central east coast
a chapter of ASBPA

The Coastal Connection

Volume 1, Issue 1, October 2013

Chapter Mission Statement

Regional collaboration for preserving, protecting and enhancing beaches, shores and other coastal resources at decadal to century time scales applicable for community planning.

Message from the President

By Maura K. Boswell, P.E.

I'm writing this as I ride the ferry across the Delaware Bay following a great few days of collaboration at the Northeast Shore and Beach Preservation Association Conference in New Jersey. As I look towards the northern end of our region, it reminds me that we are fortunate to have so many beautiful coastlines on our beaches, bays and inland waters, providing recreation, habitat, and livelihoods for our communities. My goal in forming the Central East Coast Chapter was to provide a better platform to collaborate, from Georgia to Delaware, as we work towards preserving, protecting, and enhancing our coastlines. Building relationships with organizations of complimentary interest strengthens and enhances our Chapter. We took the opportunity to partner with the Sea Level Rise Forum at Old Dominion University, in Suffolk, VA, where we held our March Chapter meeting. We will partner with the Atlantic Intracoastal Waterway Association in November when we hold the CEC annual Chapter meeting in conjunction with their Annual Waterway Conference, in Charleston, SC. This inaugural newsletter has great articles from Chapter members about some wonderful projects in the CEC region. I encourage you to go visit the wonderful coastlines in your area and share our message with someone new.

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A Flurry of Sand for North Carolina Beaches

By Kenneth Willson, CPE CBI

One wouldn't normally think of November through May as being "beach season" in North Carolina, but that is exactly what it's been for a number of beach communities this past winter. That is beach building season. Since November, Pine Knoll Shores, Emerald Isle, North Topsail Beach, Carolina Beach, Kure Beach, and Bald Head Island have all seen sand pumped onto their beaches.

Figure 1: Great Lakes Dredge & Dock crews constructing section of beach along western Emerald Isle. Photo provided by Carteret County Shore Protection Office.

The local governments of Carteret County, Emerald Isle, and Pine Knoll Shores recently completed a $15 million nourishment project totaling one million cubic yards that was formulated in response to Hurricane Irene that struck the area in August 2011. Figure 1 shows the project during construction. The project included a FEMA reimbursement component equating to roughly half of the project's cost with the remaining portion of the project funded by the local governments. Sand was placed in three reaches along the 25-mile long barrier island of Bogue Banks to address acute erosion in these discrete areas. Sand from an offshore dredged material disposal site or ODMDS, which is a component of the Morehead City Harbor Federal Navigation Project, was used to rebuild the beaches. The Town of North Topsail Beach completed Phase 1 of a comprehensive shoreline protection project in February 2013. The New River Inlet ocean bar channel was realigned closer to North Topsail Beach to provide stability to the shoreline. Marinex Construction completed the dredging work in 45 days with the Dredge Savannah. The ocean bar channel in New River Inlet was excavated to an average depth of -18 feet, NAVD with a 500-foot width. Approximately 592,000 CY were removed from the approximate 3,500 ft. long channel and placed on the shoreline of North Topsail Beach, as shown in Figure 2. Material removed from the inlet was place along 7,700 feet of shoreline to widen the beach berm approximately 135 feet. The project extended south from New River Inlet to Shipwatch Townhomes. The Town funded 100% of the permitting and design as well as initial construction of Phase 1 of the project, receiving no matching funds from the federal, state, or county governments.

(Continued page 2)

A Flurry of Sand on North Carolina Beaches (Cont'd)

Figure 2: Before and after photos of the north end of North Topsail Beach. Photographs By Aerophoto.

Work on the Kure Beach nourishment project began in early March with the Carolina Beach project beginning May 1st. Both of these projects are federal coastal storm damage reduction projects handled by the Army Corps of Engineers, Wilmington District. These two projects were part of a $26.3 million contract awarded to Weeks Marine which included the Bald Head Island project. The Kure beach project placed a total of approximately 450,000 cubic yards of sand along a 5,000-foot section of the south end of the beach and a 3,000-foot section of the north end of the beach. The sand for the Kure Beach project was excavated by hopper dredges from an offshore borrow area. The Carolina Beach project, which is scheduled to be completed May 31, plans to pump approximately 680,000 cubic yards of sand along 9,500 ft. of beach. This sand is dredged via cutterhead suction dredge from a sediment deposition basin near the confluence of Carolina Beach Inlet and the Atlantic Intracoastal Waterway. Figure 3 shows the project during construction.

Figure 3: Great Lakes Dredge & Dock crews constructing the beach at Carolina Beach just south of the Carolina Beach Fishing Pier on May 7. Photograph provided by the Island Gazette.

Figure 4: Weeks Marine placing sand fill on south beach at Bald Head Island. Photograph Provided by the Village of Bald Head Island.

On February 6th, the U.S. Army Corps of Engineers Wilmington District got underway with its operation & maintenance (O&M) contract with Weeks Marine, to dredge approximately 1.8 MCY of beach quality sediment from the Wilmington Harbor Navigation Channel. Under an existing agreement known as the "Sand Management Plan", the beach quality sand dredged from the channel is placed on the adjacent shorelines of the municipalities of Bald Head Island, Caswell Beach, and Oak Island. This cycle included material being placed on Bald Head Island as shown in Figure 34

Natural Dune Building after the 2011 Nags Head Beach Nourishment Project

By Tim Kana, Haiqing Kaczkowski, and Steven Traynum

The Nags Head beach nourishment project was completed on 27 October 2011 after Hurricane Irene (27 August) but before Hurricane Sandy (28 October 2012). For a number of reasons, fill placement was limited to the recreational beach zone and did not include any dune reconstruction. What that means is nearly all 4.6 million cubic yards of nourishment sand was placed at or below the normal dry-sand beach level. We often refer to the dry beach as the "berm," the flat area positioned between the foredune and the sloping section of beach. Nourishment had the effect of widening the berm between 50 feet (ft) and 300 ft. When Irene and Sandy impacted Nags Head with a moderate 2–3 ft open coast surge and high waves, the berm was overtopped and a considerable volume of sand was pushed by waves toward the foredune. This raised the elevation of the dry beach and positioned sand strategically for dune building.

Over the past year, winds have continued to shift sand from the berm to the foredune. The Town of Nags Head installed echelons of sand fencing to trap sand and add bulk and elevation to the dunes. Monitoring surveys show that the first row of sand fencing is already filled to capacity in many places, so the Town is adding another tier over the first.

Recent surveys indicate that, on average, Nags Head dunes have gained nearly 5 cubic yards per foot (~260,000 cubic yards) since project completion. This volume represents about 6 percent of the nourishment total and is comparable in scale to an emergency dune restoration project along Nags Head which FEMA funded after Hurricane Isabel (constructed in 2005). The dune building after Isabel cost upward of $6 million (sand had to be imported by trucks) and did not last long because of the extremely eroded condition of the beach. Erosion quickly undermined the FEMA dune and redistributed the sand along the wet-sand beach. By comparison, dune building after the 2011 nourishment project has only cost the basic sand-fencing materials, and prospects for further growth are reasonably good given the wide dry beach after nourishment.

The experience at Nags Head is little different than other nourishment projects (or naturally accreting beaches) except perhaps the scale. The basic prerequisite for dune growth is a healthy, dry-sand beach. Without that, there is little chance for dunes to grow.

Central East Coast Chapter of ASBPA is the newest chapter of ASBPA to promote healthy beaches as the first line of defense along the coast. Healthy beaches provide the sand source for natural dune building, enhance protection of property during storms, and provide priceless recreational and environmental benefits.

For more information on the experience at Nags Head or to receive a copy of the published findings, email CSE@coastalscience.com.

Hurricane Sandy's Impact on Delaware's Ocean Coast

By Kimberly K. McKenna, Delaware Department of Natural Resources and Environmental Control

Much of the focus from Hurricane Sandy has been on the New Jersey coast, and rightfully so as the devastation to some of the shore towns was catastrophic. Thankfully, Delaware did not suffer the damages because our beaches were located on the south-side of the storm's landfall, water levels were lower than those found in New Jersey, and our shoreline was protected by Federally-designed beach/dune nourishment projects. During the passage of Sandy, the Delaware shoreline was impacted by three higher than predicted water levels between October 29 and October 30, 2012 (Figure 1).

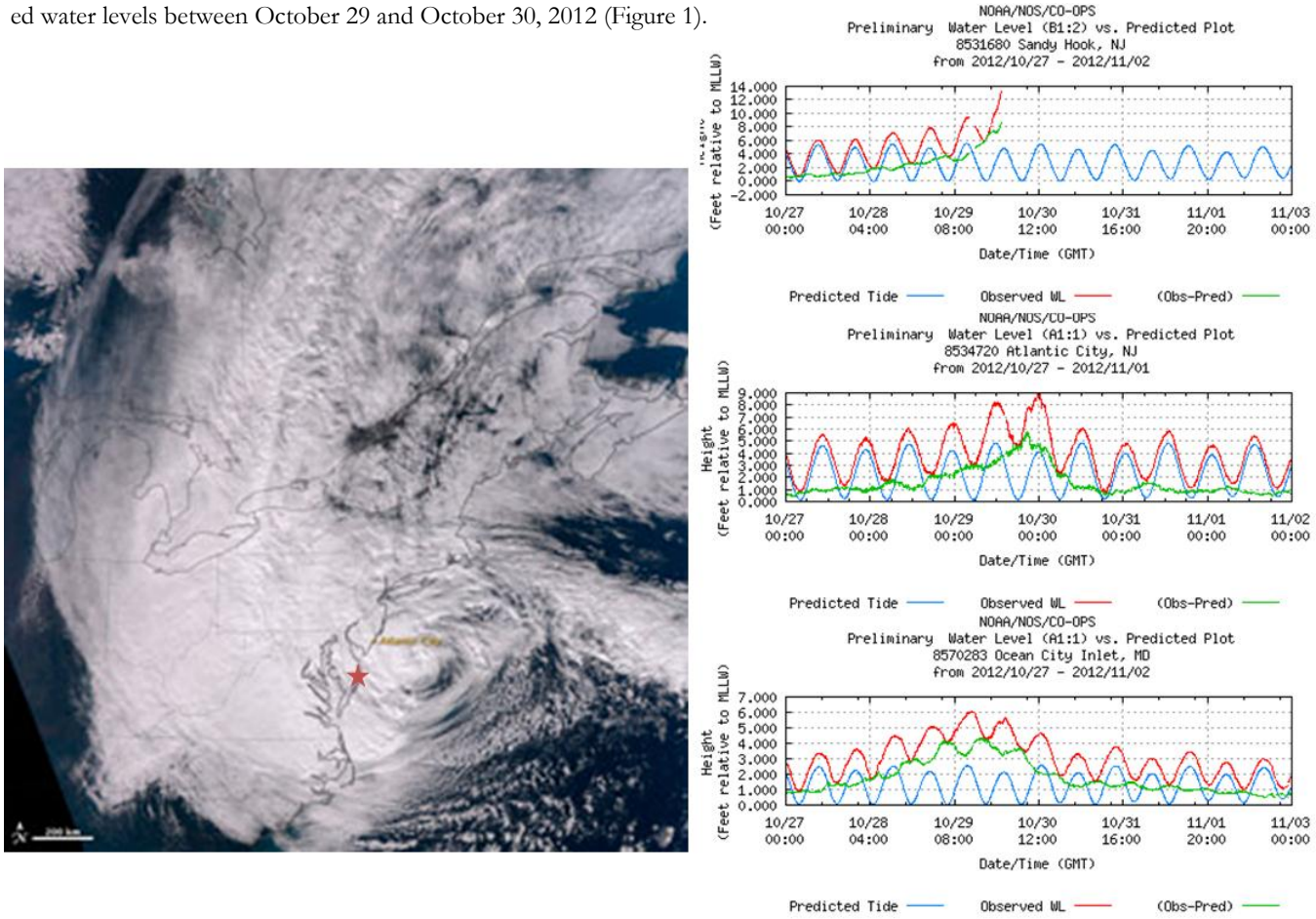

Figure 1. View of Hurricane Sandy with the star representing the location of the Delaware Atlantic shoreline. On the right are the water level measurements from (top to bottom) Sandy Hook, NJ; Atlantic City, NJ; and Ocean City, MD tide gage stations (http://tidesandcurrents.noaa.gov/).

A wave gage deployed by the US Army Corps of Engineers (USACE) offshore Bethany Beach, in about 30 feet of water, measured wave heights over 10 feet and wave periods exceeded 10 seconds (Figure 2). All of Delaware's ocean communities were impacted by the higher than normal waves and water levels. North of Indian River Inlet, the wave energy was significant enough to relocate beach and dune sands from an already vulnerable stretch of shoreline across US Highway Route 1 and severely damage the former bridge approach. *(Continued page 5)*

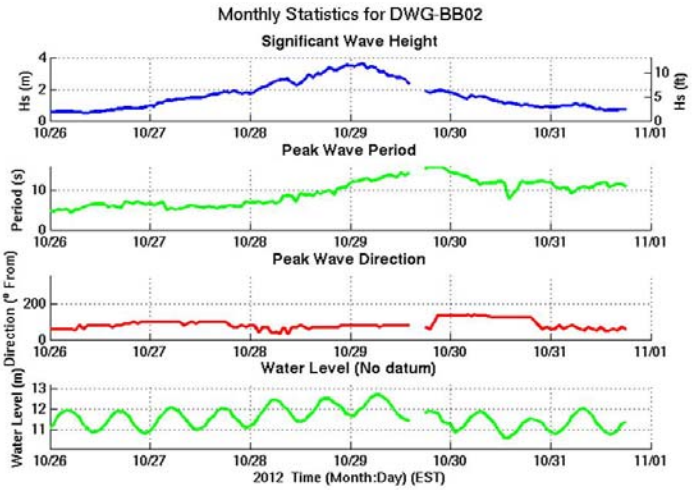

Figure 2. Wave heights, periods, direction measured from the gage offshore Bethany Beach (-30 ft depth) (http://www.frf.usace.army.mil/bethanybeach/bb.shtml).

Fortunately, this section of Route 1 had been abandoned in May 2012, a short five months before Sandy (Figures 3 and 4). However, in the developed sections of our shoreline (Rehoboth Beach, Dewey Beach, Bethany Beach, South Bethany Beach, and Fenwick Island) the storm surge eroded the beach, but was not able to overtop the dunes because of the wide beaches and high dunes that are part of a Federally-designed shore protection program. Most damages in those communities were caused by flooding from the back bays. The use of beach nourishment as a method for managing shoreline erosion on the ocean coast began in the early 1960s and involved the use of trucks to haul sand to the beaches from an onshore source. As the need grew for more sand, the state investigated the use of offshore sources and in 1988, completed the first state-sponsored beach nourishment project on Fenwick Island. In the 2000s, the state entered into a partnership with the USACE to maintain the shoreline. Beach nourishment projects were completed for the oceanfront communities mentioned above from 2004 to 2008. These projects were renourished in October 2011 to February 2012 to restore the beaches from damages inflicted by the 2009 Veteran's Day storm (Figure 5).

Figure 3. Overwash sands covering US Highway Route 1 north of the Indian River Inlet (Photo taken on October 30, 2012 by T. Pratt).

Figure 4. Beach conditions at Indian River Inlet following Hurricane Sandy and remnants of former US Route 1 (Photo taken on October 31,

Hurricane Sandy removed approximately 850,000 cubic yards of sand from the beaches within the Federal projects, making the Delaware shoreline more susceptible to losses from waves and storm surge in the future. Fortunately, the Delaware projects were included in the Federal Disaster Relief Appropriations Act of 2013 (Public Law 113-2) which allows for a mitigation component to restore the beaches back to the design condition. So, we here in Delaware expect a full recovery for our ocean beaches. The bar has been set at a very high level and we look forward to this great partnership with the USACE continuing far into the future.

Location	Year	Mode/Material Used	Fill Amount (CY)	Length (Ft)	Total Cost ($)
Rehoboth Beach/Dewey Beach	1962-2011	hydraulic or hopper dredge; truck fill	4,793,534	13,200	$41,125,190
Bethany Beach/South Bethany Beach	1961-2011	hydraulic or hopper dredge; truck fill	7,273,910	14,950	$53,614,363
Fenwick Island	1962-2011	hydraulic or hopper dredge; truck fill	2,251,136	6,500	$13,029,512
			14,318,580		$107,769,065

Figure 5. Amounts of sand placed on the beaches over the past 50 years at selected Delaware oceanfront communities.

Upcoming Events

- October 22-25, 2013 ASBPA's 2013 National Conference, South Padre Island, TX.
- November 18-19, 2013 NCBIWA 2013 Annual Conference, Wrightsville Beach, NC
- November 21-22, 2013 Atlantic Intracoastal Waterway Association Conference, Charleston, SC
- November 22, 2013 CEC Chapter Meeting, Charleston, SC
- February 25-27, 2014 ASBPA's National Coastal Summit, Washington, DC

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Interested in Being an Editor?

The CEC Chapter is seeking individuals that are interested in putting together the Chapter newsletter. This is a great opportunity for students or young professionals to gain experience with technical writing and review. Board Member David Pezza will oversee the production of the newsletter, so please contact him at dpezz001@odu.edu if you are interested in this great opportunity.

NEWSLETTER PUBLICATION GUIDELINES:

- *500 to 1000 word articles (pictures welcomed)*
- *Word format (Garamond @ 10 font)*
- *Ensure permission to publish is granted.*
- *Email articles and items to David Pezza at dpezz001@odu.edu*

Coming soon!
www.CentralEastCoast.org

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