

STOCKTON UNIVERSITY COASTAL RESEARCH CENTER



Survey site #170, Roosevelt Avenue, Deal, NJ. This view from the top of the rock seawall at the profile line shows the Phase III US Army Corps of Engineers Monmouth County shore protection project May 17, 2016 as construction was approaching site #170. The site presently has a 270-foot wide dry beach, 25 times any prior beach width.

New Jersey Beach Profile Network 2017 Annual Report on Shoreline Changes in New Jersey's Four Coastal Counties Raritan Bay to Delaware Bay Spring of 2016 Through Fall of 2017

Prepared for:
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New Jersey Beach Profile Network 2017 Annual Report

On

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EXECUTIVE SUMMARY

The New Jersey Department of Environmental Protection (NJDEP) collaborated with the Stockton University Coastal Research Center (CRC) in 1986 to create the New Jersey Beach Profile Network (NJBPN). This project commenced as an annual survey in the fall between 1986 and 1993, then switched to a spring and a fall survey at each site in 1994. This allowed the CRC to summarize winter storm damage each spring and review beach accretion following the milder summer season. This annual report is divided into four coastal county segments and provides a summary of beach changes for each county.

Following Hurricane Sandy, the US Army Corps of Engineers (USACE) undertook the restoration of the beaches and dunes to federally authorized design specifications. Funding under Public Law 113-2 allowed 100% federal payment for the restoration of existing storm reduction projects in Monmouth, Ocean, Atlantic, Cape May Counties, and the tidal Delaware Bay/River shoreline. The 2016 report documented completed hurricane restoration work as part of a 30-year review of the program. The report is available at the CRC website at www.stockton.edu/crc.

2017 Shoreline Management:

Most of the post Hurricane Sandy USACE work on authorized coastal storm damage reduction projects was completed by the end of 2015. By the fall of 2017 the USACE Absecon Island project, initially completed for Atlantic City and Ventnor in 2003, was extended through Margate and Longport. Work continued in Margate with the construction of a stormwater management/ocean drainage system to replace the existing process of ocean street-end discharge onto the beach landward of the dunes.

In 2017, work commenced on the Manasquan Inlet to Barnegat Inlet project for the developed portion of Northern Ocean County. This followed years of real estate issues due to individual ownership of the beach to the mean high water line along much of this part of the NJ coastline. Multiple dredges have operated since spring 2017 to carry sand from the offshore borrow sites and place the material on the beach to build the design beach/dune cross section. The project stops at the Island Beach State Park northern boundary in the south, and tapers off to no added material in the northernmost third of Point Pleasant Beach Borough located just south of Manasquan Inlet.

The USACE continues its evaluation of the proposed Wildwoods coastal storm damage reduction project where sand derived from the excess material accumulating on the Wildwood and Wildwood Crest municipal beaches will be excavated and used to restore the losses on the northernmost North Wildwood oceanfront.

This year, following extensive discussions with the New York District US Army Corps of Engineers (NY District), the NJDEP Division of Coastal Engineering (NJDEP DCE) and the CRC, 65 new profile locations were added to the Monmouth County NJBPN workload. Selected from existing NY District survey sites between the present NJBPN survey locations, the CRC installed or upgraded survey markers and backup monumentation at the new locations and completed an initial survey during the fall of 2017. These sites are distributed among the original 34 oceanfront locations. Including the three Raritan Bay sites, the number of

NJBPN sites for Monmouth County is 102 (Figure 1a-d). The 2018 contract will include surveys completed at the old and new Monmouth County locations in the spring and fall of 2018 leading to comparison investigations for changes to the NY District’s Monmouth County coastal storm damage reduction effort between Sandy Hook National Seashore and Manasquan Borough. The number of NJBPN locations totals 171 coast-wide.

All NJBPN survey data were analyzed to show changes in shoreline position and sand volume in each coastal county for an 18-month study interval. The three-month seasonal, annual, and 18-month summaries are provided in the tables below and at the end of the report. Beach nourishment projects in Monmouth, Long Beach Island (Ocean County), and Atlantic Counties produced the extensive sand volume increases previously.

All four counties maintained a positive sand volume gain during the study interval at double digit values for the 18-month evaluation. Two counties lost minor amounts of sand volume during the winter (F 2016 to S 2017 surveys). In the summer of 2017, Atlantic County displayed the greatest sand volume increase due to the work by the USACE on Absecon Island completing the Absecon Inlet to Great Egg Inlet shore protection project (Table 1a).

	Sand Volume Changes at the NJ Oceanfront			
	S 16 – F 16	F 16 – S 17	S 17 – F 17	S 16 – F 17
	Cu. yds./ft.	Cu. yds./ft.	Cu. yds./ft.	Cu. yds./ft.
Monmouth County	22.90	-9.30	1.74	16.17
Ocean County	28.53	-0.42	8.21	34.94
Atlantic County	4.43	1.48	35.30	43.74
Cape May County	7.58	11.51	2.87	22.32

The shoreline change values represent the difference in horizontal distance of the zero elevation position (0.0 ft NAVD88) from the reference monument on the two profiles being compared. Advances seaward are presented as positive integers and retreat landward are negative. Each number shown in the table below is the average change for all the sites in each county. Shoreline positions averaged double digit advances seaward in all four counties over the 18-month period. The two winter loss in sand volume counties (Monmouth and Ocean) also measured shoreline retreat. The summer of 2016 saw a positive sand volume gain but a shoreline retreat in Atlantic County. A similar situation occurred during the summer of 2017 in Cape May County but with single digit averaged values (Table 1b).

	Shoreline Position Shifts Landward (-) or Seaward (+) at the NJ Oceanfront			
	S 16 – F 16	F 16 – S 17	S 17 – F 17	S 16 – F 17
	Feet	Feet	Feet	Feet
Monmouth County	41.23	-23.86	7.05	24.42
Ocean County	36.40	-19.59	32.31	49.12
Atlantic County	-15.10	15.95	42.26	43.11
Cape May County	11.25	20.68	-6.63	25.30

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INTRODUCTION:

The New Jersey Beach Profile Network (NJBPN) project provides local and regional information on coastal zone changes and is designed to document seasonal and storm-related damage assessments of the New Jersey shoreline. Each site has been visited annually in the fall since 1986. Semi-annual visits, each spring and fall, began in 1994 following the passage of Public Law 93. The program was expanded to take surveys every spring following the winter northeasters and in the fall following summer beach accretion. In addition, new sites were established in the gaps of coverage and at all adjacent tidal inlet shorelines. The information collected consists of photographs of the beach/dune system at each site, a topographic profile of the dune, beach and seafloor to a minimum depth of 15-18 feet, and field notes on significant geologic changes. Also, construction activity is noted and necessary information regarding quantity and duration of such activity is gathered. The field data are used to generate graphical cross section plots, which can be used for comparison across the width of the active coastal zone. The cross section is also used to calculate sand volume and shoreline position changes. The 2017 report is focused on how and where beach recovery has met expectations and what transpired to exceed expectations in terms of beach width and dune recovery.

In 2017 the CRC, NJDEP DCE, and the USACE-New York District coordinated efforts to add 65 new profile sites to Monmouth County and were distributed along the oceanfront coastline south of Sandy Hook National Seashore. The USACE sites were added to provide more continuous coverage of shoreline changes within the recently completed Sea Bright to Manasquan coastal segment. Each of the USACE sites was surveyed during the fall of 2017 and will be re-surveyed twice during 2018 allowing change calculations to be completed for the 2018 annual report. Each new site displays a Google Earth aerial view of the location followed by the initial survey profile cross section plot. Comparison plots and spring 2016 versus Fall 2017 photographs show the changes observable for the original NJDEP sites.

Post-Sandy recovery showed that the hundreds of millions spent by the federal government, augmented by NJ shore protection money and some local enhancements did produce a better set of coastal shore protection conditions than existed prior to Sandy where such restoration work occurred. Since work commenced along the last major segment of the developed NJ coastline this fall, the comparison between beaches under federal jurisdiction versus those not currently covered by the USACE will be the last such focus. The tables of beach volume and shoreline change data are found after the county site descriptions for Cape May County in the appendix. A summary of each county's coastal zone activities follows the county profile site location diagram at the start of each county discussion. Conclusions on the study interval appear at the end of each county section.

STORM RECOVERY AND BEACH PROJECT EFFECTIVENESS:

While a sizable fraction of the sand eroded from the pre-Sandy shoreline was moved offshore into at least 10 feet of water, the rate of return was reassuring that similar results would come to pass similar to the post-1992 northeast storm recovery where now, 5 years after Sandy, much of the lost sand has returned. The combination of extensive work completed by the USACE and natural events have greatly enhanced the storm-damaged beaches.