

North End Restoration Project Annual Report: 2006
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Overview

The North End Restoration Project is a comprehensive restoration plan that focuses on restoring Assateague Island to as natural a condition as possible, mitigating the sediment starvation of Assateague Island caused by the 1934 stabilization of the Ocean City Inlet. Project partners are the U.S. Army Corps of Engineers (USACE), Assateague Island National Seashore (ASIS), the state of Maryland, Maryland Department of Natural Resources, Worcester County Maryland, and the Town of Ocean City Maryland.

The project has two phases. The first, or “short-term,” phase of the restoration program was designed to provide a one-time infusion of sand to replace a portion of the sediment lost over the past 60 years due to the effects of the jetties; that phase was completed in 2003. The second phase, the “long-term sand management” component, began in January 2004 and addresses the ongoing and future effects of the jetties by re-establishing a “natural” sediment supply for northern Assateague that reflects historic, pre-inlet rates.

This report documents the efforts made in 2006 to evaluate and restore the island’s North End as part of the long-term sand management phase of the project. The report does not serve as a synthesis of project performance to date, but rather lists the major events, collected datasets, and documents created in 2006 and related to the North End Restoration project.

Team Meetings

The North End Restoration Team consists of representatives from USACE, ASIS, Maryland Department of Natural Resources, Maryland Geological Survey, Worcester County Maryland, Town of Ocean City Maryland, Minerals Management Service, and U.S. Fish and Wildlife Service.

The Team met on February 16, 2006 to share information on total bypassing and backpassing volumes, evolution of the ebb shoal due to mining, shoreline change along the northernmost kilometer of ASIS, status of plover and amaranth monitoring, and the new North End Restoration public website. The Team also chose borrow sites for the upcoming dredging cycle, and discussed and revised planned alterations to the constructed berm in order to improve overwash.

The Team met again on August 9, 2006, to share information on total bypassing and backpassing volumes, analysis of berm performance under given overwash conditions, numerical simulations of hydrodynamics and sediment transport at Ocean City Inlet, regional cascade modeling of Delmarva Peninsula, data availability, status of plover and amaranth monitoring, and recent alterations of the constructed berm. The Team also chose borrow sites for the upcoming dredging cycle, and revised plans for bathymetry survey areas and frequency.

Dredging

Two rounds of dredging delivered an estimated total of 114,476 m³ to ASIS. Bathymetry of the shoal was surveyed both before and after the first round of dredging, and after the second round of dredging. Details of the dredging and survey dates, along with volume sources and destinations, can be found in Table 1.

Pre-Dredging Survey	Dredging	EOB Shoal Area A (cubic meters)	EOB Shoal Area B (cubic meters)	EOB Shoal Area C (cubic meters)	Flood Shoal (cubic meters)	Flood Shoal (cubic meters)	Inlet Throat (cubic meters)	Total (cubic meters)	To ASIS	To OC	Post-Dredging Survey
3/15/06 to 3/16/06	4/3/06 to 5/11/06	29397					6992	36389	34978	1410	7/27/06 to 7/30/06
None	8/11/06 to 10/29/06	71092					15134	86226	79498	6728	12/4/06 to 12/11/06

Table 1. Dates of bathymetry surveys and dredging, and sources and destinations of dredged volumes.

Constructed Berm Behavior

On September 1, 2006, Tropical Storm Ernesto produced waves up to 3.3 m and winds up to 64 mph. As a result, the constructed berm experienced a lot of Aeolian transport, and the surface of the berm crest became quite irregular. Water made it across the berm in two locations- one very near the low northern edge of the berm, and another across Notch 5 near the southern end of the berm. The flow was not strong enough to scour any of the area behind the berm or even to make a channel all the way to the bay, but was enough to carry water and some sand to the westward edge of the gravel surface (the berm footprint). The flow pathway was about 3 m wide and about 20 cm deep. There was no disturbance or burial of the vegetation west of the berm.

Notches 1 and 5 were wetted, but not overwashed, on November 12. On November 22-23 (during the Thanksgiving northeaster), notches 2, 3, and 5 were wetted. In neither case was vegetation disturbed, nor did the water reach the bay.

Constructed Berm Alteration

In November 2006, ASIS distributed to the Team a proposal (available in the Park's Electronic Library) to create cross-berm pathways to allow natural overwash at two locations along the constructed berm. The locations, elevation, slope, and width of the pathways were based on SBEACH models that incorporated tide and weather data to predict two overwash events each year, and on topographic data (lidar and RTK-GPS, including post-overwash topography) quantifying overwash elevations, locations, and widths at ASIS over the past decade. Several construction goals differed from those for the 2005 berm notches, which had not yet overwashed almost two years after their creation. One major difference was the creation of a natural slope extending from the desired elevation (2.16 m NAVD88) at the seaward edge of the berm downward towards the bay. The proposal was accepted by the Team, but construction work was not completed in 2006.

Vegetation Manipulation

Early in the growing season, a number of areas on top of the storm berm were sprayed with herbicide because nascent ammophila dunes had begun to attract horses for grazing during the plover nesting season. The ammophila grass proved to be quite resistant to treatment, and additional spraying was not possible due to the presence of nesting or brooding plovers.

Assateague State Park Modifications

Between January and May 2006, dune maintenance at Assateague State Park involved dune vegetation planting, fencing, and sand placement.

Datasets

Many spatial datasets were collected in conjunction with the North End Restoration Project, and most are available on the NPS Data Store <http://science.nature.nps.gov/nrdata/>. This year's activities resulted in the following relevant datasets:

- Overwash elevation survey, September 2006
- Overwash elevation survey, November 14, 2006
- Overwash elevation survey, November 29, 2006
- Sediment Bypassing borrow and placement locations, Spring 2006 (points shapefile)
- Sediment Bypassing borrow and placement locations, Fall 2006 (points shapefile)
- Sediment Bypassing sample grain sizes, March 2006
- Sediment Bypassing sample grain sizes, September 2006
- Multibeam bathymetry survey of the northern and eastern ebb tidal delta, March 2006 (raster and points shapefile)
- Multibeam bathymetry survey of the northern and eastern ebb tidal delta, July 2006 (raster and points shapefile)
- Multibeam bathymetry survey of the northern and eastern ebb tidal delta, December 2006 (raster and points shapefile)
- Topographic profiles, April 2006 (points shapefile)
- Topographic profiles, October 2006 (points shapefile)
- Topographic profiles of Assateague State Park constructed dune (available from MD DNR)
- High water shoreline position, January 2006 (points and line shapefiles)
- High water shoreline position, March 2006 (points and line shapefiles)
- High water shoreline position, June 2006 (points and line shapefiles)
- High water shoreline position, November 2006 (points and line shapefiles)
- Wave data as measured at the USACE Off-Shore Wave Gauge
- Weather data from the ASIS Remote Automatic Weather Station
- Environmental and weather data from the NOAA Offshore Buoy 44009
- Tide data from NOAA Tide gauges at Ocean City Inlet and Lewes, DE
- Orthorectified aerial photos, August 2006
- Piping plover nest locations
- Delineation of vegetation line (related to piping plover mobility)
- Seabeach Amaranth locations
- North End vegetation communities

Documentation and Data Synthesis

Documentation and data synthesis of the North End Restoration efforts have taken several forms:

- Piping Plover Annual Report (NPS Internal Report summarizing plover reproductive success and distribution)
- Seabeach Amaranth Monitoring Report (NPS Internal Report)
- Meteorological Monitoring Program Annual Report (NPS Internal Report summarizing weather data from RAWs station)
- A public website describing the North End project, including an overview, a timeline of major events, and a list of contacts and datasets, was posted to the NPS website and is available at <http://www.nps.gov/asis/naturescience/resource-management-documents.htm>.
- Project results were presented at public conferences, resulting in the following publications:
Buttolph, A.M., Grosskopf, W.G., Bass, G.P. and Kraus, N.C., 2006. "Natural Sand Bypassing and Response of Ebb Shoal to Jetty Rehabilitation, Ocean City Inlet, Maryland, U.S.A," In: *Proceedings 30th International Conference on Coastal Engineering Vol. 4*, World Scientific Publishers, pp. 3334-3356.
Kraus, N.C., 2006. "Understanding Piping Plover Population Dynamics through Mathematical Model, with Application to Northern Assateague Island, Maryland, and Long Island, New York, Barrier Beaches." *Shore and Beach* 74(1), pp. 3-9.

- Roach, A.A., Rodriguez, A.H., and Schupp, C.A., 2006. "Modification of Constructed Storm Berm at Assateague Island National Seashore." 26th Annual ESRI International User Conference, San Diego, CA.
- Roach, A., Schupp, C., Rodriguez, A., and Zimmerman, C., 2006. "National Parks Track: GIS Enhances Restoration of Northern Assateague Island." 26th Annual ESRI International User Conference, San Diego, CA.