Federal Ocean and Coastal Activities Report to the U.S. Congress

December 2005

Report Prepared by the Interagency Committee on Ocean Science and Resource Management Integration

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I. Introduction

The Oceans Act of 2000, which established the U.S. Commission on Ocean Policy, requires that a report of federal ocean and coastal activities be submitted to Congress every two years. It states that "Beginning in September 2001, the President shall transmit to the Congress biennially a report that includes a detailed listing of all existing federal programs related to ocean and coastal activities, including a description of each program, the current funding for the program, linkages to other federal programs, and a projection of the funding level for the program for each of the next 5 fiscal years beginning after the report is submitted." Pub. L. No. 106-256, section 5.

The 2005 Federal Ocean and Coastal Activities Report organizes this information around the theme areas identified in the U.S. Ocean Action Plan, which was submitted by the President to Congress on December 17, 2004, as the Administration's formal response to the recommendations of the U.S. Commission on Ocean Policy. The U.S. Ocean Action Plan outlines the fundamental components, both in response to the Commission's report as well as recent action, which provide the foundation to advance the next generation of ocean, coastal, and Great Lakes policy.

Highlights of Accomplishments
The U.S. Ocean Action Plan, in addition to establishing a framework to enhance leadership and coordination of federal ocean-related activities, identifies five areas of importance:

- Enhancing the Use and Conservation of Ocean, Coastal, and Great Lakes Resources;
- Managing Coasts and their Watersheds;
- Advancing Our Understanding of Oceans, Coasts, and Great Lakes;
- Supporting Maritime Transportation; and
- Advancing International Ocean Science and Policy.

The Federal Ocean and Coastal Activities Report, originally required by the Oceans Act to serve as an inventory of all federal ocean, coastal, and Great Lakes programs, provides an opportunity to highlight key federal activities, collaborative efforts, and progress made in these theme areas.

Member agencies of the Interagency Committee on Ocean Science and Resource Management Integration worked together to identify and provide information on recent accomplishments under each theme. The highlights of accomplishments, which are intended to be representative, not comprehensive, constitute the main body of this report.

Agency Summaries and Budget Data
To provide the inventory information on federal ocean-related programs and budgetary resources as required by the Oceans Act, the Office of Management and Budget gathered data from all agencies involved in ocean issues. Each agency provided a brief description of agency/subagency ocean programs as well as budget data for those programs including the actual budget for Fiscal Year (FY) 2004, the enacted budget for FY 2005, the President's budget request for FY 2006, and budget projections for the next 4 fiscal years. Presidential budget requests for these programs are evaluated annually; as such, the budget projections herein for 2007 and beyond are subject to reassessment and change, and should not be construed as equivalent to budget requests. These agency summaries and budget data are provided in the appendix to this report.

II. Executive Summary

The FY 2006 President's Budget provides over $9 billion in funding for federal ocean, coastal, and Great Lakes programs (see Table 1). These programs support activities across the themes outlined in the U.S. Ocean Action Plan of:

- Enhancing the Use, Conservation, and Management of Ocean, Coastal, and Great Lakes Resources;[1]
- Advancing Our Understanding of Oceans, Coasts, and Great Lakes;
- Supporting Maritime Transportation; and
- Advancing International Ocean Science and Policy.

There are many examples within each of these areas of programs accomplishing tangible results. This report includes a sampling of such programs intended to illustrate the diverse set of approaches being used to address ocean issues.

Enhancing the Use, Conservation, and Management of Ocean, Coastal, and Great Lakes Resources

Over $4.7 billion was proposed in the FY 2006 President's Budget to support federal programs that contribute to the responsible use and management of ocean, coastal, and Great Lakes resources.

The U.S. Coral Reef Task Force, a multiagency effort, has resulted in the mapping of over 6,338 km^2 of coral reefs, contributed to the removal of approximately 440 metric tons of derelict fishing gear and other marine debris from the reefs in the Northwestern Hawaiian Islands, and established 37 new protected areas to help ensure the long-term viability, ecological integrity and sustainable use of coral reefs.

Through cooperative conservation, the Administration is fostering broad responsibility for caring for the Nation's natural resources. Working through partnerships that emphasize local participation, federal agencies restore habitat, remove exotic species, replant native grasses, improve miles of stream habitat, and conserve limited water resources.

The use of dedicated access privileges (DAP) to manage marine fisheries illustrates how market-based approaches can promote conservation and industry objectives simultaneously. The DAPs currently employed in eight marine fisheries managed by the National Oceanic and Atmospheric Administration (NOAA) have lengthened fishing seasons, leading to greater conservation benefits, greater availability of high-quality fresh fish, and increased safety for fishermen.

Research efforts on harmful algal blooms and hypoxia have led to the development of forecast models that allow coastal managers to predict and respond to water quality events, as well as the development of new technologies to improve monitoring and prediction capabilities.

Advancing Our Understanding of Oceans, Coasts, and Great Lakes

The FY 2006 President's Budget provides over $1.3 billion for research and education efforts to increase our knowledge of the marine environment and enhance awareness of the importance of the ocean in our daily lives.

In addition to basic research on the dynamics of ocean systems, these programs support a number of research efforts. These efforts have resulted in or are leading to direct applications that provide information to guide decision makers from the local to the national level. Multi-agency efforts include improved forecast capabilities for fish abundance through research on the impacts of climate and ocean variability on commercial fish stocks, and the development of remote sensing technologies to detect the conditions that precipitate harmful algal blooms.

Federal ocean agencies are also collaborating to establish an Integrated Ocean Observing System (IOOS) to provide a comprehensive and systematic network of ocean observations that produces data and products to serve societal needs. Components of this system already exist, including the Physical Oceanographic Real Time System (PORTS), which provides information about water level and other port conditions and

[1] For the purposes of this report the U.S. Ocean Action Plan themes of "enhancing the use and conservation of our ocean, coastal, and Great Lake resources" and "managing coasts and their watersheds" have been combined into the single category of "enhancing the use, conservation and management of ocean, coastal, and Great Lake resources."

has helped reduce the number of ship groundings in some places by 60 percent. Regional groups that will participate in the IOOS, such as the Gulf of Maine Ocean Observing System (GoMOOS), are already providing real-time ocean data such as wave forecasts and ocean circulation images used by fishermen, marine pilots, the Coast Guard, and recreational boaters.

The Environmental Protection Agency (EPA), NOAA, the U.S. Geological Survey (USGS), the U.S. Fish and Wildlife Service (FWS) have collaborated to assess the condition of coastal waters of the United States and produce the National Coastal Condition Report. This national assessment provides managers with information they need to target water quality actions, and to effectively manage those actions to maximize benefits.

Several federal ocean agencies, including the Minerals Management Service (MMS), NOAA, the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), and the U.S. Navy, support ocean exploration-related activities, including collaborative efforts through the National Ocean Exploration Program. Created in 2001, this program has successfully completed a number of exploration expeditions to map and characterize unique deep sea habitats, discover new sea mounts, investigate deep sea coral dynamics, and develop new sensors and tools for furthering ocean exploration.

A number of federal agencies conduct a variety of formal and informal ocean education programs to increase ocean literacy at all levels. Specifically, programs supported by NSF and NOAA include K – 12-focused efforts aimed at increasing the general awareness of and interest in ocean issues, as well as programs to improve safety through public awareness of dangerous ocean conditions such as rip currents.

Supporting Maritime Transportation
Federal agencies support maritime transportation with programs totaling over $2.7 billion in the FY 2006 President's Budget.

These programs include the National Dredging Team, which coordinates federal efforts to ensure appropriate re-use and disposal of dredged material and the U.S. Coast Guard's ice-breaking services to maintain waterways in ice bound regions. In addition, NOAA provides mariners with information through hydrographic surveys and nautical charts, and the newly created cabinet-level Committee on the Marine Transportation System is working to improve federal coordination and integration.

Advancing International Ocean Science and Policy
Federal agencies have identified over $135 million of the FY 2006 President's Budget that directly support international ocean science and policy.

One example of a federal effort that serves U.S. needs and priorities while influencing ocean science and policy internationally is the U.S. tsunami warning system. This effort works to improve U.S. capacity to detect and respond to potential tsunamis while also informing and aiding the international effort to establish a similar warning system in the Indian Ocean.

Areas of Emerging or Renewed Interest
In addition to the programs mentioned above, the U.S. Ocean Action Plan calls attention to a number of areas for new or renewed emphasis. Two examples of such areas are the intersection of the oceans and human health issues and Great Lakes restoration and protection.

The National Institute of Environmental Health Sciences (NIEHS), NSF, and NOAA are collaborating to bring together the ocean sciences and biomedical communities to address issues of oceans and human health. Emerging research efforts are providing information that will lead to new tools and strategies for protecting human health and the marine environment from the impacts of toxic algae, chemical contaminants, and other threats. Research is also underway to examine the application of marine-based chemical compounds to the treatment of human illness, including cancer.

In May 2004 the President signed the Great Lakes Executive Order (E.O. 13340) to accelerate the restoration and protection of resources in this region. The Great Lakes Task Force and the Great Lakes Regional Collaboration have already begun to develop a restoration and protection strategy, and have been successful in coordinating and focusing federal resources on high-priority issues requiring collaborative action.

Table 1: Estimated Federal Funding for Oceans and Coastal Activities
(Dollars in Millions)*

Agency	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request	FY 2007 Budget Projection**	FY 2008 Budget Projection**	FY 2009 Budget Projection**	FY 2010 Budget Projection**
Dept. of Agriculture	634	669	643	643	590	544	544
Dept. of Commerce	1,871	2,101	1,682	1,643	1,654	1,649	1,622
Dept. of Defense	1,508	1,528	1,423	1,253	1,249	1,232	1,248
Dept. of Energy	24	16	12	12	12	12	12
Environmental Protection Agency	1,105	963	782	782	782	782	782
Dept. of Health and Human Services	7	7	7	7	7	7	7
Dept. of Homeland Security	2,086	2,771	2,962	3,048	3,185	3,361	3,496
Dept. of the Interior	732	752	766	765	769	771	769
Marine Mammal Commission	2	2	2	2	2	2	2
National Aeronautics and Space Administration	91	104	136	133	75	54	45
National Science Foundation	358	340	344	344	344	344	344
Smithsonian Institution	1	1	1	1	1	1	1
Dept. of State and USAID	96	93	96	92	78	76	70
Dept. of Transportation	893	837	492	373	373	374	374
Dept. of the Treasury	16	16	16	16	16	16	16
Total	**$9,423**	**$10,199**	**$9,364**	**$9,112**	**$9,138**	**$9,224**	**$9,332**

* Numbers may not add due to rounding.
** Unless specified by the agencies. Estimates for FY 2007 to FY 2010 were assumed equal to the President's 2006 Budget Request. Presidential budget requests for these programs are evaluated annually; as such, the budget projections herein for FY 2007 and beyond are subject to reassessment and change, and should not be construed as equivalent to budget requests.

Table 2: Estimated FY 2006 President's Budget for Ocean and Coastal Activities by Theme
(Dollars in Millions)

Agency	Enhancing the use, conservation, and management of ocean, coastal, and Great Lakes resources	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified
Dept. of Agriculture	641				2
Dept. of Commerce	895	182	516	9	81
Dept. of Defense	170	851	127		275
Dept. of Energy			11	1	
Environmental Protection Agency	697		67	15	3
Dept. of Health and Human Services			7		
Dept. of Homeland Security	1,598	1,268	55	42	
Dept. of the Interior	688		71	6	
Marine Mammal Commission	1		1		
National Aeronautics and Space Administration			136		
National Science Foundation	1		343		
Smithsonian Institution			1		
Dept. of State and USAID	33		8	47	7
Dept. of Transportation	22	470			
Dept. of the Treasury				16	
Total	**$4,747**	**$2,772**	**$1,343**	**$135**	**$367**

III. Enhancing the Use Conservation and Management of Ocean, Coastal, and Great Lake Resources

The FY 2006 President's Budget provides over $4.7 billion for programs that address use, conservation, and management of ocean and coastal resources. The agencies that participate in these programs are the Departments of Agriculture, Commerce (NOAA), Defense, Homeland Security, the Interior, State, Transportation, and the Environmental Protection Agency, and the U.S. Agency of International Development.

These programs cover a wide variety of activities and responsibilities of the federal agencies. Some are carried out primarily by a single lead agency; others are collaborative efforts between several agencies. What follows provides four examples of federal programs that are working to produce results and accomplishments in this area.

- The U.S. Coral Reef Task Force
- Cooperative Conservation
- Managing Marine Fisheries through Dedicated Access Privileges
- Harmful Algal Blooms and Hypoxia

U.S. Coral Reef Task Force

Healthy coral reefs are among the most biologically diverse and economically valuable ecosystems on earth, providing food, jobs, recreational opportunities, coastal protection, and other important services. Unfortunately, increasing human impacts, climate change, and other factors have damaged many of the world's coral reefs. According to the *Status of Coral Reefs of the World: 2004* (Australian Institute of Marine Science, 2005), 70 percent of the world's coral reefs are threatened, and 20 percent of those are damaged beyond repair. The decline and loss of coral reefs have significant social, economic, and ecological impacts on people and communities in the United States and around the world.

Mission

In June 1998, Presidential Executive Order 13089 established the U.S. Coral Reef Task Force (Task Force) to lead, coordinate, and strengthen U.S. government actions to preserve and protect coral reef ecosystems. Co-chaired by the Departments of Commerce and the Interior, Task Force members include leaders of 12 federal agencies, seven U.S. states and territories, and three freely associated states (See Box I).

Box I

U.S. CRTF Members

Co-Chairs
U.S. Department of Commerce, NOAA
U.S. Department of the Interior

Members

Federal Agencies
U.S. Agency for International Development
U.S. Department of Agriculture
U.S. Department of Defense
U.S. Department of Homeland Security
U.S. Department of Justice
U.S. Department of State
U.S. Department of Transportation
U.S. Environmental Protection Agency
National Aeronautics and Space Administration
National Science Foundation

States and Territories
Commonwealth of the Northern Mariana Islands (CNMI)
Commonwealth of Puerto Rico
State of Florida
State of Hawaii
Territory of American Samoa
Territory of Guam
Territory of the US Virgin Islands (USVI)

Non-Voting Members
Federated States of Micronesia
Republic of the Marshall Islands
Republic of Palau

Box II

The National Action Plan

Theme 1: Understand Coral Reef Ecosystems
Goal 1: Create comprehensive maps of all U.S. coral reef habitats;
Goal 2: Conduct long-term monitoring and assessments of reef ecosystem conditions;
Goal 3: Support strategic research to address the major threats to reef ecosystems; and
Goal 4: Increase understanding of the social and economic factors of conserving coral reefs.

Theme 2: Reduce the Adverse Impacts of Human Activities
Goal 5: Improve the use of marine protected areas to reduce threats;
Goal 6: Reduce adverse impacts of fishing and other extractive uses;
Goal 7: Reduce impacts of coastal uses;
Goal 8: Reduce pollution;
Goal 9: Restore damaged reefs;
Goal 10: Improve education and outreach;
Goal 11: Reduce international threats to coral reef ecosystems;
Goal 12: Reduce impacts from international trade in coral reef species; and
Goal 13: Improve coordination and accountability.

How We Work

The Task Force has led the development of national and local strategies to conserve coral reefs, increased collaboration among federal agencies and jurisdictions in coral reef regions, and helped its members launch new actions to protect and manage reef ecosystems. In 2000, the Task Force developed the *National Action Plan to Conserve Coral Reefs*, the first comprehensive U.S. strategy to conserve coral reefs. The plan outlines 13 conservation strategies (goals) within two fundamental themes to address the most pressing challenges facing reefs today (See Box II). The Task Force holds biannual public meetings to discuss key issues, propose new actions, and review progress.

Accomplishments
Following are some areas in which the Task Force has helped foster solutions through interagency and multi-jurisdictional efforts:

Mapping and Monitoring of Coral Reef Ecosystems
The Task Force launched new efforts to map all shallow-water coral reefs of the United States and implement a nationally coordinated program to inventory, assess, and monitor U.S. coral reef ecosystems. Significant progress has been made toward both these goals; monitoring and assessment of reef ecosystems has increased throughout the United States and in 2005, shallow-water coral reef habitat maps were completed for Guam, American Samoa, and Commonwealth of the Northern Mariana Islands. To date, 6,338 km^2 of U.S. coral reefs have been mapped.

Local Action Strategies – Linking National Goals to Local Action
In 2002, the Task Force launched development of three-year (FY 2005 – FY 2007) Local Action Strategies (LAS) in each of the seven member U.S. states, territories, and commonwealths. The Task Force prioritized six key threats for action: over-fishing, land-based sources of pollution, recreational overuse and misuse, lack of public awareness, climate change and coral bleaching, and disease. The LAS provides a framework for Task Force member agencies to identify and address these threats and additional local needs, connect local priorities to national goals, and coordinate federal agency actions with local management of reef resources. The Administration's FY 2006 budget request includes $2.7 million to support these LAS projects as part of the U.S. Ocean Action Plan.

Reducing the Amounts, Sources, and Cumulative Impacts of Pollution
Task Force members have taken a number of actions to address pollution issues. For example, the Environmental Protection Agency and the U. S. Department of Agriculture – Natural Resources Conservation Service have been establishing federal/local partnerships to voluntarily implement best management practices within coral reef watershed areas to reduce sediment and nutrient loads from impacting coral reefs. In addition, the National Oceanic and Atmospheric Administration (NOAA), State of Hawaii, Department of the Interior (DOI), U.S. Coast Guard, and many local partners have removed approximately 440 metric tons of derelict fishing gear and other marine debris from the Northwestern Hawaiian Islands.

Research of Coral Reef Ecosystems
Research continues to provide a better understanding of the natural and anthropogenic influences on the dynamics of coral reef ecosystems, and the development of tools and solutions for improved management. For example, the National Science Foundation (NSF) has initiated a LTER (Long-Term Ecological Research) program focused on a coral reef ecosystem in French Polynesia addressing different influences on the performance of reef-building corals in the tropical Pacific. Similarly, the DOI U.S. Geological Survey (USGS) research focuses on ecosystem processes including effects of global dust on reef decline, the resilience of coral reefs to increased water temperatures, and providing data to document reef health. In response to basic research and ecological monitoring needs, the National Aeronautics and Space Administration (NASA) is funding research to improve remote imaging of coral reefs, seagrasses, as well as water column constituents. NASA is also developing a sensor that can be flown on small aircraft, and could be utilized for NOAA's Coral Reef Early Warning System (CREWS) stations. The Coral Disease and Health Consortium (NOAA, USGS, EPA) has been instrumental in determining disease processes and developing emergency response protocols to assess and identify potential disease outbreaks in corals. In partnership with Task Force and other partners,

Photo Courtesy of Guam

In the Guam LAS Land-based Sources of Pollution (LBSP) focus group, the Division of Forestry and Soil Resources, in collaboration with the Fouha Watershed community, is working to replant 2,650 acres of badlands to reduce sedimentation and erosion from entering Guam's coral reefs in Fouha Bay. The LBSP focus group has completed approximately 80 percent of the projects identified in its LAS.

NOAA conducts research on impacts of fishing on reefs, reproduction and habitat use of reef species, connectivity among reef areas, and how people use and value reef ecosystems.

Improving the Use of Coral Reef Protected Areas

The Task Force calls for strengthening and expanding the Nation's network of coral reef marine protected areas (MPA). In 2000–2004, Task Force members worked with communities and others to establish 37 new protected areas in six jurisdictions (See Table III). Specific coral reef protected area management plans and coordinated monitoring programs for these sites help ensure the long-term viability, ecological integrity, and sustainable use of coral reefs.

Table III	
Jurisdiction	**New Protected Areas**
American Samoa	8
CNMI	5
Florida	8
Hawaii	1
Puerto Rico	11
USVI	4
Total	**37**

Reducing Threats to Reefs Internationally

Task Force member agencies have increased efforts and leadership to help reduce the pressures on reef ecosystems internationally. The U.S. Agency for International Development (USAID), U.S. Department of State (DOS), NOAA, and DOI have engaged domestic and international partners to increase the prominence of coral reefs in international fora. DOS continues to provide substantial financial support to the International Coral Reef Initiative (ICRI) and ICRI-related activities. USAID supports projects in over 20 countries that directly promote the protection and improved management of coral reef ecosystems.

Looking to the Future

One of the highest priorities for the Task Force is to continue support for the LAS projects. This requires better use of existing and requested new resources, and substantial partnering with the private sector and nongovernmental organizations. Additionally, continued mapping remains a priority as many LAS activities depend upon accurate and up-to-date coral reef ecosystem maps. Long-term success of LAS frameworks requires focused outreach, education, and management.

Cooperative Conservation

Cooperative conservation fosters broad responsibility for caring for the Nation's natural resources. States, Tribes, community organizations, and individual citizens work together to preserve habitat for wildlife and recreation, while maintaining working landscapes that support dynamic economies across the Nation. These partnerships have achieved significant conservation benefits. Millions of acres of habitat have been restored, exotic invasive species removed, native grasses replanted, thousands of miles of stream habitats have been improved, and limited water resources have been conserved. Cooperative conservation efforts occur across the country, including a number of projects that affect marine and coastal areas, as well as coastal watersheds.

Mission

Showing his commitment to advancing conservation through partnerships, in August 2004, the President issued an executive order directing federal departments to work together to implement laws relating to the environment and natural resources in a way that promotes cooperative conservation, emphasizing local participation.

Program Description and Accomplishments

The Executive Order directed the Departments of the Interior, Agriculture, Commerce and Defense, and the Environmental Protection Agency to work cooperatively with their partners to foster conservation. Below are examples of collaborative efforts that are preserving and restoring marine and coastal areas.

Coastal Program

More than half of the U.S. population lives in coastal counties that continue to grow in population each year. Coastal populations can significantly impact coastal habitats that support fish and wildlife, and it is a challenge to balance coastal conservation with economic development. Since its inception, the U.S. Fish and Wildlife Service's (FWS) Coastal Program has restored over 112,000 acres of coastal wetlands, 26,100 acres of coastal uplands, and 1,118 miles of coastal streamside habitat and has provided communities with technical assistance that helped them identify and protect over 1.3 million acres of coastal habitat.

Watts Branch, Anacostia River, Maryland – Longitudinal profile survey used to characterize stream bed (i.e., pools, riffles, runs, and glides)

Bald eagle and osprey attempt to nest beside well-traveled bridges in the District of Columbia, and Peregrine falcon soar among skyscrapers in many cities. Although pollution and high-density development present especially tough challenges, these birds are proof that urban habitats are worth restoring. The Anacostia River in Washington, D.C., crippled by erosion, urban runoff, pollution, and loss of natural areas, is a good place to start. The Stream Habitat Assessment and Restoration Program (SHARP) program has formed an innovative partnership with the District of Columbia, the National Park Service (NPS), the National Arboretum, and other organizations to restore the Watts Branch, Oxon Run, and Hickey Run tributaries of this once-vital river for the benefit of both wildlife and people. With determination, restoration can succeed in a highly urban setting.

Northwest Straits Marine Conservation Initiative

The Northwest Straits Marine Conservation Initiative is a unique combination of local, regional, and federal support. While much work remains to reach the long-term goal of a healthy marine ecosystem in the area, the Initiative is already a model of action, collaboration and participation. Conservation projects—ranging from derelict fishing gear removal to eelgrass protection zones—are addressing specific threats to ecosystem health. The Initiative has successfully engaged a broad range of citizens and government agencies in projects that reflect local marine conservation priorities

and contribute to broader marine conservation goals. Key projects include: developing inventory protocols in conjunction with state agencies and more than 275 volunteers to map 4,600 survey stations and document 32.5 miles of newly discovered potential spawning habitat for species that are critical prey for salmon, marine fish, birds, and marine mammals; changing state policy to encourage reporting of lost or abandoned fishing gear; planting oysters for public education and to improve water quality at a beach closed to harvest due to pollution problems.

Coastal Wetlands Planning, Protection, and Restoration Act Louisiana

The U.S. Army Corps of Engineers (Corps) chairs the Louisiana Coastal Restoration Task Force, composed of the National Oceanic and Atmospheric Administration, Fish and Wildlife Service, Natural Resources Conservation Service, Environmental Protection Agency, and the State of Louisiana. The task force meets annually to select the top priorities from a group of candidate projects and develops a Priority Project List. Projects have a 20-year life and are implemented in three phases: construction, operation and maintenance, and monitoring. In FY 2006, the Black Bayou Hydrologic Project proposed by the Natural Resources Conservation Service will improve more than 51,000 acres of cypress wetlands and fresh marsh by repairing the natural hydrologic regime. Estimated first year wetlands improvements through Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) are 12,460 acres. In FY 2006, it is anticipated that the federal–state interagency CWPPRA program in Louisiana will improve 60,184 acres of wetlands.

Managing Marine Fisheries through Dedicated Access Privileges

The Nation's marine fisheries are a valuable resource, contributing $31.5 billion in value added to the U.S. Gross National Product, supporting 82 million recreational fishing trips, and providing 9.5 billion pounds of protein-rich foods to the Nation. Sustainable management of these fishery resources faces a number of challenges, including ending overfishing, reducing excessive harvest capacity, and limiting bycatch.

NOAA is responsible for sustainably managing these fisheries and conserving healthy marine ecosystems. One approach that has proven promising in promoting these goals is market-based approaches to management, including the use of Dedicated Access Privilege (DAP) programs. In the U.S. Ocean Action Plan, the Administration strongly supported the use of market-based systems such as DAPs to help ensure the sustainability of marine resources and improve the economic viability of the associated industries.

The Problem

Under traditional management approaches, fisheries are an open access resource. Each fisherman is competing for a share of a common resource. The person who catches the most fish before a total quota is reached and the fishery is closed will make more money. This leads to a "race for fish" that results in short fishing seasons, higher harvesting costs, lower profits, overcapacity, poor product quality, and environmentally damaging fishing practices. Also, it costs more for fishery managers to monitor and enforce these 'derby' fisheries to ensure that overfishing does not occur. Overfishing leads to an array of economic problems. Because fish are less able to reach maturity and reproduce, fish that are caught tend to be of lower value. Fish become harder to catch as their stocks are depleted, and intense competition for the remaining fish creates additional waste. Traditional management approaches mandate many aspects of fishing by law, including allowable fishing gear technology, the length of fishing seasons, and fishing locations. These approaches are difficult to enforce, and they do not provide incentives for fishermen to curb their fishing efforts, and limit the ability of fishermen to develop innovative technology and fishing practices.

Description of DAPs and Benefits

Several types of DAP programs exist. These include individual fishing quotas, allocations to fishing cooperatives, community allocations, and sector allocations. Their common characteristic is that an allocation of a privilege to harvest a share of a fishery resource is made to an entity that is legally required to harvest no more than the quota allocated to them, ensuring that the overall quota is not exceeded. DAPs with transferable quotas provide the incentive for fishermen to catch their available harvest at a minimum cost, thus reducing fleet overcapacity and increasing profitability. In addition, fishermen in a DAP can adopt new fishing practices to reduce bycatch without concern that they will lose target catch to competitors. Under a DAP, fishermen have much more choice about when to fish, so they can avoid hazardous weather and sea conditions and improve their profitability by fishing when prices are best. Current DAP programs have resulted in both increases in per unit product value and decreases in total harvesting cost.

Federal marine fisheries are managed by NOAA working with eight regional fishery management councils (councils) under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). To implement a DAP program for a fishery, the councils develop a plan for the program, taking into consideration both national requirements and regional issues, thus ensuring that DAPs are responsive to the diversity in fisheries throughout the country. NOAA reviews the plans and, if they meet the ten national standards in the MSFCMA and other applicable laws, NOAA approves, implements and enforces the plans.

Accomplishments

Since 1990 NOAA and the councils have implemented DAPs in eight fisheries that have an annual ex-vessel value over $600 million. Commercial fishermen in these fisheries have seen increased profits, decreased costs of gear and fishing crews, and a safer and more stable

industry. For example, due to improved product quality under a DAP, the Alaska pollock catcher/processor cooperative fleet in 2001 yielded 49 percent more products from each pound of fish harvested than in 1998, the last year of the "race for fish." In another fishery, the Alaska halibut and sablefish individual fishing quota (a type of DAP) program ended the race for fish and increased season length from less than 5 days per year to 245 days per year. The availability of high-quality fresh (versus frozen) halibut year-round has benefited consumers, and environmental benefits have been realized in connection with decreased halibut mortality. DAP programs have led to higher profits because of decreases in operating costs and higher product prices.

Looking to the Future

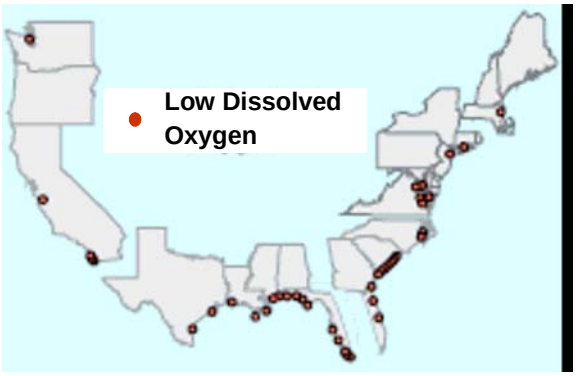
The FY 2006 President's Budget included proposed funding of $1.0 million to help facilitate development of DAP programs in regions where there is council interest.

NOAA is currently developing a set of national guidelines for DAP programs, to aid the councils in developing effective DAP programs that will help realize the diverse benefits of DAPs for each fishery.

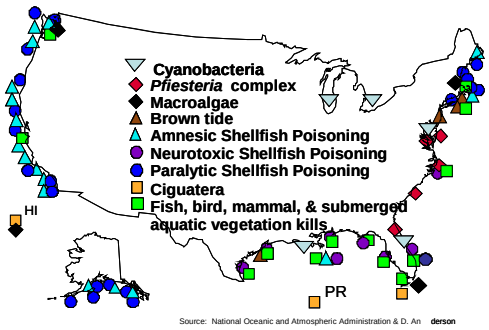
In implementing the Administration's U.S. Ocean Action Plan, NOAA will work with the Councils to double the number of DAP programs by 2010. This goal will bring eight new fisheries under market-based management programs. NOAA expects such management will increase the stability, value and safety in these fisheries.

Harmful Algal Blooms and Hypoxia

Harmful algal blooms and hypoxia (severe oxygen depletion) are often interrelated issues affecting an increasing number of Great Lakes and coastal ecosystems. Virtually every coastal state has reported recurring blooms, and a recent national assessment revealed that over half of our Nation's estuaries experience hypoxic conditions. There are several causes of harmful algal blooms and hypoxia; some are natural, but others are human-induced. Impacts have included the devastation of critical coastal habitats, loss of economically and culturally vital shellfish resources, illness and death in populations of protected marine species, and serious threats to human health posed by algal toxins. Just one harmful algal bloom event can cost tens of millions of dollars to local coastal economies and the total costs associated with harmful algal blooms over the past few decades have been conservatively estimated at over $1 billion.



U.S. estuaries with low dissolved oxygen (from An Assessment of Coastal Hypoxia and Eutrophication, 2003)



Harmful algal blooms in U.S. waters (modified from http://www.whoi.edu/redtide/HABdistribution/HABmap.html)

How We Work

The 1998 Harmful Algal Bloom and Hypoxia Research and Control Act (HABHRCA) established an Interagency Task Force to develop four assessments and plans (see accomplishments) and authorized funding for research programs on harmful algal blooms and hypoxia. NOAA, EPA, NSF, NASA, and U.S. Navy's Office of Naval Research (ONR) participate in these research efforts. Involving federal, state, and academic partners, all of these programs support multi-year, interdisciplinary extramural research studies to address the issues of harmful algal blooms and hypoxia in an ecosystem context. NOAA also supports this research at laboratories on the East and West Coasts as well as the Great Lakes. In 2004 NSF and NIEHS established four centers for Oceans and Human Health with harmful algal blooms as one major research theme. HABHRCA was reauthorized in 2004 requiring 5 additional assessments and plans and authorizing continuation or establishment of additional research programs on harmful algal blooms and hypoxia. The Oceans and Human Health Act was also passed in 2004, establishing a NOAA program that includes intramural Centers of Excellence and providing funding for research on harmful algal blooms and other health problems in an ecosystems context. (More information on efforts to address oceans and human health issues is provided in the Areas of Emerging or Renewed Interest section of this report.)

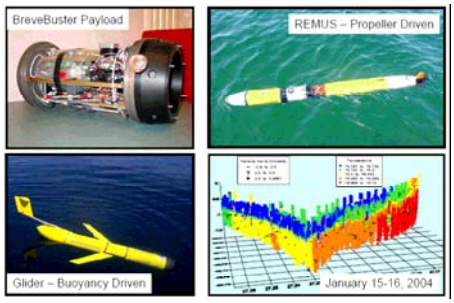
In addition to the work of the Interagency Task Force on Harmful Algal Blooms and Hypoxia, the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force is operating under the *Action Plan for Reducing, Mitigating and Controlling Hypoxia in the Northern Gulf of Mexico, 2001*. The Task Force is represented by nine federal agencies, nine

Interagency Task Force on Harmful Algal Blooms and Hypoxia
Department of Commerce, Chair
Environmental Protection Agency
National Science Foundation
National Aeronautics & Space Administration
Department of the Navy
Department of Agriculture
Department of Interior
Department of Health and Human Services
Food & Drug Administration
Office of Science & Technology Policy
Council on Environmental Quality

the Northern Gulf of Mexico, 2001. The Task Force is represented by nine federal agencies, nine States, and two Tribes. The States are represented individually as well as participating in one of the six sub-basin teams (Missouri, Upper Miss., Lower Miss., Arkansas, Tennessee, and Ohio).

The *Action Plan* is a national strategy to reduce the frequency, duration, size and degree of oxygen depletion of the hypoxic zone of the northern Gulf of Mexico while restoring and protecting the waters and improving the communities and economic conditions throughout the Basin.

The *Action Plan* calls for a recurring five year assessment. The 2005 Reassessment is currently underway. The Reassessment includes several notable actions, including a series of four public science symposia, an expert panel review on current state of the science on hypoxia in the northern Gulf of Mexico, a synthesis of management recommendations and options, and an inventory of existing point sources in the Mississippi River Basin. For more information go to: http://www.epa.gov/msbasin/



AUVs (Slocum Glider and REMUS) with automated sensor for *Karenia brevis* (Breve Buster) and example of temperature and red tide abundance data during operation (graphics provided by Gary Kirkpatrick, Mote Marine Lab)

Accomplishments
Operational products from interdisciplinary research studies are helping to advance the state of the science and aid state coastal resource and public health managers.

Florida Harmful Algal Bloom Forecasts
In 2004 the ecological forecast for harmful algal blooms on the west coast of Florida was made an operational product. Satellite imagery, wind data, and transport models are used to identify potential harmful algal blooms and predict their movement. This information is then relayed to coastal managers so they can more effectively target expensive and time-consuming field sampling to confirm the presence of toxic algae.

State Adoption of ORHAB
The Olympic Region Harmful Algal Bloom (ORHAB) partnership comprises federal, state and local management agencies, coastal Indian tribes, marine resource-based businesses, public interest groups, and academic institutions that developed a state of the art shellfish monitoring program. Initially funded by NOAA in 2000, the State of Washington apportioned funds from shellfish harvesting license fees to continue the program in 2004 and beyond.

Models of Harmful Algal Blooms (Alexandrium) in the Gulf of Maine
NOAA, NSF and NIEHS are supporting ecosystems research in the Gulf of Maine leading to coupled biological-physical models of toxicity in shellfish. Last fall and again this spring during the red tide outbreak, the multiagency modeling and monitoring efforts in this region were able to warn resource managers of toxic conditions.

In Water Harmful Algal Bloom Sensor
NOAA, NSF, ONR, and NASA have supported research on the optical characteristics of the Florida harmful algal bloom, *Karenia brevis*, which has led to an in-water sensor that detects blooms in situ in real time. The sensor has been used on shipboard for mapping, on moorings to provide early warning or on Autonomous Underwater Vehicles (AUVs) to confirm blooms that have been detected by satellite remote sensing (see figure).

Hypoxia Forecasts
The size of the hypoxic area known as the "dead zone" on the Louisiana shelf was forecast in 2003 and 2004 from Mississippi River nutrient loading, based on 20 years of NOAA ecosystem research. The models have been used to evaluate nutrient reductions needed to reduce the size of the

hypoxic area and the effectiveness of management actions.

Event Response

NOAA provides either emergency funding or technical assistance to state and federal coastal managers and public health officials to reduce the impact of harmful algal blooms. Examples of events in which assistance was provided include: in 2004 Florida Panhandle dolphin mortality, testing toxicity of cyanobacterial blooms and mortality of Great Blue Herons in the Chesapeake Bay, expanding capability to identify cyanotoxins in Great Lakes; in 2005, Texas Brown Tide in the Laguna Madre, Oregon coast domoic acid closure of shellfish harvesting, New England-wide harmful algal bloom and closure of shellfish harvesting.

Looking to the Future

HABHRCA and the Oceans and Human Health Act, along with reports required therein, provide guidance for future research and response to harmful algal blooms and hypoxia. Existing research programs will be strengthened and new ones focusing on prediction and response will be established. Partnerships between federal agencies and with state managers and academic scientists will be critical to developing an understanding of harmful algal blooms and hypoxia that will result in operational products for managing these increasingly serious problems. The development of regional observing systems with harmful algal bloom and hypoxia sensing systems, coupled with ecosystem models, will be critical to developing new capabilities to forecast and manage harmful algal blooms and hypoxia.

IV. Advancing Our Understanding of Oceans, Coasts, and Great Lakes

The FY 2006 President's Budget included over $1.3 billion for science, research and education aimed at advancing our knowledge and awareness of ocean and coastal issues. The agencies that participate in these programs include the Departments of Commerce, Defense, Energy, Health and Human Services, Homeland Security, the Interior, and State, and the Environemntal Protection Agency, the Marine Mammal Commission, the National Aeronautics and Space Administration, the National Science Foundation, and the Smithsonian Institution.

What follows are five examples of federal programs and colaborative efforts for research, observation, exploration, and education related to ocean and coastal issues.

- Ocean Research to Ocean Applications
- The Integrated Ocean Observating System
- The National Coastal Condition Report II
- Ocean Exploration
- Enhancing Ocean Awareness

Ocean Research to Ocean Applications

For six decades the Nation has made significant investments in basic and applied research for the purposes of exploration and discovery, scientific curiosity, building a technology base, providing information to ocean resource managers, and training scientists and engineers. The U.S. Ocean Action Plan identifies the expansion of scientific knowledge of our oceans, coasts and Great Lakes as a critical area for federal effort and as a major aspect of the plan. Sustainable use of the oceans, including ecosystem-based management, must be based on a solid foundation of scientific understanding.

Mission

Research results can lead directly to useful technology and direct societal benefits, but sometimes the outcome of research investments is more diffuse, more long-term, and harder to quantify. The motivations for the researcher tend to be the quest for new knowledge, to answer questions about the unknown, or to mitigate obstacles to some kind of desirable application.

How We Work

The federal agencies listed in Box III are those that perform and/or fund extramural ocean research. They work individually and also cooperatively through numerous formal (such as Memoranda of Agreement) and informal (such as working relationships between researchers in several agencies) arrangements. Examples of some of the major interagency efforts are described below. The U.S. Ocean Action Plan, building on prior efforts of the National Oceanographic Partnership Program, is developing interagency governance structures to ensure useful cooperation, minimize redundancies, integrate science and technology with resource management, and prioritize ocean research themes.

Accomplishments

The following are examples of some research investments that may lead to societal applications, are already providing data for decision makers, or are now being carried out in an operational mode.

Box III
Federal Ocean Research Agencies
National Science Foundation (NSF)
National Aeronautics and Space Administration (NASA)
U.S. Environmental Protection Agency
U.S. Department of the Interior *(U.S. Geological Survey, Minerals Management Service)*
U.S. Department of Homeland Security *(U.S. Coast Guard)*
U.S. Department of Health and Human Services *(National Institute of Environmental Health Sciences)*
U.S. Department of Energy
U.S. Department of Defense *(Navy, Army)*
U.S. Department of Commerce *(National Oceanic and Atmospheric Administration - NOAA)*
U.S. Department of Agriculture

Global Ocean Ecosystems Dynamics (GLOBEC)

As an example of basic ocean research with potential but not yet fully realized applications, GLOBEC – a component of the U.S. Global Change Research Program – is a large multi-disciplinary, multi-year oceanographic research program to understand the impacts of climate change and ocean variability on marine populations, including commercial fish stocks and their prey. To understand these processes and improve the predictability and management of U.S. living marine resources, a suite of research, observational, modeling, and retrospective studies is used to gather physical and biological information on marine ecosystems. These complementary efforts are a fundamental element of the GLOBEC research strategy, a strategy that is leading to new, ecosystem-based estimates of abundances and distributions for improved fishery forecasts. Extensive coordination between NSF and NOAA on GLOBEC has resulted in a fruitful partnership, allowing NSF to explore fundamental science questions regarding marine ecosystems and NOAA to address ecosystem questions important to fish and fisheries. The U.S. GLOBEC program currently focuses in three areas: Georges Bank of the Northeast United States, the North Pacific and the Southern Ocean. Each field program is evaluating a unique set of problems related to practical questions of living marine resource management, and the impacts of

environmental variation on the productivity of ecosystems.

Ecology and Oceanography of Harmful Algal Blooms (ECOHAB)

ECOHAB is an interagency research program to investigate fundamental physical, biological, and chemical oceanographic questions critical to scientifically-based management of fisheries resources, public health, and ecosystem health in regions threatened by toxic and harmful algal blooms. This program represents a basic research effort that is moving beyond scientific curiosity to inform a specific societal need. ECOHAB research is used to guide management of coastal resources to reduce harmful algal bloom development, impacts, and future threats through early warning forecast modeling, and to develop new strategies to control, prevent, and mitigate harmful algal bloom impacts. Research supported through ECOHAB has led to an in-water sensor that can detect Florida red tides, including deployment of an underwater autonomous vehicle, contributing valuable information to an operational ecological forecast for harmful algal blooms in the Gulf of Mexico. Information based on ECOHAB research was also used to develop a model that predicts the development of harmful algal blooms and their transport into the southern Gulf of Maine region. In the Northwest, ECOHAB-funded studies show how wind conditions can lead to build up of toxins in coastal shellfish.

Sea-Viewing Wide Field-of-View Sensor (SeaWiFS)

On the scale of ocean research spanning from basic research motivated by scientific curiosity to the operational application of scientific information for product delivery, SeaWiFS data have evolved to represent the latter. Estimates of phytoplankton chlorophyll *a* and other biological and biogeochemical properties are produced from space-based SeaWiFS data. Research products are obtained in near-real time and are fed into operational systems and models for harmful algal bloom detection, as done by the NOAA's Harmful Algal Bloom Forecast System. NASA developed SeaWiFS in partnership with OrbImage, Inc., and some of the research to support harmful algal bloom detection was funded by NASA and other federal agency partners through the ECOHAB program. Many of the SeaWiFS data products are now used operationally by NOAA and other federal agencies for applications beyond harmful algal bloom detection. For example, the Naval Oceanographic Office processes SeaWiFS data to yield in-water optical properties and underwater visibility distance. The Navy used these underwater visibility distance products for planning during Operation Iraqi Freedom.

Looking to the Future

Continued investment in research, both basic and applied, is essential to our sustainable use of the oceans. Increased understanding, a robust human resources pool, and development of new approaches and technologies are the inevitable outcomes of research. Interagency cooperation is the hallmark of ocean research, for no one ocean agency has the entire set of ocean research missions. In the future, working through the U.S. Ocean Action Plan governance structures, coordinated pursuit of major, integrated research themes is anticipated.

U.S. Integrated Ocean Observing System

Our Nation's history is intertwined with the oceans that surround us. They are the birthplace of weather systems and modifiers of climate; the highways for marine commerce and a buffer for national security; a major reservoir of natural resources; havens for recreation; virtual schoolrooms for educators; and natural laboratories for science. Responsible use of the oceans requires continuing knowledge of their health, their behavior; required knowledge comes from observations, data, models, and research. For these reasons, the U.S. Ocean Action Plan identifies Integrated Ocean Observing System (IOOS), the U.S. ocean contribution to the Global Ocean Observing System of Systems (GEOSS), as a priority.

Mission

A sustained and Integrated Ocean Observing System is a network of regional, national and global systems. The system of floats, buoys, tide gauges, radar, sonar, satellites, current meters, wind gauges, and many other emerging technologies provides the capability to rapidly and systematically acquire and disseminate data and products to serve critical and expanding societal needs. These needs include the safety and efficiency of marine operations, mitigating the effects of natural hazards, improving predictions of climate change and its effects on coastal populations, improving national security, reducing public health risks, protecting and restoring healthy coastal marine ecosystems, and enabling the sustained use of marine resources.

Box V

The IOOS Development Plan

Highest Priorities for the current IOOS

- Implementation of the data management plan
- Development of the regional partnerships
- Continue implementation of the coastal and global observational components
- Enhance ocean science and education using IOOS

Desirable Enhancements for the future IOOS

- Integration of data streams across disciplines, institutions, time scales and geographic regions
- Improved biological and chemical sensors
- Operational hydrodynamic-ecosystem models to rapidly predict changes in the coastal environment

Box IV

U.S. IOOS Partners

Federal Agencies

U.S. Department of Commerce, NOAA
U.S. Department of Defense (Navy, Army)
U.S. Department of Energy
U.S. Department of the Interior (USGS, MMS)
U.S. Department of Homeland Security (USCG)
U.S. Environmental Protection Agency
National Aeronautics and Space Administration
National Science Foundation

U.S Global Ocean Observing System Steering Committee – Institutions and Organizations

Cal. Coastal Water Research Project Authority
Coastal Services Center, NOAA
Ocean.US Office
Exxon Valdez Oil Spill Trustee Council
Ohio Sea Grant College Program
Pacific Marine Environnemental Lab, NOAA
Rutgers University
State of Maine
Texas A&M University
University of South Florida
University of Southern Maine
Weathernews Oceanroutes

How We Work

The federal partners listed in Box IV operate through an interagency coordination office called Ocean.US and work closely with regional, state, public and private partners in establishing an IOOS. Coordination of IOOS activities focuses on a global ocean component (in cooperation with other nations) and a U.S. coastal ocean component, which includes the U.S. Exclusive Economic Zone (EEZ; out to 200 nautical miles from our coastline), the Great Lakes, and estuaries. Ocean.US works with the federal partners and eleven regional partnerships to develop, implement and improve the IOOS. Box V outlines the priorities for integrating and improving the IOOS.

Accomplishments

The following projects exemplify the current IOOS efforts and present some pilot projects that will become the next-generation of sustained observing.

Argo
A global array of free-floating profiling floats that measure the temperature and salinity of the upper 2000m of the ocean. Floats are deployed by many countries and now total 1960 of the planned 3000. Data are publicly available within hours of collection. The data are being used routinely for improved weather forecasting, climate assessments, in predictive ocean models, and by commercial fishing fleets.

Physical Oceanographic Real-Time System (PORTS®)
The PORTS system gathers and disseminates information about the marine environment to help improve safety in the shipping industry. In the 5 years after PORTS® was installed in Tampa Bay (Florida) the number of ship groundings dropped by 60 percent.

Data Buoy Partnership
Operators of federal and non-federal oceanic and coastal weather stations cooperate in order to provide "one-stop shopping" for forecasters and the maritime public. Information from non-federal stations now makes up more than 15 percent of all observations distributed by the National Data Buoy Center.

Monitoring and Forecasting Harmful Algal Blooms
An operational system has been established in the Gulf of Mexico for monitoring and forecasting harmful algal blooms. Collaboration between federal, state, and commercial organizations utilizes data from multiple sources to provide state and local managers with better harmful algal bloom predictions to support decisions on beach closures and public health risks. The program is built upon the ECOHAB interagency research effort.

Gulf of Maine Ocean Observing System (GoMOOS)
GoMOOS has developed a web-site to provide seafarers with real-time data for real-time uses. Data include weather forecasts, buoy information, wave forecasts, satellite images and ocean circulation model information which are being used by fisherman, marine pilots, the Coast Guard and recreational boaters. GoMOOS is one of a number of existing regional and sub-regional observing systems throughout the country.

Global Ocean Data Assimilation Experiment (GODAE)
GODAE demonstrates near-real-time, global ocean data assimilation to provide regular, complete descriptions of the temperature, salinity and velocity structures of the ocean. These descriptions are available through the GODAE Monterey Server supported by the National Oceanographic Partnership Program (NOPP).

Working with Industry
In the spirit of the government-private sector partnerships necessary for developing IOOS, the MMS and NOAA worked with the offshore oil and gas industry to establish an ocean current monitoring and data-sharing program in the Gulf of Mexico. Under this program, deepwater oil and gas platform operators are collecting ocean current data from deepwater drilling and production sites, and making it available to the public on the Internet. These data are helping to ensure safe and environmental sound operations – key societal values of IOOS.

Looking to the Future
Progress toward establishing the IOOS will continue with implementation of the U.S. Ocean Action Plan, continued coordination and integration of IOOS related data streams between the federal and regional observing systems, and further development of demonstration pilot projects. Near-term focus areas include improved capabilities for more effective warnings of coastal inundation caused by natural hazards and mitigating and managing the impacts of coastal inundation. Improved sensors, models and forecasts are being developed to more effectively manage and mitigate these effects.

National Coastal Condition Report II

Scientifically credible monitoring and assessment are key to identifying and understanding environmental conditions and effective protection and conservation of our ecological resources. The *National Coastal Condition Report II* (NCCR II) describes the ecological and environmental conditions in our coastal waters. The value of knowing ecological and environmental conditions is multifold: existing and emerging problems may be identified, quantifiable trends detected, and management programs evaluated.

Mission
In 2000, U.S. EPA initiated the National Coastal Assessment (NCA) for the purpose of developing a statistically valid "snapshot" of the ecological health of coastal ecosystems at a regional and national scale.

Program Description
The NCCR II report is a joint effort by multiple federal and state agencies to assess the condition of the coastal ecosystems of the United States. It is based on data gathered by a variety of federal, state, and local sources, and includes over 50,000 samples taken between 1997 and 2000 on all continental seacoasts and Puerto Rico. Three main types of data are used in the report: (1) coastal monitoring data, largely from NCA (2) offshore fisheries data from NOAA and (3) assessment and advisory data from EPA. Ecological condition was determined from a minimum of 50 sites in each coastal state (except Alaska and Hawaii) and Puerto Rico for the study period. This probability design allowed extrapolation to represent all coastal waters of a state, a region, and the entire United States.

Coastal ecosystems include estuaries, coastal wetlands, coral reefs, and mangrove forest areas. These critically important coastal habitats provide spawning grounds, nurseries, shelter and food for finfish, shellfish, birds, and other wildlife, as well as nesting, resting, feeding, and breeding habitat for 85 percent of waterfowl and other migratory birds. Estuaries provide habitat for more than 75 percent of America's commercial fish catch, and for 80 – 90 percent of the recreational fish catch. Estuarine-dependent fisheries were worth more than $1.9 billion in 1990, excluding Alaska. Nationwide, commercial and recreational fishing, boating, tourism, and other coastal industries provide more than 28 million jobs. Coastal recreation and tourism generate $8 billion to $12 billion annually.

Accomplishments
The NCCR II is a valuable tool consistent with themes and goals in the U.S. Ocean Action Plan. In particular, the report:

- provides us with the first comprehensive, national assessment of ecological condition of 100 percent of U.S. coastal waters, exclusive of Alaska and Hawaii;
- is the only statistically-based measure of U.S. water quality on a nationwide scale;
- has helped to build local, state, and tribal capacity in cost-effective and scientifically sound monitoring of local conditions required under the Clean Water Act;
- has resulted in strengthened interagency and state partnerships;
- clearly communicates water quality to the public; and
- provides managers with the information they need to target water quality actions, and to effectively manage those actions to maximize benefits, e.g., by providing information on whether pollution control actions/best management practices are having the desired environmental results, such as reducing contaminants in fish tissues, reducing coastal eutrophication, or maintaining biodiversity.

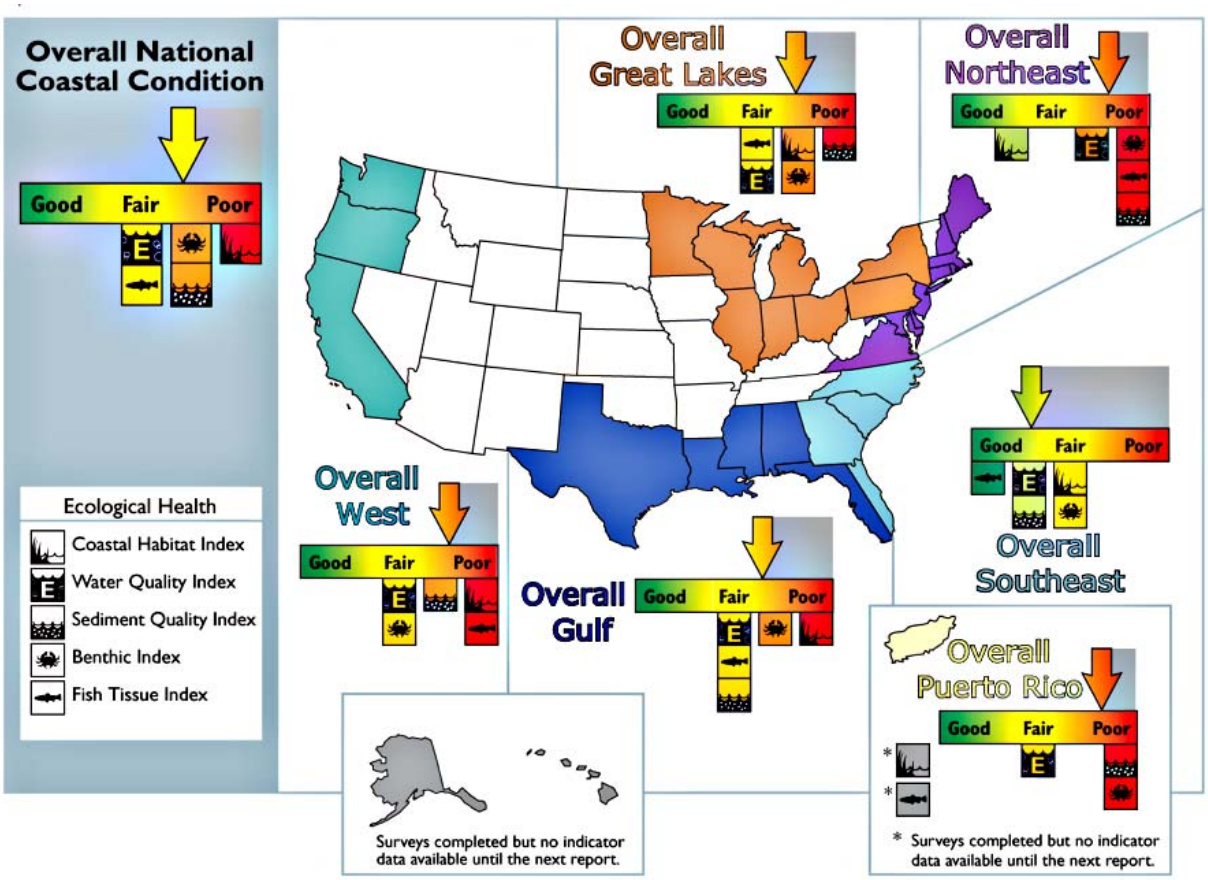
What does the NCCR II tell us about the condition of U.S. coastal ecosystems for the study period 1997-2000? The NCCR II ratings are based on comprehensive, comparable and nationally consistent data, primarily the NCA. The report relies heavily on NCA estuarine data in assessing coastal condition and uses NCA and other data to evaluate five indicators of condition in each region of the country: water quality, coastal habitat loss, sediment quality, benthic

community condition, and fish tissue contaminants. The ratings for each indicator are then used to calculate both overall regional ratings and overall national rating of coastal condition in the "traffic light" scorecard below.

Based on these indicators, the overall health of the Nation's coastal waters is fair. This is essentially the same as the findings from the first NCCR issued in 2001. From a regional perspective, the condition of the coastal waters in the Southeast, Gulf of Mexico, and Great Lakes has improved since the first NCCR, while the Northeast and the West coasts remain the same.

Looking to the Future

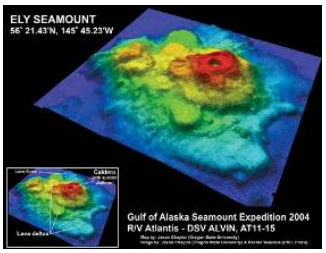
In 2005, EPA plans to issue the first-ever nationwide report on stream health, with plans to develop reports on other waters such as lakes and rivers. In 2007, EPA plans to release the NCCR III to address the condition of the coastal waters in the United States for 2001-2003 and identifiable trends in estuarine condition from 1990-2003.



(http://www.epa.gov/owow/oceans/nccr2/index.html)

Ocean Exploration

The ocean covers more than 70 percent of the planet's surface, and our daily lives depend on it in many ways. It moderates the Earth's weather and climate as well as generates more than half of its oxygen. The oceans fuel our economy via energy resources from beneath its seafloor, food products and a growing number of medicines from its water column, sea lanes of commerce across its surface, and recreational and work opportunities along its shores. For all that we value about the ocean, the vast majority of it has yet to be explored.



Mission
Realizing the need to better understand this vital global resource, and in response to growing national concern over the state of the ocean, the National Ocean Exploration Program (OE) was created in 2001. This program was charged to investigate the oceans for the purpose of discovery and the advancement of knowledge; to fill existing gaps in our knowledge; and to set the stage for future ocean research and management. While NOAA is the lead, other federal agencies conduct exploration-related activities and interagency partnerships are essential to this coordinated national exploration program.

The following 4 challenges constitute the National Ocean Exploration Program's basic objectives:

- Mapping and characterizing the physical, biological, chemical and archaeological aspects of the ocean;
- Developing a more thorough understanding of ocean dynamics and interactions at new levels;
- Developing new sensors and systems to regain U.S. leadership in ocean technology, and;
- Engaging the public in new ways, to improve the literacy of learners of all ages with respect to ocean issues.

To accomplish these objectives, OE solicits exploration proposals that address these specific theme areas. OE partners include MMS, NSF, NPS, Navy, and the Consortium for Oceanographic Research and Education.

Accomplishments
The following are some highlights of OE's mission of discovery and the advancement of knowledge.

Habitat Characterizations
Explorations to unique deep-sea habitats include undersea volcanoes, deep-sea coral, sponges chemosynthetic communities, and under the Arctic sea ice. Knowledge gained can lead to better understanding of species biogeography and recruitment patterns, habitat function and anthropogenic impacts.

Discoveries of new Sea Mounts and Deep Sea Coral Dynamics
In collaboration with international scientists, seamount habitats were explored in the Atlantic (New England) and Pacific (Gulf of Alaska) Oceans and deep sea coral aggregations studied for their role in structuring seamount communities.

Marine Life Inventory – Census of Marine Life Mission to the Arctic
OE collaborated with a multi-national team of scientist-explorers, aboard the Russian *R/V Professor Khromov*, to help establish a baseline for a long-term census of marine life in the Arctic. This

set of studies provides a foundation for detecting future environmental changes.

Ocean Exploration Technology –New Sensors and Tools

OE funds supported research into new artificial intelligence for autonomous underwater vehicles (AUVs) as well as transfer of sensors from lab prototypes to field trials. Through OE, the U.S. Navy, NSF, and NOAA funded new biological and chemical autonomous sensor development.

Partnerships and Other Federal Efforts

Minerals Management Service (MMS) - In 2005 OE partnered with MMS to conduct an archaeological and ecological expedition in the Gulf of Mexico to investigate a number of World War II shipwrecks. Scientists investigated rates of corrosion and the potential for these ships' propulsion fuel and their cargoes to adversely affect the environment, as well as these shipwrecks' function as a habitat. This effort has led to a continued partnership to conduct a 3-year study of deep-water chemosynthetic communities and deep-water coral habitats in the Gulf of Mexico.

National Aeronautics and Space Administration (NASA) – NASA conducts exploratory missions that lead to discovery, and are critical to developing research programs that enhance our understanding of the Earth system, including the oceans. For example, the NASA Earth System Science Pathfinder (ESSP) missions address ocean exploration in two ways. First, the Gravity Recovery and Climate Experiment (GRACE) currently in orbit is exploring variations in the mass field of the ocean, which is important for climate and ocean circulation studies. Second, the Aquarius mission to be launched in 2008 will explore the salinity of the ocean from space, using microwave remote-sensing technology to reveal detailed patterns of salinity on the surface of the ocean. Ocean surface salinity is known to be an important but poorly understood factor within the climate system. As with all NASA satellites, data will be freely available to the research community and other federal agencies. NASA supports the research and preparation of explorers for all its missions. For the ocean, the basic research programs in physical and biological oceanography support the background developments needed to launch new explorations of the ocean (from space).

National Science Foundation (NSF) – Many of the ocean research projects supported by NSF result in important discoveries of habitats and phenomena that had never been investigated before. For example, in December 2000, NSF sponsored scientists discovered the Lost City hydrothermal vent field in the mid-Atlantic Ocean. The features discovered in this area, including a massive 18-story vent taller than any seen before, were found to be formed in a very different way than ocean-floor vents studied since the 1970s, emphasizing how little is known about the oceans, the seafloor and the processes taking place there. Based on this discovery, in the summer of 2005, OE is sponsored a return visit to the Lost City to further investigate the hydrothermal structures, the biological communities that inhabit them, and the processes used in their formation.

NSF also is supporting the Woods Hole Oceanographic Institution (WHOI) to construct the next generation human-occupied deep-sea submersible to replace *Alvin*. This new submersible with a depth capability of 6500 meters will be able to descend to 99 percent of the global ocean, and provide scientists and explorers with a unique capability to investigate and study new areas of the world's oceans.

Looking to the Future

NOAA recently took ownership of a former Navy research vessel that will be converted into the Nation's first modern ocean exploration platform. Recently named the *Okeanos Explorer*, it is expected to become operational in 2007.

Enhancing Ocean Awareness

Formal and informal ocean education is recognized in the U.S. Ocean Action Plan as a priority area of attention. Lifelong ocean education is the cornerstone of successfully employing ocean stewardship strategies that promote healthy ecosystems while fostering a strong economy and preparing future generations with the scientific understanding needed to address complex ocean and coastal issues.

Mission

Most Americans are not well aware of the role the oceans, coasts and Great Lakes play in our daily activities, or the threats facing the marine environment. With state, local and private sector partners, federal ocean agencies support and carry out a range of activities specifically designed to capture the attention of the American public on ocean-related topics and create a continual flow of educational opportunities from grade school through graduate school and beyond. Select examples of collaborative ocean education initiatives are highlighted below.

Program Descriptions and Accomplishments

Centers for Ocean Sciences Education Excellence

Funded by the National Science Foundation with additional support from the U.S. Navy and the National Oceanic and Atmospheric Administration (NOAA), the nationally coordinated Centers for Ocean Sciences Education Excellence (COSEE) program fosters integration between the ocean science community and the education community. Through its centers, the COSEE program has engendered efforts that allow researchers to gain a better understanding of educational processes and educators to enhance their capacity to understand and deliver appropriate educational programs in the ocean sciences. In California, an award-winning course is instructing undergraduate and graduate students in strategies for communicating ocean issues to K-12 classrooms, and community lecture series are providing a venue for the public to explore current research topics with ocean scientists. In the Gulf of Mexico, K-12 teachers are experiencing real-world oceanography and geography through first-hand participation in research onboard a U.S. Navy oceanographic vessel. Middle-school educators in the Northeast are helping develop new lessons that bring real-time data from coastal ocean observing systems into the classroom. In New England, scientists and informal educators are collaborating to facilitate ocean sciences programming in informal education institutions. A residential program in the Southeast is introducing educators to ocean and estuarine research topics and high quality educational resources, while an online "school" in Florida is allowing educators to create and deliver complete online courses on ocean sciences topics.

The National Ocean Sciences Bowl

The National Ocean Sciences Bowl (NOSB) is an academic competition for high school students designed to increase knowledge of the oceans among students, teachers and parents, and raise public understanding of the national investment in ocean-related research. With multi-agency support, NOSB has involved over 10,000 students from over 400 high schools across the United States since its inception in 1998. A recent independent evaluation of the program praises NOSB's contribution to enhancing leadership skills among students and ocean awareness in participating communities. The evaluation further describes the program as "an exemplary model…linking recent and emerging science knowledge to secondary classrooms" that is a prototype for emulation.

The National Sea Grant College Program

NOAA's National Sea Grant College Program (Sea Grant) educates future environmental professionals and leaders and enhances marine and aquatic literacy among the general public. Partnering with other national education efforts, including COSEE, the Sea Grant Educators Network operates locally to enhance formal and informal education for children and adults. This network also provides highly respected marine and aquatic science education programming nationally. In partnership with NOAA's National Weather Service and the U.S. Lifesaving Association, Sea Grant initiated a comprehensive, national rip current safety awareness campaign, increasing public knowledge of the primary cause of distress in over 80 percent of beach rescues. The "Extreme 2004: Voyage to the Deep" project provided a virtual fieldtrip with marine scientists on a deep sea

expedition. Live conference calls and a website allowed students and the public to share the excitement of scientific discovery. Developed by the U.S. Aquatic Nuisance Species Task Force and its partners, Habitattitude™ is a national program that provides aquarists and pond owners with environmentally sound alternatives to properly dispose of unwanted aquatic plants and fish. Sea Grant also published a new edition of *Marine Science Careers*. With more than 40,000 copies in circulation, this book has helped to address the national need for comprehensive information on marine sciences careers.

Coastal Ecosystem Learning Centers

Coastal America, a partnership of federal agencies, state and local governments, and private organizations to protect, preserve and restore our Nation's coasts, has established a network of Coastal Ecosystem Learning Centers (CELC) that combines the resources of federal agencies with marine educational centers. Through this partnership, each CELC provides the public with access to expert speakers, exhibit information, educational publications, teaching materials, field trip sites, and scientific data that may otherwise not be available. In 2004, the John G. Shedd Aquarium became the first CELC in the Great Lakes region. With the addition of the North Carolina Aquarium Complex in 2005, there are now 18 Learning Centers across the United States.

Looking to the Future

Through expansion of these initiatives and the commitment to education laid out in the U.S. Ocean Action Plan, federal agencies are continuing to support and implement efforts to further enhance ocean awareness among the American public. NSF plans to establish additional centers in the COSEE network to build on the progress made through this collaborative program. Moving into its ninth year, NOSB is involving even more students, teachers, parents, and researchers in learning about ocean, coastal and Great Lakes issues. Through Sea Grant and other education initiatives, NOAA continues to foster partnerships and collaborations to complement ongoing and emerging federal education efforts to increase the public's understanding and stewardship of marine and aquatic resources. Through the recent dedication of two new sites, CELCs are expanding their reach in educating the public on how each of us can help protect coastal ecosystems.

V. Supporting Maritime Transportation

The FY 2006 President' Budget provides over $2.7 billion for programs that support maritime transportation. The agencies that conduct these programs are the Departments of Commerce, Defense, Homeland Security, and Transportation.

What follows are examples of programs that contribute to maintaining U.S. waterways, providing navigation information and coordinating federal actions with respect to the Marine Transportation System.

- National Dredging Team
- U.S. Coast Guard Icebreaking
- Mapping/Oceanographic Services
- Improving Coordination and Intermodal Freight Connectivity

Maintaining and Enhancing Waterways Passage

Each year over two billion tons of domestic and international freight and 3.3 billion barrels of oil are transported through U.S. ports and waterways. This represents 95 percent of all overseas international trade, 25 percent of domestic trade, and supports commerce and recreation for 35 states. Ports and waterways also handle essential cargo for military operations and ensure effective responses to national and international emergencies. The goal of maintaining waterways passage is to facilitate safe and efficient transport of goods and people while maximizing recreational access to and enjoyment of the water. While many facets are integral to maritime mobility, described below are four particular aspects that have shown significant recent achievement: Dredging, Icebreaking, Mapping/Oceanographic Services, and Improving Coordination and Intermodal Freight Connectivity.

National Dredging Team

Maintenance of the Nation's navigation system results in the dredging of several hundred million cubic yards of sediment from U.S. waterways, ports, and harbors each year. Appropriate re-use and disposal of this dredged material plays a vital role in the protection of the Nation's coastal, estuarine, and fresh water resources. The goals of the federal, interagency National Dredging Team are to facilitate communication, coordination, and resolution of dredging issues among participating agencies (Box VI). The NDT also serves as a forum for promoting the NDT Action Agenda's 22 recommendations in 4 priority areas that guide the actions of the NDT (Box VII).

Established in 1995, the NDT addressed a number of critical issues during its first five years in the areas of dredged material management planning, dredging project review and permit process, funding, and scientific uncertainties. The NDT also facilitated the creation of Regional Dredging Teams (RDTs), which have been established in most geographic areas in the United States and are primarily composed of federal and state representatives.

Box VI: NDT Members

Co-Chairs
U.S. Environmental Protection Agency
U.S. Army Corps of Engineers

Members
Maritime Administration
National Oceanic & Atmospheric Administration
U.S. Coast Guard
U.S. Department of Agriculture
U.S. Fish and Wildlife Service

Other Participants
U.S. Geological Survey
U.S. Navy

Box VII: Action Agenda Priority Areas

Beneficial Use of Dredged Material

Sediment Management

Emerging Issues

Strengthening Regional Dredging Teams

A 2001 workshop resulted in the Action Agenda which provides the NDT with recommendations for specific actions to ensure that dredging of U.S. harbors and channels is conducted in a timely and cost-effective manner while also meeting environmental protection, restoration and enhancement goals. Through these recommendations, federal and state agencies have coordinated on issues such as local planning groups and dredged material management plans, the Coastal Zone Management Act, and essential fish habitat.

In addition to the 2001 meeting, the NDT brings interested participants together through meetings such as regular RDT meetings and the National Meeting on Dredged Material Management in the Watershed, planned for 2006. Through activities such as this 2006 meeting, the NDT recognizes the need for coordination among watershed and sediment managers to address the $15 billion in damages that annually occur in North America from excessive sediment erosion transport and deposition. A coordinated, consistent approach that incorporates beneficial use, coordination among governments and the public, and a watershed-wide approach is contributing to more effective dredged material

management to the benefit of the U.S. economy, national security, and the environment.

Icebreaking

Coast Guard ice operations facilitate the movement of vessels transiting ice bound regions, directly assist commercial vessels transiting ice-bound waters of the United States, and perform channel maintenance and harbor breakout operations. Coast Guard domestic icebreakers facilitate approximately $1.5 billion in commerce through ice-bound Great Lakes and East Coast waterways annually.

U.S. Coast Guard (USCG) icebreaking efforts support numerous customers (See Box VIII), including the Great Lakes freight transportation, the steel and iron ore industries, and the East Coast home heating oil industry. Currently, USCG and Canadian domestic icebreaking supports 11 distinct trade routes through the Great Lakes and St. Lawrence Seaway System, as well as numerous states in the Northeast. Icebreaking on the Great Lakes keeps shipping moving for ten months out of the year. It has been estimated that the economic benefit to industry is between $49 million to $93 million per year over alternate shipping, stockpiling, and storage costs – a benefit-cost ratio estimated between 2 to 1 and 4 to 1. The Coast Guard Icebreakers also assist the Army Corps of Engineers by breaking up ice dams in selected areas to prevent catastrophic flooding regularly on the Detroit/St. Clair, St. Mary's, Penobscot, Kennebec, St. Lawrence and Hudson Rivers to protect property valued at $2 billion on the St. Clair River alone. Coast Guard had been successful in keeping waterways open, meetings its performance goals in nine of the past ten winters, three of which measured severe.

As the global climate changes around us, the Coast Guard is preparing for future icebreaking challenges. As suggested in the Arctic Climate Impact Assessment (ACIA) key finding Number Six, "Reduced sea ice is very likely to increase marine transport and access to resources," including the potential for increased use of Arctic waterways. The Coast Guard will continue to ensure that the Nation's icebreaking needs are met.

With the arrival of the new Great Lakes Icebreaker (GLIB) in spring 2005, the USCG plans to conduct operational tests during the 2006 winter season and commissioning the GLIB as USCGC MACKINAW (WLBB 30) in June 2006. The new MACKINAW will greatly enhance the Coast Guard's ability to conduct essential icebreaking activities while remaining multi-mission capable. In addition to ice breaking, the new MACKINAW will maintain aids to navigation, assist with Search and Rescue as needed, and conduct Port Security and Law Enforcement Operations as required.

Box VIII: Icebreaking

Cooperating Partners

Canadian Coast Guard, Depts. of Defense, Interior, Justice, State, Transportation, EPA, Commerce, Energy

Authority

The icebreaking missions were established by Presidential Executive Order 7521, Public laws 14 U.S.C. 2 and 14 U.S.C. 93.

Customers

General Public, Commercial Shipping Industry, Commercial Fishing Vessels, Power Plants, Steel Mills

Mapping/Oceanographic Services

NOAA supports the Marine Transportation System (MTS) by providing the mariner with the best environmental information possible to improve situational awareness for safe and efficient navigation. NOAA's portfolio of Navigation Services include accurate nautical charts populated with up-to-date hydrographic and shoreline mapping data, high-accuracy positioning data, real-time water level data and accident response tools. Oceanographic and ice forecasts are critical components of the MTS, as well as federal contributions to an Integrated Ocean Observing System. These tools help the mariner maximize use of limited channel depths safely and increase the efficiency of a port's throughput. NOAA also facilitates compatible port development while protecting coastal resources, and information provided by NOAA's Navigation Service helps coastal managers make better informed decisions on development and resources.

Responsible for surveying U.S. and territorial waters of the Exclusive Economic Zone (EEZ), NOAA has provided the Nation with nautical charts, tide

predictions and positioning information since 1807. Technological advances now enable new generations

Box 4: Partners

Federal
US Coast Guard, US Army Corps of Engineers, US Navy, Transportation

External
Pilots, Port Authorities, Shippers, Marine Exchanges, State and Local Governments, Academia

of information products and services. One of the newest products now available on the Internet are Electronic Navigational Charts (ENC), which can be integrated with Global Positioning System data and electronic chart display systems to provide powerful features such as automatic alarms when approaching a hazardous obstruction. NOAA currently has 425 ENCs available and plans to provide a comprehensive suite of ENCs to meet maritime user requirements after the Coast Guard promulgates new electronic chart carriage regulations in January 2007. When used in conjunction with other environmental information such as water levels, currents, salinity and weather, navigation safety can be significantly improved. The ENCs will also support the Coast Guard's vessel Automatic Identification System for safe navigation and Maritime Domain Awareness, as well as other Homeland Security initiatives and contingency planning exercises.

Real-time water levels are another tool in NOAA's suite of services to support safe and efficient use of a port. NOAA works with regional and local partners to expand the National Water Level Observation Network (NWLON) and the Physical Oceanographic Real-Time System® (PORTS®) in major U.S. ports. This system delivers integrated real-time data for water levels, currents, winds and water temperature to users via the telephone, fax, and Internet. PORTS® can tie into a vessel traffic system to help ships optimize both their schedules and their cargo lading to transit ports as quickly as possible, and as fully loaded as is safely possible. Currently 13 PORTS® around the Nation service 38 major U.S. seaports. In addition, by the end of FY2007 all NOAA national water level stations will be upgraded to provide real-time water level data.

Improving Coordination and Intermodal Freight Connectivity

As the U.S. economy continues to expand and international trade increases, the importance of the marine transportation infrastructure will continue to grow. It is vitally important to work together to develop a secure, safe environmentally sound Maritime Transportation System that will keep America economically strong and commercially viable in the 21st Century. The U.S. Ocean Action Plan directed creation of a cabinet-level Committee on the Marine Transportation System to improve federal coordination and policy formulation for the marine transportation system. The first meeting of the Committee was held July 11, 2005. A charter has been developed and mechanisms are being created for staff support and integrated action.

The Administration has developed a National Freight Action Agenda to ensure integration of all modes of transportation into a seamless, efficient, safe, secure and environmentally sound system for movement of goods. The Freight Action Agenda has identified high priority freight initiatives, including developing better freight data and tools, improving intermodal freight research and technology, and facilitating nationally significant freight projects. Teams have been formed to facilitate significant intermodal freight projects. To enhance freight data, a new Transportation Services Index measures changes in freight and passenger input of transportation industries. The Department of Transportation has also worked to enhance training and technical tools through its Freight Professional Development Program. The Safe, Accountable, Flexible, Efficient Transportation Equity Act-A Legacy for Users (SAFETEA-LU), signed by the President on August 10, 2005, authorized activities and programs proposed by the Administration to support the National Freight Action Agenda. The Department will oversee implementation of high priority freight projects Congress designated in the Act. The Department has also partnered with interested parties to promote and address challenges to short sea shipping on coastal and inland waterway systems to increase capacity of the intermodal transportation system.

VI. Advancing International Ocean Science and Policy

The FY 2006 President's Budget provides $135 million for programs related to international ocean issues. These programs are conducted by the Departments of Commerce, Energy, Homeland Security, the Interior, and State, the Environmental Protection Agency, the U.S. Agency for International Development and the Global Environment Facility within the Department of Treasury.

The U.S. tsunami warning system is one example of a U.S. program that informs and affects international ocean science and policy, while serving priority national needs.

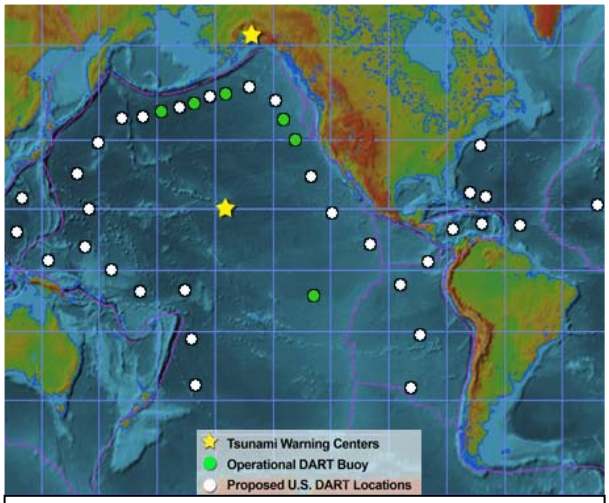
- Tsunami Warning Systems

Tsunami Warning Systems

Following the tragic events of the December 26, 2004 Indian Ocean earthquake and tsunami, the United States and members of the international community recognized the need for tsunami warning capability similar to the one operated by NOAA for the U.S. West Coast and the Pacific Ocean Nations. U.S. and international efforts have since focused on establishing a global tsunami warning system (TWS) that will contribute to a multi-hazard warning system. Concurrently, the United States has established a plan for improved tsunami detection and warning that will benefit the United States and many of our neighbors. To accomplish these tasks, relevant U.S. agencies have developed a collaborative, interagency approach to maximize response efforts.

Mission

The phenomenon called "tsunami" is a series of traveling ocean waves of extremely long lengths generated by displacements of the sea associated primarily with earthquakes occurring below or near the ocean floor. The result can be a series of devastatingly large waves at the shoreline. Tsunamis are a threat to the lives and property of anyone living near the ocean. U.S. government agencies are taking action to improve tsunami protection for the United States and the world.



Green dots are existing DART stations; White dots are NOAA estimated DART system locations for an expanded Pacific, Caribbean, and Atlantic tsunami monitoring network. Yellow stars are the Pacific Tsunami Warning Center in Hawaii and the West Coast/Alaska Tsunami Warning Center.

Box IX. Key Components to an integrated, end-to-end Tsunami Warning and Mitigation System

- Hazard Assessment
  - Modeling & Mapping
  - Vulnerability Assessment
  - Risk Assessment
- Warning Guidance
  - Real-time Seismic
  - Deep-ocean stations
  - Near-shore sea-level stations
  - Operational warning center
  - Warning assessment
  - Information dissemination
- Mitigation
  - Response planning
  - Outreach & education
  - Situational Awareness
- Research
  - Tsunami science
  - Technology development
- International Coordination
  - Regional warning systems
  - Data exchange

How We Work

Warning of a potentially dangerous tsunami begins with rapid earthquake detection and notification. The seismic monitoring network of the U.S. Geologic Survey (USGS) and the National Science Foundation (NSF) is the U.S. national "backbone" to the Global Seismic Network (GSN). Ground motion data are acquired and processed through the USGS National Earthquake Information Center (NEIC) and transmitted in near real-time to NOAA's Tsunami Warning Centers (TWCs). Within minutes, the TWCs will issue tsunami warning bulletins and tsunami watches to the public and emergency managers if the seismic event is above a predetermined threshold. The TWCs combine seismic with deep-ocean and near-shore sea-level data to confirm the tsunami event, analyzes models to assess impacts, and updates warnings.

The U.S. tsunami warning system is a cooperative effort to save lives and protect property through hazard assessment, warning guidance, mitigation, research capabilities, and international coordination (see Box IX). These efforts support existing

international agreements and relationships with other nations and organizations to improve the durability of regional tsunami warning systems and to coordinate the global TWS. The U.S. warning system is linked with the Group on Earth Observations (GEO) since the global TWS is part of the all-hazards warning system of the Global Earth Observing System of Systems (GEOSS).

Accomplishments

International Tsunami Warning Efforts

The United States has committed $16.5 million to the development of an end-to-end tsunami early warning system for the Indian Ocean and has developed an interagency approach to work within international fora on the global TWS and its component regional systems. Efforts to establish a TWS in the Indian Ocean will benefit from the existing Pacific and Alaska Tsunami Warning Centers operated by NOAA. The full range of ocean and coastal hazards will be addressed by sharing knowledge, information and technology among countries. The United States supports the lead coordinating role of UN Educational, Scientific, and Cultural Organization's Intergovernmental Oceanographic Commission (UNESCO-IOC) to develop a global tsunami detection, forecasting, and warning network that will also contribute to the all-hazards warning system coordinated by the GEO. Through a coordinated, interagency approach, the United States will also provide assistance to countries by:

- Contributing technical expertise as well as real-time seismic and sea level data to any national or regional TWS effort; and
- Assisting tsunami-affected countries to improve communication, warning and public education to warn populations threatened by natural disasters.

The United States has successfully conveyed its coordinated, interagency support for UNESCO-IOC and GEO in their respective roles through a number of international meetings to advance global tsunami warning efforts. In addition, the United States has organized digital video conferences in Chennai, India and Sri Lanka to inform countries impacted by the Indian Ocean earthquake and tsunami of U.S. strategies to monitor and respond to similar natural disasters.

The U.S. Tsunami Warning System

Federal agencies, in coordination with states and local communities, are working to improve the U.S. capability to detect, warn, and respond to potential tsunami events.

The United States has committed $40.24 million over the next two years to expand U.S. tsunami detection and monitoring capabilities. These efforts will include deploying new advanced-technology Deep-ocean Assessment and Reporting of Tsunami (DART II) stations for a total of 39, upgrading and expanding tidal gauge and seismic capacities, implementing 24/7 coverage at the TWCs, and accelerating inundation mapping and modeling for high risk communities for a fully operational, enhanced TWS by mid-2007. Expanded monitoring capabilities throughout the entire Pacific, Atlantic, and Caribbean basins will provide tsunami warning for regions bordering half of the world's oceans.

The National Tsunami Hazard Mitigation Program (NTHMP) partners NOAA and USGS with states and local communities to develop tsunami hazard plans. NTHMP supports projects that raise awareness and advance mitigation to lessen the impact (loss of life and property) of tsunami and tsunami-related events. NTHMP has developed risk assessments, inundation models and maps, and warning systems for many coastal communities of its current member states (Alaska, Hawaii, Washington, Oregon, and California). NTHMP is expanding its membership to 30 coastal states. In June 2005 all counties in Hawaii became recognized as TsunamiReady; by July 8 new U.S. TsunamiReady communities had been established; and on July 7th the first East Coast community in Harbour Beach, Florida, was recognized.

TsunamiReady
NOAA's National Weather Service

Looking to the Future

In May 2005, NOAA submitted to Congress a report on "Implementing the FY2005 Emergency Supplemental Appropriations: Strengthening The U.S. Tsunami Warning Program" and is entering a two year Interagency Agreement with USAID, USGS, USFS, USTDA, and Department of State to assist in the development of a Tsunami Warning capability in the Indian Ocean Basin.

VII. Areas of Emerging or Renewed Emphasis

Recognizing the ongoing need to pursue new opportunities in emerging areas of interest and to apply new approaches to existing issues, federal agencies, along with partners in other sectors, are capitalizing on past and current achievements to secure results on issues that are either in a developing stage or are at the center of renewed focus. Two such areas of particular interest – Oceans and Human Health and the Great Lakes – show notable promise to produce highly useful, near-term results.

- Oceans and Human Health
- Great Lakes Executive Order

Oceans and Human Health

Coastal, ocean and Great Lakes waters contribute significantly to the quality of life in the U.S, but can potentially become conduits for environmental threats to human health, including disease, contaminants and toxins. At the same time, marine-based biochemical compounds offer great potential for treating human illness. To guard against health impacts and take advantage of the many benefits oceans provide, federal agencies are involved in collaborative research efforts to examine connections between ocean condition and human health.

NSF, NIEHS, and NOAA are collaborating on novel ocean and human health (OHH) initiatives that bring together ocean scientists and the biomedical community to support interdisciplinary research. Results from these initiatives will inform managers and planners, the scientific community and the public in reducing human health risks and enhancing national biomedical capabilities. The most significant of these efforts is the recent establishment of OHH research centers across the country, both at academic institutions and federal laboratories. These OHH initiatives support an ecosystem approach to understanding human impacts on the condition of marine systems, the effects of impacted ocean environments on human health, and the ecologically sound discovery of marine pharmaceuticals.

Interagency OHH research efforts covering a range of issues are underway in nearly every region of the Nation. Studies on marine algal toxins are developing new detection tools and strategies to prevent or treat impacts to human health that may result from consumption of contaminated seafood, contact with toxins in seawater, or inhalation of aerosolized toxins. Cutting-edge genomics tools are being applied to the identification of marine algal species and the toxins they produce, as well as to identification of pathogenic microbes in coastal waters. This work will enable early warning systems for threats to human health and marine ecosystems. OHH researchers have also determined why certain clams are resistant to the toxin that causes Paralytic Shellfish Poisoning (PSP), providing information that could help prevent PSP in humans. OHH-related research recently provided information that guided state officials in taking measures to protect human health during the largest outbreak of red tide in Massachusetts Bay in over a decade. Findings from other OHH work will make it possible for shellfish producers to remove the pathogen *Vibrio vulnificus*, the leading cause of seafood-related mortality in the United States, from shellfish before they are consumed. Models of Lake Michigan circulation recently showed that sewer overflows from Milwaukee were not the cause of beach contamination in the Chicago area. Further development of such models will provide beach managers with a new generation of tools to more rapidly assess conditions and protect public and economic health. Research on chemical contaminants, microbial pathogens and sentinel species and habitats is feeding the development of new models that will enhance our understanding of the relationships between exposure to contaminants, pathogens and toxins and the occurrence of disease in both indicator animals and humans. Studies of extracts from marine microorganisms are underway to reveal their potential application to treat cancer, chronic pain, and infectious diseases. (The harmful algal blooms and hypoxia highlight provides additional information on OHH-related efforts.)

With these OHH initiatives at the one-year mark, research results are starting to reveal cause and effect relationships between the state of the marine environment and the state of human health. The collaborative nature of this research is accelerating the pace of scientific discovery and affording researchers access to the interactions necessary to build on promising early results.

Great Lakes Executive Order

The Great Lakes constitute the largest system of fresh, surface water on Earth, and provide enormous economic, environmental, and cultural values to millions of American and Canadian citizens. On May 18, 2004, the President signed the Great Lakes Executive Order (E.O. 13340) to accelerate the restoration and protection of this unique and valuable resource. The Executive Order has two main elements – establishment of a Great Lakes Interagency Task Force (Task Force), and creation of a regional collaboration of national significance to address environmental and natural resource issues involving the Great Lakes.

The Task Force brings together nine federal agencies and the Council on Environmental Quality to coordinate restoration and protection of the Great Lakes. This effort is designed to improve program efficiencies by reducing overlap and better leveraging existing programs and resources.

The regional collaboration of national significance was established through the creation of the Great Lakes Regional Collaboration (GLRC), a partnership of federal agencies, states, cities, tribes and Congress whose purpose is to develop a widely understood and broadly supported Great Lakes Restoration and Protection Strategy. The first step toward developing this strategy was the creation of Issue Area Strategy Teams to examine and make recommendations on eight Great Lakes-specific issues, which were derived from priorities adopted by the Council of Great Lakes Governors in October 2003 and subsequently endorsed by the U.S. Great Lakes Mayors.

While development and adoption of a final strategy is not scheduled to occur until the winter of 2005, the Task Force and the GLRC have already had numerous accomplishments. The Task Force has been successful in gathering resources of federal agencies involved and directing them toward high priority issues requiring focused and collaborative action, including the Chicago Sanitary and Ship Canal Aquatic Nuisance Species Dispersal Barrier, the Great Lakes Legacy Act, and the Great Lakes component of the Global Earth Observation System of Systems.

Accomplishments of the Great Lakes Regional Collaboration include the successful design of the collaboration framework, which was formally adopted by the members on December 3, 2004; the creation of the eight Issue Area Strategy Teams which involve representatives from all sectors in the Great Lakes community; and the development and release of a draft Great Lakes Restoration and Protection Strategy. Following a 60-day public comment period and five public meetings, the GLRC will finalize the strategy and release it on December 12, 2005.

VIII. Appendix: Agency Summaries of Activities and Resources

Department of Agriculture

The U.S. Department of Agriculture (USDA) provides leadership on food, agriculture, natural resources, and related issues. USDA's goals are to enhance economic opportunities for agricultural producers; support increased economic opportunities and improved quality of life in rural America; enhance protection and safety of the Nation's agriculture and food supply; improve the Nation's nutrition and health; and protect and enhance the Nation's natural resource base and environment.

Three USDA agencies, the Agricultural Research Service (ARS), Cooperative State Research Education and Extension Service (CSREES), and the Natural Resources Conservation Service (NRCS) conduct programs in support of USDA's goals that affect ocean, coastal, and Great Lake resources and contribute to the themes of the U.S. Ocean Action Plan. In particular, USDA programs support the Clean Water Action Plan, provide agricultural support to encourage conservation of wetlands, and work to improve water quality.

Agricultural Research Service

One area of focus for the Agricultural Research Service (ARS), USDA's primary in-house science agency, is addressing problems related to the interaction of agriculture and the environment. These efforts support the U.S. Action Plan themes of "Managing Coasts and Their Watersheds" and " Enhancing the Use and Conservation of Our Ocean Coastal, and Great Lakes resources" as described below.

Managing Coasts and Their Watersheds

ARS conducts research in cooperation with USDA's Natural Resources Conservation Service (NRCS), the South Florida Water Management District, the Army Corps of Engineers, EPA, and others state agencies on the restoration of the Everglades National Park and South Florida ecosystem. ARS also evaluates and develops models to predict crop response, soil-crop nutrient availability, environmental impacts, habitat management, and economic factors under high water tables which relate directly to restoring the Everglades. Finally, ARS focuses on developing a comprehensive water management model to define water requirements and the risk of flooding in agricultural areas based on proposed changes in the water delivery system in South Florida.

Enhancing the Use and Conservation of Our Ocean, Coastal, and Great Lakes Resources

ARS is engaged in research programs directly related to marine aquaculture. These include developing aquaculture and livestock feed supplements from marine fish processing byproducts; developing marine shrimp feeds and culture technologies; studying food safety of farm-raised marine shellfish; integrating management of fish diseases using multi-disciplinary approaches; developing culture systems for marine finfish; developing fish feeds containing less fish meal; genetic improvement of shellfish and cold water marine fish; and habitat restoration. Cooperative research programs exist with state and Land Grant universities (University of Alaska, University of Oregon, University of Idaho, Mississippi State University, and Delaware State University) and private research organizations (Oceanic Institute and Harbor Branch Oceanographic Institute).

ARS also participates in integrated research and demonstration projects, conducted cooperatively with the Army Corps of Engineers, and the USDA-Cooperative State Research, Education, and Extension Service (CSREES) scientists with assistance from the USDA-Natural Resources Conservation Service (NRCS), Economic Research Service (ERS), and National Agricultural Statistics Service (NASS). The goals of these projects are to develop alternative options and strategies to reduce nutrient use and availability for transport to surface waters, and sediment yield; techniques for estimating soil nutrient status; and agricultural production systems that are both economically sound and environmentally benign. ARS has the expertise needed to develop improved agricultural drainage systems and management practices for the Great Lakes Regions of the United States.

Cooperative State Research, Education, and Extension Service

In cooperation with its partners and customers, the Cooperative State Research Education and Extension Service (CSREES) helps advance research, extension, and higher education in the food and agricultural sciences and related environmental and human sciences to benefit people, communities, and the Nation.

The CSREES results-oriented vision is to improve economic, environmental, and social conditions through improved agricultural and other economic enterprises; safer, cleaner water, food, and air; enhanced stewardship

and management of natural resources; healthier, more responsible, and more productive individuals, families, and communities; and a stable, secure, diverse, and affordable national food supply.

CSREES funds a diverse assortment of research and educational programs related to nutrient management from farm animal agriculture, including aquaculture. Examples of programs that affect coastal and ocean resources are described below.

- CSREES Aquaculture Program: The CSREES Aquaculture program funds aquaculture research, education, and extension projects focusing on a variety of freshwater and marine species via a varied portfolio of funding programs. The Regional Aquaculture Center (RAC) Program supports aquaculture research, development, demonstration, and extension education to enhance viable and profitable U.S. aquaculture production to benefit consumers, producers, service industries, the American economy, while maintaining the quality of our Nation's water resources. The RACs encourage collaborative research and extension education aquaculture programs with regional or national application. RACs programs complement and strengthen existing aquaculture research and extension programs supported by USDA, the National Sea Grant Program, and other public institutions. Projects developed and funded by the RACs are based upon aquaculture industry needs and are designed to affect U.S. commercial aquaculture development while maintaining the quality of our environment.

- National Research Initiative: The National Research Initiative Competitive Grants Program funds research on key problems of national and regional importance in biological, environmental, physical, and social sciences relevant to agriculture, food, and the environment on a peer-reviewed, competitive basis.

- Sustainable Agriculture Research and Education Program (SARE): SARE works to increase knowledge of, and help farmers and ranchers adopt sustainable agricultural practices. To advance such knowledge nationwide, SARE administers competitive grants for research, education, and professional development, through four regional programs. These programs help small farmers learn production techniques that reduce nutrient losses from their particular farm. These programs reduce nutrient inputs from applied fertilizers and animal operations, thereby reducing the nutrient loads reaching estuarine and marine ecosystems downstream.

- Integrated Pest Management (IPM): IPM promotes informed and judicious pesticide use, enhanced environmental stewardship, and sustainable systems. This is achieved by protection of commodities with environmentally and economically sound practices and results in abundant and diverse supplies of food and fiber products.

  Pest Management Alternatives is one example of an IPM grant that supports projects to help farmers respond to the environmental and regulatory issues confronting agriculture. These grant funds support research into effective alternatives to pesticides that may be subject to regulatory action by the Environmental Protection Agency. New pest management tools are being developed to address critical pest problems identified by farmers and others in a crop production region and to identify new approaches to managing pests without some of the most widely used pesticides. Where effective alternative tactics have been developed, they are widely and rapidly implemented by farmers. These research grant funds are distributed on a competitive basis to all eligible research institutions through the Pest Management Alternatives Program or PMAP.

- Integrated Activities: Water Quality projects funded under the Integrated Activities program include projects to determine the causes and effects of low dissolved oxygen in the rivers, streams, and wetlands; to develop a scientifically-based framework for trading phosphorus credits between point and non-point sources to meet the phosphorus load restrictions; and utilizing diversions for nutrient management in coastal watersheds.

Natural Resources Conservation Service

The Natural Resources Conservation Service's (NRCS) conservation programs are developed for many purposes, including conservation of soil, improvement of water quality and quantity, conservation of habitat, and enhancement of the health of natural resources, primarily

on private lands. Programs, including Conservation Technical Assistance, are provided to landowners on a voluntary basis. Although improving ocean resource health is not the primary purpose for NRCS programs, benefits to ocean resources are often realized, including benefits to aquatic wildlife, habitat restoration and water quality enhancement.

- Conservation Technical Assistance (CTA): NRCS, working in partnership with local conservation districts and others, is a major provider of technical assistance. CTA is based on effective, science-based technology. Assistance is provided to land users who voluntarily engage in conservation and to those who must comply with local or state laws and regulations. CTA helps landowners and land users make informed decisions about how to improve soil and water quality, improve and conserve wetlands, enhance fish and wildlife habitat, and reduce upstream flooding. Land-based conservation practices applied through the CTA program provide off-site benefits to near-shore ocean habitats, including coral reef ecosystems, by reducing sediment and nutrient loading into receiving water bodies.

  A significant portion of NRCS field staff expertise is used to assist farmers in the development of comprehensive nutrient management plans. These plans are intended to reduce animal waste runoff to water bodies through the development and implementation of practices related to the handling and storage of animal manure and the application of the manure on land. The process of developing such management plans also encourages landowners to assess and address the condition of all natural resources on their property.

- Environmental Quality Incentives Program (EQIP): EQIP is a voluntary conservation program that promotes agricultural production and environmental quality as compatible national goals. One of the EQIP national priorities is the reduction of nonpoint source pollution. By controlling nonpoint source pollutants entering coastal and inland waterways, installation of these conservation practices provide off-site benefits to near-shore ocean habitats by reducing sediment and nutrient loading. Through EQIP, farmers and ranchers may receive assistance to install or implement structural and management conservation practices on eligible agricultural land. Producers engaged in livestock or crop production on eligible land may apply for the program.

  EQIP activities are carried out according to an EQIP plan of operations developed in conjunction with the program participant. EQIP may pay up to 75 percent of the costs of certain conservation practices or up to 90 percent for limited resource farmers and beginning farmers. The use of incentive payments encourages producers to adopt land management practices, such as nutrient management, manure management, integrated pest management, irrigation water management, and wildlife habitat management, or to develop a Comprehensive Nutrient Management Plan (CNMP) and components of a CNMP.

- Wetlands Reserve Program: The Wetlands Reserve Program is a voluntary program that provides assistance to eligible landowners to restore, enhance, and protect wetlands. Restoring wetlands and associated upland buffer areas benefits the ocean waters by providing filtering for nutrients and sediment from surface runoff that flows into ocean receiving waters. Landowners enjoy the benefits that come from both new and improved wildlife habitat, better water quality, and biodiversity. Landowners may decide whether to use permanent or 30-year easements, or restoration cost-share agreements that generally last 10 years. In all instances, landowners maintain fee title ownership and control of access to the land. NRCS State Conservationists determine project selection priority within broad national guidelines. Over 1.6 million acres are enrolled in the program.

Department of Agriculture								
	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
United States Department of Agriculture								
Agricultural Research Service								
Managing Coasts and Their Watersheds					100%	1.9	1.9	1.6
Marine Aquaculture	100%					6.0	6.2	0.4
Cooperative State Research, Education,								
and Extension Service								
Non-point Source (NS) Freshwater, Physical	95%		5%			1.0	1.0	1.0
NS Freshwater, Chemical	95%		5%			2.0	2.0	2.0
NS Estuarine Water, Physical	90%		10%			1.0	1.0	1.0
NS Estuarine Water, Chemical	100%					1.0	1.0	1.0
NS Marine, Physical	100%					0.1	0.1	0.1
NS Marine, Chemical	95%		5%			0.2	0.2	0.2
Habitat, Marine (HM), Freshwater	90%		10%			0.4	0.4	0.4
HM, Estuarine	90%		10%			0.4	0.4	0.4
HM, Marine	90%		10%			0.1	0.1	0.1
Natural Resources Conservation Service								
Conservation Operations	100%					189.7	183.9	165.2
Wetlands Reserve Program	100%					95.6	93.6	98.8
Environmental Quality Incentives Program	100%					334.9	377.3	371.0
Department of Agriculture Total						**634.3**	**669.1**	**643.2**

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.

Department of Commerce

National Oceanic and Atmospheric Administration

The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) forecasts weather and climate, manages fisheries and coastal areas, provides navigation services, and researches atmospheric and oceanic issues. NOAA's mission is to understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs. NOAA's five goals are to:

- Protect, Restore, and Manage the Use of Coastal and Ocean Resources Through an Ecosystem Approach to Management;
- Understand Climate Variability and Change to Enhance Society's Ability to Plan and Respond;
- Serve Society's Needs for Weather and Water Information;
- Support the Nation's Commerce with Information for Safe, Efficient, and Environmentally Sound Transportation; and
- Provide Critical Support for NOAA's Mission

Ocean and coastal programs within NOAA are described below.

National Ocean Service

The National Ocean Service (NOS) is the primary federal entity concerned with the study, preservation, and enhancement of America's coastal environment and resources. NOS acts on its mandates through the observation, measurement, assessment, and management of the Nation's coastal and ocean areas and conducts response and restoration activities to protect vital coastal resources. As a national leader for coastal stewardship, NOS promotes a wide range of research activities to create the strong science foundation required to advance the sustainable use of coastal systems. NOS provides improvements in the quality, quantity, geographic distribution, and timeliness of ocean and coastal observations. Mapping, charting, geodetic, and oceanographic activities produce marine and coastal data to increase efficiency and safety of marine commerce and support coastal resource management. NOS protects and restores coastal resources injured by releases of oil and other hazardous materials. NOS also manages marine sanctuaries and, in partnership with the coastal states, helps manage the Nation's valuable coastal zones and nationally significant estuarine reserves. The NOS mission is accomplished through three subactivities: Navigation Services; Ocean Resources Conservation and Assessment; and Ocean and Coastal Management.

- Navigation Services: NOAA's Navigation Services provide the information and products to ensure safe marine transportation and to support coastal resource management. This includes building and maintaining a nautical charting database through updating nautical surveys, defining the national shoreline, and developing the National Spatial Reference System. NOAA Navigation Services also works to provide real-time observations and forecasts of water levels, tides, and currents.

- Ocean Resources Conservation and Assessment: The NOS programs under the Ocean Resources Conservation and Assessment subactivity carry out a number of restoration and research efforts to provide for sustainable use of coastal and ocean resources. NOS performs damage assessments for coastal natural resources and restoration efforts to mitigate the effect of human activities and restore ecosystem functions. NOS programs also conduct research on the factors that affect the health and productivity of the Nation's coastal resources leading to improved monitoring, assessment and prediction of ecosystem structure and change. Finally, through NOS's connections to the research and management communities, the program is able to facilitate the development and transfer of tools and technology that provide more effective mechanisms to protect, restore, and use coastal ecosystems.

- Ocean and Coastal Management: NOS's Ocean and Coastal Management subactivity maintains the quality and utility of the Nation's coastal lands and waters through a national network of Federally-approved, coordinated, and supported state management programs. As part of this effort NOS provides technical assistance to states in the development, and implementation state Coastal Zone Management programs and estuarine research reserves. In addition, NOS maintains and manages a national network of marine protected areas to conserve natural resources with national significance and enhance public awareness and understanding of the marine environment.

National Marine Fisheries Service

Marine fisheries annually contribute billions of dollars and hundreds of thousands of jobs to the U.S. economy, yielding a valuable bounty of finfish and shellfish -- lobster, cod, shrimp, pollock, crab, scallop, tuna, and many others. Marine fisheries provide recreational opportunities for over 17 million Americans each year. The National Marine Fisheries Service (NMFS) is responsible for sustaining the health and productivity of living marine resources and their habitats within 3.4 million square miles of ocean and coastal waters, allowing U.S. citizens to reap the greatest economic and social benefits. These benefits include a continuing supply of high-quality seafood, recreational enjoyment, and a rich and diverse marine environment.

The agency manages both fisheries and federally-protected resources (e.g., whales, dolphins, sea turtles), conducts research that underpins decisions and protective regulations, and enforces fishery laws. It supports interstate and international fisheries management, fisheries and aquaculture development, seafood safety, protected species recovery, and habitat protection and restoration. The NMFS mission encompasses three primary areas:

- Fisheries Sustainability: The United States has a highly efficient fishing industry. NMFS scientists develop new sampling methods, survey technologies, and sophisticated models to assess the status and utilization of hundreds of fish and shellfish stocks harvested in both domestic and international waters. In partnership with coastal states, territories, tribes, and regional Fishery Management Councils, NMFS crafts management measures that rebuild stocks, prevent overfishing, reduce by-catch, support fishery-dependent local communities, and safeguard the long-term value of the Nation's seafood supply.

- Protected Species Recovery: Marine mammals, sea turtles, salmon stocks, sea birds, and other resources under federal protection are affected by fishing, coastal development, environmental change, and other factors. NMFS monitors these activities, develops measures to reduce their impact, and works with other partners to conserve the habitat of protected species, both domestically and around the globe.

- Ecosystem Health: Tidal marshes, coral reefs, mangroves, seagrass beds, kelp forests, and other marine habitats provide forage, shelter, and spawning sites for the Nation's fisheries and protected resources. NMFS monitors threats to these fragile areas – sediment contamination, water diversion for industry and agriculture, sedimentation, dredging and filling – and recommends measures to offset their impact. Agency scientists are in the forefront of habitat restoration research and work closely with states and local communities to protect and restore fish habitat.

Office of Oceanic and Atmospheric Research

The Office of Oceanic and Atmospheric Research (OAR) studies the Earth system from the deep ocean to the highest reaches of the atmosphere, providing products and services that help to explain, and, in some cases, to predict environmental changes at spatial scales from local to global and at time scales from days to centuries. OAR is integrated across the three central research themes of climate; weather and air quality; and ocean, coastal, and Great Lakes resources, reflecting the intimate connections between the land, ocean, and atmosphere.

OAR is an applied research organization that consists of 11 federal laboratories, their 13 Joint Institute research partners, the National Sea Grant College Program, the National Undersea Research Program, the NOAA Climate Program, the Arctic Research Program and the Office of Ocean Exploration. These programs are enhanced by formal partnerships with academia, industry, and governmental agencies.

The coupling of the oceans and atmosphere drives many natural cycles and events including weather systems, climate variability, and long-term environmental change. OAR has world-class observational, modeling and technology-development capabilities used to understand ocean-atmosphere systems. These capabilities better characterize the role of the oceans in weather and climate, and support modeling efforts to predict major coastal storms and hurricanes. The development and enhancement of sophisticated climate models is central to the work of NOAA's Climate Services. OAR also provides sustained *in-situ* observations for understanding the role of the oceans in climate variability and potential change. OAR is a world leader in monitoring and understanding the influence of natural and anthropogenic atmospheric constituents, including greenhouse gases and aerosols, that may affect climate or influence air quality.

OAR scientists, in partnership with many of the Nation's top universities and other federal scientists, provide research-based information and predictive capabilities to assist management of U.S. territorial waters. The National Sea Grant College Program fosters scientific and economic advances in sustainable marine aquaculture, marine biotechnology, commercial

and recreational fishing, aquatic nuisance species research and outreach, marine education, seafood technology, and harmful algal blooms. OAR information has supported decisions regarding fisheries, coral reef, and water resource management; the biotechnological and geological potential of hydrothermal vent systems; depleted populations of exploited or protected species; and development and understanding of the physical, chemical, and biological aspects of the oceans and Great Lakes.

National Weather Service

The National Weather Service's (NWS) mission is to provide weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas for the protection of life and property and the enhancement of the national economy. It supports the infrastructure of critical ocean observations; telecommunication and data management functions; and the provision of a number of advisory, warning, and forecast services. Most NWS ocean program activities support the national observation infrastructure and related advisories, warnings and forecasts needed for the safety of life and the overall quality of the earth's environment.

Important ocean-related activities supported within the NWS are:

- Marine Observations: Continuous, real-time monitoring of ocean and atmospheric elements supports weather and climate-change prediction. The NWS operates the National Data Buoy Center, which maintains a marine observational network of over 150 buoys and 55 coastal stations.

- Marine Weather Services: The NWS issues marine forecasts and warnings for the U.S. coastal, Great Lakes, offshore, and high seas waters.

- Tropical Cyclone Support: The NWS issues forecasts, watches, and warnings for tropical cyclones for the United States and its territories. It operates the National Hurricane Center in Miami, Florida and the Central Pacific Hurricane Center in Honolulu, Hawaii.

- Tsunami Program: The NWS operates the West Coast/Alaska Tsunami Warning Center in Palmer, Alaska; the Pacific Tsunami Warning Center in Ewa Beach, Hawaii; and the Deep-ocean Assessment and Reporting of Tsunamis buoy network.

- Storm Surge: The Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model provides an assessment of the storm surge expected from hurricanes hitting land along the U.S. East and Gulf coasts. The extratropical model provides expected storm surge for winter-type storms for the East, Gulf, and Northwest coasts, and Alaska's Bering Sea and Arctic coastlines.

- Numerical Modeling Activities for the Ocean and the Ocean-Atmosphere Coupled System: The NWS runs ocean data assimilation and numerical models that provide analysis and guidance forecasts to support weather and seasonal climate forecast and warning responsibilities.

National Environmental Satellite, Data, and Information Service

The National Environmental Satellite, Data, and Information Service (NESDIS) ensures continuous operational availability and access to environmental satellite data and information from both NOAA and non-NOAA satellites. While NESDIS's remote sensing activities have focused on short-term weather warnings and forecasts, ocean applications have grown in importance as satellite sensor technologies have improved. Looking toward the future, the National Polar Orbiting Environmental Satellite System and the Geostationary Operational Environmental Satellite R-Series will address an expanded suite of ocean, coastal, and terrestrial sensing needs. NESDIS also operates the Nation's oceanographic, climatic, and geophysical data centers, which provide for long-term stewardship, and access to critical environmental data and information.

NESDIS also supports research partnerships to enable the transition of remote sensing products into operational availability, and to provide guidance for the development of future spacecraft and sensors. These products and services range from worldwide operational sea ice analyses and forecasts; search and rescue of aviators, mariners, and land-based users in distress; and the detection and prediction of coral reef bleaching and harmful algal blooms. Data from multiple satellite sensors can be used to infer a variety of oceanic properties, ranging from surface wind speeds to small/large scale oceanic circulations.

NOAA's National Data Centers manage the world's largest collection of publicly available climatic, oceanographic, and geophysical data and information. They house and operate several World Data Centers for Oceanography, Marine Geology, and Geophysics, as well as the NOAA Library. These World Data Centers are components of a global network of discipline

centers that facilitate the international exchange of data. The NOAA Central Library maintains an extensive, multi-disciplinary research collection of all subjects related to the NOAA mission.

NOAA Marine and Aviation Operations

NOAA Marine and Aviation Operations' mission is to provide high-quality ship and aircraft operations and scientific support to NOAA. It operates and maintains 13 aircraft and the NOAA fleet of 18 research and survey vessels, provides guidance and assistance for outsourced projects, conducts diving operations, and serves in program positions throughout NOAA.

The NOAA fleet provides platforms for the collection of oceanographic and atmospheric data required to meet NOAA's environmental and scientific missions. The fleet conducts complex hydrographic surveys to support nautical charting; oceanographic and atmospheric research to study global climate change; fisheries-stock and marine- ship and aircraft support, conducts the NOAA Diving Program, and administers the NOAA Commissioned Corps. The NOAA Commissioned Corps – the smallest of the Nation's seven uniformed services – operates ships and aircraft, leads mobile field parties, manages research mammal assessments; and monitoring of coastal habitats and pollution trends. NOAA's aircraft collect environmental and geographic data for NOAA hurricane and other severe-weather and atmospheric research; provide aerial support for coastal and aeronautical-charting and remote-sensing projects; conduct aerial surveys to help predict flooding potential from snow melt; and provide support to NOAA's fishery research and marine-mammal assessment programs.

Department of Commerce								
	Percentage of Funds Dedicated to Each Ocean-Related Program Function*						Dollars in millions	
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
National Oceanic and Atmospheric Administration								
National Ocean Service								
Operations, Research, and Facilities								
Mapping and Charting		100%				88.80	85.30	91.60
Tide and Current Data		100%				24.70	27.30	23.10
Ocean Assessment Program	100%					132.10	146.90	55.20
Response and Restoration	100%					25.20	38.00	24.90
Oceanic & Coastal Research			100%			20.00		
Coastal Ocean Science			100%			21.00		
National Centers for Coastal Ocean Science			100%				59.60	48.00
Coastal Management	100%					104.40	94.70	91.10
Marine Sanctuary Program	100%					54.30	58.00	35.70
Procurement, Acquisition, & Construction								0.00
NERRS Construction & Acquisition	100%					36.30	36.50	7.30
Marine Sanctuaries Facilities	100%					3.20	9.90	7.30
Coastal and Estuarine Land Conservation Program	100%					50.60	41.70	
Other NOS Construction/Acquisition	100%					13.10	39.00	
National Marine Fisheries Service								
Operations, Research, and Facilities								
Protected Species Research and Management	51%		48%	1%		145.10	175.50	159.30
Fisheries Research and Management	45%		55%			285.40	297.90	294.00
Enforcement and Observers/Training	96%			4%		71.20	70.40	80.20
Habitat Conservation and Restoration	45%	10%	45%			41.20	53.20	34.10
Other Activities Supporting Fisheries	33%		67%			78.40	79.50	57.90
Other NMFS Accounts								
Other Accounts	36%		64%			28.60	27.90	10.90
Pacific Coastal Salmon Fund	88%		12%			85.00	88.20	90.00
Procurement, Acquisition, & Construction								
NMFS Construction			100%			23.20	31.00	2.00

(Continued on next page.)

Department of Commerce								
	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Oceanic and Atmospheric Research								
Ocean, Coastal, & Great Lakes Research Labortories and Joint Institutes			100%			20.20	20.30	20.10
National Sea Grant College Program	49%	1%	17%		33%	61.90	61.90	61.20
National Undersea Research Program			100%			16.80	17.20	10.50
Ocean Exploration			100%			29.70	28.60	22.70
Other Ecosystem Programs			100%			0.80	0.00	4.10
Other Ocean, Coastal and Great Lakes Partnership Programs			100%			24.10	18.80	0.00
Climate Research Labs & Joint Institutes / AOML & PMEL			100%			13.80	13.50	14.00
National Weather Service								
U.S. Marine Observations	10%				90%	16.30	13.20	15.20
U.S. Marine Weather Program		15%			85%	17.50	17.90	18.36
U.S. Tropical Cyclone Program					100%	5.04	5.04	5.20
U.S. Tsunami Warning Program					100%	8.40	8.40	15.90
Storm Surge Program					100%	0.16	0.16	0.16
Marine Modeling					100%	1.80	1.82	1.80
NOAA Marine and Aviation Operations								
Operations, Research, & Facilities								
Marine Services	60%	25%	15%			82.20	110.50	86.80
Fleet Planning & Maint.	60%	25%	15%			12.20	13.80	13.10
Aircraft Services		100%				3.00	3.00	3.10
Procurement, Acquisition, & Construction								
Fleet Replacement	75%		25%			17.20	58.00	35.70
National Environmental Satellite, Data, and Information Service								
Operations, Research, & Facilities								
Environmental Satellite Observing Systems								
Ocean Remote Sensing	65%		35%			3.50	3.90	4.00
Coral Reef Watch	100%						0.70	0.70
Other Environmental Satellite Observing Services	65%		35%			8.80	10.30	10.20
NOAA's Data Centers and Information Services								
Archive, Access, and Assessment	65%		35%			6.80	8.30	9.10
Coastal Data Development	65%		35%			4.50	4.50	4.60
International Pacific Research Center			100%			0.30	0.70	
Pacific Ocean and Environmental Information Center	65%		35%				0.70	
Procurement, Acquisition, & Construction								
Systems Acquisition								
GOES Series	100%					18.90	28.20	42.10
NOAA K-N'	33%	7%	60%			6.10	6.30	6.20
Polar Convergence	60%	20%	20%			68.40	75.10	80.30
Program Suuport								
Operations, Research, & Facilities								
Corporate Services	40%	20%	25%	5%	10%	71.40	74.40	72.30
NOAA Education Program	100%					1.50	18.30	0.00
Facilities	40%	20%	25%	5%	10%	8.70	12.40	7.70
Procurement, Acquisition, & Construction								
Corporate Services					100%	3.20	0.40	0.00
Construction					100%	2.40		
National Institute of Standards and Technology								
Scientific and Technical Research and Services								
Marine Analytical Quality Assurance and Environmental Specimen Bar	100%					2.70	2.70	2.70
Marine Health Biosciences	100%					1.00	1.00	1.00
Physics			100%			0.18	0.18	0.18
TOTAL						**539.47**	**640.19**	**569.00**

Department of Defense

Within the Department of Defense, the Department of the Navy, the Defense Advanced Research Projects Agency, the Office of the Secretary of Defense, and the Army Corps of Engineers are actively engaged in ocean and coastal activities.

Department of the Navy

The U.S. Navy's ocean and coastal activities are performed by the Office of Naval Research (including the Naval Research Laboratory) and, for the Chief of Naval Operations, by the Oceanographer of the Navy. While the programs' primary focus is to support military objectives, they also impact some of the theme areas of the U.S. Ocean Action Plan, especially the themes of "Advancing our Understanding of the Oceans, Coasts and Great Lakes," and "Advancing International Ocean Policy and Science." The U.S. Ocean Action Plan stresses the need for an Integrated Ocean Observation System; and Navy programs continue to develop much of the observational technology that is in that system. The U.S. Ocean Action Plan also stresses Lifelong Ocean Education; and Navy programs currently support over 500 graduate students studying ocean science, contribute to secondary school programs and teacher-training programs, and to general workforce development within the field of oceanography.

Office of Naval Research

The Office of Naval Research (including the Naval Research Laboratory) coordinates, executes, and promotes the science and technology programs of the United States Navy and Marine Corps through universities, government laboratories, and nonprofit and for-profit organizations. It provides technical advice to the Chief of Naval Operations and the Secretary of the Navy, works with industry to improve technology manufacturing processes while reducing fleet costs or extending fleet capabilities, and fosters continuing academic interest in naval-relevant science from the high school through postdoctoral levels. It has programs in a number of ocean-related activities, including:

- Naval Ocean Sciences: Basic research areas included in this program are: coastal geosciences, ocean engineering, oceanic optics and biology, marine meteorology, physical oceanography (including remote sensing, ocean modeling, and high-latitude studies), and ocean acoustics. The basic research conducted in these areas is competitively selected to have a potential for major impact on future naval operations and warfare. The focus is upon observing, modeling, and predicting mostly small scale processes in the air/ocean/shore environments as they might affect naval operations, as well as sensor and system performance in the world's oceans, primarily littoral regions around the globe. Principal investigators are primarily in the academic community but extensive ties exist with Navy labs, university/Navy labs, other federal labs and private industry. Much of the knowledge gained in this research is useful to other agency programs, plus state and local entities, both public and private.

- Applied Oceanographic Research: Applied oceanographic research is conducted in an integrated approach with the basic research program to allow new knowledge obtained in various oceanographic disciplines to be synthesized and exploited toward specific naval applications, such as nowcasts and forecasts of ocean variability or environmental effects on sensors, platforms, structures, and operations. Often the result is an environmental model, algorithm, or technique to be tested for operational use. The products are designed to increase the naval operator's knowledge of the battlespace environment with the goal of uncluttering the tactical picture, providing tools for tactical decisions, and providing a tactical advantage through exploitation of environmental variability. In addition, significant investments are made in new instrumentation and observational methods such as drifters, floats and, most recently, autonomous underwater vehicles for adaptive sampling and data assimilation. Principal investigators are in the academic community, Navy and other federal labs, and private industry. A significant portion of these developments, especially the observational capabilities, have often proved very useful to non-DOD agencies, plus state and local entities, both public and private.

- National Oceanographic Partnership Program: This program was established in Fiscal Year 1997 through Public Law 104-201 with the aims: 1) to promote the national goals of assuring national security, advancing economic development, protecting quality of life, and strengthening science education and communication through improved knowledge of the ocean; (2) to coordinate and strengthen oceanographic efforts in support of those goals by identifying and carrying out

partnerships among federal agencies, academia, and industry in the areas of data, resources, education, and communication. Formal linkage exists with fifteen federal agencies (Navy, National Oceanic and Atmospheric Administration, National Science Foundation, National Aeronautic and Space Administration, Department of Energy, Environmental Protection Agency, Department of Homeland Security, U.S. Coast Guard, U.S. Geological Survey, Defense Advanced Research Projects Agency (DARPA), Minerals Management Service, Office of Science and Technology Policy, Office of Management and Budget, Department of State, and U.S. Army Corps of Engineers). Efforts funded under this program involve partnerships between various components of the national oceanographic community focusing most recently on a U.S. Integrated Ocean Observing System (IOOS) and Promoting Lifelong Ocean Education.

- Marine Mammals: This program provides both basic and applied research in response to the need to conduct naval activities in ways that minimize disruption to marine mammals and other protected marine life. Program areas include investigations of environmental consequences of underwater sound, predictive modeling and quantitative risk assessment for manmade sounds in the marine environment, and development of resources to monitor and mitigate potentially adverse interactions between naval activities and the marine environment. Principal investigators include members of the academic community, government labs, and private industry. The Marine Mammal program works closely with federal, state, and non-U.S. agencies charged with conservation and management of the marine environment to better facilitate the dissemination of program results. Results from this program are not only presented in peer-reviewed professional literature and similar outlets for scientific information, but are summarized in annual reports provided to the U.S. Marine Mammal Commission and the National Academy of Sciences and made publicly available on the program website. Recognizing the high level of public interest in a relatively new, unfamiliar, and technical subject, the Marine Mammal program devotes a significant portion of its effort to outreach and education from grade school through postgraduate levels of instruction.

Defense Advanced Research Projects Agency (DARPA)

Most of DARPA's contribution to work on the ocean sciences comes from Congressional earmarks to the Center of Excellence for Research in Ocean Sciences (CEROS). This undertaking encourages research and development in ocean sciences, by involving specialized small businesses with expertise in ocean related research, and providing access to the ocean sciences expertise of the University of Hawaii. Major research areas of interest have included:

- Shallow Water Surveillance Technologies, emphasizing approaches to collection, processing and presentation of information from and about the maritime operational environment.
- Ocean Environmental Preservation, emphasizing system development and demonstrations for ocean environmental sensing, remediation, monitoring and control.
- New Ocean Platform and Ship Concepts, emphasizing development and demonstration of designs, advanced structures or improved techniques.
- Ocean Measurement Instrumentation and Ocean Engineering Tools, emphasizing development and demonstration of sensors, undersea systems or facilities, and techniques for undersea measurement, modeling, prediction and data exploitation.
- Unique Properties of the Deep Ocean Environment**,** emphasizing techniques to identify or exploit unique properties, conditions, materials, products or potential of the deep ocean for enhanced maritime operational capability.

Office of the Secretary of Defense

Two programs within the Office of the Secretary of Defense contribute to ocean and coastal activities: the Environmental Security Technology Certification Program (ESTCP) and the Strategic Environmental Research and Development Program (SERDP).

- Environmental Security Technology Certification Program: The ESTCP's goal is to demonstrate and validate promising, innovative technologies that target the Department of Defense's most urgent environmental needs. These technologies provide a return on investment through cost savings and

improved efficiency. The current cost of environmental remediation and regulatory compliance in the Department is significant. Innovative technology offers the opportunity to reduce costs and environmental risks. For example, the Department of Defense is responsible for a large number of contaminated sites in coastal and estuarine environments. Advanced technologies will improve our ability to assess, monitor and remediate contaminated sediments at these sites.

- Strategic Environmental Research and Development Program: SERDP was established by the Defense Authorization Act of 1991 as a partnership among the Department of Defense (DOD), the Department of Energy (DOE), and the Environmental Protection Agency (EPA). The Program was created with a vision of bringing the capabilities and assets of the federal laboratories to bear on the environmental challenges faced by the Department of Defense. As such, SERDP is DOD's corporate environmental research and development program. To address the highest priority issues confronting the Army, Navy, and Air Force, SERDP focuses on cross-service requirements and pursues high-risk / high-payoff solutions to the Department's most intractable problems.

  SERDP invests in science and technology that improves our understanding of marine mammals, their populations, locations and behavior. In addition, SERDP invests in technologies to monitor and control marine invasive species as well as new, environmentally friendly hull coatings. The fate, transport and effects of energetic materials and other contaminants in the marine environment are areas of ongoing research. Finally, SERDP is in the process of initiating the Defense Coastal-Estuarine Research Project at Marine Corps Base Camp Lejeune.

U.S. Army Corps of Engineers

The Army Corps of Engineers (Corps) maintains regulatory, coastal storm damage reduction, environmental restoration, and research and development missions that significantly contribute to coastal and ocean activities of the federal government. The Corps supports a coastal wave data collection program, conducts coastal mapping and surveying, provides hindcast data bases of waves and water levels, provides analytical tools for evaluating the water and sediment elements of several coastal-ocean linked watersheds, tracks several indicator (target) species, monitors habitats, and develops engineering guidance documents that are used widely in both the public and private sectors. The Corps' Coastal and Hydraulics Laboratory is renowned for the contributions to ocean and coastal science.

Funding for the Corps ocean and coastal activities is provided through the following six programs:

- Construction: The Corps builds navigation projects, which generally consist of dredging entrance and exit channels and harbors to a great depth and width to allow larger vessels to safely navigate in and out of the harbors and ports. The Navigation program mission is to provide safe, reliable, efficient, effective and environmentally sustainable waterborne transportation systems for movement of commence, national security needs, and recreation. The Corps also constructs storm damage reduction projects, which generally consist of dredging sand from the ocean and placing it on the shore. Often this is done in conjunction with constructing groins to mitigate shore erosion. The Storm Damage Reduction (SDR) program contributes to the national effort to reduce flood risk by protecting lives, homes, business, agricultural areas, public infrastructure and critical environmental areas. Further, the Corps protects and restores the environment through sub-business programs such as the Aquatic Ecosystem Restoration (AER). The Aquatic Ecosystem Restoration contributes to the Nation's environmental resources by restoring degraded significant ecosystem structure, function and process to a more natural condition.

- Operation and Maintenance: This general area provides funding for the operation, maintenance, and care of existing harbors and related works, including maintenance of harbor channels provided by a state, municipality or other public agency, that serve navigation needs of general commerce where authorized by law; clearing and straightening channels; and removal of obstructions to navigation. Work to be accomplished consists of dredging, repair, and operation of structures and other facilities. Related activities include aquatic plant control, monitoring of completed coastal projects, removal of sunken vessels, and the collection of domestic waterborne commerce statistics. Generally, the Corps is not responsible for O&M of AER and SDR projects.

- Mississippi River and Tributaries: Under this program, Congress has authorized two structures, with levees and channels, to divert freshwater from the Mississippi River into coastal bays and marshes for fish and wildlife restoration.

- General Investigations: The Corps conducts studies, pre-construction engineering and design, data collection, interagency coordination and research activities to determine the need, engineering feasibility, economic justification, and the environmental and social suitability of projects relating to storm damage reduction and reservation of aquatic coastal resources. Theses two business programs, storm damage reduction and aquatic coastal ecosystem restoration provide the Nation with a full range of capabilities. Specifically, the Storm Damage Reduction program contributes to the national effort to reduce flood risk by protecting lives, homes, business, agricultural areas, public infrastructure and critical environmental areas. Further, The Aquatic Ecosystem Restoration contributes to the Nation's environmental resources by restoring degraded significant ecosystem structure, function and process to a more natural condition.

- Regulatory Program: The regulatory program administers laws pertaining to regulation of activities affecting U.S. waters, including wetlands in accordance with the Rivers and Harbors Appropriation Act of 1899, the Clean Water Act, and the Marine Protection, Research, and Sanctuaries Act of 1972.

- Coastal Wetlands Restoration Trust Fund: In 1990, the Coastal Wetlands Planning, Protection and Restoration Act (Public Law 101-646) authorized transfer of 18 percent of annual appropriation from the Aquatic Resources Trust Fund, Sport Fish Restoration Account, and the Coastal Restoration Trust Fund, for coastal wetlands activities; 70 percent of this amount is allocated to the Corps of Engineers for use by the Louisiana Coastal Wetlands Conservation and Restoration Task Force, chaired by the Secretary of the Army, to provide for the long term conservation, protection, and restoration of coastal wetlands in the State of Louisiana.

Department of Defense

	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Department of Defense								
Defense Advanced Research Projects Agency								
The Center of Excellence for Research in Ocean Sciences (CEROS)								
		30%			70%	7	7	
Office of the Secretary of Defense								
Strategic Environmental Research & Development Program (SERDP)								
	100%					2	3	3
Enviromental Security Technology Certification Program (ESTCP)								
	100%					0	1	1
Department of the Army								
Corps of Engineers - Civil								
Construction								
Aquatic Ecosystem Restoration	100%					17	20	13
Storm Damage Reduction	100%					105	100	75
Navigation		100%				214	239	188
Operation and Maintenance								
Commericial Navigation		100%				656	669	649
Research and Development		100%				11	14	11
Mississippi River and Tributaries	100%					4	3	2
General Investigations								
Storm Damage Reduction	100%					8	7	2
Coastal Field Data			100%			3	4	2
Research and Development	50%	50%				8	7	7
Regulatory Program	100%					7	7	9
Coastal Wetlands Restoration Trust Fund	100%					59	58	61
Corps of Engineers - Military								
Military R&D/Rapidly Installed Breakwater								
Department of the Navy								
Office of Naval Research (ONR)								
Naval Ocean Sciences			100%			92	87	88
Applied Ocean Research			100%			42	32	24
National Oceanographic Partnership Program			100%			8	9	9
Marine Mammals			100%			4	4	4
Environmental Compliance								
Marine Mammals					100%	2	2	5
Oceanographer of the Navy								
Oceanography Program					100%	136	131	139
Oceanography - Research and Development to Support Operations **					100%	45	47	53
Geospatial Information and Services					100%	77	77	77
Department of Defense Total						**1507.4**	**1527.8**	**1421.8**

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.
** Includes the recently-acquired Space Meteorology and Oceanography (METOC) line, which was not included in the earlier versions of this biennial report.

Department of Energy

Two Offices within the Department of Energy conduct ocean-related research: the Office of Science and the Office of Fossil Energy. The current programs within these offices are listed below.

Office of Science

- Sequencing Genomes of Microorganisms for Carbon Sequestration: The Office of Science is currently working to sequence the genomes of microbes that mediate in carbon fixation and sequestration. Genomic information will enable the identification of the key genetic components of the organisms that regulate carbon fixation and sequestration. Related research is being initiated in the GTL: Genomics Program to characterize key reaction pathways or regulatory networks following the determination of their DNA sequence. Understanding how carbon sequestration is regulated in the ocean will lead to powerful new strategies for carbon management.

  DOE also supports the DNA sequencing and analysis of samples of ocean water taken from various ocean ecosystems. This analysis of complex ocean ecosystems has already led, and will continue to lead, to the discovery of thousands of new microbial species and millions of new genes. These discoveries will provide resources that serve as the basis for the development of new biotechnology approaches not only for carbon sequestration but also for production of clean energy and environmental cleanup in addition to providing dramatic increases in the amount of information available on microbial life in the earth's oceans.

- Carbon Cycle: The Office of Science supports research using microbiological tools to determine the linkages between the carbon and nitrogen cycles involving marine microbes and research to understand the movement of carbon starting from natural and human-induced emissions to the atmosphere to ultimate sinks in the oceans. In addition, research is supported using a coupled model of physical, chemical, and biological processes in the ocean to determine to what extent increased carbon fixation in surface waters would result in increased carbon sequestration in the deep ocean, how long carbon added to the ocean would remain in the ocean, and the changes in natural biogeochemical cycles that could result from carbon sequestration through iron fertilization of surface waters.

  The Office of Science also supports modeling and basic biological and ecological research in the field (deep ocean) and the laboratory on the effectiveness, and potential environmental impacts, of direct injection of carbon dioxide into the deep ocean as a mechanism to store carbon away from the atmosphere (where it could contribute to climatic change) for centuries to millennia. Physical/chemical modeling activities address the residence time of carbon injected into the ocean at various depths and varies longitudes/latitudes. Experimental studies in the deep ocean and the laboratory are improving the efficiency of delivery systems for mixing carbon dioxide with sea water at depth.

Office of Fossil Energy

- Methane Hydrates: Hydrates are solid, ice- like materials containing molecules of gas bound in a lattice of water molecules. Methane hydrates are stable under conditions of low temperature and high pressure and thus, are found on ocean outer continental shelves and slopes at several hundred to several thousand feet deep, and under the permafrost in arctic regions. Developments in the last five years have demonstrated the possibility of methane production from hydrates. As much as 200,000 trillion cubic feet (Tcf) of methane may exist in hydrate systems in the U.S. permafrost regions and surrounding waters. This is over a hundred times greater than the estimated conventional U.S. gas resource. The resource is currently unproducible, and the volume that may be economically produced is unknown. However, these resources, if producible and economic, could have significant implications for U.S. energy security and global environmental issues, particularly global climate change and sea floor stability.

The Department of Energy, Office of Fossil Energy initiated the National Methane Hydrate Program in FY 2000. The program has worked on detecting, quantifying and sampling arctic and oceanic hydrates. Budget discipline necessitated close scrutiny of all Fossil Energy programs, using strict guidelines to determine their effectiveness and compare them to other programs offering more clearly demonstrated and substantial benefits. As a result the 2006 Budget proposes to conduct orderly termination of the program in FY 2006. However, several other government agencies, specifically Minerals Management Service (MMS), U.S. Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), and Naval Research Laboratory (NRL), support gas hydrate-related research that is relevant to their missions.

- Oil and Natural Gas Research and Development: Several oil and gas projects are applicable in both offshore and onshore environments. These projects include: 1) Deep Trek, a group of projects to develop advanced technologies in high-temperature materials and sensors to allow deep drilling (greater than 15,000 feet below the land surface or seafloor); 2) joint industry National Lab efforts to adapt defense-related technology to oil and gas detection and recovery; and 3) laboratory research and field tests of technologies to improve recovery from mature oil fields. Budget discipline necessitated close scrutiny of all Fossil Energy programs, using strict guidelines to determine their effectiveness and compare them to other programs offering more clearly demonstrated and substantial benefits. As a result the 2006 Budget proposes to conduct orderly termination of the program in FY 2006.

- Ocean Carbon Sequestration: Ocean sequestration has huge potential as a carbon storage sink, but the scientific understanding to enable ocean sequestration to be considered as a real option is not yet available. A small level of funding is provided to leading researchers in this area to develop the necessary scientific understanding of the feasibility of ocean sequestration. Work is focused on understanding the mechanisms of CO_2 uptake in the ocean and assessing the environmental impacts of CO_2 storage. The Program is also funding laboratory experiments aimed at learning more about the basics of CO_2 behavior in an ocean environment and also the formation and behavior of CO_2 hydrates and collaborating with other federal agencies.

Department of Energy

	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					(Dollars in Millions)		
	Enhance the use, conservation, and management of oceans, coasts,	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Office of Science								
Biological and Environmental Research								
Climate Change Research			100%			6.44	6.00	5.30
Genomics			100%			6.50	2.50	5.50
Office of Fossil Energy Research and Dev.								
Oil and Natural Gas Technology								
Methane Hydrates	100%					5.30	2.90	0.00
Natural Gas Technology	100%					2.90	3.70	0.00
Oil Technology	100%					2.00	0.02	0.00
President's Coal Research Initiative								
Sequestration R&D				100%		0.94	0.89	0.93
TOTAL						**24.08**	**16.01**	**11.73**

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.

Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) is an independent agency within the Executive Branch. EPA protects human health and safeguards the natural environment upon which all life depends. EPA contributes to the protection of our Nation's ocean and coastal resources by striving to ensure that our waters are successfully managed, protected, and restored to sustain healthy biological communities and to protect human health. EPA's ocean and coastal protection activities emphasize habitat protection, partnerships, programs addressing ocean-based and land-based sources of coastal and ocean pollution, and water quality monitoring and assessment. Whenever possible, these activities are implemented on an integrated watershed basis, addressing air, land, and ecosystem relationships.

National Estuary Program

The National Estuary Program, established in 1987 by amendments to the Clean Water Act, currently consists of 28 estuaries of national significance. In each estuary a local, collaborative process develops and implements a comprehensive management plan. In addition to the many successes in the estuaries, the NEP return on investment is high. In 2002, the 28 local NEPs leveraged approximately $17 million in base funding to generate nearly $200 million (11:1). These funds protected or restored 118,000 acres of habitat and reduced point and non-point sources of pollution threatening the estuaries.

Regulation of Transportation of Material for Dumping into the Ocean

Under the Marine Protection, Research, and Sanctuaries Act (MPRSA or Ocean Dumping Act), EPA designates recommended sites for ocean dumping, and issues permits for such dumping (except for dredged material permits, on which EPA must concur with the Army Corps of Engineers). This Act serves to implement U.S. treaty obligations under the London Convention.

Vessel Pollution

Under Section 312 of the Clean Water Act, EPA sets performance standards for marine sanitation devices, and designates no-discharge zones for vessel sewage. Working with States, EPA has designated 83 no-discharge zones nationwide. Also under Clean Water Act Section 312, EPA is working with the Department of Defense to develop Uniform National Discharge Standards to regulate discharges incidental to the normal operation of vessels of the Armed Forces. In addition, as set out in the Certain Alaska Cruise Ship Operations Act, EPA, working closely with the State of Alaska and the U.S. Coast Guard, will jointly develop gray and black water standards for cruise ships operating in Alaska. EPA is an active member of U.S. delegations to the International Maritime Organization and has assisted in drafting annexes to the international convention addressing pollution from vessels.

BEACH Program

EPA administers the Beaches Environmental Assessment and Coastal Health Act (BEACH Act), signed into law on October 10, 2000. Through the first four years of the Act, EPA has awarded $ 21.3 million in grants to 35 eligible States and territories, with an additional $10 million to be issued this year. These funds support microbiological testing and monitoring of coastal recreation waters, including the Great Lakes waters, and support notifying the public of possible exposure to disease-causing microorganisms in coastal recreation waters. EPA's Beach Program also operates a website on the Internet, called "Beach Watch," which is an online directory of information about monitoring and notification programs.

National Marine Debris Program

EPA supports efforts to mitigate marine debris and educate people about the impact of their actions through the International Coastal Cleanup Campaign, which is funded by EPA grants. EPA also supports the National Marine Debris Monitoring Program, which is a statistically based national monitoring program to assess trends and sources of marine debris at 130 beaches nationwide.

Ocean and Costal Survey Work

EPA's ocean survey vessel (OSV) Bold acts as a platform from which EPA scientists gather data critical to guiding the Agency's coastal and ocean protection programs. EPA scientists aboard the OSV Bold perform a variety of functions including: surveillance in connection with the implementation of statutorily required monitoring and assessment programs, evaluation of the effects of pollution, special pollution

studies, oceanographic and biological studies, data collection and laboratory analysis, and training of professional personnel. The Lake Guardian is EPA's survey vessel on the Great Lakes, performing many of the same functions as the OSV Bold.

CZARA

Under the Coastal Zone Act Reauthorization Amendments of 1990, EPA works with NOAA to strengthen and approve state coastal nonpoint source control programs. Currently 16 of the original 29 participating States have fully approved coastal nonpoint source pollution control programs and 13 have conditionally approved programs. Five States have joined the original 29 entrants to seek federal approval. As of May 2005, four of these States have conditionally approved programs.

Invasive Species Program

Invasive species are one of the greatest threats to U.S. waters and ecosystems. EPA is funding pilot prevention, control, management, research, and education projects and is studying and providing input to national and international programs to address this issue as part of the Invasive Species Council, the Aquatic Nuisance Species Task Force, and international efforts to develop a treaty and implementing guidance to address introductions through ballast water.

Monitoring and Assessment

The National Coastal Condition Report (NCCR) describes the ecological health of U.S. coastal waters and the Great Lakes at a regional and national scale. First issued in 2002 and updated in 2004, the NCCR is a collaborative effort among EPA and other federal agencies, as well as state, regional, and local organizations. It is the only statistically-significant measure of U.S. water quality on a nationwide scale, clearly communicates water quality to the public; and provides managers with the information they need to target water quality actions wisely, and to effectively manage those actions to maximize benefits.

EPA, National Oceanic and Atmospheric Administration, U.S. Geological Survey, and the U.S. Fish and Wildlife Service are jointly responsible for the National Coastal Condition Report II (NCCR II) that was produced using data from EPA's Environmental Monitoring and Assessment Program (EMAP). http://www.epa.gov/owow/oceans/nccr/2005/downloads.html. NCCRII demonstrates the type and applicability of information generated by EMAP for use in the construction of National Report Cards. Full assessments were completed for northeastern, southeastern, west coast, and Gulf of Mexico estuaries and partial assessments were completed for the Great Lakes. EPA is integrating a comprehensive coastal monitoring program across all coastal states (including Alaska and Hawaii), U.S. territories, and National Estuary Programs to provide a probabilistic assessment of estuarine conditions to be used in future NCCRs.

Other Clean Water Act Programs

In addition to the Clean Water Act programs discussed above, there are numerous other programs established under the Clean Water Act to control pollution in all surface waters within the Act's jurisdiction. By controlling pollution before it reaches coastal and ocean waters, these programs also contribute to EPA's overall ocean and coastal protection activities. They include: water quality standards and criteria; point source discharge permit program; technical assistance/grant program to address nonpoint source pollution; total maximum daily load program; and water quality monitoring and reporting.

Great Lakes Research

EPA conducts research to integrate remote sensing technologies to protect air and water quality and ecological resources in the Great Lakes and surrounding Basin. Remotely-sensed landscape changes have been related to changes in urban and suburban water quality and other coastal changes, including extent of wetlands and the impacts of invasive vegetation. Air quality monitoring has been integrated with satellite observations to evaluate regional air quality and to predict the impacts of wildfire smoke on air quality within the Great Lakes Basin. In support of the BEACH program, in situ and remote sensing sampling for pathogens and related measures help predict pathogen exposures at recreational beaches in response to meteorological events.

International Affairs

EPA helps shape U.S. Government's positions on marine pollution issues. EPA also participates in treaty negotiations and advises technical programs that protect both environmental and economic interests throughout the world's oceans.

Great Waters Program

Under the Great Waters program, in partnership with the Department of Commerce's National Oceanic and Atmospheric Administration, EPA addresses the impacts of air deposition to coastal waters. EPA regulates air emissions from area, stationary, and mobile

sources and establishes National Ambient Air Quality Standards to protect public health and the environment. Using advanced computer models, the Chesapeake Bay program identified air deposition as the source of nearly one-third of the nitrogen load to the Bay. (http://www.epa.gov/air/oaqps/gr8water/3rdrpt/report00.html). EPA states in the *Third Report to Congress on Deposition of Air Pollutants to the Great Waters,* roughly 10 – 40 percent of the nitrogen deposited in the East and Gulf coast estuaries is transported via the atmosphere. Atmospheric deposition is also the principal source of mercury to several Great Waters, followed by riverine inputs. Over one third of the Great Waters have fish consumption advisories for mercury.

Nutrient Thresholds for Coastal Waters

The addition of excess nutrients continues to cause hypoxia, nuisance algal blooms, and degraded coastal ecosystems. The determination of thresholds for nutrient addition, particularly nitrogen and phosphorus, that cause these problems is necessary to establish water quality criteria and to set loading targets for protection of these critical ecosystems. EPA is conducting extensive research in coasts of the East Coast, Gulf of Mexico, West coast and the Great Lakes to identify these thresholds. In addition, research to classify coastal ecosystems based on their sensitivity to nutrient additions is underway to help extrapolate research results across various biogeographical provinces.

Other Research

EPA is conducting research to address other significant coastal problems such as invasive species, harmful algal blooms, and the effects of nutrient loading, habitat alteration and climate change. Additional research focuses on coral reefs including coral condition and monitoring recreational waters for microbial contamination. EPA is assisting with the development of biocriteria for coral reefs, which contributes to the development of an Integrated Ocean Observation System (IOOS), and improved indicators of estuarine condition.

Environmental Protection Agency

	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Environmental Protection Agency								
Office of Water								
Gulf of Mexico	60%		30%	10%		4.06	3.89	4.47
Great Lakes	35%		48%	17%		22.50	43.61	71.52
Chesapeake Bay	70%		30%			23.19	22.76	20.75
Water Quality standards**	100%					12.72	12.72	12.72
Marine ecosystems	30%		55%	5%	10%	10.13	11.36	12.28
Coastal ecosystems	55%		30%	5%	10%	21.71	29.15	21.97
BEACH program**	100%					1.76	1.71	1.91
National Fish and Wildlife Contamination**	100%					0.12	0.10	0.09
BEACH program grants	100%					8.83	9.92	10.00
Clean Water SRF	100%					768.79	611.10	408.00
Section 106 grants	100%					85.21	97.90	100.10
Nonpoint source management	100%					120.75	103.60	104.55
Office of International Affairs								
Marine Pollution and Arctic Programs								
Program Activities**				100%		0.35	0.35	0.35
Office of Air and Radiation								
STAG								
Section 105 Clean Air Grants	100%					1.00	1.00	1.00
Environmental Program Management								
Great Waters Program	100%					1.00	1.00	1.00
Office of Research and Development								
Oceans and Coastal Research			100%			22.40	12.60	11.70
TOTAL						**1,104.52**	**962.77**	**782.41**

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.
** FY 2004 Actual levels are estimates.

Department of Health and Human Services

The Department of Health And Human Services (DHHS) is the United States government's principal agency for protecting the health of all Americans and providing essential human services, especially for those who are least able to help themselves. A part of DHHS is the National Institutes of Health (NIH), whose mission is to uncover new knowledge that will lead to better health for everyone. Within the NIH is the National Institute of Environmental Health Sciences (NIEHS) that has as its mission reducing human illness and dysfunction from environmental causes. In furtherance of its mission, the NIEHS supports research on a number of oceans-related issues including harmful algal blooms and the effects of environmental chemicals on marine life.

National Institutes of Health

The National Institute of Environmental Health Sciences

Oceans and marine life intersect with human health in a number of ways, presenting both an opportunity and a challenge. Oceans have become conduits for a number of environmental threats to human health. At the same time, oceans harbor diverse organisms that show great promise for providing new drugs to combat cancer and fight infectious diseases. To guard against such health threats and to take advantage of the medicinal benefits that oceans might provide NIEHS is studying the impacts of the oceans on human health.

For the past two decades, NIEHS has supported a set of Core Centers devoted to Marine and Freshwater Biomedical Sciences. This unique resource within NIH has conducted innovative research focused on development and application of aquatic organisms as models of human health effects resulting from exposure to environmental toxicants, and on studying the mechanism of effects of toxins resulting from harmful algal blooms.

Harmful algal blooms represent the most notorious marine hazard to man and animal alike. It is estimated that over 60,000 individual cases and clusters of human intoxication occur annually in the U.S. alone. Worldwide, harmful algal blooms cause a variety of acute, sub-acute, and chronic diseases in humans, as well as in other mammals, fish, and birds. Health effects in humans range from acute neurotoxic disorders (such as polyether seafood poisonings, e.g., neurotoxic shellfish poisoning and ciguatera fish poisoning) to chronic and persistent diseases (such as amnesic shellfish poisoning and chronic liver disease caused by the cyanobacterial toxins, the microcystins). Disease caused by exposure to environmental chemicals produced by harmful algal bloom organisms initiates with consumption of contaminated seafood or inhalation of toxins entrapped in sea spray. The oral route of intoxication is by far the better understood and more commonly recognized, and coastal states all have public health surveillance and monitoring systems in place to prevent human intoxications. However, exposure to aerosolized particles in Florida red tide (and putative *Pfiesteria* outbreaks) is not uncommon and is an intoxication route that is much more difficult to quantify or control.

Expanding upon the Marine and Freshwater Biomedical Centers, NIEHS has embarked upon a program called the Centers for Oceans and Human Health (COHH), which further enhances our understanding of connections between the oceans and human health, ranging from marine processes that threaten public health to the contributions of marine biodiversity to biomedicine. In collaboration with the National Science Foundation (NSF), NIEHS has developed an interagency, multidisciplinary research and prevention center program focused on detecting potential marine-based contaminants, preventing associated illness, and developing products from the ocean that will enhance human well-being. The following 3 research areas are considered high priority for this program: combating the spread of harmful algal blooms; studying marine organisms for sources of new drugs; and reducing morbidity due to water- and vector-borne disease.

In addition to the aforementioned NIEHS marine research efforts, several projects focus on the effects of environmental chemicals on marine life. One in particular addresses exposure to arsenic in marine waters from chromated copper arsenate (CCA)-treated wood used in building docks.

NIEHS and DHHS participate in a number of interagency coordinating committees now addressing the broad scope of ocean science as a result of the President's U.S. Ocean Action Plan. Future directions in oceans and human health are likely to be a key component of a current effort to develop a government-wide ocean research strategy.

Department of Health and Human Services								
	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Health and Human Services								
National Institutes of Health								
National Institute of Environmental Health Sciences								
Ocean-related Extramural Research and Training			100%			7.2	7.2	7.3

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.

Department of Homeland Security

The creation of the Department of Homeland Security (DHS) is the most significant transformation of the U.S. government since WWII, when President Harry S Truman merged the various branches of the U.S. Armed Forces into the Department of Defense to better coordinate the Nation's defense against military threats. DHS represents a similar consolidation, both in style and substance. In the aftermath of the terrorist attacks against America on September 11th, 2001, President George W. Bush united 22 previously disparate domestic agencies into one coordinated department to protect the Nation against threats to the homeland.

The Department's first priority is to protect the Nation against further terrorist attacks. Component agencies will analyze threats and intelligence, guard our borders and airports, protect our critical infrastructure, and coordinate the response of our Nation for future emergencies. Besides providing a better-coordinated defense of the homeland, DHS is also dedicated to protecting the rights of American citizens, residents, and visitors, and enhancing public services, such as natural disaster assistance and citizenship services, by dedicating offices to these important missions.

Within the Department of Homeland Security the United States Coast Guard and the Emergency Preparedness and Response Directorate are actively engaged in ocean and coastal activities.

United States Coast Guard

The United States Coast Guard (USCG), formerly part of the Department of Transportation, is now housed in the Department of Homeland Security. The USCG is one of the five Armed Services of the United States and the Nation's primary maritime law enforcement agency. In addition, the Coast Guard provides a wide range of safety, security, and environmental protection services. The USCG protects vital interests of the United States from internal and external threats, both natural and man-made, and serves in America's ports and inland waterways, along the coasts, on international waters, or in any other maritime region where U.S. interests are at risk.

The Coast Guard is a military, multi- mission, maritime service that possesses a unique blend of humanitarian, law enforcement, regulatory, diplomatic, and military capabilities. These characteristics undergird the Coast Guard's five fundamental roles: maritime security, maritime safety, protection of natural resources, maritime mobility, and national defense. Three of these roles, maritime safety, protection of natural resources, and maritime mobility include programs that provide significant contributions to the theme areas outlined in the U.S. Ocean Action plan.

Maritime Safety

The lead responsibility for protecting the lives and safety of Americans in the maritime realm falls to the Coast Guard. In partnership with other federal agencies, state and local governments, marine industries, and individual mariners, the USCG preserves safety at sea through a focused program of prevention, response, and investigation.

Coast Guard prevention activities include developing commercial and recreational vessel standards, enforcing compliance with these standards, licensing commercial mariners, operating the International Ice Patrol to protect ships transiting the North Atlantic shipping lanes, and educating the public about maritime safety. The USCG develops operating and construction criteria for many types of vessels, from commercial ships to recreational boats and serves as America's voice in the International Maritime Organization, a specialized agency of the United Nations, which promulgates international standards to improve shipping safety, pollution prevention, mariner training, and certification processes. The agency also has primary responsibility for developing domestic shipping and navigation regulations. It ensures compliance with safety regulations in many ways, including inspection of U.S. flag vessels, mobile offshore drilling units, and marine facilities; examination of foreign- flag vessels based on the projected safety and pollution risk they pose; review and approval of plans for U. S. flag vessel construction, repair, and alteration; and documentation of U.S. flag vessels. The Port State Control program is a key element in the Coast Guard's safety enforcement program because approximately 95 percent of large passenger ships and over 90 percent of all international commercial freight arrives or departs on foreign-flagged vessels.

As National Recreational Boating Safety Coordinator, the Coast Guard works to minimize loss of life, personal injury, property damage, and environmental harm associated with recreational boating. The USCG boating safety program involves public education programs, regulation of boat design and construction, approval of boating safety equipment, and vessel safety checks of recreational boats for compliance with federal

and state safety requirements. The all- volunteer Coast Guard Auxiliary plays a central role in executing this program.

As the lead agency for maritime search and rescue in U.S. waters, the Coast Guard coordinates the search and rescue efforts of its afloat and airborne units, as well as those of other federal, state, and local responders. It also leverages the world's merchant fleet to rescue mariners in distress around the globe through the Automated Mutual-assistance Vessel Rescue system. When natural disasters, such as hurricanes and floods, threaten America, the Coast Guard active duty and Reserve members work closely with state and local authorities to apply its rescue and other operational capabilities in protecting life, property, and the environment.

Finally, in addition to responding to a wide variety of time-critical maritime emergencies and accidents, the Coast Guard investigates their causes and determines whether laws have been violated that warrant civil or criminal enforcement action, or whether changes should be made to improve safety through prevention programs.

Protection of Natural Resources

Today, with the U.S. EEZ supporting commercial and recreational fisheries worth more than $30 billion annually, the Coast Guard serves as the primary agency for at-sea fisheries enforcement. Additionally, it actively protects sensitive marine habitats and sanctuaries, marine mammals, and endangered marine species, and enforces laws protecting U.S. waters from the discharge of oil and other hazardous substances.

The Coast Guard conducts a wide range of activities — education and prevention, enforcement, contingency planning, and emergency response — in support of its primary environmental protection mission areas: maritime pollution law enforcement, offshore lightering zone enforcement, domestic fisheries enforcement, and commercial vessel inspection. It also provides mission-critical command and control support and typically is the first responding force to maritime environmental disasters.

At the same time, the USCG is typically the lead agency for any response effort. Under the National Oil and Hazardous Substances Pollution Contingency Plan, Coast Guard Captains of the Port are the pre-designated Federal On-Scene Coordinators for oil and hazardous substance incidents in all coastal and some inland areas. The Coast Guard's National Strike Force supports both Coast Guard and U.S. Environmental Protection Agency coordinators who respond to environmental incidents in both coastal and inland areas of the United States, as well as being available to advise foreign governments for incidents worldwide.

Maritime Mobility

The U.S. marine transportation system facilitates America's global reach into foreign markets and the Nation's engagement in world affairs, including protection of U.S. national interests, through a national and international regulatory framework governing trade and commerce. This system includes the waterways and ports through which more than 2 billion tons of America's foreign and domestic freight and 3.3 billion barrels of oil move each year, plus the intermodal links that support U.S. economic and military security. It also includes international and domestic passenger services, commercial and recreational fisheries, and recreational boating. The Coast Guard works to increase the integration and coordination of public and private policies, activities, and infrastructure needed to create a seamless inter- modal transportation system.

The USCG carries out numerous port safety and security, waterways management, and commercial vessel safety missions and tasks. It provides a safe and efficient navigable waterway system to support domestic commerce, international trade, and the military sealift requirements for national defense. Coast Guard services include long- and short-range aids to navigation, access to a range of navigational information through Notices to Mariners, vessel traffic services, domestic and international icebreaking and patrol services, technical assistance and advice, vessel safety standards and inspection, and bridge administration standards and inspection. The Coast Guard is also America's principal point of contact for international marine transportation issues in the IMO and other international regulatory and standards bodies. These critical services support an effective, efficient, and safe marine transportation system that is key to the economic well-being of the United States.

Coast Guard teams also train the maritime forces of other nations throughout the world in all Coast Guard mission areas. Through these efforts the USCG builds vital alliances with foreign nations and gains access to overseas operating areas while it promotes cooperation and compliance with international laws, encourages consistent standards throughout the world and advances internationally recognized human rights concepts.

Finally, the Coast Guard operates a polar icebreaking research vessel and the Nation's two heavy polar icebreakers. These vessels enable the Service to resupply America's polar facilities, support the research

requirements of the National Science Foundation and other federal agencies, project U.S. national presence in the polar regions, and protect national interests in Antarctica and the Arctic,. In addition, the vessels have the capability to perform search and rescue and to respond to oil and other hazardous spills in ice-bound waters, including areas off Alaska.

Coast Guard Assets and Capabilities

To perform its missions, the Coast Guard maintains and operates a variety of facilities, aircraft, cutters, small craft and communications systems strategically located throughout the Nation. In addition, due to the international/global reach of its assigned duties, the Coast Guard has a small number of specialists located in embassies and at overseas military bases around the world. Because rapid response to emergency situations and efficiency in using its available resources have long been Coast Guard hallmarks, most operational assets are multi- mission in nature. Cutters on law enforcement patrols, for example, are always ready to shift immediately into Search and Rescue functions. Similarly, Coast Guard Marine Safety professionals, whose primary focus is prevention of commercial maritime casualties, are always prepared to rapidly shift into environmental response operations when prevention proves inadequate. The Coast Guard's ability to fulfill its roles — saving lives and property at sea, protecting America's maritime borders and suppressing violations of the law; protecting the marine environment; providing a safe, efficient marine transportation system; and defending the Nation — makes it a unique instrument of national security. More than simply "guarding the coast," the Coast Guard safeguards the global commons and brings critical capabilities to the full-spectrum, multi-agency response needed to address America's national and maritime security needs.

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) manages several programs that address ocean and coastal issues, the most important of which is the National Flood Insurance Program. Other FEMA programs that address coastal issues include the Hazard Mitigation Grant Program, the Flood Mitigation Assistance Program, Hazards-United States (HAZUS), and others. These programs are described, below.

Flood Hazard Mapping Program

The National Flood Insurance Act of 1968 created the National Flood Insurance Program (NFIP), and mandated that FEMA identify and map flood hazards nationwide in support of this program. The maps are known as Flood Insurance Rate Maps (FIRMs). FIRMs delineate boundaries of flood hazard and insurance risk zones including areas commonly referred to as 100-year flood zones, and areas with an added degree of flood risk due to wave action and other coastal processes. FEMA also delineates, on FIRMs, the boundaries of coastal areas that are within the Coastal Barrier Resources System (CBRS) and Otherwise Protected Areas (OPAs). These areas are identified by Congress and mapped by the U.S. Fish and Wildlife Service. Federal flood insurance is not available in these areas therefore FEMA delineates the boundaries of CBRS and OPAs on FIRMs.

In fiscal years 2003, 2004, and 2005, a total of $548 million was appropriated for modernizing the Nation's flood hazard maps. Prior to 2003, the flood hazard mapping program was funded through flood insurance policy fees that totaled $35-50 million per year. Under the Map Modernization effort, FEMA has been collaborating with federal, state, regional, and local partners which will leverage resources, help to improve and maintain the quality and reliability of flood hazard data, and enable the partners to have some ownership of the maps.

In fiscal year 2004, FEMA began an effort to reevaluate the current methodologies for analyzing and mapping coastal flood hazards. This includes developing guidelines for analyzing and mapping these hazards for the Pacific Coast of the conterminous United States, and preparing a set of recommendations for improving coastal studies on the Atlantic and Gulf coasts.

Hazard Mitigation Grant Program.

The Hazard Mitigation Grant Program (HMPG) was created in November 1988, by section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. This program assists states and local communities to implement long-term hazard mitigation measures following a major disaster declaration. Currently, available HMGP federal funding is based on the formula of 7.5 percent of the federal funds spent on the Public and Individual Assistance programs for each disaster or an increased percentage if a state has an enhanced mitigation plan in effect. Under this program, FEMA can fund up to 75 percent of the eligible costs of mitigation projects.

The goals of the HMGP are to contribute to the development of a long-term, comprehensive mitigation program by funding measures designed to achieve the goals of state and local Mitigation Plans; and assist state and local governments in avoiding or lessening the impact of natural hazards through safer building practices and the improvement of existing structures and supporting infrastructure. Examples of coastal project types include property acquisition, structural elevation, wind retrofits, certain shoreline stabilization measures, and mitigation plans that meet FEMA's multi-hazard mitigation planning requirements, and which may address coastal zone management issues. Acquisition projects must be voluntary and the land deed restricted to open space in perpetuity.

All projects funded under the HMGP must conform to the FEMA-approves state and local Hazard Mitigation Plans, provide a beneficial impact, conform to environmental laws and regulations, solve a problem independently, and be cost-effective. In addition, projects should also contribute to a long-term solution. Project applications are reviewed and prioritized at the state level and then submitted to FEMA for final approval.

Flood Mitigation Assistance Program

In 1994, Congress enacted the National Flood Insurance Reform Act. This Act created FEMA's first significant pre-disaster opportunities for flood mitigation. The Act authorizes the Flood Mitigation Assistance (FMA) Program that provides funding to assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP.

The goals of the FMA program are to reduce the number of repetitively or substantially-damaged structures and the associated claims on the National Flood Insurance Fund; to encourage long-term, comprehensive mitigation planning; and to respond to the needs of communities participating in the NFIP. Up to $20 million has been made available annually under the FMA program. Fees paid by flood insurance policyholders provide funding for the FMA Program. Examples of FMA projects include structure elevation and property acquisition.
States have the lead role in administering the FMA program, reviewing grant applications, setting mitigation funding priorities, and awarding planning and project grants to eligible applicants. States are also responsible for ensuring that projects are completed and that all performance and financial reporting requirements are met. Local governments and communities must have a FEMA-approved mitigation plan that addresses their flood hazards, including repetitive loss properties and continued compliance with NFIP floodplain management standards before they can receive project grant funds.

Pre-Disaster Mitigation Program

The Disaster Mitigation Act of 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding a new section 203, which established a Pre-Disaster Hazard Mitigation Program (PDM). Funding for the program is provided through the National Pre-Disaster Mitigation Fund to provide a consistent source of funding to state, tribal, and local governments for pre-disaster hazard mitigation planning and mitigation projects primarily addressing natural hazards. Funding these plans and projects reduces overall risks to lives and property, while also reducing reliance on funding from actual disaster declarations. The PDM program is a nationally competitive program, with all eligible applications reviewed and ranked against established factors. Applicants and sub-applicants must have a FEMA-approved mitigation plan in order to receive project grants. PDM planning grants are available to applicants and sub-applicants that do not have a FEMA-approved mitigation plan to enable them to meet the planning requirements. All projects funded under the PDM program must be cost effective, feasible, compliant with environmental and historic preservation requirements, and contribute to a long-term solution.

Hazards – United States (HAZUS)

HAZUS is a GIS-based modeling tool designed to produce damage and loss estimates for use by federal, state, regional, and local governments as well as the private sector in planning for risk mitigation, emergency preparedness, response, and recovery. The methodology deals with important aspects of the built environment, and a wide range of different types of losses. HAZUS was initially released by FEMA in 1997 and included a state-of-the-art earthquake model. In February 2004 a new multihazard version of HAZUS was released. This version, called HAZUS-MH, includes flood and hurricane models and an updated earthquake model. At present, the hurricane component does not model damage caused by coastal flooding (storm surge). We are, however, in the process of developing a storm surge component of the hurricane model that will integrate hazards and damage analysis from both the hurricane and flood models. The hurricane model is also being enhanced to provide a "near real-time" loss modeling capability that will rely on NOAA's real-time meteorological and oceanographic data.

Hurricane Program

The National Hurricane Program (NHP) is a cooperative effort between federal, state, and local governments to reduce the risk to lives and property from all hazards associated with hurricanes in the United States. The NHP is dedicated to providing the 22 threatened coastal states and territories with financial and technical assistance and support to all levels of government for hurricane mitigation, preparedness, response, and recovery. Grants are provided to the states to undertake a number of mitigation and preparedness activities. This involves emergency planning for hurricane evacuations.

Training and Educational Material

FEMA prepares educational and training materials related to coastal areas, including a three-volume Coastal Construction Manual for design professionals, building officials, floodplain managers, and other local officials. These materials provide participants the opportunity to learn best practices in siting, design, construction, and maintenance for residential buildings in coastal areas.

Department of Homeland Security								
	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
U.S. Coast Guard								
Operating Expenses								
Maritime Safety/								
Search and Rescue	100%					439.19	663.88	704.47
Recreational Boat Safety	100%					116.53	163.13	176.03
Commercial Vessel Safety	50%	49%		1%		108.38	119.87	126.86
Port Safety-Waterways Management	50%	49%	1%			75.56	82.01	86.83
Maritime Mobility/								
Bridge Administration		100%				17.69	19.65	20.81
Radio Navigation Aids		100%				115.94	127.30	134.44
Short Range Aids to Navigation		98%	3%			531.47	646.56	738.84
Ice Breaking - Domestic		100%				43.53	51.63	71.65
Ice Breaking - Polar			47%	53%		107.39	114.72	68.79
Protection of Natural Resources								
Marine Enviromental Protection		99%	2%			120.88	207.59	219.40
Enforcement of Laws and Treaties (ELT) - Fish Domestic								
	100%					331.35	524.57	563.32
ELT - Marine Sanctuaries/Protection of Living Marine Resources								
	100%					43.33	10.24	11.04
USCG Total						**2,051.23**	**2,731.15**	**2,922.47**
Federal Emergency Management Agency (FEMA)								
Disaster Relief Fund								
Hazard Mitigation Grant Program	100%					14.40	14.40	14.40
National Flood Insurance Fund/Flood Map Modernization Fund								
Hazards Mapping	50%			50%		7.50	7.50	7.50
Training and Educational Materials	100%					0.02	0.02	0.02
Preparedness, Mitigation, Response, and Recovery								
Hazards-United States (HAZUS)	100%					1.90	1.50	1.50
Training and Educational Materials	100%					0.10	0.10	0.10
Pre-Disaster Mitigation (PDM)	100%					10.00	15.00	15.00
National Flood Mitigation Fund								
Flood Mitigation Assistance								
Program (FMA)	100%					1.00	1.00	1.00
EP&R Total						**34.92**	**39.52**	**39.52**
Department of Homeland Security Total						**2,086.15**	**2,770.67**	**2,961.99**

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.

Department of the Interior

The Department of the Interior has five Bureaus and one program within the Office of the Secretary that participate in programs relating to oceans, coasts, and the Great Lakes. The Bureau of Land Management (BLM), Minerals Management Service (MMS), Fish and Wildlife Service (FWS), National Park Service (NPS), US Geological Survey (USGS), and the Natural Resource Damage Assessment and Restoration program are involved in many ocean and coastal activities, including natural hazards, living and non-living marine resource management, operation of national parks and refuges, offshore leasing of oil and gas, restoration of natural resources, and marine science research, at an estimated 2006 funding level of $765 million. The principle U.S. Ocean Action Plan theme for the Department's activities is "Enhancing use and conservation of our ocean, coastal, and Great Lakes resources." although DOI is also active in the theme area of "Advancing our understanding of ocean, coastal, and Great Lakes resources."

The U.S. Geological Survey

The USGS conducts a diverse range of activities and programs that provide research and information products for application to ocean and coastal issues. USGS activities link with the programs and missions of other federal and state agencies to define and address priority science needs.

USGS coastal and marine geology investigations provide the understanding of geology and geologic processes required to address issues such as coastal erosion, storm, tsunami, earthquake, landslide and seal-level rise hazards; impacts of coastal contaminants; and decline of wetland, coral and offshore marine habitats.

USGS also monitors the changes that occur on the land surface along the coasts using remote sensing, studies the connections between people and those changes, and provides the public with information they can use to address the consequences of those changes. USGS water monitoring programs such as the National Stream Flow Information Program and various elements of the Cooperative Water Program provide fundamental measures of the quality and quantity of water in many of the Nation's rivers, lakes, and estuaries.

Biological investigations quantify status and trends of critical biological resources in marine, coastal and Great Lakes environments, including species at risk, shorebirds and water birds, sea ducks, pelagic seabirds, marine mammals, sea turtles and fish stocks. Research programs document declines in coral reef, coastal, wetland and marine habitats and ecosystems, and investigate impacts of contaminants, invasive species, pollution, human use and development, climate change and other human and natural stressors on marine, coastal and Great Lakes ecosystems.

Bureau of Land Management

BLM activities support the management of anadromous fish through habitat restoration, including culvert replacement to improve fish passage, road maintenance to control erosion, shoreline stabilization, as well as monitoring, inventorying, and conducting research. In addition, BLM manages the California Coastal National Monument program, consisting of over 2,000 rocks and small islands spread along California's coastline under a combined resource management plan and environmental impact statement.

Through BLM's Oregon and California Grant Lands program, funding is used for salmon habitat protection, restoration, and enhancement, as outlined in the conservation strategies of the Western Oregon resource management plans.

Minerals Management Service

The Minerals Management Service (MMS) is responsible for environmentally safe and sound minerals resource management on more than 1.76 billion acres of the Outer Continental Shelf (OCS). At present about 43 million acres are leased to private industry for oil and gas development. Production from these leases account for almost 30 percent of the Nation's domestic production of crude oil and 23 percent of its natural gas. In carrying out this function, MMS regularly works with federal, state, and local agencies and in consultation with the public. Additionally, MMS works in partnership with 14 coastal states to manage access to sand and gravel resources for coastal restoration and shore protection projects.

The MMS ensures that all activities on the OCS are conducted with appropriate environmental protection and impact mitigation by providing scientific information needed for critical program decisions

which accommodate the exploration, development and production of petroleum energy resources, and other marine minerals, with the protection of the human, marine and coastal environments. MMS also supports oil spill research, oil spill prevention and response planning activities, financial responsibility and management activities.

Environmental Studies Program

The MMS Environmental Studies Program carries out mission oriented research which nurtures scientific discovery in the marine environment and social sciences while focusing on activities that address national goals related to environmental quality, economic prosperity and sustainable development. The program includes studies of threatened and endangered species in diverse areas ranging from the Gulf of Mexico to the arctic waters of the Beaufort Sea offshore Alaska. The research is designed to describe habitat, and distribution, abundance, and behavior and the potential effects of OCS activities so that appropriate mitigating measures can be developed. Studies of deepwater ocean currents and deep sea ocean life are undertaken in the Gulf of Mexico to gather information on the physical processes and biological communities so that environmentally sound resource management decisions can be made with development of the appropriate protective measures. The program conducts large scale oceanographic circulation and modeling and laboratory studies to improve understanding of the fate, transport, and effects of oil when spilled in the environment and other potential impact producing agents including permitted discharges which may affect air and water quality, and noise. Social and economic research is supported to develop an understanding of how OCS activities affect community composition and infrastructure, employment, and culture. Research partnerships with stakeholders, academia, other federal agencies and international researchers and independent peer review are keystones for the program.

Offshore Resource Management

On August 8, 2005, the President signed the Energy Policy Act completing his 3 year effort, as outlined in his U.S. Ocean Action Plan, to better manage energy development of the Outer Continental Shelf. The legislation includes an amendment to the Outer Continental Shelf Lands Act to establish a uniform permitting process coordinated across appropriate federal agencies and authorizes the establishment of an authorization process and regulatory framework for non-traditional energy projects including, but not limited to, renewable energy projects such as wind, wave, and solar energy. The Act also authorizes the permitting of oil and gas facilities on the Outer Continental Shelf to be converted to other approved uses; requires a comprehensive inventory of OCS oil and gas resources every 5 years, and establishes a new coastal impact assistance program for 2007-2010. The Minerals Management Service is tasked with implementing these provisions of the Outer Continental Shelf Lands Act.

Fish and Wildlife Service

Endangered Species

The FWS Endangered Species program protects species in order to avoid adding species to the threatened and endangered species list. Activities include Section 7 consultations with federal agencies and their applicants to ensure activities are compatible with the conservation needs of listed species. The recovery program works with federal, state, tribal and non-government entities to take immediate action to prevent the extinction of species, prepare recovery plans to ensure coordinated, effective recovery actions, and implement recovery actions to reverse the decline of listed species and expedite species recovery.

Coastal Program

The FWS Coastal Program identifies and maps coastal fish and wildlife habitats, works with land trusts to employ protection strategies, restores coastal habitats, opens access to coastal streams for anadromous fish, controls and monitors invasive species, and leverages federal funds for fiscal and in-kind contributions by partners.

National Wildlife Refuge System

National Wildlife Refuge System marine programs span 169 refuges, including expansive estuarine systems above the Arctic Circle to remote atoll coral reefs below the Equator. Conservation initiatives support fishery, wildlife, and listed species. Refuge marine programs ensure the maintenance of biological integrity and environmental health of refuge lands and waters. Projects include in-house and wider partnership efforts in habitat enhancement, restoration and reclamation; conservation area zoning; law enforcement; removal and control of exotic and invasive plant and animal species; removal of hazardous wastes; species re-establishment, reintroduction, and translocation to historic habitats; risk and threat reduction to protected species; scientific monitoring and research; and education and outreach efforts.

Marine Mammals

The Marine Mammal Protection Act assigns responsibility to the FWS for the conservation and management of polar bears, walrus, sea and marine otters, three species of manatees, and dugongs. The MMPA requires that marine mammals and the health and stability of their ecosystems be maintained at, or returned to, healthy population levels. The FWS implements the provisions of the MMPA by conducting population censuses and assessing population health, developing and implementing conservation plans, promulgating regulations, and by enhancing the public understanding of conservation activities. Many of these activities are conducted cooperatively with other federal and state agencies, Alaska Natives, researchers and universities, aquaria, non-governmental agencies and private interests. The FWS also works cooperatively with other countries for species that cross international boundaries.

Coastal Barrier Resources System

The FWS implements the Coastal Barrier Resources Act (CBRA), which discourages development on designated coastal barriers in the John H. Chafee Coastal Barrier Resources System (CBRS) by restricting certain federal expenditures in the CBRS. Projects include completing a Congressionally-directed Digital Mapping Pilot Project that includes digitally produced draft maps of some CBRS areas and a report to Congress describing the feasibility and costs for completing digital maps for all CBRS areas.

Anadromous Fish

Anadromous fish management supports the mission of the U.S. Fish and Wildlife Service by conserving and restoring inter-jurisdictional fish species and the habitats on which they depend. The program focuses on culturally and economically significant species, such as Pacific and Atlantic salmon, steelhead trout, American shad, sturgeon, American eel, and striped bass. The program works closely with state, federal, and tribal governments.

Aquatic Invasive Species

FWS ocean and coastal activities address aquatic invasive species including ecological surveys of coastal areas that are highly susceptible to invasions resulting from ballast water operations or areas that require additional study; conducting surveillance and assessing management approaches for reducing the risk of invasive species introductions; participating in cooperative efforts to manage infestations and conducting efforts to prevent dispersal; and conducting management activities to slow the dispersal of invasives.

National Fish Hatchery System

The National Fish Hatchery System propagates almost 80 million anadromous fish on an annual basis to aid in restoration efforts throughout the Atlantic, Gulf, and Pacific coasts. Thirty-four hatcheries play a vital role in restoring anadromous species such as Atlantic salmon, Atlantic and Gulf sturgeon, and striped bass in cooperation with the Atlantic States and the Gulf States Marine Fisheries Commissions. In the Pacific Northwest, production of Pacific salmon and steelhead trout throughout the region contributes to meeting obligations under the United States/Canada Pacific Salmon Treaty.

Wildlife Without Borders

The FWS Wildlife Without Borders-Russia and Wildlife Without Borders-Latin America and Caribbean initiatives support activities and small grants for the conservation of marine mammals, waterbirds, fish, and other marine species. Permit-related activities are required for sturgeon, polar bears, walrus, sea otters, manatees, whales, dolphins, sea turtles, corals, eels, marine fish and marine invertebrates. These activities require close coordination with other federal agencies, the states, parties to the Convention on International Trade in Endangered Species, and domestic and foreign scientific experts. Activities associated with conservation of turtles, coral, black coral, and Caspian Sea sturgeon, seahorses, whale, sharks, queen conch, Patagonian toothfish, Asian arrowana, polar bear, and sea otters include participation in regional and international meetings; permit findings; assessments pertaining to species status; and species listing as endangered or threatened.

Wetlands

Coastal Wetlands Grants issued by FWS are authorized by the 1990 Coastal Wetlands Planning, Protection and Restoration Act and are funded through the Dingell-Johnson Sport Fish Restoration Act. Eligible recipients are coastal States, Puerto Rico, the U.S. Virgin Islands, Guam, the Northern Mariana Islands, and American Samoa. The grants are used to acquire, restore, and enhance coastal wetlands for long-term benefits to wildlife and habitat.

Through the North American Wetlands Conservation Act, FWS provides matching grants to partnerships to carry out wetlands conservation projects in the United States, Canada, and Mexico. Funding to specifically

protect, restore, and enhance coastal wetland habitats under NAWCA is derived from the receipts of the Coastal Wetlands Planning, Protection, and Restoration Act and only available for grants in coastal areas of the United States and its territories. Funding is also provided to States and territories for species and habitat conservation actions on non-federal lands. This assistance is crucial because most listed species depend on habitat found on state and private lands, which include coastal areas.

Clean Vessel Act of 1992

The Clean Vessel Act of 1992 authorizes a FWS competitive grants program to states to survey for the number and location of operational pump-out stations and dump stations in coastal states for certain types of recreational vessels; plan for construction of stations and facilities (coastal states only); construct, renovate, operate, and maintain pump out and dump stations; and conduct programs to educate recreational boaters about the problem of waste discharge from vessels and the location of pump out and dump stations. States are reimbursed up to 75 percent of project costs.

Enforcement

FWS Law Enforcement plays a vital role in safeguarding marine resources in the United States and around the world, protecting endangered and threatened marine wildlife from illegal take and commercial exploitation; species of concern include sea turtles, manatees, walrus and sea otters. With state and federal counterparts, the Service prevents illegal commercialization of U.S. marine fisheries resources, such as clams, eels, oysters, and striped bass and investigates the unlawful take of migratory birds caused by oil spills in coastal waters and works with the fishing industry to reduce the toll that "by catch" takes on migratory bird populations.

National Park Service

NPS funds 40 units in the National Park System that are listed on the Marine Managed Areas Inventory as containing submerged ocean and Great Lakes resources. More than 57 million people visit these parks to experience beaches, coral reefs, kelp forests, wetlands, glaciers, historic shipwrecks and other valuable resources. Charged with conserving natural and cultural resources unimpaired for the enjoyment of future generations, the National Parks are prone to fishing pressures, water quality impairment, coastal watershed degradation, invasive species and other threats in the coastal zone. NPS recognizes that effective conservation involves cooperation between federal agencies, states, citizens, local communities, and academia, all working to maintain this shared ocean heritage.

NPS continues to heighten the agency's scientific focus and organizational emphasis on marine resource management. Key elements of the strategy include characterizing marine species and habitats; evaluating and monitoring their condition; increasing the understanding of how marine ecosystems function; and developing cooperative science based fishery management plans between parks and state agencies, such as the joint Fisheries Management Plan (FMP) between Biscayne National Park, Miami and the Florida State Fish and Wildlife Conservation Commission.

NPS management policies require the agency to determine the quality of Park water resources and avoid, whenever possible, pollution of park waters by activities occurring within and outside (emphasis added) of parks. Under the Natural Resource Challenge, the NPS is working to meet these goals in coastal parks through vital signs monitoring of waters that chronically exceed standards, and by working closely with EPA, USGS, state agencies and local jurisdictions.

Natural Resource Damage Assessment and Restoration Program

The restoration program's mission is to restore natural resources injured as the result of oil spills or hazardous substances releases. It assesses the injuries to natural resources for which the Department is designated a Trustee on behalf of the public. Damages are calculated based on the cost to restore or acquire equivalent resources. The DOI negotiates legal settlements or takes legal actions against responsible parties to achieve the restoration of the injured resources. The restoration program uses recovered funds. Such restoration activities are carried out consistent with a publicly-approved restoration plan, and are almost always carried out in conjunction with other federal, state, or tribal co-trustees, including partnerships with all DOI bureaus, NOAA, DOJ, U.S. Coast Guard, U.S. Forest Service, DOE, DOD, and EPA.

Bureau of Reclamation

Finally, though the Bureau of Reclamation's core mission is as a water management agency, its activities often indirectly impact oceans and marine life. Dam

operations impact anadromous fish runs, flow of riverine water to the oceans, and sediment loading to estuaries and deltas. In many cases, the Bureau of Reclamation cooperates with other federal agencies to mitigate these impacts. For example, in the Pacific Northwest, Reclamation operates its projects to reduce impacts to ocean going anadromous fish, such as salmon and steelhead. Reclamation is helping to build fish screens at irrigation diversions, removing barriers in streams, and increasing stream flows to improve salmon/steelhead survival in several major tributaries to the Columbia River

Department of the Interior														
				Percentage of Funds Dedicated to Each Ocean-Related Program Function*						Dollars in millions		
				Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified		FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
U.S. Geological Survey												
	Surveys, Investigations and Research											
		Geologic Resources, Hazards, and Geologic Hazards Assessments										
			Earthquake Hazards	75%		25%				5.40	9.10	9.10
			Landslide Hazards	100%						0.40	0.40	0.40
			Global Seismographic Network				100%			3.40	7.30	4.00
		Geologic Landscape and Coastal Assessments										
			Earth Surface Dynamics	40%		60%				3.00	3.00	3.00
			National Cooperative Geologic Mapping	100%						1.63	1.63	1.63
			Coastal and Marine Geology	55%		44%	1%			38.43	37.46	38.44
		Geologic Resource Assessments										
			Energy Resources	25%		75%				0.75	0.75	0.75
		Water Resources Investigations, Hydrologic Monitoring, Assessments, and Research										
			National Water-Quality Assessment	40%		60%				6.30	6.20	6.30
			National Stream Quality Accounting	0.25		0.75				0.46	0.44	0.44
			Toxic Substances Hydrology	25%		75%				3.00	2.89	2.62
			National Streamflow Information	60%	5%	35%				0.70	0.70	0.71
			Hydrologic Networks and Analysis	20%		80%				3.00	2.95	2.81
		Cooperative Water Program										
			Cooperative Water Program	60%	5%	35%				3.10	3.12	3.19
		Water Resources Research Act Program										
			Water Resources Research Act	10%		90%				2.80	3.20	2.88
		Biological Research and Monitoring										
			Contaminants	100%						0.15	0.15	0.15
			Fisheries and Aquatic Resources	85%		15%				8.40	8.40	8.75
			Invasive Species	70%		30%				0.98	0.98	0.98
			Status and Trends	100%						3.59	3.59	3.59
			Terrestrial, Freshwater, and Marine Ecosystems	30%		70%				16.13	16.12	16.12
			Wildlife and Terrestrial Resources	70%		30%				2.71	1.98	1.48
		Mapping, Remote Sensing, and Geographic Investigations										
			Cooperative Topographic Mapping [1]			100%				0.10	0.10	0.10
			Land Remote Sensing	75%		25%				1.73	1.73	1.73
			Geographic Analysis and Monitoring	25%		75%				1.50	1.50	1.60
		Enterprise Information										
			National Geospatial Program			100%				0.00	0.00	0.00
			USGS Totals							**107.66**	**113.69**	**110.77**

(Continued on next page.)

Department of the Interior													
				Percentage of Funds Dedicated to Each Ocean-Related Program Function*						Dollars in millions		
				Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified		FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Bureau of Land Management												
	Management of Lands and Resources											
		Management		100%						8.42	8.12	8.13
		Science/R&D/Technology		100%						0.25	0.24	0.24
		Education		100%						0.05	0.05	0.05
		Law Enforcement		100%						0.03	0.03	0.03
		Coastal Facilities Deferred Maint		100%						0.03	0.32	0.18
		Salmon in Oregon		100%						3.93	3.25	3.25
		Subtotal								12.71	12.01	11.88
	Oregon & California Grant Lands											
		Management		100%						20.25	20.50	20.50
		Science/R&D/Technology		100%						1.00	1.01	1.01
		Education		100%						0.47	0.47	0.47
		Law Enforcement		100%						0.03	0.03	0.03
		Coastal Facilities Maintenance		100%						0.00	0.00	0.00
		Subtotal								21.75	22.01	22.01
	Construction											
		Coastal Facilities		100%						0.00	0.00	0.00
		Subtotal								0.00	0.00	0.00
		BLM Totals								**34.46**	**34.02**	**33.89**
Minerals Management Service												
	Royalties and Offshore Minerals Management (ROMM) - Oouter Continental Shelf Lands											
		Leasing & Environmental Program		100%						37.04	37.22	37.77
		Resource Evaluation Program		100%						27.08	29.57	28.68
		Regulatory Program		100%						49.47	51.52	51.77
		Information Management Program		100%						25.71	29.97	30.13
	ROMM - Minerals Revenue Management											
		Compliance and Asset Management		100%						17.88	16.20	20.24
		Revenue and Operations		100%						4.74	4.74	4.96
	ROMM - General Administration			100%						31.14	32.80	33.23
	ROMM Totals									193.06	202.02	206.78
	Oil Spill Research											
		Oil Spill Research Program		100%						7.02	7.01	7.01
		MMS Totals								**200.07**	**209.03**	**213.78**
National Park Service												
	Operation of the National Park System											
		40 Ocean and Great Lakes Units		100%						162.76	167.21	172.87
		Everglades Restoration & Research		100%						10.87	10.81	20.63
		NPS Totals								**173.63**	**178.02**	**193.50**

(Continued on next page.)

Department of the Interior									
	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Natural Resource Damage Assessment and Restoration (NRDAR) Program								
Natural Resource Damage Assessment and Restoration (NRDA)								
Damage Assessments	100%					1.89	2.38	2.00
Restoration Implementation	100%					12.21	15.00	15.00
NRDAR Totals						**14.10**	**17.38**	**17.00**
Fish and Wildlife Service								
Resource Management								
Candidate Conservation	100%					0.15	0.15	0.15
Consultation	100%					1.61	1.60	1.60
Recovery	100%					2.86	2.86	2.86
Coastal Program	100%					10.18	11.46	13.33
National Wetlands Inventory	100%					1.85	1.89	1.80
Nat'l Conservation Training Center	40%		60%			0.03	0.03	0.03
Refuge Operations & Maintenance	78%		21%	1%		98.00	98.69	100.66
Marine Mammals Program	60%		35%	5%		4.57	4.57	2.49
Anadromous Fisheries Management	100%					10.29	10.22	10.47
ANS Control Invasive Alien Species	100%					1.13	1.13	1.13
Ballast Water Demonstration		100%				0.25	0.25	0.25
Hatchery Operations & Maintenance [2]	100%					23.54	22.93	20.37
Division of International Conservation	95%			5%		0.40	0.40	0.40
Division of Management Authority	100%					0.20	0.20	0.20
Division of Scientific Authority	50%			50%		0.07	0.07	0.07
Office of Law Enforcement	100%					1.06	1.06	1.06
subtotal						156.19	157.50	156.85
Construction	100%					10.18	6.56	2.48
Sport Fish								
Coastal Wetlands Grants	100%					12.65	12.44	13.14
Clean Vessel Act Program	100%					10.00	10.00	10.00
subtotal						22.65	22.44	23.14
North American Wetlands Conser Fund								
Coastal and Great Lakes Grants	100%					12.65	12.44	13.85
Cooperative Endangered Species Fund								
Section 6 Grants to States						0.65	0.65	0.65
FWS Totals						**202.31**	**199.58**	**196.96**
Total, Department of the Interior						**732.23**	**751.72**	**765.90**

Notes:

* The FY 2006 President's Budget was used to allocate funding across functional areas.

1 - Oceans activities administered under the Cooperative Topographic Mapping program will be administered under the National Geospatial Program beginning FY 2007.

2 - Operational Funding of the Great Lakes Crosscut in the Hatchery Operations & Maintenance account includes Great Lakes Consent Decree and FONS increase since FY 2004. Base funding involved in the Great Lakes Crosscut.

Marine Mammal Commission

The Marine Mammal Protection Act was enacted in 1972 in response to growing concern that certain species and population stocks of marine mammals were in danger of extinction or depletion as a result of human activities. The Act established a national policy to prevent such depletion and directed federal agencies to take measures to replenish marine mammal species or population stocks that had declined below optimum sustainable population levels. The Act also directed agencies to protect essential marine mammal habitats, including rookeries, mating grounds, and areas of similar significance, from adverse effects of human actions.

The Act was the first legislation to mandate an ecosystem approach to the conservation of marine living resources. In the Act, Congress directed that the primary objective of marine mammal management should be to maintain the health and stability of the marine ecosystem and, when consistent with that primary objective, to obtain and maintain optimum sustainable populations of marine mammals.

The Marine Mammal Commission (MMC) and its Committee of Scientific Advisors on Marine Mammals, created under Title II of the MMPA, oversee domestic and international actions to further the policies and provisions of the Act and advise Congress and the Executive Branch agencies. Because of its independent status and the scientific expertise of its Committee of Scientific Advisors, the Commission is able to provide objective, science-based advice.

The Commission works with representatives of state and federal agencies, affected fisheries, and public interest groups to provide research and advisory services on issues that include:

- reducing the number of marine mammals taken incidental to human activities;
- encouraging regulatory agencies to develop, update, and implement recovery and conservation plans;
- promoting the adoption on science-based ecosystem-oriented approaches to conservation;reviewing the efficacy of recovery programs and providing recommendations on priority research and management tasks;
- identifying measures to improve the effectiveness of the MMPA; and
- working with Alaska Natives and others to minimize threats posed by environmental changes to Arctic marine mammals.

The Commission also provides reports to government agencies, private organizations, and scientists in the United States and elsewhere to focus attention on the most critical research and regulatory problems. Recent projects have included:

- the Federal Advisory Committee on Acoustic Impacts on Marine Mammals, which brought together people representing different interests to find ways to reduce potential impacts of noise on marine mammals;
- the 2003 Future Directions of Marine Mammal Research Consultation, which gathered scientists from around the world to discuss marine mammal research and develop priorities for filling information gaps; and
- the 2002 Workshop on the Management of Hawaiian Monk Seals in the Main Hawaiian Islands.

Finally, the MMC also manages an active research program that addresses issues of importance to the conservation of marine mammals and their habitat as espoused by the MMPA. These research projects complement the MMC's ongoing oversight of the complex issues involving the conservation, protection, and management of marine mammals and their habitats in the United States and abroad.

Marine Mammal Commission

	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Marine Mammal Commission	40%		60%			1.86	1.86	1.93

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.

National Aeronautics and Space Administration

Improving understanding of the oceans via implementing technological advances and cutting-edge research is one component of the National Aeronautics and Space Administration's (NASA) mission "to understand and protect our home planet", according to the agency mandate. In order to fulfill its mission, NASA develops space-borne global observing capabilities and research programs to expand understanding of the Earth system.

NASA's ability to study the Earth's oceans from space has become essential to progress in oceanographic research, given the global reach of the Earth's oceans and their extensive interactions with the atmosphere in shaping the Earth's climate. NASA's Earth Science Program has many highly successful and critical missions in orbit, several pilot or new measurement-missions planned, an extensive research program for analysis of these data, and modeling/data assimilation activities in place to provide useful products for a wide variety of science investigations and applications.

NASA engages the national and international science community in developing priority research requirements and participates in national programs (e.g., Climate Change Science Program). The National Oceanographic Partnership Program (NOPP) ensures that these contributions are shared with other agencies as appropriate. NASA also partners with other U.S. agencies to promote operational implementation of appropriate research results, and with other nations to leverage and extend Global Earth Observations.

The primary objectives of NASA's ocean research programs are to describe, understand, and predict the time-varying three-dimensional circulation of the ocean and the biological regimes of the upper ocean. The oceanography programs encompass core research within the sub-disciplines of Physical Oceanography and Ocean Biology and Biogeochemistry. Aspects of ocean modeling (e.g., global circulation, air/sea gas exchange, carbon cycle, ecology) are also supported by the programs in partnership with the Global Modeling and Analysis Program. Research and modeling activities for the high-latitude ice-covered oceans are supported by the Cryospheric Sciences Program. Ocean-relevant research is integrated with other aspects of the Earth system through NASA's interdisciplinary program. Ocean research and modeling activities focus on aquatic areas that range from global oceans to coastal areas and lakes. All NASA research data are available to researchers world-wide.

Satellite observations that are dedicated to ocean science objectives provide the basic information upon which most of NASA's ocean research is based; however there is necessarily great synergy with the global in situ networks of observations deployed by other agencies (e.g., National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), and the U. S. Navy). Space-based Earth observations made by missions within NASA's Science Mission Directorate are categorized into two general areas: systematic measurements and exploratory measurements. In addition to the space and other remote sensing missions, calibration and validation activities (in situ observations) are required to establish and maintain climate and Earth System quality data records.

Systematic Measurements

Systematic measurements require long-term, sustained support to obtain long time series for scientific studies and environmental monitoring. Areas of observation include:

- Ocean Surface Topography: Measurements of the dynamic height of the surface of the ocean reflecting the accumulated temperature, salinity, and mass anomalies of the underlying water column. These measurements are the key inputs to global circulation models, and have enabled significant developments in global oceanography over the last decade. These data are assimilated into operational models used to predict El Niño (TOPEX/Poseidon, Jason-1- under continual operations, the Ocean Surface Topography Mission (OSTM) under development).

- Ocean Surface Winds: Winds are the essential driving force of the upper ocean circulation. Observations of surface wind over the ocean are historically sparse because their source is a few ships and buoys. Measurement of vector winds at 25 km scale globally on a daily basis is now routine, thanks to satellite scatterometers. Weather services and oceanographers use these measurements in a broad array of science studies, and the measurements are routinely assimilated into operational forecast models (QuikSCAT, currently on extended operations).

- Biology/Biogeochemistry: measurements at particular wavelengths are combined using

mathematical algorithms to estimate water properties, including phytoplankton (microscopic plant) biomass or the chlorophyll content of ocean surface waters, as well as allowing detection of characteristic signatures of features such as plant types, and subsequent interpretations of primary productivity, the process by which plants take up carbon dioxide and produce oxygen. These measurements are key to evaluating the carbon cycle in the ocean, as well as ecology and the oceanic uptake of gases. Sensor used include the Sea-viewing Wide Field-of-View Sensor (SeaWiFS), and Moderate Resolution Imaging Spectroradiometer (MODIS) on the Terra and Aqua platforms. NASA's role is to provide new and better products in terms of absolute accuracy and stability for both climate requirements and improving understanding of the role of ocean biology and biogeochemistry in the Earth System.

- Sea Surface Temperature (SST): This quantity is routinely measured from operational meteorological satellites, using the Advanced Very High Resolution Radiometer (AVHRR). NASA's role is to provide new and better products in terms of absolute accuracy and stability for climate requirements (MODIS and ASTER on Terra, MODIS on Aqua, TMI on the Tropical Rainfall Measuring Mission (TRMM)).

Exploratory Measurements

NASA develops and implements satellite missions to explore new techniques or new geophysical variables. The Gravity Recovery and Climate Experiment (GRACE) mission, launched in March 2002, contributes to oceanography by measuring the time varying gravity field. These measurements, combined with the ocean surface topography data, enabled improved simulations of the ocean, and subsequently, better ocean circulation predictions. The Ice Cloud and land Elevation Satellite (ICESat), which provides high-accuracy, high-resolution observations of surface topography, shows promise for estimating sea ice thickness. Sea ice thickness remains the most critical unknown in determining ocean-atmosphere energy exchanges in climatically sensitive polar regions. NASA is examining other exploratory measurements such as: a) ocean surface salinity from space, b) reflected signals from the Global Positioning System satellites for sea level and wind vector measurement; c) LIDAR to estimate oceanic plant groups and particle types (unknowns in carbon cycle models); and d) pulse and probe laser techniques to study phytoplankton photosynthetic efficiency or changes in plant biochemistry.

Calibration and Validation

Calibration and validation activities are generally in situ observations, which are required to establish and maintain the quality and usefulness of remotely sensed data. Each systematic and exploratory measurement described above has a calibration and validation component. The primary objectives of NASA's calibration and validation program are to:

- reduce measurement errors by identifying and characterizing true error sources, such as changes in the satellite sensors or platform;
- evaluate the various algorithms used by different ocean satellite missions to derive the key measurements;
- improve algorithms for data merging between various national and international sensors;
- improve satellite data processing;
- develop new calibration and measurement protocols as technology advances; and
- improve space-based ocean data for the next generation of NASA ocean research.

For example, NASA's researchers work with the international community to provide a long-term ocean biology/biogeochemistry data set that encompasses measurements from several satellite instruments from the U.S. and international partners. Ocean biology or biogeochemistry data calibration is partially done by using the Marine Optical BuoY (MOBY), an internationally-utilized ocean calibration site with standards traceable to the National Institute of Standards and Technology (NIST) and operated in partnership with NOAA. NASA also has a strong partnership with NOAA to provide in situ sea level measurements that support the calibration and validation of ocean surface topography measurements. High quality tide gauges other measurements are maintained at specific sites under satellite ground tracks to monitor and understand trends observed from the satellite platforms (such as global sea level rise).

Modeling

A high NASA priority is combining biological and physical models to facilitate the co-interpretation of ocean ecology, biogeochemistry and ocean surface topography data. NASA generally uses ocean models with an extensive heritage and adapts them for the special requirements of satellite data assimilation. NASA's oceanography modeling projects offer unique capabilities which include: developing efficient and technically advanced data assimilation techniques; optimizing estimates of the ocean circulation, a key link to seasonal-to-interannual climate forecasting; and estimating the exchange of heat and CO_2 between the ocean and atmosphere, a key link to global long-term

climate prediction. NASA's component of the NOPP funded several significant activities tying the global modeling and state estimation programs to coastal high-resolution modeling applications. These include focused activities on Monterey Bay, Narragansett Bay, and the South Atlantic Bight. NASA also invested in NOPP's education and instrumentation projects, as well as the interagency funded Estimating the Circulation and Climate of the Ocean (ECCO) Project.

NASA's Role

NASA is the U.S. agency at the forefront of science and technology research and development. NASA's primary role in oceans and coastal activities is developing the next generation of techniques and capabilities for satellite-based global and coastal ocean observation, demonstrate the techniques' utility, and pioneer the utilization of the acquired data. In addition to developing and implementing observing capabilities, NASA develops and implements data systems and computing advances in connection with ocean and Earth system modeling. NASA is working with various agencies to transition research results, as appropriate to operational agencies. NOAA, the Navy, and private sector institutions are just a few organizations using these measurements for practical purposes. NASA's strength in oceanography has traditionally been in providing the global "blue water" view of the planet from space. However, the coastal zone often presents societal and practical ocean challenges. NASA plans to aggressively address coastal issues, e.g., instruments to provide better resolution for coastal remote sensing; development of nested, high-resolution coastal models; and use of global model outputs as offshore boundary conditions. Additionally, understanding of the ice-covered polar regions, believed to be the most vulnerable to changes in climate, is a high priority within NASA's research activities. NASA has led the way in using satellite sensors to derive ice concentration, extent, temperature, and motion to understand high-latitude oceanographic processes, particularly in the context of significant climate changes in the Arctic and Antarctic. NASA's programs also provide critical observations and research to understand and model the broader oceanic environment. The Tropical Rainfall Measuring Mission (TRMM) precipitation data continues to provide unique understanding of the ocean-atmosphere interaction in the tropics. NASA investments in ocean science and technology during the past decades have established a solid foundation for ocean monitoring and ocean conditions prediction in the next decade.

National Aeronautics and Space Administration

	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
National Aeronautics and Space Administration								
Science Mission Directorate								
Research			100%			44.6	40.0	41.3
Observations			100%			46.2	63.8	94.6
TOTAL						**90.8**	**103.8**	**135.9**

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.

National Science Foundation

The National Science Foundation (NSF) is the largest federal supporter of academic basic research in the ocean sciences, with investments in disciplinary and interdisciplinary research and education efforts. NSF also supports academic research vessels, instrumentation, and other facilities necessary to access the marine environment. The NSF Directorates and Programs with the most direct interest in ocean sciences are described below.

Directorate for Geosciences, Division of Ocean Sciences

The Division of Ocean Sciences supports basic research and education to further understanding of the global oceans and their interactions with the earth and atmosphere. The Division also supports the operation, maintenance, acquisition, construction, and conversion of major shared-use oceanographic facilities needed to conduct this research. Through these efforts, the Division contributes to the U.S. Ocean Action Plan theme of "advancing our understanding of ocean, coastal, and Great Lakes resources."

Partnerships are fundamental to agency activities. The Division collaborates with other federal ocean agencies on a range of efforts. Collaboration often involves joint funding of individual projects, special competitions or entire programs. Partnerships also extend to specific research programs within the Division selected for emphasis on the basis of special scientific opportunities, such as oceans and human health, global change, and coastal processes.

The Division supports research and education activities through three Sections. The Ocean Section funds research on biological, chemical, and physical processes occurring within the water column from the air/sea interface to the ocean floor. The Marine Geosciences Section supports research on processes that occur on and below the seafloor and at the interface with water, sediment, and rocks. This includes the Integrated Ocean Drilling Program, an international marine research program to expand exploration beneath the oceans. The Integrative Programs Section supports activities, including oceanographic facilities, necessary to advance NSF-funded research and training of oceanographers across disciplines. Examples of research and training support include technology development and dedicated educational activities. The Section provides significant support to facilities and technologies that enable access to various regions of the ocean and ensure effective research and communication capabilities.

Office of Polar Programs (Ocean-Related Research)

NSF's polar programs, most of which are supported through the Office of Polar Programs, provide support for investigations in a range of scientific disciplines, including a number of areas of ocean-related research. The majority of this work contributes to the U.S. Ocean Action Plan theme of "advancing our understanding of ocean, coastal, and Great Lakes resources," but specific efforts within the Arctic Research Programs and the U.S. Antarctic Program also support the Action Plan themes of "enhancing the use and conservation of our ocean, coastal, and Great Lakes resources" and "advancing international ocean science and policy."

The goal of the NSF Arctic Research Programs is to gain a better understanding of the Earth's biological, geological, chemical, and social processes, and the interactions of ocean, land, atmosphere, biological, and human systems. Ocean-related research is supported within the Arctic System Science and Arctic Natural Sciences programs.

NSF is charged with managing all U.S. activities in the Antarctic as a single, integrated program. Funding for the U.S. Antarctic Program includes research and the science support directly linked to specific research projects, as well as support for the broader operations and logistics infrastructure that make it possible to conduct science on the remote and uninhabited continent. Three Antarctic programs fund ocean-related research: Antarctic Geology and Geophysics, Antarctic Biology and Medicine, and Antarctic Ocean and Climate Systems.

Directorate for Biological Sciences (Ocean-Related Research)

The Directorate for Biological Sciences provides support for research to advance understanding of the underlying principles and mechanisms governing life. The Directorate is organized into five divisions that fund research on marine organisms and research related to marine ecosystems. The Directorate also supports marine research infrastructure. Through these efforts, Biological Sciences contributes to the theme of "advancing our understanding of ocean, coastal, and Great Lakes resources" described in the U.S. Ocean Action Plan.

The Division of Environmental Biology supports fundamental research on the systematics, population genetics, and diversity of marine organisms, and research

on the terrestrial components of coastal communities and ecosystems. It also jointly supports a coastal Long-Term Ecological Research site with the Geosciences Directorate.

The Division of Integrative Organismal Biology funds research to enhance understanding of the living organism as a unit of biological organization. Specific ocean-related research includes studies on ecological and evolutionary physiology, behavior, and behavioral ecology of marine species.

The Division of Molecular and Cellular Biosciences supports research to enhance fundamental understanding of life processes at the molecular, subcellular, and cellular levels. Experimental organisms used include marine species. In addition, the division funds some microbial observatories that focus on marine and near shore ecosystems.

The Division of Biological Infrastructure supports activities that provide infrastructure for biological research. This includes improvement of marine research laboratories and living collections of marine organisms widely used in basic biological research.

The Division of Emerging Frontiers fosters new initiatives and catalyzes research at the boundaries of disciplines. This includes support for the study of marine pathogens and microbial genome sequencing of marine organisms.

National Science Foundation

	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
National Science Foundation								
Research and Related Activities Account								
Directorate for Geosciences								
Division of Ocean Sciences								
Ocean Section			100%			120.35	115.98	117.28
Integrative Programs Section			100%			118.40	113.70	114.97
Marine Geosciences Section			100%			84.23	82.09	82.99
Office of Polar Programs								
Arctic Natural Sciences	14%		86%			1.30	2.50	2.60
Arctic Systems Science	14%		86%			6.19	3.10	3.20
Antarctic Geology & Geophysics			80%	20%		2.00	1.70	1.70
Antarctic Biology & Medicine			100%			4.50	1.50	1.50
Antarctic Oceans & Climate Systems			100%			4.70	4.10	4.20
Directorate for Biological Sciences**								
Division of Environmental Biology								
Systematic Biology & Biodiversity Inventories			100%			2.36	2.31	2.33
Population & Evolutionary Processes			100%			0.55	0.54	0.55
Ecosystem Science			100%			2.00	1.96	1.98
Ecological Biology			100%			0.29	0.28	0.28
Division of Integrative Organismal Biology								
Developmental Mechanisms			100%			0.28	0.27	0.27
Ecological & Evolutionary Physiology			100%			0.79	0.77	0.78
Integrative Animal Biology			100%			1.10	1.08	1.09
Sensory Systems			100%			0.14	0.14	0.14
Behavioral Neuroscience			100%			0.23	0.23	0.23
Animal Behavior			100%			0.92	0.90	0.91
Division of Molecular & Cellular Biosciences								
Biomolecular Systems			100%			0.35	0.34	0.34
Microbial Observatories & Microbial Interactions			100%			3.02	2.96	2.99
Division of Biological Infrastructure								
Biological Field Stations & Marine Laboratories			100%			0.85	0.83	0.84
Divison of Emerging Frontiers								
Ecology of Infectious Diseases			100%			1.05	1.03	1.04
Microbial Genome Sequencing			100%			2.00	1.96	1.98
National Science Foundation Totals						**357.60**	**340.27**	**344.20**

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.
**BIO does not have a specific program that only funds marine and coastal activities. Proposals can be submitted to most any BIO program, so the level of support for this activity will fluctuate with the number, type and quality of proposals that are submitted each year. Therefore, even large changes in the percent of marine or coastal activities by a program does not necessarily reflect a change in the program's focus or policy.

Smithsonian Institution

In 1829, James Smithson, a British scientist, bequeathed his estate to the American people for the "increase and diffusion of knowledge." Today the Smithsonian Institution supports that goal through its operation of National museums and research institutes. Three organizations within the Smithsonian Institution contribute to coastal and ocean activities. All three contribute to the U.S. Ocean Action Plan theme of "Advancing our Understanding of Oceans, Coasts, and Great Lakes.

National Museum of Natural History

The National Museum of Natural History (NMNH) manages a marine station on Carrie Bow Cay, located on the Meso-American Barrier Reef in central Belize. This laboratory is part of the Smithsonian Marine Science Network that supports the Institution's marine scientists' research projects on a year-round basis. The precursor to the Caribbean Coral Reef Ecosystems Program was established in 1972. The NMNH was first appropriated base federal funding for this program in 1985. Since 1999, improved facilities now include dry and wet labs, housing, generator, compressor, small boats and scuba cylinders, and essential facilities such as solar power, running-seawater system, and a weather station. The majority of recent Caribbean Coral Reef Ecosystems marine research can be described by the following four main areas of interest.

1. Biodiversity, morphology and developmental biology;
2. Species interactions and behavior;
3. Ecophysiology and responses to environmental change; and,
4. Processes linking species and environment.

Smithsonian Environmental Research Center

The Smithsonian Environmental Research Center (SERC) Marine Environmental Sciences Program measures long-term changes in water quality and nutrient loading, as well as species composition and population dynamics of fish, invertebrates, plankton and marshes in the Rhode River subestuary as a model system of Chesapeake Bay. The long-term data are used to assess human impacts and natural variation in the Nation's largest estuary.

Smithsonian Tropical Research Institute

The Smithsonian Tropical Research Institute (STRI) Marine Environmental Sciences Program monitors a variety of physical and biological parameters on the Atlantic and Pacific coasts of the Republic of Panama at Naos Island, Bocas del Toro, Galeta, San Blas and Golfo de Chiriqui. This monitoring is designed to reveal local long-term changes in the environment as well as to provide background data to support marine research. The physical monitoring data is available for general non-commercial use (http://www.stri.org/mesp/MESP.htm). MESP sub-projects are:

1. Panama Reef Monitoring Network;
2. Marine Environmental Assessment Study; and,
3. Oil Spill Project

Smithsonian Institution

	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Smithsonian Institution								
NMNH Caribbean Coral Reef Ecosystem			100%			0.09	0.09	0.09
SERC Marine Environmental Sciences			100%			0.27	0.27	0.27
STRI Marine Environmental Sciences			100%			0.20	0.20	0.20
Total						**0.56**	**0.56**	**0.56**

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.

Department of State and USAID

Department of State

The Department of State works around the world to protect and advance U.S. interests with respect to uses of the oceans and conservation and management of marine resources. In this regard, the Department works to: (1) negotiate and implement agreements to protect the world's oceans and to conserve and manage marine living and non-living resources; (2) raise awareness of the environmental and economic costs associated with a lack of effective long-term conservation and management of such resources both at home and around the world; and (3) advance the United States' strategic goals by addressing challenges that require international consultation and coordination.

The Department works in close coordination with multiple stakeholders, both within and outside government, to protect and advance U.S. interests in the following oceans-related areas: commercial fisheries, including the incidental catch of marine mammals, seabirds, sea turtles, and non-target fish stocks; aquaculture; aquatic invasive species; biodiversity; coral reefs; marine debris; Antarctic and Arctic affairs; homeland security, including maritime domain awareness; the Law of the Sea Convention, including deep seabed mining, marine scientific research, maritime boundaries and national maritime claims, continental shelf claims, marine pollution, commercial and military navigation/transport; regional seas programs; small island developing States; underwater cultural heritage; and whales. Within the Department, primary responsibility for these issues rests with the Bureau of Oceans and International Environmental and Scientific Affairs (OES), supported by other bureaus and an extensive network of Missions around the globe.

To carry out this work, the Department of States participates in multiple organizations, agreements and arrangements at the global, regional and bilateral levels. At the global level, the Department is engaged at the United Nations and its subsidiary bodies, such as the International Maritime Organization (IMO) and the Food and Agriculture Organization (FAO). At the regional level the Department participates in an extensive list of regional organizations and arrangements. A representative (but not exhaustive) list of the global and regional organizations in which the Department participates on an active basis is included at the end of this section. The Department also maintains extensive coordination at the bilateral level with countries and entities such as Canada, Mexico, Russia, Japan, China, Australia, the States of the Pacific Forum, and the European Commission.

In carrying out its work with respect to the conservation and management of living marine resources, the Department seeks to advance a number of key goals including: promoting an ecosystem-based approach to fishery management, controlling fishing capacity, combating illegal, unregulated and unreported (IUU) fishing, strengthening regional fishery management organizations, securing equitable access for U.S. fishers to shared resources, increasing assistance to developing states, and improving food security.

Significant and recent successes by the United States in this regard include the negotiation and adoption of new regional conventions and bilateral treaties governing the conservation and management of shared living marine resources, a ban on shark-finning adopted by two regional fisheries management organizations in the Atlantic and Pacific, a 98 percent reduction in dolphin mortality in the Eastern Pacific tuna fishery under the International Dolphin Conservation Program, the introduction of turtle excluder devices in the commercial shrimp fleets of more than 15 countries that export shrimp to the United States, and significant advances in combating IUU fishing.

Since September 11, the Department has redirected some of its work in the oceans arena to address issues of maritime security. The U.S. delegation to the IMO initiated soon-to-be-adopted amendments to the Convention on the Suppression of Unlawful Acts against the Safety of Maritime Navigation. The Department has prepared a strategy to involve international partners in enhancing maritime domain awareness.

The Department has also led interagency efforts to bring the Law of the Sea Convention before the U.S. Senate for its advice and consent. Recent achievements in protecting the marine environment include international agreements on air pollution from vessels, the use of anti-foulant paints, and the control of invasive species in ballast water. The Department responded to the tragedy of the Indian Ocean tsunami by working with the Intergovernmental Oceanographic Commission towards an early-warning system for the Indian Ocean. In the polar regions, the Department has overseen the U.S. initiatives in the Arctic Council on the Arctic Climate Impact Assessment and a new Arctic human health monitoring program. In the

Antarctic, the Department took the lead role to conclude an Annex on Liability to the Environmental Protocol to the Antarctic Treaty, after several years of negotiation.

In coming years, the Department will remain fully engaged in efforts to protect and advance U.S. interests with respect to oceans issues consistent with U.S. domestic priorities and as part of an integrated and comprehensive U.S. foreign policy.

Global and Regional Organizations, Agreements and Arrangements in which the Department participates:

International Programs and Organizations

- United Nations Environment Program
- Cartagena Convention
- South Pacific Regional Environmental Program
- The Convention on International Trade in Endangered Species of Wild Flora and Fauna
- RAMSAR Convention on Wetlands of International Importance
- The World Conservation Union (IUCN)
- United Nations Food and Agriculture Organization, Department of Fisheries
- Intergovernmental Oceanographic Commission

Collaboration with International Organizations

- International Maritime Organization
- International Seabed Authority
- International Tribunal for the Law of the Sea
- International Union for the Conservation of Natural Resources
- Pacific Community

International Fisheries Commissions and Related Organizations

- International Sea Turtle Agreements
- International Whaling Commission
- International Council for the Exploration of the Seas
- North Pacific Marine Science Organization
- The Commission for the Conservation of Antarctic Marine Living Resources
- Inter-American Tropical Tuna Commission
- Great Lakes Fishery Commission
- Pacific Salmon Commission
- North Atlantic Fisheries Organization
- North Atlantic Salmon Conservation Organization

Other agreements and arrangements

- South Pacific Tuna Treaty and Associated Assistance Agreement
- Oceans, Environmental and Science initiatives
- Project to support the Food and Agriculture Organization of the United Nations International Plan of Action to deter and eliminate illegal, unregulated and unreported fishing
- Arctic Council
- Antarctic Treaty Secretariat

U.S. Agency for International Development

The U.S. has strong political and economic interests in protecting international coastal ecosystems and resources. Healthy marine ecosystems are critical to U.S. diplomatic and development strategies to promote economic and food security, social stability and conflict prevention, democratic governance, improved human health, disaster and climate change mitigation, and biodiversity conservation in many countries. Coastal ecosystems have economic, social and cultural importance to many nations and entire regions and comprise the basis for sustained development, particularly for small island nations.

USAID is committed to assisting developing nations protect and manage their coastal areas. Recognizing that the conservation and sustainable use of coastal resources are critical to sustainable economic development, USAID works in over 25 countries on projects that directly promote the protection and improved resource management of coastal and coral reef ecosystems. Agency programs build human and institutional capacity to improve management of valuable resources.

Integrated Coastal Management (ICM) and Seascape Approach to Management

USAID is a world leader in promoting the practice of integrated coastal management and large-scale seascape/landscape approaches to management, which address regional economic and ecological issues. The Agency recognizes that sound management of coastal resources must be at the forefront of sustainable development throughout the global community of nations. USAID's coastal management projects promote the essential elements of sustainable development -- protecting the world's environment, fostering balanced economic development, promoting democratic participation in governance, and improving the health and well-being of people in the world's developing nations.

USAID is supporting significant projects in ICM in the Philippines, Indonesia, Egypt, and Tanzania. USAID supports three marine ecoregions of global significance – the East African Marine Ecoregion, the Meso-American Reef region, and the South East Asian Coral Triangle in Indonesia, the Philippines and Papua New Guinea – in partnership with the World Wildlife Fund, the Nature Conservancy, the Wildlife Conservation Society, and the International Coral Reef Action Network.

Integrated Watershed Management

Successful integrated coastal management is best addressed at the ecosystem-scale, with the best management unit being the entire watershed adjacent to a coastal area. Success requires forging the right balance between competing human uses of water and natural resources, while ensuring that natural "assets", such as environmental health and productivity, are not compromised in the long term. For example, in Jamaica, watershed management is integrated with activities in wastewater and sanitation management, improved land use, and sound coastal tourism. In addition to Jamaica, major watershed management projects are supported in the Central American, Caribbean and Southeast Asian regions.

Coral Reef Ecosystems: Critical for Food Security, Economic Development and Coastal Protection

Coral reef and mangrove ecosystems play a critical but often undervalued role in the sustainable development options for coastal residents throughout the tropical world. Protection of coasts from storm surge and tsunamis, alternative livelihoods based on tourism, and significant contributions to fisheries exports and food security are but a few of the many ecological services and values of coral reef ecosystems. USAID's activities directly support coral reef and mangrove forest conservation in over 20 tropical countries throughout the world. Activities range from field programs in best management practices and monitoring, to the establishment and improvement of marine parks and reserves, to improvements in coastal tourism and fisheries management, to ICM and larger seascape approaches.

Management of Marine Protected Areas and Sustainable Fisheries

One especially effective management approach is the establishment of a series of ecological "no-take" reserves and/or multi-purpose marine protected areas that can result in early and sustained management dividends. Ecological reserves improve fishery yields and help build and maintain healthy fish populations. Ecological reserves have also proven very effective in the conservation of marine biodiversity and the generation of jobs and revenue through tourism. Such tools, when coupled with ongoing education, enforcement, and alternative livelihood schemes, offer the best hope for reducing or eliminating stress on coral reefs and other marine habitats.

USAID is supporting marine protected areas, fishery reserves, and marine national parks of regional and international significance in Indonesia, the Philippines, Papua New Guinea, Egypt, Kenya, Tanzania, Mozambique, Dominican Republic, Ecuador, Brazil, Dominican Republic, Honduras, Mexico and Panama, as well as several transboundary sites. Many of these areas are included in the *Parks-in-Peril Program,* a regional protected area management program in Latin America and Caribbean that is implemented in partnership with The Nature Conservancy. Those sites situated along the coast afford protection to coastal watersheds, coral reefs and mangrove forests.

USAID is improving fisheries management in the Philippines by promoting an ecosystem-based approach to management and improved governance of these critical, but overexploited, resources. In addition, USAID provides core support to the International Center for Living Aquatic Resources Management (ICLARM) for research and management on sustainable fisheries and mariculture.

East Asia and Pacific Environmental Initiative

Key regional environmental problems are addressed through this initiative, which is a joint DOS/USAID program. Programs address illegal wildlife trade, destructive fishing practices associated with the international trade in live reef fish for the food and aquarium trades, and improve management of coral reefs through partnerships with the private tourism sector.

International Leadership and Cooperation

USAID, in partnership with other federal agencies, was instrumental in establishing the International Coral Reef Initiative (ICRI) and in developing ICRI's Call to Action and Framework for Action, which are based upon integrated coastal management principles promoted in Agency projects worldwide. The Agency continues to support the goals and efforts of ICRI.

USAID also contributes technically and programmatically to the Global Program of Action

(GPA) for the control of Land-Based Sources of Marine Pollution, the Meso-American Reef Alliance Initiative, the East Asia and Pacific Environmental Initiative, the Middle East Regional Cooperation (MERC) project of the Middle East Peace Process, the Convention on International Trade of Endangered Species of Fauna and Flora (CITES), the Asia Pacific Environmental Cooperationforum, and other regional and global efforts contributing to the conservation and sustainable use of coastal and coral reef resources.

Support for the Executive Order for the Protection of Coral Reefs

As co-chair of the International Working Group with the Department of State, USAID is an active participant and leader on the U.S. Coral Reef Task Force. USAID's activities support the international charge of the Executive Order to (1) assess the U.S. role in the international trade of coral reef species; (2) develop an appropriate, broad-based strategy for mitigating the negative impacts of trade; (3) develop and implement strategies and activities for the protection and sustainable use of coral reef resources worldwide; and (4) implement the International Coral Reef Initiative's Framework for Action through expanded cooperation with ICRI partners.

Department of State and USAID

	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual [1]	FY 2005 Enacted [2]	FY 2006 Budget Request
Bureau of Oceans and International Environmental and Scientific Affairs (OES)								
D&CP								
Oceans Affairs				100%		0.80	0.90	0.90
Marine Conservation				100%		0.20	0.20	0.20
Economic Support Fund								
Oceans, Environmental and Science Intitiative	50%			50%		1.60	0.40	1.40
South Pacific Islands Fisheries Fund				60%	40%	18.00	18.00	18.00
International Fisheries Commission								
Inter-American Tropical Tuna Commission - IATTC			50%	50%		1.80	2.20	2.10
Great Lakes Fishery Commission - GLFC	30%		30%	40%		12.10	12.80	15.00
International Pacific Halibut Commission - IPHC			50%	50%		1.60	2.00	3.10
Pacific Salmon Commission - PSC	30%		30%	40%		2.30	2.70	3.00
Other Fisheries Commission				100%		1.30	1.90	1.80
International Organization and Programs								
United Nations Environment Program (UNEP) Fund				100%		6.00	6.00	6.00
UNEP Trust Funds				100%		3.30	3.30	3.50
Cartegena Convention				100%		0.50	0.50	0.50
South Pacific Regional Environmental Program (SPREP)				100%		0.20	0.20	0.20
CITES				100%		1.00	1.10	1.10
RAMSAR Convention on Wetlands of International Importance				100%		0.80	0.90	1.00
The World Conservation Union (IUCN)				100%		1.10	1.00	1.00
Intergovernmental Oceanographic Commission (IOC)				100%		0.50	0.20	0.20
Contributions to International Organizations								
Food and Agriculture Organization - Fisheries Department/Committee on Fisheries (FAO/CC				100%		3.00	3.00	3.00
International Maritime Organization (IMO)				100%		1.30	1.50	1.50
International Seabed Authority (ISA)				100%		0.00	0.00	1.00
International Tribunal for the Law of the Sea (ITLOS)				100%		0.00	0.00	1.90
International Union for the Conservation of Natu	100%					0.30	0.40	0.40
Pacific Community (PC)				100%		1.00	1.60	1.50
TOTAL						**58.70**	**60.80**	**68.30**

(Continued on next page.)

Department of State and USAID

	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual [1]	FY 2005 Enacted [2]	FY 2006 Budget Request
US AGENCY FOR INTERNATIONAL DEVELOPMENT								
Bureau: Latin America and Caribbean								
Development Assistance								
Jamaica Special Objective (SO) 2	90%			10%		3.41	0.70	0.60
Mexico/SO6	100%					0.78	0.00	0.00
Panama/SO2	100%					5.75	5.75	5.75
Ecuador/SO1	100%					1.07	0.25	0.00
Dominican Republic/SO3	100%					0.13	0.30	0.00
Central America Regional/SO2	100%					1.53	0.15	0.15
LAC Regional/SO22 (PiP)	100%					0.70	0.70	0.70
Economic Support Fund								
Caribbean Regional/SO5	100%					0.33	0.00	0.00
Bureau: Asia and Near East [3]								
Development Assistance								
Bangladesh/SO05	100%					0.85	0.90	0.90
Bangladesh/SO6	100%					0.90	0.45	0.45
Indonesia/SO12	100%					2.00	2.00	0.00
Philippines/SO4	100%					1.45	2.36	2.36
Vietnam/AEP	100%					0.25	0.00	0.00
Thailand/SO2	100%					0.00	0.75	0.55
Economic Support Fund								
Bangladesh/SO6	100%					0.20	0.50	0.50
Egypt	100%					4.96	4.96	4.96
Indonesia	100%					0.30	0.30	0.00
West Bank-Gaza/SO2	100%					7.48	7.48	7.48
Lebanon	100%					0.50	0.00	0.00
Bureau: Europe and Eurasia								
No funds reported								
Bureau: Africa								
Development Assistance								
Tanzania/SO8	100%					0.72	0.75	0.00
Kenya/SO5	100%					0.40	0.54	0.00
Bureau: Central Programs								
Development Assistance								
Bureau for Economic Growth, Agriculture and Trade								
WorldFish Center - CGIAR Center	50%			50%		0.34	0.34	0.34
Environment Strategic Objective 1.4	80%			20%		0.97	0.97	0.97
Environment Strategic Objective 1.1	80%			20%		1.80	1.80	1.80
Middle East Regional Cooperation Program (MEI	60%			40%		0.30	0.72	0.00
Cooperative Development Research (CDR) - Jam	60%			40%		0.16	0.00	0.00
USAID Total						**37.26**	**32.67**	**27.51**
Total						**95.96**	**93.47**	**95.81**

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.
1 USAID FY 2004 figures are estimates; ground-truthing from Missions is not yet complete.
2 USAID FY 2005 figures are anticipated funding levels; budget had not yet been disbursed or obligated at the time this data was collected.
3 USAID FY 2005 figures do not include anticipated funds for Asian tsunami reconstruction.

Department of Transportation

The Department of Transportation (DOT) is involved in ocean and coastal activities through two of its agencies - the Maritime Administration and the Saint Lawrence Seaway Development Corporation, both of which support DOT's strategic goals of safety, mobility, global connectivity, environmental stewardship and security.

Saint Lawrence Seaway Development Corporation

The Saint Lawrence Seaway Development Corporation (SLSDC), a wholly owned government corporation within the U.S. Department of Transportation, is responsible for the operations and maintenance of the U.S. portion of the St. Lawrence Seaway. The Great Lakes St. Lawrence Seaway System, also known as "America's Fourth Seacoast", is an active North American transportation corridor for the movement of commercial goods into a robust economic region.

The region is home to almost one-half of both the U.S. and Canadian population and has the five largest steel producing states in the U.S., accounting for approximately 70 percent of the total U.S. production. Further, almost one half of the Fortune 500 Industrial Companies are headquartered in the region. A 2001 study found that maritime commerce on the Great Lakes Seaway System generates more than 150,000 U.S. jobs, $4.3 billion in personal income, $3.4 billion in business revenues, and $1.3 billion in federal, state, and local taxes.

The SLSDC not only provides international customers with a safe, efficient, and reliable U.S. transportation system, it also coordinates all of its activities with its Canadian counterpart, The St. Lawrence Seaway Management Corporation (SLSMC), particularly with respect to rules and regulations, the Tariff of Tolls, overall day-to-day operations, traffic management, navigation aids, safety, environmental programs, operating dates, and trade development programs. The major SLSDC programs are described below.

Foreign Flag Vessel Inspections and Ballast Water Exams

The SLSDC continues to perform its Enhanced Seaway Inspection (ESI) program, inspecting all ocean vessels for safety and environmental protection issues in Montreal, Quebec, before they enter U.S. waters.

During the 2004 navigation season, the SLSDC achieved its internal performance goal of inspecting all ocean vessels with 224 inspections completed, all performed by SLSDC marine inspectors. The ballast water exchange program continues to be an important function of the ship inspection program. These inspections are carried out concurrently with the ESIs, by SLSDC personnel in Montreal and by USCG and Corporation staff at Snell Lock in Massena. These programs support the Oil Pollution Act of 1990 and the Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990. During the 2004 navigation season, there were 52 ballast water exams conducted in Montreal and 32 in Massena, N.Y.

St. Lawrence Seaway Lock Availability

During the 2004 navigation season, the availability of the U.S. sectors of the Seaway, including the two U.S. locks maintained and operated by the SLSDC, was 99.0 percent, meeting the annual goal of 99 percent. During the 2004 navigation season, delays due to malfunctioning lock equipment totaled 6 hours, 15 minutes, representing less than one-tenth of one percent of the entire navigation season.

Concrete Rehabilitation

In January 2006, the SLSDC is expected to begin the first year of work on a four-year, $6 million concrete replacement project at the two U.S. Seaway locks (first year funding provided in FY 2005; however, funding was not made available in time to complete the work in FY 2005). The replacement of deteriorated concrete has historically been one of the SLSDC's most expensive maintenance projects dating back to the Seaway's opening in 1959. Since 1991, the SLSDC has made in-house repairs to the most critical areas identified by the Corps, but further deterioration and harsh winter conditions have caused additional damage. As the concrete deteriorates, pieces of it become dislodged and fall into the lock chambers. This poses a risk to people on the decks of commercial vessels and pleasure boats.

U.S. Seaway Capital/Lock Improvements

The SLSDC annually performs necessary capital improvements to the locks and other agency facilities. SLSDC management and engineering/maintenance teams annually develop five-year capital plans to identify capital and other special projects (upgrades or replacements). These

improvements are critical to ensuring the short and long-term reliability of the Seaway System and its lock infrastructure. Without the necessary capital replacements and improvements each year, the risk of a lock malfunction or shutdown increases. The SLSDC's capital and maintenance programs ensure that the Seaway System remains safe, reliable, and efficient.

Trade Development Initiatives

Since 1985, when the SLSDC began its marketing program, the agency has performed trade development and promotional activities geared at generating trade to and from North America via the Great Lakes Seaway System. Program-wide activities include hosting overseas trade missions that promote the entire Seaway System at maritime and trade-related exhibitions, developing commodity-specific marketing plans, and working directly with ports, carriers, terminal operators, labor, and importers/exporters in the development of promotional materials and initiatives. Overseas trade missions, which include U.S. and Canadian maritime, government, industry, and labor delegates, have led to the development of new international cargo movements into the System.

The Maritime Administration

The Maritime Administration (MARAD), a component of the Department of Transportation, promotes a U.S. maritime industry for the continued security and prosperity of the Nation. MARAD's programs seek to assure that the United States has efficient ports and terminals with modern intermodal connections; sufficient commercial shipping capacity to meet the needs of the Nation's growing economy and of the Department of Defense in times of national emergency; adequate shipbuilding and repair service and facilities, and an available professional workforce for employment in the U.S. marine transportation system. These focus areas support many of the ocean policy objectives, including the enhancement of marine-related commerce and transportation; the protection of the marine environment; advancement of Merchant Marine Officer education and training; intergovernmental and private sector cooperation; and preservation of the role of the United States as a leader in ocean and coastal activities.

Marine Commerce and Transportation

Although U.S.-flag vessels provide premium quality shipping services, their operating costs reflect America's higher labor costs and its business operating environment, compared to competitors who often have the benefit of tax havens. The Federal Government, through MARAD's Maritime Security Program (MSP), assists U.S.-flag operators to ensure that an active U.S.-flag merchant fleet of militarily useful general cargo vessels continue to operate in international trade, and the trained personnel needed to operate both active commercial and Government-owned reserve vessels, are available to meet U.S. economic and national security requirements.

The Voluntary Intermodal Sealift Agreement (VISA) program is the sealift emergency preparedness program for the United States. Approximately 125 vessels participate in this program, including the MSP vessels. It provides contractual arrangements with private U.S.-flag ship operators to make intermodal transportation services available in times of national emergency.

Statistics relating to Operating Enduring Freedom (OEF)/Operation Iraqi Freedom (OIF) from September 12, 2001 to March 23, 2004, show that approximately eighty-eight percent of cargo (approximately 39.4 million square feet) moved in OEF/OIF was carried aboard 96 U.S.-flag government and privately owned ships. While DOD did not activate the VISA program, 13 VISA vessels [two MSP and 11 cargo preference vessels], were chartered by the Military Sealift Command to support OEF/OIF. The Military Traffic Management Command also utilized a total of 37 VISA vessels [33 MSP and four cargo preference vessels] for their liner services.

The continued presence of U.S.-flag vessels in foreign trades provides legal standing for the U.S. Government to protect the interests of American businesses and consumers. As a result, the U.S. Government may directly intervene in disputes with foreign countries that regulate or otherwise restrict the operation of U.S.-flag ships, carriers, ports, and connecting intermodal operations abroad to assure that U.S. interests are protected.

The Maritime Guaranteed Loan Program (Title XI) authorizes MARAD to guarantee up to 87.5 percent of the obligations on private sector debt financing for ships constructed, reconstructed, or reconditioned in the United States, including vessels for export, and to guarantee shipyard obligations of indebtedness for eligible domestic and exports vessels and for shipyard modernization and improvement. Guarantees in force and commitments to guarantee include a large portion of the U.S.-flag fleet, including vessels on the coastal and inland waterways.

MARAD is responsible for the support, organization, and management of the Marine Transportation System National Advisory Council, which provides non-federal

advice to the Secretary of Transportation on Marine Transportation System (MTS) issues. Under MARAD's leadership, this group provides valuable insights into the MTS and intermodal challenges, needs, and solutions from the state, private and public interest sectors.

MARAD participates as a part of the Interagency Committee on the Marine Transportation System (ICMTS). The purpose of ICMTS is to improve federal MTS coordination and policies; promote the environmentally sound integration of marine transportation with other modes of transportation and with other ocean, coastal, and Great Lakes uses; develop outcome-based goals for the MTS and a method for monitoring progress towards those goals; coordinate federal annual budget requests and regulatory activities that impact the MTS; and recommend strategies and plans to maintain and improve the MTS.

MARAD programs also focus on enhancing marine-related commerce, particularly with regard to economic and security issues. Port economic activities include the excess federal property conveyance program and port impact analyses. Port security activities include the National Port Readiness Network, port security training and other activities seeking to improve commercial and cargo security.

MARAD processes deepwater port applications for the Department of Transportation. Currently, there is only one operational deepwater port for petroleum. In 2002, the law was amended to allow for liquefied natural gas (LNG) deepwater port facilities. To date, twelve applications have been received for the LNG facilities, four licenses have been granted, and one LNG facility is operational. The U.S. Energy Information Administration (part of the Department of Energy) estimates that four proposed LNG deepwater ports on the Atlantic and Gulf coasts will generate a 58 percent increase in LNG imports from 2007 through 2010.

MARAD negotiates specific bilateral maritime agreements to remove restrictions that impinge on U.S. maritime companies' access to foreign transportation markets, add to costs, limit revenues, and impede efficient operations of the U.S. maritime industry in international trade. Such agreements are intended to achieve full market access for U.S. carriers in specific markets where full access is not assured by major global trade agreements. With respect to multilateral activities, MARAD is involved in trade negotiations launched under the umbrella of the World Trade Organization and participates in the Asia-Pacific Economic Cooperation (APEC) Transportation Working Group. MARAD works either directly, or in conjunction with the State Department and other government agencies, to negotiate these agreements, understandings and arrangements.

Environmental Protection

MARAD programs provide support to the commercial and public sector in addressing environmental challenges related to maritime commerce. These activities cover a broad range of marine related environmental issues, including port and vessel discharges and the establishment of environmental management tools and practices. One initiative is directed at air pollution from and energy efficiency of maritime vessels and port facilities and operations. The program seeks to foster the development and deployment of advanced air emissions technologies for the maritime industry through public/private partnerships. Our public partners include the Environmental Protection Agency, Department of Energy, Department of Defense, and the Coast Guard. Another seeks to reduce the introduction of aquatic nuisance species through ballast water discharges. This is a cooperative effort with the Coast Guard, the Environmental Protection Agency, and National Oceanic and Atmospheric Administration. MARAD has provided and will continue to provide where possible, vessel platforms for use in testing and demonstrating ballast water treatment systems. MARAD also supports the development of international marine environmental standards through membership in and participation on the U.S. delegations to the International Maritime Organization, Marine Environmental Protection Committee and the Conference of the Parties to the Basel Convention, and as the U.S. delegate to the International Organization for Standards, subcommittee on Marine Environmental Protection.

MARAD is the U.S. government's disposal agent for merchant type vessels 1,500 gross tons or more and has custody of a fleet of over one hundred obsolete ships owned by the federal government that are designated for disposal. In 2005, MARAD plans to remove approximately 15 additional obsolete vessels from the National Defense Reserve Fleet (NDRF) sites. MARAD is striving to remove all vessels that have a high or moderate risk to the environment as soon as possible, and to have disposal alternatives and the necessary funding in place in the future to ensure that obsolete vessels can be disposed of at a rate greater than obsolete vessels coming into MARAD's fleets.

Advancement of Merchant Marine Officer Education

Both the U.S. Merchant Marine Academy and the State Maritime Schools support marine–related commerce by educating young men and women to become officers in the American merchant marine. The U.S. Merchant Marine Academy is a Federally operated institution. MARAD provides funding and other assistance to the State Maritime Schools. Graduates receive Bachelor of Science degrees and U.S. Coast Guard licenses as deck or engineering officers. These maritime academies produce merchant marine officers to meet our domestic and international U.S.-flag crewing needs.

Department of Transportation

	Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
	Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Department of Transportation								
Saint Lawrence Seaway Development Corporation								
Operations and Maintenance (021-40-8003)		100%				14.00	16.00	16.00
Maritime Administration								
Operations and Training								
Cargo Preference		100%				1.88	1.92	1.96
Ports, Intermodal and Environmental Act	30%	70%				4.53	4.63	4.72
Maritime Academies		100%				66.10	65.87	74.47
Ship Disposal	100%					16.12	21.44	21.00
Maritime Guaranteed Loan Program								
Shipyard Revitalization - Title XI		100%				4.47	4.73	3.53
Ocean Freight Differential		100%				687.82	624.60	214.60
Maritime Security Program		100%				98.12	97.91	156.00
TOTAL, MARITIME ADMINISTRATION						879.03	821.09	476.27
TOTAL DOT						**893.03**	**837.09**	**492.27**

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.

Department of the Treasury

The Department of the Treasury is responsible for oversight of U.S. participation in the Global Environment Facility (GEF) which, among other things, funds projects to address international water pollution and over fishing. Other portions of the GEF portfolio (e.g. biological diversity projects) may also indirectly benefit international waters and coastal areas.

Global Environment Facility

The GEF was created in 1991 to help developing countries address global environment problems that may affect the United States and the rest of the world, including those related to international waters. In addition to cleaning up international water pollution and protecting fisheries, GEF funding is also focused on expanding clean energy production and efficient energy use; conserving biodiversity; phasing out ozone-depleting chemicals (in Eastern Europe, to complement Montreal Protocol Fund work in developing countries); promoting sustainable land use; and reducing persistent organic pollutants (an issue of particular concern in the northern United States).

Under a new international agreement, the GEF will play a key role in addressing the impact of persistent organic pollutants (POPs) on human life and the environment and sustainable land management. POPs is an issue of particular concern in the northern United States, and President Bush signed the international agreement on POPs in May 2001.

GEF Operations

The GEF focuses on innovative, cost-effective and generally small projects that can be duplicated elsewhere with financing from non-GEF sources. Since beginning regular operations in 1994, the GEF has designed and initiated nearly 1,600 investment and capacity building projects in over 161 countries and disbursed $2.4 billion in grants. Projects are implemented by developing countries through three implementing agencies – the World Bank, the UN Development Program, and the UN Environment Program -- and seven executing agencies (the four regional development banks, and three specialized UN agencies). GEF has committed over $5.4 billion to date, leveraging over $17 billion from other sources. Cofinanciers include the developing countries themselves, bilateral aid agencies, the GEF's three implementing agencies and other multilateral financial institutions, and in some cases, private sector investors and non-governmental organizations. GEF operations take two forms: (1) technical assistance to help developing countries frame more environmentally sound policies in such key sectors as energy production and land management; and (2) direct investments to demonstrate innovative technology projects, such as rural solar power, that may be copied on a larger scale.

GEF operations to reverse the degradation of international waters are grouped into three categories: 1) water bodies; 2) integrated land and water projects; and 3) contaminants. Its land and water resource management projects help countries put together plans to reduce pollution, address water scarcity, and prevent conflicts over water in key river basins around the world (e.g., the Aral Sea Basin of Central Asia; the Black Sea and the Danube River in Europe; the Bemejo River Basin of South America; and the Nile, Okavango and Niger River basins in Africa). Projects have also included efforts to improve water quality in international ports by reducing the release of harmful organisms from ship ballast water, and, more recently, a pilot electronic tracking system to help improve the safety of shipping traffic in Asia.

Department of the Treasury									
		Percentage of Funds Dedicated to Each Ocean-Related Program Function*					Dollars in millions		
		Enhance the use, conservation, and management of oceans, coasts, and Great Lakes	Supporting maritime transportation	Advancing our understanding of oceans, coasts, and Great Lakes	Advancing international ocean science and policy	Other, not elsewhere classified	FY 2004 Actual	FY 2005 Enacted	FY 2006 Budget Request
Department of the Treasury									
International Assistance Programs									
Multilateral Assistance									
Contributions to the International Bank for Resconstruction and Development (IBRD)									
Global Environment Facility (GEF)**					100%		16.00	16.00	16.00

Notes:
* The FY 2006 President's Budget was used to allocate funding across functional areas.
** Approximately 15% of total GEF funding from all sources supports ocean-realted projects.