recreational opportunities, as