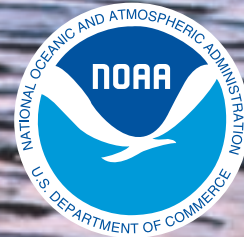




Science Serving Coastal Communities



NOAA's National Centers for Coastal Ocean Science

Accomplishments: 2007

Contents

Message from the Director	1
About NCCOS	2
Core Principles	2
Research Focus	3
NCCOS Accomplishments	6
Ecosystem Conservation	6
Societal Stressors	10
Extreme Natural Events.....	17
Leadership.....	23
Contact Information	34
Acronym Definitions	37
Index by Subject, Location	37

It is with great pride that I share this collection of accomplishments by NOAA's National Centers for Coastal Ocean Science (NCCOS) staff and our partners during fiscal year (FY) 2007.

This accomplishments report reflects the efforts in FY 2007 toward meeting our five-year goals and objectives outlined in the NCCOS Strategic Plan (<http://coastalscience.noaa.gov/documents/strategicplan.pdf>). Just as NCCOS' goals address both the natural and human aspects of ecosystem management, our achievements highlighted here exemplify our efforts not only to understand the impacts of natural and human-induced stressors, but also to forecast the impacts and help identify ways to avoid those impacts. It is for these reasons that NCCOS science occurs.

With this report, I extend a heartfelt thanks to all of our partners across the country and around the world, as most of the complex issues facing our coastal and

ocean ecosystems cannot be examined by one scientist in one discipline at one institution. And none of these accomplishments would be possible without the exceptional NCCOS staff.

We hope you enjoy learning about NCCOS and its accomplishments, and invite you to learn even more about our efforts to provide the scientific information and tools needed to balance society's environmental, social, and economic goals by visiting our web site (coastalscience.noaa.gov) or by contacting us using the information located at the end of this report.

Gary C. Matlock

Gary C. Matlock, Ph.D.

Message from the Director

Photo credit: Teresa McTigue



Photo credit: Carol Baldwin

ABOUT NCCOS

The National Oceanic and Atmospheric Administration (NOAA) formed the National Centers for Coastal Ocean Science (NCCOS) in February 1999 as the focal point for NOAA's coastal ocean science efforts. NCCOS conducts and supports research, monitoring, and assessments and provides technical assistance to meet NOAA's coastal stewardship and management responsibilities. NCCOS provides coastal managers with the scientific information necessary to decide how best to protect environmental resources and public health, preserve valued habitats, and improve the way communities interact with the surrounding ecosystems. By providing relevant and timely information and offering creative approaches to environmental issues, NCCOS strengthens the linkage between sound science and sound management.

Core Principles

Society benefits when coastal stewardship decisions are guided by sound science. For NCCOS, this vision translates into the following core operating principles:

- Deliver high quality science in a timely and consistent manner using productive and strong partnerships;

- Develop and maintain relevant research, long-term data collection and analyses, and forecasting capabilities in support of its customers, stakeholders, and partners;
- Build capacity in the private, local, state, and tribal sectors by transferring technology, and by providing technical assistance and knowledge to its customers and partners;
- Conduct the anticipatory science necessary for managing the potential impacts of multiple stressors on coastal ecosystems; and
- Provide the best possible work environment for each employee by treating each individual with fairness, respect, and recognition, and with adequate training in the safest facilities and with the most current equipment possible.



Research Focus

NCCOS focuses its research on four categories of ecosystems that NOAA and its partners manage – coral reefs; National Marine Sanctuaries; estuaries, including National Estuarine Research Reserves (NERRs); and coastal oceans. The benefits of these valuable, yet at-risk, ecosystems include diverse biological resources and habitats, research and recreational opportunities, and a wealth of commercial fish and shellfish.

Coral Reefs: Among the most diverse and productive ecosystems on Earth, coral reefs are rich in biological diversity and cultural heritage. In the U.S. and internationally, these ecosystems are under stress from a combination of human activities and natural causes, including overfishing, disease, pollution, climate change and coral bleaching, and tropical storms.

National Marine Sanctuaries: National Marine Sanctuaries are marine areas protected either administratively or by an Act of Congress based on their ecological integrity, biological diversity, and natural and cultural resources. The 13 sanctuaries and the Northwestern Hawaiian Islands Marine National Monument include deep-ocean “gardens,” nearshore coral reefs, whale migration corridors, deep sea canyons, and underwater archeological sites in the Pacific and Atlantic Oceans, the Great Lakes, and off the coast of American Samoa.

Estuaries (including NERRs): Spanning more than 4.5 million acres of U.S. coastline, estuaries are semi-enclosed bodies of water where freshwater and ocean tides connect, and are some of the most biologically productive ecosystems on Earth. The NERR System is a network of 27 estuarine areas protected for long-term research, education, and stewardship through partnerships between NOAA and coastal states.

Photo credit: NCCOS Biogeography Branch





Coastal Oceans: The coastal oceans that form the U.S. Exclusive Economic Zone extend 200 miles offshore and encompass a broad range of saltwater ecosystems, including estuaries, coral reefs, rocky shores, gravel shores, sandy shores, mud flats, marshes, and mangrove forests. At least two-thirds of the Nation's commercial fish and shellfish use these ecosystems as spawning grounds and nurseries. Coastal oceans also provide many recreational opportunities that contribute to the economic well-being of local communities.

NCCOS also responds to stakeholders' practical needs for information on the impacts of human and natural "stressors." NCCOS categorizes the stressors facing coastal ecosystems as climate change, extreme natural events, pollution, invasive species, and land and resource use. Understanding how these stressors affect coastal ecosystems is vital to assessing impacts to coastal communities and managing our Nation's coastal and ocean resources.

Climate Change: There is a scientific consensus that the Earth's air and oceans are warming, and that sea level will rise over the coming century. Given uncertainties about the degree of warming and how coastal zones and marine life will respond to the changes, scientists are striving to improve the understanding of both natural and human causes of climate change.

Extreme Natural Events: Storms, floods, droughts, and phenomena such as harmful algal blooms (HABs) have profound effects on coastal ecosystems and the people living and working near them. HABs, which can wreak havoc on local economies and threaten human health, occur in nearly every coastal and Great Lakes state, causing an estimated \$1 billion in economic losses over the past few decades.

Pollution: Marine organisms can accumulate chemical and other contaminants in their tissues from water, sediments, and food, and may experience adverse biological effects even from extremely low concentrations of pollutants. Increased nutrient loadings can lead to excessive production of algae, which decompose and reduce oxygen concentrations in bottom waters, often to levels at which fish and other organisms cannot survive.



Invasive Species: Exotic plants and animals brought to the U.S. from other countries – or moved to new areas from within the U.S. – can damage native plants and animals, lead to undesirable changes in native community structure, and cost millions of dollars for management and control measures. U.S. marine and coastal environments, already under stress from other factors, are particularly susceptible to risks posed by the introduction of non-native species. The resulting changes in species composition often can be dramatic and difficult to predict.

Land and Resource Use: Increasing domestic and international demands for food, fiber, and space are accelerating changes in land and resource use, resulting in exhausted fisheries, habitat loss, degraded water quality, and increased chemical and sediment runoff. These conditions are found throughout the U.S. and are among the most challenging problems facing coastal managers. Increased understanding of the consequences of human uses of land and resources will allow for better balancing of economic demands with environmental sustainability.





Photo credit: Lisa Angle

NCCOS ACCOMPLISHMENTS

To best demonstrate NCCOS' efforts toward meeting the five-year goals and objectives outlined in its strategic plan (coastalscience.noaa.gov/documents/strategicplan.pdf), the FY 2007 accomplishments highlighted here are arranged by NCCOS' strategic goals and objectives.

Ecosystem Conservation

- **All NOAA-protected areas will have baseline assessments of ecological resources**

Ecological Assessment of Gulf of Maine and Stellwagen Bank National Marine Sanctuary Helps Protect Endangered Whales

NOAA's National Marine Fisheries Service (NMFS) used information in a NCCOS report to evaluate and mitigate potential impacts from a proposed offshore gas facility in Massachusetts Bay, MA. With the best available information on the seasonal distribution and abundance of large marine mammals in the southern Gulf of Maine, the report provided much-needed information to assist managers in protecting endangered whales. The report – *An Ecological Characterization of the Stellwagen Bank National Marine Sanctuary Region* – covers the distribution of marine fish, seabirds, and marine mammals, as well as contaminants, in the Stellwagen Bank National Marine Sanctuary and the Gulf of Maine. NCCOS scientists integrated a wide range of existing data sets and conducted field surveys in and around the sanctuary to produce a unique multidisciplinary study revealing many complex ecological patterns that characterize the region. The increased understanding of marine ecosystems from the data, models, maps, and analyses in the report benefit NOAA and other management organizations in their efforts to protect Gulf of Maine ecosystems. The December 2006 report is available at: ccma.nos.noaa.gov/products/biogeography/stellwagen/.

Sanctuary Advisory Council and Staff Laud Assessment of Gray's Reef National Marine Sanctuary for Its Value, Application to Resource Management

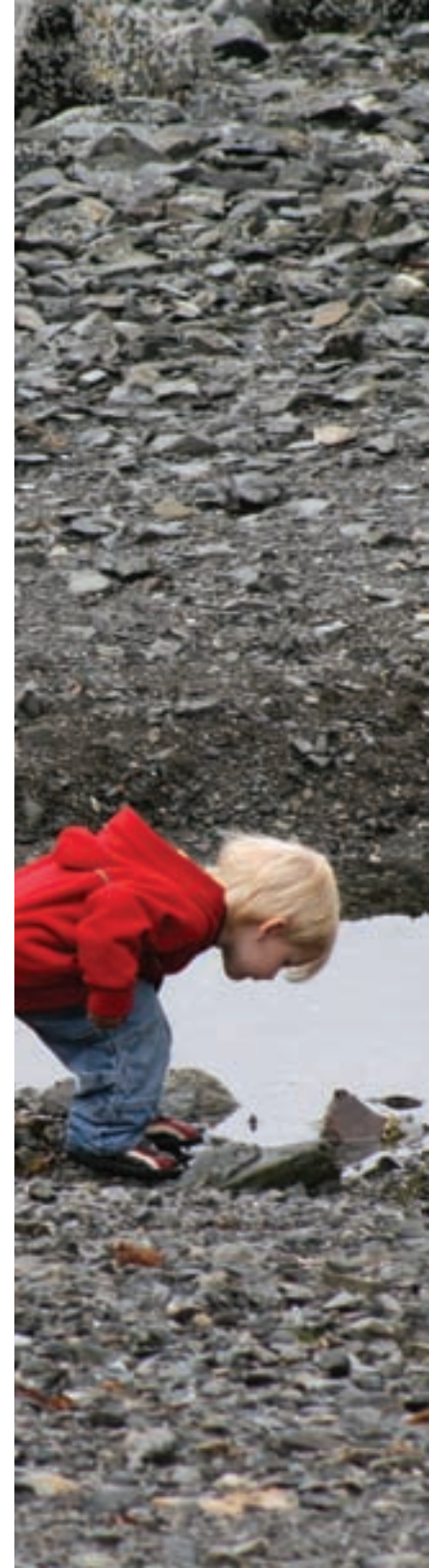
According to Gray's Reef National Marine Sanctuary staff and its Advisory Council, the baseline resource assessment published in March 2007 by NCCOS scientists represents the most comprehensive characterization of resources ever conducted in the sanctuary located off the Georgia coast. Based on 179 field surveys, the assessment fulfills critical needs identified by the sanctuary staff and provides recommendations regarding future monitoring efforts. Information from the assessment has already been used to begin developing a research-only zone and to consider banning spear fishing in the sanctuary. The assessment includes a detailed characterization of the types and distribution of bottom features, fish, and marine debris throughout the sanctuary. The assessment – *Characterization of the Benthos, Marine Debris and Bottom Fish at Gray's Reef National Marine Sanctuary* – is available at: ccma.nos.noaa.gov/products/biogeography/GRNMS_Tech_Memo_50.pdf.

• All NOAA-protected areas will have Integrated Assessments

NCCOS' John Christensen, Randy Clark, and Mark Monaco and four colleagues from NOAA's National Ocean Service (NOS) were awarded U.S. Department of Commerce (DOC) Bronze Medals for developing a quantitative biogeographic assessment of the Channel Islands National Marine Sanctuary off the California coast to support management plan revisions. The assessment is available at: ccma.nos.noaa.gov/products/biogeography/cinms/welcome.html.



Photo credit: Susan Baker





Most Comprehensive Assessment of Nutrient Pollution Levels in U.S. Estuaries Released by NCCOS and Partners

Scientists from NCCOS and NOAA's Chesapeake Bay Program Office, along with their partners at the University of Maryland's Center for Environmental Studies, completed the Nation's most comprehensive assessment of nutrient pollution (eutrophication) in U.S. estuaries to date. The report clearly indicates linkages between upstream activities and coastal ecosystem health, as two-thirds of the 99 U.S. estuaries assessed were moderately to highly impacted. The scientists also found that overall, eutrophic conditions were not significantly different – neither worse nor improved – between the early 1990s and early 2000s. Eutrophication is caused by excess nutrients in the water which stimulate excessive algal growth that consumes oxygen faster than it can be replenished, thereby threatening the survival of aquatic species and their habitats. The report, an update to the 1999 *National Estuarine Eutrophication Assessment*, provides insight into the causes of eutrophication and potential future conditions, includes recommendations for reducing eutrophic conditions in estuaries, and highlights the need for increased Federal partnerships to identify well-balanced solutions. Information was provided by more than 150 scientists and coastal managers through an online survey and during a national eutrophication workshop. The report – *Effects of Nutrient Enrichment in the Nation's Estuaries: A Decade of Change, National Estuarine Eutrophication Assessment Update* – is available at: ccma.nos.noaa.gov/publications/eutrouupdate/.

- **NCCOS will determine the effectiveness of coastal managers' decisions in NOAA-protected areas**

In April 2007, the U.S. Environmental Protection Agency (EPA) awarded the Bronze Medal – its highest regional award – to two scientists from NCCOS' Cooperative Oxford Laboratory, Bob Wood and Ben Longstaff, for their participation in the development of the multi agency report on the health of and restoration progress in the Chesapeake Bay. The report – *Chesapeake Bay 2006 health and restoration assessment: A report to the citizens of the Bay region* – is available at: www.chesapeakebay.net/content/publications/cbp_15548.pdf.

NCCOS Completes First Comprehensive Evaluation of Effectiveness of Hawaiian Marine Life Conservation Districts

In FY 2007, NCCOS released the first comprehensive evaluation of Hawaii's system of Marine Life Conservation Districts (MLCDs) established by the state as marine protected areas (MPAs). NCCOS scientists examined the 11 MLCDs as well as surrounding areas for their effectiveness in conserving biodiversity and fisheries, and found that those MLCDs fully protected from fishing had larger and more abundant fish and better biodiversity than adjacent areas of similar habitat quality. The scientists also determined that all of the MLCDs were too small to provide any

measurable positive influence on adjacent fished areas. Overall, they found that habitat complexity, protected area size, and habitat diversity were the major factors in determining MPA effectiveness. Produced with funding from NOAA's Coral Reef Conservation Program and in partnership with the Hawaii Department of Land and Natural Resources and U.S. National Park Service, the report also includes recommendations for effective MPA design. These findings were published in the April 2007 issue of the journal *Ecological Applications* and the December 2007 issue of *Marine Ecology Progress Series*. The report – *Fish Habitat Utilization Patterns and Evaluation of the Efficacy of Marine Protected Areas in Hawaii* – is available at: ccma.nos.noaa.gov/publications/NCCOSTm23.pdf.



Photo credit: Robert Schroeder



Photo credit: Teresa McTigue

Societal Stressors

- **NCCOS will determine the social and economic costs and benefits to humans of activities dependent upon coastal ecosystems**

New Interactive Fact Sheet Illustrates Economic Costs of Harmful Algal Blooms

To demonstrate the economic impacts of HABs in the U.S., NCCOS staff developed an interactive map depicting the economic costs of HAB events in specific states. The interactive fact sheet is available at: www.cop.noaa.gov/stressors/extremeevents/hab/current/HAB_Econ.html.

Human Dimensions Strategic Plan Improves Scientific Support for Resource Management through Broader View of Ecosystems

In FY 2007, the *NCCOS Human Dimensions Strategic Plan (FY2009-FY2014)* was published to help NCCOS improve its scientific support of resource management by ensuring that its scientific research endeavors include a focus on human causes, consequences, and responses to ecosystem stressors. A better understanding of the human dimensions of ecosystems will help NCCOS achieve its mission of providing coastal managers with the information and tools needed to balance society's environmental, social, and economic goals. Building on NCCOS' Strategic Plan and responding to numerous

statutory authorities and other drivers, the report is available at: coastalscience.noaa.gov/human/strategy/NCCOSHDPlan.pdf. More information is available at: coastalscience.noaa.gov/human/welcome.html.

- **NCCOS will determine the social, economic, and biological effects of human activities on specific coastal ecosystems**

David W. Evans was awarded the DOC Bronze Medal for initiating, developing, and executing a program of investigation into the transfer of mercury through estuarine and coastal ocean food webs.

NCCOS Provides Evidence of Environmental Risk Due to Pharmaceuticals in Coastal Waters

In an ongoing effort to predict the effects of pharmaceuticals and personal care products on estuarine environments, NCCOS scientists studied the effects of common pharmaceuticals that have been found in coastal waters. NCCOS scientists and their partners at the Harbor Branch Oceanographic Institute found an intestinal bacterium in fecal samples from bottlenose dolphins was resistant to 25 commonly-used antibiotics. Resistance to penicillin was the most common, followed by cephalothin, ampicillin, and amoxicillin. In a separate study, NCCOS

scientists found that simvastatin, a common cholesterol-lowering drug, was toxic to laboratory-exposed larval and adult grass shrimp, an ecologically important crustacean species, although only at concentrations well above those reported in the environment. Additionally, NCCOS scientists found triclosan, an antimicrobial ingredient used in a variety of non-prescription products such as soaps, toothpaste, and deodorants – to be toxic to the estuarine algal species *Dunaliella tertiolecta* at concentrations similar to maximum concentrations found in the environment. As approximately 100 drugs have been identified in rivers, lakes, and coastal waters worldwide, and little is known about their effects on aquatic organisms, NCCOS' research efforts are helping coastal managers assess the risks associated with these compounds. The research results were published in the journals *Environmental Toxicology*, *Archives of Environmental Contamination and Toxicology*, and *Aquatic Mammals*.

Findings of Overall Decline of Pesticide Mirex in Great Lakes except Lake Ontario Help Planning and Management Efforts

To assist ecosystem managers in the Great Lakes, NCCOS quantified the pesticide mirex in sediments and zebra mussels in the southern Great Lakes and found that mirex concentrations have decreased at more than 80% of the sites. However, the greatest concentrations of the pesticide were found at Lake Ontario sites during the monitoring period from 1992-2004, followed by Lakes Erie, Huron, and Michigan. The downward trend of mirex concentrations in the sediments and mussel tissues is thought to be due to a 1977 ban on its use and environmental processes which have removed it from the Great Lakes. Because mirex is a persistent, bioaccumulative, and toxic pesticide and a possible human carcinogen, this NCCOS research will aid Great Lakes managers in their efforts to protect coastal resources and human health. The findings were published in the fall 2006 issue of the *American Journal of Environmental Sciences*. More information is available at: ccma.nos.noaa.gov/stressors/pollution/nsandt/mw_details.html.

Photo credit: Michigan Department of Environmental Quality





No Significant Changes in PCB and PAH Levels Detected in Hudson-Raritan Estuary Following 9-11 Attacks

While the September 11, 2001 attacks on the World Trade Center resulted in a massive plume of dust and smoke that blanketed lower Manhattan and part of the Hudson-Raritan Estuary, NCCOS scientists found no significant change in the concentrations of polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) after the attack. The PCB and PAH levels in the Estuary were high enough before the 9-11 attack that concentrations were not measurably changed by contaminant input from the collapse of the two towers. With several long-term monitoring sites in the Estuary, including the one closest to “Ground Zero” at the Statute of Liberty, the scientists were able to compare mussel and sediment samples collected in December 2001 and November 2003 with more than 10 years of monitoring data from NCCOS’ Mussel Watch Project. These results are useful to coastal resource and public health managers, as well as to local citizens and other members of the public interested in the status of coastal resources following the attack. The results were published in the March 2007 issue of the journal *Marine Pollution Bulletin* and discussed by several media sources, including WNYC’s National Public Radio and the New York Daily News.

Coastal managers’ capabilities will be strengthened with the transfer of knowledge and tools from NCCOS research projects

R. Wayne Litaker, Patricia A. Tester, Marc Suddleson, and three NMFS colleagues received NOAA Technology Transfer Awards for the development and commercialization of rapid, cost-effective detection tools of algal toxins threatening human health and marine resources in coastal waters.

NCCOS-Developed Test Kits Expedite Monitoring of Algal Toxin, Help Protect Human Health and Local Economies on West Coast

A rapid, reliable, and inexpensive monitoring kit to detect and measure the toxin domoic acid from HABs was developed by NCCOS scientists and a private industry partner which will manufacture and market it. This HAB toxin causes economic loss to coastal communities as well as illness and death in humans, marine mammals, and birds through marine food webs. The test kits can detect toxin levels in less than 1.5 hours in water and shellfish samples, thereby providing managers with real-time data to help protect human health and local economies. This new tool is already being used by the California State Department of Health and University of California-Santa Cruz, as well as the Quinalt Nation and the Quileute Tribe in California and Washington.

Unique Opportunity to Educate Children on Invasive Species Helps Improve Environmental Literacy, Stewardship

During a special episode of the children's television show *Aquakids*, a NCCOS scientist discussed invasive species and how growth, reproduction, and life history characteristics of a species can determine its success as an invader. He highlighted the Indo-Pacific lionfish which has invaded coastal waters from North Carolina to Florida since its first observance in the southern Atlantic in 2000. In June 2007, divers found that lionfish densities were 80% higher on average than those observed a year earlier at 11 stations off the North Carolina coast. The June 16, 2007 episode aired on local stations across the U.S. and helped meet NOAA's goal of promoting environmental stewardship and environmental literacy. More information is available at: www.ccfhr.noaa.gov/stressors/invasivespecies/lionfish/welcome.html.



Regional Capacity to Respond to Coral Disease Outbreaks Built in Western Pacific

As part of a long-term effort to build local capacity for coral reef management, NCCOS and its partners in NMFS and the University of Guam trained 15 resource managers and scientists from the Cook Islands, Saipan, and Guam on how to investigate and respond to coral disease outbreaks. Held at the University of Guam, the five-day workshop included classroom and field training on coral disease identification, advanced planning and readiness, response management, field collection techniques, and baseline coral disease assessment and monitoring techniques. The trained response teams are now capable of mobilizing on short notice and conducting coral disease investigations to assist local resource managers.





Photo credit: Michigan Department of Environmental Quality

Technology Transfer Improves Detection of Wetland Violations and Habitat Changes in Massachusetts

The transfer of NCCOS expertise in remote sensing technology to the Massachusetts Department of Environmental Protection has resulted in the use of state-of-the-art digital imagery to identify potential wetland violations and monitor changes in seagrass habitats there. This transition from standard aerial photography to digital aerial orthophotography will improve the state's ability to enforce wetland laws and regulations as well as document the status of ecologically important coastal habitats in a more cost-effective manner. Detection of change in sentinel species such as seagrasses is an innovative approach for managers to identify land and resource uses impacting the coastal zone.

- **NCCOS will investigate the effectiveness of changing human activities in preserving ecosystems**

NCCOS scientists Jeff Hyland, Fred Holland, Tom O'Connor (retired), and Andrew Robertson (retired) were honored by the EPA for their efforts on the multi-agency National Coastal Assessment Team in developing and implementing national monitoring programs to assess status and trends in the quality of our Nation's coastal ecosystems.

Local Citizens Empowered by NCCOS-supported Researchers to Monitor, Protect Coral Reef Resources of Micronesia

In FY 2007, NCCOS-supported researchers taught young native Micronesians and their teachers how to monitor and protect the coral reefs surrounding them in the Pacific Islands. Based on their research and previous successes applying the native Micronesians' own sociocultural practices and attitudes to empower them to take action, the Coral Reef Ecosystem Study scientists also taught the local residents about the impacts that land-based activities are having on the coral reefs there. In addition to sharing their research and empowering the Micronesians to protect their own resources, this effort is encouraging native students to pursue studies and careers in environmental sciences. The NCCOS-supported researchers also leveraged additional funding from the National Science Foundation to implement the educational program. Their research findings on the differences between regulation-based management systems and those on the Micronesian Islands were published in the July/August 2007 issue of the journal *BioScience*. More information is available at: www.cop.noaa.gov/ecosystems/coralreefs/current/cres-micro-factsheet-cr.html.

NCCOS Celebrates with, Educates Local Community at Oxford Day

On Saturday, April 28, 2007, NCCOS' Cooperative Oxford Laboratory held its annual open house in conjunction with Oxford Day, a family-oriented event celebrating the town of Oxford, MD. More than 200 people attended the open house activities, which included demonstrations of scientific tools to help restore the Chesapeake Bay, tours of the research vessel (R/V) LAIDLAY, a dedication ceremony for a new National Geodetic Survey marker installed on the premises, and hands-on projects for children, such as the opportunity to make their own underwater robots. Attendees included the NOS Assistant Administrator, staff for U.S. Senator Barbara Mikulski and U.S. Congressman Dutch Ruppersberger, as well as several Maryland state senators and delegates. Highlights included the presentation of a letter from Senator Mikulski commending Cooperative Oxford Laboratory staff for their outstanding contributions in coastal science in the Chesapeake Bay and the Nation.





New Detection Method May Help Reduce Aquaculture Losses by Preventing Disease

In collaboration with scientists from the North Carolina College of Veterinary Medicine and the National Center for Mariculture in Israel, NCCOS scientists developed a method to detect and help manage a parasite responsible for 20% of aquaculture losses of warm water fishes. The parasite, *Amyloodinium ocellatum*, causes the disease Amyloodiniosis or “marine velvet” which can kill fish within hours of infestation from a lack of oxygen. While previous methods could not detect the parasite in the water or in the early stages of infestation, this new method can detect the parasite’s deoxyribonucleic acid (DNA) from just a single cell in both artificial and natural seawater environments. Fisheries managers are now able to know quickly whether this parasite is present and can take steps to kill the parasite by moving the fish to water with a different salinity. The results were published in the February 2007 issue of the journal *Diseases of Aquatic Organisms*.

Extreme Natural Events

- **NCCOS will forecast the ecological impacts of climate change**

NCCOS scientist Bill Sunda received NOAA's Distinguished Career Award for his pioneering research of trace metal-biological interactions in the oceans that has advanced our understanding of climate change, HABs, and biogeochemical cycling.

Global Climate Change Models Improved with NCCOS Prediction

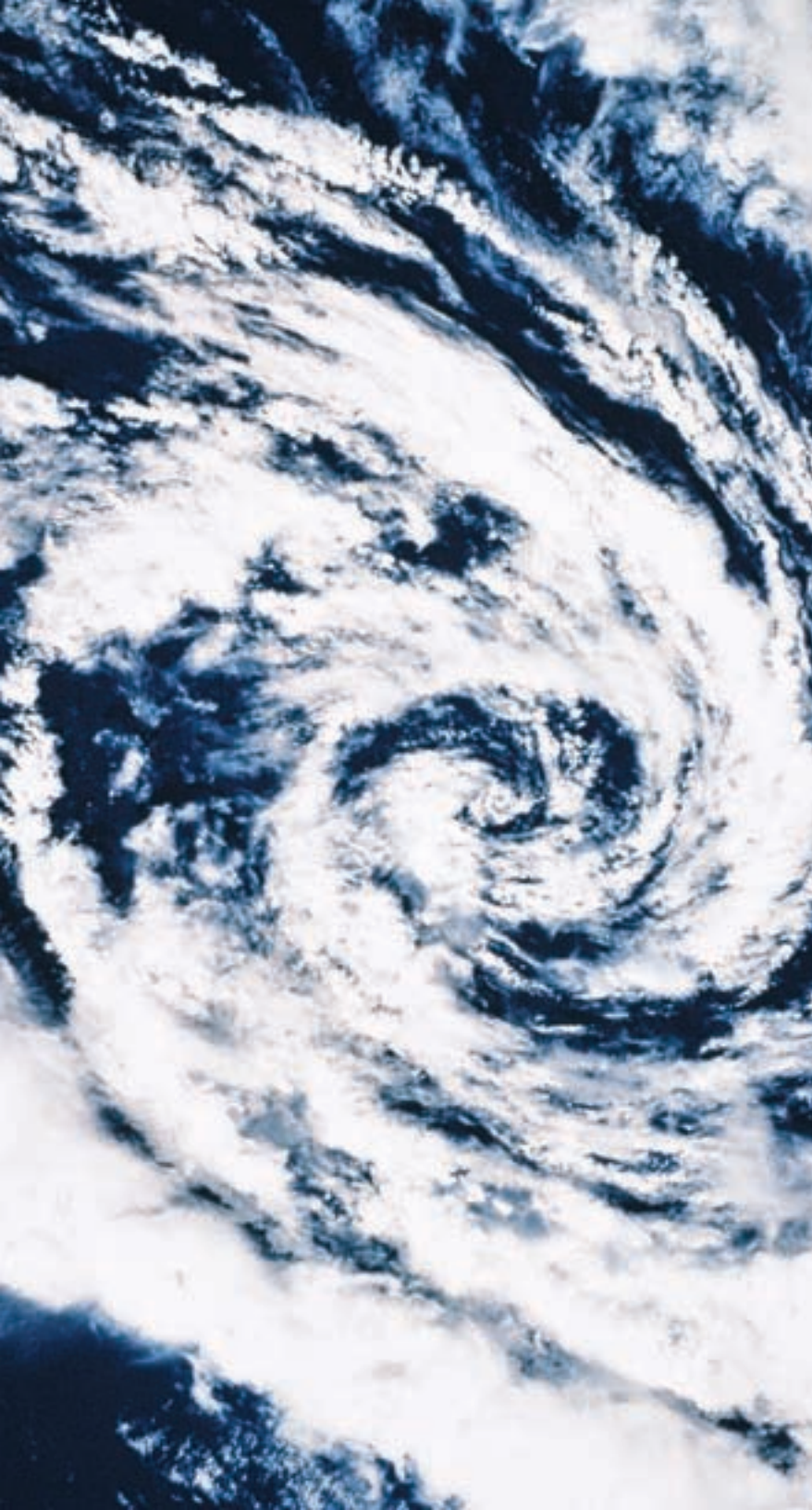
In June 2007, scientists from the Scripps Oceanographic Institute confirmed a prediction made by NCCOS scientists in 1997 that phytoplankton growth in the deep chlorophyll maximum, a broad light-limited layer found in 60% of the world's oceans, is also limited by the micronutrient iron. The simultaneous limitation of phytoplankton growth by both light and iron has far-reaching implications for our understanding of the carbon cycle in the ocean, and its effect on atmospheric carbon dioxide (CO₂) levels and global climate change. The NCCOS scientists' fundamental insights published in the November 27, 1997 issue of the journal *Nature* have been used by NOAA's Geophysical Fluid Dynamics Laboratory and other researchers to model CO₂ cycling in the ocean and atmosphere.

NCCOS Data Used to Calibrate NASA Satellite, Help Understand and Predict Global Change

In FY 2007, NCCOS scientists processed their third year of data to improve the accuracy of a satellite instrument measuring global dynamics and processes on land, in the oceans, and in the lower atmosphere. The surface level reflectance, salinity, temperature, conductivity, turbidity, and chlorophyll data collected from Pamlico Sound and offshore the North Carolina coast helped calibrate the Moderate Resolution Imaging Spectroradiometer sensors on the National Aeronautics and Space Administration's (NASA) 'Terra' and 'Aqua' satellites which are viewing the entire Earth's surface every one to two days. The sensors have a vital role in developing models that forecast global change accurately enough to assist environmental managers in making sound decisions. Information from the satellite will also be used by a wide and diverse community of scientists studying global dynamics and processes throughout the world. More information is available at: modis.gsfc.nasa.gov.

Photo credit: Emerys Hall and Jordan





- **NCCOS will provide forecasts for the ecological effects of hurricanes**

NCCOS scientists Robert Warner, Gunnar Lauenstein, S. Ian Hartwell, Andrew Leight, Jeff Hyland, Michael Fulton, Edward Wirth, Laura Webster, Marion Sanders (retired), and Steve Morton received DOC Bronze Medals for planning, coordinating, and executing a multi-agency impact assessment of coastal contamination resulting from Hurricanes Katrina and Rita.

Improvements to Satellite Imagery to Help Forecast Hurricane Impacts, Support U.S. Ocean Action Plan

NCCOS and its partners at the Northern Gulf of Mexico Cooperative Institute improved the spatial accuracy of satellite imagery to be used in conjunction with field data to determine the ecological effects of hurricanes. A new procedure developed by NCCOS scientists was used to reduce errors in NOAA's Advanced Very High Resolution Radiometry and sea surface temperature images as large as 10 km to an average of less than 1 km. The NCCOS scientists use sea surface temperature and meteorological data to infer the impacts of hurricane winds which can cool the sea surface and destratify the mixed layer during summer, when nutrient concentrations tend to be low. NOAA's funding of the Institute, a nongovernmental organization, reflects its commitment to supporting coordinated research efforts in the northern Gulf of Mexico as called for in the U.S. Ocean Action Plan. More information is available at: www.northerngulfinstitute.org/home/ngi.php.

- **NCCOS will provide annual forecasts of the ecological effects of varying weather patterns**

Ecological Forecast of Jellyfish Occurrence Helps Protect Water-based Recreation, Power Production in Chesapeake Bay

Using data on sea surface temperature and salinity (both of which are influenced by varying weather patterns), NCCOS-sponsored scientists developed an ecological forecasting system that predicts the probability and location of the sea nettle (*Chrysaora quinquecirrha*), a type of jellyfish, in Chesapeake Bay. In addition to predicting where this nuisance species may interfere with water-based recreation, a nuclear power plant located on the Bay relies on the system to know when to clean the filters over the intake pipes that use Bay waters to cool the reactors. The system may also prove helpful in multi-species management efforts and can be applied to other plankton species, such as harmful algae. The results were published in the January 11, 2007 issue of the journal *Marine Ecology Progress Series*. More information is available at: coastwatch.noaa.gov/seanettles/sn_salinitymodel.html.

Photo credit: Susan Baker





Photo credit: Mary Hollinger

- **NCCOS will provide forecasts of the initiation, trajectory, and behavior of harmful algal bloom events**

Quay Dortch, Marc Suddleson, Alicia Jarboe, Susan Banahan (former NCCOS employee), and five colleagues from NMFS were awarded DOC Bronze Medals for their quick action and exceptional initiative helping shellfish managers protect human health in the face of the 2005 New England harmful algal bloom.

Interagency Report to Congress Identifies Critical Research Needs for HAB Prediction and Response

In July 2007, the White House Council on Environmental Quality and Office of Science and Technology Policy reported to the U.S. Congress on the state of the science concerning HABs and the greatest research needs for predicting and responding to HABs. Written primarily by three NCCOS scientists and a scientist from the U.S. Food and Drug Administration (FDA), the report also includes an assessment of the HAB problem in the U.S. and identifies progress made by Federal agencies. This is the first of five interagency reports mandated by Congress for which NOAA is the lead agency. The report – *National Assessment of Efforts to Predict and Respond to Harmful Algal Blooms in U.S. Waters* – is available at: www.cop.noaa.gov/stressors/extremeevents/hab/habhrca/Predict_Resp_IntRpt_0107.pdf.

NCCOS-funded Forecasts Help New England Managers Protect Human Health, Coastal Resources

New England managers received weekly predictions from NCCOS-sponsored researchers of the distribution of the one-celled organism *Alexandrium fundyense* that causes “red tides” in order to help protect human health from the organism’s neurotoxins that accumulate in shellfish and often necessitate the closure of shellfish beds to harvesting. Interest in the development of a forecast was triggered by the April 14-17, 2007 nor’easter, which was similar to the nor’easters in 2005 and 2006 that contributed to severe HAB events in the Gulf of Maine. Researchers at the Woods Hole Oceanographic Institution and North Carolina State University developed the forecasts using a computer model coupling physical and biological factors. The results were then shared with regional public health and coastal resource managers via a limited-access web site. More information is available at: www.cop.noaa.gov/stressors/extremeevents/hab/ecoforecasting.html.

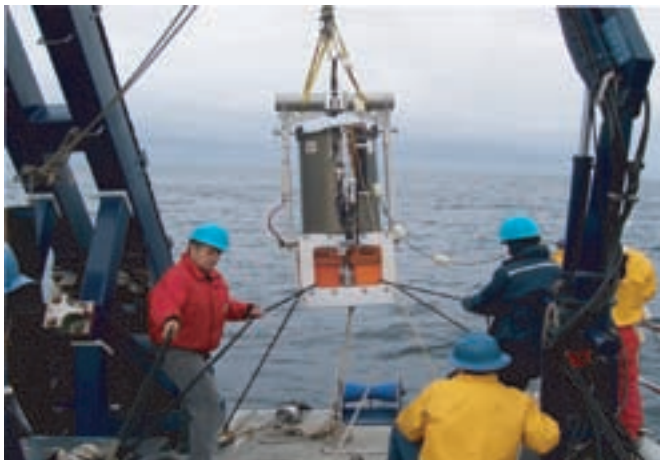
First Underwater Sensors Measuring Algal Toxin Make Real-time Warnings Possible

NCCOS scientists and their colleagues at the Monterey Bay Aquarium Research Institute successfully developed and deployed an underwater sensor that remotely transmits measurements of the algal-produced neurotoxin, domoic acid, from Monterey Bay, CA to a land-based laboratory in real-time. This transfer of HAB data via radio modem represented the first concurrent detection of a harmful algal species and its toxin by an autonomous instrument. The sensors are part of an instrument designed to integrate with ocean observing systems and provide coastal managers with real-time warnings of impending HABs, which will allow additional time to mitigate the frequently devastating impacts of these events. More information is available at: www.mbari.org/esp/.

Photo credit: Kip Evans



Photo credit:
Monterey Bay Aquarium Research Institute



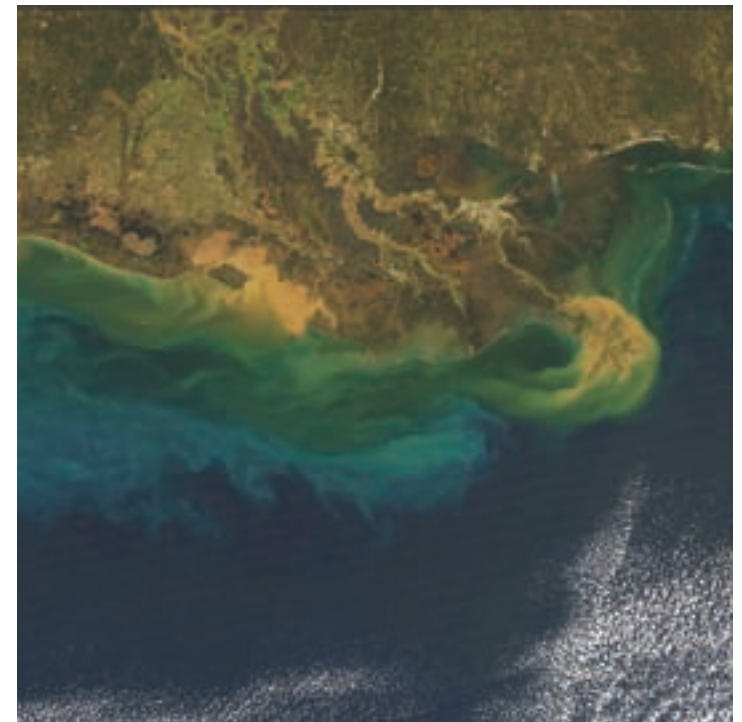


- **NCCOS will provide annual forecasts of the areal extent of the hypoxic zone in the Gulf of Mexico**

Large Gulf of Mexico “Dead Zone” Validates 2007 Forecast by NCCOS and Partners

In July 2007, a NCCOS-sponsored survey cruise confirmed that the “Dead Zone” – an area off the coasts of Alabama and Texas where seasonal oxygen levels drop too low to support most life in bottom and near-bottom waters – was the third largest on record since annual measurements began in 1985. The observed area (7,900 square miles) was only 7% lower than the area predicted by the NCCOS-funded model (8,500 square miles, an area about the size of New Jersey). The closeness of the model predictions in this and previous years indicates an association between springtime nitrate loading and hypoxic zone area. The Dead Zone is caused by increased nutrients, such as nitrogen and phosphorus, from the Mississippi and Atchafalaya Rivers that stimulate excessive algal growth. As a result of this enhanced growth, the mass of algae consume oxygen faster than it can be replenished. The forecast, which was announced on July 17 by NCCOS scientists and their partners at the Louisiana Universities Marine Consortium and Louisiana State University, was based on nitrate loads from the Mississippi and Atchafalaya Rivers in May

provided by the U.S. Geological Survey. NCCOS is a key player in reducing the size of the Dead Zone through the reassessment and revision of the Gulf of Mexico Hypoxia Task Force’s action plan. Announcement and validation of the forecast were covered by many media sources, including CNN, BBC News, and Reuters. More information is available at: www.cop.noaa.gov/stressors/extremeevents/hab/features/hypoxiafs_report1206.html.



Leadership

- **NCCOS will continuously improve as an organization**

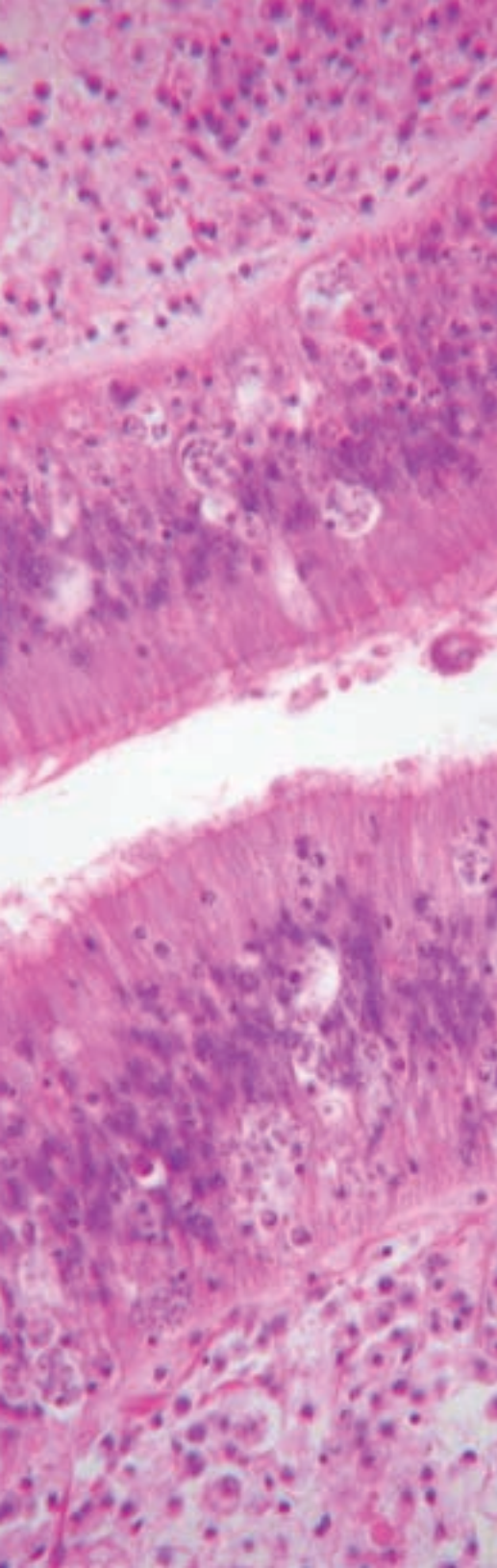
Nancy Davey, in collaboration with NOAA's Eastern Regional Acquisition Division, was recognized as the NOS Employee of the Year for developing and implementing a new multi-year, multi-million dollar scientific and technical labor task contract at multiple NCCOS research facilities.

B. William Gottholm, Earl J. Lewis, Richard A. Meitzler, and one NOS colleague were awarded DOC Bronze Medals for developing NOAA's first office-wide Environmental Management System to help manage NCCOS' impacts on human and ecosystem health more efficiently.

Year-long IT System Certification and Accreditation Efforts Upgrade, Secure NCCOS Network

Thanks to the year-long efforts of a team of Headquarters and Center information technology (IT) staff, NCCOS secured IT system certification and accreditation and fulfilled Federal Information Security Management Act requirements, DOC policy, and National Institute of Standards and Technology guidance. As part of the certification and accreditation process, the team upgraded network systems and software, identified IT needs and potential solutions, and consolidated efforts where possible, resulting in reduced costs of more than \$200,000. The team also conducted IT security training for all NCCOS staff, and more than 1,000 network devices were scanned and patched to mitigate vulnerabilities. These efforts helped ensure the confidentiality, integrity, and reliability of NCCOS-wide information resources.





Laurie Golden was named the NOAA Employee of the Month in July 2007 for leading the NCCOS grants team, numerous program managers, and NCCOS management through a demanding set of processes and for meeting NOAA grant submission deadlines with only one-third the time normally allotted, even though these processes were more complicated due to fiscal constraints.

New Geothermal System Makes NCCOS Laboratory More Energy-Efficient

As part of its renovation, NCCOS' Cooperative Oxford Laboratory in Oxford, MD is installing a geothermal heating and cooling system to reduce the lab's use of petroleum products and increase its energy efficiency. Other improvements to the COL facility include increased pumping capacity of the seawater system, revamped experimental ponds, installation of a runoff containment landscape, a new tissue archive facility, library renovations, and a new pier to accommodate several research vessels, including the 55-foot R/V LAIDLAY. Construction of the geothermal system will be completed in FY 2008.

NCCOS Library Modernization Helps Fulfill Executive Order to Preserve Heritage Resources

In FY 2007, the library at NCCOS' Center for Coastal Fisheries and Habitat Research in Beaufort, NC took several steps to preserve NOAA's heritage resources by installing a security system to protect the library collection, adding security strips into circulating documents, and establishing a secure, climate-controlled room for its rare book collection. Preserving heritage resources responds to President W. Bush's Executive Order 13287 which calls for the Federal government to inventory, preserve, and showcase Federally-managed historic and cultural (i.e., heritage) resources.

- **NCCOS will optimize the capacity of its diverse workforce to accomplish work in a professionally challenging environment**

NCCOS Promotes Science Literacy Among Hispanic Youth, Inspires Next Generation of Scientists

Supporting NOAA's effort to increase environmental literacy and promote science careers, NCCOS joined with other NOAA staff to exhibit and distribute materials to approximately 40 elementary and middle school teachers at a February 2007 event sponsored by the nonprofit organization Celebra la Ciencia. The organization works to increase science literacy and awareness about science-related educational and career opportunities for Hispanic youth. NCCOS provided educational resources to enhance the classroom experience and inspire the next generation of NOAA scientists. More information is available at: www.celebralaciencia.org/.

NCCOS Advances Diversity of Science Talent through Educational Partnership Program

Continuing its efforts to promote diversity in the workplace, NCCOS accepted three participants in NOAA's Educational Partnership Program (EPP) in FY 2007. The EPP's Graduate Sciences Program offers two to four years of training and research opportunities in NOAA-related sciences and upon graduation, the EPP participants will join NCCOS' workforce. The program also provides financial assistance to minority serving institutions that support research and training of students in NOAA-related sciences. The EPP also seeks to increase collaborative research efforts between NOAA scientists and researchers at minority serving academic institutions. NCCOS' EPP participants are researching bioremediation of oil pollutants, contaminants in water and marine sediments, and hurricane impacts on biological production cycles in the Chesapeake Bay.



Photo credit: Susan Baker





NCCOS Works to Increase Job Opportunities for American Indians and Native Alaskans

Together with other Federal agencies, NCCOS is seeking ways to increase diversity in the Federal workforce by identifying and recruiting qualified American Indian and Native Alaskan students. NCCOS is working with the American Indian Science and Engineering Society to increase recruitment of Native scientists into Federal service and improve the retention of Native employees. To recruit qualified students, NCCOS is building on existing internship programs through the DOC and will host an American Indian or Native Alaskan student intern in 2008. NCCOS and its partners in NOAA's Office of Oceanic and Atmospheric Research (OAR) are also supporting American Indian and Native Alaskan students by donating educational materials.

- **NCCOS will improve its operational capabilities through the use of safe, secure, state-of-the-art facilities; equipment; and processes**

NCCOS Breaks Ground for New Lab and Offices in South Carolina

In support of its collaborative efforts to protect oceans and human health, NCCOS is building new laboratories and offices at NOAA's Hollings Marine Laboratory in Charleston, SC. A new facility housing cutting-edge nuclear magnetic resonance instruments was completed in 2007. The new facility will enable NCCOS scientists and their partners to relate molecular-scale information to complex ecosystem and human health issues. In addition to the facilities, two eco-friendly parking areas were installed with compacted limestone bases and compacted gravel on the surface rather than asphalt or concrete. Construction is expected to be completed in FY 2008.

NCCOS' Center for Coastal Fisheries and Habitat Research in Beaufort, NC was recognized by the State of North Carolina for promoting clean activities in its use of boats and research vessels. The Center implemented a series of environmentally-sound operating and maintenance practices, including fuel spill prevention, sewage and fish waste elimination, and reduced impacts from boat maintenance. The efforts leading to the clean marina recognition reflects NCCOS' commitment to reducing its environmental footprint.

Kasitsna Bay Lab Open House Lays Groundwork for New Educational Partnerships

On August 17, 2007, NCCOS' Kasitsna Bay Laboratory near Seldovia, Alaska held an open house and facility dedication to celebrate the completion of the five-year, \$12.5 million facility renovation and NOAA's 200th anniversary. Over 150 community members, research partners, and NOAA staff working in Alaska attended the event. Co-hosted by NCCOS' research partners at the University of Alaska-Fairbanks, activities included facility tours and opportunities to build and test small, remotely operated underwater vehicles. With extensive kelp forests near the laboratory, bull kelp was used instead of ribbon in the dedication ceremony. As a result of community attendance and enthusiastic interactions at the open house, local teachers and youth organizations are planning new field trips and activities at the laboratory.

Photo credit: Susan Baker





Construction Efforts at NCCOS Research Center are Electrifying, Uplifting, and Warming

In FY 2007, staff from the NCCOS Center for Coastal Fisheries and Habitat Research and North Carolina NERR celebrated the construction of their new joint administration building in Beaufort, NC. The 17,500 sq. ft. facility includes a 120-seat auditorium and a teaching laboratory which allows NC NERR staff to communicate NOAA research to the public through educational and outreach programs conducted there. A new heating, ventilation, and air conditioning system is providing healthy air for the staff, while a new elevator is safely moving staff, as well as freight and cargo. A new bridge – the only one owned by NOAA – connecting the Center’s buildings with the Morehead City-Beaufort causeway replaced a 60-year old bridge that had weight limitations and exceeded its life span.

NCCOS Lab’s Emergency Preparedness Training Praised by NOAA

For the second year in a row, NCCOS’ Cooperative Oxford Laboratory in Oxford, MD received high praise from the director of NOAA’s Office of Marine and Aviation Operations. Rear Admiral De Bow commended the lab for its “first rate” Vessel Emergency Preparedness and Survival Awareness Training Program that “could serve as a model” for other NOAA small boat operations.

NCCOS-developed Database Deemed Best Management Practice, Shared with Other NOAA Offices

NCCOS’ new data management tool – the NCCOS Projects Database – is not only making it easier for NCCOS staff to improve the accuracy and efficiency of responses to internal and external information requests as well as strategic planning efforts, but is being adapted or modified by several NOAA offices. Designed jointly by NCCOS scientists and IT staff, the database is easily exportable because of its intuitive interface and built-in flexibility. Identified as a best practice in data management, the database has already been adapted by the NOS Marine Debris Program, while NOAA’s OAR and Ecosystem Research Program are modifying it to meet their data management needs. Also expressing interest in the database are several NOS offices and NOAA’s Integrated Ocean Observing System Program. Some of the information stored in the database is available via the NCCOS Projects Explorer web site (www8.nos.noaa.gov/nccos/npe/about.aspx), which helps ensure that NOAA’s scientific endeavors are shared with and are transparent to the public.

Susan L. Baker received a NOAA Administrator’s Award for designing and managing a database that improves the accuracy and efficiency of Congressional inquiry responses and strategic planning efforts.

- **NCCOS will expand its reliance on effective partnerships**

NCCOS' Michael Dowgiallo and Felix Martinez received NOAA Administrator's Awards for creating the Caribbean Coral Reef Institute to conduct strategic research for the improved management of coral reefs.

NCCOS scientists Trey Knott and Julie Carter received a special award from the U.S. Attorney's Office (Northern District of Florida) in May 2007 in appreciation of their assistance in the successful prosecution of a Florida seafood importer for smuggling and fraud violations.

NCCOS Scientists Assist NOAA Fisheries' U.S. Department of Justice with Case against Seafood Smuggler

Working with special agents from NOAA Fisheries' Office for Law Enforcement over a two-year period, NCCOS scientists assisted with the seizure and identification of intentionally mislabeled seafood to avoid DOC anti-dumping tariffs. The NCCOS scientists used DNA sequencing methods to reveal that the samples were catfish, not grouper, and assist the U.S. Department of Justice in assembling the case against the Florida seafood importer. As a result of their assistance, the seafood importer received a sentence of 51 months in Federal prison, multiple years of probation, \$1.13 million in fines, and forfeiture of two Florida businesses. NCCOS routinely identifies fish and marine mammal species for law enforcement agencies using DNA, protein, and lipid-based analyses. Successful enforcement efforts such as this help to ensure truth in seafood labeling and deter future schemes to mislead seafood consumers. The NCCOS scientists also trained U.S. Coast Guard managers in evidence handling practices and marine forensics capabilities to improve their pursuit and prosecution of marine animal poachers.

Photo credit: T. Potts, NOAA's National Undersea Research Program/UNC at Wilmington





Expanded Contaminant Monitoring Effort in Alaska Increases Coastal Stewardship, Improves Resource Management

In FY 2007, NCCOS' Mussel Watch Project expanded its long-term contaminant monitoring efforts to encompass the entire Gulf of Alaska by adding new sites at Resurrection Bay, Bristol Bay, and Cook Inlet. The sites were established and sampled in collaboration with local Native Alaskan communities and the University of Alaska-Fairbanks. Shellfish were also collected in the western Aleutian Islands and at a new location in Bear Cove on Cook Inlet where subsistence fishing of shellfish species occurs. The Mussel Watch Project is the longest continuous contaminant monitoring program in U.S. coastal waters, analyzing chemical and biological contaminant trends in sediments and shellfish at more than 280 coastal sites. More information is available at: ccma.nos.noaa.gov/stressors/pollution/nsandt/mw_details.html.



Expansion of Volunteer Monitoring Network Advances HAB Forecasting System in Gulf of Mexico

NCCOS' Phytoplankton Monitoring Network, which matches NOAA scientists with volunteers to increase awareness about HABs, added 12 new sampling sites along the Texas Coast and nine new sites along the Alabama coast. In collaboration with the Texas Parks and Wildlife Department, Texas Master Naturalist Program, Dauphin Island Sea Lab, and NOAA's Gulf of Mexico Cooperative Institute, NCCOS selected and trained new volunteer groups to sample the distribution and seasonal abundance of toxic phytoplankton (very small free-floating aquatic plants). The volunteers provide data for NOAA's HAB Forecasting System which uses satellite imagery, buoy data, and field observations to predict the location, extent, and probability of HABs in the Gulf of Mexico. The forecasts are posted on a NOAA web site twice each week during the HAB season to provide advance warning to coastal managers, thereby limiting public exposure and helping target sampling efforts. In addition, Network volunteers have identified at least five potentially toxic species not previously known to exist in the Southeastern U.S. Volunteers from 72 school and community groups monitor over 96 sites along the coasts of North Carolina, South Carolina, Georgia, Florida, Hawaii, Massachusetts, the U.S. Virgin Islands, and now Texas and Alabama. More information is available at: www.chbr.noaa.gov/PMN/.

NOAA, State Partnership Improves Scientific Basis for Dock Management

In FY 2007, NCCOS' partnership with the State of Florida, State of Connecticut, and NOAA's Office of Ocean and Coastal Resource Management and NERRs provided coastal decisionmakers with information, skills, and tools for a more streamlined, science-based permitting process for residential docks and piers. The partners conducted four workshops in Florida and Connecticut with over 250 coastal managers attending. The information, skills, and tools from the workshops will help coastal managers evaluate the environmental, visual, navigational, and public access impacts associated with construction and maintenance of residential docks and piers as part of the permitting process. As the partnership matures, NOAA's local partners are covering more of the meeting costs, allowing NCCOS and the Office of Ocean and Coastal Resource Management to focus on research and technology transfer. More information is available at: coastalmanagement.noaa.gov/dock.html.

• NCCOS science will be world-renowned

NOAA Helps African Government, Industry Develop Harmful Algal Bloom Monitoring Program and Respond to Marine Mammal Deaths

At the request of the Angolan Government, NCCOS scientists are helping establish an algal sampling program in the Congo River Delta to understand and respond to the death of a large number of dolphins and sea turtles associated with HABs in the region. Since December 2007, scientists from the Angolan Government and Chevron Corporation, which was concerned about HABs near its oil production facilities in that area, have been sampling weekly in the Congo River Estuary and sending the samples to NCCOS to identify species responsible for the marine mammal deaths. Results of the year-long sampling study will help the scientists detect and monitor these species, and will lead to a monitoring program to predict and mitigate the toxic effects of HAB events. Development of this detection and monitoring program reflects NOAA's commitment to cooperative research endeavors with international partners from both industry and governmental organizations.





Photo credit: Paige Gill

NCCOS Seagrass Assessment Raises Awareness of Apparent Worldwide Decline

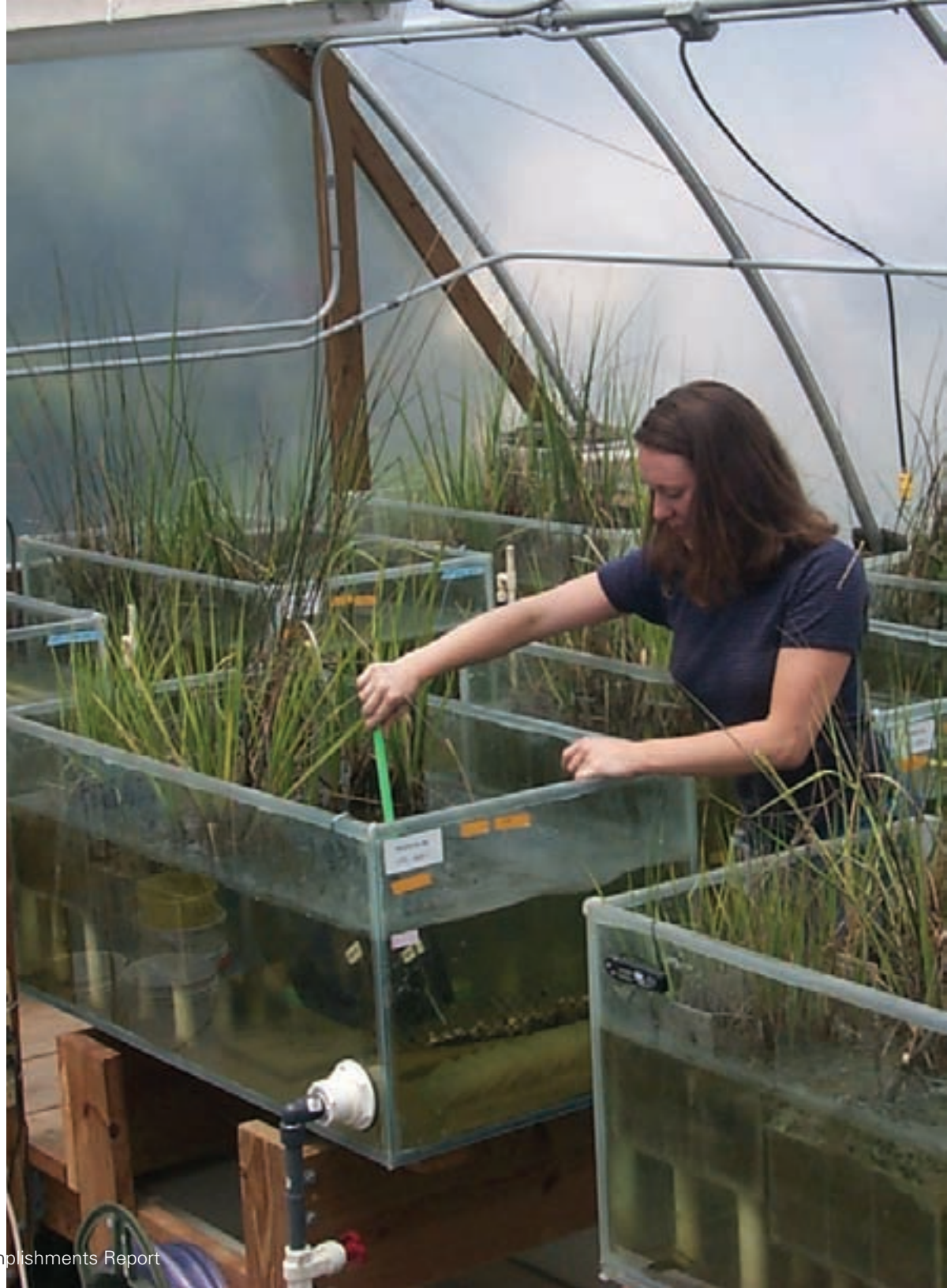
In collaboration with seagrass experts from around the world, NCCOS scientists found that 65% of seagrass abundance investigations worldwide show declines in the important resource, with an accelerating rate of decline in more recent studies. The scientists used the largest data set ever compiled on global distribution and abundance of seagrasses for this study, and are now examining regional trends and correlations between seagrass change and environmental and human stressors. Seagrass is critically important in the marine environment as habitat for thousands of fish, shellfish, and wildlife species. The plants also filter the water, stabilize sediments, recycle nutrients, and are a source of primary production, providing ecosystem services worth an estimated \$1.9 trillion per year.

African Countries Implement NCCOS Algal Toxin Detection Technology, Underscoring Value as Seafood Testing Regulatory Tool

In FY 2007, the governments of Kenya, Tanzania, and Tunisia joined Angola, Namibia, and South Africa in implementing an algal toxin-detecting technology developed by NCCOS scientists to test for toxins causing paralytic shellfish poisoning, a potentially fatal food poisoning of global distribution. The receptor assay technology allows seafood regulators to test shellfish for the accumulation of such toxins and determine whether they are safe for domestic or export sale, thereby protecting seafood consumers and local economies. This technology transfer effort – sponsored by the International Atomic Energy Agency – responds to formal requests from international government agencies with seafood safety concerns, and reflects NCCOS' role as a global leader in protecting oceans and human health. While the current regulatory method uses laboratory mice to test for the toxin, NCCOS is collaborating with the FDA and International Atomic Energy Agency to replace live animal testing of shellfish for international commerce with this new method.

NCCOS Expertise to Assure Largest Seagrass Restoration Effort in European Union

NCCOS scientists collaborated with scientists from several European countries to coordinate research regarding one of the largest seagrass habitat restoration projects implemented in Europe. NCCOS' seagrass restoration experts are also overseeing the restoration effort, including the transplanting of approximately 24.5 acres of three local seagrass species (*Cymodocea nodosa*, *Zostera marina*, and *Zostera noltii*) in Portinho de Arrabida where commercial clam harvesting activities destroyed the seagrass. The bays, now included in a new park, will be protected from further impacts. More information is available at: si-wagner.ualg.pt/ccmar/maree/proj2.php?p2=institutions.



CONTACT INFORMATION

NCCOS Headquarters is located along with its parent organization, NOAA's National Ocean Service, in Silver Spring, MD. Headquarters staff manages and coordinates professional, financial, and administrative efforts in support of all NCCOS activities.

NCCOS Headquarters

1305 East West Highway, Room 8110
Silver Spring, MD 20910
Phone: (301) 713-3020
Fax: (301) 713-4353
coastalscience.noaa.gov



NCCOS Center for Coastal Monitoring and

Assessment (CCMA), located in Silver Spring, MD, assesses and forecasts coastal and marine ecosystem conditions through a diverse program of research and monitoring at the national, regional, and local levels. CCMA's capabilities include environmental and biogeographic assessments, ecological forecasts, physical and biological oceanographic characterizations, and contaminant monitoring through the National Status and Trends Program. The Center is a national leader in marine protected area assessment, eutrophication assessment, coastal remote sensing, harmful algal bloom detection, and integrated coral reef mapping and monitoring to meet national goals. All of CCMA's activities are conducted in direct support of coastal managers and communities.

CCMA

1305 East West Highway, Room 8419
Silver Spring, MD 20910
Phone: (301) 713-3028
Fax: (301) 713-4388
ccma.nos.noaa.gov

NCCOS Center for Sponsored Coastal Ocean Research (CSCOR) is also located in Silver Spring, MD. CSCOR uses a multi-disciplinary approach to understanding and predicting the impacts of natural and anthropogenic influences on coastal regional ecosystems, communities, and economies. Through competitive research funding and effective partnerships, CSCOR supports long-term multidisciplinary projects to evaluate the ecological effects of multiple stressors; develop forecasting tools; respond to the combined public health, economic, and ecosystem threats of harmful algal blooms; and transition successful research into operations. CSCOR research addresses coastal fisheries ecosystems, cumulative coastal impacts including sea level rise, and harmful algal blooms/ eutrophication.

CSCOR

1305 East West Highway, Room 8307
Silver Spring, MD 20910
Phone: (301) 713-3338
Fax: (301) 713-4044
www.cop.noaa.gov

NCCOS Center for Coastal Fisheries and Habitat Research (CCFHR) is located at laboratories in Beaufort, NC and Kasitsna Bay, AK. CCFHR provides coastal resource managers with information to enhance recreational and commercial fishing and essential fish habitat. The Beaufort Laboratory conducts laboratory and field research on estuarine processes, biological productivity of nearshore and ocean ecosystems, dynamics of coastal and reef fishery resources, and effects of human influences on resource productivity. The Kasitsna Bay Laboratory focuses on the impacts of land and resource use on relatively pristine coastal fjord ecosystems.

CCFHR Beaufort Laboratory

101 Pivers Island Road
Beaufort, NC 28516
Phone: (252) 728-3595
Fax: (252) 728- 8784
www.ccfhr.noaa.gov/

CCFHR Kasitsna Bay Laboratory, Homer Office

2181 Kachemak Drive
Homer, AK 99603
Phone: (907) 235-2400
www.ccfhr.noaa.gov/about/kasitsna/welcome.html



Photo credit: Susan Baker



Photo credit: Captain Albert E. Theberge, NOAA Corps (ret.)

NCCOS Center for Coastal Environmental Health and Biomolecular Research (CCEHBR)

is located at laboratories in Charleston, SC and Oxford, MD. CCEHBR conducts interdisciplinary research on issues related to coastal ecosystem health, environmental quality, and related public health impacts. The Charleston Laboratory conducts chemical, biomolecular, microbiological, and histological research pertaining to human influences on marine and estuarine habitats. The Cooperative Oxford Laboratory, a cooperative research center with the Maryland Department of Natural Resources, specializes in the pathology of marine organisms and habitat restoration research.

CCEHBR

219 Fort Johnson Road
Charleston, SC 29412-9110
Phone: (843) 762-8525
Fax: (843) 762-8700
www.chbr.noaa.gov

Cooperative Oxford Laboratory

904 South Morris Street
Oxford, MD 21654-1323
Phone: (410) 226-5193
Fax: (410) 226-5925
www.chbr.noaa.gov/default.aspx?category=oxford&pageName=Oxford%20home%20page

NCCOS also operates a joint project agreement at the **Hollings Marine Laboratory (HML)** in Charleston, SC. The agreement focuses on the relationship between the coastal ocean ecosystem and human health, and represents an innovative way of developing scientific advancements by integrating medical and marine expertise through a diverse partnership among Federal, state, and academic organizations: NCCOS, the Medical University of South Carolina, National Institute of Science and Technology, University of Charleston, and South Carolina Department of Natural Resources. One of NOAA's Centers of Excellence in Oceans and Human Health and managed by NCCOS, HML uses state-of-the-art technologies to conduct pioneering new research examining relationships between coastal environmental health and human health.

HML

331 Fort Johnson Road
Charleston, SC 29412-9110
Phone: (843) 762-8811
Fax: (843) 762-8737
www.hml.noaa.gov/

ACRONYM DEFINITIONS

CO ₂ – carbon dioxide
DNA – deoxyribonucleic acid
DOC – U.S. Department of Commerce
EPA – U.S. Environmental Protection Agency
EPP – NOAA’s Educational Partnership Program
FDA – U.S. Food and Drug Administration
FY – fiscal year
HAB – harmful algal bloom
IT – information technology
MLCD – Marine Life Conservation District
MPA – marine protected area
NASA – National Aeronautics and Space Administration
NCCOS – NOS’ National Centers for Coastal Ocean Science
NERR – National Estuarine Research Reserve
NMFS – NOAA’s National Marine Fisheries Service
NOAA – National Oceanic and Atmospheric Administration
NOS – NOAA’s National Ocean Service
OAR – NOAA’s Office of Oceanic and Atmospheric Research
PAHs – polycyclic aromatic hydrocarbons
PCBs – polychlorinated biphenyls
R/V – research vessel

INDEX

Subject

Aquaculture	16
Assessment/Characterization	6-9, 13, 18, 20, 32
Chemical contamination	10-12, 18, 25, 30
Climate change	17
Coral reef	9, 13, 14, 29
Ecological forecast	17-20, 22
Education	13-15, 25-28, 30
Estuaries	8, 10, 12, 31
Eutrophication	8
Harmful algal blooms	10, 12, 17, 20, 21, 30-32
Human Dimensions	10
Hurricanes	18, 25
Hypoxia	22
Invasive Species	13
Land use	14, 19, 31
Mapping	6, 7
Marine debris	7
Marine forensics	29
Marine mammal	6, 10, 12, 29, 31
Marine protected area	9
Monitoring	7, 11-14, 30, 31
National Estuarine Research Reserve	28, 31
National Marine Sanctuary	6, 7
Nutrient pollution	8, 22
Resource management	6, 7, 10, 11, 13, 14, 16, 20, 29-31
Restoration	9, 33
Seagrass	14, 32, 33
Technology transfer	12, 14, 16, 32
Wetlands	14

Location

International	13, 14, 31-33
Africa	31, 32
Europe	33
Guam	13
Micronesia	14
Chesapeake Bay	9, 15, 19, 25
Great Lakes	11
Gulf of Mexico	18, 22, 30
Alabama	22, 30
Texas	22, 30
Northeastern U.S.	6, 12, 14, 20, 30, 31
Connecticut	31
Maine	6, 20
Massachusetts	6, 14, 20, 30
New York	12
Northwestern U.S.	7, 12, 21, 26, 27, 30
Alaska	26, 27, 30
California	7, 12, 21
Washington	12
Southeastern U.S.	7, 13, 15, 17, 26-31
Florida	13, 29-31
Georgia	7, 13, 30
Maryland	15, 28
North Carolina	13, 17, 27, 28, 30
South Carolina	13, 26, 30
U.S. Virgin Islands	30
Southwestern U.S.	7, 9, 30
California	7
Hawaii	9, 30



U.S. Secretary of Commerce
Carlos M. Gutierrez

*U.S. Undersecretary of Commerce for Oceans and Atmosphere, and
Administrator, National Oceanic and Atmospheric Administration –
NOAA*
Conrad C. Lautenbacher, Jr.
Vice Admiral, U.S. Navy (Retired)

*Assistant Administrator for Ocean Services and Coastal Zone
Management,
NOAA National Ocean Service*
John H. Dunnigan

National Centers for Coastal Ocean Science
1305 East West Highway, Room 8110
Silver Spring, MD 20910

coastalscience.noaa.gov
(301) 713-3020

May 2008

