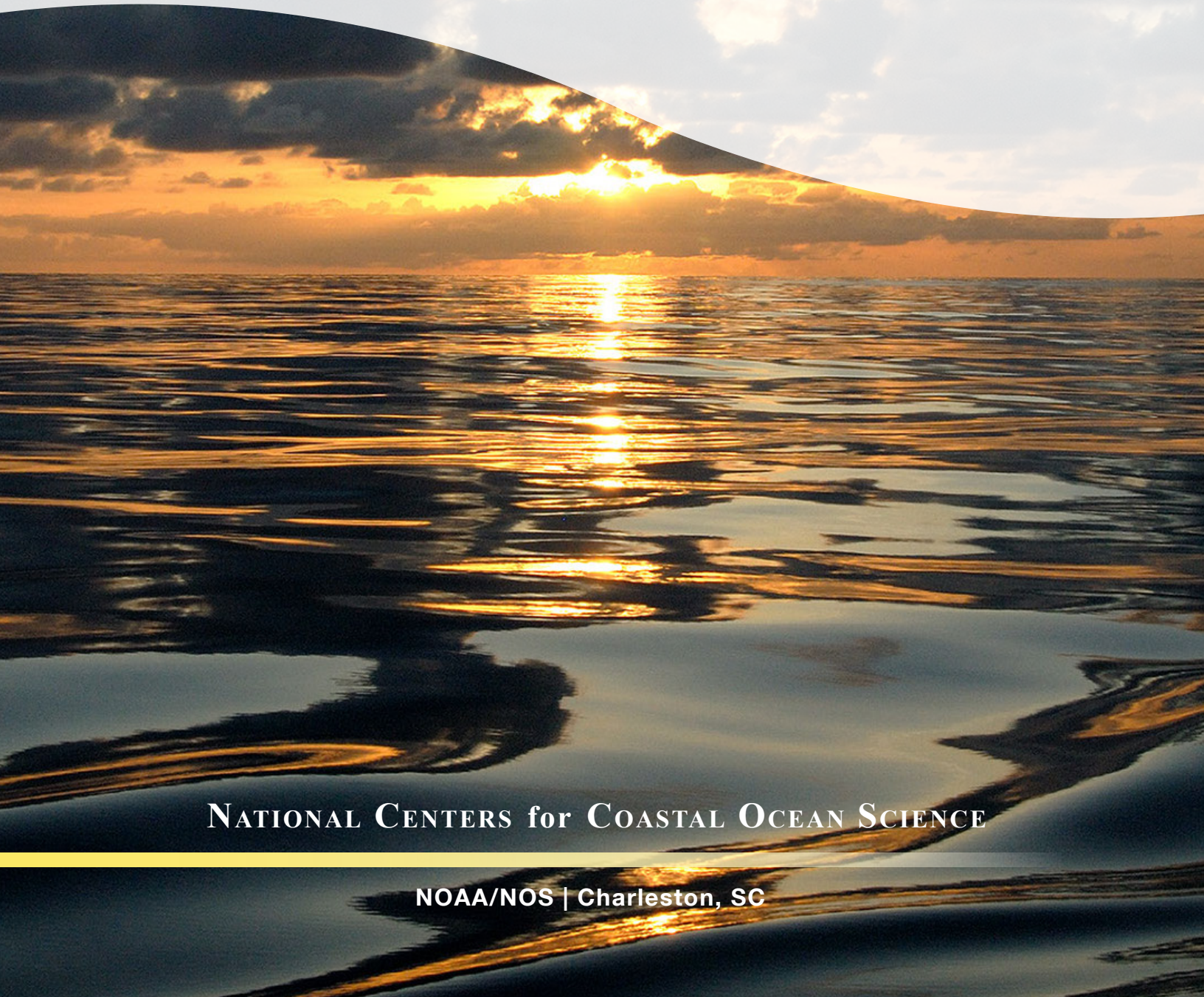
Center for Coastal Environmental Health and Biomolecular Research

ANNUAL RESEARCH REPORT

2012 - 2013



NATIONAL CENTERS for COASTAL OCEAN SCIENCE

NOAA/NOS | Charleston, SC

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Letter from the Acting Director of CCEHBR

As Acting Director of the Center for Coastal Environmental Health and Biomolecular Research (CCEHBR), I am pleased to present this report highlighting the Center's research emphases and selected accomplishments for 2012-2013.

CCEHBR is one of five Science Centers of the National Centers for Coastal Ocean Science (NCCOS), within the National Ocean Service of NOAA. The Center is co-located with the NCCOS Center for Human Health Risk (CHHR) at the Hollings Marine Laboratory (Dr. Jeff King, Acting Director) and other research institutes at Ft. Johnson in Charleston, SC. CCEHBR also administers the Cooperative Oxford Laboratory located in Oxford, Maryland (Suzanne Skelley, Director). CCEHBR scientists conduct multi-disciplinary environmental research focused on four major research themes: Science to Manage Threats of Harmful Algal Blooms; Understanding Impacts of Coastal Pollution (including chemical legacy pollution, contaminants of emerging concern, microbes and nutrients); Science to support Coastal Ecosystem Management; and Advancing Research on Climate Change Impacts to Coastal Ecosystems.

Our scientific findings aid the understanding of linkages between ecosystem and human health towards better defining "Ocean Health" and in sustaining ecosystem services, such as fishability and swimability. Basic and applied research is conducted from the molecular to the ecosystem level, and information and tools are transitioned into applications such as ecosystem forecasts to address a variety of coastal zone and environmental management issues. Research is planned and implemented through extensive collaborations within NOAA and with other federal, state and local governments, academic, and NGO partners and stakeholders. This approach, coupled with public outreach and service, is vital to NCCOS' mission: "To conduct integrated environmental research and develop diagnostic tools to measure the health of the coastal ecosystems".

Enclosed are highlights of CCEHBR recent research addressing issues of concern to NOAA and the Nation that have improved understanding of Coastal Ecosystem Health issues and better informed environmental managers, public health officials and decision makers in their roles to protect, sustain and restore coastal ecosystems. These findings will help NOAA meet the goals of its Next Generation Strategic Plan, http://www.ppi.noaa.gov/ngsp/, including the challenges presented by coastal development and global climate change and support the NOS research priorities of Coastal Preparedness and Resiliency, Coastal Intelligence Network and Place-Based Management.

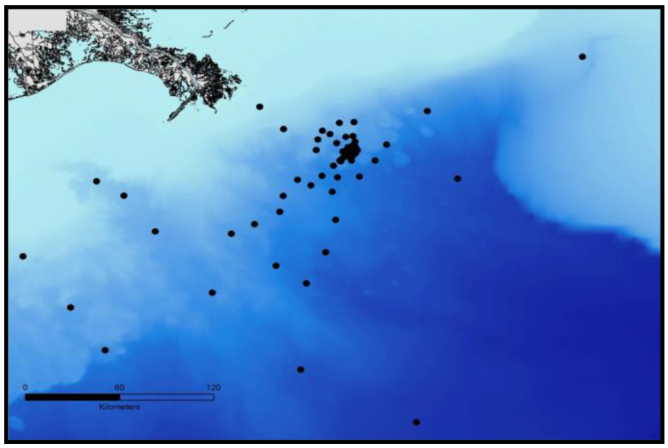
Please feel free to contact us in interpretation and application of our research findings to your interests or needs. CCEHBR looks forward to these future discussions and interactions.

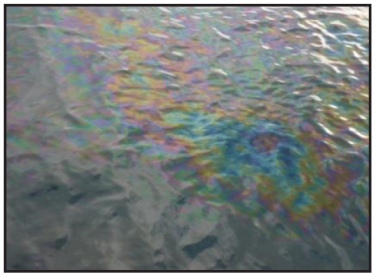
Paul Comar, Acting Director
NCCOS, Center for Coastal Environmental Health and Biomolecular Research

Coastal Pollution

Supporting NOAA Efforts to Assess Potential Effects of the Deepwater Horizon Oil Spill

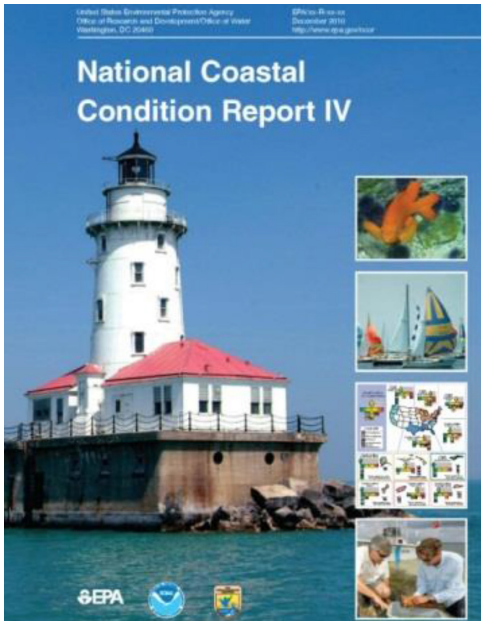
The Deep Water Horizon (DWH) oil spill that occurred in the Gulf of Mexico between April-July 2010 resulted in the release of unprecedented quantities of oil into the marine and estuarine environment. CCEHBR scientists have been working closely with NOAA's Office of Response and Restoration and other colleagues to support efforts under the Natural Resource Damage Assessment (NRDA) process to assess potential effects of the spill on offshore and deep-water resources including coral assemblages, marine mammals, and the soft-bottom benthos. Major research activities in FY12 focused on: a study to assess impacts of the spill on mesophotic coral reefs along the outer edge of the continental shelf, based on surveys conducted in 2010 and 2011; a study to assess impacts of the spill on deep-sea/soft-bottom benthic assemblages and sediment quality in deeper waters along the continental slope and rise (Montagna et al. 2013, NOAA Tech Memo 166); a study to assess status of ecological condition and potential effects shallower offshore/soft-bottom benthic assemblages and along the northeastern Gulf of Mexico shelf (Cooksey et al. processing samples of teeth from stranded dolphins in the age determinations in support of ongoing efforts to assess on marine-mammal populations. Related follow-up work is support of DWH NRDA and subsequent restoration efforts.





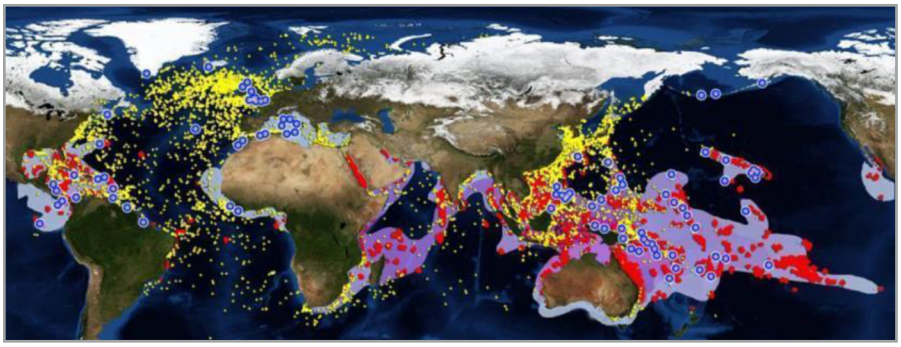
Working in Collaboration with EPA to Develop National Coastal Condition Reports

CCEHBR scientists worked in partnership with the U.S. Environmental Protection Agency (EPA) to develop the Nation's most recent National Coastal Condition Report (NCCR4, April 2012). These reports serve as Environmental Report Cards on the health of our coastal ecosystems. While there is a continued focus on estuaries as in the previous three reports (NCCR1: 2001, NCCR2: 2005, and NCCR3: 2008), this latest report was the first of the series to include sections assessing the health of our coastal-ocean waters, i.e., throughout the various continental shelf regions including many of NOAA's National Marine Sanctuaries. CCEHBR scientists were given the lead on developing these offshore sections for the following three regions, based on results of recent NOAA-EPA offshore surveys: western U.S. continental shelf, South Atlantic Bight, and Mid Atlantic Bight. CCEHBR scientists are also working currently with EPA to develop a fifth NCCR scheduled to be released as a draft in FY14. The latter effort includes preparation of sections on the health of Gulf of Mexico offshore waters and participation in various eco-indicator working groups.



Determining Ecological Risks of Legacy Munitions on Coral and Coral-Reef Health

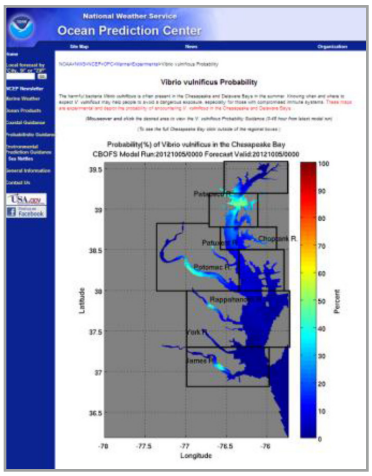
CCEHBR scientists are collaborating with the U.S. Department of Defense (DOD) to evaluate whether munitions compounds affect coral and coral-reef health and to determine the degree of ecological risk they may pose.



Such information is relevant to DOD management decisions in balancing continuity of operations with environmental compliance and stewardship. Military activities in and proximal to marine environments (i.e., training and demilitarization) have resulted in the accumulation of munitions and unexploded ordnances throughout the world's oceans. Yet the ecological impacts to marine life from the associated chemical constituents and their breakdown products remain largely unknown. Coral reefs are particularly vulnerable ecosystems found in proximity to many key U.S. military installations in the Caribbean, (e.g., Key West, FL, Puerto Rico, Guantanamo Cuba) and Pacific Islands (e.g., Hawaii, Marshall Islands, Am. Samoa, Guam).

Detection and Assessment of Marine Pathogens

CCEHBR scientists collaborated with partners to provide marine-mammal tissues for the detection of emerging marine pathogens that could be zoonotic. In particular, the marine pathogen Brucella was detected in over 50% of the dolphins tested in FY12 prompting the involvement of the Centers for Disease Control and Prevention, NOAA Fisheries, and the SC Department of Health and Environmental Control to develop new protocols for the safety of first responders and necropsy personnel to stranded marine mammals. As a result, CCEHBR scientists are part of a multi-agency, two-year research study (U.S. Marine Mammal Brucella Study) aimed at determining: the prevalence of Brucella in North American marine-mammal populations; the variety and pathogenicity of various strains; historical environmental factors associated with Brucella cases; the zoonotic potential to humans; reproductive success of captive animals; and the serological prevalence in stranded and wild populations.



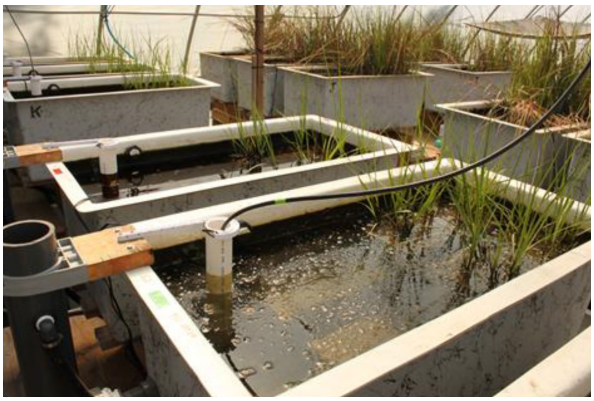
Forecasting Pathogen Abundance and Distribution

Scientists from the Cooperative Oxford Laboratory (COL) in partnership with CO-OPS, National Weather Service, National Environmental Satellite Data Information System, and state and academic partners produced NOAA's first operational forecast for human bacterial pathogens in the Chesapeake Bay. A 5-year intensive monitoring effort generated a spatially and temporally explicit data set used to develop a series of empirical models for one of the leading causes of seafood mortality and wound infections in the U.S., Vibrio vulnificus. This effort is serving as a framework for national level pathogen forecasting through NOAA's Ecological Forecasting Initiative.

Assessing Pharmaceuticals and Antibiotic Resistance in Agricultural Runoff

Biosolids and poultry litter are commonly used as fertilizers applied to agricultural fields in the Chesapeake Bay watershed. Known for their contribution to Bay eutrophication, these manures can also contain pharmaceuticals and other pollutants. COL scientists, in collaboration with the University of Maryland and the U.S. Geological Survey, have determined concentrations of pharmaceuticals and levels of antibiotic resistance in samples taken from agricultural fields and their receiving waters. Some multiple antibiotic resistant bacteria were found in the runoff samples. The magnitude of antibiotic resistance levels was found to be influenced by the tillage practices and types of manure used. Information from this study will inform managers about best practices for fertilizer application.

An Oil Spill Assessment in a Simulated Saltmarsh Ecosystem

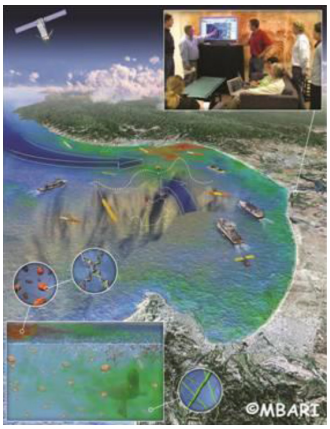


After the Deepwater Horizon (DWH) oil spill in the Gulf of Mexico, approximately 2.1 million gal of dispersant were applied. A total of 1.4 million gal were applied on surface slicks and 771 thousand gal were pumped into the water column at the wellhead. The use of chemical dispersants to mitigate oil spills has been a controversial issue for many years since dispersants do not reduce the amount of oil in the environment, but rather alter the chemical and physical properties of oil which affect transport, fate, and possible bioeffects. Since NOAA's Environmental Sensitivity Index (ESI) maps list salt marshes as the most vulnerable habitat in the Gulf of Mexico, a mesocosm study was undertaken to assess potential impacts of crude oil and dispersants in a simulated salt marsh community. Objectives of the study were to characterize the chemical fate of chemically-dispersed and non-dispersed crude oil in estuarine surface waters, sediment, and biota; determine the acute and chronic impacts of crude oil, chemical dispersants (Corexit 9500), and chemically-dispersed crude oil on representative estuarine biota; and improve NOAA's capacity to respond to major spills by increasing the information available on crude oil impacts with and without chemical dispersants. A large variety of lethal and sublethal endpoints were measured in animals, plants, and microbes and the movement of oil and the dispersant was tracked over time. Results indicated that various biota were sensitive to the dispersant and crude oil alone as well as to the chemically dispersed oil. Different biota showed different sensitivities to the different crude oil and dispersant components. Results of this study will be useful to NOS, OR&R; EPA, Coast Guard, and other oil spill responders as well as to Federal and state agencies involved in damage assessment and remediation.

Marine Debris White Papers

In August of FY13, NCCOS and OR&R's Marine Debris Program (MDP) initiated a collaboration to develop a series of white papers on six marine debris topics. Initially, four writers within NCCOS/CCEHBR were identified and began work on the papers with topics that address the impacts of marine debris on organisms via entanglement and ingestion, the impacts of derelict fishing gear on capture/mortality of species (e.g., "ghost fishing"), and the potential impacts of debris on habitats. The NCCOS/CCEHBR writers worked closely with MDP staff to develop and finalize these papers, which summarize current research, critically evaluate the "state of the science", and identify important data/knowledge gaps. Papers covering Entanglement, Ghost Fishing, Ingestion of Debris, and Habitat Population have been externally reviewed and final revisions are underway. Work is near completion on two additional white papers covering the topics of Marine Debris Modeling and Invasive Species Transport via Marine Debris.

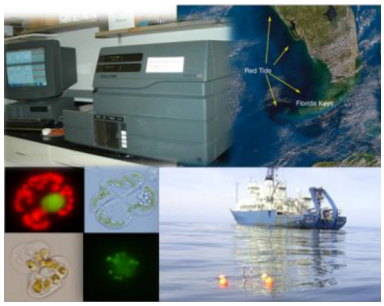
Harmful Algal Blooms



Sensor Development

In 2013 a NCCOS-developed HAB toxin sensor was deployed off the coast of southern California in March, the Gulf of Maine in April and Monterey Bay in September on two robotic, sub-surface instruments called Environmental Sample Processors (ESPs) as part of a novel ocean observing network. Near real-time measurements of HAB toxins and species using ESPs, and supporting data from intelligent sampling by automated underwater vehicles (AUVs) tracking HAB populations provided unique insights into factors affecting HAB growth and toxicity in this complex, rapidly changing ecosystem. The results of this study are being used to inform predictive models needed by coastal managers.

HAB Control & Mitigation



Genomic studies identifying processes involved in aging and cell death in Florida red tide dinoflagellates are guiding the development of field based biomarkers for monitoring bloom termination. The application of specific indicators for the physiological status of blooms will lead to improved modeling of bloom progression and termination needed to advise coastal management decisions.

HABs and Disease

Hawaiian monk seals, that are critically endangered, inhabit the Papahānaumokuākea Marine National Monument and the Hawaiian Islands. For the first time CCEHBR scientists identified the algal toxin ciguatoxin, the cause of ciguatera fish poisoning syndrome, in these seals. An experimental model was developed using mice to determine the effect of ciguatoxin on seal foraging behavior. The model will be used to evaluate the potential impact of ciguatoxin on the recovery of this endangered species.

Technology Transfer

The CCEHBR-developed receptor binding assay for paralytic shellfish toxins has been designated an AOAC Official Method of Analysis following an international collaborative trial to evaluate its performance for measuring shellfish toxicity. This high throughput method provides an alternative to time consuming live animal testing. This promising new technology may be used to better protect seafood consumers and further support international shellfish commerce.

HAB Monitoring

Data collected by volunteers of the Phytoplankton Monitoring Network (PMN) have been utilized to ground-truth NOAA's forecasting of HAB events, assist New York authorities in the detection of emerging algal toxins, and produce an early warning system to alert Alaskan shellfish growers on potential toxic HAB events. The network enhances the awareness of harmful algae and their impacts by directly engaging volunteers in coastal stewardship, resulting in increased monitoring of HABs through constituent groups. The PMN has grown to cover 200 monitoring sites across 17 states.

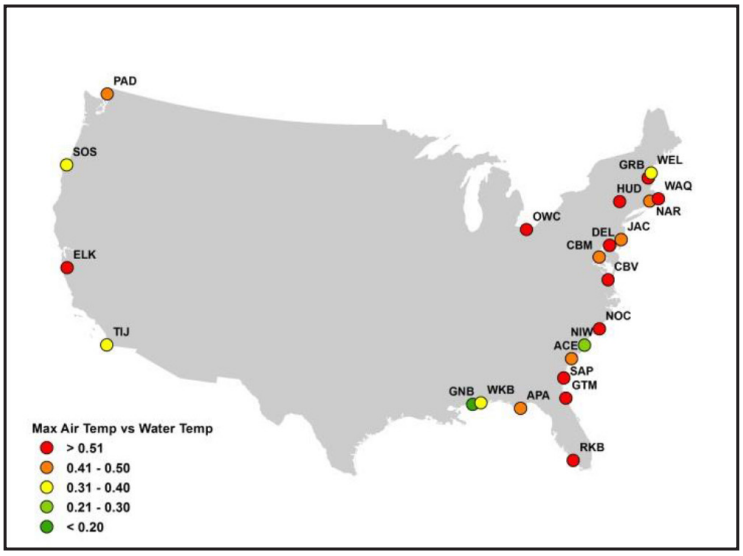
Impacts of Climate Change

Coral Facility for Climate Research

Animal and human research depends heavily on the availability of animal models to elucidate essential biological processes (e.g., reproduction, physiology, biochemistry, genetics) and assess disease states. The unique challenge rooms and microscopy resources at CCEHBR's Coral Culture and Collaborative Research Facility are being used to evaluate impacts of variable physical, biological and chemical stressors on coral biology and health. The facility provides a tremendous resource for laboratory investigations that can enhance our understanding of potential effects of global climate change on corals and coral-reef communities – science that is vital to good management decisions.

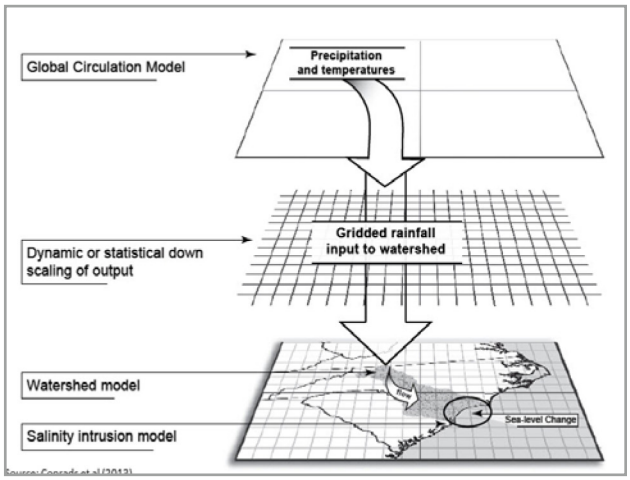
Biophysical sensitivity of the National Estuarine Research Reserves to climate change

Coastal ecosystems support high biological productivity, high densities of human populations, and essential natural resources. Climate change threatens the biophysical conditions of these valuable habitats. Using long-term water quality monitoring data from the National Estuarine Research Reserves, scientists at the Cooperative Oxford Laboratory examined the sensitivity of water quality to the two dominant climate variables of precipitation and air temperature. These climate drivers proved to have strong relationships to many of the water quality variables in the Reserves. These relationships were summarized into a Reserve-level score to indicate the relative climate sensitivity for each Reserve. This biophysical sensitivity assessment was combined with evaluations of social sensitivities, ecological resilience, and economic sensitivity, projected sea-level rise, and projected air temperature increases. The resulting July 2013 NOAA report provides the first ever examination of climate change across the coastal US Reserves.



Integrated Sea Level Rise Model and Climate Change Model Forecasts Future Changes in Salinity that May Affect Community Resilience and Public Health

Sea level rise and an ever changing climate, with increased temperature and alterations in precipitation patterns, are long term forecasts predicted by the Intergovernmental Panel on Climate Change (IPCC) for many parts of the US. In the southeastern US, increased drought and higher temperatures are forecast into the future by the IPCC. The effect of these changes in climate such as drought along with sea level rise may have significant effects on salinity within estuarine ecosystems. These salinity changes may affect the availability of water in coastal plain rivers used for drinking water as well as affect the range, seasonality and distribution of marine microbes and phytoplankton species that cause harmful algal blooms and disease. NCCOS, working with NOAA's National Integrated Drought Information System (NIDIS), the United States Geological Survey (USGS) and the Carolina's Integrated Science Assessment (CISA) Program at the University of South Carolina, developed a new coastal drought index (CDI) based on real-time salinity and streamflow data, as part of the NIDIS Carolinas Coastal Ecosystems Drought Early Warning Pilot.

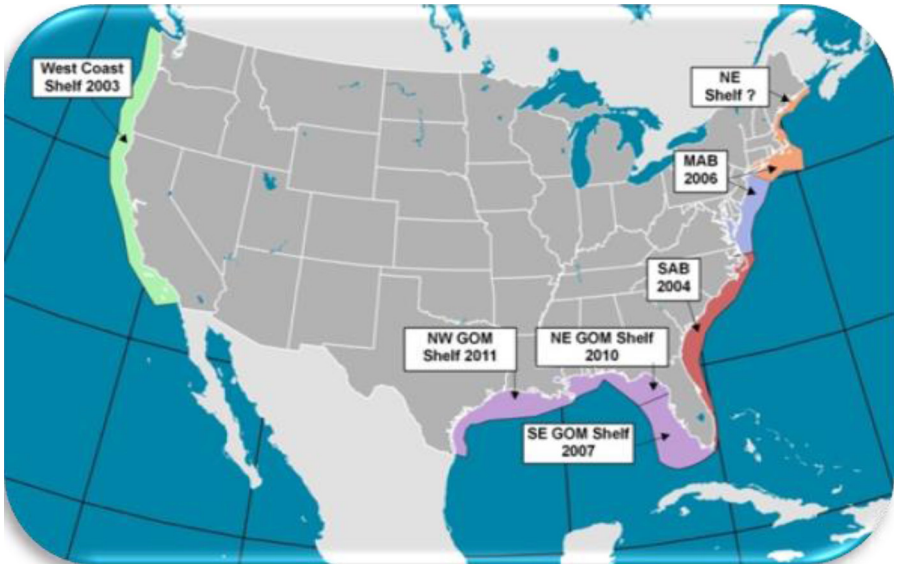


The CDI developed a neural network model that integrates land use models that predict changes in freshwater runoff associated with altered precipitation patterns and increase salinity intrusion from sea level rise models, both of which may affect future salinity regimes in estuaries and may drive salt wedges further upstream in some rivers. The CDI provides critical site-specific information regarding occurrences of salt water intrusions when streamflows are low and has also been used to predict long term changes in salinity that may affect the abundance of marine pathogens such as Vibrios. These integrated models show that optimum conditions for Vibrio growth may increase 10 fold in the future due to predicted salinity and temperature changes forecasted in South Carolina. The initial target audiences for the index are those who live, recreate and work along the Carolina coasts, but lessons learned in the development of this index should be transferable to other locations with real-time salinity and streamflow measurements across the US.

Science for Coastal Ecosystem Management

Place-based ecological assessments for SCEM

CCEHBR scientists have been working in partnership with other parts of NOAA, EPA and various coastal states over the past decade to conduct assessments of ecological condition and potential stressor impacts at multiple spatial scales throughout large marine ecosystems of the U.S., targeted estuaries, and NOAA-managed areas such as National Marine Sanctuaries (NMS) and National Estuarine Research Reserve System (NERRS) sites. The various surveys are conducted using consistent methods and suites of indicators including multiple measures of habitat characteristics, stressor levels, condition of living resources (benthos and fish), and human dimensions (e.g., human-health risks, aesthetics). By incorporating probabilistic sampling designs, the resulting data can be used to make statistical estimates of the spatial extent of the region's health with respect to the various measured indicators and corresponding management thresholds, and to serve as baselines for determining how environmental conditions may be changing with time. Results contribute to a variety of ecosystem-based management actions and related signature products for NOS/NOAA including multi-agency National Coastal Condition Reports and management plans and condition reports for NMS and NERRS sites.



- ***Assessment of Ecosystem Health of the Sapelo Island, Georgia NERRS.***

  CCEHBR scientists, in partnership with the Sapelo Island Georgia NERRS (SINERRS), conducted an assessment of the status of ecological condition and potential stressor impacts at the SINERRS reserve, based on multiple indicators of ecosystem condition that were measured during a field survey conducted in summer 2009 (Balthis et al. 2012, NOAA Tech Memo 150). Results of the study, completed in 2012, serve as an important baseline to track potential changes in the future, due to both natural and anthropogenic factors, and to support informed decisions for management and stewardship of the reserve's valuable natural resources.

- ***Long-term Ecological Monitoring to Support Ecosystem-based Management at Gray's Reef National Marine Sanctuary (GRNMS).***

  A field survey was conducted in FY12 and 13 to assess status of ecological condition and potential stressor impacts throughout offshore waters of GRNMS located 32 km off the coast of GA. The study consisted of synoptic sampling of multiple indicators of ecosystem condition at 20 stations using a probabilistic sampling framework to support unbiased statistical estimates of the spatial extent and magnitude of condition relative to the various measured indicators and corresponding management thresholds. The survey was conducted as a follow-up to prior studies conducted in 2000 and 2005, using similar protocols and indicators, in efforts to continue the long-term monitoring record as a basis for tracking trends in sanctuary conditions with time and supporting important management needs such as future sanctuary management plans and condition reports. Report to be completed summer 2015.

- ***Monitoring to Support Ecosystem-Based Management Decisions in Great Lakes Areas of Concern (AOCs).***

  A study was initiated in August 2012 to assess ecological conditions and stressor impacts in two river systems of the Great Lakes (Ashtabula River in Lake Erie and Milwaukee estuary in Lake Michigan), as part of an "Expanded Mussel Watch Great Lakes Assessment (EMWGLA)" developed through collaborative efforts of NCCOS, CCEHBR and CCMA scientists. The EMWGLA combines CCEHBR's methods of probabilistic multi-indicator surveys of ecological condition with CCMA's traditional mussel watch sampling in various AOCs throughout the Great Lakes, to provide coastal managers with information needed to evaluate changes in the quality of these water bodies relative to Benefical Use Impairment designations and corresponding AOC Remedial Action Plan goals. Other AOCs (which include a total of 24 in U.S. waters among the 5 Great Lakes) will be surveyed in future years. Processing of samples collected is underway.

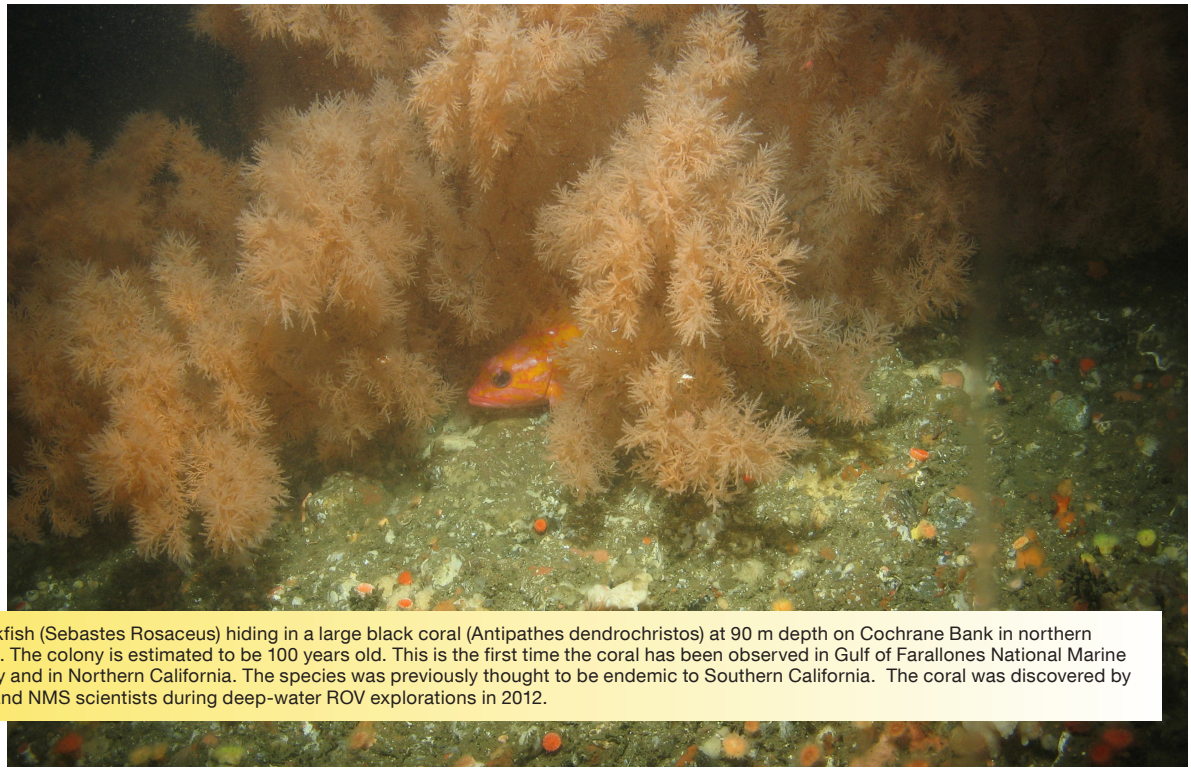
- ***Assessment of Ecosystem Health along the Southern Florida Shelf.***

  CCEHBR scientists, in partnership with FL Keys NMS, NOAA/Ocean and Atmospheric Research/AOML, EPA, USGS, and FL Fish and Wildlife Conservation Commission, conducted an assessment of the status of ecological condition and potential stressor impacts throughout the U.S. continental shelf off south FL, from West Palm Beach on the Atlantic side to Anclote Key in the Gulf of Mexico, based on multiple indicators of ecosystem condition measured during a field survey in May 2007 (Cooksey et al. 2012, NOAA Tech Memo 159). Results of the study serve as an important baseline to track potential changes in the future and support decisions for management and stewardship of the region's natural resources and protected areas (including FKNMS and several wildlife reserves).

ROV Surveys of Deep-Sea Coral (DSC) and Sponge Ecosystems at Gulf of Farallones National Marine Sanctuary (GFNMS)

CCEHBR and other NCCOS scientists in partnership with the GFNMS, NOAA's Deep-Sea Coral Research & Technology Program (DSCR&TP), and US Geological Survey completed a ROV-based expedition at GFNMS in 2012 that marked the final stage of a coordinated three-year research initiative, sponsored by DSCR&TP, to better understand the location, distribution, status, and health of DSC and sponge ecosystems along the West Coast Results, including the discovery of new DSC and sponge habitats within these waters along with documentation of their value as habitat for fishes and other species, will inform various marine conservation and management actions such as pending decisions by Pacific Fisheries Management Council and NMFS to designate additional areas along the West Coast as Essential Fish Habitat. The results will also provide support for the management of NMS resources within the region. See further details and pictures at:
<http://oceanservice.noaa.gov/news/weeklynews/nov12/deepsea-coral.html>
<http://oceanservice.noaa.gov/podcast/p0612.html#mw99>.

Citation: PJ. Etnoyer, G. Cochrane, E. Salgado, K. Graiff, Roletto, J., G. Williams, K. Reyna, and J. Hyland. 2014. Characterization of deep-sea coral and sponge communities in Gulf of the Farallones National Marine Sanctuary: Rittenburg Bank, Cochrane Bank and Farallon Escarpment. A report to the NOAA Deep-sea Coral Research and Technology Program, Silver Spring MD and Gulf of the Farallones National Marine Sanctuary, San Francisco, CA.



Rosy rockfish (Sebastes Rosaceus) hiding in a large black coral (Antipathes dendrochristos) at 90 m depth on Cochrane Bank in northern California. The colony is estimated to be 100 years old. This is the first time the coral has been observed in Gulf of Farallones National Marine Sanctuary and in Northern California. The species was previously thought to be endemic to Southern California. The coral was discovered by NCCOS and NMS scientists during deep-water ROV explorations in 2012.

Marine Acoustic Surveys for Offshore Fisheries and Coral Ecosystem-Based Management

CCEHBR and other NOAA scientists used advanced acoustic technologies to map bottom habitats and associated species, especially in high-priority conservation areas, to gather information for management of these natural resources from an ecosystem perspective. Acoustic-based surveys conducted in FY12, primarily from NOAA ships, provide support to broad ecosystem assessments and fisheries- independent sampling efforts at shelf-edge. These studies included high-priority managed areas in the USVI as defined by the Caribbean Fishery Management Council and others, and targeted resource management issues at Gray's Reef NMS and Flower Garden Banks NMS. To strengthen these and future research initiatives, a new Southeast Acoustics Consortium was co-founded by scientists from NCCOS, NOAA Southeast Fisheries Science Center, FIU, and Duke University. The Consortium will serve as a focal point for bringing together scientists, resource managers, commercial interests, and academics to address critical science and coastal management needs and challenges through the application of advanced acoustic technologies.

Providing Environmental Risk Assessment Training to Coral-Reef Managers

Human activities and pollutants in our coastal waters can become major threats to the health and vitality of coral reefs. As coastal development, tourism, and industries increase, resulting environmental threats increase in both number and kind. To provide resource managers with tools for investigating such threats to corals and mitigating their impacts, the Coral Disease and Health Consortium, with support from NOAA's Coral Reef Conservation Program, hosted two training exercises led by CCEHBR scientists. The first session was held in the USVI, involving participants from 10 Caribbean countries; the second in Hawaii with coral-reef managers. The attendees experienced both classroom theory and hands-on training in the field. As a result, they learned about new tools and techniques that will help deal with unique threats to their local coral-reef resources and, in the process, developed new and stronger partnerships among other Caribbean and Hawaiian Island counterparts.

From the Classroom to the Lab to the Field - Coral Reef Managers received training in Practical Methods for Conducting Threat Assessments for Reef Managers.

Assessing Spatial and Physical Interactions between Bottlenose Dolphins and Fisheries

Coastal living-marine resources, such as the bottlenose dolphin, often compete spatially with humans over prey resources. CCEHBR scientists collaborated with the College of Charleston and SC Department of Natural Resources to conduct two research projects involving depredation by dolphins on the recreational hook and line fishery, and the interaction between dolphins and the commercial shrimp trawl fishery in South Carolina. Results from the depredation study added to the knowledge of an evolving trend of increased mortality of dolphins due to entanglement and ingestion of fishery gear in the southeastern US. The shrimp-trawl study provided significant information of value to NMFS, including news that dolphin mortality associated with this fishery is greater than that being reported. Suggestions for mitigating this problem have been provided to NMFS, including recommendations for educational engagement with the fishermen.

Assessing Land Use Effects on Chesapeake Bay Watersheds

Land-use and its effect on watersheds of the Chesapeake Bay is a key issue and concern for Chesapeake Bay managers. Land-use affects the ecology of adjacent watersheds in complex ways due to the diffuse nature of non-point sources, buffering capacity of the land and the natural variability of ecosystems. Effective ecosystem management depends on understanding these impacts and creating proactive management plans. Scientists at the Cooperative Oxford Laboratory conducted an Integrated Ecosystem Assessments (IEA) within sub-watersheds in Chesapeake Bay to provide information so local managers may connect the influence of land-use sources to impacts on living marine resources in estuaries. Results from the first three years of this study,(Leight et al. 2014, NOAA Tech Memo 189) provide insight into land use effects in Chesapeake Bay. Additionally, a compendium of methods completed as a guide for others (Messick et al. 2013, NOAA Tech Memo 169, 2013).

Supplemental Information

Student Mentorship

The NCCOS commitment to future generation of environmental scientists is met through NOAA fellowship programs and agreements with universities and sponsoring organizations. CCEHBR scientists serve as associate university faculty, as mentors at both the baccalaureate and graduate levels, and as advisors and committee members for numerous academic research programs. CCEHBR provides student direction and training through the Knauss Fellowship Program, Environmental Cooperative Science Center, and a number of other programs. NOAA science benefits also from CCEHBR's participation in the National Research Council and other post-doctoral programs. CCEHBR mentored three Doctoral students (Medical University of South Carolina and University of South Carolina (USC) and four Masters students (College of Charleston and USC) in 2012-2013.

Publications

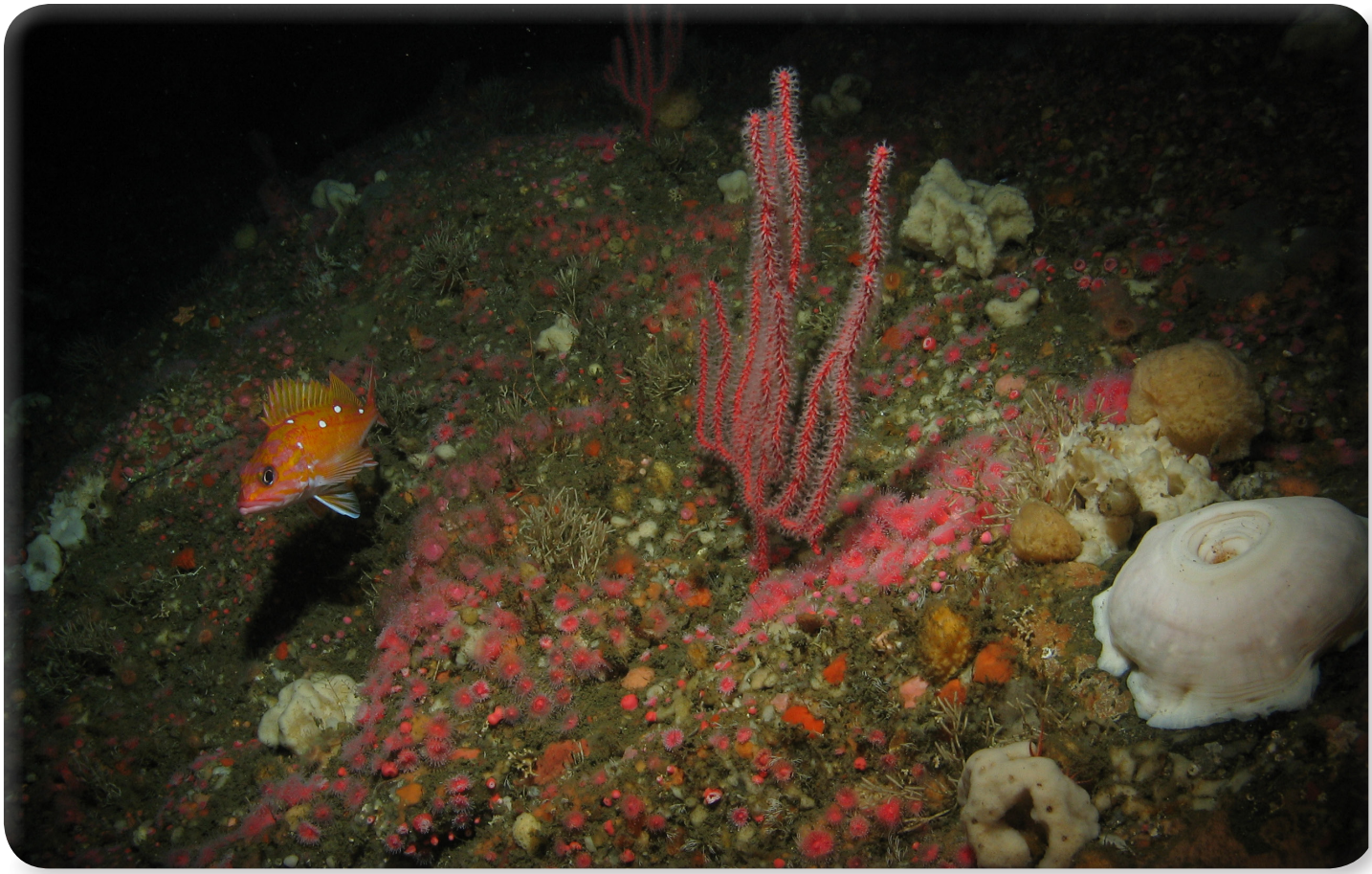
CCEHBR research is well recognized and documented with over 101 articles and papers published in scientific and technical journals and series during 2012-2013, including Toxicology, Harmful Algae, Environmental Toxicology and Chemistry, Environmental Health Perspectives and Marine Mammal Science.

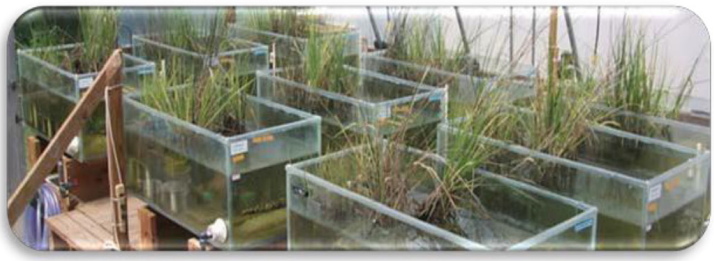
Safety

CCEHBR has demonstrated a multi-year record of diligence and achievement in safety. A research lab presents unique challenges requiring an active safety program that works from each employee up through management. CCEHBR science requires regular small boat-based field work; proper use, monitoring, controls and disposal of hazardous chemicals and biological materials; extensive employee training; and related safety concerns far exceeding those at many NOAA facilities. CCEHBR completed a NOAA-wide audit in 2013 with no major safety issues and only minor safety variances identified, all of which have been corrected.

2012-2013 Scientific Achievement Awards

- NOS Peer Recognition Rafting Award: For rapidly supporting Deepwater Horizon response needs with critical expertise in evaluation of hazards from the bacteria Vibrio vulnificus (Nominated by ORR).
- NOAA Scientific Achievement Award: For outstanding research that increased scientific knowledge, understanding and tools to benefit the health of marine mammals and humans.
- NOAA Administrators Award: For scientific achievement in identifying the role of multi-decadal climate patterns on striped bass harvests and its fishery management implications.





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