USGS

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Fieldwork

USGS Scientists Predict, Measure Sandy's Impacts on the Coastal Landscape

By Kate Bradshaw

Hurricane Sandy, one of the biggest storms ever to hit the United States, struck the Eastern Seaboard on October 29, 2012. It caused dozens of deaths and billions of dollars worth of damage and displaced massive volumes of protective beach and dune sediments. Before, during, and after Sandy's landfall, U.S. Geological Survey (USGS) scientists in St. Petersburg, Florida, predicted, then measured, the change that took place along the shore.

Days before Sandy made landfall in southern New Jersey, the USGS Hurricanes and Extreme Storms team at the St. Petersburg Coastal and Marine Science Center set out to determine how the storm was likely to affect the coastal landscape. The team used forecasted wave heights and water levels in combination with a storm-impact scale to predict the likelihood that selected stretches of coast would experience certain patterns of sediment erosion and deposition (**http://coastal.er.usgs.gov/hurricanes/sandy/coastal-change/)**. In addition, a pre-storm Global Positioning System (GPS) ground survey was conducted for Fire Island, New York, an area that ultimately experienced substantial coastal change during the storm. Along the New Jersey coast, another area that underwent severe impacts, pre-storm topographic measurements were made using EAARL-B (Experimental Advanced Airborne Research Lidar; **http://ngom.usgs.gov/dsp/tech/eaarl/**). (Lidar, short for "light detection and ranging," is similar to radar but uses laser light instead of radio waves to measure distances.) These pre-landfall measurements provide crucial baseline information for assessing and understanding the storm's impacts.

NOAA's GOES-13 satellite captured this visible image of the massive Hurricane Sandy on October 28 at 1302 UTC (9:02 a.m. EDT), about a day and a half before it made landfall on the New Jersey coast. The line of clouds from the Gulf of Mexico north are associated with the cold front that Sandy is merging with. Sandy's western cloud edge is already over the mid-Atlantic and northeastern United States. Image from NASA GOES Project; learn more at ***http://www.nasa.gov/mission_pages/hurricanes/archives/2012/h2012_Sandy.html****.*

After the storm, the team acquired imagery from a variety of sources. Initially, they obtained post-storm photographs and videos from news reports and social media that featured clear examples of beach and dune erosion, overwash (occurs when storm waves overtop dunes and carry sand inland), and inundation (complete submersion of beach and dunes). They used this imagery to "ground-truth" their pre-storm assessments.

Additional ground-truthing was provided by aerial photographs acquired during a 2-day mission flown along the open-coast shoreline from the Outer Banks of North Carolina to coastal Massachusetts. The aim was to compare post-storm photographs with those taken before the storm to get a qualitative look at coastal change in certain areas. To view examples, visit **http://coastal.er.usgs.gov/hurricanes/sandy/photo-comparisons/**. Many more photo pairs are posted at **http://coastal.er.usgs.gov/hurricanes/sandy/post-storm-photos/obliquephotos.html**.

In partnership with several other agencies, the team coordinated lidar topographic surveys along the same stretch of coast. These data will be compared to those taken before the storm in order to quantify the magnitude of coastal change and gauge the accuracy of their pre-storm assessments.

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Sound Waves

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Deadline: The deadline for news items and publication lists for the March/April issue of *Sound Waves* is Tuesday, January 15, 2013.
Publications: When new publications or products are released, please notify the editor with a full reference and a bulleted summary or description.
Images: Please submit all images at publication size (column, 2-column, or page width). Resolution of 200 to 300 dpi (dots per inch) is best. Adobe Illustrator© files or EPS files work well with vector files (such as graphs or diagrams). TIFF and JPEG files work well with raster files (photographs or rasterized vector files).

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Need to find natural-science data or information? Visit the USGS Frequently Asked Questions (FAQ's) at URL **http://www.usgs.gov/faq/**

Can't find the answer to your question on the Web? Call 1-888-ASK-USGS

Want to e-mail your question to the USGS? Send it to this address: ask@usgs.gov

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Before-and-after views looking west along the New Jersey shore. Storm waves and surge cut across the barrier island at Mantoloking, New Jersey, eroding a wide beach, destroying houses and roads, and depositing sand onto the island and into the back-bay. In lower photograph, just days after the storm, construction crews with heavy machinery are clearing sand from roads and pushing sand seaward to build a wider beach and protective berm. Yellow arrow in each image points to the same feature. From USGS Coastal Change Hazards webpage at ***http://coastal.er.usgs.gov/hurricanes/sandy/photo-comparisons/newjersey.php****.*

The group also worked closely with the National Park Service, the U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers to coordinate a post-storm survey of Fire Island National Seashore almost immediately after the storm. This survey, conducted before any data or imagery could be collected from the air, revealed drastic changes.

"We found that there was widespread dune erosion and overwash," said St. Petersburg-based USGS coastal geologist **Cheryl Hapke**. "On average, the dunes eroded back 70 feet—the equivalent of 30 years of change, which had previously been measured. Our data also showed that dunes lost as much as 10 feet of elevation."

These rapid response data were used to help the National Park Service assess the areas of the coast that were most vulnerable to a nor'easter that struck the coast a week after Sandy.

Whether carried out from the air, on the ground, or in an office, all of this work enhances our understanding of how and why coastlines respond to storms the way they do. This understanding, gained through partnering with stakeholders and agencies at all levels of government, can help coastal managers prepare to mitigate the impacts of future storms.

Check the Hurricanes and Extreme Storms team's website for updates and additional information: **http://coastal.er.usgs.gov/hurricanes/sandy/**

To learn more about USGS responses to Hurricane Sandy, read **http://www.usgs.gov/blogs/features/usgs_top_story/**

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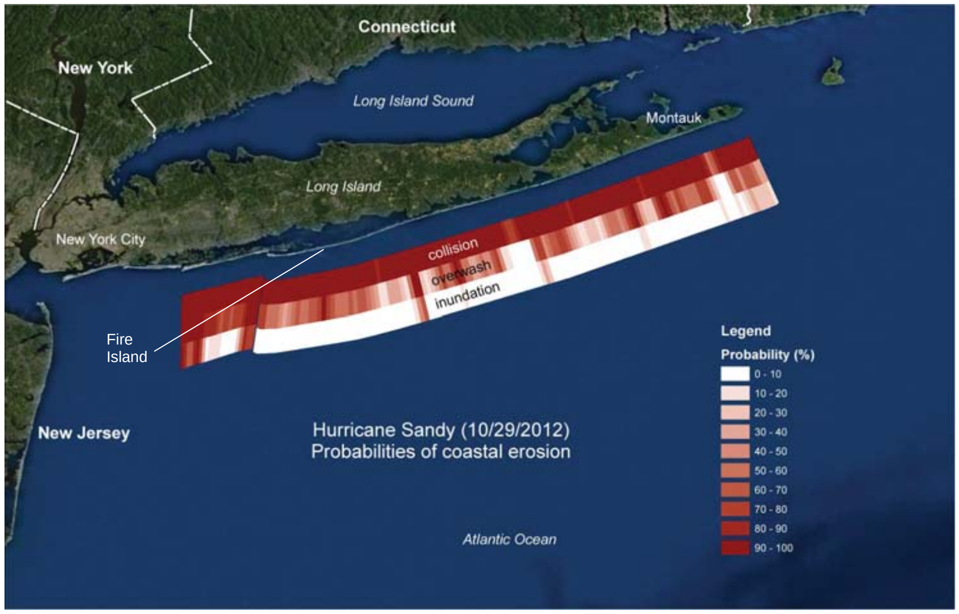
sandy/ and visit the USGS Newsroom, **http://www.usgs.gov/newsroom/**. ☸



Map posted at 11:00 a.m. on October 29, 2012—just hours before Hurricane Sandy made landfall on the U.S. east coast—showing probabilities of collision (in which waves erode dune fronts), overwash (in which waves wash over dunes and transport sand inland), and inundation (in which beach and dunes are completely submerged) along the sandy beaches of Long Island, New York. Red colors indicate high probability; white indicates low probability. For more information and to view similar assessments for sandy beaches of New Jersey and Delmarva (Delaware, Maryland, and Virginia), visit ***http://coastal.er.usgs.gov/hurricanes/sandy/coastal-change/****.*

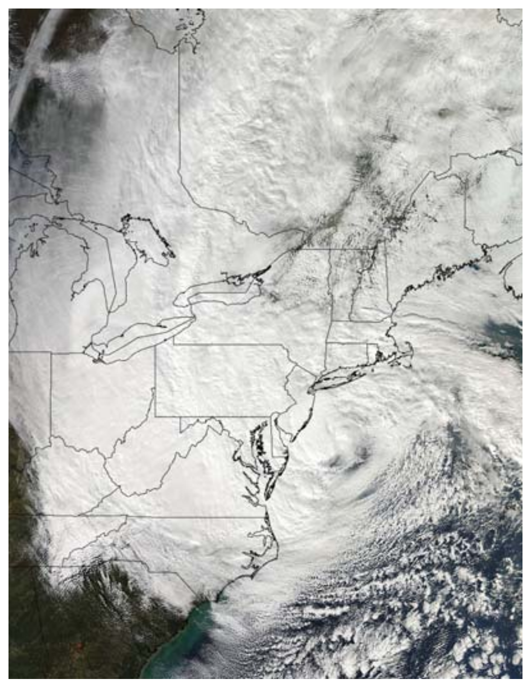
What's in a Name? Post-Tropical Cyclone Sandy

By Helen Gibbons

About an hour before Hurricane Sandy made landfall in New Jersey on the evening of October 29, 2012, the National Weather Service reclassified the storm as "Post-Tropical Cyclone Sandy." The name change came as Sandy lost the characteristics of a strong tropical cyclone, or hurricane.

A tropical cyclone is a storm system with a warm core of low pressure surrounded by winds spiraling inward and upward. In the North Atlantic, strong tropical cyclones—with sustained winds of 74 miles per hour or higher—are called hurricanes. Tropical cyclones get their energy from warm ocean water: water evaporates from the ocean surface and then condenses as the saturated air rises. This condensation forms clouds and thunderstorms that become part of the tropical cyclone, and it releases heat energy that powers the winds of the cyclone.

In contrast, extratropical, or mid-latitude, cyclones get their energy not from warm ocean water but from horizontal temperature differences in the atmosphere. These low-pressure systems, with their associated warm fronts or cold fronts, are the most common type of storm in the United States. (For more information about tropical and extratropical cyclones, visit **http://www.aoml.noaa.gov/hrd/tcfaq/tcfaqA.html**.)



NASA's Aqua satellite captured a visible image of Sandy's massive circulation on October 29 at 1820 UTC (2:20 p.m. EDT). Sandy covers 1.8 million square miles, from the Mid-Atlantic to the Ohio Valley, into Canada and New England. Image from NASA Goddard MODIS Rapid Response Team; for more information see ***http://www.nasa.gov/mission_pages/hurricanes/archives/2012/h2012_Sandy.html****.*

As Hurricane Sandy moved northward along the U.S. Atlantic coast, it met with a winter storm coming from the west and cold air coming down from Canada; interaction with these air masses hastened its transition to an extratropical cyclone. Because it began as a tropical cyclone, Sandy was designated not simply as an extratropical cyclone but as a "post-tropical" cyclone. While Sandy transitioned from a hurricane to a post-tropical cyclone as the center neared landfall, there was no change in expected impacts, including tropical-storm-force and hurricane-force winds, storm surge, heavy rain, inland flooding, and heavy snow. The cyclone's intensity and enormous breadth inspired additional names, such as Frankenstorm and Superstorm Sandy. ☸

Using Shallow-Water Seafloor Mapping to Understand Sediment Movement in the Northern Chandeleur Islands, Louisiana

By Jennifer Miselis, Jim Flocks, Nathaniel Plant, Julie Bernier, Nancy DeWitt, Kyle Kelso, Will Pfeiffer, BJ Reynolds, and Dana Wiese

Scientists from the U.S. Geological Survey (USGS) Coastal and Marine Geology Program's science center in St. Petersburg, Florida, in cooperation with the U.S. Fish and Wildlife Service (FWS), have been studying the storm-related evolution of the Chandeleur Islands in eastern Louisiana for many years. This work was undertaken to support research objectives of the National Assessment of Coastal Change Hazards Project (**http://coastal.er.usgs.gov/national-assessment/**) and will also support a new project launched in October 2012: the Barrier Island Evolution Research Project. The latter seeks to address a research gap between the short time scale of individual storms (hours to days) and the longer time scales associated with the historic and geologic evolution of the coastal system (decades to millennia). The new project is an exciting challenge because it requires integration of two of the Coastal and Marine Geology Program's strengths in studying coastal-change hazards—assessment of storm impacts and characterization of coastal geologic framework (the composition and geometry of rocks and sediment underlying coastal areas). Combining these strengths with modeling of morphology (the shape of the seafloor and land surface) will make possible predictions of barrier-island behavior over time scales useful to resource managers (1–5 years).

Geologic variability (that is, changes in stratigraphy, surface-sediment distribution and composition, and morphologic features) has long been associated with barrier-island evolution over centennial and millennial time scales; however, the relative importance of geologic variability over shorter time scales (days to years) is poorly understood. Regional-scale research, while helpful for establishing the geologic framework in which barrier islands evolve, lacks the finer scale resolution necessary for addressing seasonal and interannual (over several years) system response. Furthermore, many models of morphologic evolution are ill equipped to incorporate the complexity of natural geologic variability and commonly assume uniformity in sediment distribution, composition, and availability that may not exist. Such assumptions can lead to model results that are not consistent with observations. In order to address medium-term relations between geologic variability and storm and nonstorm processes, the geographic extent of the observations must be reduced, high-resolution information from highly dynamic areas of the nearshore and surf zone must be obtained, and observed geologic variability must be suitably simplified for integration with predictive models.

To this end, scientists from the Seafloor Mapping Group at the USGS St. Petersburg Coastal and Marine Science Center are conducting a series of seafloor surveys of the submerged regions around the north end of the Chandeleur Islands. (For example, see "USGS Scientists Study an Oil-Spill-Mitigation Sand Berm in the Chandeleur Islands, Louisiana," *Sound Waves*, July/August 2012, **http://soundwaves.usgs.gov/2012/08/**.) The most recent survey took place in July 2012 and spanned 9 days. Because the region around the islands is very shallow (less than 10 meters [30 feet] deep), two small research vessels were used in lieu of one large vessel typically employed for this type of survey. A suite of acoustic sensors was deployed from the St. Petersburg center's research vessel (R/V) *Survey Cat* to measure the surface and subsurface variability of the nearshore. A high-resolution swath bathymetry system (468 kHz) measured depths across a wide swath of the seafloor, a sidescan-sonar system (900 kHz) provided information about variations in seafloor-sediment type, and a chirp subbottom profiler (4–24 kHz) was used to measure the geometry of subseafloor sedimentary layers. The center's R/V *Twin Vee* was out-

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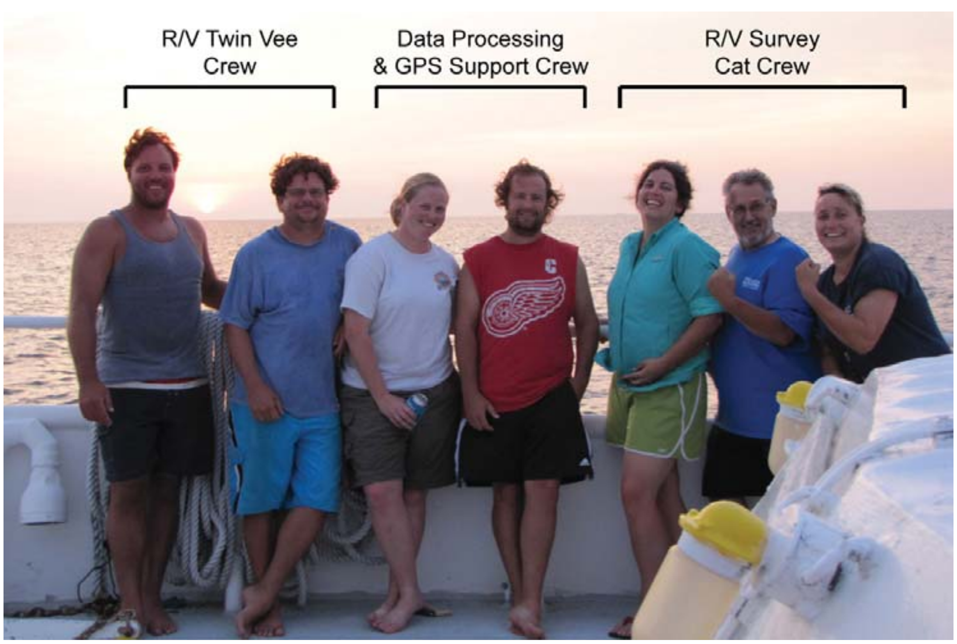

The fearless seafloor-mapping team enjoys a post-survey sunset aboard service charter vessel The VI. *Using a service charter vessel for room and board enabled the team to use small research vessels to access the shallow depths around the islands and simultaneously eliminate a 3- to 4-hour round trip to the mainland each day. Left to right,* ***Kyle Kelso****,* ***BJ Reynolds****,* ***Julie Bernier****,* ***Will Pfeiffer****,* ***Jennifer Miselis****,* ***Dana Wiese****, and* ***Nancy DeWitt****.*

(Chandeleur Islands continued from page 4)

fitted with a dual-frequency single-beam echosounder (2 and 28 kHz) to reveal the morphology of the surf zone and of the submerged Hewes Point shoal north of the islands (see map below). In just 9 days, the R/V *Survey Cat* and R/V *Twin Vee* collected seafloor-mapping data along more than 900 kilometers (560 miles) of survey tracklines.

Analysis of data from the survey described above and from other surveys conducted in 2011 and 2012 will reveal patterns of cumulative change resulting from seasonal processes (for example, winter storms, summer tropical disturbances, and intervening fair-weather periods) and will help to identify annual sediment-transport pathways. The recent data will also be compared with regional-scale data collected in 2006 and 2007 and published in USGS Scientific Investigations Report 2009–5252 (**http://pubs.usgs.gov/sir/2009/5252/**). This comparison will help us better understand interannual changes in the submerged island platform caused by natural processes, as well as alterations to the system stemming from the construction of the *Deepwater Horizon* oil-spill-mitigation sand berm, begun in June 2010 and completed in March 2011. Furthermore, by combining seafloor-mapping data with island elevations derived from airborne lidar (light detection and ranging) surveys, we can establish links between the annual and interannual evolution of the Chandeleur Islands and the geologic variability just offshore. Establishing such links is essential for understanding not just the magnitude of surface-area changes to the islands, but also the response of the entire barrier-island system. Finally, data from 2012 were collected less than one month before the August 29 landfall of Hurricane Isaac, which

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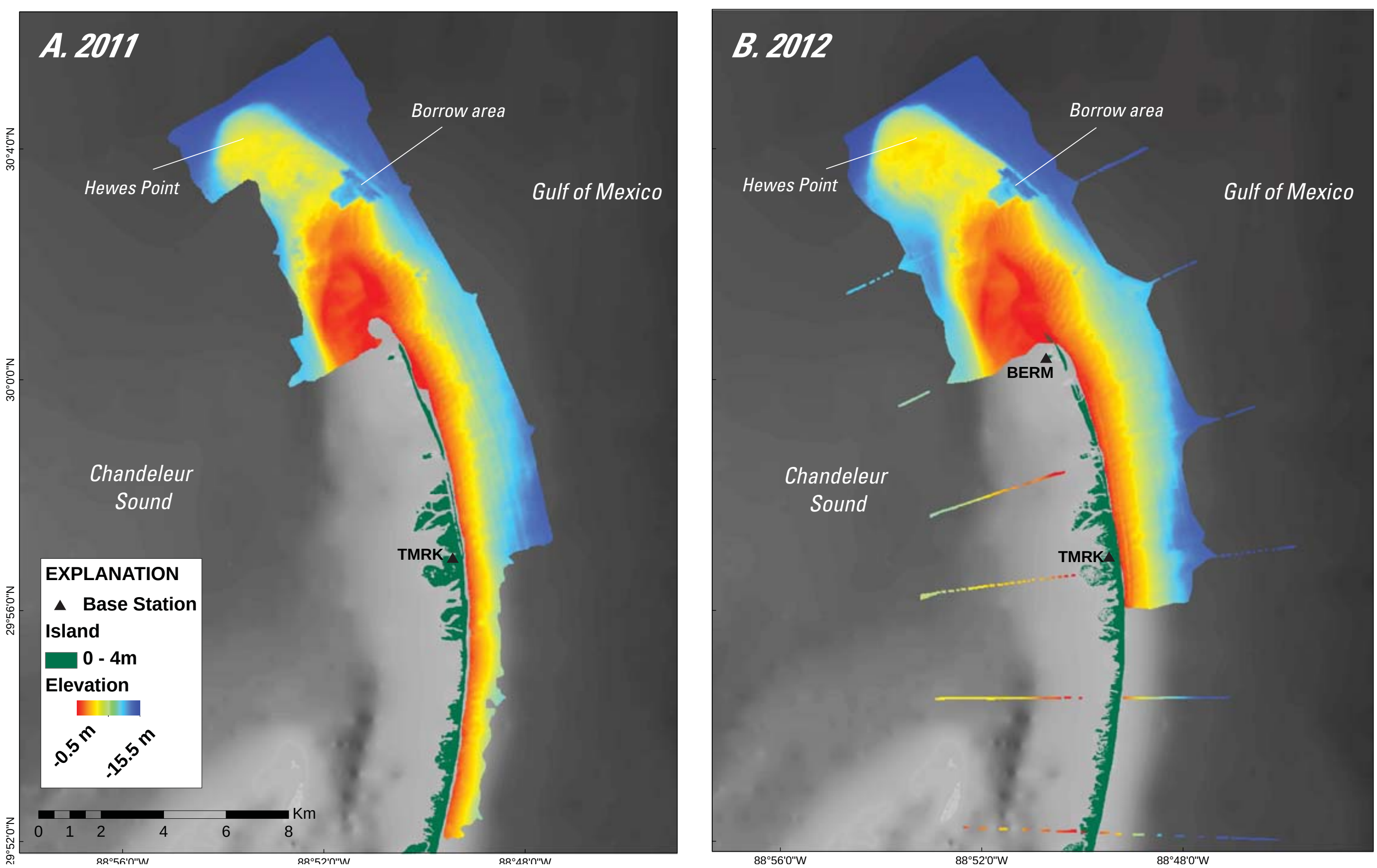

*Morphology of submerged island platform surrounding the northernmost Chandeleur Islands, in 2011 (A) and 2012 (B). Extent of the islands (dark green) in February 2011 (A) and February 2012 (B) is derived from airborne lidar (light detection and ranging) data and includes oil-spill-mitigation sand berm constructed along northernmost 12 kilometers (7 miles) of the chain on the Gulf of Mexico side. Hewes Point, a large, submerged sand deposit just north of the islands, was a source of sediment for berm construction. Note location and morphology of borrow pit and changes to the shape of Hewes Point itself. Photograph B on page 6 shows installation of the benchmark "BERM" (which is not on the berm but on an island west of the berm) before the 2012 survey. TMRK, another benchmark on the islands. Grayscale bathymetry in background from Love, M.R., Amante, C.J., Carignan, K.S., Eakins, B.W., and Taylor, L.A., 2010, Digital elevation models of the northern Gulf Coast—procedures, data sources and analysis: NOAA National Geophysical Data Center technical report, Boulder, Colo., 37 p. (**http://www.ngdc.noaa.gov/dem/squareCellGrid/download/731**).*

(Chandeleur Islands continued from page 5)

directly affected the Chandeleur Islands. Data from airborne optical sensors can tell us the volume of sand lost from the islands. (Most of the oil-spill-mitigation sand berm was swept away; see **http://coastal.er.usgs.gov/hurricanes/isaac/photo-comparisons/** and **http://www.nola.com/hurricane/index.ssf/2012/09/isaacs_surge_waves_wiped_out_b.html**.) A third seafloor survey planned for 2013 will help us pinpoint where lost sediment was deposited and whether or not it will be naturally available to the islands for post-storm recovery. This information is essential for models that will predict the evolution of the Chandeleur Island system over the next 1 to 5 years.

Information derived from these repeated shallow-water seafloor-mapping surveys allows the USGS to remain at the forefront of understanding coastal-change hazards. These surveys will expand our expertise from short- and long-term assessments to quantifying medium-term changes, filling a gap where scientists lack fundamental information about the relations between surf-zone and nearshore geologic variability and coastal evolution over time scales relevant to coastal-resource management. Datasets such as this one enable an assessment of those relations and allow the USGS to honor its commitment to applying cutting-edge science to resource-management issues. By integrating temporally relevant and simplified geologic observations into morphologic models of coastal change, we seek to refine predictions of barrier-island and coastal evolution and to support more informed management of the nation's coasts.

Views of the survey area. A, Low-elevation Chandeleur Islands from the research vessel (R/V) Twin Vee. *B, (Left to right)* ***Kyle Kelso, Nancy Dewitt****, and* ***Julie Bernier*** *install a Global Positioning System (GPS) benchmark (BERM) on the northernmost part of the Chandeleur Islands. C,* ***Julie Bernier*** *surveys a transect from the Gulf of Mexico, across the berm, and onto the island with GPS to provide data for ground-truthing seafloor-mapping elevations in the Gulf and lidar elevations acquired after the geophysical survey. D,* ***Will Pfeiffer*** *surveys island elevations in different types of vegetation to provide data for ground-truthing lidar.*

Recovery Slows for California's Sea Otters, 2012 Survey Shows

By Ben Young Landis

The southern sea otter population continues its pattern of tepid recovery, according to the latest population survey led by scientists from the U.S. Geological Survey (USGS), the California Department of Fish and Game (CDFG) Office of Spill Prevention and Response, and the Monterey Bay Aquarium.

Since the 1980s, USGS scientists have calculated an averaged population index each year for the southern sea otter, a federally listed threatened species in California (see **http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0A7**). The population index is calculated as the average of total sea otter counts from three consecutive annual surveys. Sometimes called the "three-year running average," the population index helps to compensate for year-to-year variability in observation conditions and gives scientists a more reliable picture of sea otter abundance trends.

For the 2012 report, USGS listed the population index as 2,792. (Note: the 2012 population index is the average of only two years' counts, 2010 and 2012, because—for the first time in more than two decades of monitoring—poor weather conditions prevented completion of the 2011 survey; see *Sound Waves* article at **http://soundwaves.usgs.gov/2012/06/fieldwork.html**). The 2012 survey survey data, released last August, are available online at **http://www.werc.usgs.gov/seaottercount**.

"Just as the polar bear has become symbolic of protecting the Arctic, so is the status of the sea otter emblematic of the health of the central California coast," said USGS Director **Marcia McNutt**. "These annual surveys and the associated studies to understand the drivers for population changes are critical factors in ensuring the continuing survival of not just the sea otter, but the entire complex ecosystem for which this icon is integral."

After nearly a decade of slow recovery in California sea otter numbers, the population index indicated a stall in 2008—and a decline to 2,711 in 2010. Even though the 2012 numbers are a comparative increase from those 2010 figures, the longer

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***Tim Tinker**, USGS biologist who supervises the annual California survey of southern sea otters. Binoculars and telescope (left) are used for spotting sea otters and observing their behavior from shore. Photograph taken in August 2012 by **Leslie Gordon**, USGS.*

term trend suggests that the population recovery may be at a plateau.

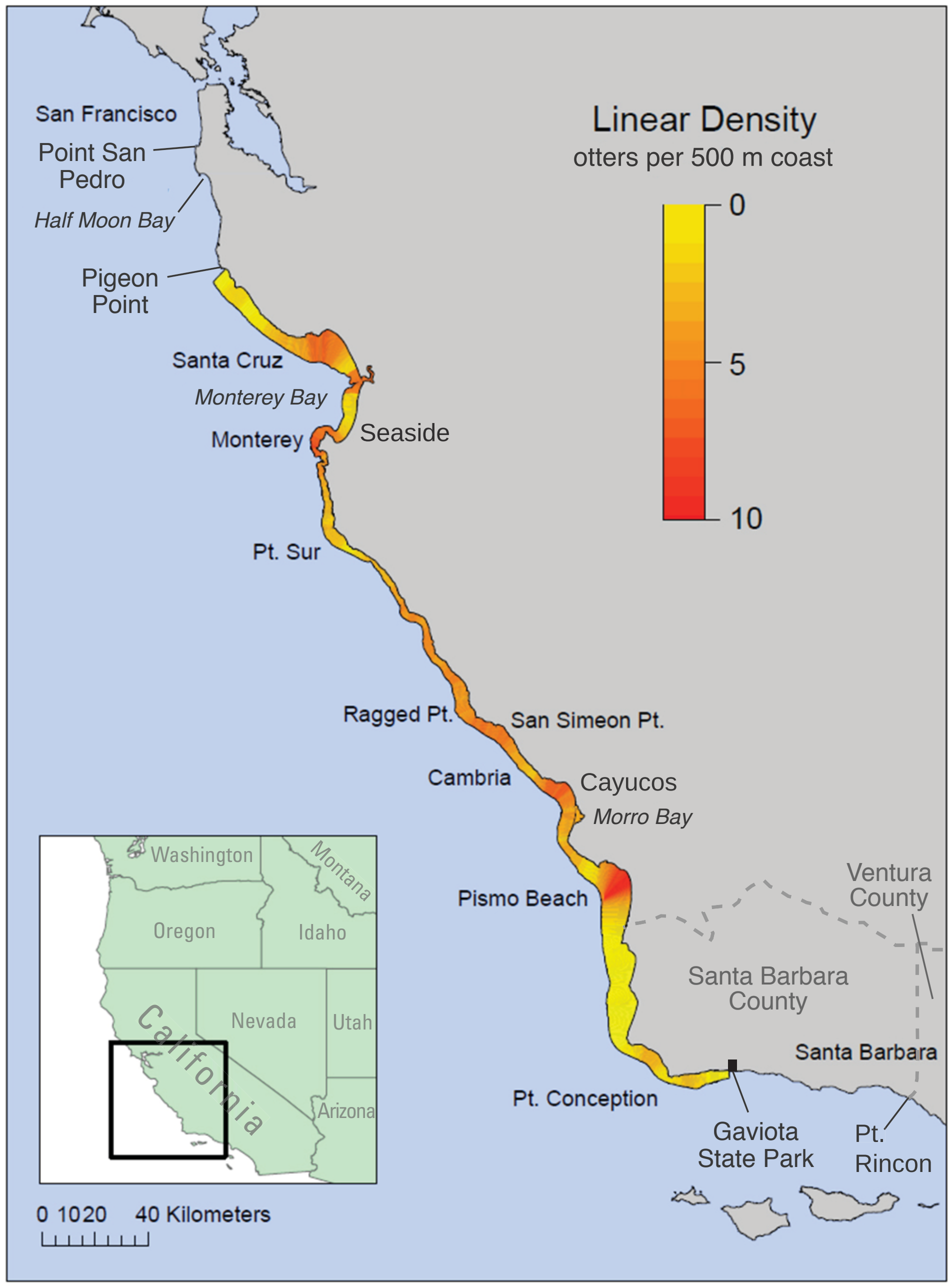
"We saw a similar plateau in the late 1990s, before sea otter numbers began to rise again in the early 2000s," said **Tim Tinker**, a biologist with the USGS Western Ecological Research Center (**http://www.werc.usgs.gov/**) who supervises the annual survey. "Recent shifts in mortality causes have brought to light additional explanations for the cessation of growth we've seen over the last few years."

USGS scientists updated their database of sea otter strandings—the number of dead, sick, or injured sea otters recovered along California's coast each year—in August 2012. The numbers are available at **http://www.werc.usgs.gov/seaotterstranding**.

In 2011, scientists from the California Department of Fish and Game (CDFG), the USGS, the Monterey Bay Aquarium, and other institutions came across a total of 335 stranded sea otters—a record high. Efforts are made to recover and examine each reported sea otter carcass, and a subset of fresh carcasses are sent to the CDFG Marine Wildlife Veterinary Care and Research Center (**http://www.dfg.ca.gov/ospr/Science/marine-wildlife-vetcare/**), where veterinarians conduct necropsies to determine the primary causes of death and to identify factors that may have contributed to the death of each animal.

"We saw an increase in death due to white shark 'tasting' bites," said **Melissa Miller**, the necropsy veterinarian at the CDFG Marine Wildlife Veterinary Care and Research Center. "We are working closely with our collaborators to understand what could be driving this new trend. The usual causes of deaths were also evident: harmful algal toxins, parasites and infectious diseases, mating trauma, emaciation, bacterial infections, heart disease, and boat strikes round out the list."

(Sea Otter Count continued on page 8)



*Central California, showing sea otter habitat in nearshore coastal waters (colored strip along coast) with color shading indicating the relative abundance of sea otters (yellow indicates low densities, red indicates high densities). See **http://www.werc.usgs.gov/seaottercount** for more information.*

(Sea Otter Count continued from page 7)

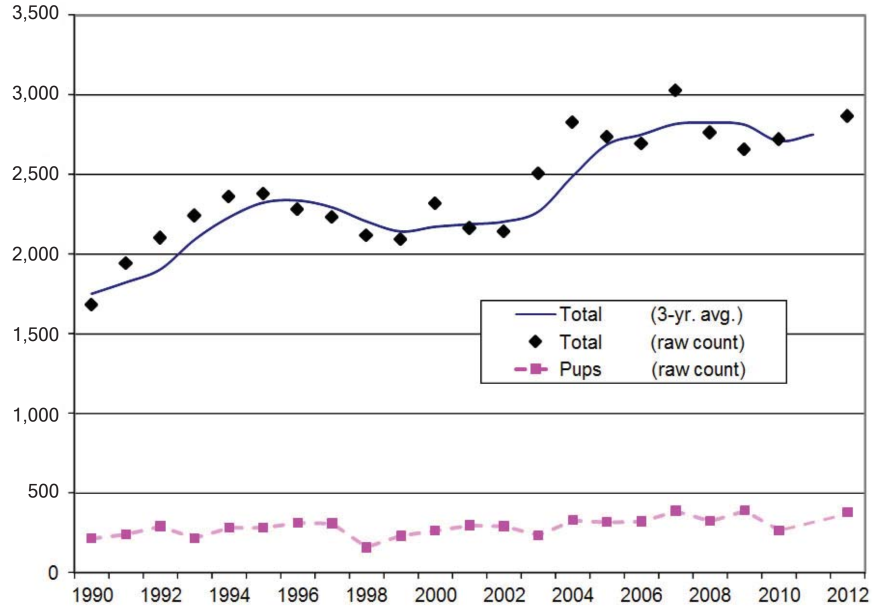
According to **Tinker**, the continued lack of population growth in the center of the geographic range—where sea otter densities are highest—adds evidence that sea otter populations may be approaching equilibrium abundance in these long-established areas. "The population density of sea otters is ultimately limited by their prey resources, although reduced food abundance may act in concert with other factors, such as infectious diseases," said **Tinker**. (For more information, read an interview with **Tinker**, titled "What's the Future for California Sea Otter Populations," at **http://www.werc.usgs.gov/outreach.aspx?RecordID=150**.)

"With natural factors like the shark bites and food limitation, there's little we can or should do," said **Lilian Carswell**, Southern Sea Otter Recovery Coordinator for the U.S. Fish and Wildlife Service. "But to cope with non-natural factors, the population recovery at the very least will depend on sea otters expanding into new areas that can support sustained populations."

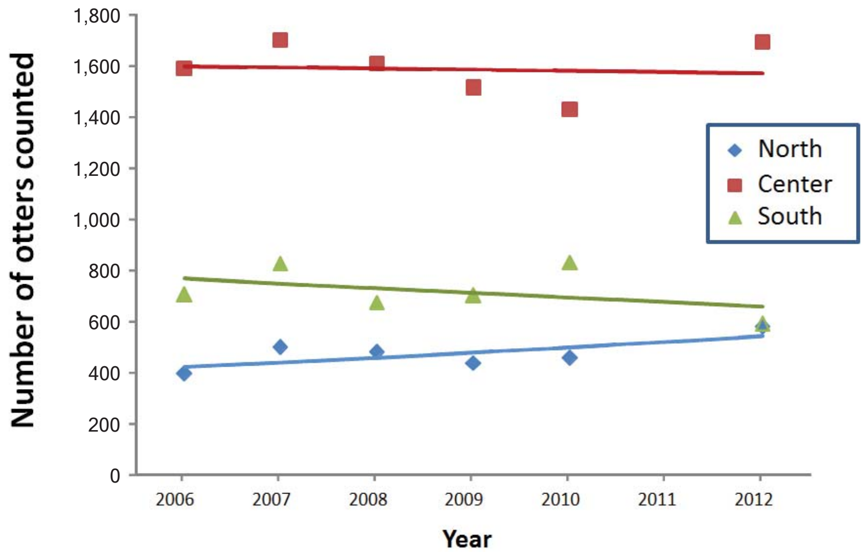
For southern sea otters to be considered for removal from threatened species listing, the population index will have to exceed 3,090 for three consecutive years, according to the threshold established under the Southern Sea Otter Recovery Plan by the U.S. Fish and Wildlife Service (**http://www.fws.gov/ventura/species_information/so_sea_otter/**). That would mark a significant comeback for this marine mammal, presumed extinct in California after the fur-trade years until a group of fewer than 50 animals was rediscovered along the coast of Big Sur in the 1930s.

Sea otters are considered a keystone species of the kelp ecosystem, preying on herbivorous invertebrates, such as sea urchins, that can decimate kelp beds, and consequently fish habitat, if left unchecked. Scientists also study sea otters as an indicator of nearshore ecosystem health (see **http://on.doi.gov/nearshore**), since sea otters feed and live near the coast and often are the first predators exposed to pollutants and pathogens washed down from coastlands, such as the microbial toxin microcystin (**http://news.ucsc.edu/2010/09/otter-toxin.html**).

(Sea Otter Count continued on page 9)



Southern sea otter population trends over the period 1990–2012. Annual counts shown for pups (pink squares) and total animals (independents plus pups; black diamonds). Blue line is running 3-year average of total counts (for example, value for year 2010 is average of total counts for years 2008, 2009, and 2010), which represents the official index of population abundance. For southern sea otters to be considered for removal from threatened species listing, the 3-year running average of total counts, or "population index," would have to exceed 3,090 for 3 consecutive years. See ***http://www.werc.usgs.gov/seaottercount*** *for more information.*



Differences in southern sea otter population trends across parts of geographic range. North is Half Moon Bay to Seaside. Center is Seaside to Cayucos. South is Cayucos to Gaviota State Park. Numbers represent raw (not averaged) counts from annual surveys. See ***http://www.werc.usgs.gov/seaottercount*** *for more information.*

(Sea Otter Count continued from page 8)

The annual population index is calculated from visual surveys conducted along the California coastline by researchers, students, and volunteers from the USGS (**http://www.werc.usgs.gov/seaottercount**), the CDFG Office of Spill Prevention and Response (**http://www.dfg.ca.gov/ospr/**), the Monterey Bay Aquarium (**http://www.montereybayaquarium.org/cr/sorac.aspx**), the Santa Barbara Zoo (**http://www.sbzoo.org/**), the University of California, Santa Cruz (**http://ims.ucsc.edu/lml.html**), the U.S. Fish and Wildlife Service (**http://www.fws.gov/ventura/species_information/so_sea_otter/**), and the U.S. Bureau of Ocean Energy Management (**http://www.boem.gov/**). The surveys are coordinated by USGS scientist **Brian Hatfield** for the Fish and Wildlife Service, which is the agency responsible for managing the southern sea otter's recovery.

Surveys are conducted via telescope observations from shore and via low-flying aircraft, typically from April through June. In 2012, the surveyed coastline extended from Point San Pedro in San Mateo County south to Rincon Point near the Santa Barbara-Ventura County line. ❁

Research

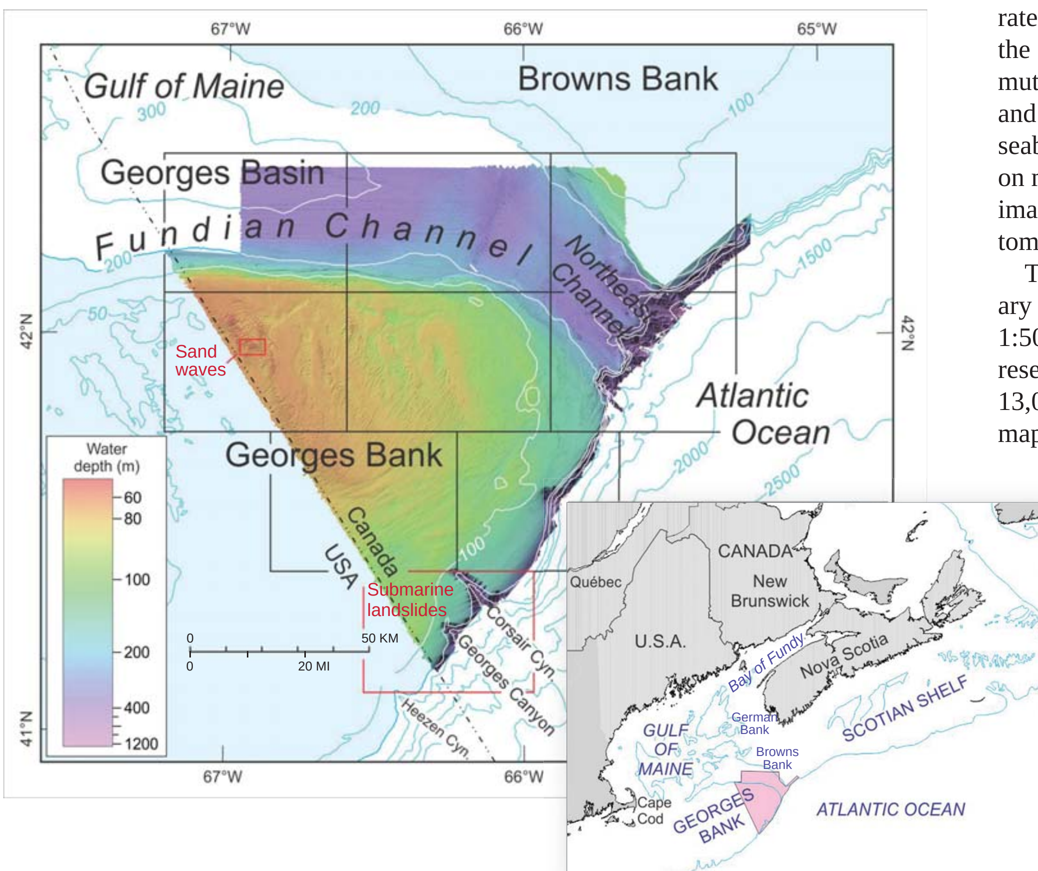
U.S. and Canadian Geologists Collaborate in Mapping the Georges Bank Seabed

By Page Valentine (U.S. Geological Survey) and Brian Todd (Geological Survey of Canada)

Georges Bank is a large (42,000 square kilometers) part of the continental shelf offshore of New England that lies in both U.S. and Canadian waters. The seabed is primarily glacially derived sand and gravel deposited since the end of the last glacial maximum approximately 20,000 years ago. A series of maps showing the seabed topography of the Canadian portion of relatively shallow Georges Bank and the deeper Fundian and Northeast Channels has been compiled by geologists **Brian Todd** and **John Shaw** of the Geological Survey of Canada (GSC) and **Page Valentine** of the U.S. Geological Survey (USGS). The area was surveyed over two field seasons using multibeam sonar technology. **Todd** has led the effort to map large parts of the Canadian continental margin, including the Bay of Fundy, German Bank, Browns Bank, and the Georges Bank region. **Valentine** has conducted research on the Georges Bank seabed in U.S. waters and has previously collaborated with **Todd** on geologic studies of the Canadian portion of the bank. Their mutual research interests have led **Todd** and **Valentine** to collaborate in compiling seabed maps using an approach that relies on multibeam sonar data, video and photo imagery, sediment sampling, and subbottom seismic profiling.

The map series, to be released in January 2013, comprises 9 sheets at a scale of 1:50,000 (1 centimeter on the map represents 500 meters on the seabed). In all, 13,000 square kilometers of seabed were mapped in water depths of 42 meters to

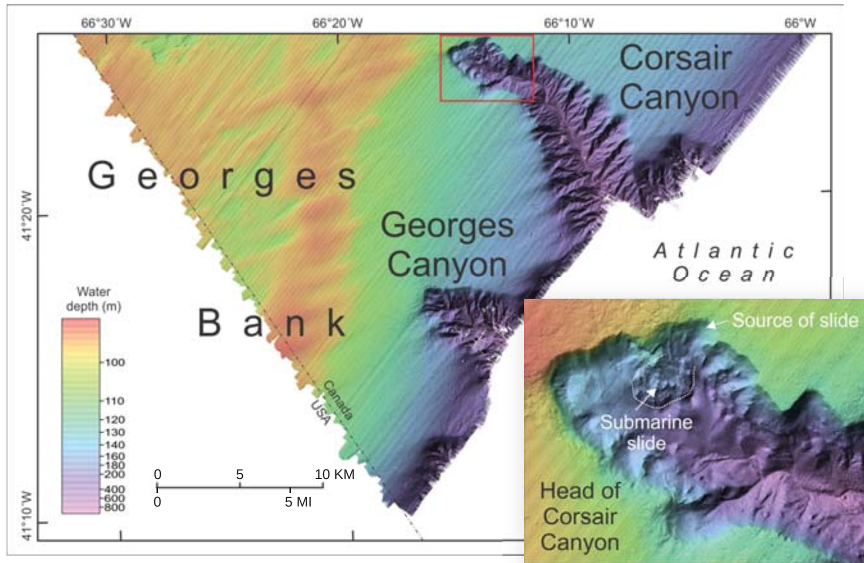
(Georges Banks Maps continued on page 10)



Regional map showing multibeam-sonar topographic imagery of the Canadian part of Georges Bank and the Fundian and Northeast Channels. Mapped area is southeast of the Gulf of Maine and southwest of the Scotian Shelf (see inset map). Large rectangles are boundaries of the 9 sheets of the new map series. Red rectangles are locations of high-resolution images of sand waves and submarine canyons (see page 10). Water depths are color-coded; topographic contours are in meters.

(Georges Bank Maps continued from page 9)

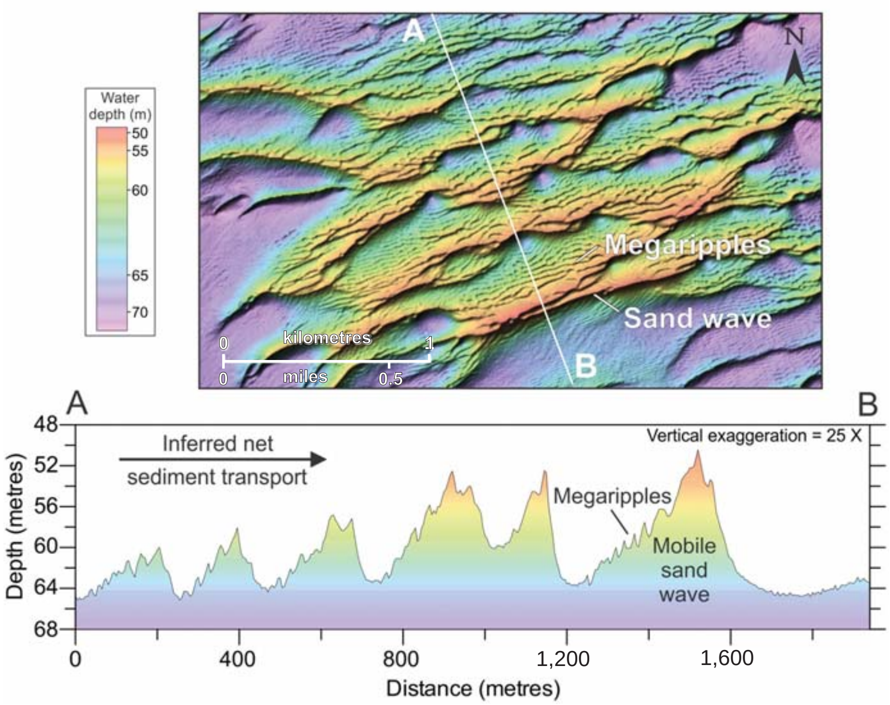
more than 1,000 meters. Multibeam bathymetric data show the topography in great detail at a horizontal resolution of 5 to 10 meters and a vertical resolution of 10 to 30 centimeters. The seabed bears the imprint of the last glaciation, when sea level was approximately 125 meters lower and the Laurentide ice sheet covered all of New England and Atlantic Canada. Glacial ice encroached on the northern and eastern margins of Georges Bank and found an outlet to the Atlantic Ocean through the Fundian and Northeast Channels, which separate Georges Bank from the Scotian Shelf to the north. Today, much of the bank is covered by sand and gravel outwash from the glaciers. These sediments have been reworked by rising sea level and modern tidal and storm currents to produce large sand waves in shallow parts of the bank. Moraines and other glacial features on the seabed show the direction of flowing ice, and numerous iceberg keel marks record the breakup (or calving) of floating ice where glaciers terminated in the ocean. Old shoreline features document rises of sea level following the melting of the regional ice sheet. On the seaward edge of Georges Bank, submarine slide features document the collapse of sediment deposits, which contributed to the formation of submarine canyons. Present-day features of deformed seabed on the bank edge identify sediments that are susceptible to future slumping and sliding events. Apart from revealing the morphology of the seabed and the recent glacial and postglacial processes that formed it, these maps provide a framework for further mapping of the geological substrates and environmental processes that characterize the region, for fishery management, and for baseline studies that would precede any future oil and gas development.



Southernmost map sheet of the series shows submarine canyons incising the seaward margin of Georges Bank. Canyon walls are characterized by ridges and gullies caused by slumping of glacially derived mud. A large submarine slide is present in the head of Corsair Canyon (see inset image). Not visible at this scale are sand waves on the bank at water depths of as much as 100 meters, and iceberg keel marks and incipient slump features at the shelf break at depths of approximately 200 meters. See the regional map on page 9 for location of the image.

The new map series will be published by the Geological Survey of Canada; the full citation is: Todd, B.J., Valentine, P.C., and Shaw, J., 2013, Shaded seafloor topography, Georges Bank, Fundian Channel, and Northeast Channel, Gulf of Maine: Geological Survey of Canada, Maps 2191A–2199A, 9 sheets, scale 1:50,000.

Multibeam bathymetric imagery of the Canadian continental margin can be viewed at **http://gdr.ess.nrcan.gc.ca/multibath/e/viewer.htm**. The Georges Bank imagery will be available for viewing after this map series is published in January 2013. ☸



Map and cross-section showing the morphology (shape) of mobile sand waves and megaripples on north-central Georges Bank. Inferred direction of net current and sediment transport is from northwest to southeast, as determined from the steep down-current lee faces of the sand waves. Megaripples occur on the up-current (or stoss) faces of the sand waves. Mobile sand waves in this image reach 14 meters in height (in water depths of 50–64 meters), and megaripples are less than 2 meters in height. See the regional map on page 9 for location of the image.

Native Youth in Science—Preserving Our Homelands

By Chris Polloni, Ben Gutierrez, and Monique Fordham

The Mashpee Wampanoag Tribe partnered with the U.S. Geological Survey (USGS) Woods Hole Coastal and Marine Science Center (WHCMSC) in Woods Hole, Massachusetts, to develop and deliver a summer science pilot program for Mashpee Wampanoag tribal youth in grades 6, 7, and 8. The program was developed by **Renée Lopes-Pocknett**, Director of the Mashpee Wampanoag Tribe's Education Department, and **Monique Fordham**, USGS National Tribal Liaison, and was guided by **Chris Polloni**, WHCMSC Outreach Coordinator. **Troy Currence** (WHCMSC) provided initial contacts and advice for the science staff about tribal customs. The program was designed to help reconnect Mashpee Wampanoag youth with the ecology and geology of their traditional homelands through classroom and field presentations, with an emphasis on hands-on experience. The program wove scientific information and data collection together with traditional ecological knowledge provided by tribal culture keepers, to ensure that information was provided in a context that stressed the ancestral relationships between the Wampanoag people and the ecosystems of their homelands.

Titled "Native Youth in Science—Preserving Our Homelands," the summer 2012 pilot program strived to present science as a tool by which to protect and preserve the ecosystems and homelands of the Mashpee Wampanoag Tribe. It also challenged the students to develop ways of thinking and being studious about their surroundings while achieving habits of mind and skills for understanding how science works.

Points of inquiry were developed for six "experience units," with an overarching focus on traditional ecological knowledge. **Kristen Wyman** (Freshwater Consulting), a tribal environmental educator, worked with **Ben Gutierrez** (WHCMSC) to develop the program curriculum; **Lopes-Pocknett** and **Polloni** provided additional input. The team also identified scientists to develop the scientific content for each experience unit and then consulted with the tribal culture keepers to place the science content in a context that supported the presentation of tribal traditional ecological knowledge. In addition, **Wyman** provided guidance in ensuring that the program was compatible with science, technology, engineering, and mathematics (STEM) content standards for the Commonwealth of Massachusetts (for more information on Massachusetts curriculum frameworks, see **http://www.doe.mass.edu/omste/ca.html**).

The program included the following six experience units:

Unit 1: Water quality; discussion of Wampanoag knowledge of the locations and characteristics of different water sources; water-quality testing (terrestrial and marine).

Unit 2: Wampanoag creation story and geological history of Cape Cod; origin of the ancestral homelands from Wampanoag and geological perspectives; rock characteristics; contemporary and traditional Wampanoag use of rock materials.

Unit 3: Climate change, sea-level change, shoreline change, and how they are monitored; the potential impacts of these changes on Wampanoag traditional homelands and tribal hunting and fishing locales.

Unit 4: Regional geology and biology of the Mashpee River region and Popponesset Bay; plants and animals that inhabit the local landscape; topographic maps, with an emphasis on geologic features in the region and the historical locations inhabited by the tribe (as passed down by oral tradition); the historical significance of the bay and river to Wampanoag culture; Wampanoag ethnobotany (the relationships between people and plants).

Unit 5: Marsh ecology and the plants and animals that inhabit the coastal marshes; fish identification; impacts of sea-level rise on the marsh ecosystem; Wampanoag ethnobotany.

Unit 6: An exploration of a part of Washburn Island, an island of strong cultural significance to the Wampanoag, followed by the closing ceremony.

The pilot program included 14 Mashpee Wampanoag youth and ran from the initial orientation session on July 9, 2012, to the closing ceremony on August 9, 2012. Each unit began with a morning energizer coordinated by **Kristen Wyman** and held at the offices of the Mashpee Wampanoag Tribe's Natural Resources Department. The first unit began with an opening ceremony, led by the Tribal Historic Preserva-

(Native Youth continued on page 12)

*Mashpee Wampanoag tribal youth preparing a traditional meal under the watchful eyes of **Renée Lopes-Pocknett** and **Errol Hicks**. Photograph by **David Gray**.*

(Native Youth continued from page 11)

tion Officer, that reinforced the purpose of the program and emphasized the need for the participants to respect both the traditional knowledge they would be receiving and the scientific inquiry on which they were about to embark.

The classroom activities were held at the tribe's Natural Resources Department offices. Other units included field trips to nearby scientifically significant locations, all of which also had tribal significance as part of the Wampanoag traditional homelands. Lunch in each unit was provided by the tribal members and typically included traditional tribal foods that were obtained locally and prepared using traditional methods.

The tribal culture keepers for the program were **Earl "Chiefie" Mills, Jr.**, **jessie "little doe" baird**, **Jonathan Perry**, **Darrel Wixon**, **Kitty Hendricks**, **Tony Perry, Sr.**, and **Ramona Peters**. The culture keeper coordinator was **Errol Hicks**. The science staff included **Richard Williams**, **Larry Poppe**, **Erika Lentz**, and **Wayne Baldwin** (all USGS), along with **Christina Stringer** (Bureau of Indian Affairs), **Pamela Polloni** (Marine Biological Laboratory/Woods Hole Oceanographic Institution [WHOI] Library Herbarium), and **Jim Rassman** (Waquoit Bay National Estuarine Research Reserve [WBNERR]). WBNERR provided an important component to the program by granting access to its research facilities, which are in proximity to local marshes and beach sites that are being studied by a number of scientists. **David Gray**, a retired WHOI employee and tribal member, provided still photography and videography for the entire program. The whole team functioned extremely well and laid a foundation for future collaboration on tribal educational initiatives.

Mashpee Wampanoag tribal youth display their T-shirts and certificates at the closing ceremony for the 2012 Native Youth in Science program, in Woods Hole, Massachusetts. The adults in the photograph include tribal culture keepers, support staff, and USGS personnel. Photograph by ***David Gray****.*

We gratefully acknowledge the invaluable support of the staff at the Mashpee Wampanoag Tribe's Natural Resources Department, especially the Director, **Quan Tobey**, and Assistant Director, **George "Chuckie" Green**, who were instrumental in the development and implementation of the program. ☸

Awards

USGS Scientists on Team Honored by Excellence in Partnering Award

Four U.S. Geological Survey (USGS) scientists were members of a project team that won the National Oceanographic Partnership Program's (NOPP) 2011 Excellence in Partnering Award: **Amanda Demopoulos** (Southeast Ecological Science Center, Gainesville, Florida), **Cheryl Morrison** (Leetown Science Center, Kearneysville, West Virginia), **Christina Kellogg** (St. Petersburg Coastal and Marine Science Center, St. Petersburg, Florida), and **Nancy Prouty** (Pacific Coastal and Marine Science Center, Santa Cruz, California).

The 2011 award recognizes the achievements of the "Lophelia II" project team, led by **Charles Fisher** of Pennsylvania State University and **James Brooks** of TDI Brooks International, Inc. The work of project team Lophelia II involved the exploration and research of deepwater natural and artificial hard-bottom habitats in the northern Gulf of Mexico, with an emphasis on coral communities. Deepwater coral habitats are

(Excellence continued on page 13)

Cheryl Morrison *(USGS Leetown Science Center) in front of the* Johnson-Sea-Link II, *a submersible the team used to investigate deepwater corals in the northern Gulf of Mexico. Photograph by* ***Christina Kellogg*** *(USGS St. Petersburg Coastal and Marine Science Center).*

(Excellence continued from page 12)

Closeup image of a single Eumunida picta *squat lobster perched on a live* Lophelia pertusa *thicket. Image courtesy of Lophelia II 2012 Expedition, NOAA-OER/BOEM.*

biodiversity hotspots and significant biological resources with both intrinsic and socio-economic value.

The Lophelia II project completed its last research cruise in July 2012 in the Gulf of Mexico, where it discovered *Lophelia* coral growing deeper than previously seen anywhere in the Gulf. (Learn more about this cruise—the first dedicated scientific study of deep-sea corals on actively producing oil and gas platforms—at **http://www.oceanleadership.org/2012/joint-boem-noaa-usgs-mission-discovers-record-depth-for-lophelia-coral-on-gulf-of-mexico-energy-platforms/** and **http://oceanexplorer.noaa.gov/explorations/12lophelia/welcome.html**.) Information from all the Lophelia II cruises will inform future environmental review and decision making for the protection of deepwater corals.

The Bureau of Ocean Energy Management (BOEM), the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Geological Survey (USGS) were the NOPP contributing agencies for the *Lophelia II* project. The project was nominated for the NOPP Excellence in Partnering Award by BOEM for its exceptionally diverse partnerships between scientists, graduate students, technicians, public outreach professionals, and industry professionals from 3 federal agencies, 11 private companies, and 5 universities.

The award was presented October 15, 2012, during the Oceans 2012 Conference in Virginia Beach, Virginia.

"As a Program that is built on successful collaboration and coordination, the NOPP Office is pleased to honor the Lophelia II project team with the 2011 Excellence in Partnership Award for exhibiting exemplary partnerships in ocean science," said **Allison Miller**, NOPP Office Program Manager. "The Program Office applauds the contributing agencies of this project for supporting and nominating such a diverse, first-of-its-kind deep-sea coral study."

For more information about the 2011 Excellence in Partnering Award, visit **http://www.nopp.org/2012/national-oceanographic-partnership-program-honors-2011-excellence-in-partnering-award-recipients/**.

USGS participation in the Lophelia II project is part of the USGS Diversity, Systematics, and Connectivity of Vulnerable Reef Ecosystems (DISCOVRE) Project (**http://fl.biology.usgs.gov/DISCOVRE/**), an integrated, multidisciplinary effort investigating deep-sea communities from the microscopic to the ecosystem level. USGS DISCOVRE scientists recently completed the second cruise of a 4-year project to study the biology, geology, and oceanography of a series of canyons off the U.S. middle Atlantic coast (see **http://deepwatercanyons.wordpress.com/about/** and **http://oceanexplorer.noaa.gov/explorations/12midatlantic/welcome.html**).

As part of the Ecosystems Mission Area, the USGS deep-sea coral research is supported by the Terrestrial, Freshwater, and Marine Environments Program Outer Continental Shelf funds under the guidance of **Colleen Charles**. ☸

Staff and Center News

Pacific Coastal and Marine Science Center Welcomes Andy O'Neill

By Patrick Barnard

Oceanographer **Andy O'Neill** joined the U.S. Geological Survey (USGS) Pacific Coastal and Marine Science Center in Santa Cruz, California, in August 2012. She is assisting **Patrick Barnard** and **Li Erikson** with the development of the Coastal Storm Modeling System (CoSMoS) for assessing future climate-change impacts along the California coast.

Andy has a background in both oceanography and meteorology. She earned her B.S. in oceanography at the University of Washington in Seattle and her M.S. in physical oceanography and meteorology at the Naval Postgraduate School in Monterey, California, where she worked with **Jamie MacMahan** investigating rip-current pulsation structures.

Andy has spent the past 11 years providing oceanographic and meteorological analyses to the U.S. Navy, primarily out of Yokosuka, Japan; most of her work has revolved around natural-hazard risk analyses, meteorological and oceanographic vulnerability assessments, and ocean acoustics. ☸

Andy O'Neill

Staff and Center News, continued

Olivia Cheriton Joins USGS Pacific Coastal and Marine Science Center

By Curt Storlazzi

Olivia Cheriton has joined the U.S. Geological Survey (USGS) Pacific Coastal and Marine Science Center in Santa Cruz, California, as an oceanographer in support of several projects: Pacific Coral Reef Geology and Oceanography, National Seafloor Mapping and Benthic Habitat Studies, and Climate Change Impacts to the U.S. Pacific and Arctic Coasts.

Olivia earned her Ph.D. at the University of California, Santa Cruz (UCSC). Funded by the U.S. Office of Naval Research, she used bottom-mounted instrument packages, moorings, and vessel surveys to study the physical oceanographic controls on coastal-ocean plankton patches called "thin layers." She also received a U.S. Defense University Research Instrumentation Program Award for developing a new oceanographic equipment package that includes an undulating underwater vehicle with integrated optical and chemical sensors.

After receiving her Ph.D. in 2008, **Olivia** worked as a postdoctoral researcher with a joint position between UCSC and the University of Hawai'i at Manoa, and then as a postdoctoral researcher at Moss Landing Marine Laboratories in Moss Landing, California.

Olivia has lectured and taught classes on physical oceanography, data-analysis techniques in marine science, and oceanographic instrumentation for students at UCSC, Stanford University, and Moss Landing Marine Labs. She has extensive experience overseeing dozens of simultaneous moorings and tripods with acoustic, optical, and chemical time-series oceanographic sensors; collecting oceanographic data from vessels; water-column and seabed sampling; data processing and data visualization; and publishing in peer-reviewed journals. ☸

Olivia Cheriton

Publications

Recently Published Articles

Adams, J., MacLeod, C., Suryan, R.M., Hyrenbach, K.D., and Harvey, J.T., 2012, Summer-time use of west coast U.S. National Marine Sanctuaries by migrating sooty shearwaters (*Puffinus griseus*): Biological Conservation, doi:10.1016/j.biocon.2011.12.032 [**http://dx.doi.org/10.1016/j.biocon.2011.12.032**].

Barnard, P.L., Hansen, J.E., and Erikson, L.H., 2012, Synthesis study of an erosion hot spot, Ocean Beach, California (USA): Journal of Coastal Research, v. 28, no. 4, p. 903–922, doi:10.2112/JCOASTRES-D-11-00212.1 [**http://dx.doi.org/10.2112/JCOASTRES-D-11-00212.1**].

Behrens, M.D., and Lafferty, K.D., 2012, Geographic variation in the diet of opaleye (*Girella nigricans*) with respect to temperature and habitat: PLoS ONE, v. 7, no. 9, e45901, doi:10.1371/journal.pone.0045901 [**http://dx.doi.org/10.1371/journal.pone.0045901**].

Berkowitz, P., Storlazzi, C.D., Courtot, K.N., Krause, C.M., and Reynolds, M.H., 2012, Sea-level rise and wave-driven inundation models for Laysan Island, chap. 2 *of* Reynolds, M.H., Berkowitz, P., Courtot, K.N., and Krause, C.M., eds., Predicting sea-level rise vulnerability of terrestrial habitat and wildlife of the Northwestern Hawaiian Islands: U.S. Geological Survey Open-File Report 2012–1182, p. 72–126 [**http://pubs.usgs.gov/of/2012/1182/**].

Bertolino, S., Guichon, L.M., and Carter, J., 2012, *Myocastor coypus* Molina (coypu), chap. 30 *of* Francis, R.A., ed., A handbook of global freshwater invasive species: New York, Routledge, Taylor and Francis Group, p. 357–368 [**http://www.routledge.com/books/details/9781849712286/**].

Blazer, V.S., Iwanowicz, L.R., Henderson, H., Mazik, P.M., Jenkins, J.A., Alvarez, D.A., and Young, J.A., 2012, Reproductive endocrine disruption in smallmouth bass (*Micropterus dolomieu*) in the Potomac River basin; spatial and temporal comparisons of biological effects: Environmental Monitoring and Assessment, v. 184, no. 7, p. 4309–4334, doi:10.1007/s10661-011-2266-5 [**http://dx.doi.org/10.1007/s10661-011-2266-5**].

Breithaupt, J., Smoak, J.M., Smith, T.J., III, Sanders, C., and Hoare, A., 2012, Organic carbon burial rates in mangrove sediments; strengthening the global budget: Global Biogeochemical Cycles, v. 26, GB3011, 11 p., doi:10.1029/2012GB004375 [**http://dx.doi.org/10.1029/2012GB004375**].

Briggs, B.R., Inagaki, F., Morono, Y., Futagami, T., Huguet, C., Rosell-Mele, A., Lorenson, T., and Colwell, F.S., 2012, Bacterial dominance in subseafloor sediments characterized by methane hydrates: FEMS Microbiology Ecology,

(Recently Published continued on page 15)

(Recently Published continued from page 14)

v. 81, no. 1, p. 8898, doi:10.1111/j.1574-6941.2012.01311.x [**http://dx.doi.org/10.1111/j.1574-6941.2012.01311.x**].

Buler, J.J., Randall, L.A., Fleskes, J.P., Barrow, W.C., Jr., Bogart, T., and Kluver, D., 2012, Mapping wintering waterfowl distributions using weather surveillance radar: PLoS ONE, v. 7, no. 7, e41571, doi:10.1371/journal.pone.0041571 [**http://dx.doi.org/10.1371/journal.pone.0041571**].

Calderon, K., Forde, A.S., Dadisman, S.V., Wiese, D.S., and Phelps, D.C., 2012, Archive of digital boomer subbottom profile data collected in the Atlantic Ocean offshore northeast Florida during USGS cruises 03FGS01 and 03FGS02 in September and October of 2003: U.S. Geological Survey Data Series 670, DVD [**http://pubs.usgs.gov/ds/670/**].

Cretini, K.F., Visser, J.M., Krauss, K.W., and Steyer, G.D., 2012, Development and use of a floristic quality index for coastal Louisiana marshes: Environmental Monitoring and Assessment, v. 184, no. 4, p. 2389–2403, doi:10.1007/s10661-011-2125-4 [**http://dx.doi.org/10.1007/s10661-011-2125-4**].

DeWitt, N.T., Flocks, J.G., Reynolds, B.J., and Hansen, M., 2012, Archive of single-beam bathymetry data collected during USGS cruise 07CCT01 nearshore of Fort Massachusetts and within Camille Cut, West and East Ship Islands, Gulf Islands National Seashore, Mississippi, July 2007: U.S. Geological Survey Data Series 722, CD-ROM [**http://pubs.usgs.gov/ds/722/**].

Ellis, M.M., Williams, J.L., Lesica, P., Bell, T.J., Bierzychudek, P., Bowles, M., Crone, E.E., Doak, D.F., Ehrlen, J., Ellis-Adam, A., McEachern, K., Ganesan, R., Latham, P., Luijten, S., Kaye, T.N., Knight, T.M., Menges, E.S., Morris, W.F., den Nijs, H., Oostermeijer, G., Quintana-Ascencio, P.F., Shelly, J.S., Stanley, A., Thorpe, A., Ticktin, T., Valverde, T., and Weekley, C.W., 2012, Matrix population models from 20 long-term studies of perennial plant populations: Ecology, v. 93, no. 4, p. 951, Ecological Archives E093-083, doi:10.1890/11-1052.1 [**http://dx.doi.org/10.1890/11-1052.1**]

Erikson, L.H., Gibbs, A.E., Richmond, B.M., Storlazzi, C.D., and Jones, B.M., 2012, Modeling arctic barrier island-lagoon system response to projected arctic warming: Arctic Landscape Conservation Cooperative Progress Report [**http://arcticlcc.org/projects/geophysical/barrier-island-lagoon-systems/**].

Falcini, F., Khan, N.S., Macelloni, L., Horton, B.P., Lutken, C.B., McKee, K.L., Santoleri, R., Colella, S., Li, C., Volpe, G., D’Emidio, M., Salusti, A., and Jerolmack, D.J., 2012, Linking the historic 2011 Mississippi River flood to coastal wetland sedimentation: Nature Geoscience, v. 5, p. 803–807, doi:10.1038/NGEO1615 [**http://dx.doi.org/10.1038/NGEO1615**].

Forde, A.S., Dadisman, S.V., Kindinger, J.L., Miselis, J.L., Wiese, D.S., and Buster, N.A., 2012, Archive of digital chirp subbottom profile data collected during USGS cruise 10BIM04 offshore Cat Island, Mississippi, September 2010: U.S. Geological Survey Data Series 724, 2 DVDs [**http://pubs.usgs.gov/ds/724/**].

Forde, A.S., Dadisman, S.V., Wiese, D.S., and Phelps, D.C., 2012, Archive of digital boomer subbottom data collected during USGS cruise 05FGS01 offshore east-central Florida, July 17-29, 2005: U.S. Geological Survey Data Series 647, DVD [**http://pubs.usgs.gov/ds/647/**].

Ganguli, P.M., Conaway, C.H., Swarzenski, P.W., Izbicki, J.A., and Flegal, A.R., 2012, Mercury speciation and transport in a California coastal lagoon system; the role of submarine groundwater discharge and monomethyl mercury production: Environmental Science and Technology, v. 46, no. 3, p. 1480–1488, doi:10.1021/es202783u [**http://dx.doi.org/10.1021/es202783u**]

Geist, E.L., 2012, Near-field tsunami edge waves and complex earthquake rupture: Pure and Applied Geophysics, Online First, May 22, 2012, doi:10.1007/s00024-012-0491-7 [**http://dx.doi.org/10.1007/s00024-012-0491-7**].

George, D.A., Gelfenbaum, G., and A.W. Stevens, 2012, Modeling the hydrodynamic and morphologic response of an estuary restoration: Estuaries and Coasts, v. 35, p. 1510–1529, doi:10.1007/s12237-012-9541-8 [**http://dx.doi.org/10.1007/s12237-012-9541-8**].

Glorioso, B.M., Waddle, J.H., Crockett, M.E., Rice, K.G., and Percival, H.F., 2012, Diet of the invasive Cuban treefrog (*Osteopilus septentrionalis*) in pine rockland and mangrove habitats in South Florida: Caribbean Journal of Science, v. 46, no. 2–3, p. 346–355.

Goldfinger, C., Nelson, C.H., Morey, A.E., Johnson, J.E., Patton, J.R., Karabanov, E., Gutiérrez-Pastor, J., Eriksson, A.T., Gràcia, E., Dunhill, G., Enkin, R.J., Dallimore, A., and Vallier, T., 2012, Turbidite event history—Methods and implications for Holocene paleoseismicity of the Cascadia subduction zone: U.S. Geological Survey Professional Paper 1661–F, 170 p. [**http://pubs.usgs.gov/pp/pp1661f/**].

Gonzalez-Martin, C., Teigell-Perez, N., Lyles, M., Valladares, B., Griffin, D.W., 2012, Epifluorescent direct counts of bacteria and viruses from topsoil of various desert dust storm regions: Research in Microbiology, available online 6 September 2012, doi:10.1016/j.resmic.2012.08.009 [**http://dx.doi.org/10.1016/j.resmic.2012.08.009**].

Grace, J.B., Keeley, J.E., Johnson, D.J., and Bollen, K.A., 2012, Structural equation modeling and the analysis of long-term monitoring data, *in* Gitzen, R.A., Millspaugh, J.J., Cooper, A.B., and Licht, D.S., eds., Design and analysis of long-term ecological monitoring studies: Cambridge, U.K., Cambridge University Press, p. 325–358 [**http://www.cambridge.org/gb/knowledge/isbn/item6661397/?site_locale=en_GB**].

Grace, J.B., Schoolmaster, D.R., Jr., Guntenspergen, G.R., Little, A.M., Mitchell, B.R., Miller, K.M., and Schweiger, E.W., 2012, Guidelines for a graph-theoretic implementation of structural equation modeling: Ecosphere, v. 3, no. 8, article 73, doi:10.1890/ES12-00048.1 [**http://dx.doi.org/10.1890/ES12-00048.1**].

Havens, K., Jolls, C.L., Marik, J.E., Vitt, P., McEachern, A.K., and Kind, D., 2012, Effects of a non-native biocontrol weevil, *Larinus planus*, and other emerging threats on populations of the federally threatened Pitcher’s thistle, *Cirsium*

(Recently Published continued on page 16)

(Recently Published continued from page 15)

pitcheri: Biological Conservation, v. 155, p. 202–211. doi:10.1016/j.biocon.2012.06.010 [**http://dx.doi.org/10.1016/j.biocon.2012.06.010**].

Hein, J.R., Conrad, T.A., Frank, M., Christl, M., and Sager, W.W., 2012, Copper-nickel-rich, amalgamated ferromanganese crust-nodule deposits from Shatsky Rise, NW Pacific: Geochemistry Geophysics Geosystems, v. 13, no. 10, 23 p., doi:10.1029/2012GC004286 [**http://dx.doi.org/10.1029/2012GC004286**].

Howard, R.J., and Allain, L., 2012, Effects of a drawdown on plant communities in a freshwater impoundment at Lacassine National Wildlife Refuge, Louisiana: U.S. Geological Survey Scientific Investigations Report 2012–5221, 27 p. [**http://pubs.usgs.gov/sir/2012/5221/**].

Iverson, R.D., Westbrooks, R.G., Eplee, R.E., and Tasker, A.V., 2011, Overview and status of the witchweed (*Stringa asiatica*) eradication program in the Carolinas, chap. 6 *of* Leslie, A., and Westbrooks, R.G., eds., Invasive plant management issues and challenges in the United States; 2011 overview: American Chemical Society, ACS Symposium Series, v. 1073, p. 51–68, doi:10.1021/bk-2011-1073.ch006 [**http://dx.doi.org/10.1021/bk-2011-1073.ch006**].

Izbicki, J.A., Swarzenski, P.W., Burton, C.A., Van DeWerfhorst, L.C., Holden, P.A., and Dubinski, E.A., 2012, Sources of fecal indicator bacteria to groundwater, Malibu Lagoon, and near-shore ocean water, Malibu, California, USA: Annals of Environmental Science, v. 6, article 4, p. 35–86 [**http://www.aes.neu.edu/table_contents/volume_6_2012/index.php**].

Jones, W.R., and Garber, A., 2012, Classifications for Coastal Wetlands Planning, Protection and Restoration Act site-specific projects; 2008 and 2009: U.S. Geological Survey Data Series 701, 8 p. [**http://pubs.usgs.gov/ds/701/**].

Kranenburg, C., Palaseanu-Lovejoy, M., Nayegandhi, A., Brock, J.C. and Woodman, R., 2012, Unsupervised classification of lidar-based vegetation structure metrics at Jean Lafitte National Historical Park and Preserve: U.S. Geological Survey Open-File Report 2012-1096, 19 p. [**http://pubs.usgs.gov/of/2012/1096/**].

Krause, C.M., Courtot, K.N., Berkowitz, P., Carter, J., and Reynolds, M.H., 2012, Climate change vulnerability assessment of the low-lying northwestern Hawaiian Islands, chap. 1 *of* Reynolds, M.H., Berkowitz, P., Courtot, K.N., and Krause, C.M., eds., Predicting sea-level rise vulnerability of terrestrial habitat and wildlife of the Northwestern Hawaiian Islands: U.S. Geological Survey Open-File Report 2012–1182, p. 3–71 [**http://pubs.usgs.gov/of/2012/1182/**].

Krauss, K.W., and Ball, M.C., 2012, On the halophytic nature of mangroves: Trees—Structure and Function, Online First, September 4, 2012, doi:10.1007/s00468-012-0767-7 [**http://dx.doi.org/10.1007/s00468-012-0767-7**].

Krauss, K.W., Whitbeck, J.L., and Howard, R.J., 2012, On the relative roles of hydrology, salinity, temperature, and root productivity in controlling soil respiration from coastal swamps (freshwater): Plant and Soil, v. 358, no. 1–2, p. 265–274, doi:10.1007/s11104-012-1182-y [**http://dx.doi.org/10.1007/s11104-012-1182-y**].

Lacy, J.R., Rubin, D.M, and Buscombe, D., 2012, Currents, drag, and sediment transport induced by a tsunami: Journal of Geophysical Research–Oceans, v. 117, C09028, 15 p., doi:10.1029/2012JC007954 [**http://dx.doi.org/10.1029/2012JC007954**].

Lafferty, K.D., 2012, Biodiversity loss decreases parasite diversity; theory and patterns: Philosophical Transactions of the Royal Society B, v. 367, no. 1604, p. 2814–2827, doi:10.1098/rstb.2012.0110 [**http://dx.doi.org/10.1098/rstb.2012.0110**].

Lidz, B.H., 2012, Outlier reefs are found off the Florida Keys, *in* Krucnynski, W.L., and Fletcher, P.J., eds., Tropical connections—South Florida's marine environment: Cambridge, Md., IAN Press, University of Maryland Center for Environmental Science, p. 197–198 [**http://www.umces.edu/release/2012/jul/24/tropical-connections-south-floridas-marine-environment**].

Lidz, B.H., 2012, Sand grain sources at coral reefs indicate reef health, *in* Krucnynski, W.L., and Fletcher, P.J., eds., Tropical connections—South Florida's marine environment: Cambridge, Md., IAN Press, University of Maryland Center for Environmental Science, p. 207 [**http://www.umces.edu/release/2012/jul/24/tropical-connections-south-floridas-marine-environment**].

Luent, M.C., Collins, M., Jeske, C., and Leberg, P., 2012, Prevalence of a potentially lethal parasite of wading birds in natural and agricultural wetlands in South Louisiana: Southeastern Naturalist, v. 11, no. 3, p. 415–422, doi:10.1656/058.011.0305 [**http://dx.doi.org/10.1656/058.011.0305**].

Marot, M.E., and Smith, C.G., 2012, Radioisotopic data of sediment collected in Mobile and Bon Secour Bays, Alabama: U.S. Geological Survey Open-File Report 2012–1172, 15 p. [**http://pubs.usgs.gov/of/2012/1172/**].

McKee, K.L., 2012, Neotropical coastal wetlands, chap. 7 *of* Batzer, D.P., and Baldwin, A.H., eds., Wetland habitats of North America: Berkeley, University of California Press, p. 89–101 [**http://www.ucpress.edu/book.php?isbn=9780520271647**].

Miller, S.L., Shinn, E.A., and Lidz, B.H., 2012, Corals are the building blocks of reefs, *in* Krucnynski, W.L., and Fletcher, P.J., eds., Tropical connections—South Florida's marine environment: Cambridge, Md., IAN Press, University of Maryland Center for Environmental Science, p. 189 [**http://www.umces.edu/release/2012/jul/24/tropical-connections-south-floridas-marine-environment**].

Nosal, A.P., Cartamil, D.C., Long, J.W., Luhrmann, M., Wegner, N.C., and Graham, J.B., 2012, Demography and movement patterns of leopard sharks (*Triakis semifasciata*) aggregating near the head of a submarine canyon along the open coast of southern California, USA: Environmental Biology of Fishes, published online 21 September 2012, doi:10.1007/s10641-012-0083-5 [**http://dx.doi.org/10.1007/s10641-012-0083-5**].

Null, K.A., Dimova, N., Knee, K.L., Esser, B.K., Swarzenski, P.W., Singleton, M.J., Stacey, M., and Paytan, A., 2012,

(Recently Published continued on page 17)

(Recently Published continued from page 16)

Submarine groundwater discharge-derived nutrient loads to San Francisco Bay; implications to future ecosystem changes: Estuaries and Coasts, v. 35, no. 5, p. 1299–1315, doi:10.1007/s12237-012-9526-7 [**http://dx.doi.org/10.1007/s12237-012-9526-7**].

Osland, M.J., Spivak, A.C., Nestlerode, J.A., Lessmann, J.M., Almario, A.E., Heitmuller, P.T., Russell, M.J., Krauss, K.W., Alvarez, F., Dantin, D.D., Harvey, J.E., From, A.S., Cormier, N., and Stagg, C.L., 2012, Ecosystem development after mangrove wetland creation; plant-soil change across a 20-year chronosequence: Ecosystems, v. 15, no. 5, p. 848–866, doi:10.1007/s10021-012-9551-1 [**http://dx.doi.org/10.1007/s10021-012-9551-1**].

Palta, M.M., Doyle, T.W., Jackson, C.R., Meyer, J.L., and Sharitz, R.R., 2012, Changes in diameter growth of *Taxodium distichum* in response to flow alterations in the Savannah River: Wetlands, v. 32, no. 1, p. 59–71, doi:10.1007/s13157-011-0245-9 [**http://dx.doi.org/10.1007/s13157-011-0245-9**].

Poore, B.S., Wolf, E.B., Korris, E.M., Walter, J.L., and Matthews, G.D., 2012, Structures data collection for The National Map using volunteered geographic information: U.S. Geological Survey Open-File Report 2012–1209, 34 p. [**http://pubs.usgs.gov/of/2012/1209**].

Raabe, E.A., Roy, L.C., and McIvor, C.C., 2012, Tampa Bay coastal wetlands; nineteenth to twentieth century tidal marsh-to-mangrove conversion: Estuaries and Coasts, v. 35, no. 5, p. 1145–1162, doi:10.1007/s12237-012-9503-1 [**http://dx.doi.org/10.1007/s12237-012-9503-1**].

Raabe, E.A., Roy, L.C., McIvor, C.C., and Gleim, A.D., 2012, Digital recovery of 19th century surveys in Tampa Bay, Florida; topographic charts and Public Land Surveys: U.S. Geological Survey Data Series 727 [**http://pubs.usgs.gov/ds/727/**].

Raabe, E.A., Stonehouse, D., Ebersol, K., Holland, K., and Robbins, L.L., 2011, Detection of coastal and submarine discharge on the Florida Gulf Coast with an airborne thermal-infrared mapping system: The Professional Geologist (TPG), v. 48, p. 42–49 [**http://pubs.er.usgs.gov/publication/70039643**].

Reich, C., Flocks, J., and Davis, J., 2012, Geophysical investigation of sentinel lakes in Lake, Seminole, Orange, and Volusia Counties, Florida: U.S. Geological Survey Open-File Report 2012–1201, 174 p. [**http://pubs.usgs.gov/of/2012/1201/**].

Renault, L., Chiggiato, J., Warner, J.C., Vizoso, G., Ruiz, S., Gomez, M., and Tintoré, J., 2012, Coupled atmosphere-ocean-wave simulations of a storm event over the Gulf of Lion and Balearic Sea: Journal of Geophysical Research–Oceans, v. 117, no. C09019, 25 p., doi:10.1029/2012JC007924 [**http://dx.doi.org/10.1029/2012JC007924**].

Reynolds, M.H., Berkowitz, P., Courtot, K.N., and Krause, C.M., eds., 2012, Predicting sea-level rise vulnerability of terrestrial habitat and wildlife of the Northwestern Hawaiian Islands: U.S. Geological Survey Open-File Report 2012–1182, 139 p. [**http://pubs.usgs.gov/of/2012/1182/**].

Ryan, H., von Huene, R., Scholl, D., and Kirby, S., 2012, Tsunami hazards to U.S. coasts from giant earthquakes in Alaska: Eos (American Geophysical Union Transactions), v. 93, no. 19, p. 185, doi:10.1029/2012EO190001 [**http://dx.doi.org/10.1029/2012EO190001**].

Ryan, H.F., von Huene, R., Wells, R.E., Scholl, D.W., Kirby, S., and Draut, A.E. 2012, History of earthquakes and tsunamis along the eastern Aleutian-Alaska megathrust, with implications for tsunami hazards in the California Continental Borderland, *in* Dumoulin, J.A., and Dusel-Bacon, C., eds., Studies by the U.S. Geological Survey in Alaska, 2011: U.S. Geological Survey Professional Paper 1795–A, 31 p. [**http://pubs.usgs.gov/pp/1795/a/**].

Shim, M-J., Swarzenski, P.W., and Shiller, A.M., 2012, Dissolved and colloidal trace elements in the Mississippi River Delta outflow after Hurricanes Katrina and Rita: Continental Shelf Research, v. 42, p. 1–9 [**http://dx.doi.org/10.1016/j.csr.2012.03.007**].

Smith, C.G., and Robbins, L.L., 2012, Surface-water radon-222 distribution along the west-central Florida shelf: U.S. Geological Survey Open-File Report 2012–1212, 26 p. [**http://pubs.usgs.gov/of/2012/1212/**].

Stevens, A.W., Gelfenbaum, G., Ruggiero, P., and Kaminsky, G.M, 2012, Southwest Washington littoral drift restoration—beach and nearshore morphological monitoring: U.S. Geological Survey Open-File Report 2012–1175, 67 p. [**http://pubs.usgs.gov/of/2012/1175/**].

Swarzenski, P.W., Storlazzi, C.D., Presto, M.K., Gibbs, A.E., Smith, C.G., Dimova, N.T., Dailer, M.L., and Logan, J.B., 2012, Nearshore morphology, benthic structure, hydrodynamics, and coastal groundwater discharge near Kahekili Beach Park, Maui, Hawaii: U.S. Geological Survey Open-File Report 2012–1166 [**http://pubs.usgs.gov/of/2012/1166/**].

Waddle, J.H., Glorioso, B.M., and Faulkner, S.P., 2012, A quantitative assessment of the conservation benefits of the Wetlands Reserve Program to amphibians: Restoration Ecology, Early View, July 5, 2012, doi:10.1111/j.1526-100X.2012.00881.x [**http://dx.doi.org/10.1111/j.1526-100X.2012.00881.x**].

Wang, H., Meselhe, E.A., Waldon, M.G., Harwell, M.C., and Chen, C., 2012, Compartment-based hydrodynamics and water quality modeling of a northern Everglades wetland, Florida, USA: Ecological Modelling, v. 247, p. 273–285, doi:10.1016/j.ecolmodel.2012.09.007 [**http://dx.doi.org/10.1016/j.ecolmodel.2012.09.007**].

Warrick, J.A., and Barnard, P.L., 2012, The offshore export of sand during exceptional discharge from California rivers: Geology, published online June 29, 2012, doi:10.1130/G33115.1 [**http://dx.doi.org/10.1130/G33115.1**].

Warrick, J.A., Duda, J.J., Magirl, C.S., and Curran, C.A., 2012, River turbidity and sediment loads during dam removal: Eos (American Geophysical Union Transactions), v. 93, no. 43, p. 425, doi:10.1029/2012EO430002 [**http://dx.doi.org/10.1029/2012EO430002**]

Westbrooks, R.G., 2011, Federal interagency coordination for invasive plant issues—the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW), chap. 11 *of* Leslie, A., and

(Recently Published continued on page 18)

(Recently Published continued from page 17)

Westbrooks, R.G., eds., Invasive plant management issues and challenges in the United States; 2011 overview: American Chemical Society, ACS Symposium Series, v. 1073, p. 121–128, doi:10.1021/bk-2011-1073.ch011 [**http://dx.doi.org/10.1021/bk-2011-1073.ch011**].

Westbrooks, R.G., 2011, Interagency partnering for weed prevention—progress on development of a National Early Detection and Rapid Response System for Invasive Plants in the United States, chap. 13 *of* Leslie, A., and Westbrooks, R.G., eds., Invasive plant management issues and challenges in the United States; 2011 overview: American Chemical Society, ACS Symposium Series, v. 1073, p. 135–142, doi:10.1021/bk-2011-1073.ch013 [**http://dx.doi.org/10.1021/bk-2011-1073.ch013**].

Westbrooks, R.G., and Brabson, E.N., 2011, Overview and history of the Beach Vitex Task Force—an interagency partnership in action, chap. 15 *of* Leslie, A., and Westbrooks, R.G., eds., Invasive plant management issues and challenges in the United States; 2011 overview: American Chemical Society, ACS Symposium Series, v. 1073, p. 159–168, doi:10.1021/bk-2011-1073.ch015 [**http://dx.doi.org/10.1021/bk-2011-1073.ch015**].

Westbrooks, R.G., and Tasker, A.V., 2011, Overview of prohibited and permitted plant regulatory listing systems, chap. 2 *of* Leslie, A., and Westbrooks, R.G., eds., Invasive plant management issues and challenges in the United States; 2011 overview: American Chemical Society, ACS Symposium Series, v. 1073, p. 19–28, doi:10.1021/bk-2011-1073.ch002 [**http://dx.doi.org/10.1021/bk-2011-1073.ch002**].

Wong, F.L., Dartnell, P., Edwards, B.D., and Phillips, E.L., 2012, Seafloor geology and benthic habitats, San Pedro Shelf, southern California: U.S. Geological Survey Data Series 552 [**http://pubs.usgs.gov/ds/552/**].

Yang, X., Pal, N., Ackleh, A.S., and Carter, J., 2011, A case study of green tree frog population size estimation by repeated capture-mark-recapture method with individual tagging; a parametric bootstrap method vs. Jolly-Seber method: Journal of Statistical Computation and Simulation, v. 81, no. 12, p. 1879–1895, doi:10.1080/00949655.2010.507764 [**http://dx.doi.org/10.1080/00949655.2010.507764**].

Publications Submitted for Bureau Approval

Aippli, C., Valentine, D.L., Kellermann, M., Lorenson, T.D., Nelson, R.K., and Reddy, C.M., Oil spill vs. natural seepage; contrasting weathering characteristics of oil from the Macondo well and Southern California oil seeps [abs.]: Gulf of Mexico Oil Spill and Ecosystem Conference, New Orleans, La., January 21–23, 2013.

Andrews, B.D., Ackerman, S.D., Baldwin, W.E., Foster, D.S., and Schwab, W.C., High-resolution geological mapping of the inner continental shelf; Vineyard Sound, Massachusetts: U.S. Geological Survey, Open-File Report 2012–1006.

Barnard, P.L., Erikson, L.H., Elias, E., and Dartnell, P., Sediment transport patterns in the San Francisco Bay coastal system from cross-validation of bedform asymmetry and modeled residual flux: Marine Geology.

Barras, J., and Brock, J.C., Coastal Louisiana airborne and terrestrial lidar collaboration for improving topo-bathymetric mapping in coastal Louisiana [abs.]: Association of American Geographers Annual Meeting, Los Angeles, Calif., April 9–13, 2013.

Brock, J.C., Chappell, A., and Wozencraft, J., National coastal mapping strategy proposed by the Interagency Working Group on Ocean and Coastal Mapping [abs.]: Coastal GeoTools 2013 conference, Myrtle Beach, S.C., March 25–28, 2013.

Brothers, L.L., Van Dover, C.L., German, C.R., Kaiser, C.L., and Yoerger, D.R., Re-examination of seep activity at the Blake Ridge Diapir: Fire in the Ice, U.S. Department of Energy/National Energy Technology Laboratory Newsletter [**http://www.netl.doe.gov/technologies/oil-gas/futuresupply/methanehydrates/newsletter/newsletter.htm**].

Childs, J.R., Triezenberg, P.J., and Danforth, W.W., Joint U.S.-Canadian program to explore the limits of the extended continental shelf—Cruise HLY-0806; September 05–October 01, 2008; Barrow to Barrow, Alaska; cruise report: U.S. Geological Survey Open-File Report.

Draut, A.E., and Clift, P.D., Differential preservation in the geologic record of intraoceanic sedimentary and tectonic processes: Earth Science Reviews.

Edwin, E., Gelfenbaum, G., and van de Wethusen, A., Validation of a coupled wave-flow model in high-energy setting; the mouth of the Columbia River: Journal of Geophysical Research–Oceans.

Erikson, L.H., Gibbs, A.E., Ohman, K., Martin, P., and Richmond, B.M., Evolution of an Arctic barrier island [abs.]: Alaska Marine Science Symposium, Anchorage, Alaska, January 21–25, 2013.

Erikson, L.H., Wright, S.A., Elias, E., Hanes, D.M., and Schoellhamer, D.H., The use of modeling and suspended sediment concentration measurements for quantifying net suspended sediment transport through a large tidally dominated inlet [abs.]: American Geophysical Union Fall Meeting, San Francisco, Calif., December 3–7, 2012.

Flocks, J., Twichell, D., and Pendleton, E., Coast-wide geologic-assessment projects; unraveling regional coastal evolution [abs.]: Association for the Sciences of Limnology and Oceanography (ASLO) Aquatic Sciences Meeting, New Orleans, La., February 17–22, 2013.

Gelfenbaum, G., Elias, E., and Stark, J., The influence of dredging and flow regulation on the morphological development at the mouth of the Columbia River [abs.]: International Conference on Coastal Dynamics, 7th, Arcachon, France, June 24–28, 2012.

Gibbs, A.E., Cochran, S.A., and Tierney, P.W., Seafloor video and still frame-

(Publications Submitted continued on page 19)

(Publications Submitted continued from page 18)

grabs from USGS activities in Hawaiian nearshore waters: U.S. Geological Survey Data Series.

Griffin, D.W., and Shinn, E.A., Dust in the wind brings diseases too: Science, Letter to the Editor.

Hapke, C.J., Sea cliffs of the U.S.—occurrence, assessment and prediction [abs.]: IAG/AIG International Conference on Geomorphology, 8th, Paris, France, August 27–31, 2013.

Hapke, C.J., List, J., Plant, N.G., Schwab, W.C., and Lentz, E.E., Medium-term morphologic response to variations in spatial and temporal forcing; Fire Island, New York [abs.]: American Geophysical Union Fall Meeting, San Francisco, Calif., December 3–7, 2012.

Howd, P.A., Doran, K.J., and Sallenger, A.H., Jr., Random and bias errors in simple regression-based calculations of sea-level acceleration [abs.]: American Geophysical Union Fall Meeting, San Francisco, Calif., December 3–7, 2012.

Ishii, M., Kiser, E., and Geist, E.L., Mw 8.6 Sumatran earthquake of 11 April 2012; rare seaward expression of oblique subduction: Geology.

Johnson, S.Y., Dartnell, P., Cochrane G.R., Golden, N.E., Phillips, E.L., Ritchie, A.C., Greene, H.G., Krigsman, L.M., Kvitek, R.G., Dieter, B.E., Endris, C.A., Seitz, G.G., Sliter, R.W., Erdey, M.D., Gutierrez, C.I., Wong, F.L., Yoklavich, M.M., Draut, A.E., Hart, P.E., and Conrad, J.E., California State Waters Map Series—offshore of Santa Barbara, California: U.S. Geological Survey Scientific Investigations Map.

Johnson, S.Y., Dartnell, P., Cochrane G.R., Golden, N.E., Phillips, E.L., Ritchie, A.C., Kvitek, R.G., Greene, H.G., Endris, C.A., Seitz, G.G., Sliter, R.W., Erdey, M.D., Wong, F.L., Gutierrez, C.I., Krigsman, L.M., Draut, A.E., and Hart, P.E., California State Waters Map Series—offshore of Carpinteria, California: U.S. Geological Survey Scientific Investigations Map.

Johnson, S.Y., Dartnell, P., Cochrane, G.R., Golden, N.E., Phillips, E.L., Ritchie, A.C., Kvitek, R.G., Greene, H.G., Krigsman, L.M., Endris, C.A., Seitz, G.G., Erdey, M.D., Gutierrez, C.I., Sliter, R.W., Wong, F.L., Yoklavich, M.M., Draut, A.E., and Hart, P.E., California Seafloor Map Series—offshore of Ventura, eastern Santa Barbara Channel, California: U.S. Geological Survey Scientific Investigations Map.

Khider, D., Quinn, T.M., and Reynolds, C.E., Assessing seasonal temperature variability from Mg/Ca and $\delta^{18}O$ in *Globigerinoides ruber* from the northern Gulf of Mexico [abs.]: American Geophysical Union Fall Meeting, San Francisco, Calif., December 3–7, 2012.

Kindinger, J.L., Lee, D.M., Kulp, M.A., Khalil, S.M., Buster, N.A., Flocks, J.G., Bernier, J., and Raynie, R., Louisiana Barrier-Island Comprehensive Monitoring (BICM) Program 2006–2010—beginnings of a large-scale coastal system-monitoring program [abs.]: Association for the Sciences of Limnology and Oceanography (ASLO) Aquatic Sciences Meeting, New Orleans, La., February 17–22, 2013.

Lidz, B.H., and Zawada, D.G., Possible return of *Acropora cervicornis* at Pulaski Shoal, Dry Tortugas National Park, Florida: Journal of Coastal Research.

Long, J.W., Plant, N.G., and Sallenger, A.H., Jr., Interactions between a sand-starved barrier island and an artificial berm [abs.]: Gulf of Mexico Oil Spill and Ecosystem Conference, New Orleans, La., January 21–23, 2013.

Long, J.W., Thompson, D.M., Plant, N.G., Dalyander, P.S., and Sherwood, C.R., Nested modeling approach to quantify sediment transport pathways and temporal variability of barrier island evolution [abs.]: American Geophysical Union Fall Meeting, San Francisco, Calif., December 3–7, 2012.

Lorenson, T.D., Rosenbauer, R.J., Campbell, P.L., Lam, A., Hostettler, F.D., Thomas, B., and Wong, F.L., Fingerprinting hydrocarbons in oil, tarballs, and sediment from coastal Texas to Florida during the Deepwater Horizon oil spill [abs.]: Gulf of Mexico Oil Spill and Ecosystem Conference, New Orleans, La., January 21–23, 2013.

Mayo, M., Smoak, J.M., Smith, C., Fanning, K., and Smith, T., A comparison of uranium budgets for estuarine wetlands of the Everglades National Park, Florida and Mobile Bay, Alabama [abs.]: Association for the Sciences of Limnology and Oceanography (ASLO) Aquatic Sciences Meeting, New Orleans, La., February 17–22, 2013.

McGann, M., Erikson, L., Wan, E., Powell, C., II, and Maddocks, R.F., A multi-constituent approach for analyzing sediment transport in the San Francisco Bay coastal system [abs.]: Bay-Delta Science Conference, 7th Biennial, Sacramento, Calif., October 16–18, 2012.

Miselis, J., Kindinger, J., and Buster, N., Refining the link between the Holocene development of the Mississippi River Delta and the geologic evolution of Cat Island, MS [abs.]: Association for the Sciences of Limnology and Oceanography (ASLO) Aquatic Sciences Meeting, New Orleans, La., February 17–22, 2013.

Mosher, D.C., Shimeld, J., Hutchinson, D., Chian, D., Lebedeva-Ivanova, N., and Jackson, R., Canada Basin revealed: Arctic Technology Conference, Houston, Tex., December 3–5, 2012, proceedings.

Osterman, L.E., and Smith, C.G., A century of environmental degradation in Mobile Bay, Alabama [abs.]: Association for the Sciences of Limnology and Oceanography (ASLO) Aquatic Sciences Meeting, New Orleans, La., February 17–22, 2013.

Palaseanu-Lovejoy, M., Kranenburg, C., Barras, J., and Brock, J., Land loss due to recent hurricanes in coastal Louisiana, USA: Journal of Coastal Research Special Issue.

Plant, N.G., Stockdon, H.F., Flocks, J., Sallenger, A.H., Jr., Long, J.W., Cormier, J., Guy, K., and Thompson, D.M., Prediction of barrier island restoration response and its interactions with the natural environment [abs.]: American Geophysical Union Fall Meeting, San Francisco, Calif., December 3–7, 2012.

Poore, R.Z., Tedesco, K.A., and Spear, J.W., Seasonal flux and assemblage composition of planktic foraminifers from a sediment trap study in the northern Gulf of Mexico: Journal of Coastal Research Special Issue.

Poppe, L.J., McMullen, K.Y., Ackerman, S.D., Guberski, M.R., and Wood, D.A., Sea-floor character and geology off

(Publications Submitted continued on page 20)

(Publications Submitted continued from page 19)

the entrance to the Connecticut River, northeastern Long Island Sound: U.S. Geological Survey Open-File Report 2012–1103.

Prouty, N.G., Druffel, E., Griffin, S., Fisher, C., and Demopoulos, A., Growth rate and age distribution of deep-sea coral *Paramuricea* sp. in the Gulf of Mexico [abs.]: Gulf of Mexico Oil Spill and Ecosystem Science Conference, New Orleans, La., January 21–23, 2013.

Reich, C.D., Poore, R.Z., and Hickey, T.D., The role of vermetid gastropods in the development of the Florida Middle Ground, northeast Gulf of Mexico: Journal of Coastal Research Special Issue.

Richmond, B.M., Gibbs, A.E., and Martin, P., A half century of coastal change along the north coast of Alaska [abs.]: Alaska Marine Science Symposium, Anchorage, Alaska, January 21–25, 2013.

Ross, S.L., Jones, L.M., Wilson, R., Bahng, B., Borrero, J.C., Brosnan, D.M., Bwarie, J.T., Geist, E.L., Johnson, L.A., Hansen, R., Kirby, S.H. Knight, E., Knight, W.R., Long, K., Lynett, P., Miller, K., Mortensen, C.E., and Nicolsky, D.D., USGS SAFRR tsunami scenario—potential impacts to the U.S. West Coast from a plausible M9 earthquake near the Alaska Peninsula [abs.]: American Geophysical Union Fall Meeting, San Francisco, Calif., December 3–7, 2012.

Roy, M., Martin, J.B., Cable, J.E., and Smith, C.G., Variations of iron flux and organic carbon remineralization in a subterranean estuary caused by interannual variations in recharge: Geochimica et Cosmochimica Acta.

Rubin, D.M., and Rubin, A.M., Commentary on: “Origin and lateral migration of linear dunes in the Qaidam Basin of NW China revealed by dune sediments, internal structures, and optically stimulated luminescence ages, with implications for linear dunes on Titan” (Geological Society of America Bulletin, v. 124, no. 7–8. p. 1147–1154, doi:10.1130/B30550.1): Geological Society of America Bulletin.

Sallenger, A.H., Jr., Doran, K., and Howd, P., Sea-level acceleration hotspot along the Atlantic coast of North America [abs.]: American Geophysical Union Fall Meeting, San Francisco, Calif., December 3–7, 2012.

Santamarina, J.C., and Winters, W.J., A suite of pressure core characterization tools (PCCT) to enhance gas hydrate field programs: Fire in the Ice, U.S. Department of Energy/National Energy Technology Laboratory Newsletter [**http://www.netl.doe.gov/technologies/oil-gas/futuresupply/methanehydrates/newsletter/newsletter.htm**].

Schwab, W.C., Baldwin, W.E., Hapke, C.J., Lentz, E.E., Gayes, P.T., Denny, J.F., List, J.H., and Warner, J.C., Geologic evidence for onshore sediment transport from the inner-continental shelf; Fire Island, New York: Journal of Coastal Research.

Smith, C.G., and Marot, M.E., Preliminary analysis of back-barrier sedimentation on the Chandeleur Islands, Louisiana, following the construction of the oil-mitigation sand berm [abs.]: Association for the Sciences of Limnology and Oceanography (ASLO) Aquatic Sciences Meeting, New Orleans, La., February 17–22, 2013.

Smith, C.G., Osterman, L.E., and Poore, R.Z., An examination of historic inorganic sedimentation and organic matter accumulation in several marsh types within the Mobile Bay and Mobile-Tensaw River Delta region: Journal of Coastal Research Special Issue.

Stockdon, H.F., Doran, K., Sopkin, K., and Thompson, D.M., National assessment of hurricane-induced erosion hazards [abs.]: American Geophysical Union Fall Meeting, San Francisco, Calif., December 3–7, 2012.

Storlazzi, C.D., Field, M.E., Presto, M.K., Swarzenski, P.W., Logan, J.B., Reiss, T.R., Elfers, T.C., Cochran, S.A., Torresan, M.E., and Chezar, H., Coastal circulation and sediment dynamics in Pelekane and Kawaihae Bays, Hawaii—Measurements of waves, currents, temperature, salinity, turbidity, and geochronology; November 2010–March 2011: U.S. Geological Survey Open-File Report.

ten Brink, U.S., Danforth, W.W., and Polloni, C.F., Project PROBE Leg III, final report and archive of swath bathymetric sonar, XBT and GPS navigation data collected during USGS cruise RONB03032 (NOAA RB0305)—Puerto Rico Trench 28 August – 4 September 2003: U.S. Geological Survey Open-File Report 2006–1210, DVD.

Thirumalai, K.R., Quinn, T.M., Reynolds, C.E., and Flannery, J.A., Centennial- to millennial-scale variability of the surface ocean in the northern Gulf of Mexico during the late Holocene [abs.]: American Geophysical Union Fall Meeting, San Francisco, Calif., December 3–7, 2012.

Umberger, D.K., Osterman, L.E., Smith, C.G., Frazier, J., and Richwine, K.A., Seasonal variability in the surface sediments of Mobile Bay, Alabama recorded by geochemistry and foraminifera, 2009–2010: U.S. Geological Survey Data Series.

Warner, J.C., Defne, Z., Haas, K., and Arango, H.G., A wetting and drying scheme for ROMS: Ocean Modeling.

Wood, W.T., Barth, G.A., Scholl, D.W., and Lebedeva-Ivanova, N., Deep-water acoustic anomalies from methane hydrate in the Bering Sea: Naval Research Laboratory Review 2012 [**http://www.nrl.navy.mil/media/publications/nrl-review/**].

Yates, K.K., USGS-St. Petersburg carbon analytical laboratory: U.S. Geological Survey website.