



NEWSWAVE

NEWS FROM THE U.S. DEPARTMENT OF THE INTERIOR: OCEANS, COASTS AND GREAT LAKES

NEWSWAVE—Winner of NAGC's 2015 Blue Pencil Award

Spring 2016



Offshore wind development continues to move forward as an important part of DOI's offshore energy portfolio. Photo credit: BOEM

Interior's Offshore Energy Portfolio An Update

By Randy Bowman (DOI)

The Department of the Interior's (DOI) Bureau of Ocean Energy Management (BOEM) is engaged in multiple efforts to develop renewable and conventional energy resources on the Outer Continental Shelf (OCS).

Renewables

The BOEM received unsolicited lease requests for wind energy projects on OCS areas off Oahu, HI, from two applicants. The requests came four years after the BOEM and State of Hawaii established the Hawaii Intergovernmental Renewable

See Offshore Energy Update page 8

Northeast and Mid-Atlantic Regions Making Progress on Ocean Plans

By Robert LaBelle (BOEM)

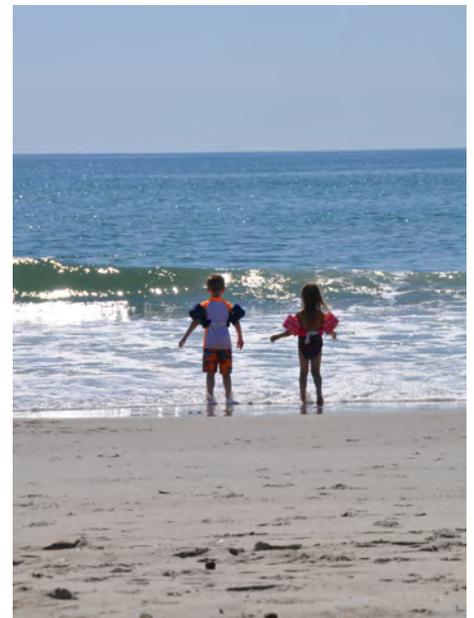
Robert LaBelle serves as the Federal Co-Lead of the Mid-Atlantic RPB

The Northeast and the Mid-Atlantic Regional Planning Bodies (RPBs) are making major strides toward producing the Nation's first two regional ocean plans this year in support of key National Ocean Policy objectives. These plans focus on bringing Federal, State and tribal partners together with stakeholders to enhance communication, improve coordination and enable agencies to better meet

See Ocean Planning page 3

Celebrate the 100th Birthday in Ocean and Coastal Parks!

In 1872 when Congress conserved the marvels of Yellowstone in the first National Park, the Nation could not have imagined the spectacular seascapes lying under the oceans. Future parks along the coast had yet to be envisioned and created. Today, the wonders of 88 ocean and coastal parks are ready for you to experience—above and below the waves. Our national parks, national seashores, lakeshores, monuments and historic sites celebrate a panorama of nature, history and cultural resources on the coast. More than 88 million visitors explore these parks every year.



Young children enjoy the surf at Assateague Island National Seashore, MD. Photo credit: Ann Tihansky

See NPS Centennial page 9

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Illustration credit: Cole Goco



Follow Us on Facebook: New #Oyster Reefs at Chincoteague National Wildlife Refuge to Help Protect Coastlines

<http://www.facebook.com/USInterioroceanscoastsgreatlakes>

Volunteers do the heavy lifting to build “Oyster Castles” for living shoreline project—Dozens of volunteers are helping out at Chincoteague Refuge to build the reefs using oyster castles, which will form the foundation of two living shorelines designed to reduce wave energy and make for a more resilient coastline. #Restore #Resilience #theworldisyouroyster #USFWS #DOICoasts

Learn more: http://www.fws.gov/news/ShowNews.cfm?ref=new-oyster-reefs-at-chincoteague-national-wildlife-refuge-to-help-protect-&_ID=35656



Volunteers assemble oyster castles to create an oyster reef living shoreline at Chincoteague National Wildlife Refuge. Credit: Chelsi Burns, USFWS



Illustration credit: Cole Goco

NEWSWAVE is a quarterly newsletter from the Department of the Interior featuring ocean, coastal, and Great Lakes activities across the Bureaus.

Visit us online: <http://www.doi.gov/pmb/ocean/newswave>

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Ocean Planning continued from page 1

their existing responsibilities. The Northeast and Mid-Atlantic RPBs will deliver their final ocean plans to the National Ocean Council in August and September 2016, respectively. This is in line with the President's Executive Order 13547 in 2010 on implementing the National Ocean Policy.

Northeast

The Northeast Ocean Plan and data portal will enable more consistent regional characterizations of living natural resources, habitats and ocean human-use trends that may be applied in regulatory/environmental reviews and other management applications. It will also support early identification of potential conflicts (and compatibilities) and affected resources; employ best practices for regulatory/management processes through interagency coordination; improve stakeholder engagement; and increase use and sharing of scientific data. By signing on to the Ocean Plan, Federal agencies will agree to use and maintain ocean plan data and information and continue best practices in agency and stakeholder coordination. *See related story, page 4.*

In March, the Northeast RPB released its draft Ocean Plan for an internal review across RPB agencies. The BOEM worked closely with the Senior Ocean Policy Team leads and DOI leadership to conduct this expedited draft Ocean Plan review throughout the DOI and its bureaus. In keeping with the strict timeline, we submitted consolidated DOI comments to the RPB on April 1; the draft Ocean Plan was revised in April and released in May for a 45-day public comment period. Soon after the draft Ocean Plan is released for public comment, the RPB will hold its next meeting followed by public meetings in the northeast states. Based on comments received, the Ocean Plan will be revised in July and submitted to the

National Ocean Council in August for approval by November, after which the Ocean Plan will be in effect. Learn more: <http://neoceanplanning.org/about/northeast-rpb/>

Mid-Atlantic

The Mid-Atlantic Ocean Action Plan will follow about a month behind the Northeast Ocean Plan timeline. The Mid-Atlantic RPB held its fifth in-person meeting in Baltimore, MD, from March 21–24, during which the RPB members agreed on initial content for the draft Ocean Action Plan. In addition to public comment opportunities during the RPB meeting, stakeholders participated in a workshop-style public engagement session to provide direct input on topics under consideration by the RPB. About 90 people participated in the meeting, including RPB members and stakeholders. Beth Kerttula, the National Ocean Council Director, provided opening remarks and served as a resource during the three-day meeting. After the meeting,

the RPB continues to refine the draft Ocean Action Plan for internal review this spring. The draft will then be further refined and released for a 45-day public comment period starting in late June. This public review will begin in early July with a public webinar conducted by the RPB, followed by public listening sessions in the Mid-Atlantic States hosted by the Mid-Atlantic Regional Council on the Ocean (MARCO). After considering public comments, the draft Ocean Action Plan will be refined again during August for final review by RPB entities. In mid-September, the RPB will hold its sixth in-person meeting and deliver the final Ocean Action Plan to the National Ocean Council, with concurrence anticipated in November. In 2017 and beyond, the agencies will work on implementation of the Ocean Action Plan. Details are available at: <http://www.boem.gov/Mid-Atlantic-Regional-Planning-Body/>



Mid-Atlantic RPB members considered and reached general agreement on initial content for the draft Ocean Action Plan during their March 2016 meeting. From left to right, Joe Atangan, Dept. of Defense; Sarah Cooksey, Delaware; John Kennedy, Dept. of Transportation; Michael Jones, U.S. Navy; Elizabeth Semple, New Jersey; Deerin Babb-Brott, facilitation team; Kevin Chu, NOAA; Meghan Massaua, facilitation team; Ingrid Irigoyen, facilitation team; Simon Gore, Dept. of Energy; Karen Chytalo, New York; Gwynne Schultz (State co-lead), Maryland; Laura Cantral, facilitation team; Bob LaBelle (Federal co-lead), BOEM; Kelsey Leonard (tribal co-lead), Shinnecock Indian Nation; Mike Luisi, Fishery Management Council; Chris Scraba, U.S. Coast Guard; Greg Capobianco, New York; Sherilyn Lau, EPA; Catherine McCall, Maryland; and John Clark, Delaware. Photo credit: Arlo Hemphill, MARCO

Sharing Data: The Foundation of Marine Planning

By Mary Boatman (BOEM)

In support of the marine planning efforts in the Mid-Atlantic and Northeast, regional data portals have been developed by State and Federal partners. During the past five years, existing data about the marine and coastal environments have been gathered and synthesized into map products. New data about human uses of marine resources and offshore areas, such as commercial fishing, recreational boating and shipping vessel traffic

patterns, are being collected and incorporated into geospatial map products. These products are critical to regional planning efforts and are freely accessible now through these data portals. For the first time, synthesized distribution and abundance data for whales, birds and fish along the entire Atlantic Coast are now available.

Check out the data portals to learn more:

Northeast Ocean Data Portal: <http://www.northeastoceandata.org/>

Mid-Atlantic Regional Council on the Ocean Data Portal: <http://midatlantic-ocean.org/data-portal/>



The Mad Dog platform is a floating spar facility in the Gulf of Mexico. Photo credit: BP

Voices for the Ocean

By Ann Tihansky

The National Ocean Council's (NOC) Governance Coordinating Committee (GCC) is an advisory group consisting of 18 officials from State, tribal and local governments that serves as an independent body to advise and coordinate with the NOC on interjurisdictional collaboration and cooperation on the National Ocean Policy and related matters. The GCC represents broad, diverse interests, regions and people for a "Sea Change."

The GCC recognizes the need for a coordinated national campaign for ocean health to address ocean conditions using all media tools available. The members unanimously agreed to develop plain language, nonpartisan transition papers around the theme "Sea Change" that address the care of the ocean while providing recommendations on the most important ocean issues affecting communities, including climate adaptation and ocean acidification, temperature and hypoxia.

Through a set of thematic policy papers, the GCC has expressed prioritized concerns for what they see as the most important interjurisdictional ocean issues for the Nation:

Changing seas—Ocean acidification, ocean temperature, harmful algal blooms, contaminants, sea-level rise, adaptation and inundation.

Data and planning—Marine and ocean science, connecting science to policy, ocean data portals and monitoring programs.

Resource management—Ocean planning, offshore sediment resource management, offshore energy, adaptive management and marine protected areas (MPAs).

Communications—Work together with States, tribes and indigenous people to continue work beyond the accomplishments of the National Ocean Policy Implementation Plan.

As one of the major Federal agencies implementing the National Ocean Policy, the DOI plays various roles in supporting and addressing the issues highlighted by the GCC. Throughout

this issue of NEWSWAVE, there are just a few examples ranging from foundational science about sea-level rise to offshore energy resource management to planning for and protecting coastal and marine habitat health.

Read the GCC's "Voices for the Ocean": https://www.whitehouse.gov/sites/default/files/microsites/ostp/gcc_-_voices_for_the_ocean_-_20160210_final.pdf



Illustration credit: Cole Goco

DOI—Multiple Missions for Stewardship of our Ocean, Coasts and Great Lakes

By Cheryl Fossani (DOI)

The DOI is entrusted to conserve and protect America's resources for today and future generations to come. Recognizing the vital connection between the health of our natural resources and human health and the economy, the DOI is one of the Nation's principal stewards of our ocean, coastal and Great Lakes resources.

Made up of nine bureaus, the DOI as a whole has a wide range of ocean and coastal responsibilities ranging from robust scientific programs, to stewardship of vast land, coastal and ocean areas, to ensuring safe and sustainable management of our Nation's mineral and energy resources. Working collaboratively across our bureaus, we are able to consistently manage our delicate ocean resources, connecting on-the-ground implementation and resource management to effective policies—something that one organization alone would have a hard time accomplishing.

- The DOI provides public access to our Nation's seashores, refuges,

parcs and monuments in coastal and marine environments, including wetlands, watersheds, refuges, monuments, parks, coastlines and open ocean areas in all 50 states and U.S. territories in the Atlantic, Pacific and Arctic Oceans, the Gulf of Mexico, the Great Lakes and the Caribbean Sea.

- DOI experts provide data, tools and information to inform and support multiple levels of leaders and decision makers so they can manage upland watersheds, coastal and estuarine ecosystems, continental shelf and deep ocean environments and the natural and cultural resources that exist in them.
- The DOI uses science-based and adaptive management to increase our understanding of natural resources and inform their responsible use, conservation and management so that they are able to adapt to changing conditions.

In addition to working within and among its bureaus, the DOI collaborates across the Federal family and with States, tribes, local governments and a wide array of partners to manage resources at landscape and ecosystem scales, ensuring our ocean, coasts and Great Lakes are healthy and resilient, safe and productive and

understood and treasured. The DOI supports programs that work across political boundaries and through community engagement to promote health, reduce risk and support sustainable resources.

Through many different partnerships, our cumulative impact in managing, conserving and protecting ocean areas, coral reefs, barrier islands, bays, deltas and wetlands is much bigger than the impact that any organization can have alone. Working together we can protect and conserve coastal and marine resources and the diverse communities, economies and wildlife that depend on them.

DOI Resources

The DOI studies, manages, protects and provides access to these significant resources:

- More than 35,000 miles of national coastline.
- More than 34 million acres in 88 marine and coastal national parks managed by the NPS.
- More than 180 marine and coastal Refuges managed by the USFWS.
- More than 1.7 billion underwater acres of OCS managed by the BOEM and BSEE.
- More than 1,100 miles of the California Coastal National Monument managed by the Bureau of Land Management (BLM), as well as additional coastal lands in Florida, Alabama, Oregon, Washington and Alaska.
- More than 473,000,000 square miles in the Pacific Remote Islands, Marianas Trench, Papahānaumokuākea and Rose Atoll Marine National Monuments and associated Refuges.

Learn more: <https://www.doi.gov/pmb/ocean/newswave>

Follow us on Facebook:
<https://www.facebook.com/USInterioroceanscoastsgreatlakes/>

#DOIOcean, #DOICoasts



Children on the beach.

Introducing the New ESIP Smartphone App ICUC

By Susan Russell-Robinson (USGS) and Jonathan Parker (NPS)

Have you ever been out and about in a new location and wondered what groups might be monitoring the environment near you?

The Gulf of Maine Council on the Marine Environment's EcoSystem Indicator Partnership (ESIP) is excited to release a new ICUC ("I See You See") smartphone app. The new app helps you "see" ongoing monitoring activities while also allowing you to use your mobile device to collect information of use to the environmental scientists in charge of managing the Gulf of Maine and watershed. The app uses your location to inform you about monitoring programs in your vicinity. In addition, you can use your phone to upload images into photo

libraries or to introduce others to locations you feel are important. Once you have logged into the app, it will pull up a map of your location with layers available to look at monitoring sites or interact with photo collection sites.

You can also use your phone to contribute to a gallery that will become a photo library over time. Special blue brackets have been placed in locations so that you and other photographers can collect consistent visual imagery for selected monitoring sites. Currently there are two sites in Massachusetts, two in New Hampshire, four in Maine, two in New Brunswick, and two in Nova Scotia. Each time you revisit the site and snap a picture, the photo library grows! If you have another site you want others to discover, you can take a picture there and share what is important about the site to you.

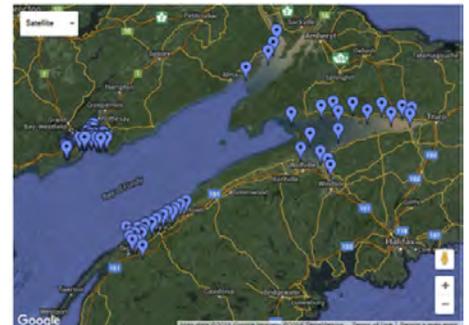
This release is the result of several years of hard work by the ESIP team.

Read more: <http://www.gulfofmaine.org/2/esip-monthly-journals/>

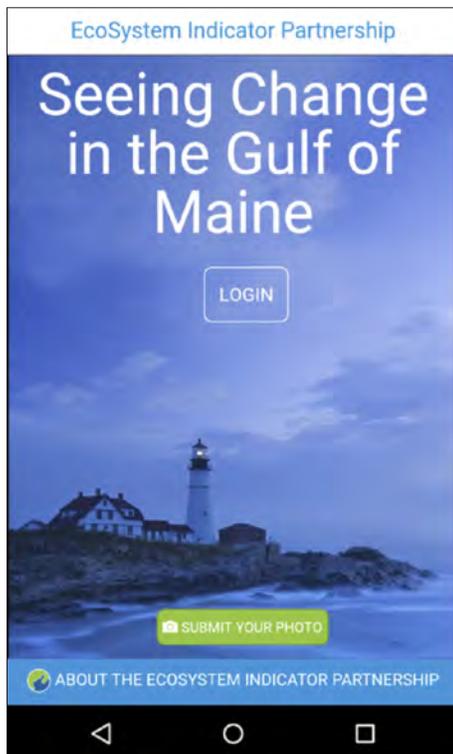
You can download the app from iTunes or the Google Play store. Simply search ESIP and ICUC, download and begin!

Learn more about the NPS Salem Maritime National Historic Site: <https://www.nps.gov/sama/index.htm>

Learn more about the NPS Saugus Iron Works National Historic Site: <https://www.nps.gov/sair/index.htm>



ICUC app view of locations of new water sampling sites. Image credit: Gulf of Maine Council



The new ICUC app available from the Gulf of Maine Council on the Marine Environment's EcoSystem Indicator Partnership (ESIP). Image credit: Gulf of Maine Council



Two examples of views equipped with the phone bracket to enable many people to take images from the same point of view. These two brackets are installed at NPS sites in Massachusetts, Saugus Iron Works National Historic Site (at left-150) and Salem Maritime National Historic Site (at right-149).



Introducing SeaScribe App

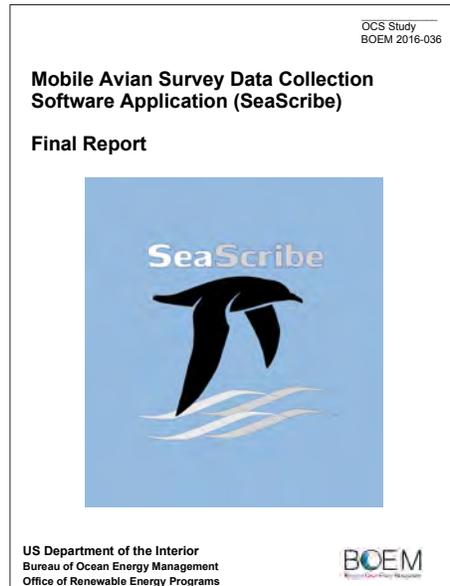
A New Tool for Offshore Surveys of Marine Birds and Other Wildlife

By Mary Boatman (BOEM)

Offshore surveys for wildlife, including seabirds, marine mammals and sea turtles, are necessary to establishing baseline and project-specific information for offshore development. The BOEM recently funded the development of SeaScribe, a new at-sea survey data collection app, designed to be the standard application for marine wildlife survey data collection. Developed by the Biodiversity Research Institute and Tilson Government Services, the application is a tool specifically designed for offshore wildlife surveyors (using either boats or planes) to improve data collection, standardization and work flow, reduce data entry errors and decrease time from raw data output to finalized datasets for analysis. SeaScribe operates on Android and iOS platforms, such as tablets and smartphones, and is available freely to the public.

SeaScribe features include:

- capturing environmental conditions and behavioral information alongside each georeferenced wildlife observation, using internal or external global positioning system,
- efficient data entry screens with core data fields and the ability to create and use customized data fields,
- capturing digital photographs and audio clips from onboard cameras and microphones, tagged to specific observations and locations,
- export of data in JSON or CSV file formats, including tagged images or audio clips, via email or Dropbox, and



A new app from the BOEM supports offshore surveys for wildlife at sea such as seabirds, marine mammals and sea turtles. Image credit: BOEM



Cory's Shearwater. Photo credit: John Slovin, Northeast Seabirds

- a reporting tool that summarizes survey data by transect or survey for screen view or exporting.

Download the App

Google Play Store: <https://play.google.com/store/search?q=seascribe&c=apps>

iTunes App Store: <https://itunes.apple.com/in/app/seascribe/id1084264780?mt=8>

Read the User's Manual and report: <http://www.boem.gov/Avian-Survey-App-Profile/>

Investing in Ecosystem Services

Establishing Metrics, Evaluating Changes, Guiding the Future

By Rick Bennett (USFWS)

The DOI invested \$787 million for Hurricane Sandy recovery to clean up and repair damaged national parks and Refuges; restore and strengthen coastal marshes, wetlands and beaches; and connect and open waterways to increase fish passage, eliminate water control structures and improve flood resilience while bolstering local efforts to protect communities from future storms.

Investments in ecosystem services can have multiple payoffs. These include providing jobs that can make long-lasting impacts to support healthy natural resources and make communities more resilient to predicted future storms—a goal outlined in President Obama's Climate Action Plan: <https://www.whitehouse.gov/sites/default/files/image/president27sclimateaction-plan.pdf>

Improving the resilience of the northeastern coastline of the United States is a massive and complex task. Developing accurate and sensitive performance metrics for detecting and assessing change in resilience is equally complex. Similarly, determining the relationships between changes in resilience of ecological systems and changes in community resilience is a complicated and underexamined area of research; however, it is integral to ensuring projects are strengthening desired societal outcomes.

Stressors such as sea-level rise, storm surge, other climate-driven stressors of coastal systems and accelerating development pressures in the coastal region are affecting much, if not all, of the northeastern coast. Some current

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Offshore Energy Update continued from page 1

Energy Task Force to initiate coordination and planning on offshore renewable energy issues between Federal, State and local agencies and Native Hawaiians Organizations (the State Office of Hawaiian Affairs and the DOI Office of Native Hawaiian Relations). The BOEM will continue its work with the Task Force and further engage the public as it moves forward with its offshore wind leasing process. In January, the BOEM also received an unsolicited request for a wind lease on the OCS off California. The next steps here will be to determine competitive interest and request public comments on the proposed area.

On March 16, the BOEM announced the formal designation of the New York Wind Energy Area, which totals about 81,130 acres, for potential commercial wind energy development in Federal waters about 11 miles south of Long Island, NY.

“New York has tremendous offshore wind potential, and today's milestone marks another important step in the President's strategy to tap clean, renewable energy from the Nation's vast wind and solar resources,” Secretary Jewell said. “We will continue to work with the State and local stakeholders through a collaborative effort as we determine what places have the highest potential and lowest conflict to harness the enormous wind energy potential off the Atlantic seaboard.”

This was the latest in a series of steps by the BOEM to develop OCS renewable energy through a collaborative intergovernmental process. To date, the BOEM has issued 11 commercial wind energy leases off the Atlantic Coast, including those offshore Massachusetts, Rhode Island, New Jersey, Delaware, Maryland and Virginia.

Read more: <http://www.boem.gov/Renewable-Energy-State-Activities/> and <https://www.doi.gov/pressreleases/secretary-jewell-announces-milestone-commercial-wind-energy-development-offshore-new>

Conventional

On March 15, the BOEM announced a proposal for the next five-year OCS Oil and Gas Leasing Program for 2017–2022. The proposal continues a balanced approach to leasing; protects sensitive resources and asks for public comment on additional protections. The proposed Program evaluated 13 potential lease sales in six planning areas—10 potential sales in the Gulf of Mexico and three potential sales off the coast of Alaska. The proposal did not include lease sales in the Mid- and South Atlantic Program Area due to current market dynamics, strong local opposition and conflicts with competing commercial and military ocean uses.

Release of the proposed Program is one of several steps in a multiyear process to develop a final offshore leasing program for 2017–2022. Before the program is finalized, the BOEM will consider another round of public comment on the proposal and accompanying Draft Programmatic Environmental Impact Statement (EIS). The current proposal was informed by more than one million comments, 23 public meetings and extensive outreach with members of the public, nonprofit organizations, industry, elected officials and other interested parties across the country.

Read more: <http://www.boem.gov/Five-Year-Program-2017-2022/>

On March 23, the BOEM offered about 45 million acres for oil and gas exploration and development in the Gulf of Mexico under the current OCS program, which previously offered

more than 60 million acres for development and garnered \$3 billion in high bids.

“These Gulf of Mexico lease sales reflect this Administration's commitment to facilitate the orderly development of offshore energy resources while protecting the human, marine and coastal environments, and ensuring a fair return to American taxpayers,” said BOEM Director, Abigail Ross Hopper.

Read more: <http://www.boem.gov/press03232016/>

The BOEM currently manages about 5,000 active OCS leases covering more than 26 million acres—the vast majority in the Gulf of Mexico. In 2015, OCS oil and gas leases accounted for about 16 percent of domestic oil production and five percent of domestic natural gas production. This production generates billions of dollars in revenue for State and local governments and the U.S. taxpayer, while supporting hundreds of thousands of jobs.

BOEM and DOI staff contributed to this article: Tracey Moriarty (BOEM), John Romero (BOEM), Marjorie Weisskohl (BOEM), John Filostrat (BOEM), Caryl Fagot (BOEM) and Jessica Kershaw (DOI)

In order to promote responsible development of these offshore energy resources, Interior's Bureau of Safety and Environmental Enforcement (BSEE) announced final well control regulations to reduce the risk of an offshore oil or gas blowout on April 15.

Read more: <http://www.bsee.gov/BSEE-Newsroom/Press-Releases/2016/Interior-Department-Releases-Final-Well-Control-Regulations-to-Ensure-Safe-and-Responsible-Offshore-Oil-and-Gas-Development/>

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The National Park Service (NPS) invites you to Find Your Park and join the celebration of these special places during the 2016 NPS Centennial.

Come discover coral reefs and kelp forests teeming with vibrant marine life. Visit tidewater glaciers that form the majestic seascape that has been there for generations of native Alaskan culture. Explore quiet bays framed by remote barrier islands that provide a haven for shorebirds and schools of fish. Lighthouses, shipwrecks and memorials tell of centuries of maritime commerce by seafarers and sacrifice by servicemen and women during our Nation's wars.

Find your ocean and coastal park:
<http://www.nature.nps.gov/water/oceancoastal/>

<http://findyourpark.com/> or <https://www.nps.gov/>



The beach is great place to make and share discoveries. There are many activities for the whole family to enjoy at your coastal national parks. Photo credits: Ann Tihansky

Visit a National Park

Here are a few ways you can take advantage of your national parks. Come visit!

Find Your Park:

<http://findyourpark.com/>

This website introduces special places at national parks to help park visitors, supporters and advocates discover and connect with their ocean heritage.

Every Kid in a Park:

<http://www.everykidinapark.gov>

This program provides free admission to parks for 4th graders and their classes or youth groups, along with transportation grants and educational curricula to support schools and teachers.

BioBlitz:

<https://www.nps.gov/subjects/biodiversity/national-parks-bioblitz.htm>

BioBlitzes are events in parks where teams of volunteer scientists, students and teachers search for and identify as many species of plants, animals and micro-organisms as they can find and help discover and document those new to science. The idea is to help gather information about the many different types and numbers of species that are using these environments but also to raise awareness and engage the public in this learning process.

BioBlitzes are one of the ways the NPS is celebrating with their partners in the U.S. Fish and Wildlife Service (USFWS) National Wildlife Refuges (Refuges), National Oceanic and Atmospheric Administration (NOAA) National Marine Sanctuaries and National Estuarine Research Reserves and State and local coastal and marine parks.

See the social media feeds: <http://tgb.io/BioBlitz2016/288150>

Surf Your Park!

From sea to shining sea, the NPS manages 88 ocean, coastal and Great Lakes parks across 22 states and four territories. Altogether, these parks conserve more than 11,000 miles of coast and 2.5 million acres of ocean and Great Lakes waters.



Hannah Waltman surfs at Gulf Islands National Seashore, FL. Photo credit: John Russell



A view from above of Point Reyes National Seashore. Photo credit: Greg Purifoy



You can find surfers and wild horses at Assateague Island National Seashore. Photo credit: Ann Tihansky

Investing in Ecosystems continued from page 7

coastal infrastructure and resource uses are already unsustainable, so trade-offs will need to be considered, and resilience requirements for critical functions that sustain coastal ecological systems, communities and commerce will need to be defined.

Determining thresholds of resilience to cumulative stressors beyond which ecological system change or infrastructure damage occurs would help managers make informed decisions on the management of ecological systems and communities. In some locations, managed retreat of infrastructure may be required, both as an economic reality and to protect unique coastal ecological systems that depend on the dynamic nature of the coastal zone.

The DOI supports the development of new science to better understand impacts of storms and sea-level rise on coastal ecosystems to help managers respond and adapt to changing environmental conditions.

The DOI is taking a leadership role in evaluating how recovery and restoration projects are enhancing the ecological resilience in the area impacted by Hurricane Sandy in 2012 through the

DOI News: Hurricane Sandy Project Metrics Report: <https://www.doi.gov/hurricanesandy/news/hurricane-sandy-project-metrics-report>

Metrics are needed to determine project success at multiple levels to inform future responses and evaluate economic investments of tax dollars toward improved resilience. Knowledge gained within the DOI project footprints could have substantial transfer value to natural system applications throughout the region.

The DOI has initiated a resilience assessment process that will establish criteria for measuring success and quantifying changes in resilience resulting from project actions at multiple scales. The metrics report was developed for DOI by a metrics expert group (MEG) of physical and ecological scientists and socioeconomic experts who recommended performance metrics for measuring changes in resilience resulting from the DOI-sponsored projects. The metrics report identifies natural and artificial coastal features most affected by Hurricane Sandy along the Northeast coast—such as marshes, beaches, and estuaries—and a recommended suite of metrics that would indicate changes

in the resilience of those features. The list of performance metrics is extensive, given the diversity of coastal features and objectives, so a subset of recommended core metrics is also provided.

The DOI is also working on an effort to measure DOI Hurricane Sandy Project and Program Outcomes with the latest development of the Socioeconomic Metrics Report. This report builds on the MEG ecological metrics and incorporates metrics to address socioeconomic benefits resulting from the DOI-sponsored projects. Combined, the metrics identified by the MEG and this report will be used to evaluate the impacts of the DOI projects, individually and across larger scales.

By using the results from the ecological metrics and socioeconomic metrics reports, the DOI will be able to demonstrate how projects performed to meet community and ecological resilience goals. The ability to evaluate the effectiveness of these investments gives communities and natural resource managers tools to inform best practices, guide future enhancements, address knowledge gaps and sustain improvements in coastal resilience. The ability



Dredges working to create channels to restore tidal flow in the back bay marsh areas of the Prime Hook Refuge. Photo credit: USFWS

to measure and evaluate additional ecosystem services or benefits that can be realized through implementing the use of natural and green infrastructure approaches will further advance informed and sustainable decisions for achieving coastal resilience at local, State and National levels.

The DOI's efforts to identify ecological and socioeconomic performance metrics is of great interest across Federal, State and local governments and nongovernmental organizations. The foundational work done by the DOI has served as a foundation to build upon. For example, the Natural Infrastructure Metrics group—a working group under the guise of the Systems Approach to Geomorphic Engineering (SAGE) group—consists of a broader cross section of Federal, State, and nongovernmental organizations that are working to develop standardized metrics to measure ecosystem services and benefits realized by implementing projects. The DOI serves as a co-chair for this effort that is ultimately developing a better understanding of how these projects provide benefits on the landscape.

Learn more: <http://www.fws.gov/hurricane/sandy/index.cfm>

See related story, page 13.

Watch the Video: Prime Hook National Wildlife Refuge Restoration

The marsh hydrology at Prime Hook Refuge is being restored, which is part of a \$38 million marsh restoration project funded through the DOI by the Disaster Relief Appropriations Act of 2013.

Video credit: USFWS

Watch the video here: <https://www.facebook.com/usfwsnortheast/videos/994788603898409/>

See *Investing in Ecosystems* page 12

Beach Restoration for People, Shorebirds and Horseshoe Crabs in Delaware Bay

The beaches along Delaware Bay are some of the most critically important stopover sites for migratory shorebirds, many of which are undergoing alarming declines. Shorebird arrival in Delaware Bay coincides with the world's largest spawning population of horseshoe crabs (*Limulus polyphemus*). For example, the red knot (*Calidris canutus*) feeds on eggs laid by nesting horseshoe crabs and depends on this food source to gain enough weight to complete the second half of the spring migration to their breeding grounds in the Arctic tundra.

Hurricane Sandy caused substantial degradation of beaches in Delaware Bay. In response, projects were mobilized quickly to completely restore five beaches in time for the spring migration of shorebirds and spawning of horseshoe crabs. About 800 tons of debris were removed while 45,500 tons of sand were placed to restore 1.5 miles of beach with an 80-foot-wide berm. This effort involved substantial partner involvement, including the American Littoral Society, Conserve Wildlife Foundation and quick permitting assistance through the New Jersey Department of Environmental Protection and U.S. Army Corps of Engineers (USACE).

Ultimately, restoring these beaches will not only benefit horseshoe crabs and migratory shorebirds, but also the people who live, work and recreate here. Benefits to people include greater protection from storm surges, improved beach areas for public recreation and the economic benefits of beach and wildlife-related ecotourism, valued at \$522 million in Cape May County, NJ, alone.

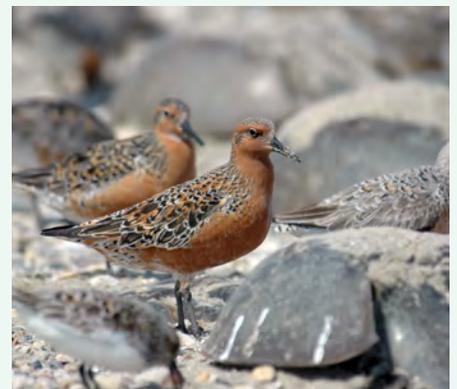
Building a Stronger Coast in New Jersey: <https://www.fws.gov/hurricane/sandy/pdf/HurricaneSandyRecoveryNJ.pdf>



Beach restoration at Reed's Beach, NJ. Photo credit: USFWS



Delaware Bay hosts the world's largest spawning population of horseshoe crabs. Photo credit: Gregory Breese, USFWS



Red knots foraging among horseshoe crabs. Photo credit: Gregory Breese, USFWS

Marsh Restoration at Prime Hook National Wildlife Refuge Provides Benefits to Ecosystems and Communities

At Prime Hook Refuge in Delaware, one of the largest coastal marsh restorations on the Atlantic Coast is underway. Hurricane Sandy magnified breaches in the dunes reducing the elevation and resulting in the rapid inundation of saltwater, which killed fresh water vegetation and increased habitat loss by converting back barrier areas that were once marsh into open water. The Refuge project is designed to restore beaches and marshes by closing shoreline breaches and constructing a marsh platform behind the beach barrier with tidal channels to restore more natural hydrologic circulation for saltmarsh species (e.g., *Spartina* spp.). Restored tidal flow will provide for sediment transport, enhance the rate of marsh development and result in a more resilient and sustainable ecosystem to the impacts of future storms and sea-level rise.

Nearly \$40 million in Hurricane Sandy resilience and recovery funding is being used to rebuild about one mile of existing dunes and barrier beach and close breaches created by the storm. This project will also restore about 4,000 acres of back-barrier tidal marsh by re-establishing natural tidal flow. More than 20 miles of primary, secondary and tertiary channels will be established, and water control structures will be removed to provide an open connection for tidal flow with the Delaware Bay.

Restored marshes within the Refuge will provide benefits to several adjacent and nearby communities such as Milton and Milford, DE, and create additional habitat for birds such as red knots (*Calidris canutus*), American oystercatchers (*Haematopus palliatus*), and piping plovers (*Charadrius melodus*). The restored marsh will also improve the communities' ability to withstand future storms and sea-level rise, improve wildlife habitat and improve beach access for the public.



Aerial view of breaches formed by Hurricane Sandy at the Prime Hook Refuge, DE. Photo credit: USFWS



Pumping sand operations to restore beach, dunes and close breaches at the Prime Hook Refuge. Photo credit: Tim Boyle, USACE



Replanting saltmarsh vegetation at the Prime Hook Refuge. Photo credit: USFWS

Ecosystem Restoration Projects Boost the Economy at Multiple Levels

By Heidi Koontz and Catherine Puckett (USGS), Erica Wales (DOI)

According to a study published in April, ecosystem restoration can provide a two- to three-fold return in economic activity that ripples through local, regional, and national economies. Economists from the U.S. Geological Survey (USGS), DOI, and BLM evaluated 21 DOI restoration projects to quantify methods for economic impact analyses focusing on jobs and business activity generated through money spent on ecosystem restoration activities. Two of the case studies from coastal areas are highlighted below.

See all 21 case studies:

<https://www.fort.usgs.gov/economic-impacts-restoration>

Ni-les'tun Tidal Marsh Restoration in Oregon

Bandon Marsh Refuge, OR, was established in 1983 as a stopover estuary habitat for migrating shorebirds and waterfowl. The Refuge now has 889 acres in two units: Bandon Marsh and Ni-les'tun, both historically tidal wetlands. Ni-les'tun (named by the Coquille Tribe and pronounced NYE-les-ton, which means "People by the small fish dam") was diked and drained in the 1800s for agricultural purposes. In the largest tidal marsh restoration in Oregon to date, the USFWS and more than two dozen public and private partners collaborated for more than a decade to restore 418 acres of tidal marshland. During the restoration, the project unearthed living sites, tools and shells dating back more than 4,000 years, providing evidence that powerful earthquakes and sands washed in by tsunamis had dramatically and repeatedly altered the landscape. The project also found



Biologists surveying fish as part of the Ni-les'tun restoration along Oregon's coast. Photo credit: Bill Bridgeland, USFWS

clues that humans occupied the area before and after those powerful earthquakes and tsunamis altered the landscape.

Economic Impacts of Restoration

The total restoration cost was \$1.64 million (in 2011 dollars), 63% of which was spent locally. Of these costs, an average of \$98,000 annually went directly to local labor income (salaries, wages and benefits) to employee construction workers in Coos County, OR, during the implementation phase. In total, the project provided more than \$1,130,000 in labor income during the life of the project and had a local economic output of \$2,377,000 (in 2014 dollars).

Piping Plover Nesting Habitat Management Program

In 1996, the North Cape Oil Spill adversely impacted piping plover (*Charadrius melodus*) nesting habitat, resulting in fewer chicks produced during the following nesting season. The FWS, Rhode Island, and NOAA provided funds to The Nature Conservancy (TNC) to implement management actions aimed at reducing threats to piping plovers and increasing the number of chicks produced in Rhode Island.

The FWS provided \$130,000 (in 2011 dollars) during 2007–2011 to TNC of Rhode Island to implement a nesting habitat management program for the Federally threatened piping plover,

a shorebird that nests along sandy beaches on the Atlantic Coast. The source of the funds was the Natural Resource Damage Assessment and Restoration settlement for the North Cape Oil Spill. TNC staff conducted more than 70 public education programs, monitored nesting beaches and removed several predators known to consume adults and chicks. During the 5-year project, piping plovers produced more chicks (108) than in the previous five years (80).

With an average of \$32,000 per year to the program for three full-time seasonal positions in Little Compton, RI, each summer between 2007 and 2011, the project supported more than \$41,000 per year in labor income in the local community. This case study illustrates that even modest restoration projects can provide benefits to the environment and local economy.

Economic Values

Economic impacts are reported as job-years, a measure of the total number of annualized full- and part-time jobs accumulated during the duration of the restoration project.

Labor income is a measure of the wages and salaries earned through the jobs supported by project expenditures.

Value added is a measure of the contribution to Gross Domestic Product (GDP).

Economic output is a measure of the total value of the production of goods and services supported by project expenditures.

Read the press release: <https://www.usgs.gov/news/ecosystem-restoration-projects-generate-jobs-and-business-activity-local-regional-and-national>

Read USGS Open-File Report 2016–1016: <http://dx.doi.org/10.3133/ofr20161016>

See related stories, pages 10–12.

Special Feature—The Power of Partnerships

"Ships Of Opportunity Benefit Many Missions"

By Erica Wales (DOI)

Deepwater corals. Shipwrecks. The Arctic. Submarine-landslides. Deep-sea canyons. The Law of the Sea. What do all of these have in common? Partnerships.

The DOI mission extends from science to cultural heritage, making the DOI a department of true explorers. Ocean exploration can be wildly expensive, costing up to \$50,000 per day for ship time, and requires a lot of equipment, maintenance and time; however, if we do not explore the nooks and crannies of deep ocean canyons—or study how our world interacts in a physical, biological and chemical sense—and do not push ourselves to explore the vast unknowns in the depths of the ocean, we are left with too many unanswered questions that will help us understand our world and how we are affecting it.

How does river runoff affect Arctic waters and what are the implications? *See related story, page 20.*

Who has sovereign rights over this part of the continental shelf and can use the resources found within it?

Could landslides in a submarine canyon pose a hazard to people on the coast?

Partnerships can help answer these questions. By sharing resources, talent, equipment and facilities among agencies, organizations and even countries, we can learn more about the 70% of Earth that lies beyond our shores. Here are a few examples of partnerships that are taking us forward to better understand how to wisely protect and use our valuable ocean resources.

Exploring the Deep Sea

Because deep-sea habitats are mostly unknown and pose many questions, the expense, remoteness and exploratory nature of learning more about deep-sea environments seems to create partnerships. The Atlantic Canyons: Pathways to the Abyss (<http://www.boem.gov/Atlantic-Canyons-Pathways-to-the-Abyss/>), is a multiyear collaboration between 54 researchers. Beginning in 2011, this partnership explored two offshore canyons in the Mid-Atlantic. The research team identified more than 125 fish species; documented historical shipwrecks; made discoveries of species unknown to occupy the canyons; recorded data on ocean currents, temperatures, salinity and ocean chemistry; mapped the canyons; and estimated the ages of deep-sea corals.

In 2012, the *Lophelia II* research cruise was the first study dedicated to understanding deep-sea coral communities on actively producing oil and gas platforms. During the research cruise in the Gulf of Mexico, scientists used a remotely operated vehicle (ROV) to visit four platforms and one subsea installation to survey for coral coverage, take coral samples for genetic research, take water samples for environmental data and produce photos and videos. The researchers also made a record-breaking discovery, finding that *Lophelia* (a type of coral) grows at a depth of 799 meters (the previous known depth was 630 meters). Both expeditions were truly interdisciplinary and collaborative, with teams that included oceanographers, ecologists, geneticists, geophysicists, biological technicians, microbiologists, web designers, communication/



Lophelia colonies, flytrap anemones and squat lobsters on a test piling of a subsea well installation. Photo credit: *Lophelia II* 2012 Expedition, NOAA–OER/BOEM



Lophelia on the side of a subsea installation. Photo credit: *Lophelia II* 2012 Expedition, NOAA–OER/BOEM



In 2014, ROV Deep Discoverer came upon a series of caves inhabited by octopuses, which the team dubbed the "Octopus Grottoes." The octopods inhabiting every nook and cranny certainly made this series of caves interesting for geologists, biologists, and non-scientists alike. Behind the scenes, this find also led to a string of emails and chat room discussions of various hypotheses for the formation of the caves. Photo credit: NOAA Okeanos Explorer Program, Our Deepwater Backyard: Exploring Atlantic Canyons and Seamounts

outreach specialists and data managers, and included Federal agency partners, academia/research institutions and the private sector. For their commitment and effort in partnering, both teams were awarded the National Oceanographic Partnership Program (NOPP) Excellence in Partnering Award (Atlantic Canyons in 2015 and *Lophelia II* in 2012).

"We can achieve more working together than alone," said Dr. Rodney Cluck, co-chair of the NOPP Committee speaking on the value added from partnerships. "Studies such as the Atlantic Canyons project take a collaborative team to bring together the various scientific perspectives that build a successful partnership. NOPP projects are generally efforts that are too big for any one agency to handle alone and



An octopus, sea star and bivalves call the deep, steep canyon walls home. Photo credit: Deepwater Canyons 2013: Pathways to the Abyss, NOAA-OER/BOEM/USGS



Deep-sea corals provide shelter for this squat lobster. Photo credit: Deepwater Canyons 2013: Pathways to the Abyss, NOAA-OER/BOEM/USGS



Aerial view of two exploration ships in the Arctic, the Louis (left) stopped alongside the Healy (right). Photo credit: Jessica Roberston, USGS

provide cutting edge research to inform decisions."

The deep seas of the U.S. East Coast are some of the least understood offshore regions of the U.S. Atlantic exclusive economic zone, making it a high research priority. To help fill the gaps in our understanding, the NOAA, USGS, and BOEM, along with nonfederal partners, are embarking on a 5-year campaign to investigate deep-sea environments off the U.S. East Coast. Multiple expeditions are planning to (1) provide guidance on the wise use of living marine and energy resources, (2) define the connectivity of vulnerable ecological communities and (3) improve tsunami prediction and hazards capabilities relevant for assessing coastal risk. Data and information gathered through this campaign will provide a foundation of publicly accessible data and information products that will be used to help guide science and management priorities off of the mid and southeastern United States.

Learn more about *Lophelia II*:
<http://oceanexplorer.noaa.gov/explorations/12lophelia/welcome.html>

Science for the Arctic

From the deep sea to the top of the seas, the Marine Arctic Ecosystem Study (MARES) seeks to understand complex physical, biological, chemical and social interactions and how those interactions of the Mackenzie River plume affect the Beaufort Sea. This five-year study (2014–2019) was started by the BOEM and NOPP and involves partners ranging from the Federal level to private companies, as well as academia, tribal organizations and nonprofits. The partnership allows for the use of a variety of monitoring and sampling equipment, including ships, drones, satellites, ice and snow sensors, acoustic sensors and models. Three marine mammal species will also be tagged in order to understand how environmental conditions may affect their presence. The research will help inform research into environmental protection, climate change, food security and biodiversity, as well as ensuring the protection of areas known for high biological productivity and subsistence use.

The Law of the Sea

Key partnerships also play a role in defining the limits of U.S. sovereign rights. The Law of the Sea allows for States to have sovereign rights for exploring the continental shelf and using natural resources within 200 nautical miles from baseline—and also allows for a shelf to be extended up to 350 nautical miles in some situations. Not only is there a wealth of biological diversity and



Capt. Steven Wachowski (U.S. Air Force) launching the unmanned aerial vehicle from the Louis. Photo credit: Debbie Hutchinson



The autonomous underwater vehicle (jointly developed by Defense Research and Development Canada and International Submarine Engineering, Ltd) being deployed from the Louis as the Healy is seen in the background. Photo credit: Debbie Hutchinson

unexplored habitats on the shelves, but there is also the potential for offshore resources, such as oil, gas and minerals. In order to determine the limits to this extended continental shelf, bathymetric data needs to be collected and analyzed.

Enter the U.S. Extended Continental Shelf (ECS) Task Force, made up of 14 government agencies and headed by the Department of State (DOS), USGS and NOAA. Whereas DOS is in charge of the diplomatic and legal aspects, the USGS and NOAA are in charge of collecting and analyzing bathymetric data. Missions to the Arctic, Atlantic, Bering Sea, Gulf of Alaska, Gulf of Mexico and Pacific have been ongoing since 2003 and are sometimes an international affair. From 2007–2011, the U.S. Coast Guard Cutter Healy and the Canadian Coast Guard Ship Louis S. St-Laurent paired up to collect bathymetric and seismic data in the Arctic Ocean, adding about 15,000 kilometers (km) of seismic data and thousands of kilometers of bathymetric data. In 2011, for the first time, an autonomous underwater vehicle (AUV) was deployed in the ice and recorded bathymetric data, and an unmanned aerial vehicle (UAV) was used to survey ice conditions and look for marine mammals.

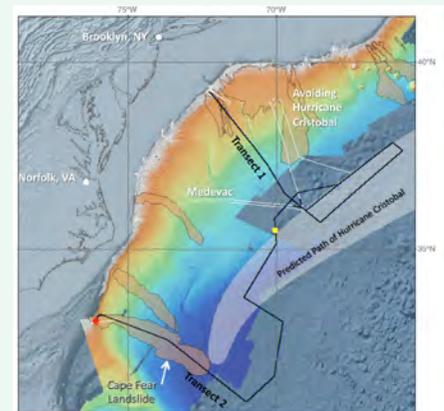
“The ECS project mapping the seafloor of the Arctic with Canada was a win-win situation. It saved time to have two ice breakers working together rather than much slower data acquisition with only one icebreaker; it meant data could be collected in areas where one icebreaker might not go because of the risk of getting stuck in ice; it saved money because sharing data meant neither country had to re-survey an area; it minimized the impact on the native peoples by collecting data only once; and it strengthened the

science because it enabled a whole view of the basin, rather than just having data from the Canadian side or the American side,” said Debbie Hutchinson, USGS scientist.

In total, the ECS project has conducted 31 cruises in 10 regions, logged more than 2.5 years of sea time and mapped more than 2.5 million square kilometers of the ocean floor. The U.S. ECS could add up to 1 million square kilometers (that is twice the size of California or half the size of the Louisiana Purchase) under U.S. control.

Understanding Hazards

While some partnerships involve a common goal, other partnerships involve the same equipment but for very different goals. In August/September 2014, the ECS Task Force partnered with scientists studying submarine landslides (<http://soundwaves.usgs.gov/2014/12/>). Since both projects required the use of seismic equipment and were focused on mapping the Atlantic margin, the two teams paired up to share ship time and equipment. The ECS project was focused on surveying tracks parallel to the margin in order to delineate the extended continental



Map of the surveyed Atlantic margin for submarine hazards. Transect 1 and 2 were part of the submarine landslide study. The black survey lines parallel to the margin were for use by the ECS Task Force. Image credit: USGS

shelf. The submarine landslide team was focused on surveying tracks perpendicular to the margin in order to assess the potential for tsunamis on the U.S. East Coast. This was the first time a landslide on the Atlantic margin was mapped and imaged from the origin on the continental slope, where the rupture occurs, to where it runs out on the continental rise or abyssal plain. This information helps in understanding why submarine landslides happen and in evaluating the risk of tsunamis. The partnership obtained more than 2,700 km of seismic data and more than 4,000 km of bathymetric and backscatter data. By combining efforts, the two teams were able to accomplish both goals at the same time and helped us better understand the subsurface of the Atlantic margin.

Underwater Cultural Heritage

In 2012, the NOAA, NPS, Flinders University and Open Boat Films explored maritime heritage in the Pacific. During the course of 21 days, a six-person maritime archeology team partnered with other teams to explore Papahānaumokuākea Marine National Monument. Made up of marine archeologists, a biologist and a science filmmaker, the marine archeology team surveyed shipwrecks, documented new artifacts and sunken aircraft and used remote sensing equipment to discover more than 35 other potential maritime heritage sites (to be explored in the future). The shipwrecks included the Two Brothers, a Nantucket whaleship sunk at French Frigate Shoals in 1823. While on the shipwreck site, the team documented new artifacts and continued collecting documentary film footage, which will help in confirming the ship's identity. The team also

documented a sunken WWII aircraft while at Midway Atoll, which helps to further tell the story of the war in the Pacific theater. The interdisciplinary team helped unlock our maritime history and answer questions about our past.

Partnerships play a key role in ocean exploration. Interdisciplinary teams help researchers think outside of their own expertise and encourages a holistic approach to research. Sharing ship time and equipment helps avoid duplication, reduces impact on the environment, and allows for one expedition to accomplish many goals. Cooperation between the Federal government, academic and research institutions, private companies and even local and international partners encourages dialogue among different levels and ensures openness and transparency. Without partnerships that help us understand the world around us, knowing where to site energy production to ensure maximum production while conserving biological and historical resources or helping predict natural disasters

becomes much more challenging. Encouraging these partnerships ensures we can answer the many questions about the world around us and ensures we are ready to handle future challenges that arise.



Dr. Kelly Gleason, marine archaeologist for the NOAA, explores the Two Brothers shipwreck. Photo credit: Greg McFall, NOAA



Cathy Green takes notes underwater as she documents maritime artifacts on the Two Brothers shipwreck site in the French Frigate Shoals in the Northwest Hawaiian Islands. Photo credit: Tane Casserley, NOAA

Ocean & Coastal Management Cites USGS: Most Credible Science Research

By Erica Wales (DOI)

In a recent report, the USGS took first place for science research credibility among ocean resource managers and interest group leaders. The study authors asked several hundred people to rank the research reputations of 12 government agencies and organization types on “marine resource management and environmental policy issues.”

In recent years there have been calls among decision makers, interest groups, citizens and scientists alike for the use of the “best available science” when making environmental policy and managing natural resources. The article, published in the March issue of *Ocean & Coastal Management*, shares the analysis of 570 surveys

returned by scientists, managers and interest group leaders to examine the attitudes and orientations of marine scientists, resource managers and interest group representatives concerning factors that may affect scientific credibility. The study found that the top three indicators of credible scientists were “quality of the methodology used in their scientific research,” “scientific data and information they generate in their research,” and “experience and knowledge of the management of marine resources.”

The USGS has a long history of high-quality research methods and data sharing, combined with experienced and knowledgeable ocean research staff.

Learn more about the USGS Coastal and Marine Geology Program: <http://marine.usgs.gov/>

Read the article: <http://dx.doi.org/10.1016/j.ocecoaman.2016.01.011>



USGS scientists work on coastal process data collection offshore of Fire Island, NY. Photo credit: Sandy Baldwin

Up to 70 Percent of the Northeast U.S. Coast May Adapt to Rising Seas

New Model Shows that Drowning is Not the Only Response for Low-Lying Coasts

By Erika Lentz and Heather Dewar (USGS)

Much of the coast from Maine to Virginia is more likely to change than to simply drown in response to rising seas during the next 70 years or so, according to a new study led by the USGS. The study is based on a new computer model that captures the potential of the Northeast U.S. Coast to change, driven by geological and biological forces, in ways that will reshape coastal landscapes.

In the paper published in *Nature Climate Change*, the researchers reported that 70 percent of the Northeast U.S. Atlantic Coast is made up of ecosystems that have the capacity to change during the next several decades in response to rising seas. For example, barrier islands may migrate inland, build dunes, change shape or be split by new inlets as tides, winds, waves and currents sculpt their sands. Marshes trap sediment and break down decaying plants into new soil, which may elevate them sufficiently in some areas to keep pace with sea-level rise.

Although most sea-level rise models that cover large areas show low-lying coastal land converting to open water in coming decades, many of these inundation models overpredict the land likely to submerge. The USGS model, developed in collaboration

with Columbia University, produces a more nuanced picture of sea-level rise as a mosaic of dry land, wetlands and open seas, rather than as a uniform response across the landscape.

The USGS model is the first to factor in natural forces and make detailed predictions from the 2020s through the 2080s over a large coastal area, some 38,000 square kilometers (about 9.4 million acres). It is an advance over most regional models, which project drowning as the only outcome as the oceans rise. These are often referred to as “bathtub models” and assume the coast is progressively submerged as sea levels rise.

The new model includes the potential for dynamic coastal change and shows where in response to future sea levels coastal lands fall on a continuum between dry land and open water.

“Geologists have always known that the coast has some potential for give and take,” said lead author Erika Lentz, a research geologist at the USGS Coastal and Marine Science Center in Woods Hole, MA. “But the standard bathtub models of sea level rise don’t reflect that. This approach couples what we do know about these systems with what we still need to learn—how different ecosystems may respond to different sea-level rise scenarios—to estimate the odds that an area will persist or change instead of simply drown. Our model results suggest that even natural changes may pose problems,” Lentz said. “For example, the likelihood that barrier islands will change could impact the infrastructure and economies of coastal communities, and the barrier islands or marshes may not protect coastal communities in the same way they do today.”

In fact, the outcome is uncertain for the Northeast U.S. Coast’s low-lying developed coastlines, where seawalls, buildings and other immovable structures thwart some natural processes. The model found the region’s developed coastal lands lying 1 meter (about 3 1/2 feet) or less above sea level will likely face a tipping point by the 2030s, when humans’ decisions about how and whether or not to protect each area will determine if it survives or drowns.



Waves crash along the undeveloped shores of the Cape Cod National Seashore, MA. Photo credit: Robby McQueeney

See Sea-Level Response page 22

BOEM Proposes Rule to Aid Coastal Restoration Projects

By Marjorie Weisskohl (BOEM) and Randy Bowman (DOI)

On March 21, the DOI BOEM proposed regulations providing additional clarity for an important but not widely known program that governs the use of nonenergy OCS resources such as sand, gravel and shell. Under the Outer Continental Shelf Lands Act, the DOI, through the BOEM, proposed a rule that codifies new and existing procedures for using OCS sand, gravel and shell resources for shore protection, beach restoration or coastal wetlands restoration projects undertaken by Federal, State and local governments. It also addresses the use of OCS resources for construction projects authorized or funded by the Federal government. The rule does not apply to competitive leasing of minerals, such as sand for private or commercial use or commodity minerals such as gold. Comments were due within 60 days after publication of the proposed regulations in the Federal Register on March 22. The regulations would replace BOEM guidelines that now govern the process.

The BOEM’s Marine Minerals Program manages sand and gravel activities, which are critical for the long-term success and cost-effectiveness of many beach nourishment and coastal habitat restoration projects along the Gulf of Mexico and Atlantic Coasts. To date, the BOEM has provided OCS sand resources for projects in New Jersey, Maryland, Virginia, North Carolina, South Carolina, Florida and Louisiana, conveying more than 112 million cubic yards of material that has restored more than 269 miles of coastline. This program has extensive partnerships with state geological surveys and environmental agencies,



Beach renourishment activities at Wallops Island, VA, part of the barrier islands that stretch along the eastern seaboard of the United States. Photo credit: Patrick Bloodgood, USACE

the USACE, National Aeronautics and Space Administration (NASA), Department of Defense, NOAA’s National Marine Fisheries Service and DOI Bureaus including the NPS, USFWS and USGS.

For more information on the proposed rule, see: <http://www.boem.gov/press03212016/>

Information about the BOEM’s Marine Minerals Program is available at: <http://www.boem.gov/Marine-Minerals-Program/>

Restoration of the Duval County Shoreline

On April 13, the BOEM, city of Jacksonville, FL, and U.S. Army Corps of Engineers signed an agreement under the existing guidelines authorizing Jacksonville and the Corps to dredge nearly 1.4 million cubic yards of sand from Federal waters to restore a 10-mile stretch of coast between the St. Johns River entrance and the Duval County/St. Johns County boundary along the Atlantic Ocean. Dredging will likely begin this summer.

For more information, visit: <http://www.boem.gov/press04132016/>

The Arctic Distributed Biological Observatory Network

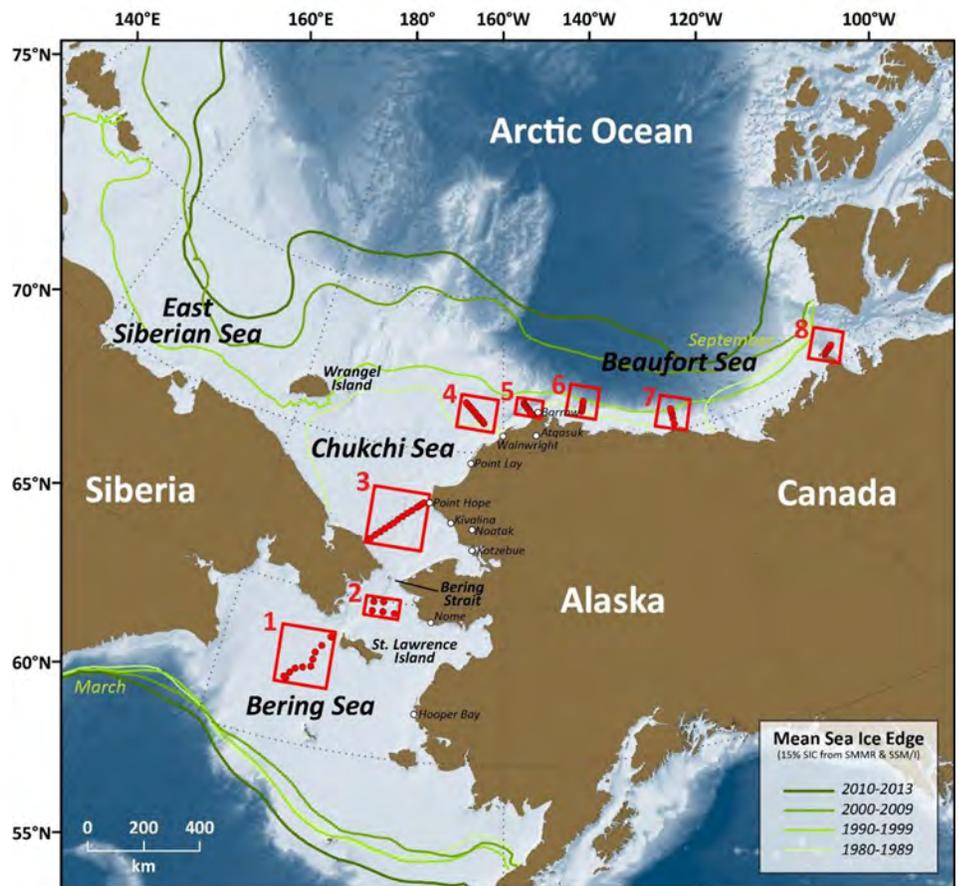
Linking Physics and Biology in the Changing Arctic

By Dee Williams (BOEM)

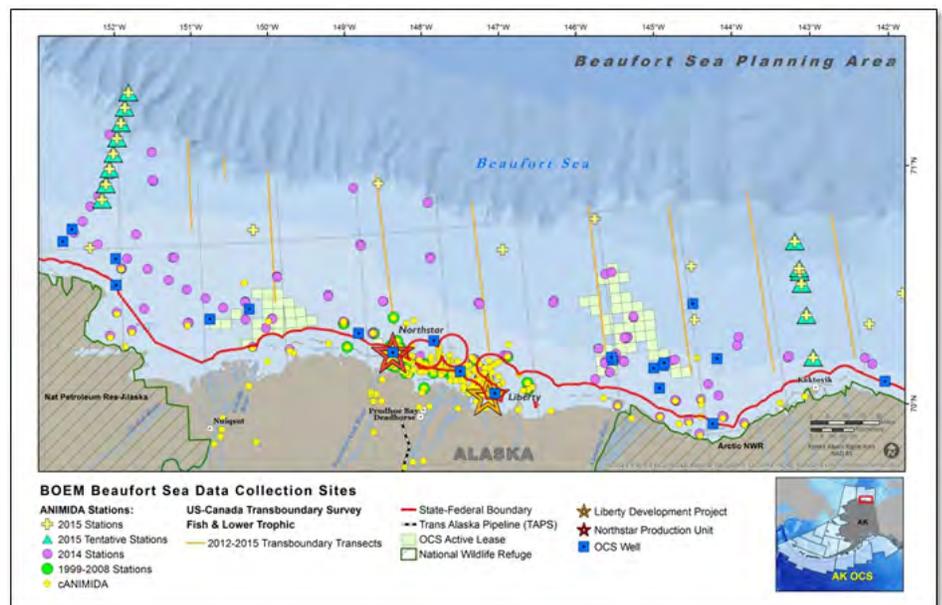
In May 2009, the dramatic seasonal retreats and thinning of sea ice, record-setting seawater temperatures and multiple observations of biological changes in the Pacific Arctic sector precipitated an international workshop to evaluate ecosystem response to climate forcing. A team of international scientists conceived the Distributed Biological Observatory (DBO) network to monitor and better understand the dramatic changes observed in the biological and physical dynamics of the Arctic marine ecosystem (especially in sea ice and benthic habitat). The DBO was originally envisioned as a network of arrays strategically positioned to detect change along latitudinal gradients extending from the northern Bering Sea to the Chukchi Sea Barrow Arc in locations known for high biodiversity, high biological productivity and high rates of change.

The PAG coordinated the pilot phase (2010–2014) of sampling the DBO network, which has helped leverage funding to support annual sampling of DBO lines through an international network of ship operations involving Chinese, Japanese, Korean, Russian and U.S. collaborator programs. In addition, the Interagency Arctic Research Policy Committee (IARPC) DBO collaboration team actively promotes analysis of collected data as a means to improve conservation, protection and management of Arctic coastal and ocean resources.

Many U.S. agencies, including the BOEM, have endorsed the DBO concept and have provided past and ongoing financial support. The



Locations of the Distributed Biological Observatories as of March 2016. Image credit: NOAA



Locations and types of BOEM sea data collection sites. Image credit: Carla Langley, BOEM

BOEM’s Environmental Studies Program has partnered with the NOAA on several ecosystem studies that sample DBO lines, including:

the Chukchi Acoustic, Oceanographic, and Zooplankton study, Arctic Whale Ecology study (ARCWEST), Hanna Shoal Ecosystem

study, COMIDA Chemistry and Benthos study, Aerial Surveys of Arctic Marine Mammals (ASAMM) and the Arctic Marine Biodiversity Observation Network (AMBON). The projects are outlined in the Alaska Annual Studies Plan for fiscal year 2016: <http://www.boem.gov/2016-Alaska-Studies-Plan/>

In addition to the strong BOEM-NOAA partnership, many other U.S. interagency and academic partners, as well as international research teams, support this coordinated ecosystem monitoring effort. Information and data are shared among partners: <http://dbo.eol.ucar.edu/> and <http://neptune.gsfc.nasa.gov/csb/index.php?section=270>

The DBO concept has gained such momentum that the program recently added three new detection arrays in the Beaufort Sea. Two arrays in the U.S. Beaufort Sea were strategically chosen, based in part on previous sampling through BOEM's long-term monitoring program, Arctic Nearshore Impact Monitoring in the Development Area (ANIMIDA).

BOEM's Environmental Studies Program has also recently fostered transboundary fishery and lower trophic data collection in the Canadian Beaufort.

Learn more: <http://www.arctic.noaa.gov/dbo/> and <http://www.iarpccollaborations.org/teams/Distributed-Biological-Observatory>

The PAG

The Pacific Arctic Group (PAG) is a consortium of institutes and individuals with a Pacific perspective on Arctic science that serves as a Pacific Arctic regional partnership to plan, coordinate and collaborate on science activities.

Read more: <http://pag.arcticportal.org>

News about Safety and Environmental Enforcement Technology

By Tiffany Gray (BSEE)

Advances in Arctic Tracking Technology

The BSEE is testing Geo-Referencing Identification Satellite (GRIDSAT) tag technology at the U.S. Navy's Ice Camp Sargo, a temporary station on top of a floating ice sheet in the Arctic as part of Ice Exercise (ICEX) 2016. The extreme conditions in the Arctic, especially the presence of sea ice, create unique challenges to the identification, tracking and response to an oil spill, should one occur. If a spill were to occur in the Arctic, GRIDSAT tags could be used to track oil trapped under or encapsulated in Arctic sea ice for up to nine months. Oil Spill Preparedness Engineers and Specialists from BSEE are part of a diverse and multinational team with more than 200 participants from more than 35 organizations coming together to support more than 25 test objectives at ICEX 2016.

Exercises for Oil Spill Preparedness

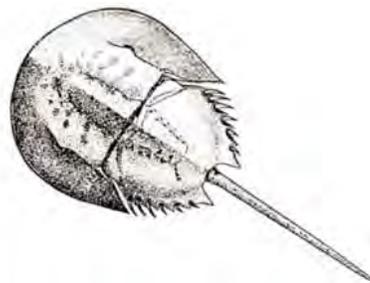
In addition to ongoing skimmer testing and evaluations of absorptive material at the Ohmsett facility, the BSEE recently helped oversee and execute a series of test in situ burns in the newly opened burn tank at the Joint Maritime Test Detachment in Mobile, AL, to evaluate burns and train teams to respond to open water oil spills. An in situ burn is the intentional, controlled burning of oil, a strategy that was used extensively during the response to the Deepwater Horizon tragedy. All these tests are aimed at improving the ability of the government and industries to respond quickly and effectively to an oil spill.



The BSEE is in the process of testing a GRIDSAT tag project at the U.S. Navy's Ice Camp Sargo, a temporary station on top of a floating ice sheet in the Arctic, as part of ICEX 2016. In the event of an oil spill in the Arctic, a GRIDSAT radio/global positioning system marking device can be left on an ice floe to track the movement of the floe and entrapped oil for up to nine months. Photo credit: Tyler Thompson, Mass Communication Specialist 2nd Class, U.S. Navy



The BSEE recently contributed to the renovation and refurbishment of the Joint Maritime Test Detachment in Mobile, AL. After sitting dormant for 17 years, the newly reopened facility provides a place where equipment manufacturers, regulators and researchers can perform in situ burns to test containment boom, ignition devices and methods and monitoring equipment. First responders will also train at the facility on how to safely conduct in situ burns. Photo credit: U.S. Coast Guard



Happy 113th Birthday, National Wildlife Refuge System!

President Theodore Roosevelt created the first Refuge on March 14, 1903, at Pelican Island, FL, to protect brown pelicans (*Pelecanus occidentalis*) and other birds from extinction through plume hunting. After 113 years, the Refuge System now includes more than 560 Refuges and 38 wetland management districts covering more than 150 million acres plus more than 418 million acres of marine national monuments.

This is Paul Kroegel, an immigrant who arrived in Sebastian, FL, in 1881 to begin a homestead on the west bank of the Indian River Lagoon. Kroegel didn't know it yet, but he would soon become the first person interested in protecting the birds on Pelican Island. Kroegel enjoyed looking out at the island and watching all of the birds but knew they would not last long if their slaughter was allowed to continue.

Without State or Federal laws to protect the birds, Kroegel decided to take matters into his own hands. He began



Paul Kroegel, warden of Pelican Island.

to sail out to Pelican Island with gun in hand to stand guard over the birds, protecting them from hunters.

Based on Kroegel's efforts, the American Ornithologist's Union and Florida Audubon Society led a successful campaign in 1901 to pass legislation in Florida to protect nongame birds.

The Florida Audubon Society then hired Kroegel and three others to be wardens of the Island to protect the birds from market hunters.

Read more about Pelican Island and Paul Kroegel: http://www.fws.gov/refuge/pelican_island/about/history.html

Sea-Level Response continued from page 19

“A 2012 USGS study identified the densely populated region from Cape Hatteras to Boston, MA, as a hot spot where seas are rising faster than the global average, so land managers urgently need to understand how their coastal landscape may change,” said John Haines, coordinator of the USGS Coastal and Marine Geology Program.

“The model allows us to identify vulnerable areas, and that information can be very valuable to land managers as they consider whether to protect, relocate or let go of certain

assets,” said Haines. “Even when the results are uncertain, it’s useful to know there’s a 50 percent chance that an important habitat or infrastructure project may be lost in a few decades.”

“By building in our understanding of the sea level rise response of the coastal landscape, we’re providing a more realistic picture of coastal change in the Northeastern U.S. over the next several decades,” Lentz said.

The researchers’ next step will be to group the basketball-court-sized parcels into larger areas, such as major coastal cities, Refuges and national

seashores, and assess the vulnerability of these areas to future change and drowning. This information may assist decision makers as they develop management priorities to address longer-term coastal challenges.

Read more: <https://www.usgs.gov/news/70-percent-northeast-us-coast-may-adapt-rising-seas>

Read about the National Assessment of Coastal Vulnerability to Sea Level Rise here: <http://woodshole.er.usgs.gov/project-pages/cvi/>

A Refuge Story

The Texas Refuge and Whooping Cranes

By Matthew Butler and Wade Harrell (USFWS)

The whooping crane (*Grus americana*) population has increased in recent years. All whooping cranes alive today, both wild and captive, are descendants of the last 15 cranes that wintered at the Aransas Refuge in 1941. The only wild crane flock that exists nests at Wood Buffalo National Park in northern Canada and migrates 2,500 miles to winter on the Texas coast at and near the Aransas Refuge.

"We have a growing population and excellent habitat conditions this year on the wintering grounds," said national whooping crane recovery coordinator, Wade Harrell.

The USFWS recently completed aerial surveys centered on the Aransas Refuge to estimate the whooping crane population for winter 2015–16.

Preliminary analyses indicate 329 whooping cranes (38 juveniles, 122 adult pairs) inhabited the primary survey area. Recruitment of juveniles into the winter flock was 13 chicks per

100 adults, which is comparable to long-term average recruitment.

A continued upward trend in whooping crane abundance during the last five years was observed, which is consistent with the long-term trend of about 4% growth per year. The 78-year trend in whooping crane abundance shows an increase with occasional, periodic declines happening every 10 years. "We hope this upward trend continues," said USFWS biometrician, Matthew Butler, "it is exciting to watch a species recover from the brink of extinction. Aransas NWR, as well as other protected coastal areas, provide important habitat that is a critical part of our recovery strategy."

Tell us your favorite Refuge:
#WildlifeRefuge #USFWS #conservation
#Refuges #FindYourPark

Read more about cranes: <http://www.fws.gov/refuge/Aransas/>

Learn how scientists track cranes:
<https://www.youtube.com/watch?v=oPjPmdVf36k>

Watch cranes on the Texas coast: <https://www.youtube.com/watch?v=hTWOOnLst0-4>



Whooping cranes touch down at the Aransas Refuge along the Gulf Coast of Texas. Photo credit: Diane Nunley, USFWS

Tribal LiDAR Training for Hurricane Sandy Impacted Tribes

USGS Shares Coastal Mapping Expertise

By Glenn Holcomb and Monique Fordham (USGS)

USGS research uses the latest available technologies and software to collect data and information about our Nation's natural resources and environment. Not only does the USGS provide scientific results and interpretations of these data to the public, it also has a responsibility to share the knowledge and methods used in collecting, processing and interpreting this information. This duty extends to Federally recognized Indian Tribes, to whom the USGS and other Federal bureaus and agencies have a trust responsibility.

On March 9–10, 2016, the USGS held a tribal training workshop at the USGS Woods Hole Coastal and Marine Science Center in Massachusetts. The training was designed and coordinated by USGS Northeast Region Tribal Liaison, Glenn Holcomb, to assist Tribes, particularly those impacted by Hurricane Sandy, in the use of light and detection ranging (LiDAR) data. Through support provided by the USGS Office of Tribal Relations, LiDAR experts John Young, Jeff Danielson and Dean Gesch presented the material.

In August 2013, as a part of the overall Hurricane Sandy response, a multidisciplinary team from the USGS visited four Native American Tribes to assess impacts from Hurricane Sandy and gather information about research needs related to hazards and future storms and climate change. The team met with the Wampanoag Tribe of Gay Head (Aquinnah) (Martha's Vineyard, MA), the Mashpee Wampanoag Tribe (Mashpee, MA), the Narragansett Indian Tribe (Charlestown, RI), and the Shinnecock Indian Nation (Southampton, NY). Each site visit included assessment and discussion of USGS capabilities, USGS efforts related to Hurricane Sandy recovery and

mitigation and general natural resource science needs of the Tribes.

Based on the Tribes research needs, up-to-date LiDAR data were identified as an invaluable tool for assessing forest damage, and assessing baseline conditions to understand vulnerability to storm surge, flooding and potential coastal change from future large storm events. A substantial number of LiDAR datasets were collected during flights that covered several areas throughout the impacted states during 2013 and 2014, which included tribal lands. The USGS Office of Tribal Relations, led by USGS National Tribal Liaison, Monique Fordham, wanted to ensure that each of the impacted Tribes were not only provided their LiDAR datasets but also received the training on how to use them in managing their respective tribal natural resources. The Office of Tribal Relations provided funding to pull together a team of USGS LiDAR experts to develop the training curriculum, process the LiDAR data and provide it to the Tribes during the training.

The training was crafted specifically to give an in-depth look at what LiDAR is, how it is collected, point clouds, LiDAR sensor priorities, common data products and LiDAR applications. Exercises helped tribal participants identify where to find and download LiDAR data; how to use LiDAR data viewers and processes for importing, viewing and manipulating LiDAR data in ArcGIS, and demonstrated how to use software for elevation analysis. The instructors demonstrated topobathy (combined topography and bathymetry) LiDAR models; research on classifying wetland extent, looking beyond bare earth at vegetation, and change detection were also provided. Each of the four Tribes directly impacted by Hurricane Sandy were given their individual LiDAR datasets to work from during the class. The USGS staff provided hands-on assistance to the training participants.

For additional information about this training, contact Glenn Holcomb (gholcomb@usgs.gov).



Participants at the March 2016 USGS Tribal LiDAR Training at the USGS in Woods Hole, MA. Photo credit: Glenn Holcomb

What is LiDAR?

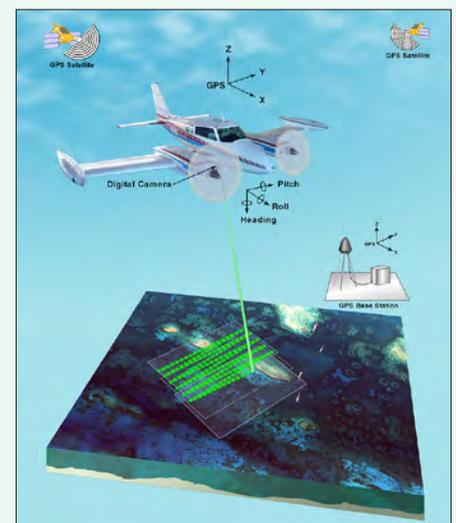
LiDAR is an active remote-sensing technique that is similar to radar but uses laser light pulses instead. LiDAR mapping is an accepted method to generate precise and directly georeferenced spatial information about the characteristics of the Earth. Recent technological advancements in LiDAR mapping systems allow scientists and mapping professionals to examine natural and built environments across a wide range of scales with greater accuracy, precision and flexibility. LiDAR has become an established method for collecting very dense and accurate elevation data across landscapes, shallow-water areas and project sites. LiDAR is typically “flown” or collected from planes where it can rapidly collect points over large areas. LiDAR is also collected from ground-based stationary and mobile platforms. These collection techniques are popular within the surveying and engineering communities because they are capable of producing extremely high accuracies and point densities, thus permitting the development of precise, realistic, three-dimensional representations of railroads, roadways, bridges, buildings, breakwaters and other shoreline structures.

LiDAR elevation data have several advantages over other types of data

because they are high resolution and can detect land surface in forested areas.

Some uses for LiDAR data include:

- Hydrology (flood forecasting, watersheds, coastal change, sea-level rise)
- Topographic analysis (elevation, slope aspect, landform)
- Forestry (canopy heights and density, structure, useful for timber harvesting)
- Geology (fault lines, outcrops, sinkholes)
- Archaeology (site mapping, discovery)
- Solar potential mapping



Airborne LiDAR is collected from a plane using a scanning pattern of light pulses. Image credit: Betsy Boynton, USGS

USCRTF Watershed Indicators—Evaluating Success of Watershed Partnerships

By Cheryl Fossani (DOI)

In 2009, the U.S. Coral Reef Task Force (USCRTF) developed a Watershed Partnership Initiative (WPI) to focus the capabilities and capacities of the USCRTF agencies and the U.S. coral reef jurisdictions to reduce land-based sources of pollution (LBSP) entering into coastal coral reef areas. The USCRTF is currently implementing this partnership approach to watershed management in three watersheds: Guánica Bay/Rio Loco in southwest Puerto Rico (established 2009), Ka'anapali in west Maui, Hawai'i (established 2010) and Faga'alu in American Samoa (established 2012).

This initiative is intended to enhance coordination, partnerships and contributions of agency resources and expertise to implement geographically specific and integrated activities to reduce LBSP entering into coral reef ecosystems. The WPI also aims to promote consistent and strengthened approaches and enforcement of laws and authorities intended to address LBSP on near-shore coral reefs.

In 2013, a subcommittee of the USCRTF Watershed Working Group began to develop an approach to help watershed managers assess success within the three USCRTF WPI sites with recommended metrics and indicators. To date, the subcommittee has developed two products, which were adopted during the 35th Meeting of the USCRTF in February 2016.

The first is a *Programmatic Checklist* designed for watershed coordinators to assess the status of the institutional and stakeholder support for watershed partnership sites. It also provides guidance to help determine whether or



Overlooking the Faga'alu watershed in American Samoa. Photo credit: Alex Messina

not agency resources and support are adequate for the successful implementation of a "ridge-to-reef" watershed management plan.

The second document is designed to assist coastal managers, coral reef managers and watershed coordinators faced with modest budgets and limited technical expertise determine the efficacy and evaluate the success of management efforts to reduce LBSP. The *Priority Ecosystem Indicators* includes a suite of ecological measurements and indicators that are key to successful watershed-specific monitoring plans.

Although these products were drafted for use by the USCRTF WPI, they are intended to be applicable to any watershed to improve ecosystem health by reducing threats that affect downstream coral reefs.

For more information and a copy of these management tools, please visit: <http://www.coralreef.gov/meeting35/welcome.html>



Illustration credit: Cole Goco

Highlighting Science and Monitoring to Inform Management in the Faga'alu Watershed

Land-based sources of pollution are considered a substantial threat to coral reef ecosystems; however, there has been limited research that connects watershed management actions to downstream impacts in coral reef areas.

In the Faga'alu watershed, American Samoa members of the USCRTF have been working with academia and local partners to gather baseline information, develop survey methods and identify key findings to improve the management of the watershed and protect the coral reefs in Faga'alu Bay. A recent NOAA report describes a ridge-to-reef baseline assessment of the Faga'alu watershed. It also outlines recommendations to continue monitoring the watershed to evaluate the effectiveness of management actions taken to reduce land-based sources of pollution to the coral reefs in Faga'alu Bay. The data collected during the baseline assessment and recommended monitoring efforts align with the information presented in the Priority Ecosystem Indicators document recently adopted by the USCRTF.

Additionally, in the Faga'alu watershed, the USGS collected visual data of the reefs to develop a digital data series. This data series can be used to help support science and inform the management of the Faga'alu watershed.

For more information on the baseline assessment, please visit: <http://www.coris.noaa.gov/activities/fagaaluWatershed/>

Access the digital data series: <https://www.sciencebase.gov/catalog/item/5684747ce4b0a04ef49335c6> and <https://www.sciencebase.gov/catalog/item/56422b6fe4b0831b7d62e7da>

Corals in the Capital! News from the U.S. Coral Reef Task Force

By Cheryl Fossani (DOI)

Amidst an icy February, the USCRTF held its 35th bi-annual meeting in Washington, D.C. This meeting brought together experts in science and in policy to discuss diverse issues threatening coral reef health. The USCRTF co-chairs, Lori Faeth, DOI's Deputy Assistant Secretary for Policy and International Affairs, and Eileen Sobeck, Assistant Administrator for NOAA National Marine Fisheries Service, provided remarks along with Governor Moliga, the Governor from American Samoa and the newest member of the USCRTF family, and Governor Torres, the Governor from the Commonwealth of the Northern Mariana Islands (CNMI).

This three-day meeting was jam packed with numerous working group meetings, presentations and public events. During the public business meeting, several of the USCRTF's interagency working groups provided updates on ongoing projects. The Injury, Response and Mitigation working group provided an update on the much anticipated *Handbook on Coral Reef Impacts: Avoidance, Minimization, Compensatory Mitigation, and Restoration*. Although not regulatory in nature, the handbook will provide guidance for State, jurisdiction, and regional coastal managers handling a coral reef injury event and/or events needing coral reef mitigation. The handbook includes commonly used mitigation and restoration options and practices with case studies and lessons learned. This handbook is currently in review and is scheduled for release during the fall of 2016.

The Watershed Partnership Initiative working group presented two recently developed watershed management tools to the members of the USCRTF. The *Programmatic Checklist* and the



A time series set of images documenting coral bleaching occurring in the coral reefs of American Samoa. Photo credits: Caitlyn Seaview and the NOAA Coral Reef Watch Program

Priority Ecosystem Indicators are tools for watershed coordinators to assess the success of management techniques implemented to reduce land-based sources of pollution impacting coral reef ecosystems downstream. See *related story, page 25*.

These tools adopted by the USCRTF and are available at: <http://www.coral-reef.gov/meeting35/welcome.html>

Throughout all the discussions and presentations that occurred during the week of the USCRTF meeting, one theme that carried through was the importance of climate change and the future of coral reefs. Dr. Mark Eakin (NOAA) gave a presentation to the USCRTF about the global scale bleaching event that happened during 2015 and is forecasted to continue during 2016. He explained that although bleaching isn't necessarily a death sentence for coral reefs, bleaching events that occur consecutively don't give corals a chance to recover.

After Mark's presentation, Richard Driscoll, from the DOS talked more broadly about the outcomes of the 2015 United Nations Climate Change Conference—referred to as COP 21—conversations and the worldwide efforts to address and adapt to climate change. Although both of these presentations highlighted the dire reality of the connection between climate change and the challenges of sustaining healthy coral reef ecosystems, their optimistic message of “all hope is not lost” was strong. These conversations help elevate awareness and encourage local action while the global community works to address reducing carbon emissions.

The USCRTF is currently planning its next bi-annual meeting to be held in September 2016 in Guam and the Commonwealth of the Northern Mariana Islands that will focus on key issues coral reefs face in the Pacific Island region.

Honoring Eloy Inos

The USCRTF honored the passing of the Honorable Governor Eloy Inos of the CNMI recognizing his leadership in conservation and management of our Nation's coral reef ecosystems. Governor Inos was a strong advocate of effective coral reef management in the islands. As a fisherman, he brought first-hand commitment and understanding of how healthy ecosystems sustain islands and their people. He placed a priority on coral reefs in CNMI, particularly in the face of climate change. Governor Inos was a champion for more coordinated and joint Federal-local government efforts and for doing what was best for the coral reef resources of CNMI. He was a significant supporter and partner to the All Islands Committee. His leadership and voice in coral reef conservation for the islands are two of his many legacies.

Read more about this meeting: <http://www.coralreef.gov/meeting35/>



Honoring Governor Eloy Inos of the CNMI during the 35th bi-annual meeting of the USCRTF. Image credit: CNMI



Richard Driscoll with the U.S. Department of State addresses the USCRTF members with information about the COP21 discussions and implications for coral health during the February meeting in Washington, D.C. Photo credit: Erica Wales, DOI



Image credit: DOI

Regional Contacts

DOI leadership supports state-led regional ocean partnerships (ROPs), as well as Federal-state-tribal marine planning partnerships called regional planning bodies (RPBs). Five geographic regions now have operational RPBs: Northeast, Mid-Atlantic, Caribbean, the Pacific Islands and the West Coast.

Alaska/Arctic

Jim Kendall (BOEM)
(Alaska)

Caribbean

Sherri Fields (NPS)
(Puerto Rico, U.S. Virgin Islands)
ROP: <http://caribbean-mp.org/en/>

Great Lakes

Phyllis Ellin (NPS)
Norman Grannemann (USGS)
Charlie Wooley (USFWS)
(Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin)
Great Lakes Research Initiative:
<http://www.epa.gov/glnpo/glri/>
ROP: <http://www.cglg.org/>

Gulf of Maine

Susan Russell-Robinson (USGS)
(Maine, New Hampshire, Massachusetts, New Brunswick, Nova Scotia)
ROP: <http://www.gulfofmaine.org/2/>

Gulf of Mexico

Linda Walker (USFWS)
(Alabama, Florida, Louisiana, Mississippi,

Texas)
ROP: <http://www.gulfofmexicoalliance.org>

Mid-Atlantic

Bob LaBelle (BOEM)
Leann Bullin (BOEM)
(New York, New Jersey, Delaware, Pennsylvania, Maryland, Virginia)
RPB: <http://www.boem.gov/Mid-Atlantic-Regional-Planning-Body/>
ROP: <http://midatlanticocean.org>

Northeast

Bob LaBelle (BOEM)
Leann Bullin (BOEM)
(Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut)
RPB: <http://neooceanplanning.org/>
ROP: <http://northeastoceanCouncil.org/>

Pacific Islands

Matt Brown (USFWS)
(American Samoa, Commonwealth of the Northern Mariana Islands, Guam, Hawaii)
RPB: <http://www.PacificIslandsRPB.org>

South Atlantic

Eric Strom (USGS)
(North Carolina, South Carolina, Georgia, Florida)
ROP: <http://www.southatlanticalliance.org>

West Coast

Joan Barminski (BOEM)
(California, Washington, Oregon)
RPB: <http://www.westcoastmarineplanning.org>
ROP: <http://www.westcoastoceans.org>

Hang Ten! at Your Favorite National Park

By Cheryl Fossani (DOI) and Ann Tihansky (USGS), National Park Foundation

Pursuits: Surfing Your National Parks

<http://www.nationalparks.org/explore-parks/travel-ideas/pursuits-surfing-your-national-parks>

The Surfing Bison



Visit the above Web site for an overview of surfing spots created by the National Park Foundation or go directly to the website of the park of your choice.

Ocean and coastal parks attract more than 88 million visits each year with a wide range of possibilities for recreation like hiking, camping, fishing, swimming and SURFING!

All of these spots are epic public lands. So grab your board and check it out. Surf's Up!

Assateague Island National Seashore, MD and VA: <https://www.nps.gov/asis/index.htm>

Just south of Ocean City, MD, the pristine beaches at Assateague Island National Seashore is a great place to catch some waves along the mid-Atlantic coast.

Canaveral National Seashore, FL: <https://www.nps.gov/cana/index.htm>

Canaveral National Seashore, along the Atlantic coast of central Florida, is famous for its surf. The protected beaches at Canaveral offer warm water and great waves.

Cape Cod National Seashore, MA: <https://www.nps.gov/caco/index.htm>

Cape Cod National Seashore consists of 40 miles of shoreline that, with relatively shallow surf, makes it great for beginner dudes and dudettes.

Channel Islands National Seashore, CA: <https://www.nps.gov/chis/index.htm>

Depending on the swell direction, surfing can be great at several locations on Santa Cruz, Santa Rosa and San Miguel Islands in the remote Channel Islands National Seashore. These surf spots are best accessed by boat and recommended for the hard-core surf set.

Gulf Islands National Seashore, FL: <https://www.nps.gov/guis/index.htm>

The northern Gulf of Mexico is known for white sandy beaches, aquamarine waters, an old fort and a place to fish—and when the tide, waves and sandbar conditions are just right...there is a great surf spot at the Gulf Islands National Seashore near Fort Pickens known as Pickens point, which is possibly the birthplace of surfing on Florida's west coast.

Padre Island National Seashore, TX: <https://www.nps.gov/pais/index.htm>

The Gulf of Mexico's warm waters welcome surfers of all levels to south Texas. Predominant southeast winds create consistently good surf, making the Padre Island National Seashore a great spot for beginners to learn how to catch a wave.

Point Reyes National Seashore, CA: <https://www.nps.gov/pore/index.htm>

Point Reyes National Seashore, just north of San Francisco, CA, has 80-miles of protected shoreline. Although this National Seashore beckons ocean lovers, the surf can be big and gnarly. It is a favorite destination for very advanced surfers.



Hannah Waltman surfs at Gulf Islands National Seashore, FL. Photo credit: John Russell



A surfer catches some air at Cape Cod National Seashore, MA. Photo credit: EandJFilmCrew



Crazy surf antics at Canaveral National Seashore, FL. Photo credit: Eli Kallison (@elirushk)