



# NEWSWAVE

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

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## Superstorm Sandy

### Interior Leadership and Expertise Support the Nation

By Ann Tihansky-DOI

Hurricane Sandy made landfall over New Jersey on October 29, 2012. The hurricane brought high winds, storm surge and coastal impacts to much of the Eastern United States, including New York City.

USGS tidal sensors measured record-setting storm surge peaks with floodwaters completely over-topping some of the gages.

The Statue of Liberty, located on Liberty Island, a 12-acre island located a mile south of lower Manhattan, was in the direct path of a massive storm surge. High-water marks flagged by USGS crews show storm surge levels

*See Superstorm Sandy page 15*

Winter 2013

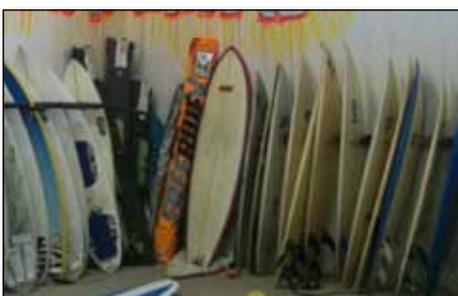


Interior leaders meet at the Statue of Liberty during the Secretary's tour to inspect Hurricane Sandy's damages. Left to right, Statue of Liberty Superintendent David Luchsinger, NPS Director Jon Jarvis, and Secretary Ken Salazar. Photo credit: Tami Heilemann, DOI.

The Statue of Liberty's 126 year-old iron framework designed by Alexandre-Gustave Eiffel withstood the storm's intense winds, but surge and waves flooded and destroyed support facilities, docks and walkways.



With the New York City skyline in the background, this dock at Liberty Island demonstrates the destructive power Hurricane Sandy's storm surge had on the northeastern U.S. coastal region. Photo credit: Tami Heilemann, DOI.



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

**Help for Sea Turtle Hatchlings**

By Shayne Banks-BLM

The Southeastern States Field Office of the Bureau for Land Management administers several small beach front tracts in south Alabama where federally threatened Loggerhead sea turtles nest. Because turtles lay eggs at night, locating a sea turtle nesting spot



and watching a hatching is rare. Volunteers from “Share the Beach” help patrol the beaches and watch for signs of turtle nesting. Once nests are found they are flagged and monitored. Sometimes it is necessary to move nests farther away from the water to ensure a more successful hatch.

In 2012, three Loggerhead sea turtle nests were located on BLM tracts. One nest, A-39 was found on June 25, and the nest “boiled” on August 23. Eighty-nine babies hatched and made it to the water. This was a 98 percent hatch rate! Loggerheads nest anytime between March and October, but mainly between June and August. Females may nest several times during a season, laying between 100 to 145 soft, round white eggs per nest. The eggs incubate in the sand for about 48 to 70 days. Hatchlings emerge from the nest mostly at night, running quickly toward the open ocean. Sea turtles can have a life span of between 30 to more than 50 years. <http://www.blm.gov/es/st/en.html>



A Loggerhead sea turtle heads back into the sea after laying her eggs on the beach. Photo credits: Mike Reynolds.

## 30 Years of Coastal Change in One Blow

*Coastal Change on Fire Island Provides Opportunities for Improved Understanding of Coastal Dynamics*

By Ann Tihansky-DOI, Cheryl Hapke-USGS, Rebecca Beavers-NPS, Mary Foley-NPS, Patricia Rafferty-NPS

More than 30 years of coastal morphology data, collected as part of a long-term study at Fire Island National Seashore, put the impact of Sandy into historical perspective. Measurements at coastal profile data stations along the shoreline made both before and after Hurricane Sandy recorded the magnitude of the powerful storm's impact on the beaches. "The entire coastline along Fire Island has basically been reconfigured. The dunes have moved substantially landward. A lot of the beach has eroded. And it's very dramatic in terms of the amount of change during the course of just one storm,"

USGS Geologist Cheryl Hapke said. "On average, the dunes at Fire Island eroded back 70 feet - the equivalent of 30 years of change. Our data also showed that dunes lost as much as 10 feet of elevation. This rapid response data was used to help the National Park Service assess the areas of the coast that were most vulnerable to a nor'easter that impacted the coast a week after Sandy."

Impacts from Sandy also provide scientists an opportunity to monitor and evaluate coastal change processes to inform management strategies. Scientific information like this can be transferred to other coastal areas and used as part of a larger coastal management strategy. Chris Soller, Superintendent



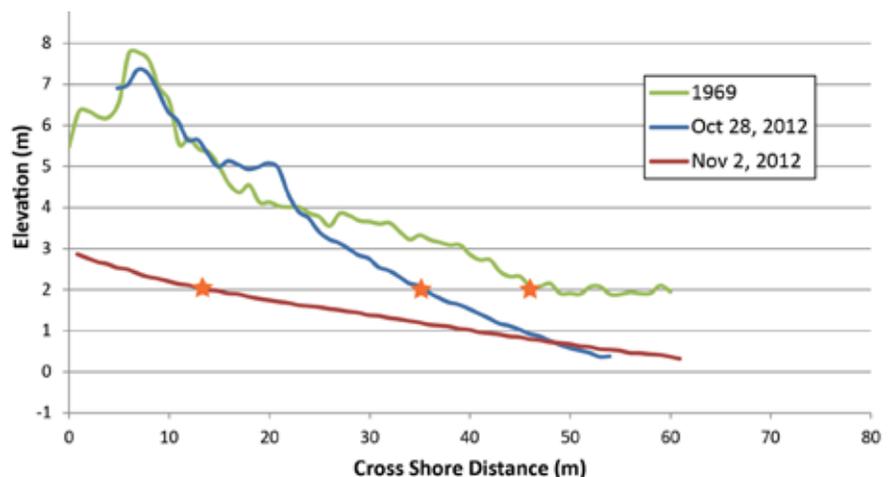
A new breach on Fire Island created by Hurricane Sandy is being monitored by an interagency research team. The breach has provided an opportunity to study coastal processes to help inform management strategies. Photo credit: Rebecca Beavers, NPS.

at Fire Island National Seashore said, "The reports generated from this research are valuable tools for land managers and stakeholders to consider when maintaining coastal resources, especially in the face of sea-level rise and other global climate change impacts. Studies of the ocean bottom and sand movement along the shoreline help to inform management decisions along a dynamic barrier island coastline, like Fire Island."

As an example, Sandy's powerful waves and surge also breached

Fire Island creating a new inlet. Through coordinated efforts, Interior's Sandy Incident Management Team (IMT), the NPS Northeast Regional Office and Fire Island National Seashore science staff, USGS and Stony Brook University have been working together to collect information that informs both the science and the management strategies for coastal resources. The Breach Contingency Plan team, which includes NPS, USGS, USFWS, the USACE and the State

*See Thirty Years page 23*



Beach profiles from location C-8 (shown on page 23) on Fire Island comparing 1969 with those measured before and after Hurricane Sandy show the dramatic effects of the storm. The dune area did not experience much change from 1969 to 2012 (before Sandy), but changed dramatically in response to the storm. The orange stars on the profiles mark locations of the 2-meter elevation contour and document that erosion from Sandy was nearly twice as much as had eroded in the previous 43 years. Graphic: USGS.

## Collecting Expert Community Knowledge

*The Pacific Regional Ocean Uses Atlas*

By Sara Guiltinan-BOEM

Learn more: <http://www.boem.gov/uploadedFiles/PROUA-Fact-Sheet.pdf>

The Pacific Regional Ocean Uses Atlas Project is an interagency collaboration between the Bureau of Ocean Energy Management (BOEM) and NOAA designed to document where coastal communities use the ocean across a full range of typical human activities and sectors. The primary purpose of the project is to enhance ocean planning for offshore renewable energy development and inform other ocean planning strategies that require insight into how and where ocean areas are used for recreational, commercial, and industrial activities. To minimize potential use conflicts and to help identify suitable operating areas for new and emerging uses, including various forms of offshore renewable energy, it is critical to understand the patterns and implications of ongoing and future human uses of the ocean. The project team will employ participatory mapping techniques and capture the knowledge of ocean use experts, community stakeholders, and cultural use practitioners. The project offers a proven, flexible, and scalable approach that empowers coastal communities to paint an accurate picture of human use on a scale appropriate for local-, state-, or regional-level ocean planning.

The geographic focus of the Pacific Regional Ocean Uses Atlas is offshore the states of Washington, Oregon, and Hawaii. In Washington, BOEM and NOAA have partnered with the Washington state agencies and ocean uses data will be collected for coastal waters and the Outer Continental Shelf (OCS).

In Oregon, the geographic scope of the project will be the OCS, and in Hawaii, data will be collected for coastal waters and the OCS for the Main Hawaiian Islands. Mapping workshops in Washington have been scheduled for April 2013 and will be followed by Oregon workshops in early summer.

### Target List of Pacific Regional Ocean Users:

#### Industry/Military Sector

- Renewable Energy
- Military Operations & Ordnance Disposal
- Mining and Mineral Extraction
- Underwater Telecommunication & Power Cables
- Commercial Shipping (including Towing & Barging)
- Designated Dumping & Outfall Sites
- Underwater Pipelines
- Mariculture

#### Fishing Sector

- Commercial Fishing with Benthic Mobile & Fixed Gear
- Commercial Pelagic Fishing
- Commercial Dive Fishing
- Commercial Seaweed Harvest
- Commercial Shore-Based Harvest
- Recreational Dive Fishing
- Recreational Fishing from Boats
- Recreational Shore-Based Harvest
- Kayak Fishing
- Indigenous Fishing

#### Non-Consumptive Sector

- Motorized Boating
- Sailing
- Paddling
- Surface Board Sports
- SCUBA/Snorkeling
- Swimming
- Wildlife Viewing at Sea
- Tide Pooling
- Shore Use
- Indigenous Cultural Use
- Tourism Cruise Ships

## A Database to Help Track Marine Invasive Species

By Seth Sykora-Bodie-DOI

For the past several years, the National Park Service (NPS) has been partnering with the United States Geological Survey (USGS) and The Nature Conservancy (TNC) to keep track of marine invasive species within National Parks using the new NPS Marine Invasive Species Database.

MIS Database: <http://www.nature.nps.gov/water/marineinvasives/MISdatabase.cfm>

Based on research completed by TNC, NPS is compiling data to analyze both how these species are invading, and which ones pose the greatest threat to the local environment. Marine areas are separated into 17 separate eco-regions based on similarities between the species located within each. Users can choose one of these regions through interactive maps and access information about marine invasive species that have been documented in each NPS unit. They can also see which potential invasive species have been identified in the wider eco-region but are not yet within park boundaries. The database also includes a tool TNC developed that incorporates quantitative data into a calculation of the risk each species may pose to a specific ecosystem.

One species that is included in the new database, Wakame (*Undaria pinnatifida*), is an invasive alga that has recently gained attention. While Wakame is most well-known for its slightly sweet flavor and use in Japanese dishes such as Miso soup, it is also a highly fe-

*See Invasives page 21*

## Large Dock from Japan Washes Ashore in Olympic National Park Wilderness

By Bret Wolfe-USFWS

On December 17, 2012, the U.S. Coast Guard reported that a massive concrete dock had washed ashore in a remote Wilderness Area of Olympic National Park.

The National Park Service led a multi-agency team in a reconnaissance trip to the site to determine its origin, access impacts and identify non-native species. With help from the Japanese government, the team concluded that the dock was one of four missing from the fishing port of Misawa following the 2011 Tohoku earthquake and tsunami. The first dock was found on a nearby Japanese island, while the second was found washed ashore near Agate, Oregon in June 2012. The fourth and final dock may have been spotted off the coast of Hawai'i in September.

In addition to being located within a designated wilderness portion of Olympic National Park, the dock is also within Olympic Coast National Marine Sanctuary and adjacent to an important bird nesting colony in the Washington Islands National Wildlife Refuge Complex that was designated as an UNESCO Biosphere Reserve in 1976 recognizing its global ecological significance to the area. In order to minimize damage to the coastline and marine habitat, Federal agencies are moving forward with plans to remove the dock. It is currently grounded in a very remote and inaccessible location far from any roads and has been heavily damaged by battering around on rocks.



Above, a large (see people in image at lower right for scale) Japanese dock that was transported to the Washington coast after the 2011 Tohoku earthquake and tsunami is sampled and decontaminated by an interagency team led by the National Park Service. Photo credit: Bret Wolfe, USFWS.

The interagency team has completed three trips to the grounding site to neutralize potentially invasive species and to assess removal options. Initial laboratory testing results have identified 30-50 plant and animal species on the dock that are native to Japan but not the United States, including species of algae, seaweed, mussels, and barnacles. The team attached a NOAA tracking buoy in case the dock washes back out to sea.

To follow the continuing Japan tsunami marine debris story or to learn what you should do if you encounter marine debris visit:

<http://marinedebris.noaa.gov/tsunamidebris/>

## Cyanobacterial Disease Killing Coral on Kauai, Hawaii

By Jonathan Sleeman-USGS, Thierry Work-USGS, Paul Slota-USGS, and Gail Moede Rogall-USGS

An unusual coral mortality event on the north shore of the Hawaiian island of Kauai is currently being investigated by a collaborative team including the USGS National Wildlife Health Center Honolulu Field Station (HFS) and the Hawaii Institute of Marine Biology at the University of Hawaii. Scientists have visited two different sites near Hanalei Bay to take multiple samples and document extent of the damage. Analysis has determined that a cyanobacterial infection is associated with coral tissue loss and death. At both sites, coral reefs were heavily degraded with overgrowth of turf algae as well as sediment deposits.

This coral disease outbreak is the first instance where cyanobacterial disease on a large scale has been documented in corals in Hawaii. Lesions are covering 10 – 80 percent of affected colonies. The consistent presentation of gross and microscopic lesions and the absence of this disease in corals

*See Corals page 8*



USGS scientist Thierry Work takes a sample from diseased coral at Tunnels Reef on the north shore of Kauai, Hawaii. Photo credit: Terry Lilley.

## Shifting Sands-Perspectives from USGS Coastal Geologists

By E. Robert Thieler, Nathaniel G. Plant and Hilary F. Stockdon

Superstorm Sandy has taken a tragic toll on the residents of the mid-Atlantic's barrier islands. The impact is not unlike many other destructive recent storms in the United States, such as Ivan, Katrina and Ike. So what can be done? In their natural state, the barrier islands that line about half of the U.S. coast, including most of the region affected by Sandy, are mobile and change constantly in response to wind, waves, tides and sea level. In fact, these islands owe their very existence to storms and the long-term rise in sea level of the past several thousand years. But much of today's coastline is a complex hybrid of a natural, dynamic landform overprinted with decades of immobile human development. Taking the dynamic nature of these barrier islands into account as we rebuild after major storms can help reduce the vulnerability of the local infrastructure to the inevitable next big storm.

Beaches and dunes are the first line defense from ocean waves and storm surge, protecting the island's interior. When dunes erode and fail, much of the sand is carried up onto the island as overwash. While a failed dune in a coastal community makes it more exposed to the next storm, dune failure can make an undeveloped barrier island stronger by adding elevation to its core. This is how the barrier islands were built in the first place. During Superstorm Sandy, broad swaths of the coastline from North Carolina to Massachusetts experienced dune failure and massive overwash. The sand washed onto and across the barrier islands, filling roads, yards and living rooms. This overwash sand instantly added several feet of elevation to the islands. On a natural barrier



### ***The Coastal Barrier Resources Act***

*A natural resource management tool to discourage development in high risk areas that is harmful to fish and wildlife, and costly to the American taxpayer.*

[www.fws.gov/CBRA](http://www.fws.gov/CBRA)

*Related story page 9*

island, this new elevation reduces the chance of inundation from the next storm. And as New Yorkers learned, a couple of feet can make all the difference between inconvenience and catastrophe. As the army of bulldozers and other earth-moving equipment deployed along the coast suggests current efforts appear headed to restore the islands to their pre-storm state. Pushing the sand off the streets and back onto the beach removes the elevation that would have added freeboard above future floods. On a developed shore, this excavation of the roads is absolutely necessary to regain the dunes that are the first line of defense. But, everyone must understand that by resetting the island back to pre-storm conditions, the long-term risks are increased.

Then there is the issue of rising seas. Sea level has risen 6 to 9 inches along the New Jersey coast since the last big storm in 1962 (the Ash Wednesday storm). Some residents say the 1962 storm barely reached their doorstep, while this time Superstorm Sandy flooded them by a foot. Although Sandy and the 1962 storm differ in their details, 50 years of sea-level rise certainly allowed water to reach areas that would not have been reached otherwise. What we know about storms, sea-level rise and barrier island response can be applied to redevelopment of the New Jersey coast. We can either try to thwart the natural response -- requiring increasing investment in construction and maintenance of storm protection structures -- or adapt by relocating farther away from the beachfront and upward as the barrier islands move. There is historical precedent for adaptation by moving. In New Jersey, some pre-WWII beachfront communities had moveable houses. In 1888, the Brighton Beach Hotel on Coney Island was moved several hundred feet back from the ocean by six steam locomotives.

There are difficult choices to be made in our response to Superstorm Sandy. Doing nothing other than rebuilding is an easy choice and least expensive in the near-term, unless the next "superstorm" comes next year, or even this winter. Hundreds of miles of the East Coast where dunes were eroded or no longer exist are now more vulnerable than ever. Protecting the entire coast with coastal structures like sea walls is not feasible or even desirable; there are aspects of coastal armoring that have negative consequences. A practical response will be a blend of all the realistic options. This requires identifying which areas can adapt best, prioritizing which will receive the most protection and which will receive the least, or even none. This will be a challenging process. But, if undertaken jointly by citizens, policymakers and scientists, it could be a refreshing response and yield a coastal environment that is more resilient and economically and environmentally sound.

[http://www.usgs.gov/blogs/features/usgs\\_top\\_story/shifting-sands-sandys-lessons-in-coastal-geology/](http://www.usgs.gov/blogs/features/usgs_top_story/shifting-sands-sandys-lessons-in-coastal-geology/)

## Restoring the Gulf after the Deepwater Horizon Oil Spill

By Nanciann Regalado-USFWS

*RESTORE ACT: Resources and Ecosystem Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act*

Interior has a major role in restoring the Gulf of Mexico after the April 2010 Deepwater Horizon oil spill damaged the Gulf of Mexico's natural resources and impacted state economies and communities relying on healthy Gulf ecosystems.

Passed in 2012, the RESTORE Act is an historic piece of legislation that directs 80% of all civil and administrative penalties paid by the responsible parties under the Clean Water Act to the newly created Gulf Coast Restoration Trust rather than to the Oil Spill Liability Trust Fund. The RESTORE Act requires the collected funds directly benefit the Gulf region for the purposes of ecosystem restoration, economic recovery, and tourism promotion.

The RESTORE Act created the RESTORE Council, comprised of governors from the five affected Gulf States, the Secretaries from the U.S. Departments of Interior, Commerce, Agriculture, and Homeland Security as well as the Secretary of the Army and the Administrator of the U.S. Environmental Protection Agency. The Gulf States selected and President Obama appointed the Secretary of Commerce to serve as the Council's Chair. The Council is committed to including the public throughout the restoration process.

In December 2012, the Council held their first meeting in Mobile, Alabama. Rachel Jacobson, Princi-



The RESTORE Council's first meeting in Mobile, Alabama December, 2012 focused on ensuring the long-term health, prosperity, and resilience of Gulf Coast communities. Keep up with meeting schedules and additional information at [www.restorethegulf.gov](http://www.restorethegulf.gov) Learn more about the RESTORE ACT: <http://www.whitehouse.gov/the-press-office/2012/09/10/executive-order-gulf-coast-ecosystem-restoration>

pal Deputy Assistant Secretary for Fish and Wildlife and Parks represented Secretary Salazar along with other Council members who are working with States and local communities to identify projects and programs that will restore the region's natural resources and help benefit jobs, communities, and economies those resources support. Interior staff manned the Ocean, Coasts and Great Lakes Program exhibit, sharing information about the critical role Interior is playing in Gulf restoration to over 500 members of the public who attended the meeting.

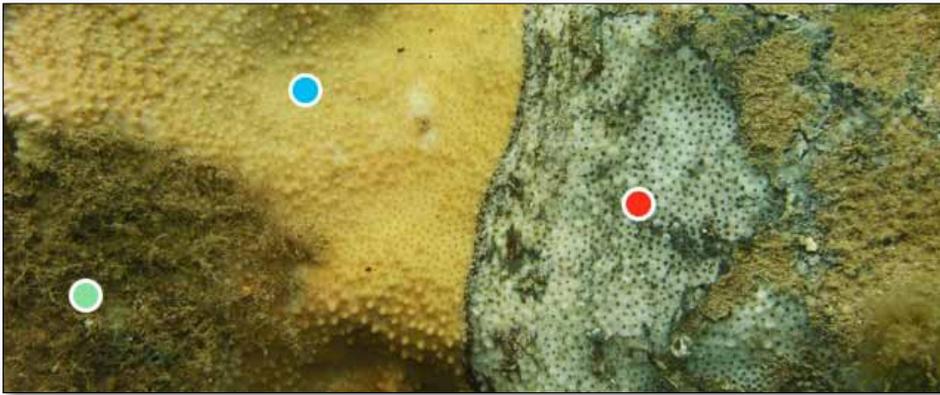
On January 29, 2013, the Council released, "The Path Forward to Restoring the Gulf Coast: A Proposed Comprehensive Plan". This document reflects the deliberations of the Council to date in developing a more detailed initial Comprehensive Plan. The collective focus is on ensuring the long-term health, prosperity, and resilience of the Gulf Coast. Read it here: <http://www.restorethegulf.gov/release/2013/01/29/path-forward-restoring-gulf-coast>

## US and Canada Update Historical Great Lakes Water Quality Agreement

By Sandra Morrison-USGS

Nearly 20% of the world's fresh surface water supply is contained in the Great Lakes--the largest freshwater system on Earth. This vital resource is shared between the U.S. and Canada and in the 1960s when the two countries observed trends of deteriorating water quality, they joined together to develop the Great Lakes Water Quality Agreement (GLWQA). Signed in 1972, the Agreement's overall purpose was "to restore and maintain the chemical, physical and biological integrity of the waters" of the Great Lakes. It provided a framework for cooperative action to restore, protect and enhance the water quality of the Great Lakes and promote the ecological health of the Great Lakes basin. Over time, this Agreement has become a model of bi-national cooperation and collaboration that has made significant reductions of pollutant discharges and improvements to water quality in the Great Lakes. The Agreement is periodically revised to address new and emerging threats to water-quality and related issues. In September, 2012, the agreement was updated with includes new provisions to address the health of the Great Lakes ecosystem through attention to aquatic invasive species, habitat degradation, and the effects of climate change. It also supports continued work on existing threats to human health and the environment including harmful algae, toxic chemicals, and discharges from vessels. The amended agreement sets out

*See Great Lakes page 15*



Coral colony in Makua, HI showing examples of live coral (blue dot), macroalgae (green dot) and tissue loss associated with cyanobacteria (red dot). Photo credit: Thierry Work, USGS.

*Coral continued from page 5*

elsewhere in Hawaii indicate that this outbreak is an epidemic currently limited to the north shore of Kauai. The HFS has archived tissues of a similar disease in Hanalei Bay from 2009 indicating that cyanobacterial disease in corals on north Kauai has been around since that time.

Since 2001, HFS has been monitoring coral disease in Hawaii and U.S. Territories, Commonwealth, and Freely Associated States in the Pacific. A significant part of this effort is dedicated to applying standard biomedical tools used in wildlife disease investigations of corals in attempts to identify potential etiologic agents associated with coral mortality. While degradation of coral reefs is well documented in Hawaii, this is the first instance where a potential etiologic agent has been documented with a coral disease epidemic in the region.

If you see similar phenomena elsewhere in the Hawaiian Islands, please contact the USGS Honolulu Field Station at 808-792-9520 or Eyes of the Reef at 808-953-4044.

Learn more: [http://www.usgs.gov/blogs/features/usgs\\_top\\_story/coral-disease-outbreak-in-hawaii/](http://www.usgs.gov/blogs/features/usgs_top_story/coral-disease-outbreak-in-hawaii/)



These fish, known as sand lance, are important food for Arctic seabirds, beluga whales, ice seals, and other Arctic species. Learn more about Arctic fish. See *related story*, page 12.

**Subscribe to the Federal Ocean.Data.Gov's Newsletter**

Receive monthly updates about the National Ocean Council's data portal. Support ocean, coastal and Great Lakes information sharing and planning. See *related story*, page 11.

**Contact Laura Muhs  
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Below- An adult female walrus on ice floe in the US waters of the eastern Chukchi Sea, Alaska. Sparse summer sea ice in the Arctic over the past five years has caused behavioral changes in Pacific walrus according to research published by U.S. Geological Survey and Russian scientists. Photo credit: S.A. Sonsthagen, USGS. Learn more: <http://www.usgs.gov/newsroom/article.asp?ID=3453>

Watch USGS video on Youtube:

***“Tracking Pacific Walrus:  
Expedition to the  
Shrinking  
Chukchi Sea Ice”***

A documentary film explores walrus in their habitat and follows USGS researchers studying them in the Arctic. The USGS-produced film contains exclusive footage of the large mammals in their natural habitat. B-roll footage also available. <http://www.youtube.com/watch?v=pF-aNYhCr8k>



## Discouraging Risky Coastal Development

By Katie Niemi and Dana Wright-USFWS

Historically, the American people have been drawn to the coasts for their natural beauty, recreational value, and fish and wildlife. Around the mid-20th century, the development of the nation's hurricane prone and biologically rich coastal barriers, the low-lying landforms located at the interface of land and sea, began to take off in earnest. By the early 1980's, Congress and the federal government recognized that such development was unsustainable, and that certain federal actions and programs were subsidizing and encouraging this risky development.

Congress addressed these challenges thirty years ago with the enactment of the Coastal Barrier Resources Act (CBRA) of 1982, which established the Coastal Barrier Resources System (CBRS), now comprised of more than 3.1 million acres of relatively undeveloped coastal barrier habitat covering 2,500 miles of shoreline along the Atlantic and Gulf coasts, Great Lakes, Puerto Rico, and U.S. Virgin Islands. The Secretary of the Interior, through the U.S. Fish and Wildlife Service (USFWS), is responsible for administering CBRA.

CBRA encourages the conservation of coastal barriers and their associated aquatic habitat by restricting federal development subsidies within the CBRS such as new flood insurance; development grants; and funding for infrastructure, dredging and beach nourishment projects. CBRA does not regulate or prohibit the development of coastal barriers. Areas within the CBRS can be developed if private developers or



Storms and rising sea levels threaten human life and property in many U.S. coastal areas. Costs associated with these risks and with maintaining supporting infrastructure is unsustainable. The Coastal Barrier Resources Act of 1982 encourages conservation of undeveloped areas by restricting federal subsidies of coastal development activities. Photo credits: Ann Tihansky, DOI.

other non-federal parties bear the full cost and risk.

CBRA is more relevant now than ever before as our nation looks for common-sense, fiscally-responsible ways to preserve our important

coastal environment and keep people out of harm's way. However, CBRA is a map-based law and because the majority of the official CBRS maps were last updated in

See CBRA page 20

## USGS Partners With Mashpee Wampanoag Tribe in Tribal Educational Program

By Chris Polloni-USGS, Ben Gutierrez-USGS, and Monique Fordham-USGS

The Mashpee Wampanoag Tribe partnered with the U.S. Geological Survey (USGS) Woods Hole Coastal and Marine Science Center (WHCMSC) to develop and deliver a pilot summer science tribal educational program, “Native Youth in Science—Preserving Our Homelands.” Fourteen Mashpee Wampanoag students participated in the program.

The program emphasized ‘hands-on’ experiences through classroom and field presentations designed to help reconnect Mashpee Wampanoag youth with the ecology and geology of their traditional homelands. By weaving scientific information and data collection together with traditional ecological knowledge provided by tribal culture keepers, the program provided a context that stressed the ancestral relationships between the Wampanoag people and the ecosystems of their homelands. It also highlighted how science can be used as a tool to protect and preserve the ecosystems and homelands of the Mashpee Wampanoag Tribe.

Six “experience units,” had an overarching focus on traditional ecological knowledge and included: sources and quality of water; geologic history of Cape Cod and ties to the Wampanoag creation story and ancestral homelands; climate change, sea-level rise and shoreline change; regional geologic control on ecosystems and traditional tribal use of rocks and mate-



Above: Mashpee Wampanoag tribal youth and tribal culture keepers, support staff, and USGS personnel at the closing ceremony for the 2012 Native Youth in Science program. Photo credit: David Gray, Wampanoag Tribe.



Mashpee Wampanoag students learn about traditional food preparation through the ‘Native Youth in Science’ educational program. Photo credit: David Gray, Wampanoag Tribe.

rials; ethnobotany: people, plants and ecosystems; marsh ecology; topographic mapping and exploration of local geographic features important to Wampanoag cultural history.

This unique project and effective team has laid a foundation for more collaborative tribal educational initiatives in the future.

Learn more:

<http://soundwaves.usgs.gov/2012/12/outreach.html>

### Marine and Arctic News--Subscribe to IUCN's "Marine News"

*Marine News* is the International Union for Conservation of Nature's Global Marine and Polar Programme (GMPP) e-newsletter.

It includes news stories related to a diversity of marine-related topics such as climate change mitigation and adaptation; threatened marine species; energy and industry; marine protected areas; marine invasive species; fisheries and aquaculture; ocean governance and the Arctic. It also highlights recent marine expeditions and outstanding marine photographs. The IUCN's Global Coasts Initiative is the focus of Issue 9 – September 2012, celebrates the last 10 years and new advances in global marine protected area coverage and reports on GMPP's work around the world as well as that of the IUCN's Regions, Commissions and partners.

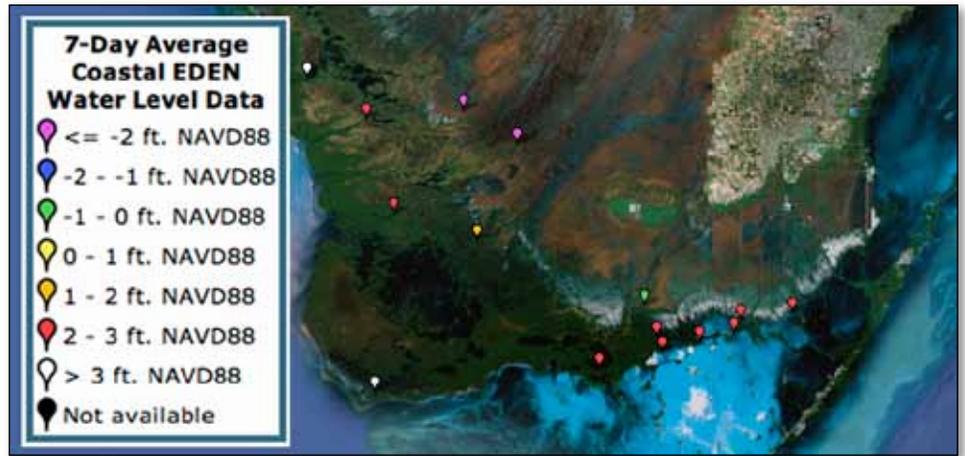
Subscribe here: [http://www.iucn.org/about/work/programmes/marine/gmp\\_newsletter/](http://www.iucn.org/about/work/programmes/marine/gmp_newsletter/)

## Data Management Keeps Information Flowing

By Ann Tihansky-USGS, Heather Henkel-USGS, Barry Rosen-USGS, and Pamela Telis-USGS

Data management doesn't often steal the limelight, but a solid foundation for storing, sharing, and combining information from various sources can enhance resource management, preparedness, response, and decision making. A great example highlighting the value of shared data management comes from the Everglades restoration effort in south Florida. The Interior Department, through USGS and NPS, plays a lead role in bringing together data from multiple sources in one centralized place. The Everglades Depth Estimation Network (EDEN) is a powerful tool for all stakeholders working on the Greater Everglades ecosystem restoration effort.

"EDEN combines information from a network of data collection sites across the landscape and presents it in a graphical format in near real time to show us, in one glance, how and where management actions affect the hydrologic conditions across the Everglades watershed," said Barry Rosen, a Biologist with the USGS Southeastern Regional Office. Managers can look at hydrologic responses for overall ecosystem health or during specific time periods that may impact individual species of concern, such as a flooding during nesting periods or salinity changes on fisheries. Tribal communities are able to protect historical burial grounds by understanding how changing water levels affect specific areas. Understanding trends in rainfall and storm events can



An example of web accessible hydrologic data through USGS's Coastal EDEN showing monitoring sites and real time salinity values for the Everglades in south Florida. Image source: USGS. Learn more about EDEN: <http://sofia.usgs.gov/eden/>

inform stormwater infrastructure design, population safety, and water supplies.

Many users look daily at the values to help manage and understand water in the ecosystem. This automated process provides for an easy visual way to monitor hydrologic conditions. Stakeholders can receive an email notifying them when or where conditions reach specified water level elevations at one or more locations. It has been so successful, EDEN has been expanded into the coastal region (called Coastal EDEN) with network monitoring capabilities serving up changes in water levels, salinity, and other parameters, to help resource managers and planners monitor effects of sea-level rise along with effects of management actions. Such visualizations give water managers a quick assessment of salinity trends that could impact drinking water supplies for residents in the South Florida region. These examples demonstrate the enormous potential and benefits of sharing Federal information in centralized locations. Shared data enhances our ability to manage resources in the long-term time frame as well as improve our response to specific events.

## Ocean.Data.Gov

### Not a Prototype Anymore!

By Mary Boatman-BOEM

Great things are happening with [Ocean.Data.gov](http://Ocean.Data.gov)! The prototype sign just came down and the site has a new look. As part of the update and redesign, we migrated to Drupal 7 like all [Data.gov](http://Data.gov) websites. This open source software simplifies access to all users and contributors. Another migration scheduled for the end of March will make it even easier for agencies to contribute their data.

Currently, [Data.gov](http://Data.gov) draws metadata from several catalogues. This organization of the metadata will be replaced by open source software called CKAN and the metadata catalogues will become a single catalogue. Unifying the catalogues will make it much easier to search for the data you want and will improve the process for each agency to submit data. Many of you may remember that Geospatial One-Stop was migrated to the [Data.gov](http://Data.gov) effort. [Ocean.Data.gov](http://Ocean.Data.gov) draws from the geospatial catalogue. The CKAN software will also make searching for data

See [Ocean.data.gov](http://Ocean.data.gov) page 12

## SOFIA- South Florida Information Access- Integrated Science for Everglades Restoration

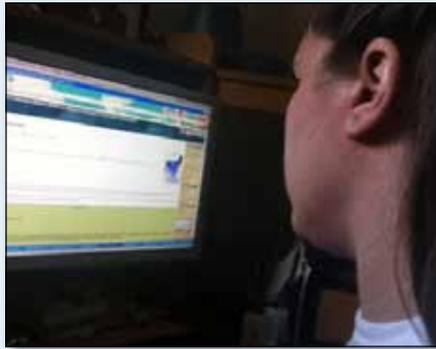
By Heather Henkel-USGS

SOFIA provides easy and free access to scientific information in support of research, decision-making, and resource management for the Nation's Greater Everglades Ecosystem Restoration effort.

Since 1995, SOFIA has provided access to a wealth of data and information for the USGS's work in the Everglades. Related websites include examples that demonstrate the value of collaborative data management. (See related story on EDEN page 11)

Because of its dedicated data management staff, SOFIA has become one of the top places to find data, metadata, publications, and other associated information. These data management capabilities also support non-USGS entities, such as the Arthur R. Marshall Loxahatchee National Wildlife Refuge's Enhanced Water Quality Monitoring and Modeling Program.

Keep up with new developments by following SOFIA News. Updates include announcements of new publications and data sets, upcoming meetings and other related information. Subscribe on-line: <http://sofia.usgs.gov/sofianews.html>



USGS serves up a broad array of scientific information on-line in support of restoration and water management decision making through South Florida Information Access (SOFIA) and the Everglades Depth Estimation Network (EDEN). Photo credit: Heather Henkel, USGS.

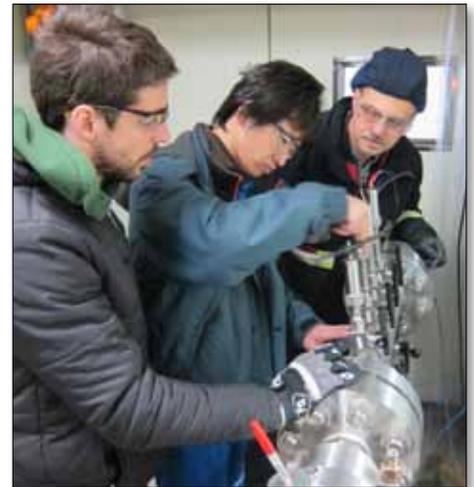
## Gas Hydrate Research

International and Collaborative

By Jessica Roberston-USGS

A new project in Japan is helping scientists make significant progress in studying gas hydrates.

The collaboration continues a



Scientists prepare to analyze pressure cores as part of a multi-year gas hydrates research project in Japan. Left to right: Efthymios Papadopoulos (Georgia Tech), Yoshihiro Konno (AIST), and William Winters (USGS). Photo credit: USGS.

long-standing relationship between research programs in Japan and the U.S., but is the first time that U.S. researchers have been directly involved in studying Japanese gas hydrate samples.

Gas hydrates are a naturally-occurring solid form of methane gas --an ice-like substance formed when methane, and sometimes other gases, combine with water at specific pressure and temperature conditions. Gas hydrates are widespread in marine sediments beneath the ocean floor and in sediments within and beneath permafrost areas. These pressure-temperature conditions keep the gas hydrate "stable," meaning it is intact and gases are contained in its solid form. Gas hydrates sequester large amounts

See Gas Hydrates page 17

*Ocean.data.gov continued from page 11*

outside the Federal catalogue easier and will include data collected by States and other governments such as Canada and Mexico.

We are also developing a map gallery to highlight data sources that are used by the regional portal teams such as the Northeast and Mid-Atlantic regional data portals for supporting ocean planning. This will help other regions set up their portals by providing an initial list of common data sources to address ocean planning needs.

Examples using ocean data to support ocean planning:

- ◆ [http://northeastoceandata.org/?page\\_id=769](http://northeastoceandata.org/?page_id=769)
- ◆ <http://portal.midatlanticocean.org/explore/needs>

We've also added a Feedback page where users can suggest how to improve the site and a virtual bulletin board where we can share stories about how data are being used. We continue to hunt for new data sources and look forward to hearing from you. For more details, please visit: [ocean.data.gov](http://ocean.data.gov)

## Fish at the Top of the World: Top 10 Fish Themes for the U.S. Chukchi and Beaufort Seas



Arctic cod sheltered in Beaufort ice habitat. Photo credit: Shawn Harper, UAF.



Snailfish. Photo credit: UAF Norcross Lab.



Sailfin sculpin. Photo credit: NOAA-Alaska.



Antlered Sculpin. Photo credit: FishBase.org



Wattled Eelpout. Photo credit: NOAA-Alaska.

By Nancy Deschu-BOEM

Catherine W. Mecklenburg, California Academy of Sciences, contributed to this article.

Leatherfin lumpsucker.  
Wattled eelpout.  
Bearded warbonnet.

These are just a few of the lesser-known fish species that occur in U.S. Arctic waters, along with their relatively famous relations such as the Arctic cod and pink salmon.

If we had to cram for an exam on Arctic fishes in the U.S. Chukchi and Beaufort seas, we would do well to focus on these 10 themes.

### 1. The fish are small.

Fishes on the Arctic continental shelf (in waters generally less than 500 feet deep) tend to be small. The majority of fish caught on the continental shelf in U.S. Chukchi Sea and Beaufort Sea surveys are less than 6 inches long.

### 2. The fish are numerous.

Although the fishes on the continental shelf are small, they are numerous, especially Arctic cod, capelin, sculpins, and eelpouts.

### 3. The Chukchi and Beaufort shelves are different.

The topography of the continental shelf and slope affects what species occur and where. The Beaufort Sea continental shelf is relatively narrow so most of the waters within



Leatherfin Lumpsucker. Photo credit: Sara Carroll, UAF.

200 miles of shore are very deep, down to thousands of meters. In contrast, the Chukchi Sea has a broad continental shelf and most of the waters within the 200-mile limit are shallower, generally 200 feet or less.

### 4. About 100+ species described so far.

More than 100 fish species have been identified in the U.S. Arctic seas within the U.S. 200-mile limit. Most of the species, including the Arctic cod, saffron cod, and Bering flounder, inhabit both the Chukchi and Beaufort seas. Numerous deep-water species are found in the U.S. Beaufort Sea, including bigeye sculpin and Arctic skate. Some species, like the smoothcheek sculpin and Sakhalin sole, are adapted to the warmer waters on the Chukchi Sea shelf and do not inhabit the cooler Beaufort Sea.

### 5. Sea ice is an important factor.

The presence or absence of ice plays a role in which species occur,

*See Arctic Fish page 14*



Two bearded warbonnets. Photo Credit: John Moran, NOAA-Alaska.



Arctic cod sheltered in ice habitat. Photo credits: Elizabeth Calvert Siddon, UAF/NOAA.

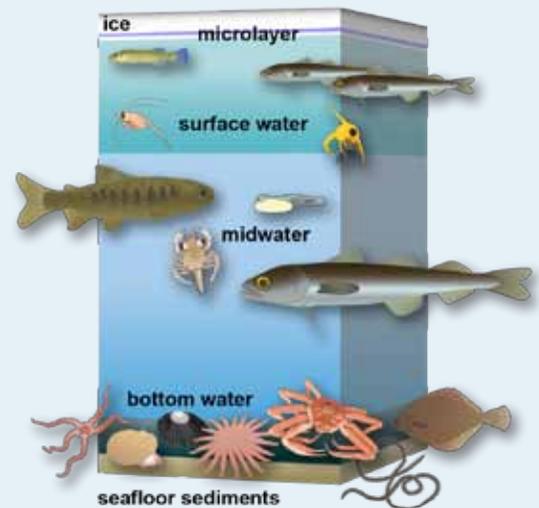
## Fish Habitat in the U.S. Arctic

Fish habitat is complex. There are the horizontal (area) and vertical (depth) components of the water column. There is also the seafloor habitat, which actually has some depth because some fish burrow into the sediments. Then there is a time element – fish move over time and they change life stage over time - from egg, to larva, to juvenile, to adult. And when a fish changes life stage, it often moves to a different habitat. Then, to make Arctic fish habitat even more complex, there is sea ice. The Magnuson-Stevens Fishery Conservation and Management Act (as amended) mandated the development of area fishery management plans, and the designation and protection of Essential Fish Habitat (EFH). Two fishery management plans apply to the U.S. Arctic: The Fishery Management Plan for the Arctic (2009) and the Salmon Fishery Management Plan for Coastal Alaska (1990).

Under these two plans, EFH was designated for Arctic cod, saffron cod, opilio crab, and five species of Pacific salmon (pink, chum, sockeye, chinook, and coho). In cases where enough information is available, EFH is designated for the various life stages of a fish species. Consequently, EFH for different life stages of the same species may be in very different habitats. So, protecting fish habitat means thinking about the water surface, the water column, and the seafloor and about all of a fish's life stages, the time of year, and the breadth of a fish's travel over its entire life.

## Seeing into a fish's world

Typical Arctic Continental Shelf  
Fish Habitat: 50m (165 ft)



Graphic by Betsy Boynton

### Arctic Fish continued from page 13

and when they occur. Arctic cod, arguably the most abundant fish in the Arctic seas, are commonly associated with ice. Arctic cod feed on small prey on the underside of the ice, juveniles seek shelter in ice crevices, and it is thought their eggs and larvae develop at the underside of the ice.

### 6. Most fish have benthic life stages.

The majority of Arctic fish species depend on the benthic environment for parts of their lives. Flatfish adults live on the bottom and typically release their eggs into the plankton drift. Most eelpouts and sculpins dwell on the bottom and their eggs, larvae and juveniles develop on the bottom. Saffron cod adults occur at various depths,

however, they lay their eggs on the bottom and the eggs develop there.

### 7. Marine, migratory, anadromous and freshwater species occur.

In addition to the species that are entirely marine, several migratory, anadromous, and freshwater fish species occur in the U.S. Arctic. Pacific salmon occur in both the Chukchi and Beaufort seas and spawn in Alaska's rivers and streams. Arctic cisco are coastal migrators, moving east and west along the Beaufort Sea coastline, crossing the boundary between the U.S. and Canada.

### 8. Fish are important prey.

Fish are important prey for many seabird species, beluga whales, ice seals, and fishes. Arctic cod, capelin, sand lance, herring, and

saffron cod are a few of the fish species that are important prey for these animals.

### 9. Fish are an important subsistence food.

Fish are an important subsistence food for Arctic communities. Arctic cisco, whitefishes, Dolly Varden, rainbow smelt, and salmon are species commonly taken for subsistence.

### 10. Climate change affects fish.

Distribution, time of spawning, and diet are a few aspects of Arctic fish ecology that will likely have effects on Arctic fish.

Fish research in the Arctic can be challenging given the rough weather conditions, presence of sea ice, short open-water season,

*Superstorm Sandy continued from page 1*

reached 18.98 feet at Long Branch, NJ. Nearby in Battery Park, water rose 13.8 feet (4.2m). On Liberty Island, that meant nearly 75% of the Island was under water according to Statue of Liberty Superintendent David Luchsinger. Both Ellis and Liberty Islands are closed and further south, NPS sites in the Gateway National Recreation Area, including the Staten Island, Jamaica Bay and the Sandy Hook Units were also hard hit. Many are still closed as repairs are made. Visit the NPS page to check progress. <http://www.nps.gov/stli/after-hurricane-sandy.htm>

Expertise across the Interior Department prepared for and continues to respond to Sandy's impacts. USGS scientists contributed an array of tools in support of national storm readiness including: mapping of coastal elevations, storm tide, and flood levels, landslide alerts, water-quality sampling and analysis, and continuous real-time data monitoring.

Recently highlighted as a sea-level rise hot spot USGS scientists indicated the northeast US region was highly vulnerable to a storm like Sandy. See previous story: [http://www.doi.gov/pmb/ocean/news/newswave/upload/DOI\\_Newswave-Summer-2012-FINAL-2.pdf](http://www.doi.gov/pmb/ocean/news/newswave/upload/DOI_Newswave-Summer-2012-FINAL-2.pdf)

As Sandy approached, the USGS predicted more than 90 percent of the sandy beaches from the mouth of Chesapeake Bay to Long Island would experience significant coastal change. More than 20 percent of New Jersey and the Delmarva peninsula were expected to experience extreme coastal change due to inundation by storm surge. On October 29, USGS posted real-time predictions of coastal impacts

that informed emergency managers ahead of the storm's landfall. By working with the emergency management community, evacuations and preparations greatly reduced the risks to human lives. The USGS has confirmed that these pre-storm models did a good job predicting vulnerable coastal areas and how Sandy would alter the coastline. USGS continues to assess how well the models predicted these impacts and to monitor coastal zone response in these areas. The USGS worked closely with the National Park Service to gather field data on pre- and post-storm conditions at Fire Island National Seashore on Long Island (*See related story, page 3*).

Other impacts from the storm are less obvious. "We tend to think of events like Sandy in terms of the ephemeral effect of the wind, rain, waves, and even snow as it swept through our communities, but in fact this superstorm can have a longer-term effect in the large pulse of sediment and associated pollutants swept into our waterways," said McNutt. A stormwater pulse can be a major issue for water managers, because it can cause algal blooms that increase costs to treat drinking water, limit recreational activities, and threaten valuable commercial and recreational fisheries. Increased sediment can cause costly changes in shipping channels, where new sediment can require additional dredging. "It is particularly important to quantify the input of this one unusual event before concluding that certain efforts to reduce pollutant run-off from year to year have or have not been effective," said McNutt.

Interior's scientists, resource managers, technicians, and specialists



New York beach community after Hurricane Sandy. Photo credit: USGS

from Virginia to Massachusetts continue to respond to Hurricane Sandy's aftermath. Crews are retrieving data, cleaning up damages, repairing facilities, monitoring recovery, and working with partners to inform long-term rebuilding efforts and resource management decisions. Scientific information is also being used to inform communities and resource managers on how best to prepare for the next storm. By informing recovery and rebuilding activities with scientific findings and monitoring, we are working to make our nation more resilient to future storm impacts. Learn more about USGS Sandy efforts: [http://www.usgs.gov/blogs/features/usgs\\_top\\_story/sandy/sandy/?from=image](http://www.usgs.gov/blogs/features/usgs_top_story/sandy/sandy/?from=image)

*Great Lakes continued from page 7*

a shared vision for a healthy and prosperous Great Lakes region and expands opportunities for public participation in Great Lakes issues. Many Interior programs at the NPS, USFWS and USGS were instrumental in informing the need for this revision and will continue to support the vision through science-based resource management and decisionmaking. Learn more: <http://www.epa.gov/glnpo/glwqa/>

## Celebrating Science with the Public

*USGS shares more than a decade of experience*

By Theresa Burress-USGS

The St. Petersburg Science Festival has been awarded a two-year grant to expand the three-year old community science festival in exchange for serving as a model and mentor for 12 new science festival initiatives that are being launched across the country.

St. Petersburg Science Festival Co-Chairs E. Howard Rutherford (Pier Aquarium President and CEO) and Theresa Burress (CNTS contractor to USGS) will create guidelines to help smaller communities launch similar successful science festivals nationwide.

<http://www.sciencefestivals.org/>

After 14 years of hosting its annual Public Open House, USGS joined forces with the first St. Petersburg Science Festival in 2011. The event was held in conjunction with the annual open house for the Florida Fish and Wildlife Conservation Commission's (FWC) Fish and Wildlife Research Institute. It was a marine-science themed collaboration among the 14 marine-science focused institutions that together comprise the St. Petersburg Ocean Team including the USGS St. Petersburg Coastal and Marine Science Center, the USF College of Marine Science, the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service Southeast Regional Office, the Florida Fish and Wildlife Commission and Wildlife Research Institute, among others.

Attendance at the 2012 event was estimated at more than 12,000.

The 2013 event is expected to



USGS has been instrumental in bringing community partners together to get the public excited about science. Here, a young visitor can see how waves are created in "Surf's Up", an exhibit about storms and coastal change. Photo credit: Kate Bradshaw, USGS.

be even bigger with new events planned and new partnerships with national science education organizations underway. The USGS has been sharing science with the community supported by staff from other USGS and US Fish and Wildlife Offices. USGS continues that strong commitment as a lead collaborator and exhibitor for the upcoming event.

The science festival concept demonstrates impacts of science on our everyday life and inspires curiosity in learners of all ages through interactive activities that astonish audiences. Combined contributions from local government agencies, academic institutions and technical businesses offer a wide range of entertaining, hands-on scientific demonstrations of technology, engineering, and math-related (STEM) activities. The event is free to the public.

Read more: <http://soundwaves.usgs.gov/2013/02/outreach.html>



## Secretary Salazar Launches Expedited Assessment of Offshore Drilling Program in the Beaufort and Chukchi Seas

As part of its continued commitment to rigorous oversight of oil and gas activities in the Arctic, Secretary of the Interior Ken Salazar announced January 8, 2013 that the Department has launched an expedited, high-level assessment of the 2012 offshore drilling program in the Beaufort and Chukchi Seas to review practices and identify challenges as well as lessons learned. The review, which is expected to be completed within 60 days, will pay special attention to challenges that Shell encountered in connection with certification of its containment vessel, the Arctic Challenger; the deployment of its containment dome; and operational issues associated with its two drilling rigs, the Noble Discoverer and the Kulluk. The review of Shell's Arctic activities will be led by

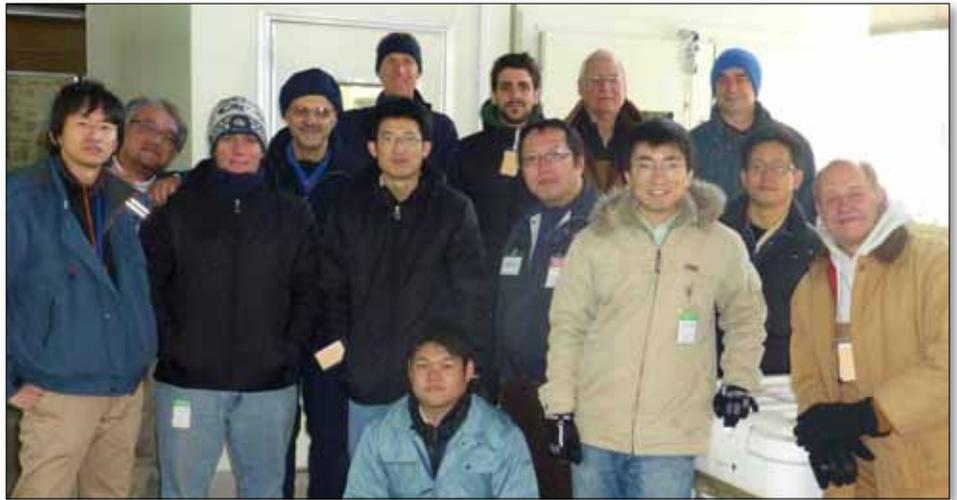
*See Arctic drilling page 22*

*Gas Hydrates continued from page 12*

of methane, making them a potentially significant source for natural gas around the world.

In the current phase of this project, an international group of scientists from Japan, the U.S. Geological Survey (USGS), and Georgia Institute of Technology (Georgia Tech) are using cutting-edge technology to study rare gas hydrate samples recovered deep beneath the seafloor. “This research will not only help us understand the character of gas hydrates in Japan, but we can also apply that knowledge as well as this innovative technology and approach to understand the potential in the U.S. and around the world,” said Brenda Pierce, USGS Energy Resources Program Coordinator. “This project brings together international experts, each with specialized knowledge to share.” “The USGS is excited that our Japanese colleagues have invited us to participate in this project along with Georgia Tech.”

A multiyear, premier research program is currently underway in Japan. Last year, Japanese researchers used innovative technology to retrieve and preserve sediment samples containing gas hydrates. These samples were obtained from layers beneath the deep seafloor in the Nankai Trough offshore Japan. Such well-preserved samples are extremely rare. They are preserved as “pressure cores,” with the gas hydrates kept as if they were still at the natural conditions in the subsurface where they formed. Scientists have been working since the 1990s on sophisticated techniques to retrieve and preserve samples. U.S. and Japanese researchers are



International gas hydrates study team in Japan. Kneeling: Jun Yoneda (AIST). Front row, standing, left to right: Yoshihiro Konno (AIST), Jiro Nagao (AIST), Marco Terzariol (Georgia Tech), William Winters (USGS), Junbong Jang (Georgia Tech), Kiyofumi Suzuki (JOGMEC), Sheng Dai (Georgia Tech), Tetsuya Fujii (JOGMEC), and Emile Bergeron (USGS). Back row, standing, left to right: William Waite (USGS), Efthymios Papadopoulos (Georgia Tech), David Mason (USGS), and Carlos Santamarina (Georgia Tech). Photo credit: William Winters, USGS.

now analyzing the cores using a key tool, the Instrumented Pressure Testing Chamber, which was the first device capable of measuring certain properties of pressure cores without first depressurizing them.

Testing these instruments in Japan will also help prepare for the analysis of pressure cores that may be obtained in the future from hydrate deposits in the deepwater Gulf of Mexico and on the Alaskan North Slope.

The USGS has a globally recognized research effort studying gas hydrates in many different settings around world. Research locations include Japan as well as the U.S. Beaufort Sea, Alaska’s North Slope, India, Korea and the northern Gulf of Mexico.

Learn more: [http://www.usgs.gov/blogs/features/usgs\\_top\\_story/groundbreaking-gas-hydrate-research/?from=image](http://www.usgs.gov/blogs/features/usgs_top_story/groundbreaking-gas-hydrate-research/?from=image)

### Gas Hydrates Technical Collaboration

The program is being led by the Japan Oil, Gas and Metals National Corporation (JOGMEC) and Japan’s National Institute of Advanced Industrial Science and Technology (AIST).

The project is being conducted in collaboration with the USGS Gas Hydrates Project and researchers from the School of Civil and Environmental Engineering at Georgia Tech. It is one component of an ongoing Japanese collaboration on methane hydrate research with the U.S. Department of Energy (DOE) and the Gulf of Mexico Gas Hydrate Joint Industry Project (JIP).

This collaborative research in Japan was financially supported by MH21, USGS, DOE, and the multinational Gulf of Mexico Gas Hydrates JIP.

## News from the Regions

Across the Nation, the Interior Department provides leadership and coordination for ocean, coastal and Great Lakes activities. Federal partners support state-led regional ocean partnerships and efforts to address common concerns within the regions.

There are nine regional planning areas:

- 1-The Northeast, 2- Mid-Atlantic,
- 3-South Atlantic, 4-Caribbean,
- 5-Gulf of Mexico, 6-West Coast,
- 7-Great Lakes, 8-Pacific Islands,
- 9-Alaska/Arctic.



### Northeast Regional Ocean Council (NROC)

**Bob LaBelle (BOEM)**  
(Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut)  
<http://collaborate.csc.noaa.gov/nroc/default.aspx>

On January 9, Interior's Climate Science Centers announced 2013/2014 research funding opportunities. The Northeast Climate Science Center (CSC) held two stakeholder meetings in January at opposite ends of the geographic Region (Minneapolis, Minnesota and Amherst, Massachusetts) to discuss the overall Climate Science Center's science strategy with potential partners. The meetings attracted a diverse group of stakeholders including leadership from USGS, Fish and Wildlife Service, the National Park Service, NOAA and Sea Grant programs, Tribes, as well as multiple members of state, federal and forestry interests, academic partners and a strong contingent of state and urban interests.

The regional CSCs are intended to operate as a network in which expertise at one CSC can be leveraged against expertise at other CSCs. Further, identification of projects that can be scaled up or combined with other projects to not only address the local science issue, but increase understanding of regional and national implications of climate impacts will help ensure best use of limited resources.

The CSC partners are encouraging collaborative projects or work across CSC units that leverage or develop expertise and projects that would have impacts beyond local scale. Visit the Northeast Climate Science Center: <http://www.doi.gov/csc/northeast/index.cfm>

Learn more about Interior's Climate Science Centers: <http://www.doi.gov/csc/index.cfm>

### Governor's South Atlantic Alliance (GSAA)

**Eric Strom (USGS)**  
(North Carolina, South Carolina, Georgia, Florida)

<http://www.southatlanticalliance.org>

The three Federal Co-Chairs supporting the Governors' South Atlantic Alliance (GSAA) are DOI, NOAA and USEPA. Federal leadership has rotated from NOAA to the USEPA for the next 1-year term (2013). Department of Interior is scheduled to assume the Federal Co-Chair leadership role in 2014. Leadership of the State Steering Group also rotated from North Carolina to Georgia and Mark Williams with the Georgia Department of Natural Resources will now assume the lead role. There will be a face-to-face meeting of the entire Executive Planning Team of the GSAA in Raleigh, NC, March 13-14. The agenda and announcement will be posted soon at: [www.southatlanticalliance.org](http://www.southatlanticalliance.org)



A pier on Cape Hatteras battered by waves and surge associated with extreme storms. Photo credit: Ann Tihansky, DOI.

### Gulf of Mexico Alliance (GOMA)

**Linda Kelsey (USFWS)**  
(Alabama, Florida, Louisiana, Mississippi, Texas)

<http://www.gulfofmexicoalliance.org/>

Read about Interior's involvement in the Gulf of Mexico restoration efforts through the RESTORE ACT. Story on page 7.

**Mid-Atlantic Regional Ocean Council (MARCO)**

**Maureen Bornholdt (BOEM)**

(Maryland, New York, New Jersey, Delaware, Virginia)  
<http://www.midatlanticocean.org/>

MARCO, in collaboration with federal agencies, is convening a Mid-Atlantic regional workshop on April 4-5 in Arlington, VA. The workshop will foster dialog among stakeholders and government entities and develop a common understanding about regional ocean planning. On December 12, BOEM held a conference call with the Mid-Atlantic Regional Planning Body (RPB) designees to become acquainted with one another and share the progress toward ocean planning already underway in the region. This was also an opportunity to voice initial ideas, questions, and concerns. The Bureau will hold more calls or information exchanges with the RPB members before the April workshop.

**Alaska**

**Jim Kendall (BOEM)**

BOEM was a contributing sponsor and active participant at the annual 2013 Alaska Marine Science Symposium (AMSS). The symposium brought together ocean researchers representing Federal agencies, State of Alaska, academics, fisheries management council representatives and others to discuss their work in the Arctic Ocean, Bering Sea, and Gulf of Alaska. Keynote speakers covered topics of ocean acidification, invasive species and marine debris associated with the tsunami, issues affecting Chinook salmon populations and reproduction, and ocean science technology. Held January 21-25, 2013 in downtown Anchorage, AK, this meeting also serves the important role as an official Information Transfer Meeting (ITM) for many BOEM research projects. BOEM staff was involved in convening the meeting through activities that ranged from reviewing abstracts, coordinating events, and presenting papers and posters. BOEM staff and partners also led and contributed to a number of

technical workshops: 1) Pacific Marine Arctic Synthesis/Soar (PacMars/Soar); 2) ShoreZone- BOEM - North Slope portion; 3) Arctic Ecosystem Integrated Survey; 4) Beaufort/Chukchi Meteorology; 5) Arctic Cod Spawning. BOEM provided an exhibit booth where staff also shared information about BOEM research efforts and partnerships. Abstracts and workshop descriptions are on-line: [www.alaskamarinescience.org/workshops.html](http://www.alaskamarinescience.org/workshops.html)



Pewetole Blowhole at the California Coastal National Monument. Photo credit: Bob Wick, BLM.

See more images: [http://www.blm.gov/ca/st/en/prog/blm\\_special\\_areas/nm/ccnm/photo\\_gallery/regular.html](http://www.blm.gov/ca/st/en/prog/blm_special_areas/nm/ccnm/photo_gallery/regular.html)

**West Coast Governor's Alliance (WGCA)**

**Joan Barminski (BOEM)**

(California, Washington and Oregon)  
<http://westcoastoceans.org>

The West Coast Governors Alliance on Ocean Health (WCGA) and the West Coast Coastal and Ocean Observing Systems (OOS) signed a two-year agreement in October of 2012 to advance effective management of coastal and ocean resources for the benefit of current and future generations, with a specific focus on using ocean observing systems to help address harmful algal blooms and ocean acidification as well as advancing surface current mapping and a regional data framework. Read the agreement-- [http://www.westcoastoceans.org/media/Press\\_ReleasesList\\_serve/mouWCGA\\_OOSFINAL\\_1.pdf](http://www.westcoastoceans.org/media/Press_ReleasesList_serve/mouWCGA_OOSFINAL_1.pdf)

**Caribbean Regional Ocean Partnership (CROP)**

**Sherri Fields (NPS)**  
(Puerto Rico, U.S. Virgin Islands)

**Great Lakes Restoration Initiative (GRLI)**

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

(Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin)  
<http://www.epa.gov/glnpo/glri/>

Read about the Great Lakes Water Quality Agreement, page 7.

**Pacific Islands Regional Ocean Partnership (PROP)**

**Richard Hannan (USFWS)**  
(American Samoa, Commonwealth of Northern Mariana Islands, Guam, Hawaii)

The Pacific Islands Regional Planning Body (RPB), held a workshop in Hawaii in October 2012 to bring stakeholders together and move forward. While NOAA is taking the lead in organizing the RPB, Interior (FWS, BOEM, NPS, and USGS) are actively involved. Similar workshops are envisioned for American Samoa, CNMI and Guam. The Pacific RPB seeks to support the Governors' Pacific Regional Ocean Partnership (PROP) to promote regional sustainability of oceanic and coastal resources through cooperation and collaboration on all aspects of ocean and coastal-related research and ocean management.



Wisdom, a Laysan Albatross and world's oldest-known wild bird (at least 61 years old), hatched another chick at Midway Atoll National Wildlife Refuge. Photo credit: Pete Leary, USFWS. <http://www.usgs.gov/newsroom/article.asp?ID=3504>

CBRA continued from page 9

1990, they are being modernized. USFWS has been working with the Federal Emergency Management Agency and other federal partners on the Federal Interagency Floodplain Management Task Force to bring the CBRS maps into the 21st century and improve CBRA compliance and outreach. These updates will make CBRA more effective now and into the future as the nation recovers from Hurricane Sandy and adapts to rising seas.

Because the official CBRS maps can be difficult to interpret, in November 2012, USFWS released an interactive mapper to the public containing approximate boundaries of the CBRS units.

USFWS has also updated the project consultation guidance on its website for federal partners as we work together on recovery efforts following Hurricane Sandy.

*Read about coastal change from a geologic perspective on page 6.*

#### Coastal Barrier Resources System (CBRS) Mapper

Users can view maps delineating coastal areas that are currently part of the CBRS.

Available online:

<http://www.fws.gov/CBRA/Maps/Map-per.html>



USGS Scientist Asbury Sallenger. Photo credit: Ann Tihansky, DOI.

He was the architect of our coastal program,” said USGS scientist John Haines. “At the heart of our response to hurricanes, you’ll find Abby’s vision, Abby’s science, and Abby’s leadership. He insisted that science comes first,” said Haines. His work with extreme-storm impacts on coasts and his skill in explaining them made him a sought-after expert by many. He was regularly interviewed and quoted by national news-media outlets, such as the New York Times, CNN, and The Weather Channel.

Sallenger led the USGS National Assessment of Coastal Change Hazards, which investigates how coasts change over the long term and during extreme storms. Sallenger was a pioneer in recognizing the growing need for science to protect coastal communities from the hazards of coastal change. He envisioned a national coastal-research program that supported scientific excellence in response to societal needs.

His recent research focused on Louisiana's barrier islands, where rapid land subsidence simulates the long-term sea-level rise that could impact the world's coasts in the next century. In the summer of 2012, Sallenger published research showing that the rate of sea-level rise has increased three or four times faster along much of the U.S. East Coast than globally. He was recently named as a lead author on the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, publication expected in 2014.

Having written scientific papers for many years, Sallenger also published an historical fiction, called *Island in a Storm*, in 2009. In his book, Sallenger used the historical perspective of an actual severe hurricane in 1856 that destroyed one of Louisiana’s barrier islands, to illustrate the dramatic impacts coastal hazards can have on human society and history.

## Remembering Asbury "Abby" Sallenger— Architect of the USGS Coastal Program

USGS scientist and renowned coastal-hazards expert Asbury "Abby" Sallenger, 63, died at home on the evening of February 5. He was a distinguished research scientist, a skilled communicator, and a mentor throughout his career. Seen as a leader in scientific response to coastal storms, Sallenger served as the voice of the USGS on hurricanes and coastal change since the USGS stood up its first scientific storm-response team in the mid-1990s.

“Abby’s contributions to the USGS, to the Coastal and Marine Program, and to many of us personally cannot be briefly captured.

## Science for Emergency Managers

By Brian McCallum-USGS

In late October, as Hurricane Sandy threatened coastal communities along the nation's eastern seaboard, the U.S. Geological Survey (USGS) was also participating in the 2012 annual conference for the International Association of Emergency Managers (IAEM) in Orlando, Florida. The coincident occurrence of Superstorm Sandy served as a timely example of the vital role scientific information plays in preparing for and responding to natural disasters. USGS also participated in a three-hour workshop demonstrating the many ways USGS scientific expertise and products support the emergency management community during natural hazards. Brian McCallum, Assistant Director of the Georgia Water Science Center presented examples from Hurricane Irene to demonstrate how USGS storm-tide data is collected, analyzed and shared with partners working on coastal and flooding hazards. USGS also shared materials at a



Wakame (*Undaria Pinnatifida*), an invasive alga, poses a threat to Pacific coast ecosystems. Photo credit: Hatfield Marine Science Center, OSU. Learn more about Wakame: [http://www.nature.nps.gov/water/marineinvasives/assets/PDFs/Undaria\\_pinnatifida.pdf](http://www.nature.nps.gov/water/marineinvasives/assets/PDFs/Undaria_pinnatifida.pdf)

display booth that described USGS scientific resources and activities that support societal understanding and preparedness for a broad array of other natural hazards such as landslides, earthquakes, volcanoes, and wildfires.

Conference presentations are available:

<http://iaem2go2012.crowdcompass.com/apps>



USGS exhibit highlighted a broad range of scientific expertise that supports an international community of emergency managers attending the International Association of Emergency Managers Conference held in Orlando, Florida, at the Orange County Convention Center, 2012. Photo credit: Brian McCallum, USGS.

*Invasives continued from page 4*

cund invasive that has been documented in New Zealand, Argentina, and Europe. After its discovery in Southern California in 2001, it quickly spread up the coast, worrying biologists as it began out-competing and threatening to replace the native kelp forests that form the basis of the region's coastal ecosystem. The National Park Service is concerned about its appearance, since the alga can release millions of microscopic spores that are easily carried in ship ballast water. The alga also spreads around the world by attaching itself to ship hulls. Meanwhile, researchers at the University of California, Santa Barbara, the Smithsonian's Environmental Research Center, and other organizations, warn that new management plans are needed since Wakame, once established, is almost impossible to eradicate.

While National Park Service units and other local organizations are working to remove Wakame as it arrives in new places, the Department is also focused on longer-term strategies that build capacity for managing threats from other invasive species. Established in 1999, the National Invasive Species Council (NISC) is co-chaired by the Secretaries of Interior, Agriculture and Commerce. Through Interior's support, it provides high-level coordination on invasive species with input from the Invasive Species Advisory Council (ISAC). Through these efforts, state, federal, local, and tribal officials come together with NGOs, industry and stakeholder groups to examine the effectiveness of current laws and policies and to develop creative approaches to reduce new threats.

Arctic drilling continued from page 16

Interior's Bureau of Ocean Energy Management (BOEM) Director Tommy Beaudreau, who has been selected to serve as the Acting Assistant Secretary for Land and Minerals Management. The review will look at Shell's safety management systems, its oversight of contracted services, and its ability to meet the strict standards in place for Arctic development.

"As part of our Department's oversight responsibilities, our review will look at Shell's management and operations in the Beaufort and Chukchi Seas," said Beaudreau. "We will assess Shell's performance in the Arctic's challenging environment. The Bureau of Safety and Environmental Enforcement demands operators make safety at all levels at all times their number one priority, and we expect the highest level of performance from operators in the Arctic," said BSEE Director James A. Watson. "As we oversee historic domestic drilling, BSEE will continue its unprecedented oversight of drilling activities in the Arctic and we will continue to hold anyone operating in public waters to the highest safety and environmental standards."

<http://www.doi.gov/news/pressreleases/secretary-salazar-launches-expedited-assessment-of-2012-arctic-operations.cfm?renderforprint=1&>



USGS scientist Karen Rice (left), shares findings with USGS Director Marcia McNutt at the NCSE poster session. Photo credit: Ann Tihansky.

## National Dialogue on Disasters

By Ann Tihansky-DOI

In January, policy makers, scientists and media representatives gathered in Washington, DC, for the 13th annual National Conference on Science, Policy and the Environment focused on the theme: *Disasters and Environment, Science, Preparedness, and Resilience*. Interior played a major role in organizing the event. USGS Director Marcia McNutt, David Applegate - the Associate Director for Natural Hazards, and Lucy Jones - the USGS Science Advisor for Risk Reduction, participated on the NCSE Leadership Committee. McNutt also participated in a plenary session where she discussed the pivotal role science plays on understanding and preparing society for hazards. Watch the session here: <http://www.c-spanvideo.org/program/310396-3>. Using the recent example of Hurricane Sandy she underscored the value of coastal change research for informing our Nation's recovery actions as well as preparing for future scenarios. Gary Machlis, Science Advisor to the Director of the National Park Service and Margaret Hiza Redsteer, USGS Research Scientist also participated in panel discussions. The agenda and an interview with Director McNutt are on-line: [http://www.websedge.com/videos/ncse\\_conference\\_2013/#/interview\\_with\\_marcia\\_mcnutt\\_phd\\_director\\_us\\_geological\\_survey](http://www.websedge.com/videos/ncse_conference_2013/#/interview_with_marcia_mcnutt_phd_director_us_geological_survey)



Three divers watch an Atlantic sailfish (*Istiophorus albicans*) use its bill to herd a school of smaller fish in its pelagic environment. The Atlantic sailfish is one of the world's fastest fish. Photo credit: JP Zegarra, USFWS.

*continued from Thirty Years page 3*

of New York, is closely monitoring breach behavior to determine if the inlet will close under natural conditions or may need to be closed mechanically. For now Federal and state agency scientists have the opportunity to observe how a barrier island breach affects the larger ecosystem and also how the system responds and recovers. Through this strategy, new wetlands will have the chance to form on tidal

shoals over time while increasing the width of the barrier islands, contributing to an overall increase in resilience to future storms and sea-level rise.

Read more:

<http://www.usgs.gov/newsroom/article.asp?ID=3463>

<http://www.nps.gov/fjis/nature-science/post-hurricane-sandy-breaches.htm>



A set of aerial images of Fire Island, NY from 2010 (top) and 2012-after Hurricane Sandy (middle), show how the beach has changed near the community of Davis Park and the location of beach profile C-8, (red line), where coastal change has been monitored for 43 years (see profile record, page 3). Red boxes outlined in the post-Sandy aerial image are locations of houses that were destroyed by the storm. Bottom map shows location of aerial images and regional location of Fire Island along the New York Atlantic coast. Photo and image credits: USGS.

*Arctic Fish continued from page 14*

rough seafloor topography, and great depths off the continental shelf. Even in light of these challenges, important Arctic fish studies have been accomplished in the past decade in the U.S. Beaufort and Chukchi seas. Notable is one of the earlier Arctic studies, the expedition in 2004 by the Russian-American Long-Term Census of the Arctic, which was sponsored by NOAA and the Russian Academy of Sciences. BOEM, in cooperation with other agencies and several universities (including University of Alaska, University of Washington, University of Maryland, and University of Texas), has been investigating fish in the Chukchi and Beaufort seas. Currently BOEM is supporting three major fish studies – one in the Chukchi Sea and two in Beaufort Sea. The recent and ongoing studies on fish in the Chukchi and Beaufort seas (including a cooperative transboundary fish study by the U.S. and Canada currently underway) will be important in making sound resource management decisions for fish in the U.S. Arctic- from the well-known Arctic cod to the obscure leatherfin lump sucker.

*A list of BOEM supported and cooperative studies on Arctic fish can be found at the BOEM website:*

<http://www.boem.gov/studies/>



Flatfish juvenile. Photo credit: Sheila Atchison, Fisheries and Oceans Canada.

## See Channel Islands Live Via Four WEBCAMS

The Surfing Bison



<http://www.nps.gov/chis/planyourvisit/channel-islands-live-nps.htm>  
<http://www.nps.gov/chis/planyourvisit/things2do.htm>

By Seth Sykora-Bodie-DOI

The Channel Islands National Park off the coast of Southern California boasts numerous opportunities to hike, camp, snorkel, dive, and bird watch. The Park consists of five islands and their surrounding ocean environment which are home to over 2,000 species. Of these, 145 species cannot be found anywhere else on Earth. The Park protects more endangered species than any other National Park in the country. Being accessible only by boat, the limited accessibility protects unique cultural and natural resources, but also prevents many visitors from exploring one of North America's most unique ecosystems. Through a unique and longstanding partnership with the Ventura County Office of Education, the Park has focused on sharing the diverse wildlife with the public on the internet through the Channel Islands Live program.



The Channel Islands Live has four webcams (three terrestrial and one underwater) that provide live streaming footage of several locations at the Park. Viewers can observe bald eagle nests, seabird rookeries, and an underwater kelp forest that is home to a wide variety of fish other marine animals.



The submarine camera (shown at right), was donated by Teens4Oceans, a Colorado non-profit organization and is the first ever to be placed in an underwater kelp forest. It has been tremendously successful in sharing this remote environment with the public.



Teens4Oceans established in 2007, by students and educators at Kent Denver High School in Colorado is an educational, non-profit organization dedicated to empowering the next generation to become impassioned ocean stewards. The teens from land-locked Colorado connect youth to ocean resources located far from their homes. After first designing, building, and patenting the submersible cameras, the students have worked with partners such as the Ventura County Office of Education, to place them in six locations in California, Florida, and the Caribbean. The Channel Islands Park Foundation generously provides financial support for the transmission hardware and new video equipment needed to operate the Ocean Webcam as a component of the Channel Islands Live program which features live presentations with Park Rangers underwater.