BOEM Partnerships Strengthen Coastal Resilience, Environmental Stewardship

Restoration Progress Along the Gulf and Atlantic Coasts

By Abigail Ross Hopper

This fall, we will mark the third anniversary of Hurricane Sandy, which wreaked havoc along the U.S. East Coast. From flooding and waist-deep sand deposited on small town streets to damaged property, mangled infrastructure and battered wildlife habitat along the coast, Sandy's legacy will not be forgotten. The coastal communities that fared the best—where impacts were less severe—were those that had invested in their own resilience, those that had rebuilt beaches and dunes and other protective measures in the wake of previous storms or to combat long-term erosion.

The year 2015 also marks the 10th anniversary of Hurricanes Katrina and Rita, which devastated the Gulf of Mexico (GOM) Coast, as well as the fifth year since the *Deepwater Horizon* (DWH) tragedy, bringing other coastal ecosystem impacts and demonstrating the need for coastal resilience.

For more than 20 years, the U.S. Bureau of Ocean Energy Management (BOEM) has partnered with coastal communities, states and other federal agencies to help build that

The Long Beach Island Coastal Storm Damage Reduction Project in New Jersey, started in May 2015, is designed to complete the dune and berm system and reduce future storm damage. It is a partnership between BOEM, USACE and the New Jersey Department of Environmental Protection.

(Photo Credit: Tim Boyle, USACE)

Fisheries biologists involved in the interagency Canaveral Shoals fish habitat study tagged nearly 400 fish off Florida's east coast in the first year-and-a-half. Eric Reyier, a NASA Kennedy Space Center fisheries biologist, holds the first cobia tagged (left) and a tagged scalloped hammerhead shark (right). (Photo Credit: NASA)

resilience through its Marine Minerals Program (MMP). The program manages nonenergy minerals (primarily sand and gravel) on the ocean floor and is the only federal program authorized to grant access to Outer Continental Shelf (OCS) sand.

However, there is more to BOEM's involvement than providing OCS sand. The relationships we are building and fortifying with a wide range of stakeholders are helping to reach a new level of coastal resilience. Our goal is to contribute to the nation's environmental, economic and recreational well-being through the completion of safe, sustainable projects. Ongoing environmental and sand resource research will help speed future responses and decrease uncertainty by knowing where suitable OCS sand resources are located when they are needed in the future.

Building Atlantic Coastal Resilience

Under the Disaster Relief Appropriations Act of 2013, BOEM received $13.6 million for Hurricane Sandy response for coastal resiliency studies and efforts. Several restoration projects using OCS sand have taken place since then, including those in Sandbridge Beach and Wallops Island, Virginia; Brevard County, Florida; and Long Beach Island, New Jersey. For instance, at Long Beach Island, a barrier island on the state's Atlantic Coast, BOEM granted the U.S. Army Corps of Engineers (USACE) authority to dredge up to 7 million cu. yd. of OCS sand for use on its shoreline, making it the largest amount of OCS sand conveyed by BOEM along the Atlantic Coast for a single project to date. The state's Department of Environmental Protection played a significant role in helping to assess project needs. Dune vegetative species planted this fall will help resilience take root and trap wind-blown sand to facilitate more robust dunes.

While individual projects are important, BOEM is also utilizing a portion of the Hurricane Sandy recovery funds to implement a regional approach to strengthen resilience. This involves reaching out to and collaborating with federal, state and local environmental agencies, geologists, coastal managers, public works departments, the business and tourism communities, the fisheries community and ordinary citizens. In 2014, 13 coastal states received funding from BOEM and each is well on its way to updating its maps and databases of offshore sand resources to address future requirements.

In 2015, BOEM began the Atlantic Sand Assessment Project (ASAP) to survey and evaluate OCS sand resources within areas with little or no existing data from 3 to 8 naut. mi. offshore from Miami to Maine. Several site-specific surveys are planned for 2016 to further identify areas that can serve as future sand borrow sites. Knowing the location, composition and potential volume of available sand resources is critical to being prepared for future storms. The MMP will integrate the data collected from the ASAP and state cooperative agreements with historical data it has gathered over the past 20-plus years into a comprehensive database of OCS sand resources. The knowledge gleaned from this database will enable BOEM to support ongoing coastal resilience planning and provide OCS resources for emergency and long-term restoration more quickly than would be possible without updated data.

Before beginning the ASAP, BOEM completed an environmental assessment that described and evaluated the potential environmental impacts related to reasonably foreseeable geophysical and geological surveys off the Atlantic Coast. BOEM consulted with NOAA's National Marine Fisheries Service (NMFS) regarding potential environmental impacts on threatened or endangered species, such as sea turtles and whales, and essential fish habitat. BOEM considered impacts to fishing areas, spawning and feeding grounds and evaluated the importance of these areas to the recreational or commercial fishing communities as high-value resources.

Another major component of BOEM's Sandy response includes broad-scale environmental monitoring offshore Cape Canaveral, Florida, which has been used as a source of sand for eight coastal restoration projects in Florida. It began in October 2013 through agreements with the University of Florida, the Navy and NASA. Data obtained from this study will support BOEM and other agencies in making more informed resource management decisions by better understanding the ecological function and recovery of dredged sand shoal habitats. Complex biological assemblages from

With wetlands in the background, OCS sand from Ship Shoal in the Gulf of Mexico is placed onto Louisiana's Caminada Headland, one of the most rapidly eroding shorelines in North America. The barrier headland provides unique habitat and plays an important role in protecting wetlands from storm impacts. It also maintains the salinity and nutrient gradients in the estuaries that many species require for survival.

benthic invertebrates to plankton and predatory fishes will be examined to aid our understanding of key functions and processes.

As part of that effort, University of Florida, Navy and NASA researchers have been collecting data on the movement, behavior and habitat preferences of fish associated with shoals to compare with data from control sites where dredging has not taken place. From late 2013 through September 2015, more than 400 fish were tagged with acoustic transmitters. Acoustic receivers are able to detect signals from 300 to 1,000 m, depending on ocean conditions. The transmitters can last from seven months to 10 years depending on their size (ranging from 1 to 3 in. long). Researchers periodically download the data from the acoustic receivers, which rest on the ocean floor.

The tagged fishes' movements are tracked via the Florida Atlantic Coast Telemetry (FACT) Array, a collaboration that now has nearly two dozen partner agencies, including BOEM, and maintains more than 400 stationary acoustic receivers from Georgia to the Florida Keys and Bahamas. BOEM is sponsoring 29 of the 57 acoustic receivers currently deployed on or directly adjacent to the Canaveral Shoal complex. Several dozen additional receivers are moored in the adjacent Indian River Lagoon and nearby coastal inlets. Signals from some of the Canaveral Shoals tagged species have been recorded in other arrays as far north as the Chesapeake Bay and New Jersey.

The project will continue to track movements of tagged fish through at least 2017, providing important insights regarding habitat preferences across species, seasons and years. Additional animals and species will be tagged, including bluefish and king mackerel, which are common within the Canaveral Shoals complex and support substantial recreational and commercial fisheries in the region.

GOM Coastal Restoration 10 Years Post-Katrina, Rita

Since 2005, Hurricanes Katrina, Rita, Gustav and Ike caused a net loss of 328 sq. mi. of the Gulf States' coastline. In 2007, BOEM's predecessor recognized a need for action and funded cooperative agreements with Alabama, Mississippi, Louisiana and Texas to delineate sand resources in offshore waters for potential use in Gulf Coast restoration efforts. Sand Management Working Groups composed of OCS resource stakeholders determined that an estimated 250 to 300 million cu. yd. (or more) of sand resources would be needed to restore the coastlines and barrier islands of the affected Gulf States, which were further affected by the *Deepwater Horizon* oil spill in 2010.

BOEM has supported Gulf of Mexico restoration projects with OCS sand since 2002, with research to identify sand resources back to the 1990s. Several BOEM-funded studies have found Ship Shoal offshore Louisiana to be an ideal source of sand to restore eroding barrier islands. The Louisiana State University Coastal Studies Institute, the Louisiana Geological Survey and Coastal Protection and Restoration Authority of Louisiana conduct field surveys and shoal monitoring to better describe Ship Shoal's physical and biological conditions and understand the impacts of sand mining.

In 2012, BOEM granted Louisiana approval to use sand from Ship Shoal to restore 280 ac. of beaches and dunes at the Caminada Headland in Lafourche and Jefferson Parishes. Three active projects are using Ship Shoal sand: Caminada Increment I (recently completed), Caminada Increment II (construction in progress), and Whiskey Island Restoration (lease signed June 2015).

Presently, two projects mentioned above are taking place with funds from DWH fines and penalties: Caminada Headland Beach and Dune Restoration Project Increment II, funded by the National Fish and Wildlife Foundation through the Gulf Environmental Benefit Fund; and the Caillou Lake Headlands (Whiskey Island) Natural Resources Damage Assessment (NRDA) Early Restoration Project. DWH fines and penalties are also funding the North Breton Island NRDA Early Restoration Project.

Completion of Increment I of the Caminada Headland Restoration Project was a major accomplishment. It was the first project to use sand from Ship Shoal (located about 27 naut. mi. from the project site). Ship Shoal has been the target of restoration planners in Louisiana for more than three decades; large volumes of beach-quality sand are a rare occurrence on the muddy shelf offshore the Mississippi delta plain.

The Whiskey Island project will excavate up to 13.4 million cu. yd. of high-quality sand from Ship Shoal, the largest volume of OCS sand authorized for use on a single project in the program's history. Sand located 9 mi. offshore on the OCS will be pumped to the project site to construct some 1,100 ac. of barrier island habitat to pro-

tect wetlands from storm impacts, and maintain the salinity and nutrient gradients in the estuaries that many species require for survival. The centralized sand placement will be redistributed by waves to naturally nourish down-drift barrier islands east and west of the project site and maintain estuarine conditions in the Barataria-Terrebonne National Estuary system.

Other recent projects along Louisiana's coast using OCS sand involve the Cameron Parish Shoreline, Raccoon Island Backbarrier Marsh and Pelican Island.

As for the Mississippi Gulf Coast, the USACE Mississippi Coastal Improvements Program, funded in the wake of Hurricane Katrina to increase resilience in the area, is repairing barrier island breaches unable to heal naturally due to long-term loss of sand from the coastal system.

These activities illustrate the ongoing BOEM MMP dialog with at least 17 states and a wide range of stakeholders and partners. They include sand management working groups along the Atlantic and Gulf of Mexico Coasts; regional planning bodies or councils on the Atlantic; the Governor's South Atlantic Alliance; and the Gulf of Mexico Alliance. Close collaboration with our federal partners in Washington, D.C., and their coastal offices—USACE, NOAA, U.S. Fish and Wildlife Service, U.S Geological Survey, Gulf Coast Ecosystem Restoration Council, and the National Park Service—is key to successful outcomes.

Another new relationship emerged from BOEM's Hurricane Sandy response: The extensive coordination with 13 Atlantic states became a catalyst for BOEM to streamline operations further in relation to state geologists. BOEM signed an agreement with the Association of American State Geologists (AASG) in June 2015 to foster interaction, cooperation and coordination on marine minerals and oil and gas resources on the OCS. The agreement is designed to improve information exchange and the ability for BOEM, AASG and its members to communicate on national plans and issues with each other.

Future Priorities

Because coastal systems are constantly changing, BOEM's priority is to be dynamic and ready to meet the nation's coastal sand resource needs. Our planning depends on consultations with diverse stakeholders to assess needs and concerns, and conducting environmental research and analyses to make informed decisions.

Looking ahead, BOEM is working with the five Gulf Coast States to develop a Gulf-wide sand inventory to support long-term restoration planning. Nationally, BOEM is working with the USACE to establish a more formal mechanism to plan and coordinate long term. Through enhanced coordination with Interior bureaus, we are working to leverage our expertise and other resources with theirs. BOEM's goal is to help communities make the best decisions to strengthen coastal resilience in meaningful, sustainable ways. **ST**

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