



NEWSWAVE

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

IN THIS EDITION:

Adapting to Climate Change	1
National Ocean Policy	1
Cultural Resource Risks.....	3
Bay-Delta Science Conference..	4
UPDATE: Deepwater Horizon....	5
Visualizing Wetland Change.....	5
Marine Monument Expansion..	6
WOW! Record Salmon	9
Quick Guide Climate Change....	9
Threatened Red Knot	9
Whale Sculptures.....	11
MARES Artic Study-	12
Conserving Coastal Wetlands	13
Pacific Islands Climate Change	14
Chukchi Sea Research	14
World Parks Congress	15
Waterbird Society Session	15
Aloha from Maui!	16
Carbon Sequestration Report	17
#StrongAfterSandy	17
Tribal GIS Training	18
Tracking Nitrate to the Gulf....	18
Coral Reef Initiatives	19
Coastal Defense Tool	19
Methane Seepage Discovery ..	20
Science for Society	21
Swan Days at Mattamuskeet ..	21
Adaptive Coastal Park.....	22
That's Wrack	23
Gulf of Mexico Shipwrecks.....	23
Renewable Energy.....	24
Envisioning Sea-Level Rise	25
Regional News	26
Eating Invasive Species.....	27
The Surfing Bison	28

Adapting to Climate Change

Interior's 2014 Plan

By Rose Beattie and Jonathan Steele, DOI

Climate change is already impacting the lands, wildlife and waters managed by Interior and more widespread future impacts are predicted - including sea-level rise, more frequent coastal flooding, significant wildlife habitat changes, increased risk of wild land fire and alterations to fresh water availability.

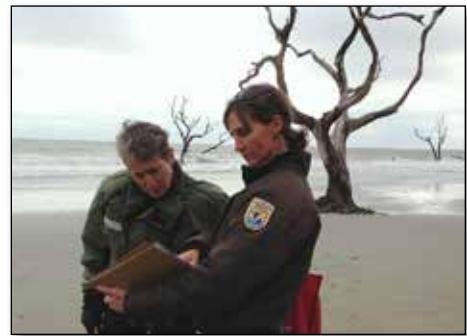
According to the Third National Climate Assessment released in June 2014, coastal ecosystems are particularly vulnerable to climate change because many have already been dramatically altered by human stresses. Climate change will result in further reduction or loss of the services that these ecosystems provide, including potentially irrevers-

See Adapting page 7



A yellow-finned triggerfish cruises the coral reef at Palmyra Atoll National Wildlife Refuge, part of the newly expanded Pacific Remote Islands Marine National Monument. Photo credit USFWS. *See related story page 6.*

Fall 2014/Winter 2015



Secretary Sally Jewell discusses the impacts of rising seas at the Cape Romain National Wildlife Refuge in South Carolina with Refuge Manager Sarah Dawsey. Photo credit: USFWS.

See stories in this issue for examples of how Interior is addressing and adapting to sea-level rise and climate change across the Nation.

Interior's Recent Ocean Policy Accomplishments

By Randy Bowman

Released in 2013, the National Ocean Policy Implementation Plan translates the National Ocean Policy into a roadmap of on-the-ground actions for coordinated, science-based actions to better manage and understand uses of and resources provided by the ocean, our coasts, and the Great Lakes.

Federal agencies, including the Department of the Interior, have made great progress on the actions identified under the Plan. Many of the actions are aimed at providing easy access to information and facilitating collaboration among Federal agencies in support of state, tribal, and local partners' needs.

See Accomplishments page 10

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

Visit us online:

www.doi.gov/pmb/ocean/index.cfm

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Keep up with Interior's Ocean, Coasts and Great Lakes News

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Terry Holman, Interior's Ocean, Coastal and Great Lakes Coordinator, retired on January 2, 2015. We wish her the best of luck! Watch for an article in our next issue about future plans for Interior's coordinated ocean, coastal and Great Lakes activities.

Marine Protected Areas:

President Obama has protected vital marine habitat by expanding the existing MPA known as the Pacific Remote Islands Marine National Monument. The MPA Center serves as a resource to all federal, state, territorial and tribal programs responsible for the health of the oceans. MPAs support the national economy by helping to sustain fisheries and maintain healthy marine ecosystems for tourism and recreation businesses; and promotes public participation in decision-making by improving access to scientific and public policy information.

<http://marineprotectedareas.noaa.gov/>
 See related stories on pages 6 and 15.



A pod of Melonhead whales within the newly expanded Pacific Remote Islands Marine National Monument.
 Photo credit: Kydd Pollock.



USGS scientist Patrick Barnard leads a field trip for Secretary Jewell, Acting USGS Director Suzette Kimball, and San Francisco Mayor Ed Lee along the most rapidly eroding stretch of California's coast. Photo credit: Tami Heilmann, DOI.

"The President's action protects one of the most spectacular and vulnerable areas on earth," said Secretary Jewell. "As our world's oceans come under increasing pressure from climate change, ocean acidification and resource extraction, expanding the Pacific Remote Islands Marine National Monument will further protect these National Wildlife Refuges and their surrounding ecosystems for the benefit of future generations. Today marks another step toward supporting the beauty and balance of our diverse country – from the mountain peaks to the ocean depths – that strengthen our economy and define us as a nation."

Secretary Sally Jewell

Commenting on the expansion of the Pacific Remote Islands Marine National Monument



A fautasi is an American Samoan long boat, designed to be rowed by a large number of paddlers (40-50) whose primary objective is to pull completely in unison to advance in speed. An important mode of island transportation in American Samoa in the early days, they are now used purely as racing boats. Photo credit: National Park of American Samoa. See related story page 19.



Secretary Sally Jewell inspects artifacts from the Jamestowne colony site in Virginia where rapid sea-level rise threatens cultural landmarks. Photo credit: DOI. **Watch a video about Jamestowne history and climate change:** <http://www.nps.gov/av/nri/avElement/nri-21014FINAL.mp4>

Cultural Resource Risks

On Thursday, June 5, Secretary Jewell toured Jamestown Island, Virginia and hosted a roundtable discussion on the impacts of climate change on cultural resources at Virginia's Historic Jamestowne, part of Colonial National Historical Park.

On the tour, Jewell examined areas previously affected by flooding that are expected to experience increased flooding from sea-level rise as a result of climate change. In a May 2014 report on National Landmarks at Risk, the Union of Concerned Scientists included Jamestown among 30 case studies of iconic historic and cultural sites at risk from climate change.

Jewell met with NPS land managers and cultural and natural resource specialists, scientists from the USGS and the nonprofit sector, local officials and other stakeholders to discuss how to make the island and its archeological treasures more resilient to climate change.

<http://www.doi.gov/news/mediaadvisories/secretary-jewell-to-see-climate-change-impacts-in-historic-jamestowne-rising-seas-threaten-cultural-and-natural-resources.cfm>

Dealing with Climate Change: A Moral Obligation

by Sally Jewell, U.S. Secretary of the Interior

President Obama understands that we have a moral obligation to future generations to leave our land, water and wildlife better than we found it.

In June, the Administration unveiled another historic milestone in the President's bold Climate Action Plan. At the President's direction, the U.S. Environmental Protection Agency's Clean Power Plan proposal calls for cuts in carbon pollution from existing power plants, the single largest source of carbon pollution in the United States.

By 2030, the plan will reduce carbon emissions from the power sector by 30 percent nationwide from 2005 levels and cut particle pollution, nitrogen oxides, and sulfur dioxide by more than 25 percent as a co-benefit.

Beyond benefiting public health and the economy, these reductions will greatly benefit the parks, refuges, other public lands and cultural resources entrusted to the Department of the Interior on behalf of all Americans. From the Gates of the Arctic to the Gulf of Mexico and from Gettysburg to Guam, we see the effects of climate change.

The Department of the Interior is meeting the President's call to action on climate—from standing up homegrown renewable energy and transmission infrastructure, to reducing methane emissions while supporting safe and responsible energy development, to making lands and waters more resilient in the face of climate change.

Interior has developed a nationwide network of Climate Science Centers and Landscape Conservation Cooperatives through which scientists and land managers work together to translate science into hands-on solutions that partners from all levels of government and the private sector can use to make sure our resources are resilient.

Science and collaboration guide programs like coastal resilience grants that help shoreline communities prepare for climate change impacts, such as sea level rise and severe storms, and drought-stricken communities conserve water and reduce the risk of devastating wildfires.

Interior is on track to permit 20,000 megawatts of renewable energy on public lands by 2020—enough energy to power 6 million homes—working alongside states, tribes and industry to build a clean energy future.

Dealing with climate change is not only a central challenge of the 21st century, but it is also a moral obligation and a necessity to advance our nation's economy, environment and public health. The Interior Department is committed to being a strong partner in these efforts to cut carbon pollution, balance thoughtful development with conservation, and create sustainable American jobs.

<http://www.doi.gov/news/blog/dealing-with-climate-change-a-moral-obligation.cfm>

Eighth Biennial Bay-Delta Science Conference

By Mark Sogge and Michelle Shouse, USGS

For decades, USGS science has helped manage and conserve water and natural resources in the San Francisco Bay and Sacramento-San Joaquin Delta (Bay-Delta). In late October, USGS co-hosted the 8th Biennial Bay-Delta Science Conference along with California's Delta Stewardship Council, held in Sacramento, CA.

The conference is a major forum for presenting new information and syntheses to the broad community of scientists, engineers, resource managers, and stakeholders working on Bay-Delta issues.

This year's theme was "Making Connections," recognizing that management of the Bay-Delta ecosystem is at a critical crossroads with political and regulatory mandates seeking new ways to manage water exports while restoring landscape-level ecosystem attributes and functions.

The Delta is in the heart of California, where the Sacramento and San Joaquin rivers converge into a labyrinth of waterways and islands. This is the focal point of a complex and sometimes contentious Federal and State water management system that provides water to two-thirds of California residents (25 million people), irrigates vast amounts of farmland, and supports an array of key habitats. Science supports the tough decisions that water managers need to make in order to balance water demands. These activities require that scientists make connections among external drivers, management actions, and ecosystem responses. Perhaps



Mike Connor, Deputy Secretary of the Interior, delivered a plenary talk on the first day of the Conference addressing the theme of "Making Connections." Photo credit: Cathy Munday, USGS.

The simple truth is that the only way that we are going to be able to ensure a continued reliable water supply for the State and also make progress in restoring the health of the Bay-Delta is if policymaking and scientific research advance aggressively and hand in hand with each other.

--Mike Connor,
Deputy Secretary of the Interior

more critical, scientific and management communities must make connections to ensure a two-way flow of needs, resources, ideas, and understanding.

Deputy Secretary of the Interior, Mike Connor, delivered a plenary talk on the first morning of the conference. Connor was joined by Jennifer Gimbel, Principal Deputy Assistant Secretary for Water and Science, and Estevan Lopez, the President's nominee to serve as the Commissioner of the Bureau of Reclamation.

USGS Pacific Regional Director Mark Sogge said, "USGS is making key science contributions that help tackle difficult challenges. The complexity of issues and on-going

research in the Bay-Delta really allow the USGS breadth of expertise to shine; we bring unique capabilities and expertise to provide the landscape science picture needed by managers and politicians."

Over 1,100 scientist and resource managers attended the conference showcasing scientific advances in the region and their implications for management.

Dr. Anke Mueller-Solger (USGS California Water Science Center) was this year's recipient of the Brown-Nichols Science Award. She was recognized for significant research and active involvement in facilitating the use of science to manage the San Francisco Estuary and watershed. She was presented with this year's award by past recipients Wim Kimmerer and Jim Cloern.



Anke Mueller-Solger of the USGS California Water Science Center was presented with this year's Brown-Nichols Science Award at the Bay Delta Conference. Photo credit: Michelle Shouse, USGS.

The 8th Biennial Bay-Delta Science Conference Program is available on-line:

<http://scienceconf2014.delta-council.ca.gov/>



UPDATE – Post-Deepwater Horizon Oil Spill Gulf of Mexico Restoration

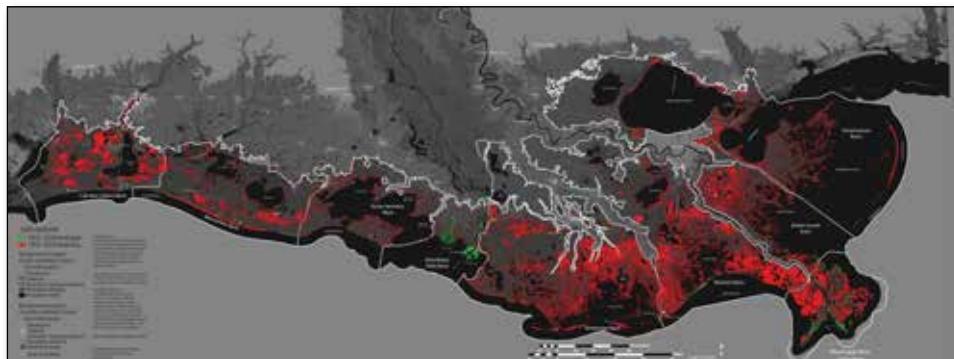
By Nanciann Regalado, USFWS

The 2010 Deepwater Horizon oil spill, as disastrous as it was, initiated a new and aggressive set of processes focused on both repairing the damage done by the spill, and making the Gulf's health better than it was on the day of the spill. Since our spring 2014 update, state and federal partners have taken additional and significant steps to restore the Gulf of Mexico; the Department of the Interior maintains a major role in all of these efforts.

Deepwater Horizon Natural Resource Damage Assessment

By spring 2014, the Deepwater Horizon NRDA Trustees were well on their way to identifying and implementing \$1 billion worth of “early restoration” projects. Ten projects with a combined estimated cost of \$72 million had been approved via phase I and phase II restoration plans. Another 44 projects (combined cost of \$627 million) had been included in a Draft Phase Programmatic and Phase III Early Restoration Plan and Early Restoration Programmatic Environmental Impact Statement.

Stakeholder and public interest in early restoration is high. Trustees received thousands of comments during the 45-day public comment period. In October 2014, the trustees were pleased to announce that all the public comments were considered, and the complex and comprehensive document was finalized. Immediately thereafter, the Trustees began to aggressively



Visualizing Coastal Wetland Changes in Louisiana

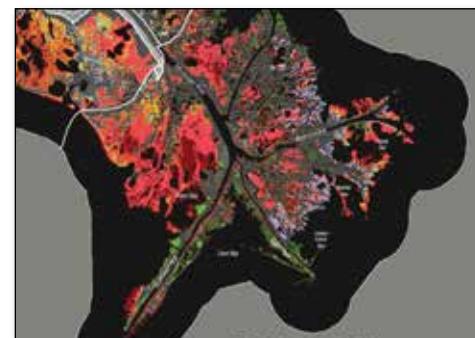
By Gabrielle Bodin, USGS

Coastal Louisiana wetlands make up the seventh largest delta on Earth, contain about 37 percent of the estuarine herbaceous marshes in the conterminous United States, and support the largest commercial fishery in the lower 48 States. These wetlands are in peril because Louisiana currently accounts for nearly 90 percent of the total coastal wetland loss in the continental United States. Documenting and understanding the occurrence and rates of wetland loss are necessary for effective planning, protection, and restoration activities.

USGS land change analyses show coastal Louisiana has experienced a net change in land area of about -1,883 square miles from 1932 to 2010, a decrease of about 25 percent of the land area since 1932. Trend analyses from 1985 to 2010 show a wetland loss rate of 16.6 square miles per year. If this loss were to occur at a constant rate, it would equate to Louisiana losing an area the size of one football field per hour. <http://pubs.usgs.gov/sim/3164/>

Access satellite images, aerial photographs and more: <http://www.nwrc.usgs.gov/topics/land-loss.htm>

Images from coastal Louisiana:
Above-Cumulative land loss (shown in red) and gain (shown in green) for the entire Louisiana coast from 1932 - 2010.



Central Louisiana's Bird's Foot Delta shows cumulative land loss in red with other colors corresponding to time intervals when the losses occurred. Gains are shown in green and brown.



Green and brown areas show land gains in the Wax Lake Outlet and Atchafalaya River Delta areas that receive direct sediment from the Atchafalaya and Mississippi Rivers. Image credits: USGS.

Videos of changes over time: Land Area Change in Coastal Louisiana (1932 to 2010)

<http://gallery.usgs.gov/videos/433#.VBCG2WMXPm4>

Louisiana Coastal Land Loss Computer Simulation 1932 through 2050 <http://www.youtube.com/watch?v=zQhrgqaQiwQ>

Expansion of Pacific Remote Islands Marine National Monument

By Cheryl Fossani, DOI

On September 25, President Obama signed a proclamation significantly expanding the Pacific Remote Islands Marine National Monument (PRIMNM), thereby creating the largest “no-take” marine protected area in the world.

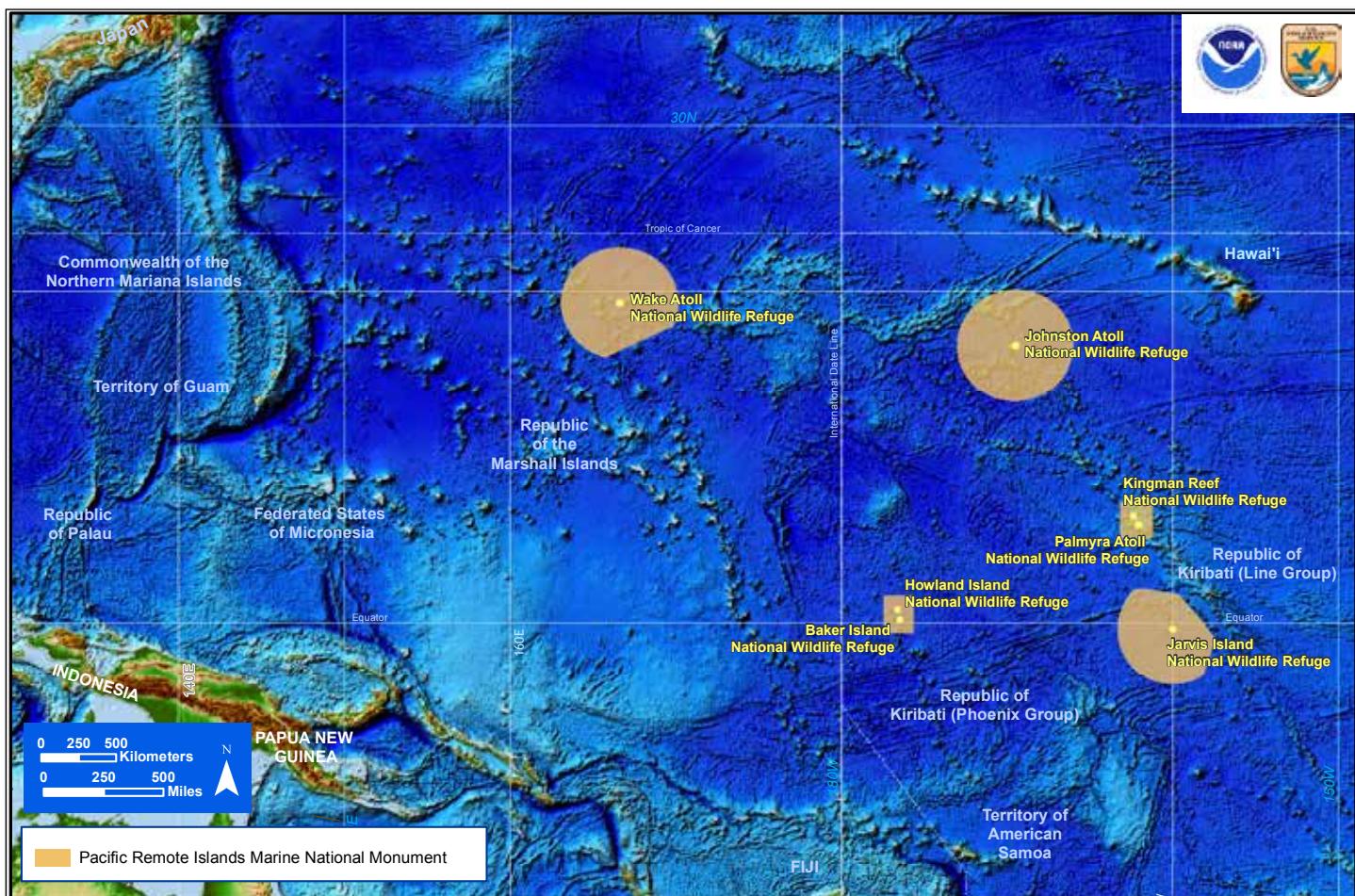
Through this proclamation, the PRIMNM, one of the most intact, ecologically sound marine environments in the world, was expanded to six times its original size, making it approximately three times the size of California. Expansion of the monument will more fully protect this pristine tropical environment, home to deep coral reefs, seamounts, and other marine ecosystems unique to the remote Pacific. This area is also among the most vulnerable to the impacts of

climate change and ocean acidification. The monument, comprised of Wake, Baker, Howland, and Jarvis Islands, Johnston and Palmyra Atolls, and Kingman Reef, includes the lands, waters, and submerged and emergent lands of these seven Pacific Remote Islands. Many endemic species, including corals, fish, shellfish, marine mammals, seabirds, water birds, land birds, insects, and vegetation are sustained there. The islands of Jarvis, Howland, and Baker were also the location of notable bravery and sacrifice by a small number of voluntary Hawaiian colonists, known as Hui Panalā'au, who occupied the islands from 1935 to 1942 to help secure the U.S. territorial claim over the islands.

The expanded monument, measuring 370,000 square nautical miles (490,000 square miles) of protected resources around these islands and atolls in the south-central Pacific Ocean, will continue to be managed by the USFWS and NOAA.



A butterfly fish swims among corals at Palmyra Atoll National Wildlife Refuge, part of the Pacific Remote Islands Marine National Monument. Photo credit: USFWS.



New boundaries of the expanded Pacific Remote Islands Marine National Monument. Image credit: USFWS.

Adapting continued from page 1

ible impacts. Interior recognizes these risks including those to its ocean and coastal management responsibilities, and is taking action.

On October 31, 2014, the Department released its 2014 Climate Change Adaptation Plan in response to Executive Order 13653, issued by President Obama on November 1, 2013.

The 2014 Climate Change Adaptation Plan describes climate impacts on ocean and coastal resources as critical risks to its mission, which requires important management actions—many of which are currently underway.

http://www.doi.gov/greening/sustainability_plan/upload/2014_DOI_Climate_Change_Adaptation_Plan.pdf

Interior's Plan is designed to protect the Nation's economic and social well-being through specific areas of responsibility that include managing 84 marine and coastal national parks, 180 marine and coastal national wildlife refuges, hundreds of thousands of square miles in marine national monuments, energy and mineral development on 1.7 billion underwater acres of the Outer Continental Shelf, and more than 35,000 miles of the Nation's coastline. The Plan is built upon existing Departmental and bureau-level policies, strategies, and activities to address climate change led by field offices around the Nation.

The 2014 Climate Change Adaptation Plan describes climate impacts on ocean and coastal resources as

critical risks to its mission, which require important management actions--many of which are currently underway:

USFWS has conducted analyses of sea-level rise vulnerability using the Sea Level Affecting Marshes Model (SLAMM) to project the effects of sea-level rise on coastal marshes and related habitats for all coastal Refuges, and is actively working to build resilience and help slow and offset habitat loss through a variety of habitat restoration and other projects.

NPS is designing criteria and guidance to promote a thorough analysis of facility location and design features in all coastal parks so that agency staff can make wise decisions regarding facility location, replacement, and construction designs. (See related story-Assateague)

BOEM's Marine Minerals Program, which provides sand for coastal restoration and resilience projects, is analyzing data, conducting studies, and using tools such as Geospatial Information Systems and the Multipurpose Marine Cadastre to manage risks associated with climate change.

USGS is developing improved forecasts and assessments of vulnerability of coastal lands and resources to future extreme storms and sea-level rise, studying the impacts of coastal land use change on community risk and vulnerability to sea-level rise and storm surges, incorporating structured decision-making approaches that integrate the latest sea-level rise projections to refuge and other land managers, and conducting a number of regional studies focused on the geologic record of past sea level and past storms.

Interior's Role in Climate Change Adaptation:

Response to Superstorm Sandy

DOI's role in the Federal response to Superstorm Sandy is informative from a climate planning perspective. While scientists cannot directly link Superstorm Sandy to climate change, the storm demonstrated the impacts of an intense coastal storm, which are projected to become more frequent in the future as a result of climate change. Sandy, which caused extensive damage to the northeastern United States, was a rare storm featuring combined tropical and mid-latitude storm characteristics. Sandy caused record-level storm surge in large portions of coastal areas of New York, New Jersey, Connecticut, Rhode Island, and Massachusetts. Gale force winds were reported as far west as the Great Lakes and heavy snow piled up in the Appalachian Mountains. The storm killed 72 people in the United States and many more in the Caribbean.

To address Superstorm Sandy's impacts, Congress passed the Disaster Relief Appropriations Act of 2013, which appropriated nearly \$830 million to DOI for response, recovery, and mitigation of damages. DOI, working with Federal, State and local partners, has invested a large portion of this funding to increase the resilience of its coastal resources and communities in the Superstorm Sandy-affected region. Projects address climate impacts such as sea level rise and more frequent and intense extreme weather. DOI will

See Adapting page 8

Adapting continued from page 7

evaluate the impacts of these investments to inform Federal, State, Tribal and local decision makers into the future.

DOI is also conducting a review of its Superstorm Sandy disaster response operations. DOI is responsible for coordinating Federal efforts of the Natural and Cultural Resources (NCR) Recovery Support Function (RSF) established by the Natural Disaster Recovery Framework. Under this Framework, the NCR RSF helps FEMA assist State, Tribal and local authorities restore and recover natural and cultural resources that have been damaged by natural disasters, including those caused by climate- or weather-related extreme events. The NCR RSF helps reduce vulnerability of such resources to similar future events and is one of six RSFs that may be mobilized in the wake of a natural disaster. While the review recognizes numerous accomplishments, several opportunities for improvement were noted, and are described in the Plan.



Secretary Jewell discusses historic shoreline maps with National Park Service experts in Jamestowne Island, VA. Photo credit: Tami Heilmann, DOI.

Interior's Role in Climate Change Adaptation:

Sea Level Rise in the South-eastern United States

While sea-level rise is expected to impact most coastal regions in the United States, sea-level rise poses particular threats to the natural and built environments of the southeastern States with shores on the Atlantic Ocean and Gulf of Mexico. Many coastal areas of the southeastern States are sinking from both natural and human causes – a phenomenon that is exacerbated by sea level rise caused by climate change. In the Hampton Roads, Virginia region, home to more than 1.6 million people, sea level has risen over one foot in the past 80 years. This rate far outpaces the global average. The Virginia Tidewater Institute projects that sea level will continue to rise between three and seven feet by 2100.

Interior manages many areas on the southeastern United States coast and is involved in Federal, State and local planning efforts to identify climate vulnerabilities and improve the climate resilience of vulnerable areas. Research at the Southeast Climate Science Center in support of multiple Federal, State, and other organizations is developing a comprehensive and integrated assessment of monitoring programs associated with atmospheric, stream, and terrestrial ecosystems. The project has developed the Southeast Global Change Monitoring Portal to provide a centralized, comprehensive catalog of observational networks associated with aquatic



By 1999, the Cape Hatteras lighthouse (upper left) was less than 200 feet from shore and had to be relocated to an inland site (lower right). The historic move illustrates one of the ways Interior is adapting to the dynamic nature of barrier islands and reducing vulnerability to sea-level rise. Photo credit: NPS.

and terrestrial ecosystems in the southeastern United States that may be influenced by climate change.

In addition to beach and shoreline ecosystems, many cultural landmarks, such as lighthouses, are also becoming increasingly vulnerable to climate impacts. In 1870, the Cape Hatteras Lighthouse was built 1,500 feet from the ocean. Over 129 years, the shoreline migrated to within 120 feet of the lighthouse. By 1999, the lighthouse had to be moved--a combination of sea-level rise and coastal erosion left this priceless national landmark vulnerable to destruction. This is just one example of the kind of adaptation challenges facing our Nation as we prepare for and protect America's cultural icons from the impacts of climate change.



WOW! Record Salmon

By Steve Haeseker, USFWS

It's been a great year for fish and for fishing in the Pacific Northwest. From record-breaking sockeye runs to sizeable Chinook returns, these numbers tell a story. USFWS shares three perspectives: a long-time USFWS biologist, a respected Tribal Commissioner, and one of Idaho's best known fishing guides. Each gives us their perspectives on the numbers that have everyone saying "Wow!" while simultaneously asking "Why?"

Read more:

<http://bit.ly/RecordReturns>



These coho salmon fry hatching at Quilcene National Fish Hatchery are part of an exciting fish tale for the Pacific NW. Photo credit: Florian Graner.

eDNA for Salmon

Scientists from the USGS and Washington State University have discovered that endangered Chinook salmon can be detected accurately from DNA they release into the environment. The use of environmental DNA (also known as eDNA) can be a useful tool in conserving and managing aquatic species. Learn more: http://www.usgs.gov/newsroom/article.asp?ID=4091&from=rss&utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+UsgsNewsroom+%28Newsroom++National+Releases%29#.VK-weOnuhT9o

Quick Guide to Climate Change Resources:

Interior's Climate Change Adaptation Plan:

http://www.doi.gov/greening/sustainability_plan/upload/2014_DOI_Climate_Change_Adaptation_Plan.pdf

Executive Order:

<http://www.whitehouse.gov/the-press-office/2013/11/01/executive-order-preparing-united-states-impacts-climate-change>

Third National Climate Assessment:

<http://nca2014.globalchange.gov/>

U.S. Fish and Wildlife Service's Climate Change Strategic Plan:

<http://www.fws.gov/home/climate-change/pdf/CCStrategicPlan.pdf>

National Park Service's (NPS) Climate Change Action Plan:

http://www.nps.gov/orgs/ccrp/upload/nps_ccactionplan.pdf

NPS Climate Change Response Program:

<http://www.nps.gov/orgs/ccrp/index.htm>

Landscape Conservation Cooperatives:

<http://lccnetwork.org/>

Climate Science Centers:

<http://www.doi.gov/csc/index.cfm>

Bureau of Reclamation's Basin Studies:

<http://www.usbr.gov/WaterSMART/bsp/index.html>

Bureau of Reclamation's West-wide Climate Assessments:

<http://www.usbr.gov/WaterSMART/wcra/index.html>

Red Knot Designated as Threatened

Concerns include impacts of climate change and coastal development



Red knots stopped at Mispillion Harbor, Delaware, during their annual migration. Photo credit: Gregory Breese, USFWS.

On December 9, the USFWS announced federal protection for the rufa subspecies of the red knot, a robin-sized shorebird, designating it as threatened under the Endangered Species Act. Since the 1980s, the knot's population has fallen by about 75 percent in some key areas.

"The red knot is a remarkable and resilient bird known to migrate thousands of miles a year from the Canadian Arctic to the southern tip of South America," said Service Director Dan Ashe. "Unfortunately, this hearty shorebird is no match for the widespread effects of emerging challenges like climate change and coastal development, coupled with the historic impacts of horseshoe crab overharvesting, which have sharply reduced its population in recent decades."

Read more:

<https://www.fws.gov/news>ShowNews.cfm?ID=306702E2-C4DB-EDF8-28653BB2E2D600F5>

Accomplishments continued from page 1

"Rigs to Reefs"

In 2013, BSEE and the National Ocean Council convened an inter-agency working group to address needed changes to the artificial reefing process, commonly known as "Rigs to Reefs." This program allows obsolete, nonproductive offshore oil and gas platforms to be converted to artificial reefs to support marine habitat in States who agree to participate in the program. Representatives from BOEM, U.S. Coast Guard, NOAA, EPA and U.S. Army Corps of Engineers engaged Gulf Coast state agencies, the oil and gas industry, commercial and recreational fishing groups, diving groups and the general public to develop a federal policy that provides States the greatest flexibility in their artificial reef planning while balancing environmental and safety concerns with the various other uses for the Outer Continental Shelf. Converting rigs to reefs has generated more than \$100 million for the six states who have artificial reef programs. The program helps local economies and produces a variety of ancillary benefits, including additional fish habitat.

Efficiency for Energy Permitting
The WindFloat Pacific Offshore Wind Demonstration Project is a unique opportunity to show how Federal agencies (led by BOEM) can work with State and Tribal governments, the private sector, and stakeholders to streamline permitting processes and reduce duplicative efforts while ensuring appropriate environmental and other required safeguards. This project, a significant first step toward commercial offshore wind energy production along the U.S.

west coast, will help address key challenges associated with installing utility-scale offshore wind turbines, connecting offshore turbines to the power grid, and navigating new permitting and approval processes.

This 30-megawatt demonstration project is designed to present all interested parties with the ability to provide input through a streamlined approach for government at all levels to work with the private sector to identify and resolve issues more quickly.

Learn more about ocean observing:

IOOS-Integrated Ocean Observing System

<http://www.ioos.noaa.gov/>

Interagency Ocean Observations Committee - **IOOC** - provides oversight of the development of U.S. IOOS.

U.S. IOOS Program - is responsible for leading the day-to-day tasks related to managing IOOS.

IOOS Association - the IOOS Association is a non-profit organization formed by the IOOS Regional Associations for Coastal and Ocean Observing in support of the Integrated Ocean Observing System.

research reflects an expanding body of work that has advanced knowledge of oil spill response capabilities in cold water environments. Many research projects are being conducted at Ohmsett - The National Oil Spill Response Research and Renewable Energy Test Facility. BSEE is the principal federal agency funding offshore oil spill response research and is the leader for Arctic response research.

Arctic Ecological Research

On November 21, BOEM and the National Oceanographic Partnership Program (NOPP) announced a grant award for a Marine Arctic Ecosystem Study (MARES) that will investigate the interrelationships among the physical, biological, chemical and social science components of the Beaufort Sea ecosystem spanning from Barrow, Alaska, to the Mackenzie River delta in Canadian waters. (*See related story page 12*)

Supporting Ocean Observing, Data Sharing, Interoperability

The power of the U.S. Integrated Ocean Observing System (US-IOOS) was demonstrated in November when USGS scientist Richard Signell visited the NATO Centre for Maritime Research and Experimentation (CMRE) in Italy. Signell has been helping the US-IOOS (a federation of 17 federal agencies and 11 regional associations) develop standards and applications for sharing data through a web browser that can search for, access and use ocean data. These approaches make it easy for new users and providers to get connected and to easily share data catalogs and files among the many members of the ocean observing community. The US-IOOS brings together in-

Arctic Energy-Related Research

BSEE, in partnership with state and federal agencies, academia, private industry, and other countries interested in Arctic oil spill response research, has successfully developed and conducted over 30 projects directly related to improving equipment and processes for the prompt identification and removal of oil from harsh Arctic environments. These projects range from mechanical containment and recovery of oil in ice conditions to dispersant use in cold water. This

See Accomplishments page 11

Accomplishments continued from page 10

teragency observing contributions with non-Federal partners through the IOOS Regional Associations to help accelerate the development and adoption of an international, integrated ocean data and information management system. Working with the CMRE is expanding the reach of US-IOOS data sharing by introducing NATO scientists to the new US-IOOS web-based access methods and demonstrating how they can adopt it as they work with their existing data. Outreach with this group provides strong links with an active global community. Scientists at NATO's CMRE serve in rotating 3-5 year positions; as they return to their native NATO countries and institutions, they will help spread the adoption and development of this standards-based approach.

Carbon (C) Sequestration

USFWS and USGS are developing and testing tools to understand the impact of land management and upstream land use on the storage capability and long-term fate of carbon. The goal is to identify management methods that increase C-sequestration and to evaluate the socio-economic services provided to communities by protecting and restoring wetlands that sequester carbon and other greenhouse gases.

USFWS has a strong nexus with wetland C-sequestration through coastal wetland conservation projects, terrestrial C-sequestration through reforestation partnership projects, and the vast coastal wetlands protected within the Refuge System. (See related story page 17) Link to the Implementation Plan: <http://www.whitehouse.gov/administration/eop/oceans/implementationplan>



A painted bronze humpback whale sculpture (above) is one of a series (shown below) on display at the Maine Coastal Islands National Wildlife Refuge Complex at the visitor center in Rockland, Maine. Photo credits: Beth Goettel, USFWS.

Whale Sculptures on Display in Maine

The Maine Coastal Islands National Wildlife Refuge Complex is displaying a series of cast-bronze sculptures of endangered whales at its visitor center in Rockland, Maine through August 2015.

The artwork was sculpted by Alfred Goldin, who was best known as a wildlife biologist. Goldin wrote and illustrated *The Wild Mammals of New England*, published in 1977 by Johns Hopkins University Press. Over his 30-year career, Goldin worked for the USFWS and the Department of Agriculture's Animal and Plant Health Inspection Service. After retiring in 1991, he started to dabble in sculpture at Mount Wachusett Community College in Massachusetts. The eventual result was 13 whale sculptures depicting 10 species, accurate in every detail. Upon Goldin's death last spring at age 86, a niece and nephew suggested that his work be placed on public display. Maine Coastal Islands Refuge project leader Beth Goettel was honored to do so. "We know that we work alongside many talented people," says Goettel, "but it is always a surprise to discover how creative some of our co-workers are in their private lives."

http://www.fws.gov/refuges/RefugeUpdate/NovDec_2014/around_refuge.html



An Integrated Marine Arctic Ecosystem Study-MARES

BOEM has announced the award of a broad, forward-looking Arctic study--known as MARES--the Marine Arctic Ecosystem Study-- an integrated ecosystem research initiative in conjunction with its federal and private sector partners.

The overarching goals of the study are to better understand the interrelationship of the physical, biological, chemical, and human systems, including traditional knowledge, of the Beaufort Sea and to advance scientific prediction capabilities for linkages between marine life, human uses, sea ice, atmospheric and oceanic processes and river discharge.

The MARES study is taking place under the National Ocean Partnership Program (NOPP), which brings together federal agencies, academia, industry, and non-governmental organizations to support ocean research. The award recipient, Stantec Consulting Services, Inc., will lead a team of U.S. and Canadian scientists and technicians on both sides of the border, with partners: "BOEM is pleased to join our Federal and industry partners to undertake this forward-looking project," said BOEM Acting Director Walter Cruickshank. "With widespread interest in the Arctic, including potential oil and gas leasing and development, we're looking to significantly expand our knowledge of the Beaufort Sea ecosystem to inform our decision-making."

This research initiative is coordinated and planned by BOEM in conjunction with its federal and private sector partners: U.S. Arctic Research Commission, U.S. Coast Guard, USGS, U.S. Integrated Ocean Observing System, Marine Mammal Commission, National Science Foundation, NOAA, Office of Naval Research, and Shell Oil Company.

An independent scientific review board of internationally recognized experts will help to steer and provide peer review of the project, which is planned for at least five years (2014 to 2019).

It is important for BOEM and its NOPP partners to study and monitor areas known for high biological productivity and prevalent subsistence use to ensure their protection. <http://www.boem.gov/press/11212014/>



Focus area for the Integrated Marine Arctic Ecosystem Study.
Image credit: BOEM.

RESTORE continued from page 5

pursue another phase of early restoration, by identifying and approving up to \$300 million in additional projects. www.gulfspillrestoration.noaa.gov.

RESTORE Council- Funding Priority List

While the DWH NRDA trustees were working to address injuries caused by the spill, the RESTORE Council, established by the landmark RESTORE Act of 2012, was working to address non-spill related remedies to the Gulf's degraded health and damaged economy. The Act makes funds available to the five Gulf States and six federal agencies by directing 80% of all civil and administrative penalties paid by the responsible parties to the newly created Gulf Coast Restoration Trust Fund.

The funds received by the Gulf Coast Trust Fund will be distributed into five different "buckets." Recently the Council has made great strides in the process of identifying the Council-Selected Restoration group of projects (Bucket 2).

With an estimated \$150-180 million currently identified for Bucket 2, each of the Council members proposed projects for the use of these funds. Fifty projects, with a combined estimated total cost of approximately \$787 million, will be evaluated by RESTORE staff and the Council members. When the Council completes its draft priority list, spring 2015, it will invite the public to comment. More information www.Restorethegulf.gov.

See RESTORE page 22

Conserving Coastal Wetlands

U.S. Fish and Wildlife Announces \$21 Million in Grants

On January 8, the USFWS Director Dan Ashe announced over \$21 million will be provided to 25 projects in 13 coastal and Great Lakes states to protect, restore or enhance more than 11,000 acres of coastal wetlands and adjacent upland habitats under the National Coastal Wetlands Conservation Grant Program.

State and local governments, private landowners, conservation groups and other partners will contribute over \$35 million in additional funds to these projects, which include acquiring, restoring or enhancing coastal wetlands and adjacent uplands to provide long-term conservation benefits to fish and wildlife and their habitats.

The program, funded through taxes paid on equipment and fuel purchases by recreational anglers and boaters, creates significant benefits for other recreationists and the American public. The billions of dollars generated through recreational angling, boating, waterfowl hunting and bird watching benefit communities in the vicinity of wetlands restoration projects.

The Service awards grants of up to \$1 million to states based on a national competition, which enables states to determine and address their highest conservation priorities in coastal areas. Since 1992, the Service has awarded over \$357 million in grants under the program.

Conservation of coastal wetlands ecosystems will not only benefit



Conservation of coastal estuarine habitat of the Beltz Farm in Oregon has long been a priority due to the diversity of coastal habitats, the pristine condition of the estuary and its importance to listed and sensitive species including more than 100 bird species, amphibians and fish. Photo credit: Chris Swenson, USFWS.



Massachusetts Department of Fish and Game was awarded \$790,290 to restore 250 acres of recently retired cranberry bogs and supporting upland grassland. The Tidmarsh Farms Restoration Project will be the largest freshwater wetlands restoration effort to date in Massachusetts. Photo credit: Mass. Div. of Ecological Restoration.



The Point Abbaye and Huron Bay Coastal Wetlands Acquisition project in Michigan will benefit migratory birds including raptors and waterfowl. The project area's large, forested wetland and riparian habitats support wide ranging mammals such as gray wolves, black bears and bobcats in addition to a large diversity of species. Photo credit: Keweenaw Land Trust.

coastal wetland-dependent wildlife, but will also enhance flood protection and water quality, and provide economic and recreational benefits to anglers, boaters, hunters and wildlife watchers. <http://www.fws.gov/coastal/CoastalGrants/index.html> For more information about the 2015 National Coastal Wetland Conservation Grant Program, please contact Chris Darnell, 703-358-2236, chris_darnell@fws.gov.

See a complete list of projects funded by the 2015 National Coastal Wetlands Conservation Grant Program:



https://www.fws.gov/coastal/CoastalGrants/pdfs/2015_Coastal_Grants_Project_Summaries.pdf



Panel participants: (left to right) Federated States of Micronesia Ambassador to the U.S. Asterio Takesy, Assistant Secretary for Insular Areas Esther Kia'aina, Secretary of the Interior Sally Jewell, Palau Ambassador to the U.S. Hersey Kyota, Marshall Islands Ambassador to the U.S. Charles Paul. Photo Credit: Tim Bergling, DOI.

Impacts of Climate Change in the Pacific Islands

On December 11, Secretary Jewell and Assistant Secretary for Insular Areas Esther P. Kia'aina hosted ambassadors from three Pacific Islands nations for a panel discussion about the threats posed by climate change.

"There's no doubt that these Pacific Islands are on the front lines of climate change," said Secretary Jewell. "This forum is designed to help build public awareness and strengthen the partnerships needed to support these nations as they work to adapt and build resilience against the impacts of a changing climate."

The panel discussion included remarks from the Ambassadors of the Freely Associated States which include His Excellency Charles Paul, Ambassador, Republic of the Marshall Islands; His Excellency Asterio R. Takesy, Ambassador, Federated States of Micronesia; and Assistant Secretary for His Excellency Hersey Kyota, Ambassador, Republic of Palau. These Pacific Island Nations have had close historical ties with the United States dating back to World War II and their current relationships with the U.S. are enshrined in Compacts of Free Association.

"Climate change is a global issue, and nowhere is it more apparent than in the Freely Associated States," said Assistant Secretary Kia'aina. "This panel gives the Ambassadors of these Pacific nations a platform to describe the impacts their islands are already experiencing and discuss ways and means to work collaboratively with the United States to help prepare for and adapt to these changes."

The Department of the Interior is responsible for coordinating federal policy with respect to the territories of American Samoa, Guam, the U.S. Virgin Islands, and the Commonwealth of the Northern Mariana Islands, and administering and overseeing U.S. federal assistance provided to the Freely Associated States of the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau under the Compacts of Free Association. The Office of Insular Affairs mission is to foster economic opportunities, promote government efficiency, and improve the quality of life for the people of the insular areas.

Chukchi Sea Research

A special issue of the oceanography journal Deep-Sea Research II is devoted to BOEM-funded research of the northeastern Chukchi Sea. Published in spring 2014, the 13 articles in this volume present results from major field expeditions in the northern Chukchi Sea during open-water periods in the summers of 2009 and 2010. The special issue focuses on the biological and chemical characteristics of the benthos, or sea floor community, with the goal of establishing a strong benchmark for assessing future changes that may occur in response to (1) impacts from oil and gas activities and (2) variations in hydrography, circulation or ice retreat associated with climate change. Although the open access period closed in September 2014, the special issue is available for purchase from Elsevier, the publisher.

Journal citation: *Northern Chukchi Sea Benthic Ecosystem: Characterization, Biogeochemistry and Trophic Linkages*, Volume 102, 1014. http://www.boem.gov/note06262014/?utm_source=Note+to+Stakeholders++Deep-Sea+Journal+publishes+BOEM+Chukchi+Research+Journal+on+BOEM+Chukchi+Research&utm_medium=email



World Parks Congress

Protected Places are Pieces of One, Giant Planetary Puzzle

By Cheryl Fossani, DOI

On November 11, Secretary Jewell addressed the International Union for Conservation of Nature's 2014 World Parks Congress in Sydney, Australia. Jewell highlighted the importance of public lands in building a more resilient future and underlined that protected areas preserve natural heritage for future generations. She urged transfer of knowledge and wisdom to the next generation and voiced the need for international cooperation on climate change. Citing the U.S. and China climate agreement, she noted that achieving sustainable development and reduced emissions require long-term commitments. (*See related story page 6*)

During the Congress, the U.S. signed a Cooperative Arrangement with Republic of Kiribati's President Anote Tong to coordinate and jointly support research and conservation activities for the newly expanded Pacific Remote Islands Marine National Monument in the U.S. and the Phoenix Islands Protected Area in Kiribati. The two protected areas, called the Phoenix Ocean Arc, make up a wide swath of the Pacific, including entire island ecosystems, coral reefs, seamounts and marine areas. The agreement strengthens management of this area including scientific research, law enforcement, the removal of shipwrecks, conservation of seabirds, and eradication of non-native species. For more information: http://www.fws.gov/refuge/pacific_remote_islands_marine_national_monument/ and the Phoenix Island Protected Area: <http://www.phoenixislands.org/>



Snowy plover. Photo credit: Dan Roby, USGS.

Waterbird Society Special Session

USGS scientists organized and led a Special Symposium at the 38th annual meeting of the Waterbird Society and the Conference for the Study and Conservation of Mexican Birds in La Paz, Mexico on November 4-7. The special session, "Snowy Plovers, Least Terns, and Gull-Billed Terns: Shared Status, Threats, and Conservation Needs Across North America" brought together biologists from the Atlantic, Pacific and Gulf coasts who research and manage three waterbird species that occur together on each coast. Each species varies by its conservation status on each coast and in some cases one species may be causing the decline of another. Thus the challenges are complex. Co-organizers Susan Haig, Sean Murphy and Elise Elliott-Smith work on these species with a grant from the U.S. Navy in San Diego and as a result of the symposium have forged closer ties with Mexican biologists managing the same issues just across the border in Baja. This multi-species approach to ecosystem conservation bridges the gap between single-species studies and ecosystem wide approaches and results in more specific and meaningful management for each species and the ecosystem. http://www.waterbirds.org/annual_meeting-2014/past-annual-meetings



Two bird species that are found in the Pacific Remote Islands Marine National Monument. At left- Great frigate birds. Photo credit: Beth Flint, USFWS. At right- White terns. Photo credit: Kydd Pollock.



Aloha from Maui!

News from the U.S. Coral Reef Task Force

By Cheryl Fossani, DOI

In early September, the U.S. Coral Reef Task Force (USCRTF) held its 32nd meeting in Maui, Hawaii. This meeting brought together stakeholders and partners to address diverse issues affecting the health of coral reefs in the Ka'anapali Watershed and the communities in West Maui that rely on them. 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 the Governor from the U.S. Virgin Islands and the Lieutenant Governors of the State of Hawaii and American Samoa.

During this year's meeting, several site visits and workshops were organized to address coral reef conservation issues specific to the West Maui watershed, as well as those challenges that are faced on a global scale.

USGS sponsored a science tour of West Maui's coral reef eco-



At left, William Aila, (Hawaii's Department of Natural Resources), addresses USCRTF Principal Members-front row, left to right- Governor John de Jongh (USVI), Lori Faeth (DOI), and Jo-Ellen Darcy (USACE). Photo credit: Austin Shelton, Hawaii Division of Aquatic Resources.



Ka'anapali Watershed Coordinator, Tova Callender, discusses land-based sources of pollution affecting West Maui's watersheds during a group tour
Photo Credits: Austin Shelton, Hawaii Division of Aquatic Resources.

systems. In collaboration with federal, state, academic, and NGO scientists, USGS provided the tour participants with an overview of how over fifteen years of integrated science has identified the land-based sources of pollution emanating from the USCRTF West Maui priority watershed and their resulting impact on the adjacent fringing coral reefs. USGS also presented information on how recent management efforts have begun to mitigate the pollution impacts in the area and provided examples of the healthy Hawaiian fringing reefs that used to be there and hopefully will return again in the future.

The USCRTF Watershed Working Group convened a Stormwater Management workshop and training for watershed managers, local and federal agencies, and stakeholders that highlighted the vulnerability of coral reefs to stormwater runoff. Presentations and discussions during the workshop focused on the extent of future development anticipated in West Maui and identified effective and transferable stormwater management solutions to reduce the impacts of current and future development.



Juan Torres-Perez (NASA) participated in the scientific tour, led by USGS scientist Curt Storlazzi. Titled, "The Past, Present, and Future of West Maui's Coral Reefs," it included a snorkeling trip to see both healthy fringing reefs as well as those impacted by land-based pollution.
Photo credit: Curt Storlazzi, USGS.

An Herbivore Grazer Reef Survey was hosted by the USCRTF Education and Outreach Working Group. During this event, participants were given the opportunity to learn about the importance of herbivore species at Kahekili Reef and participate in a grazing survey whose information can be used to support reef management in the area.

The USCRTF Ocean Acidification sub-working group, a committee within the USCRTF's Climate Change Working Group, hosted a panel discussion and workshop addressing ocean acidification's threat to coral reefs and other marine organisms. The panel, made up of members from the University of Hawaii, NOAA, and EPA, highlighted the impacts of ocean acidification on corals and what is being done to address them. The panel discussion was followed by a workshop to solicit input on additional actions that can be taken to address ocean acidification.

The USCRTF is currently planning its annual Washington D.C. meeting on February 17-20, 2015, with a public Business Meeting scheduled for Thursday, February 19th.



From left- Neil Ganju, Mary Foley, Eric Schrading, and Claude Gascom were speakers at the USGS-hosted Congressional Briefing, "#StrongAfterSandy" in September. Photo credit: Clarice Nassif Ransom, USGS.

USGS Congressional Briefing Series: #StrongAfterSandy

By Clarice Nassif Ransom, USGS

On September 19, 2014, representing actions in response to Hurricane Sandy across the Department, the USGS hosted a formal briefing for Congress entitled "#StrongAfterSandy—The Science Supporting the Department of the Interior's Response."

Speakers included Claude Gascon, National Fish and Wildlife Foundation Executive Vice President and Chief Science Officer, who served as emcee for the briefing; Neil K. Ganju, Research Oceanographer with the USGS Woods Hole Coastal and Marine Science Center; Mary Foley, Chief Scientist for the NPS Northeast Region; and Eric Schrading, Field Office Supervisor for the USFWS New Jersey Field Office.

The briefing was attended by bipartisan congressional staff from the House and Senate, along with representatives of the Congressional Research Service, FEMA, NOAA, and other agencies. The event was also tweeted live from @USGSLive to #StrongAfterSandy. Read more about the briefing in *Sound Waves*: <http://soundwaves.usgs.gov/2014/10/spotlight3.html>.

Biological Carbon Sequestration Report: 2009-2013

http://www.fws.gov/refuges/vision/pdfs/BiologicalCarbonSequestrationAccomplishmentsReport2009_2013.pdf

A new report from the USFWS highlights case studies, ongoing research, and management activities focused on biological carbon sequestration on Refuge System lands and waters. These activities illustrate the breadth of Service-supported biological carbon sequestration activities in a variety of environments including tidal marshes, swamps and forested wetlands along the Mississippi River. These efforts help gain a better scientific understanding of the ecological, climatic, and land use controls of carbon accumulation and storage and will guide the development of refuge management plans to better protect ecological function and biodiversity in the face of a rapidly changing environment while simultaneously reducing the concentration of greenhouse gases in the atmosphere.

The USFWS and USGS are working on a variety of projects to investigate methods to enhance the capacity and effectiveness of the soils to store and sequester carbon. The USFWS is also participating in the Interagency Working Group (IWG) on Coastal Blue Carbon being chaired by NOAA.



Instruments used to measure carbon fluxes in air, soil, and water help gain understanding of how carbon is stored and transferred within different ecosystems, which is critical to effectively managing carbon sequestration. Image source: USFWS.

GIS Training for Northeast Tribes

By Andrea Toran and Brian Buczkowski, USGS

Geographic Information System (GIS) software, used by many USGS research programs, is a powerful tool for visualizing and aiding in the interpretation of geographic and geospatial data. Learning to use and transfer GIS techniques from the GIS community at USGS can benefit many other groups throughout our nation.

USGS developed a Tribal GIS Training model as a direct result of a series of science planning meetings that took place in 2013 between USGS staff and representatives from the Houlton Band of



USGS staff works with tribal members during GIS training. Photo credit: Andrea Toran, USGS.

Maliseet Indians, Aroostook Band of Micmacs, Passamaquoddy Tribe of Indian Township, Passamaquoddy Tribe at Pleasant Point and the Penobscot Indian Nation. At these meetings, tribal representatives

discussed their need for increased knowledge and assistance in collecting and interpreting data with specific emphasis on using geospatial information to protect cultural and natural resources.

On November 12-14, 2014 The USGS Woods Hole Coastal and Marine Science Center hosted members and representatives of Northeast Native American tribes as a follow up to Tribal GIS Session held at the Environmental Protection Agency Lab in Chelmsford, Mass. from March 31- April 1, 2014.

The agenda for this session was specifically designed to focus on issues and applications relevant to the tribes' individual needs.

New Sensor Technology Tracks Nitrate Pulse to the Gulf of Mexico

A new USGS report describes how advanced optical sensor technology is being used in the Mississippi River basin to accurately track the nitrate pulse to the Gulf of Mexico. http://www.usgs.gov/newsroom/article.asp?ID=4046#.VLa7h3u_b5k

Excessive springtime nitrate runoff from agricultural land and other sources in the Mississippi drainage flows into the Mississippi River and downstream to the Gulf of Mexico. This excess nitrate contributes to the Gulf of Mexico hypoxic zone, an area with low oxygen known commonly as the “dead zone.”



Map illustrating the Mississippi River and all connected rivers and streams in the watershed. Image credit: USGS.

The USGS is using the new sensor technology to collect nitrate concentration data every hour to improve the accuracy of nitrate load estimates to the Gulf of Mexico. The data can also be used to make it easier to detect changes in nitrate levels related to basin management and to track progress toward the goal of reducing the size of the dead zone.

“High frequency data from these sensors has revealed considerable variability in nitrate concentrations in small rivers and streams,” said Brian Pellerin, USGS researcher. “However, we were surprised to see nitrate concentrations vary by as much as 20 percent in a week in a river as large as the Mississippi River without similar changes in streamflows.”

These rapid changes are very easy to miss with traditional water-quality monitoring approaches. However, hourly information on nitrate levels improves the accuracy and reduces the uncertainty in estimating nitrate loads to the Gulf of Mexico, especially during drought and flood years. Nitrate sensors on small streams and large rivers throughout the Mississippi River basin are improving our ability to track where the pulses are coming from and forecast when they will arrive at the Gulf.

The USGS, in cooperation with numerous local, state, and other federal agencies, currently operates over 100 real-time nitrate sensors across the Nation.

Coral Reef Initiatives

Protecting Coral Reef Ecosystems is Critical to Livelihoods, Traditions, and Cultures

See related story page 16.

On September 19, Interior Assistant Secretary for Insular Areas Esther Kia'aina "announced more than \$300,000 in coral reef initiative grants to American Samoa, the Commonwealth of the Northern Mariana Islands, and Ulithi Atoll in the Federated States of Micronesia." The grants are made available through the Office of Insular Affairs Coral Reef Initiative program for various projects intended to help protect and preserve coral reef ecosystems and educate communities and students on management of these natural resources.

"The vitality and viability of coral reef ecosystems are absolutely critical to the livelihood, traditions and cultures of these Pacific Island communities. The damaging effects of invasive species, pollution, and ecological change are impossible to ignore in these areas. I am grateful that the federal government can support them in this meaningful way," Kia'aina said.

http://www.doi.gov/oiapress/2014/upload/09182014_Coral-Reef-Initiative-FY14-Funding.pdf

At right- an American Samoa Enu Basket is a traditional fishing trap constructed with 'ie'ie vines that are first buried in a beach pit to soak in seawater for a week, after which the vines are cleaned and hung to dry. To catch the fish, the trap is buried half way in shallow water along a sandy shoreline. The traps are baited with hermit crabs (uga) that have been pounded and mixed with sand. Photo credit: National Park of American Samoa.



Above- The coral-eating crown of thorns starfish (*Acanthaster planci*), shown above in American Samoa, are found throughout the Indo-Pacific. Population explosions can wreak havoc on reefs but are being studied to improve management options. Photo credit: National Park of American Samoa. http://www.nps.gov/pore/nature/science/upload/newsletter_pacific_ocean_2014_09.pdf



Coastal Defense Tool Wins United Nations Award



The Coastal Defense app used the Puget Sound area as a proof-of-concept site for cities to visualize and plan for coastal change. Image credit: USGS.

The Coastal Defense application or 'app', developed by The Nature Conservancy in collaboration with the USGS and other partners,

received the top award for a scientific application addressing disaster and resilience planning at the September 23, 2014, United Nations Climate Summit in New York.

The Coastal Defense app addresses one of the UN essentials for making cities resilient: protect ecosystems and natural buffers to mitigate floods, storm surges and other hazards to which a city may be vulnerable.

The Coastal Defense app allows users to: (1) identify areas at risk of coastal erosion and inundation from waves and storm surge, (2) examine the role of coastal habitats—such as tidal wetlands—in attenuating wave height and energy, and (3) determine adaptation strategies that incorporate natural as well as man-made protections.

The data platform and app help make complex social ecological models more accessible to non-technical audiences. It also provides a mechanism to change perception of what defenses can be and help make a more compelling case for the role of nature.

Decision makers are looking for cost-effective risk reduction solutions. The Coastal Defense app provides a direct way to help communities understand their vulnerability, reduce their risk, and determine the value of nature-based solutions.

Watch the demonstration video:
<https://www.hackerleague.org/hackathons/esri-global-disaster-resilience-app-challenge-2014/hacks/coastal-defense-professional>

Methane Seepage Discovered to be Widespread along Atlantic Margin

By Carolyn Ruppel and Hannah Hamilton,
USGS

Natural methane leakage from the seafloor is far more widespread on the U.S. Atlantic margin than previously thought, according to an August 2014 study published in *Nature Geoscience* by researchers from Mississippi State University, the USGS, and other institutions.



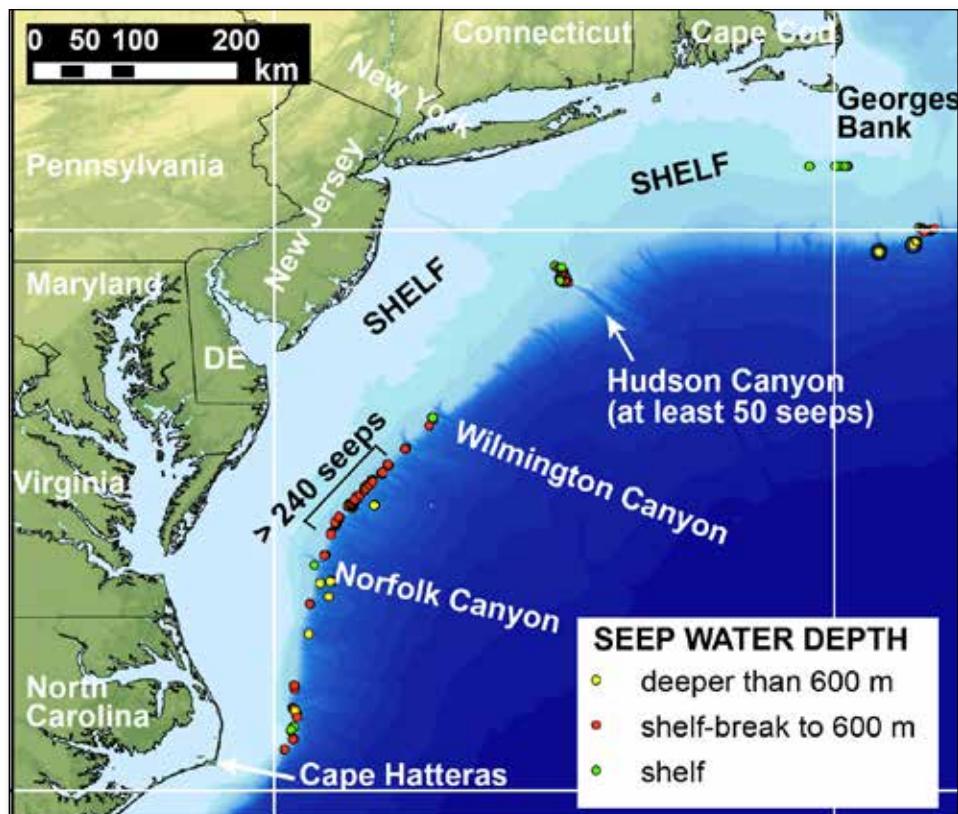
Numerous distinct methane streams emanating from the seafloor on the upper slope offshore Virginia. Image courtesy of NOAA Okeanos Explorer Program, 2013 Northeast U.S. Canyons Expedition.

Methane plumes identified in the water column between Cape Hatteras, North Carolina, and Georges Bank, Massachusetts, are emanating from at least 570 seafloor cold seeps on the outermost continental shelf and the continental slope.

Prior to 2012, only three seep areas had been identified beyond the edge of the continental shelf, between Florida and Maine on the U.S. Atlantic seafloor.

“Widespread seepage had not been expected on the Atlantic margin. It is not near a plate tectonic boundary like the U.S. Pacific coast, nor associated with a petroleum basin like the northern Gulf of Mexico,” said Adam Skarpe, the study’s lead author and an assistant professor at Mississippi State University.

The gas being emitted by the seeps has not yet been sampled and analyzed, but researchers believe



Map of the newly discovered methane seeps along the northern U.S. Atlantic margin. None of the seeps shown here was known to researchers before 2012. Image credit: USGS. Learn more: <http://woodshole.er.usgs.gov/project-pages/hydrates/>

that most of the leaking methane is produced by microbial processes in shallow sediments. This interpretation is based primarily on the locations of the seeps and knowledge of the underlying geology. Microbial methane is different from thermal methane, which is found in deep-seated reservoirs and often tapped as a natural gas resource.

“Warming of ocean temperatures on seasonal, decadal, or much longer time scales can cause gas hydrate to release its methane, which may then be emitted at seep sites,” said Carolyn Ruppel, study co-author and chief of the USGS Gas Hydrates Project. “Such continental slope seeps have previously been recognized in the Arctic, but not at mid-latitudes. So this is a first.”

“This study continues the tradition of advancing U.S. marine science research through partnerships between federal agencies and the involvement of academic researchers,” said John Haines, Coordinator of the USGS Coastal and Marine Geology Program. “NOAA’s Ocean Exploration program acquired state-of-the-art data at the scale of the entire margin, while academic and USGS scientists teamed up to interpret these data in the context of a research problem of global significance.”

The USGS research group studying natural gas hydrates in deepwater and permafrost settings is globally recognized. USGS researchers focus on the potential of gas hydrates as an energy resource, the impact of climate change on gas hydrates, and seafloor stability issues.

Strategic Science for Society

By Kris Ludwig, USGS

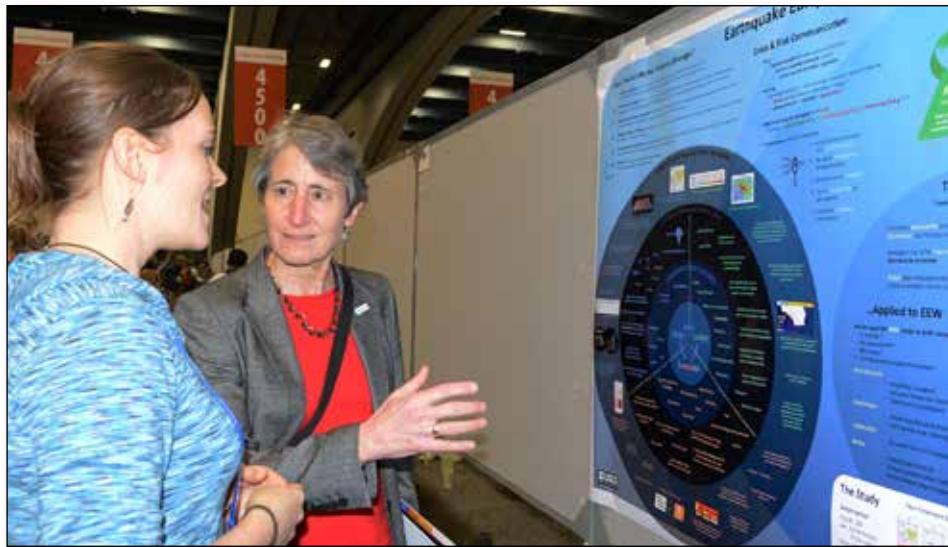
On December 18, Secretary Jewell delivered the Union Agency Lecture at the 2014 American Geophysical Union (AGU) Annual Meeting in San Francisco where numerous scientists from across Departmental bureaus were also sharing the science needed to inform climate change adaptation, natural resource management, and disaster preparedness and risk reduction. Select sessions and keynote presentations are archived online:

<https://virtualoptions.agu.org/>

Several AGU sessions focused on natural hazards. Staff from Interior's Strategic Sciences Group (SSG) co-convened a session on "Exploring the Roles of Science, Communication, and Education throughout the Disaster Lifecycle" to discuss the role of science in responding to environmental crisis events such as hurricanes, floods, earthquakes, tsunamis, industrial accidents, and pandemics -- and how such science can most effectively be planned, coordinated, conducted, documented, communicated, and applied to crisis decision-making.

Session speakers included experts from academia, government, and the non-profit sectors addressing new observations in risk communication, the need to infuse science into decision-making during disaster preparedness, response, and recovery, and the role of science throughout the lifecycle of natural and human-caused disasters.

<https://agu.confex.com/agu/fm14/meetingapp.cgi#Session/2203>



While at the AGU Fall Meeting, Secretary Jewell met with USGS scientist Erin Burkett (at left) who discussed Earthquake Early Warning communication efforts. Through the USGS Science Application for Risk Reduction (SAFRR) program, scientists are exploring concepts from the fields of social science and design that are important to consider when translating science content into effective messages and products. Photo credit: DOI.

In a similar theme, the SSG is also convening a panel session on "Science During Crisis" at the annual meeting of the American Association for the Advancement of Science in February 12-16, 2015 in San Jose, CA.

Speakers are to include Marcia McNutt, editor of Science; Leycia Palen, Associate Professor of Computer Science at the University of Colorado; Gary Machlis, SSG Co-Leader; and Kris Ludwig, SSG Staff Scientist. Presenters are focused on highlighting innovative approaches, best practices, new technology, and challenges for conducting and disseminating science during crises.

More information on the session:
<https://aaas.confex.com/aaas/2015/webprogram/Session9410.html>

Interior's Strategic Science Group:
www.doi.gov/strategicsciences/



Swan Days at Mattamuskeet

On December 6-7, 2014, the Mattamuskeet National Wildlife Refuge celebrated its 80th Anniversary along with the annual Swan Days--celebrating the exciting annual return of the Tundra Swans. Tundra swans are very large birds that winter at the Refuge and the surrounding areas in North Carolina's Pamlico Sound. They breed in the high tundra across the top of North America and return each year in large flocks to the shallow water areas with moist soil and lakes where they feed on aquatic plants. <http://www.fws.gov/refuge/mattamuskeet/>



RESTORE continued from page 12

National Fish and Wildlife Foundation

The National Fish and Wildlife Foundation (NFWF) is also making significant headway in allocating funding for Gulf restoration. The original sources of these funds, which will amount to more than \$2.5 billion over five years, are two criminal plea agreements accepted by BP and Transocean. The funds to be allocated by NFWF's Gulf Environmental Restoration Fund will be used to remedy harm from the spill and eliminate or reduce the risk of future harm to Gulf Coast natural resources. Generally, funding will be allocated for barrier island and river diversion projects in Louisiana (\$1.272 billion), with \$356 million each for natural resource projects in Alabama, Florida, and Mississippi, and \$203 million for similar projects in Texas. In its second year of making awards, NFWF has obligated nearly \$390 million to support 50 projects across the Gulf states.

www.nfwf.org

North American Wetlands Conservation Act

Another 2013 plea agreement with BP addressing criminal violations, including one count of violating the Migratory Bird Treaty Act, provides \$100 million to the USFWS's North American Wetlands Conservation Fund. These monies are to be used as matching grants for projects that will benefit migratory species affected by the spill. In fiscal year 2014, nine U.S. projects were approved for a cumulative total of close to \$9 million. Ten international projects located in Canada and Mexico, having a cost of approximately \$5 million, were also approved this year.



Hurricane Sandy damaged infrastructure on Assateague Island National Seashore and demonstrates the need for innovative design in managing public access in a dynamic coastal landscape. Assateague Island National Seashore is one of two pilot examples implementing NPS' climate change scenario planning process. Photo credit: NPS.

Coastal Park Recognized for Adaptive Design

"Resource stewardship is the cornerstone of our mission and these professionals represent the very best in teamwork, partnerships, and dedication to make sure there are exploration, discovery and interpretation opportunities for park visitors today and into the future," said National Park Service Director Jonathan B. Jarvis in announcing the 2013 Natural Resource Stewardship Awards on December 19th. The Assateague Island National Seashore staff was recognized with two awards.

National Seashore Superintendent Patricia Kicklighter was honored as Superintendent of the Year for Natural Resource Stewardship in the consideration of climate change in long-term planning and infrastructure management. The parks' General Management Plan has been recognized as one of the best examples for addressing climate change and the management challenges posed by the dynamic coastal landscape.

Maintenance Chief Ishmael Ennis was also honored for Resource Stewardship through Maintenance. Ishmael Ennis, chief of maintenance, implemented climate change adaptation strategies which have served as a model for vulnerable coastal parks throughout the NPS. He worked with resource management staff to designate more sustainable parking locations and used innovative materials and designs to create environmentally friendly parking lots. His innovative designs for coastal infrastructure have been widely cited within the National Park Service and internationally. The numerous experiments needed for successful designs are often not recognized, but Ennis's innovations only occurred through the persistence and creativity of a dedicated team with a highly-respected leader.

You can read more about Ennis' approach in a Washington Post article: <http://www.washingtonpost.com/news/storyline/wp/2014/12/02/the-old-man-and-the-rising-sea-2/>

<http://www.nps.gov/news/release.htm?id=1664>



That's Wrack

By Meredith B. Nevers, USGS

Wrack. Marine debris. Detritus. Organic debris. Flotsam. Jetsam. It's the amalgamation of material thrown onto the shore by waves and tides, ranging in size from microscopic plastic beads to tree trunks. And the name for it depends on where you are, where it originated, and what it comprises. Look closely and you might find dead algae, dried reeds, feathers, sticks, leaves, sawdust, shells, bones, plastic toys, or fishing line.

Along the Great Lakes coasts, masses of organic material are found above the sand berm; straw, wood chips, and algae are washed up by waves and storms. Gulls, Killdeer, and the federally threatened Piping Plover pick through it in search of food.

In addition to the natural wrack materials that wash up on the shore and provide food for birds and a haven for insects, man-made garbage

and plastics are also mixed in with the shoreline material. This marine debris can cause a host of problems serving as a source of contaminants (e.g., persistent organic pollutants) and being ingested by fish and birds. In some areas, shoreline wrack is dominated by invasive Dreissenid mussels and plastics.

USGS scientists at the Great Lakes Science Center are studying the community that lives and thrives in the freshwater wrack and the coastal processes that lead to its accumulation. They are applying their understanding of nearshore water movement and currents to explain why the wrack accumulates when and where it does and how this niche fits into the broader shoreline ecosystem. Understanding the composition and transport of wrack can help scientists locate sources of marine debris and other man-made materials that are mixed in with the wrack, fouling the coastline.

Read the full blog: <http://www.usgs.gov/blogs/greatlakesscience/>



There is regular exchange between the wrack and the lake (above); an ecosystem that is exposed to wet and dry cycles. At left- a close up view shows wrack is a mixture of aquatic and terrestrial organic material that may include sticks, straw, mosses, seed pods, and leaves.

Photo credits: USGS.



Shipwrecks such as Anona serve as artificial reefs in the deep ocean. Photo credit: Deep Sea Systems International's Global Explorer ROV. (See related story page 28.)

Gulf of Mexico Shipwrecks

Two BOEM research cruises completed in 2014 aboard the R/V *Pelican* investigated eight shipwrecks in the Gulf of Mexico to understand how shipwrecks change over time. The scientists are trying to determine the extent to which these shipwrecks and their resident biological communities were exposed to oil and/or dispersant from the 2010 Deepwater Horizon oil spill. The scientists investigated shipwrecks in water depths ranging from just under 500 ft to more than 7,500 ft to look at shipwreck corrosion, hydrocarbon exposure, microbiology, and archaeology. These studies will help improve understanding of impacts of oil spills on shipwrecks as well as microbial and corrosion processes for improved stewardship.

The shipwrecks: three World War II-era steel-hulled vessels, and five pre-20th century wooden hulled sailing ships – have been previously investigated by BOEM.

Learn more about BOEM's Gulf of Mexico Archaeology program and historic shipwrecks from World War II, 19th Century Steamships, Ships of Exploration, and Deepwater wrecks (greater than 1,000 ft deep): <http://www.boem.gov/Environmental-Stewardship/Archaeology/Shipwrecks.aspx> and <http://www.boem.gov/GOM-SCHEMA/> and http://mbac.gmu.edu/mbac_wp/gulf_wrecks/

Great Strides for Renewable Energy

By Cheryl Fossani, DOI

As part of President Obama's Climate Action Plan to create American jobs, develop clean energy sources, and cut carbon pollution, the Bureau of Ocean Energy Management (BOEM) has been making huge strides in offshore renewable energy off the Atlantic coast.

During late-November, BOEM met two major milestones for offshore renewable energy development in the United States. The first was the announcement that more than 742,000 acres offshore Massachusetts would be offered through competitive lease sale for commercial wind energy development, tripling the amount of federal offshore acreage available for commercial-scale wind energy projects. If this area were to be developed to its fullest potential, it could offer between 4 and 5 gigawatts of commercial wind generation, enough electricity to power over 1.4 million homes. The Massachusetts Wind Energy Area is located approximately 12 nautical miles offshore Massachusetts.

<http://www.doi.gov/news/pressreleases/interior-to-auction-more-than-742-thousand-acres-offshore-massachusetts-for-wind-energy-development.cfm>

The second milestone was BOEM's providing the first right-of-way (ROW) grant to Deepwater Wind Block Island Transmission System, LLC (Deepwater Wind). "This decision marks the first right-of-way grant offered in federal waters for renewable energy transmission, paving the way for Block Island, the only Rhode Island community not connected



Map of wind project areas, including the Massachusetts Wind Energy Area and the right-of-way grant to Deepwater Wind Block Island Transmission System, LLC., located off the coasts of Massachusetts and Rhode Island. Image credit: BOEM.

to the grid, to have access to clean, affordable renewable energy. This announcement is an exciting development for Block Island, but it also represents a big step in our nation's sustainable energy future," said Secretary Jewell.

The proposed project would install a bi-directional submerged transmission cable between Block Island and the Rhode Island mainland. The transmission system would connect a proposed 30 megawatt wind farm to the Rhode Island mainland and transmit power from the existing onshore transmission grid to Block Island.

BOEM's Acting Director Walter Cruickshank said the announcement "builds on Interior's work to stand up a sustainable offshore wind program for the Atlantic Coast." He said the Department is, "looking forward to working with Deepwater Wind to bring this offshore infrastructure project to fruition."

In other renewable energy news, in early December, BOEM published an environmental assessment (EA) describing proposed wind

energy-related research activities in the mid-Atlantic off the coast of Virginia. BOEM's EA considers the foreseeable environmental and socioeconomic consequences associated with the approval of offshore wind energy activities. The Virginia Department of Mines, Minerals and Energy (DMME) has submitted a research activities plan proposing to install and operate two 6-megawatt wind turbine generators, 24 nautical miles off the coast of Virginia Beach, as well as a cable to transport the energy to shore. This research project would help to inform the future production of offshore wind energy. <http://www.boem.gov/press12012014/>

As of mid-January 2015, BOEM has awarded seven commercial wind energy leases off the Atlantic coast: two non-competitive leases (Cape Wind in Nantucket Sound off Massachusetts and an area off Delaware) and five competitive leases (two offshore Massachusetts-Rhode Island, two offshore Maryland and another offshore Virginia). Since 2009, the Department of the Interior has approved 52 wind, solar and geothermal utility-scale projects on public or tribal lands, including associated transmission corridors and infrastructure to connect to established power grids. When built, these projects could provide about 14,000 megawatts – enough energy to power nearly 4.8 million homes and support more than 20,000 construction and operations jobs. <http://www.doi.gov/news/press-releases/interior-offers-first-right-of-way-for-renewable-energy-transmission-in-federal-waters.cfm>

SEA-LEVEL RISE PANEL DISCUSSION

Available on-line

On October 16, 2014, FEMA hosted a live webinar with Inter-agency experts to hear what the Federal Coastal Partners are doing to analyze the potential impacts of sea level rise and support States and local communities as they plan and prepare for disaster resiliency along our Nation's coastline.

The “Inter-agency Sea-Level Rise Panel Discussion” included subject matter experts from FEMA, EPA, NOAA, USGS, and the U.S. Army Corps of Engineers (USACE).

You can watch the full presentation with slides and audio or view presentation segments by agency.

Full panel discussion: https://www.youtube.com/watch?v=5DK26UVZN_Mk&feature=youtu.be

Agency-specific segments:

FEMA: <https://www.youtube.com/watch?v=8Am-fBgoWw&feature=youtu.be>

EPA: <https://www.youtube.com/watch?v=OH9osHeVvHE&feature=youtu.be>

NOAA: <https://www.youtube.com/watch?v=vxYII7UaD0U&feature=youtu.be>

USGS: <https://www.youtube.com/watch?v=Jw9ql-9wjF0>

USACE: <https://www.youtube.com/watch?v=jbiyd0cCgFk&feature=youtu.be>

Envisioning Sea-Level Rise

Images Help Communities ‘See’ Challenges

By Cheryl Fossani, DOI



Above are two winning photos depicting coastal flooding as a result of a perigean spring tide (also known as a ‘King Tide’). At left- King tides, combined with sea-level rise makes for soggy picnicking in Seabrook Beach, NH. Photo credit: Ron Sher. At right-King tide flooding in Kennebunk, Maine. Photo credit: Bill Grabin.

This fall, the USGS partnered with the Gulf of Maine Council, Gulf of Maine King Tides, and more than a dozen other organizations to engage communities in envisioning the local impacts of sea level rise through a regional photo contest that took place during a king tide event.

Perigean spring tides, also known as king tides, are the maximum high tide levels experienced by a coastal area over the course of a year. King tides can provide a glimpse of future daily water levels resulting from the impacts of sea level rise.

Coastal residents from Massachusetts to Nova Scotia submitted over 150 images documenting scenes that may become typical in the Gulf of Maine as sea level rises.

View the winning images, along with additional images from the photo contest: <http://gulfofmaine.kingtides.net/2014/08/28/featured-event-october-9-2014/>

You can participate in a king tides project too!

Have you witnessed king tides in your favorite coastal town? Upload your photos to Twitter and Instagram using the hashtag #KingTides.

The California King Tides Project: www.california.kingtides.net, Submit your photos and view images at: www.flickr.com/groups/cakingtides



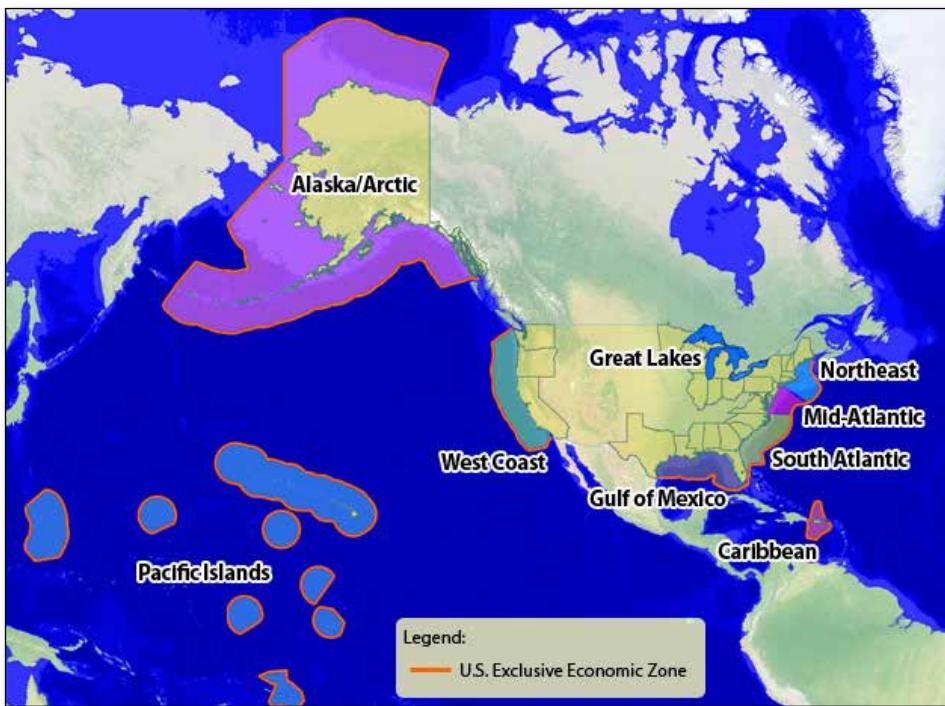
Puddledock, Portsmouth, NH. Photo credit: Tim Hayes. <http://gulfofmaine.kingtides.net/>

FEDERAL COASTAL PARTNERS

Visit FEMA’s Coastal Partner Pages where you can see the various roles of federal agencies that work together to provide science, services and support to coastal communities to ensure resource protection, community safety and reduced risk.



<http://www.fema.gov/protecting-homes/coastal-partner-pages>



Regional News

The National Ocean Policy proposed Federal-State-Tribal partnerships for marine planning at regional levels. DOI leadership supports state-led regional ocean partnerships (ROP's), as well as Federal-state-tribal partnerships for regional marine planning (RPB's). Four geographic regions now have operational regional planning bodies: Northeast, Mid-Atlantic, Caribbean and the Pacific Islands. Three other regions are close to joining the process – the South Atlantic, the Gulf of Mexico and the West Coast.

Interior contacts and related links:

Gulf of Maine

Susan Russell-Robinson (USGS)

(U.S., Canada)

ROP: <http://www.gulfofmaine.org/2/>

December 8 marked the opening of Portland's King Tides Trail, an educational project that the Gulf of Maine Climate Network organized in partnership with students at the University of Southern Maine (with permission from the City of Portland's Student Art Committee). The 4.1-mile temporary trail (in place until Jan. 23), is marked primarily by solar-powered beacons and illustrates where a 3-foot sea-level-rise would fall in several neighborhoods (Bayside, the Eastern Promenade and parts of the Old Port). The Google map link below

shows the trail and many observation points where signs of flooding are already evident at extreme high tides: <https://www.google.com/maps/d/viewer?mid=zbYcMTSgc7dU.khLljE2b-WTlw> Maine Public Radio covered the opening event. <http://news.mpbn.net/post/visualizing-climate-change-maine-artists-work-intends-spark-debate> See related story page 25.

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: www.midatlanticocean.org

The Mid-Atlantic RPB held an in-person meeting at the Javits Federal Building in New York, NY, on January 21 and 22. The meeting included discussions of RPB materials that had been informed by stakeholder input received via email and during a series of regional public listening sessions conducted in November. At the meeting, the RPB approved its proposed approach for a Mid-Atlantic Regional Ocean Action Plan, and identified next steps to develop the plan. The RPB also provided guidance for further development of the Regional Ocean Assessment by its internal work-group. The materials discussed during the meeting are posted on the RPB

website; meeting presentations and a summary will be posted in the coming weeks.

West Coast

Joan Barninski (BOEM)

Ellen Aronson (BOEM)

(California, Washington and Oregon)

ROP: www.westcoastoceans.org

The tribal, state and federal representatives who comprise the potential membership of a West Coast Regional Planning Body (WCRPB) held an inaugural in-person meeting on January 12, 2015 in Portland, Oregon. The meeting was well-attended by the potential WCRPB members and by public observers. National Ocean Council Director Beth Kerttula participated in the meeting and presented information about the National Ocean Policy and Marine Planning. DOI was represented by Ellen Aronson, Pacific Regional Director for the Bureau of Ocean Energy Management, and several other DOI personnel attended the meeting as well. A key meeting objective was to achieve consensus from the tribal, state and federal representatives in attendance to initiate the formation of the WCRPB. This objective was achieved as the representatives were overwhelmingly supportive of moving forward to establish a West Coast regional marine planning body.

Northeast

Bob LaBelle (BOEM)

Leann Bullin (BOEM)

(Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut)

RPB: www.neoceanplanning.org

ROP: www.northeastoceancouncil.org/

The Northeast RPB met on November 13 and 14 in New Hampshire; the meeting materials and summary are posted on the NE ocean planning website. The RPB's regulatory work group met via teleconference in early January to continue its work based on outcomes from the RPB meeting. The full RPB held a teleconference in mid-January to discuss the timeline and activities leading up to its next in-person meeting. The NROC winter meeting will be held on February 5 in Portsmouth, NH.

See Regional News page 27

Regional News continued from page 26

Great Lakes

**Phyllis Ellin (NPS),
Norman Grannemann (USGS)**

Charlie Wooley (USFWS)

(Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin)

Great Lakes Research Partnership:

www.epa.gov/glpo/glri/

ROP: www.cglg.org/

On August 12, 2014, in the middle of her annual August Lake Michigan hydroacoustic survey, the USGS Great Lakes Science Center's 104-foot R/V *Sturgeon*, docked at Navy Pier in Chicago. Danielle Chesky of the Northeast Midwest Institute (NEMWI) took the opportunity to hold a press conference where stakeholders and close partners who depend upon sound science for management of the Great Lakes economy and ecosystem could share comments. The event recognized accomplishments realized through USGS partnerships. During the day, the vessel hosted partners, students and tourists for tours.

Alaska/Arctic

**Jim Kendall (BOEM)
(Alaska)**

Gulf of Mexico

Linda Walker (USFWS)

(Alabama, Florida, Louisiana, Mississippi, Texas)

ROP: www.gulfmexicoalliance.org

See Deepwater Horizon and RESTORE ACT updates in *related story page 5*.

Caribbean

Sherri Fields (NPS)

(Puerto Rico, U.S. Virgin Islands)

ROP: <http://www.drna.gobierno.pr/oficinas/arn/recursosvivientes/costasreservasrefugios/pmzc/crop>

Pacific Islands

Richard Hannan (USFWS)

(American Samoa, Commonwealth of Northern Mariana Islands, Guam, Hawaii)

RPB: www.PacificIslandsRPB.org

South Atlantic

Eric Strom (USGS)

(North Carolina, South Carolina, Georgia, Florida)

ROP: www.southatlanticalliance.org

Can We Eat Our Way Out of the Invasive Species Crisis?

By Jason Goldberg, USFWS

With many species posing significant threats to wildlife, recreational opportunities, agriculture and other ecosystem services, is it possible that we can solve a crisis by gathering around the dinner table?

From a practical perspective, why not harvest invasives and do something useful with them? They can be served for lunch, worn for warm winter clothing, and even turned into biofuel to meet our energy needs, so why not do so?

The topic has been hotly debated. The answer, according to USFWS and NOAA research, lies somewhere in the middle. Two new publications provide some guidance. If used properly, encouraging public or commercial harvest represents a significant opportunity to support ecosystem and natural resource management while simultaneously boosting economic development and environmental awareness. However, if used incorrectly, negative consequences such as further spread can occur and make the invasion even worse, wasting both time and money.

In general, successful application of harvesting invasives is species- and region-dependent. Good planning and monitoring, including adaptive management, are as essential as for any other management option. Finally, invasive species may taste good or look fashionable, but encouraging their harvest is not a panacea and may not achieve conservation goals or necessarily provide more benefits than other approaches to invasive species management.



A new study helps shed light on whether lionfish and other invasive species are fierce or food. Photo credit: NOAA.

Publications:

“*Harvest Incentives: A Tool for Managing Aquatic Invasive Species*,” is available on-line: http://www.invasivespecies.gov/ISAC/White%20Papers/ISAC_HarvestIncentives_White-Paper_FINAL.pdf

“*Review of harvest incentives to control invasive species*,” was recently published in the journal, “*Management of Biological Invasions*”: http://www.reabic.net/journals/mbi/2014/3/MBI_2014_Pasko_Goldberg.pdf



Eating lionfish has been proposed as one solution to reduce the harm they cause. Photo credit: Christopher Testani.

The Surfing Bison

Shipwrecks: Preserving History through Science and Archaeology

<http://www.boem.gov/Renewable-Energy/Historic-Preservation-Activities/>



Historic Preservation on the Outer Continental Shelf

By William Hoffman (BOEM), Brandi Carrier (BOEM), Cheryl Fossani (DOI)

As BOEM's Office of Renewable Energy Programs continues to oversee the development of renewable energy offshore Atlantic states, understanding the submerged cultural resources that may potentially be affected by development activities is crucial to responsible management.

Historic properties on the Outer Continental Shelf include historic shipwrecks, sunken aircraft, lighthouses, and pre-contact archaeological sites that have become inundated due to global sea level rise since the height of the last ice age circa 19,000 years ago.

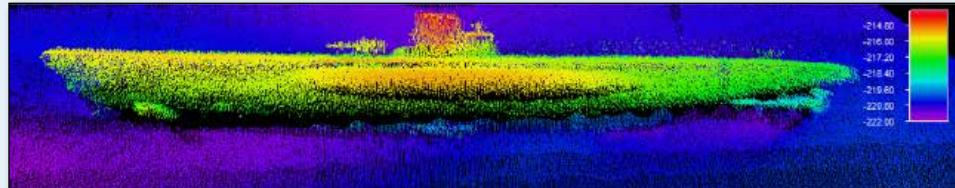
Recent research cruises are increasing our understanding of underwater cultural heritage offshore Virginia and North Carolina. **The Battle of the Atlantic Expedition research cruise** identified and recorded the historic properties within the battlefield landscape relating to World War II (WWII) naval activity off America's coasts. In collaboration with NOAA's Monitor National Marine Sanctuary, the team discovered the final resting places of the German U-576 and

the Bluefields, both casualties of WWII, offshore North Carolina. Other partners include: NOAA's Office of Exploration and Research, the National Park Service Submerged Resources Center, East Carolina University, the University of North Carolina Coastal Studies Institute, and SRI International. **The Virginia Collaborative Archaeological Survey (VCAS) cruise** focused on the submerged resources offshore Virginia Beach and included side-scan and sector scanning sonar, video recording, and photography. Several new shipwrecks were identified and many more were formally recorded for the first time.

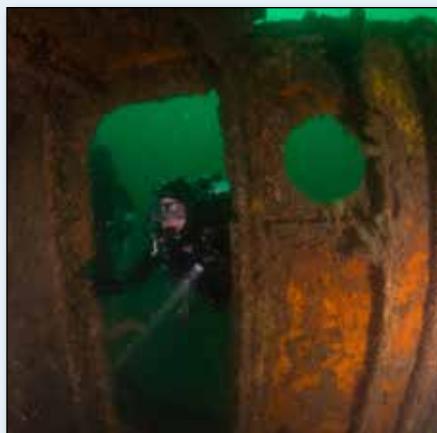
Learn more: <http://www.boem.gov/>

Renewable-Energy, Historic-Preservation Activities: <http://www.boem.gov/Renewable-Energy/Historic-Preservation-Activities/>

See related story page 23.



Multibeam imagery of the WWII-era German U-576, identified in August 2014 during the Battle of the Atlantic Expedition. BOEM archaeologists, scientists from NOAA's Office of National Marine Sanctuaries, and others worked together in a five-year collaboration to discover this significant vessel and record the historic battlefield from WWII, located approximately 30 miles off the coast of North Carolina. Image credit: BOEM.



Above left: BOEM Archaeologists William Hoffman (in doorway) and Doug Jones (back left) explore the Middle Ground wreck during the Virginia Collaborative Archaeological Survey (VCAS) in July 2014.

Above right: During the Virginia Collaborative Archaeological Survey in July 2014, BOEM Archaeologists William Hoffman (left) and Brandi Carrier (right) measure the width of a shipwreck while NOAA Archaeologist Joe Hoyt (with lights) illuminates the scene and collects photographs. Photo Credits: John McCord, UNC Coastal Studies Institute.