

NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

Delivering ecosystem science solutions to sustain thriving coastal communities and economies

The National Oceanic and Atmospheric Administration (NOAA) formed the National Centers for Coastal Ocean Science (NCCOS) in 1999 as the focal point for NOAA's coastal ocean science efforts. We help NOAA meet its coastal stewardship and management responsibilities, and we provide 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 coastal ecosystems.

NCCOS SCIENCE PRIORITIES



NCCOS is a nationally recognized leader in [conducting ecosystem science for conservation and sustainable management](#) of the nation's oceans, coasts, and Great Lakes, including coral reefs, estuaries, and National Marine Sanctuaries and other marine protected areas.



We [develop and implement advanced observation technologies and ecological forecasts](#) that help coastal managers and emergency officials identify harmful algal blooms, hypoxia, and pathogens and reduce or eliminate their impacts on economies, public health, and marine resources.



We investigate how changes in sea levels, ocean chemistry, and temperature affect coastal ecosystems. Our timely and actionable scientific assessments, data, and tools [help coastal communities plan for and mitigate inundation and other climate-related risks](#).



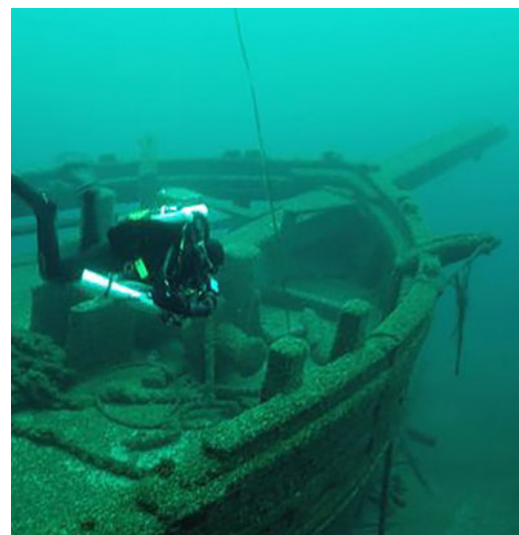
NCCOS works to [define, detect, and reduce threats to coastal ecosystems](#). We provide the nation's longest running coastal pollution monitoring and assessment enterprise and respond to legislative mandates to address harmful algal blooms, hypoxia, chemical spills, marine disease agents, and marine debris.



Regardless of where they live, Americans depend on the coast for food, economic security, and recreation. Our researchers [apply social, economic, and behavioral approaches](#) to develop ecosystem service valuations, vulnerability assessments, and human use mapping products that support thriving coastal communities.

NCCOS Science Supports Designation of New Marine Sanctuary in Lake Michigan

This year NOAA designated a 962-square-mile area of Wisconsin's Lake Michigan a marine sanctuary to protect 36 historically significant shipwrecks and related maritime heritage resources. NCCOS mapping products and ecological assessments of the area guided the designation of the Wisconsin Shipwreck Coast National Marine Sanctuary and will inform its future management. These data on lakebed habitats, substrates, water quality, invasive mussels, and nuisance algae are also being used to update nautical charts and improve our understanding of lake ecosystems and underwater cultural resources. Spanning the early 1800s through the 20th century, the shipwrecks represent a cross-section of vessel types that transformed the Great Lakes from a maritime frontier into the nation's busiest waterway.



Tools to Manage Harmful Algal Blooms and Build Resilient Coastal Communities

The Florida red tide respiratory forecast—launched by NCCOS and partners for Pinellas County—now includes more than 20 Gulf Coast beaches, with efforts underway to expand the forecast to Florida Panhandle and Texas beaches. The forecast helps beachgoers, especially those with respiratory conditions, know the daily severity of airborne red tide toxins at area beaches. In Ohio, a U.S. Army Corps of Engineers-funded program is advancing NCCOS-validated nanobubble ozone technology to control cyanobacteria and their toxins in the Maumee River, which flows into Lake Erie. Along the Maine and Rhode Island coasts, partners deployed NCCOS-developed sensors that detect the algal toxin domoic acid and alert managers to levels that can contaminate shellfisheries and threaten public health.

Climate Change Vulnerability Assessment for Los Angeles County Published

Coastal communities are increasingly vulnerable to the effects of climate change, such as sea level rise and coastal erosion. NCCOS researchers assessed vulnerability to climate change and coastal hazards in Los Angeles County, California, the most populous county in the nation. The team integrated social, structural, and natural resource vulnerability components with coastal flooding, stormwater flooding, erosion, drought, heat, and wildfire risk to identify vulnerable geographic areas in the county. Local planners and decision makers are using the information to better protect, plan for, and manage climate and coastal impacts within their communities.



Coral Restoration Efforts Advance in Florida and Gulf of Mexico

Stony coral tissue loss disease is infecting and killing roughly half of the Florida Reef Tract's hard coral species, including pillar coral—a species listed as threatened under the Endangered Species Act. NCCOS scientists have successfully treated and rehabilitated diseased pillar coral rescued from the region. The saved pillar coral fragments now await a time when they can be used to restore the species to the wild. The work supports NOAA's larger *Mission: Iconic Reefs* project, which calls for restoring nearly three million square feet of the Florida Reef Tract over the next 20 years. Also, NCCOS and partners are developing lab-based, coral propagation methods to cultivate field samples of mesophotic (mid-depth) corals injured by the *Deep-water Horizon* oil spill. Ultimately, the cultivated corals will facilitate accelerated recovery times of affected areas when transplanted back to the Gulf of Mexico.



Addressing the Climate Crisis

by Informing and Advancing Clean Energy Projects

NCCOS data and analyses are informing the Bureau of Ocean Energy Management's (BOEM) offshore wind energy siting decisions. We have ongoing projects with BOEM along the nation's coasts to provide geophysical assessments of the seafloor, the living resources found there, and models that predict the broader spatial and temporal distribution and abundance of fish, birds, corals, and marine mammals. Also, our social value surveys measure coastal community support for or against offshore wind energy development, enabling BOEM to anticipate concerns and engage stakeholders more meaningfully. These products are helping advance the President's clean energy goal of deploying 30 gigawatts of offshore wind energy by 2030, while minimizing the wind industry's impacts on protected species, habitats, and commercial and recreational fishing.

Data Atlases Promote Expansion of U.S. Aquaculture Industry

In support of an Executive Order to establish Aquaculture Opportunity Areas (AOAs), NCCOS developed marine spatial data atlases to help NOAA identify locations for sustainable commercial aquaculture in the Gulf of Mexico and Southern California Bight. AOAs are areas that show high potential for a variety of aquaculture and minimize interactions with other ocean enterprises, such as shipping, fishing, and the military. Developing sustainable aquaculture will strengthen our coastal economies and increase our nation's food security. With over 200 data layers and novel modeling approaches, the atlases (scheduled for release in November 2021) provide the most comprehensive spatial analyses ever developed for any U.S. ocean space to locate the most suitable areas for aquaculture in both regions.



Marsh Food Web Research Informs

Coastal Land Restoration Efforts in Louisiana

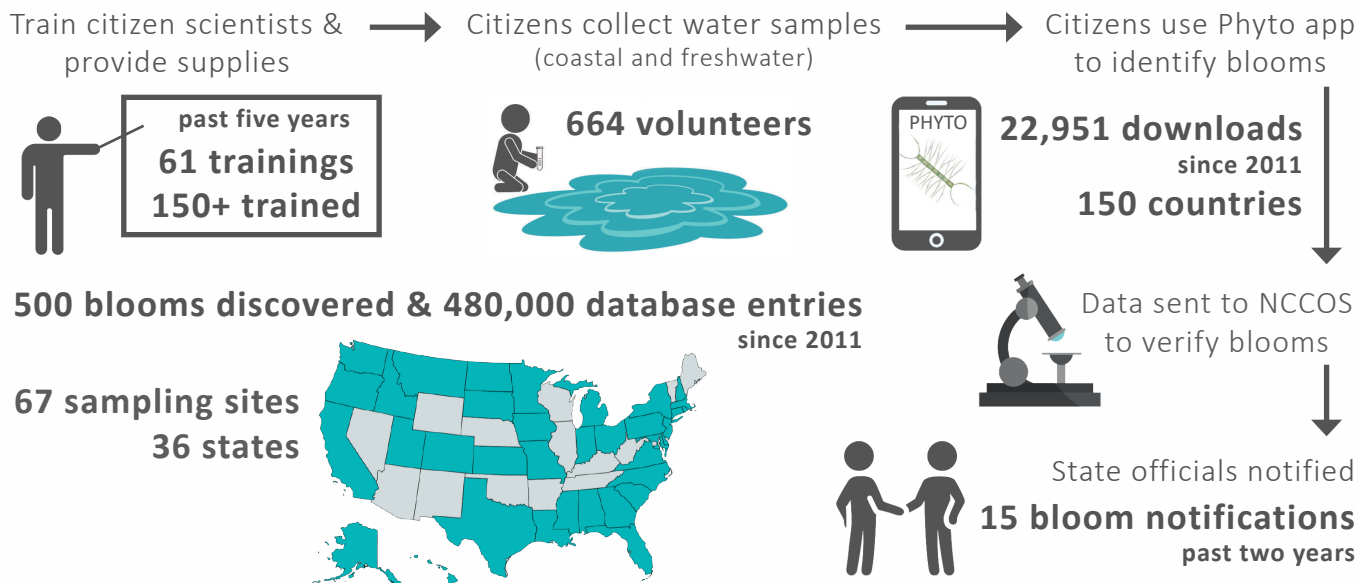
The NOAA RESTORE Science Program, administered by NCCOS, continues to transform penalty funds from the *Deepwater Horizon* oil spill into findings and products that support better management of the Gulf of Mexico. One project is investigating how Louisiana's river diversion and marsh creation work will impact the state's coastal ecosystem food web, one that has made Louisiana second only to Alaska in domestic seafood production. Federal and state managers are using a model developed by the project team to guide marsh restoration efforts and help ensure Louisiana's coast remains healthy and productive.

First Record of Microplastics in North American Bottlenose Dolphins Published

NCCOS scientists and partners documented the first record of microplastics in the gastrointestinal tract of North American bottlenose dolphins. The findings come from post-mortem examinations of dolphins stranded on South Carolina beaches. The researchers note that pathways of exposure to microplastics (pieces smaller than 5 mm) and potential impacts on dolphins are still poorly understood. Microplastics are widely distributed in coastal and marine environments and are an emerging contaminant of concern due to their abundance, potential toxicity, and bioavailability to marine and freshwater organisms. NOAA is investigating if microplastics can be added to the suite of chemical contaminants the NCCOS Mussel Watch Program monitors in the nation's coastal waters in support of pollution remediation efforts.

PHYTOPLANKTON MONITORING NETWORK CELEBRATES 20 YEARS

The National Phytoplankton Monitoring Network (PMN) is a community-based network of volunteers monitoring marine phytoplankton and harmful algal blooms since 2001. PMN enhances the nation's ability to respond to and manage the growing threat posed by HABs by collecting data on species composition and distribution in coastal and fresh waters.



NCCOS FACILITIES



NCCOS Program Office and Headquarters, Silver Spring, MD – Serving as NCCOS headquarters and program office, the Silver Spring location houses administrative functions and scientists who address marine spatial ecology and stressor, impacts, and mitigation. NCCOS appropriations are received from the National Ocean Service “Coastal Science, Assessment, Response and Restoration” and “Competitive Research” budget PPAs.



Cooperative Oxford Laboratory, Oxford, MD – The lab is a partnership among NOAA, the Maryland Department of Natural Resources, and the U.S. Coast Guard. Scientists at the lab research, and develop strategies to secure, the health of fish, shellfish, and other aquatic life in Chesapeake Bay and along the Atlantic Coast.



NOAA Hollings Marine Laboratory, Charleston, SC – This lab provides innovative and high quality research in areas such as harmful algal bloom toxin detection and reference materials, coral health and disease, contaminant fate and effects, and deep coral ecology.



NOAA Beaufort Laboratory, Beaufort, NC – Opened in 1899, this facility is the second oldest federal marine laboratory in the nation and focuses on coral reefs, harmful algal blooms, seafloor mapping, aquaculture siting and impacts, and salt marsh ecology.



Kasitsna Bay Laboratory, Seldovia, AK – NCCOS partners with the University of Alaska Fairbanks on lab operations and research. The facility includes a 1,400-square-foot, running seawater lab to research coastal impacts of climate change, ocean acidification, harmful algal blooms, and monitoring of nearshore biodiversity. The lab also serves as a testbed for underwater technology in high-latitude coastal ecosystems and under rugged conditions.