NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

# STRATEGIC PLAN: 2011-2015

MISSION FOCUSED

# MESSAGE FROM THE DIRECTOR

It gives me great pleasure to present the National Centers for Coastal Ocean Science (NCCOS) 2011 to 2015 Strategic Plan. Over the last two years, NCCOS has reexamined its scientific priorities, capabilities, and infrastructure to improve the quality, timeliness, and relevance of our science. We have worked hard to develop stronger ties to major legislative and Administration priorities and have embarked on a campaign to build strong strategic alliances with our customers and partners. Over the past 12 months, NCCOS leadership has focused on integrating science across all of our Centers, laying the foundation for a stronger, more efficient organization with a common vision of scientific excellence and public service – in other words – SUCCESS.

As a result of this introspection, dialogue, and programmatic realignment, I am excited to present a strategic plan that lays out a scientific portfolio grounded in our core strengths and focused on key challenges facing our oceans and coasts and those who live and recreate along our shores. The plan outlines our approach for building and maintaining a high quality, dynamic and diverse workforce and the critical infrastructure required of a world class organization. I am proud of the organization and of the NCCOS staff who crafted this plan through spirited, inclusive dialog. In my view, this strategic plan represents the dawn of a revitalized and mission-focused NCCOS poised to become a highly relevant force in advancing coastal science for NOAA and the Nation.

Russell Callender
Acting Director
National Centers for Coastal Ocean Science

Source: NOAA | NCCOS | CCFHR

# VISION

Science serving coastal communities

# MISSION

Provide research, scientific information and tools to help balance the Nation's ecological, social and economic goals

# BACKGROUND

In March 1999, NOAA's National Centers for Coastal Ocean Science (NCCOS) was created to be the focal point of coastal ocean science within NOAA's National Ocean Service (NOS). After a decade of service to the Nation's coastal stewards and stakeholders, NCCOS initiated a programmatic transformation to refocus our scientific portfolio on pressing coastal and Great Lakes issues of our times – issues that affect commerce, recreation, human health, and the general well-being of our coastal communities and ecosystems. This transformation is being realized through a consensus-based process, calling on broad input from Agency leadership, the communities we serve and the world-class scientific staffs in our Centers and laboratories. With over 300 federal and contract employees – and many federal, state & local, academic, and NGO partners – the skill and diversity of our employees, research capabilities, and funding mechanisms gives us the flexibility to adapt to evolving coastal and ocean priorities. In response to stakeholder input and established legislation†, and in concert with our scientific expertise and capabilities, we will focus our collective strengths on the following four priority issues over the next 5 years:

- Science to Manage Threats of Harmful Algal Blooms (HABs)
- Understanding Impacts of Coastal Pollution
- Advancing Research on Climate Impacts to Coastal Communities
- Science to Support Coastal and Marine Spatial Planning (CMSP)

As the NOAA lead for implementing the Harmful Algal Bloom and Hypoxia Research and Control Act (HABHRCA), and executor of the Nation's longest running coastal pollution monitoring and assessment enterprise, NCCOS will lead NOAA's coastal efforts to address the impacts of HABs and pollution. These critical environmental stressors affect human health, economies, and coastal ecosystem services along all of our nation's shores. With state-of-the-art laboratories located in regions on the frontier of climate change, NCCOS is investing in climate research capabilities to increase NOAA's understanding and ability to predict climate impacts on coastal ecosystems and communities. Finally, NCCOS' cutting-edge science to support CMSP meets multi-sector priorities, including the need for environmental conservation and related management practices for sustaining healthy and productive coastal ecosystems.

† *Harmful Algal Bloom and Hypoxia Research and Control Act (HABHRCA), Oceans and Human Health Act, National Coastal Monitoring Act*

# APPROACH AND ALIGNMENT TO DEPARTMENT & AGENCY GOALS

NOAA's capacity to achieve healthy and resilient coastal ecosystems, communities, and economies will depend in large part on our ability to strengthen and integrate science. We stand ready to develop science-based decision support products that influence management to improve environmental and societal well-being. Although our research strategy targets four priority issues, environmental hazards and stressors invariably interact to complicate management efforts to plan, adapt, and respond to changing conditions. With our highly skilled and interdisciplinary workforce, and the ability to enlist the nation's premier scientists through competitive research programs, NCCOS will embrace ecosystem science approaches that span the four priorities and beyond. For example, NCCOS has provided cross-cutting scientific support to NOAA's Office of National Marine Sanctuaries and Coral Reef Conservation Program as they strive to preserve and protect our coastal and ocean ecosystems.

NCCOS is committed to provide coastal stewards with research, tools, and products to incorporate complex science into ecosystem management decisions. This information stream is critical to managers as they evaluate the ecological and economic impacts of their decisions. To respond to coastal community concerns and needs, our approach involves:

- Determining scientific priorities to address the most pressing coastal management issues
- Developing strategic partnerships within, and external to, NOAA to best integrate NCCOS science with management at local, regional, national and international levels
- Conducting and funding integrated and cutting-edge strategic research
- Applying research outcomes to assess and predict the health of coastal ecosystems
- Developing and transitioning scientific tools and products to inform policy and decision making

Our portfolio is aligned and responsive to Administration priorities, including national priority objectives from the Ocean Policy Task Force and the Department of Commerce (DOC) goal for economically sound environmental stewardship and service. In addition, our work will enable NOAA to achieve coastal and ocean goals and objectives contained in NOAA's Next Generation Strategic Plan and will contribute to NOAA's delivery of climate information services. Our research portfolio is planned and organized strategically with respect to NOS' mission to provide science-based solutions to address evolving pressures on our oceans and coasts. In concert with NOS, NOAA and partners, our ability to conduct relevant and cutting-edge science will help ensure vital and healthy coastal ecosystems and communities.

Source: NOAA

## STRATEGIC GOAL AND OBJECTIVES

# HARMFUL ALGAL BLOOMS

Harmful algal blooms (HABs) present one of the most scientifically complex and economically significant coastal management issues facing the nation today. Reported in every coastal state, HAB impacts over the last several decades have caused billions in losses to coastal economies that rely on recreation, tourism, and seafood harvesting. NCCOS will equip our nation's coastal decision-makers with knowledge and tools required for informed decisions that minimize the impact of HABs on people, the environment, and coastal economies.

### GOAL

**Reduced effects of HABs on people, the environment, and coastal economies**

### OBJECTIVE I

**Characterize causes of HABs and their impacts to humans and coastal ecosystems**

NCCOS will determine the factors that regulate bloom dynamics and toxin production and will broaden the scientific community's understanding of the mechanisms, agents, and organisms responsible for harmful effects. Our scientific approach will integrate physiological and oceanographic studies, toxicological research, and modeling and forecasting services into local and regional ecosystem assessments. We will collaborate with coastal communities and state and federal agencies to determine the extent of HAB impacts to humans, ecosystems, and economies.

### OBJECTIVE II

**Develop products that detect and forecast HAB species and toxins**

NCCOS will produce laboratory-based analytical methods and biological assays, cutting-edge biosensors, and ecological models that improve detection and forecasting of HAB species and toxins. We will transfer these technologies to managers and health officials and will develop early warning networks to alert decision makers of existing and/or impending blooms. NCCOS will develop and implement research and regional action plans, assess the accuracy and utility of our forecasts, and expand partnerships and volunteer networks to enhance HAB forecasting and bloom monitoring programs.

### OBJECTIVE III

**Improve HAB prevention, control, and mitigation**

NCCOS will expand its formal partnerships with coastal managers and the academic community to anticipate and respond to HAB events. We will develop effective technologies and proactive strategies to enable decision-makers to prevent blooms from occurring, to control blooms once they occur and to minimize their effects to coastal communities and economies.

Source: Don Paulson Photography

## STRATEGIC GOAL AND OBJECTIVES

# COASTAL POLLUTION

Chemical, nutrient, pathogen, and other biological pollutants degrade habitats, increase the occurrence of waterborne diseases and impact ecosystem and human health – all symptoms of a decline in the quality of coastal environments. Over half of our nation's bays and estuaries experience low oxygen conditions (hypoxia) which can be fatal to marine organisms, reduce their populations, and negatively affect commercial and recreational harvests of fish and shellfish. NCCOS research discoveries and assessments will be delivered to our partners in the management community to guide development and implementation of practices and policies that minimize the impacts of pollution on coastal resources and human health and sustain healthy coasts.

### GOAL

**Minimized impacts of pollution on coastal resources, human health and well-being**

### OBJECTIVE I

**Characterize extent and magnitude of coastal ecosystem pollution**

NCCOS will use its research chemistry and microbiology capabilities to identify and quantify levels of pollution throughout the US coastal zone. We will integrate our nationwide monitoring program with other NOAA, state, and federal programs to establish regional monitoring networks to improve environmental quality monitoring for the Nation. We will analyze sediments, water, and marine animal tissues for known pollutants and for those of emerging concern. NCCOS will use this arsenal of research and monitoring to determine impacts of pollution on marine ecosystems, seafood safety, and human health.

### OBJECTIVE II

**Assess pollution risks and impacts to coastal ecosystems**

NCCOS will develop products and programs that define relationships among pollution, land use, hydrology, oceanography, and ecosystem services. Our products will serve as the foundation for a national early warning network, alerting managers and public health officials of potential risks resulting from human activities and natural disasters along our nation's shores. We will conduct toxicological assessments and develop forecasts and tools to evaluate pollution and hypoxia effects to human well-being and ecosystem conditions. NCCOS will lead the synthesis of multi-agency assessments and regional research and action plans that document pollution impacts, and will provide science-based mitigation strategies.

### OBJECTIVE III

**Enhance management and conservation practices to reduce impacts from contamination**

NCCOS will integrate multi-disciplinary social and economic research, modeling, and monitoring to inform decision makers on how best to minimize impacts of chemical and biological pollution in coastal ecosystems including NOAA marine protected areas. NCCOS will develop decision support and forecasting tools to evaluate management options and conservation practice trade-offs to minimize the impacts of pollution on human health and coastal ecosystems.

Source: http://gigapica.geenstijl.nl/

## STRATEGIC GOAL AND OBJECTIVES

# CLIMATE IMPACTS

Climate change is expected to dramatically affect the health, productivity, and biodiversity of coastal and marine ecosystems and measurably impact communities who live along our shores. It is critical that coastal managers understand, anticipate, and respond to these threats using the best available science. NOAA's Climate Service has responsibility for monitoring and forecasting changes in climate parameters. NCCOS will use this information to address climate impacts on coastal ecosystems – impacts that include habitat loss, coastal flooding, invasive species, ocean acidification, and sea level change – among many others. NCCOS' science-based impact modeling and vulnerability assessments will support NOAA's delivery of climate services, resulting in a society that anticipates and responds to the impacts of a changing climate.

### GOAL

**Coastal communities that are equipped to respond to the impacts of a changing climate**

### OBJECTIVE I

**Develop impact scenario models for climate change effects on coastal ecosystems**

NCCOS will identify and evaluate climate change effects to coastal ecosystem services. We will develop models to estimate habitat change, forecast shifts in the distribution of key managed and sentinel species and predict food-web alterations. We will invest in determining interacting effects of climate and other ecosystem stressors to develop reliable indicators and robust impact scenarios for coastal planners to inform their decision making processes.

### OBJECTIVE II

**Characterize ecosystem and habitat vulnerabilities to climate change impacts**

Ecosystem and habitat vulnerabilities to climate change – including forecasted rates of sea level change and storm surge intensity – will be assessed by developing models to predict changes in shoreline habitat and ecosystem function. We will determine the impact of increased wave energy on estuarine shorelines in future climate scenarios and will rate local habitats for resilience to prioritize restoration and conservation zone suitability.

### OBJECTIVE III

**Develop new conservation & restoration strategies for coastal ecosystems impacted by climate change**

NCCOS will develop monitoring, prediction, and mitigation tools for coastal decision makers to anticipate, reduce, and respond to climate impacts on coastal ecosystem services. We will evaluate the efficacy of current and proposed techniques to conserve or restore coastal ecosystems susceptible to climate impacts and will develop and evaluate climate adaptation approaches for coastal communities.

Source: http://www.katrinareliefsite.org/

## STRATEGIC GOAL AND OBJECTIVES

# COASTAL & MARINE SPATIAL PLANNING

Competition between the many users of our coasts has been on the rise for decades and will only continue to increase. For over 30 years, NCCOS and its predecessors have developed innovative geospatial products, conducted local and regional biogeographic and ecosystem assessments, and defined and mapped ecosystem services. Our decision-support tools have helped managers to evaluate trade-offs between protecting and conserving marine resources while accommodating the needs of commerce, transportation, energy production, and economic growth.

### GOAL

**Effective and sustainable spatial management of coastal and marine resources**

### OBJECTIVE I

**Develop impact scenarios for proposed uses in the coastal ocean**

NCCOS will bring together environmental and human dimension information with ecological metrics and economic indices to model and forecast ecosystem service vulnerabilities to differing coastal and ocean uses. We will use this integrated information system to produce visualization tools for natural resource managers and planners to identify and evaluate the type and importance of ecological services and economic benefits to coastal communities.

### OBJECTIVE II

**Our ecological assessments will inform coastal and ocean planning and management**

NCCOS will obtain spatial and temporal data on ecologically important habitats, species, and processes to define biologically important marine, coastal, and Great Lakes areas. We will improve upon our biogeographic assessment framework to integrate ecological and human use patterns to identify ecosystem services that affect public health and economic well-being. NCCOS will produce baseline assessments of coastal ecosystem conditions for decision-makers to evaluate their CMSP efforts and policies.

### OBJECTIVE III

**Evaluate the effectiveness of management actions in coastal and marine areas**

NCCOS will provide its decision-support models and tools to coastal decision makers and evaluate the efficacy of alternative uses of marine managed areas by our federal, state, regional and local partners. We will continuously engage the coastal management community and incorporate advancements in habitat restoration science, modeling, and monitoring for improved ecosystem-based management approaches to decision-making.

Source: http://www.siemens.com/

## STRATEGIC GOAL AND OBJECTIVES

# PEOPLE AND INFRASTRUCTURE

NCCOS relies on the work of its research, management, and administrative staffs to ensure the delivery of timely, quality, and relevant science that serves the nation's environmental, social, and economic goals. Our staff requires training in science, administration, safety, environmental management systems (EMS), information technology (IT), and security to ensure achievement of NCCOS goals and objectives within agency operational directives and requirements. Furthermore, we require equipment, technology upgrades, and facilities modernization to improve our operational services and are committed to making these improvements. Since its inception in 1999, NCCOS facilities have been upgraded with over $55 million in renovation and new construction with additional major improvements expected in the coming years. To remain responsive to the needs of our staff, our partners, and coastal decision-makers, we will strive to obtain and retain a highly specialized workforce, maintain the integrity of our state-of-the-art facilities, and enhance our infrastructure and operational practices to expand our capabilities to address the current and future environmental challenges that face the Nation.

### GOAL

**A work environment that encourages scientific excellence, creativity, diversity, and safety**

### OBJECTIVE I

**A highly skilled and productive workforce**

NCCOS will analyze current workforce capabilities and future needs, create opportunities to support undergraduate and graduate education, seek to enhance diversity, and effectively recruit and maintain high caliber scientific, administrative, and programmatic staff. We will align employee reward systems to encourage integration of our capabilities and recognize individuals for excellence in service. We will develop and implement personnel plans and invest in employee training to conduct innovative and relevant science, to improve program administration, and to effectively communicate with the communities we serve.

### OBJECTIVE II

**Safe, secure and technologically-advanced facilities**

NCCOS will provide our staff a work environment that is safe and secure and that allows them to conduct the highest quality research. We will acquire, maintain, and modernize our research equipment, implement and improve safety and EMS programs, and maintain and construct facilities that support state-of-the-art capabilities. NCCOS will upgrade its IT infrastructure to continuously improve integration and delivery of data and information to comply with federal standards and protocols.

### OBJECTIVE III

**Effective internal and external partnerships**

NCCOS will expand its partnerships to improve our scientific capabilities and better meet the needs of coastal decision makers. We will increase our ability to quickly and effectively respond to changing and emerging coastal environmental issues by improving our business practices, by optimizing agreements with coastal managers and the extramural scientific research community, and by increasing resource sharing.

Source: NOAA | NCCOS | CCFHR

ABOUT US

# NCCOS CENTERS & LABORATORIES

**Center for Coastal Environmental Health and Biomolecular Research (CCEHBR)** South Carolina & Maryland
Conducts research on the health and functioning of coastal ecosystems and the implications for human health. The Center's broad scientific expertise includes environmental chemistry, toxicology, microbiology, molecular biology, and ecology. CCEHBR conducts advanced field and laboratory research on harmful algal blooms, pollutant impacts on coastal resources, diseases, and other environmental impacts. This research evaluates the condition of the Nation's oceans and coasts, including particularly sensitive areas that NOAA manages through marine sanctuaries and marine protected areas.

**Center for Coastal Fisheries and Habitat Research (CCFHR)** North Carolina & Alaska
Provides coastal resource managers with cutting-edge science on habitat restoration, spatial planning, ecology of harmful algal blooms, and shoreline response to climate change. Models, products and services directly support federal, state, and local restoration projects. Research has directly led to specific commercial products to protect human health from algal toxins, and support forecasts of harmful algae. Also, Center research directly supports State and local creation of resilient shorelines to buffer against sea level rise and other climate impacts.

**Center for Coastal Monitoring and Assessment (CCMA)** Maryland
Administers a world-renowned program of research and monitoring at national, regional, and local levels. CCMA's capabilities include conducting science and developing tools to support coastal and marine spatial planning, ecological forecasting, coastal and ocean remote sensing, and contaminant monitoring through NOAA's National Status and Trends Program. The Center is a national leader in integrated mapping, monitoring, and research to meet national conservation and management goals.

**Center for Human Health Risk at the Hollings Marine Laboratory (CHHR)** South Carolina
Conducts research to understand and forecast relationships between coastal ocean ecosystems and human health and well-being. CHHR provides information, analytical models and diagnostic tools to resource managers and public health officials. CHHR is strengthened by collaboration among five partners: NOS, the Medical University of South Carolina, National Institute of Standards and Technology, College of Charleston, and South Carolina Department of Natural Resources. The Center is one of NOAA's "Centers of Excellence" in Oceans and Human Health, integrating medical and marine technologies and expertise through a diverse partnership among federal, state, and academic organizations to sustain and protect healthy coastal ecosystems.

**Center for Sponsored Coastal Ocean Research (CSCOR)** Maryland
Supports coastal managers through competitive research to better understand and predict the impacts of natural and man-made influences on coastal ecosystems, communities, and economies. CSCOR supports regional research that can be used to improve coastal conditions and prepare the Nation for emerging issues like hypoxia (dead zones), harmful algal blooms, climate change, and others. Through competitive research funding, CSCOR engages the nation's best talent to develop cutting-edge science for coastal management applications.

VISIT US AT coastalscience.noaa.gov

Source: NOAA | NCCOS | CCEHBR

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# Strategic Plan 2011-2015