

# Annual Science Research Plan

2014-2015



**FLORIDA OCEANS AND COASTAL  
COUNCIL**

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# Executive Summary

Florida is the only continental state largely surrounded by coastal seas and ocean. Our state's character, nature, and future are driven by and depend upon the waters that surround it. Its citizens and visitors are never more than 75 miles from salt water and Florida's economy is heavily dependent on its oceans and coastal ecosystems.

To forecast, manage, or abate critical threats to Florida's marine resources and to wisely use those resources requires accurate assessments; continuous monitoring; and real-time abilities to predict and interpret changes to the physical; chemical, biological; geological; and socioeconomic components of our marine ecosystems. It also requires integrated data and information sharing amongst resource managers and other interested parties to achieve wise decision making.

Created by The Oceans and Coastal Resources Act, §161.70, et seq., Florida Statutes, The Florida Oceans and Coastal Council is charged with coordinating coastal and marine research, identifying research gaps and creating an annual Science Research Plan, and recommending new strategies that enhance management and conservation efforts for our coastal and marine resources.

The Council sought and has compiled stakeholder input to recommend priorities for the year 2014-2015. Funding is needed to fulfill these priorities; however opportunities exist to utilize non-state funds as a result of the Deepwater Horizon Oil Spill and the National Ocean Task Force recommendations. The priorities include:

## Water Quality

Four priorities are research and monitoring; coastal observing; harmful algal blooms; and modeling to achieve the improvement and maintenance of water quality to support coral and oyster reefs; seagrass beds; fish & wildlife; and beach activities.

## Ocean and Coastal Ecosystems

Four priorities encompass mapping; hydrologic linkages; research & modeling; and ocean and coastal economics to develop and improve comprehensive understanding of sustainable natural systems.

## Ocean Management

Three priorities embrace marine spatial mapping & assessment; public outreach; and marine spatial planning to fulfill the central core of ecosystem-based management.

## Planning for Environmental Variability

Four priorities focus on applying regional data and models at locally relevant levels; establishing baselines; identifying processes; and quantifying risks to minimize the effects of changing ocean and coastal conditions on Florida's population and natural resources.

## Tools and Technology

Five priorities include coastal and ocean observing systems; remote & real-time sensors; data management & prediction; assessment tools; and mapping and monitoring cost reduction.

The Council stresses that this Science Research Plan is not intended to replace ongoing state-funded research efforts and partnerships and duplication of efforts will be prevented by coordinating with state and local entities. These research recommendations are based on identified research gaps to supplement research already under way; eliminate duplication of efforts; and advance agency missions.

# Introduction

Florida is the only continental state largely surrounded by coastal seas and ocean. Florida's character, nature, and future are driven by and depend upon the waters that surround it. Florida encompasses 58,560 square miles, including 4,308 square miles of fresh and brackish water, bordered by a tidal shoreline 2,276 miles in length and 4,000 square miles of estuaries. Florida's marine waters extend 3.5 statute miles into the Atlantic Ocean and 10.4 statute miles into the Gulf of Mexico with Florida's Gulf Coast composing the eastern shore of America's only Mediterranean-type sea: the 600,000 square mile Gulf of Mexico. Its citizens or visitors are never more than 75 miles from salt water.

Florida's 18 million residents, 84 million tourists, and economy are heavily dependent on its oceans and coastal ecosystems. Florida's coastal counties contributed over \$584 billion in gross regional product to Florida's economy in 2010<sup>1</sup>. Florida's ocean economy contributed \$17.5 billion in 2011 which is a \$3.5 billion increase over 2005<sup>1,2</sup>. In 2010, Florida's coastal counties made up 79% of the state's economic productivity, yet the shoreline counties occupy only 57% of the land area<sup>1</sup>. Over 228,000 jobs are created by activities that use ocean resources with indirect effects supporting 440,000 jobs<sup>1</sup>.

To abate critical threats and take advantage of opportunities to use Florida's marine resources requires accurate assessments, continuous monitoring, and real-time ability to predict and interpret changes to the physical, chemical, biological, geological, and socioeconomic components of our marine ecosystems. It also requires a fully integrated system to allow resource managers and other interested parties to share data and information in making their decisions. Virtually all of the research priorities outlined in this plan can contribute needed data and research analyses to help evaluate the positive and negative impacts on Florida's marine resources that might occur through offshore oil and gas exploration and production, seafood harvesting, transportation, and recreation.

The Oceans and Coastal Resources Act, §161.70, et seq., Florida Statutes, created the Florida Oceans and Coastal Council (Council) in 2005. The Secretary of the Department of Environmental Protection, the Executive Director of the Fish and Wildlife Conservation Commission, and the Commissioner of the Department of Agriculture and Consumer Services each appoint specialized scientists and experts who serve as voting members of the Council. Designees of the agency heads serve as *ex-officio* members, with the Department of Environmental Protection and the Fish and Wildlife Conservation Commission acting as co-chairs.

The Council is charged with coordinating coastal and marine research, identifying research gaps, creating an annual Science Research Plan, and recommending new strategies that enhance management and conservation of our coastal and marine resources.

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<sup>1</sup> Florida Oceans Alliance, 2013. Oceans and Coasts Economic and Cluster Analysis. 56pp.

<sup>2</sup> National Ocean Economics Program, 2008. Florida's Ocean and Coastal Economies Report. Phase II. 205pp.

# Understanding Florida's Oceans and Coasts

Florida's Constitution states that it "shall be the policy of the state to conserve and protect its natural resources..."<sup>3</sup> Success mandates that we use creative public and private partnerships, pursue opportunities to leverage funds, use our universities and research laboratories, and coordinate our efforts with local, state, and federal agencies. A complete discussion of the Council's overall research priorities is contained in the Science Research Overview that is available at: [www.FloridaOceansCouncil.org](http://www.FloridaOceansCouncil.org).

This Science Research Plan is based upon prioritized resource management needs collected from state and local government agencies with coastal and oceans resource management responsibilities and augmented by input from nongovernmental organizations regarding their view of the state's resource management needs. The Council compared these management needs with available research and monitoring to identify where funding was needed. Two common themes emerged throughout the lists of priorities: 1) understand and predict environmental change on an ecosystem level, and 2) develop science-based solutions to environmental challenges.

The Council recommends the following areas of research emphasis in FY 2014–15:

## Water Quality

Water quality is of critical importance to Florida—it determines what biological communities can live in a water body, whether the water is harmful to humans, and whether the water is suitable for other designated uses. With an economy driven by our aquatic environments, maintaining water quality to support coral or oyster reefs, seagrass beds, fishing, and beach activities must be a high priority.

### *Research Priorities:*

1. **Research and monitoring:** Examine the effects of excess nutrients and other aspects of impaired water quality on living coastal resources and relate them to causes and sources, and to human activities. The intent is to support cost-effective resource management programs to improve oceans and human health.
2. **Statewide coastal observing:** Create real-time biotic and abiotic measurements to guide water quality management, marine resource management, and navigation and hazard response.
3. **Harmful algal bloom research:** Better predict the occurrences of harmful algal blooms to protect tourism and commercial and recreational fisheries, and inform watershed management for ocean health.
4. **Dynamic modeling:** Develop hydrodynamic, water quality, and coastal/ocean ecosystem models to support a better understanding of cause-and-effect between uplands activities, coastal freshwater discharges, and estuarine and marine biological communities.

## Ocean and Coastal Ecosystems

Florida's ocean and coastal ecosystems are critical to maintaining the recreational and commercial economic activity they support. It is critical to maintain these ecosystems as sustainable natural

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<sup>3</sup> Florida Constitution, Article II, Section 7.

systems. These resources are shaped by geology, water movement, and the plants and animals themselves interacting on a variety of scales: kilometers to millimeters. Comprehensive understanding of these ecosystems through reliable baseline information is critical to supporting wise management decisions.

#### ***Research Priorities:***

1. **Mapping:** Characterize the sea floor and coast, including the distribution and abundance patterns of coastal marine organisms and other resources. Emphasis is on the gaps in mapping identified by the state resource management agencies at the Florida Mapping Workshop.<sup>4</sup> Data will help inform decisions regarding the designation of important marine boundaries and spatial authorities (i.e., development of marine cadastres).
2. **Hydrological linkages:** Improve the understanding of coastal and ocean hydrology, including the linkages between freshwater input and coastal waters. Emphasis should be on water budgets, hydrologic modeling, and factors affecting and controlling freshwater input to coastal and nearshore waters.
3. **Research and modeling:** Understand and describe linkages between ocean and coastal habitats and the living marine resources they support. One area of emphasis is the effects of marine protected areas on surrounding populations. Fisheries and their linkages to habitats are an important part of these studies.
4. **Ocean and coastal economics:** Increase our understanding of the values of nonmarket resources and issues such as the socioeconomic impacts of natural and human induced events.

#### **Ocean Management**

Ecosystem-based management is an integrated and adaptive approach that considers the entire ecosystem—the organisms, their interactions, and the chemical, physical, and human social environment that surrounds and sustains them. The goal is to maintain healthy, productive and resilient ocean ecosystems that can sustainably provide the services human beings want and need today and in the future.

Coastal and marine spatial planning and ecosystem-based management have made considerable progress since mapping and state-wide resources assessment were priorities in the Council's first Annual Science Research Plan (2006-07). Under the Geospatial Assessment of Marine Ecosystems (GAME) program, existing spatial data and information have been assessed and assembled in geographic information system format, including key resources, benthic habitats, biological diversity, physical and chemical parameters, bathymetry, and sediments. Human uses have also been mapped, including shipping lanes, pipelines and cables, minerals leases, protected areas, fishing zones, and aquaculture sites to name a few. The sources of this information include publications, databases and local knowledge.<sup>5</sup> The Council has leveraged the spatial information compiled by the GAME

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<sup>4</sup> Robbins, L., Wolfe, S., and Raabe, E., 2008, Mapping of Florida's Coastal and Marine Resources: Setting Priority Workshop, U.S. Geological Survey Open-File Report 2008-1157, 36p. PDF available at: <http://pubs.usgs.gov/of/2008/1157/ofr2008-1157a.pdf> and priority list also available at: <http://www.dep.state.fl.us/MarineMapping/priorities.htm>.

<sup>5</sup> Carollo, C., D.J. Reed, J.C. Ogden and D. Palandro. 2009. The importance of data discovery and management in advancing ecosystem-based management. *Marine Policy* 33: 651-653.

program to create an online prototype system for Ocean Managers. This tool, is an interactive mapping application currently being served on the Council website.

The March 2010 report of the Century Commission, assessing the risks of prospective oil and gas development in Florida waters, suggested that marine spatial planning is a potential mechanism for resolving conflicts between oil and gas development and competing uses of the marine environment.<sup>6</sup> Subsequently, the Legislature appropriated \$250,000 to continue the development of a web-based assessment of marine resources and human activities as a background to coastal and marine spatial planning. In the 2010 recommendations of the federal Interagency Ocean Policy Task Force, coastal and marine spatial planning is at the core of the development of a national ocean policy.<sup>7</sup> Finally, the Florida Ocean Alliance has issued a 2009 report on specific recommendations for ocean management<sup>8</sup> and a 2010 strategy for the implementation of coastal and marine spatial planning in Florida.<sup>9</sup>

***Research Priorities:***

1. **Coastal and marine resources assessment and mapping:** Geographic information systems overlay existing maps showing areas where information is abundant and areas where there are significant information gaps. Data and information gathering must continue and the maps must be updated. Ultimately, these maps must allow assessments of changes and provide parameters for models to help predict the future under different scenarios of management and environmental change.
2. **Coastal and marine spatial planning:** Resource assessment maps are the basis for the development of an ocean management plan, which will ultimately require cooperation between the state and federal governments in authorizing legislation and funding. While sectoral planning has been used in the ocean for many years, comprehensive planning is unprecedented. Several features are important to note. Planning in the ocean is flexible because private ownership is not a factor. Plans may be created for specified uses and periods and allowed to lapse or turn over to other uses. Finally, planning is an adaptive process as performance must be monitored and evaluated against the goals that are established at the outset.
3. **Public outreach:** The importance of geographic information system layered maps in visually representing complex use problems, engaging the stakeholders, and directing solutions cannot be over-emphasized. Public outreach in the use of the geographic information system maps must be expanded through website development, public meetings, and demonstrations at public forums. Public meetings are critical to filling information gaps and building a constituency for more comprehensive ocean governance.

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<sup>6</sup> Century Commission for a Sustainable Florida. February 2010. Potential Impacts of Oil and Gas Exploration in the Gulf.

<sup>7</sup> The White House Council on Environmental Quality. July 19, 2010. Final Recommendations of the Interagency Ocean Policy Task Force.

<sup>8</sup> The Florida Ocean Alliance. June 2009. Moving Ahead: The Next Step in Ocean Management for Florida.

<sup>9</sup> The Florida Ocean Alliance. June 2010. Florida's Journey Towards Marine Spatial Planning.

## Planning for Environmental Variability

The Council's 2009 & 2010 reports, "Effects of Climate Change on Florida's Ocean and Coastal Resources" and the updated "Climate Change and Sea-Level Rise in Florida", inform the Annual Science Research Plan by identifying knowledge gaps at broad and specific levels.

### Research Priorities:

1. **Scaling data and models:** Apply global, hemispheric, and continental data and models to Florida and its adjoining oceanic environments, for example, by modeling sea-level rise based on Intergovernmental Panel on Climate Change scenarios. Emphasis is on collaborative, statewide efforts with peer review.
2. **Establishing baselines:** Define existing conditions, status and trends for the major categories of effects identified in the 2009 Council report, for example, by monitoring and mapping effects on coral reef communities.
3. **Understanding processes:** Define cause-and-effect relationships between climate drivers or effects and the explicit responses of coastal and ocean ecosystems, for example, by developing and testing models that assess the impact on fisheries productivity from climate-driven changes to Florida's estuarine habitats.
4. **Quantifying risks:** Predict changes in the sustainability of natural resources and their values or beneficial uses for humans, using robust and understandable methods, for example, by adopting standard statewide projections for beach endangerment.

## Tools and Technology

Fulfilling Florida's need to observe and predict environmental change and the ecosystem responses of its coastal waters provides abundant opportunity for the development and implementation of cost-effective tools and technologies to understand, monitor, and improve the health of Florida's resources.

### Research Priorities:

1. **Coastal and ocean observing systems:** Implement a mix of in-water platforms and buoys, shipboard surveys, remote sensing, and computer models for the continuous monitoring of climate change impacts, water quality, and status of marine resources. The goal is to create a sustained interdisciplinary observing system that spans all of Florida's waters from the outer shelf to coastal estuaries and rivers. Emphasis is on extending and integrating capabilities, and filling gaps in existing coastal observations by implementing the Florida Coastal Ocean Observing System Strategic Implementation Plan.
2. **Remote and real-time sensors:** Provide improved abilities to determine the status and trends of our coastal waters and their inhabitants through sensor development for biological and chemical monitoring, as well as fish and wildlife tagging and tracking.
3. **Data management and prediction:** Improve the coordinated collection, handling, quality control, sharing, and interpretation of research and monitoring data. Centralized coordination



of model development to provide predictions and user-friendly web-based posting of information and model predictions are needed to inform and support science-based decisions by management agencies and the general public.

4. **Assessment tools:** Develop the means and methods to assess biological community status and trends, rapid assessments of natural resources, and the evaluation of management efforts.
5. **Reduce costs:** Develop innovative tools and integrate data to decrease the costs of mapping and monitoring the state's coasts and oceans.

# Agency Priorities

The Council stresses that this Science Research Plan is not intended to replace ongoing state-funded research efforts and partnerships. These research recommendations are based on identified research gaps to supplement research already under way and advance agency missions. Existing agency priorities are summarized below:

## **Florida Department of Environmental Protection**

The Florida Department of Environmental Protection (DEP), the lead agency for environmental management and stewardship, is one of the more diverse agencies in state government - protecting our air, water and land. DEP is divided into three primary areas: Regulatory Programs, Land and Recreation, and Water Policy and Ecosystem Restoration. Florida's environmental priorities include consistent and effective regulatory processes, ensuring quality and quantity of the state's water resources, and increasing access to Florida's award-winning state parks.

## **Florida Fish and Wildlife Conservation Commission**

The Florida Fish and Wildlife Conservation Commission (FWC), an agency created through a constitutional amendment in 1999, is charged with conserving the state's fish and wildlife resources and their habitats. FWC and its partners work together to protect and manage more than 575 species of wildlife, 200 species of freshwater fish and 500 species of saltwater fish. The FWC works to balance the needs of these fish and wildlife species and the habitats that support them with the needs of the more than 18 million residents and millions of visitors to Florida each year. Ocean-dependent industries such as commercial and recreational fishing, boating and aquaculture contribute over \$27 billion to the state's economy each year and support over 370,000 jobs.

## **Florida Department of Agriculture and Consumer Services, Division of Aquaculture**

Florida has the greatest number and type of aquatic animals and plants in production and the use of the most diverse production systems of any state in the country. The Division of Aquaculture was created in 1999 by the Florida Legislature with the express responsibilities of enhancing the growth of aquaculture in Florida while protecting Florida's unique and varied habitats and species. These responsibilities are described in Chapter 597, Florida Aquaculture Policy Act, Florida Statutes, and are implemented through six programs: issuance of an annual aquaculture production facility certification for compliance with environmental best management practices, leasing of sovereignty submerged land for aquacultural purposes, development of cultured shellfish (oyster, clam, and mussel) production, food safety inspection and certification of shellfish processing plants, classification and monitoring of shellfish harvesting areas to insure the production of safe and wholesome live food products, and technical support (science and regulation) to farmers and shellfish harvesters and processors. For an in-depth description of Florida aquaculture and agency priorities, please see the *Florida Aquaculture Plan* which can be found on the web at this address:

<http://www.freshfromflorida.com/content/download/30747/761449/FLAquaPlan.pdf>

# Opportunities for Funding for FY 2014–2015

The Council was created by the Legislature to:

- 1) “assist the state in identifying new management strategies to achieve the goal of maximizing the protection and conservation of ocean and coastal resources while recognizing their economic benefits” and
- 2) “encourage and support the development of creative public-private partnerships, pursue opportunities to leverage funds, and work in coordination with federal agencies and programs to maximize opportunities for the state’s receipt of federal funds.”

The current economic situation requires the Council to emphasize their commitment to leverage funds and maximize opportunities for federal and non-state funding to support the Council’s recommendations. Outlined below are opportunities to fulfill this plan’s priorities with non-state funds.

## **Deepwater Horizon Oil Spill**

The Deepwater Horizon Oil spill in the Gulf of Mexico has focused attention on research and monitoring needs in the Gulf of Mexico, from the standpoint of assessing injury to natural resources and socioeconomic well being of the Gulf region. Under the federal Oil Pollution Act (OPA), the responsible parties are legally obligated to fund much of the assessment work associated with the spill. In addition, BP has committed to provide up to \$500 million in research funding for the Gulf of Mexico Research Initiative (GRI) to study the impact of the incident, and its associated response on the environment and public health in the Gulf of Mexico. While this effort is funded exclusively with private funds, several of the major research recommendations made by the Council are relevant to the GRI. The Council intends to communicate this plan’s relevant ocean and coastal research priorities to the GRI leadership.

The President created the Gulf Coast Ecosystem Restoration Task Force to coordinate the recovery of the region’s ecosystem, based on recommendations from the group led by Secretary of the Navy Ray Mabus. Their recommendations include utilizing a substantial portion of the Clean Water Act Civil Penalties from the Deepwater Horizon Oil Spill to facilitate environmental restoration and economic recovery, and attend to health issues arising from the spill. As a result of these recommendations, Congress passed the RESTORE (Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies) Act in July 2012. The RESTORE Act establishes a Gulf Coast Trust Fund which will receive 80% of all Clean Water Act administrative and civil penalties paid by responsible parties. These funds are in addition to any funds required under the Oil Pollution Act (OPA) of 1990 for Natural Resource Damage Assessment (NRDA) and associated restoration activities necessary due to the spill. The RESTORE funds will be used to address ecologic and economic recovery needs that may fall outside the scope of the OPA. It is estimated that these penalties could range from \$5 to \$20 billion. A portion of these funds will be managed by the Gulf Coast Ecosystem Restoration Council (Restoration Council) and will be used to implement a Comprehensive Plan for restoring the Gulf. The Restoration Council’s Comprehensive Plan could be a potential source of funds for research and monitoring of impacts from the spill, beyond that required by NRDA activities. This

Council will be involved in providing information on Florida's needs and priorities as this process moves forward and maybe able to help leverage funds from other sources.

In early 2013, a U.S. District Court approved two plea agreements resolving the criminal cases against BP and Transocean which arose from the 2010 Deepwater Horizon oil spill. The agreements direct a total of \$2.544 billion to the National Fish and Wildlife Foundation (NFWF) to fund projects benefitting the natural resources of the Gulf Coast that were impacted by the spill. NFWF will carry out the plea agreements through its newly established Gulf Environmental Benefit Fund (Gulf Fund). Over the next five years, the Fund will receive \$356 million each for natural resource projects in Alabama, Florida, and Mississippi. The purpose of the Gulf Fund as set forth in the pleas is to "remedy harm and eliminate or reduce the risk of future harm to Gulf Coast natural resources." Funds may only be used to support projects that remedy harm to natural resources (habitats, species) where there has been injury to, or destruction of, loss of, or loss of use of those resources resulting from the oil spill. The Council will provide relevant information as it relates to Florida's needs and priorities as project selection moves forward.

### **National Ocean Task Force**

The President established the Interagency Ocean Policy Task Force on June 12, 2009 to provide recommendations for maintaining healthy, resilient, and sustainable ocean, coasts, and Great Lakes resources. The resulting recommendations were adopted including the establishment of the National Ocean Council through which the remaining recommendations will be guided and implemented. Nine national priority objectives were identified which include: ecosystem-based management; coastal and marine spatial planning; inform decisions and improve understanding; coordinate and support; resiliency and adaptation to climate change and ocean acidification; regional ecosystem protection and restoration; water quality and sustainable practices on land; changing conditions in the arctic; and ocean, coastal, and Great Lakes observations, mapping and infrastructure. These priorities overlap with this plan's established priorities for the state and are ready for communication with the National Ocean Council.

The Task Force also recommended the establishment of nine regional planning areas including the South Atlantic and the Gulf of Mexico for the development of a coastal and marine spatial plan. Florida already participates in an Alliance covering each of these two regions: The Gulf of Mexico Alliance (GOMA) and the South Atlantic Alliance (SAA). As a result of this Task Force recommendation, the National Ocean and Atmospheric Administration announced a federal funding opportunity for the regional planning areas which specifically referenced both GOMA and SAA.

# The Council's Research Accomplishments

- The Council developed a Coastal and Marine Resource Assessment GIS prototype which displays existing spatial data and information including key resources and human uses. This prototype tool is currently served on the Council's website ([http://www.floridaoceanscouncil.org/reports/geospatial\\_tool.htm](http://www.floridaoceanscouncil.org/reports/geospatial_tool.htm)).
- The Council issued a report for the new Energy and Climate Commission entitled *The Effects of Climate Change on Florida's Oceanic and Coastal Resources*
  - The Council revised the Sea-Level Rise section to incorporate the latest findings in this emerging field.
- The Council sponsored the National Ocean Economics Program at Monterey Bay Aquarium Research Institute to complete Phase II: *Florida Ocean and Coastal Economies Report*:
  - Made presentations to the Governor and Cabinet and the Coastal Cities Summit on the economic impact of Florida's ocean and coastal economy; and
  - Hosted the Florida Coastal and Ocean Economics Forum to present the work to the public and Florida's marine industries.
- Multiple Coastal Ocean Observing System projects were completed through a contract with the Florida Coastal Ocean Observing System Consortium involving about 200 scientists, staff, and students, leveraging \$2.5 million in nonstate funding. These projects include the following:
  - Production of the Florida Coastal Ocean Observing System Strategic Implementation Plan. (Florida Coastal Ocean Observing System Consortium, with input from other interested parties)
  - Addition of a nitrate chemical sensor which aids in understanding nutrient fluctuations and water quality at a location off northwest Florida that already makes physical and meteorological observations, to continue the development of an interdisciplinary ocean observing system. (Florida State University)
  - Installation of two high-frequency radars along the coast of southeast Florida to expand the existing array northwards and obtain high-resolution surface current and wave data that are used in search and rescue and for safe maritime operations. (University of Miami)
  - Deployment of three sub-surface physical oceanographic moorings and one sub-surface biological observing system on the Central East Florida Shelf to begin observations in a data-sparse region, including the *Oculina* Bank, a Habitat Area of Particular Concern. (Florida Institute of Technology, Harbor Branch Oceanographic Institute at Florida Atlantic University, Nova Southeastern University)
  - Deployment of one physical oceanographic and meteorological surface mooring off northeast Florida to begin observations in a data-sparse region in the protected north Atlantic right whale breeding area. (University of North Florida, with assistance from the University of South Florida)
  - Production of high-resolution, Florida-specific satellite data images and movies of sea-surface temperature and ocean color to show fronts, eddies, and biological productivity; these are used for snapper, grouper, king mackerel, and sardine fisheries. (Roffer's Ocean Fishing Forecasting Service, Inc. [ROFFS™])
  - Development of a Florida-wide ocean-atmosphere model by incorporating influences such as the Loop Current and the Gulf Stream System to provide boundary conditions for high-resolution, smaller-domain (e.g., estuarine) models, to move towards three-dimensional forecasting capabilities. (Florida State University)

- Development of a high-resolution estuarine and shelf model for the northeast Florida region, using boundary conditions provided by the Florida-wide model, which will provide initial steps for modeling water quality from the St. Johns River to Ponce de Leon Inlet. (University of Florida)
- Conducting Florida Coastal Ocean Observing System Consortium planning workshops and an Ocean Tracking Network workshop that discussed a worldwide network of transmitters to track the movement of marine life such as sharks, tunas, billfishes, and sea turtles. (Florida Coastal Ocean Observing System Consortium, Mote Marine Laboratory, Florida Institute of Oceanography)
- Data management to provide access to ongoing observations, models, and products. (Florida Coastal Ocean Observing System Consortium)
- Outreach activities, including the development of a DVD. (Florida Coastal Ocean Observing System Consortium)
- Work continued on the Resource Assessment for Florida, which provides internet-based information about the location and status of Florida's natural and human resources.
- Work continued on the Research Review for Florida, which provides internet-based information on existing ocean and coastal research in Florida. This helps identify research gaps and prevent duplication of effort.
- The Council co-sponsored three conferences/workshops:
  - 11<sup>th</sup> Annual International Coral Reef Symposium;
  - Coastal Cities Summit; and
  - Florida Fish and Wildlife Conservation Commission's Florida's Wildlife: On the Frontline of Climate Change
- The Council's support of the Florida Water Resources Monitoring Council enabled the Monitoring Council to draft a Florida Coastal Monitoring Action Plan.
- The Council co-sponsored the Gulf of Mexico Alliance's Monitoring Forum, which focused on data comparability and coastal nutrient criteria.
- The Council solicited and incorporated input from 17 Florida resource-management agencies and entities. This information was used to perform a broad-based assessment of resource management needs and to prioritize the research needed to address those needs.
- The Council's Annual Science Research Plan has been used by state agencies to guide their actions in the areas of research and resource assessment.
- Priorities identified by the Council are being used to shape the newly formed regional collaborations of the Gulf of Mexico Alliance and South Atlantic Alliance.

## Council Reports

*Climate Change and Sea-Level Rise in Florida, 2010*

*The Effects of Climate Change on Florida's Ocean and Coastal Resources, A Special Report to the Florida Energy and Climate Commission, 2009*

*Phase II: Florida Ocean and Coastal Economies Report, 2008*

*Florida Coastal Ocean Observing System Strategic Implementation Plan, 2008*

*Integrated Data Management Functional Requirements and Metadata Elements, 2008*

*Resource Assessment User and Functional Requirements, 2008*

Research Review, internet-based information on existing ocean and coastal research in Florida (available:

<http://ocean.floridamarine.org/focc/overview.cfm>), 2007–2008

*Current Status and Opportunities for Marine Stock Enhancement and Aquaculture in Florida, 2007*

- A Research Review to provide internet-based information on existing ocean and coastal research in Florida has been initiated. This will help identify research gaps and prevent duplication of effort.
- The Council completed a white paper on aquaculture that explores opportunities and hindrances for expanding aquaculture's role in Florida.
- The Council partnered with the Florida Water Resources Monitoring Council to support establishing metadata standards to improve the use of existing Florida data.
- Council actions stimulated the creation of an organized ocean-observing effort for Florida that includes public/private partnerships.
- The Geospatial Assessment of Marine Ecosystems (GAME) Project is gathering existing biological and physical information in a web-based geographic information system (GIS) format. The goals are to identify critical information gaps and to define and map Florida's marine ecosystems.
- The Council's emphasis on mapping prompted a joint state-federal interagency workshop to assess existing information and identify and prioritize mapping needs for Florida. Results from the workshop have already influenced projects funded through other sources. For example, a website was established with information to help with the coordination of mapping within the state (<http://www.dep.state.fl.us/MarineMapping>). The information was integrated into the U.S. Geological Survey's Florida Shelf Habitat Mapping Project, the Response of Florida Shelf Ecosystems to Climate Change.
- Priorities identified by the Council influenced the National Ocean Research Priorities Plan.