



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Climate and Flood Resilience

Division of Coastal Engineering

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MEMORANDUM

TO: David Rosenblatt, Assistant Commissioner

FROM: Chris Constantino for William Dixon, Director 

DATE: October 15, 2021

SUBJECT: Initial Coastal Storm Survey & Damage Assessment
Atlantic Ocean, Delaware Bay and Raritan Bay shorelines
October 9 – October 12, 2021 - Nor'easter

Since the Memorial Day 2021 weekend nor-easter, New Jersey has experienced very few periods of elevated seas and surf due to strong onshore winds. However, the region has experienced several periods of elevated surf due to medium to long period swells from offshore tropical weather systems in September and early October. Typically, these types of tropical swells aren't as destructive in nature however there could be localized short term effects if the swell is large and the tidal levels are elevated. That said, New Jersey fared well through this recent period of tropical surf. Even the 'hot spot' locations which typically are more susceptible to erosion fared well since during this period. Despite that, these areas continued to be more closely monitored by the Division of Coastal Engineering (DCE) and the respective municipalities. Consistent with the last several Coastal Storm Survey & Damage Assessments, local beach maintenance efforts as well as recently completed periodic nourishment projects in Cape May County, Atlantic County and Monmouth County helped dampen the effects and alleviated some of the pressure at several traditional 'hot spot' locations. As a result, the impacts due to the October 9th through October 12th nor'easter were not as dramatic with much of the eroded sand being shifted in the nearby intertidal and subtidal areas in the form of sandbars. This was very evident at almost all oceanfront survey locations.

Short- to medium-period seas, generated by moderate to strong east-northeast and northeast winds, on Saturday, October 9th began to impact the coast of New Jersey. Wind speeds peaked from late Sunday October 10th through much of Monday October 11th. Onshore winds began to subside on Tuesday October 12th and begin to have more of an offshore component by Wednesday October 13th. Surf heights ranged from 4 to 8 feet Saturday through Monday and 3 to 5 feet on Tuesday, with the greatest surf heights generally observed around jetties, groins, inlets, and piers.



Buoys off the New Jersey coast recorded wind gusts over 40 mph. Gusts at inland reporting stations were recorded over 40 mph during the peak of the event. Sea heights at nearby buoys peaked at 15 feet. Oceanfront tides reached minor flood stage levels for between 4 and 6 high tide cycles from between October 8th and October 12th in New Jersey; some back bay locations reached moderate flood stage during the same period. These elevated tidal levels, which began before the weather event, were a product of the recent astronomical tide phase with the prolonged period of moderate onshore winds exasperating the water levels during the event.

A full post-storm assessment was conducted on Tuesday, October 12th and Wednesday October 13th; the results of this assessment are contained in this report. During the compilation of this report, the surf conditions were around 3-5 feet on October 12th with winds generally under 25mph and 2 to 4 feet on October 13th with winds generally under 15 mph. A detailed summary listed by municipality from north to south is enclosed.

Of the 81 sites were surveyed, 79 had minor beach or dune erosion, 2 had moderate beach or dune erosion and 0 had major beach or dune erosion. Criteria for determining damage levels are listed at the end of this summary.

Please note that the storm damage assessments found herein were conducted in a rapid time interval with pre-storm and post-storm observations made immediately before and after the event in question. Please note that the changes documented in this report are from this event; pre-existing conditions (i.e. scarps in dunes prior to the event) and what caused these conditions are not always reported herein. It is often the Division's experience that much of the material eroded from the "dry" beach area has not been lost, but rather redistributed within the beach profile system, such as creation or enlargement of offshore sand bars. Our expectation is that much of material will return to the "dry" beach in time following the storm; this time frame may vary based on several contributing factors such as storm frequency and duration.

*** Damage Levels:**

Major erosion – consists of significant or total beach berm loss and/or significant erosion and scarping of the dunes.

Moderate erosion – consists of significant scarping and/or significant sloped erosion of beach berm and/or minor erosion of the dunes.

Minor erosion – consists of redistribution of sand within the beach profile or loss of sand without significant scarping or significant sloped erosion.

LOCATION	INSPECTION NOTES	DAMAGE LEVEL*
PERTH AMBOY	No major incidents or damage observed or reported.	Minor
SOUTH AMBOY	No major incidents or damage observed or reported.	Minor
OLD BRIDGE	Various sections of vertical dune scarps, up to 3' high and 2' wide. No major incidents or damage observed or reported	Minor
ABERDEEN	No major incidents or damage observed or reported.	Minor
ABERDEEN CLIFFWOOD BEACH	Up to 10' of sloped erosion, 1' to 2' in height. Various sections of vertical dunes scarps, up to 2' in height. Wave runup/tide to the upper beach. Sand over wash reported along Lakeshore Dr. and Ocean Blvd.	Minor
KEYPORT	No major incidents or damage observed or reported.	Minor
UNION BEACH	Up to 20' of sloped erosion, 1'- 2' in height. No major incidents or damage observed or reported.	Minor
KEANSBURG – BAYSHORE FLOODGATE	Minor sloped erosion and redistribution of sand. No major incidents or damage reported. Gate was closed consistent with the Operations Manual.	Minor
KEANSBURG	Floodgate Facility to Point Comfort: Up to 50' of sloped erosion, 1' – 2' in height. Various sections of pre-existing vertical beach scarps, up to 5' in height. Point Comfort to Ideal Beach: Up to 50' of sloped erosion, 1'- 2' in height. Various sections of pre-existing vertical beach scarps, up to 5' in height. No major incidents or damage observed or reported. Ideal Beach to Pews Creek: Up to 10' of sloped erosion, 1'- 2' in height. No major incidents or damage observed or reported.	Minor
MIDDLETOWN	Pews Creek Pump Station: Gate was closed consistent with the Operations Manual.	Minor
	Port Monmouth: Up to 10' of sloped erosion. 1'-2' in height. No major incidents or damage observed or reported.	Minor
	Belford: Existing 6' scarp along the dike at the ferry terminal. No major incidents or damage observed or reported.	Minor
	Leonardo: No major incidents or damage observed or reported.	Minor
ATLANTIC HIGHLANDS	No major incidents or damage observed or reported.	Minor
HIGHLANDS	No major incidents or damage observed or reported.	Minor
SEA BRIGHT	Minor sloped erosion. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor

MONMOUTH BEACH	Riverview Road to Beach Rd.: Up to 35' of sloped erosion. Wave runup/tide to the upper beach. Some windblown sand overtopped seawall.	Minor
	Beach Rd. to South end of Borough: Up to 75' of sloped erosion with some vertical beach scarping near Beach Road. Wave runup/tide to the upper beach.	Minor
LONG BRANCH	Seven Presidents to Seaview Ave.: Up to 45' of sloped erosion. Some wave runup/tide to the upper beach.	Minor
	Seaview Ave. to Cottage Pl.: Up to 35' of sloped erosion. Wave runup/tide to the upper beach.	Minor
	Cottage Pl. to Pullman Ave.: Up to 35' of sloped erosion. Wave runup/tide to the upper beach. Sinkhole formed upland of Pullman Avenue bulkhead.	Minor
DEAL	Minor to moderate sloped erosion and redistribution of sand throughout municipality. Areas of vertical beach scarping, up to 2' in height near Whitehall Ave. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
ALLENHURST	Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
LOCH ARBOUR	Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
ASBURY PARK	Minor sloped erosion and redistribution of sand. 2'-3' of vertical beach scarping near beach access/parking lot at Deal Lake Flume/8 th Ave. Jetty. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
NEPTUNE OCEAN GROVE	Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper beach/dune. No major incidents or damage observed or reported.	Minor
BRADLEY BEACH	Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper beach/dune. No major incidents or damage observed or reported.	Minor
AVON	Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
BELMAR	Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
SPRING LAKE	Minor erosion and redistribution of sand. Wave runup/tide to the upper beach. Ongoing construction near Spring Lake Beach Department. No major incidents or damage observed or reported.	Minor
SEA GIRT	Sloped erosion and redistribution of sand. Vertical dune scarping, up to 3' - 4' in height, at the south end of municipality. Wave runup/tide to the upper beach/dune. No major incidents or damage observed or reported.	Minor
MANASQUAN	Sloped erosion, 1' - 2' in height. Wave runup/tide to the upper beach/dune. No major incidents or damage observed or reported.	Minor
POINT PLEASANT BEACH	Up to 70' of sloped erosion, 5' - 6' in height. Wave runup/tide to the upper beach/dune.	Minor

BAY HEAD	Up to 30' of sloped erosion, 5' - 6' in height. Wave runup/tide to the upper beach/dune.	Minor
MANTOLOKING	Up to 15' of sloped erosion, 4' - 5' in height . Wave runup/tide to the upper beach/dune.	Minor
BRICK	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes. No major incidents or damage observed or reported.	Minor
TOMS RIVER NORMANDY BEACH through MONTEREY BEACH	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes. No major incidents or damage observed or reported.	Minor
LAVALLETTE	Up to 15' of sloped erosion, 4' - 5' in height . Wave runup/tide to the upper beach/dune.	Minor
TOMS RIVER ORTLEY BEACH	Up to 30' of sloped erosion, 4' - 5' in height. Vertical dune scarp, up to 7' in height from 5 th Ave. to 7 th Ave. Several crossovers damaged. Wave runup/tide to the upper beach/dune.	Moderate
SEASIDE HEIGHTS	Up to 30' of sloped erosion, 4' - 5' in height . Wave runup/tide to the upper beach/dune.	Minor
SEASIDE PARK	Up to 30' of sloped erosion, 4' - 5' in height . Wave runup/tide to the upper beach/dune.	Minor
BERKELEY TWP. S. SEASIDE PARK	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
ISLAND BEACH STATE PARK	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
BARNEGAT LIGHT	No major incidents or damage observed or reported.	Minor
LONG BEACH TWP. LOVELADIES	Up to 40' of sloped erosion, up to 3' in height . Wave runup/tide to the upper beach/dune.	Minor
HARVEY CEDARS	Up to 40' of sloped erosion, up to 3' in height . Wave runup/tide to the upper beach/dune.	Minor
LONG BEACH TWP. NORTH BEACH	Up to 40' of sloped erosion, up to 3' in height . Wave runup/tide to the upper beach/dune.	Minor
SURF CITY	Up to 40' of sloped erosion, up to 3' in height . Wave runup/tide to the upper beach/dune.	Minor
SHIP BOTTOM	Up to 40' of sloped erosion, up to 3' in height . Wave runup/tide to the upper beach/dune.	Minor
LONG BEACH TWP. BRANT BEACH through N. BEACH HAVEN	Up to 40' of sloped erosion, up to 3' in height . Wave runup/tide to the upper beach/dune.	Minor
BEACH HAVEN	Up to 40' of sloped erosion, up to 3' in height . Wave runup/tide to the upper beach/dune. Approx. 1,200 linear feet of vertical dune scarping, 2' - 5' in height, From approx. Fairview Ave. to Belvoir Ave.	Minor
LONG BEACH TWP. HOLGATE	Up to 40' of sloped erosion, up to 4' in height . Wave runup/tide to the upper beach/dune. Approx. 800 linear feet of vertical dune scarping up to 4' in height, near Pershing Ave.	Minor
BRIGANTINE	Sloped erosion, 1' - 2' in height throughout the City. 10 th St. N. through 15 th St. N. continues to experience more enhanced erosion; little to no beach at 15 th St. N. and 14 th St. N. Some wave runup/tide to the upper beach/dunes/revetment.	Minor

ATLANTIC CITY	Inlet Seawall and Terminal Jetty area: No incidents or damage observed or reported. Evidence of splash over near Flagship Resort	Minor
	Inlet Jetty to Ventnor Border: Sloped erosion, 1' - 2' in height throughout the City with several stretches of vertical beach scarping, up to 2' in height north of the Steel Pier (Maryland Ave.). Some wave runup/tide to the upper beach/dunes.	Minor
VENTNOR	Sloped erosion, 1' - 2' in height throughout the City with several stretches of vertical beach scarping, up to 2' in height. Some wave runup/tide to the upper beach/dunes.	Minor
MARGATE	Sloped erosion, 1' - 2' in height, with several stretches of vertical beach scarping, up to 2' in height. Some wave runup/tide to the upper beach/dunes throughout the City.	Minor
LONGPORT	Sloped erosion, 1' - 2' in height. Some enhanced erosion in the vicinity of 23 rd Ave. with vertical beach scarps up to 2' in height. Some wave runup/tide to the upper beach/dunes throughout the Borough.	Minor
OCEAN CITY	Sloped erosion, 1' - 3' in height throughout the City. Various sections of vertical beach scarps, up to 2' in height north of the Music Pier (8 th Street). Vicinity of 5 th St. continues to experience more enhanced erosion; vertical scarps into dune/stockpile between 5 th St. and 6 th St., up to 5' in height and 3' in depth. Some wave runup/tide to the upper beach/dunes throughout City.	Minor
UPPER TWP. STRATHMERE	Up to 40' of sloped erosion, 2' - 3' in height. 2'-5' of vertical dune scarp near Seaview Avenue. Some wave runup/tide to the upper beach/dunes throughout Strathmere.	Minor
SEA ISLE CITY	29th Street to 90th Street: Up to 35' of sloped erosion, 1' - 2' in height. Wave runup/tide to the upper beach. 90th Street to Townsend Inlet Waterfront Park: Up to 35' of sloped erosion, 1'-2' in height (90 th St. to 93 rd St.) Approx. 300 linear feet of existing dune scarp at Waterfront Park damaged further.	Minor
AVALON	Up to 30' of sloped erosion, 1' - 2' in height with vertical beach scarps up to 1' in height (near 13 th St. and 14 th St.). Wave runup/tide to the upper beach/dunes.	Minor
STONE HARBOR	Up to 20' of sloped erosion, 1' - 2' feet in height. Wave runup/tide to the upper beach/dunes.	Minor
NORTH WILDWOOD	Hereford Inlet & Surf Ave: Minor erosion. Wave runup/tide to the upper beach/dunes. No damage reported to the seawall.	Minor
	2nd Ave. to 15th Ave.: Up to 40' of sloped erosion, 1' - 3' in height with vertical beach scarps up to 2' in height. Wave runup/tide to the beach/dune/bulkhead. Beach access closed due to complete erosion of I-5 crossovers. 15th Ave. to Wildwood border: Up to 35' of sloped erosion, 1' - 2' in height. Wave runup/tide to the upper beach/dunes.	Moderate
WILDWOOD CITY	Up to 45' of sloped erosion, 1'-2' in height. Wave runup/tide to the upper beach. Evidence of ponding.	Minor
WILDWOOD CREST	Up to 40' of sloped erosion, 1'-2' in height. Wave runup/tide to the upper beach. Evidence of ponding.	Minor

LOWER TWP. DIAMOND BEACH	Up to 40' of sloped erosion, 1'-2' in height. No major incidents or damage reported.	Minor
CAPE MAY CITY	Up to 30' of sloped erosion; 1'-2' in height. No major incidents or damage reported.	Minor
LOWER TWP./WEST CAPE MAY	Up to 15' of sloped erosion, 1'-2' in height. No major incidents or damage reported.	Minor
CAPE MAY POINT	Up to 10' of sloped erosion. No major incidents or damage reported.	Minor
LOWER DELAWARE BAY	<u>North Cape May/Villas:</u> No major incidents or damage reported. Wave runoff/tide to the upper beach/dunes.	Minor
	<u>Del Haven/Pierces Point/Reeds Beach:</u> No major incidents or damage reported. Wave runoff/tide to the upper beach.	Minor
DELAWARE BAY/RIVER	<u>East Point:</u> No major incidents or damage reported. Wave runoff/tide to the upper beach.	Minor
	<u>Heislerville Dike:</u> No major incidents or damage reported.	Minor
	<u>Bivalve (Commercial):</u> No major incidents or damage reported. .	Minor
	<u>Fortescue:</u> No major incidents or damage reported. Wave run up/tide to the upper beach.	Minor
	<u>Gandy's Beach:</u> No major incidents or damage reported.	Minor
	<u>Lawrence Twp. - (Bay Point):</u> No major incidents or damage reported.	Minor
	<u>Fairfield Twp. (Sea Breeze):</u> No major incidents or damage reported. Wave runoff/tide to the upper beach.	Minor
	<u>Oakwood Beach:</u> No major incidents or damage reported. Wave runoff/tide to the upper beach. Debris noted on the beach.	Minor