

STOCKTON UNIVERSITY COASTAL RESEARCH CENTER



This view looking north toward NYC from Site #385 on the northern tip of Sandy Hook National Seashore illustrates the vastness of the expanse of this site (fall 2019).

New Jersey Beach Profile Network 2019 Annual Report on Shoreline Changes in New Jersey's Four Coastal Counties Raritan Bay to Delaware Bay Spring of 2018 Through Fall of 2019

Prepared for:

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The Stockton University Coastal Research Center



New Jersey Beach Profile Network 2019 Annual Report

On

Shoreline Changes In New Jersey In the Four Coastal Counties Raritan Bay to Delaware Bay

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EXECUTIVE SUMMARY

Thirty-four years ago, the New Jersey Department of Environmental Protection asked The Stockton University Coastal Research Center to establish topographic cross sections along the NJ oceanfront and parts of the Raritan and Delaware Bay shorelines to provide information about changes occurring in the dunes, on the beach and nearby offshore seafloor along the Jersey shore. This project commenced as an annual oceanfront and Raritan and Delaware Bay shoreline survey only 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 summer season. The 2019 report is divided into four coastal county segments and gives a summary of beach changes in each county.

The US Army Corps of Engineers (USACE) has established coastal shore protection projects along 100% of the 97 miles of New Jersey's developed oceanfront shoreline with the NY District responsible for Raritan Bay efforts and the oceanfront from Sandy Hook National Seashore, south to Manasquan Inlet. The Philadelphia District has jurisdiction from Manasquan Inlet south to Cape May Point and into Delaware Bay. Currently, the only segment where construction of the selected shore protection effort has yet to be undertaken encompasses North Wildwood to Lower Township (The Wildwoods). This project continues to evolve as limitations on sand supplies, real estate ownership and methodology for the project are worked out among the stakeholders.

Over the years additional survey sites were added to gain a better perspective on changes around the 11 NJ tidal inlets with a station in close proximity to both inlet beachfront shores. A site was added in 2016 on Sandy Hook closer to the northern end of the spit tip. In 2017 following discussions with the Division of Coastal Engineering (DCE) and the NY Corps of Engineers District, 66 sites were introduced between the 34 already located along the Monmouth County oceanfront to better follow changes occurring within the Monmouth County shore protection project shoreline. These were 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. 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 first survey of these new locations took place in the fall of 2017. These new sites were surveyed in the spring and fall of 2018. Today the CRC surveys 171 sites twice each year with the results summarized in these annual reports to the DCE.

2019 Shoreline Management:

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 was completed 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. Multiple dredges moved sand from the offshore borrow sites and placed 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. During the 2019 survey season this project was surveyed at all existing northern Ocean County locations. Litigation continues dominantly in Bay Head and Point Pleasant Beach as oceanfront owners object to the easement conditions required to legally have the federal government’s contractors place sand above the mean high-water line on private land.

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 seasonal, annual, and 18-month summaries are provided as county-wide averages in the tables below and in expanded tables for each site and each survey at the end of the report.

Three of four oceanfront NJ counties suffered sand volume loss over the past 18-month evaluation. Two counties lost minor amounts of sand volume while Cape May County saw almost 20 cubic yards of sand per foot of shoreline disappear. Ocean County received new sand along the northern county oceanfront which generated the average gain of 56.27 yds³/ft. (Table 1a).

	Sand Volume Changes at the NJ Oceanfront			
	S 18 – F 18	F 18 – S 19	S 19 – F 19	S 18 – F 19
	Cu. yds./ft.	Cu. yds./ft.	Cu. yds./ft.	Cu. yds./ft.
Monmouth County	-4.44	-1.61	2.83	-3.05
Ocean County	32.79	17.45	6.34	56.27
Atlantic County	-8.23	-3.68	5.13	-7.65
Cape May County	-11.28	-8.89	1.76	-18.43

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. Monmouth, Atlantic and Cape May Counties saw shoreline positions average double-digit retreats landward over the 18-month period. The recent completion of the US Army Corps of Engineers work in Northern Ocean County established the positive average shoreline advance of 44.93 feet (Table 1b).

	Shoreline Position Shifts Landward (-) or Seaward (+) at the NJ Oceanfront			
	S 18 – F 18	F 18 – S 19	S 19 – F 19	S 18 – F 19
	Feet	Feet	Feet	Feet
Monmouth County	-6.94	-9.29	3.40	-12.82
Ocean County	34.73	15.96	-6.49	44.93
Atlantic County	4.87	-24.54	-2.83	-22.49
Cape May County	-19.63	-14.69	-6.83	-41.23

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INTRODUCTION:

The New Jersey Beach Profile Network (NJBPN) project provides individual site-specific information that can be expanded into a regional assessment of NJ coastal zone changes. The surveys are designed to document seasonal and storm-related damage assessments or show beneficial sand volume accumulations along the New Jersey shoreline. Each of the original sites 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. During the first decade of work, new sites were established in the gaps of coverage and at all shorelines adjacent to tidal inlets. 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 geomorphic 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 direct comparison of any two cross sections at each site can be used to calculate sand volume and shoreline position changes at the site during the time interval between the two surveys.

The major innovation in recent years has been the CRC, NJDEP DCE, and the USACE-New York District coordinated efforts to add 66 new profile sites to Monmouth County that were distributed along the oceanfront coastline south from the Sandy Hook National Seashore. There are now five surveys in the record at these new sites to begin building trends of change across all 102 oceanfront Monmouth County locations.

Serious storm activity over this study interval has been remarkably low with periods of northeast and easterly winds of 10 to 25 MPH as the majority of all episodes of wave erosion seen. Hurricane activity has also been relatively absent along the mid-Atlantic shoreline over the past several years. Atlantic storms have moved northeast away from New Jersey with limited impact. The last major northeast event was January 23, 2016.

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 based on the study data for this time interval appear at the end of each county section.

STORM RECOVERY AND BEACH PROJECT EFFECTIVENESS:

It is now 8 years since Hurricane Sandy and based on both the recovery rates observed following the 1992 northeast storm and recovery since Sandy, the vast majority of natural sand migration back to the NJ beachfront has occurred. The massive effort by the NJ DCE and the two Army Corps Districts was critical in instituting a significant recovery in the level of beachfront storm protection for NJ coastal communities. It is a testimony to the efforts of local leaders, the NJDEP DCE staff and leadership, the federal planners and engineers, and the interest by local citizens that New Jersey is the only US state with 100% of its developed oceanfront shoreline under federal jurisdiction with completed projects and one final project about ready to be built. In addition, work has been completed or under construction along the NJ Raritan Bay at three sites (Port Monmouth, Keansburg, and Union Beach). The Philadelphia District completed projects in Avalon in 2019 and is working along the Delaware Bay shoreline in NJ with several in the design stages for Fortescue, Money Island, and Villas. Project betterments were executed in Holgate, Long Beach Island to retain the shore protection benefits by reconstructing the terminal groin at the south limit of development.