



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Climate and Flood Resilience

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MEMORANDUM

TO: David Rosenblatt, Assistant Commissioner

FROM: Chris Constantino for William Dixon, Director 

DATE: November 8, 2021

SUBJECT: Initial Coastal Storm Survey & Damage Assessment
Atlantic Ocean, Delaware Bay and Raritan Bay shorelines
October 26 – October 30, 2021 – Coastal Weather Events

From August 2021 through October 2021, New Jersey experienced more frequent periods of elevated seas and surf. Early in that period, much of the elevated seas and surf was caused by medium to long period swells from offshore tropical weather systems, which are typically less damaging in nature. Much of the New Jersey coastline, including the usual “hot spots” locations fared well during this period of tropical surf and received minimal impacts.

This trend of medium- to long-period swell has been offset in the month of October by the reintroduction of weather events with short- to medium-period swells and periods of stronger onshore winds. Most locations fared well through the October 9th to October 12th nor'easter, however a few ‘hot spot’ locations experienced notable impacts. Local beach maintenance efforts, as well as recently completed periodic nourishment projects within Cape May County, Atlantic County and Monmouth County continued to help dampen and alleviate coastal erosion at the traditional ‘hot spot’ locations.

The northern Mid-Atlantic and New England coastlines were impacted by the effects of multiple low-pressure systems from October 26 through October 30, 2021. A coastal low-pressure system impacted the area from early Tuesday October 26th through late Wednesday October 27th. This was followed by the effects of a more inland low-pressure system from Friday October 29th through much of Saturday October 30th. Short- to medium-period seas impacted the region early, while the medium- to long-period swells took over Wednesday through early Friday. The coastal low-pressure system eventually moved slowly into the offshore waters southeast of Cape Cod. By mid-day Friday, the effects of the inland low-pressure system took over as moderate east-northeasterly and easterly winds affected the New Jersey coast; the strongest of winds were felt through Friday mid-afternoon to early Saturday morning. The onshore winds generated another set of short-to-medium-period swell on Friday and into much of Saturday. By Saturday, more southerly and



southwesterly winds were generated and eventually transitioned to more westerly on Sunday and once again the swell grew into more of a medium- and long-period swell. Surf heights peaked at 4 to 8 feet on Tuesday and again at 4 to 6 feet late Friday and Saturday; conditions became cleaner and less chaotic on Sunday with surf in the 2 to 4 feet range. Throughout the weather events, the greatest surf heights were generally observed around jetties, groins, inlets, and piers.

Off the New Jersey coast, buoys recorded wind gusts over 50 mph at the nearshore locations and over 60 mph at the offshore locations. Inland reporting stations recorded gusts over 60 mph during the peak of the event, with the strongest period occurring on Friday October 29th. During this period, nearby buoys recorded peak sea heights between 13 and 19 feet. The oceanfront tides reached minor flood stage levels during 2 to 4 high tide cycles from October 26th through October 30th. All back bay locations reached minor flood stage level several times. A few locations reached moderate flood stage level several times during the same period. These elevated tidal events were a product of moderate to strong onshore winds as well as the first low-pressure system meandering offshore for much of the time period.

A full post-storm assessment for the coastal weather events during the period from October 26 through October 30, 2021, was conducted on Monday November 1st; the results of this assessment are contained in this report. During the compilation of this report, the surf conditions were around 1-3 feet with west and west-northwest winds gusting up to 30 mph. A detailed summary listed by municipality from north to south is enclosed.

Of the 81 sites surveyed, 81 had minor beach or dune erosion, 0 had moderate beach or dune erosion and 0 had major beach or dune erosion. Criteria for determining damage levels is 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 being 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 this 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	Minor sloped erosion and redistribution of sand. No major incidents or damage observed or reported.	Minor
SOUTH AMBOY	Minor sloped erosion and redistribution of sand. No major incidents or damage observed or reported.	Minor
OLD BRIDGE	Additional vertical scarping up to 2' in height and 2' in width to pre-existing scarp. No major incidents or damage observed or reported	Minor
ABERDEEN	No major incidents or damage observed or reported.	Minor
ABERDEEN CLIFFWOOD BEACH	Wave runup/tide to the upper beach. Sand over wash reported along Lakeshore Dr. and Ocean Blvd. No major incidents or damage observed or reported.	Minor
KEYPORT	Minor sloped erosion and redistribution of sand. No major incidents or damage observed or reported.	Minor
UNION BEACH	Minor sloped erosion and redistribution of sand. 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 25' of sloped erosion, 1' – 2' in height. Some wave runup to the upper beach. Various sections of pre-existing vertical beach scarps, up to 5' in height. Point Comfort to Ideal Beach: Up to 20' of sloped erosion, 1'- 2' in height. Additional vertical beach scarping up 2' in height, 1' in width, and 30' in length to the pre-existing scarps near Point Comfort. 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 increased in width by an additional 1'- 2'. No major incidents or damage observed or reported.	Minor
	Leonardo: Minor sloped erosion and redistribution of sand. No major incidents or damage observed or reported.	Minor
ATLANTIC HIGHLANDS	Minor sloped erosion and redistribution of sand. No major incidents or damage observed or reported.	Minor
HIGHLANDS	Minor sloped erosion and redistribution of sand. No major incidents or damage observed or reported.	Minor
SEA BRIGHT	Up to 10' of sloped erosion. Windblown sand observed in parking lot. No major incidents or damage observed or reported.	Minor
MONMOUTH BEACH	Riverview Road to Beach Rd.: Up to 40' of sloped erosion with some wave runup/tide to the upper beach. Some windblown sand overtopped the seawall.	Minor
	Beach Rd. to South end of Borough: Up to 40' of sloped erosion with some vertical beach scarping near Beach Road. Wave runup/tide to the upper beach. Some windblown sand observed in public parking lot.	Minor

LONG BRANCH	Seven Presidents to Seaview Ave.: Minor sloped erosion and redistribution of sand. 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. Some windblown sand observed.	Minor
	Cottage Pl. to Pullman Ave.: Up to 35' of sloped erosion with various sections of vertical beach scarps up to 1' in height.	Minor
DEAL	Minor sloped erosion and redistribution of sand. Windblown sand on some street ends. 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	Up to 10' of 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. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
NEPTUNE OCEAN GROVE	Up to 35' sloped erosion and redistribution of sand. Active beach maintenance observed. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
BRADLEY BEACH	Up to 25' sloped erosion and redistribution of sand. Wave runup/tide to the upper beach. 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	Up to 60' of sloped erosion and redistribution of sand. Windblown sand along boardwalk and street. Active beach maintenance observed. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
SPRING LAKE	Minor erosion and redistribution of sand. Windblown sand along boardwalk and street. Active beach maintenance observed. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
SEA GIRT	Minor erosion and redistribution of sand. Vertical dune scarping up to 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	Minor erosion and redistribution of sand. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
POINT PLEASANT BEACH	Minor sloped erosion, up to 5' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
BAY HEAD	Minor sloped erosion, up to 5' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor

MANTOLOKING	Minor sloped erosion, up to 4' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
BRICK	Minor sloped erosion, up to 4' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
TOMS RIVER NORMANDY BEACH through MONTEREY BEACH	Minor sloped erosion, up to 4' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
LAVALLETTE	Minor sloped erosion, up to 4' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
TOMS RIVER ORTLEY BEACH	Minor sloped erosion, up to 4' in height, and some redistribution of sand. Pre-existing vertical dune scarping, from 5 th Ave. to 7 th Ave., experienced some additional minor erosion. Wave runup/tide to the upper beach/dune.	Minor
SEASIDE HEIGHTS	Minor sloped erosion, up to 4' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
SEASIDE PARK	Minor sloped erosion, up to 4' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
BERKELEY TWP. S. SEASIDE PARK	Minor sloped erosion, up to 4' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
ISLAND BEACH STATE PARK	No major incidents or damage observed or reported.	Minor
BARNEGAT LIGHT	No major incidents or damage observed or reported.	Minor
LONG BEACH TWP. LOVELADIES	Minor sloped erosion, up to 3' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
HARVEY CEDARS	Minor sloped erosion, up to 3' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
LONG BEACH TWP. NORTH BEACH	Minor sloped erosion, up to 3' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
SURF CITY	Minor sloped erosion, up to 3' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
SHIP BOTTOM	Minor sloped erosion, up to 3' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor
LONG BEACH TWP. BRANT BEACH through N. BEACH HAVEN	Minor sloped erosion, up to 3' in height, and some redistribution of sand. Wave runup/tide to the upper beach/dune.	Minor

BEACH HAVEN	Minor sloped erosion, up to 3' in height, and redistribution of sand. Wave runup/tide to the upper beach/dune. Pre-existing vertical dune scarps, from Fairview Ave. to Belvoir Ave. experienced some additional erosion, up to 2' in height.	Minor
LONG BEACH TWP. HOLGATE	Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper beach/dune. Pre-existing vertical dune scarps, near Pershing Ave., experienced some additional erosion, up to 2' in height.	Minor
BRIGANTINE	Up to 25' of 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	<u>Inlet Seawall and Terminal Jetty area:</u> No incidents or damage observed or reported. Evidence of splash over near Flagship Resort	Minor
	<u>Inlet Jetty to Ventnor Border:</u> Up to 25' of 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	Up to 25' of Sloped erosion, 1' - 2' in height throughout the City with several stretches of vertical beach scarping, up to 1' 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 1' in height. Some wave runup/tide to the upper beach/dunes throughout the City.	Minor
LONGPORT	Sloped erosion, 1' - 2' in height. Some sections of vertical beach scarps up to 2' in height. Some wave runup/tide to the upper beach/dunes throughout the Borough.	Minor
OCEAN CITY	Up to 25' of 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. experienced some additional erosion to the pre-existing vertical scarps in the dune/stockpile between 5 th St. and 6 th St.; only some minor additional losses. Some wave runup/tide to the upper beach/dunes throughout City.	Minor
UPPER TWP. STRATHMERE	Up to 20' of sloped erosion, 1' in height. Additional vertical dune scarping up to 4' in height and 1' in width near Seaview Avenue. Wave runup/tide to the upper beach/dune. No major incidents or damage observed or reported.	Minor
SEA ISLE CITY	<u>Whale Beach to 90th Street:</u> Up to 50' of sloped erosion, 1' - 2' in height. Wave runup/tide to the upper beach/dune. <u>90th Street to Townsend Inlet Waterfront Park:</u> Up to 20' of sloped erosion, 1' - 2' in height (90 th St. to 93 rd St.). Wave runup/tide to the upper beach/dune. Existing dune scarp at Waterfront Park not heavily impacted.	Minor

AVALON	Up to 30' of sloped erosion, 1' – 2' in height with vertical cut to dune up to 6' in height and up to 12' in width (near 13 th St. and 14 th St.). Wave runup/tide to the upper beach/dune.	Minor
STONE HARBOR	Up to 30' of sloped erosion, 1' - 2' feet in height. Wave runup/tide to the upper beach/dune. No major incidents or damage observed or reported.	Minor
NORTH WILDWOOD	Hereford Inlet & Surf Ave: No major incidents or damage observed or reported to the inlet beach and inlet seawall. Wave runup/tide to the upper beach/dune	Minor
	2nd Ave. to 15th Ave.: Up to 20' of sloped erosion, 1' to 2' in height with vertical beach scarps up to 2' in height and dune scarps up to 3' in height and 2' in width near 14 th Ave. Wave runup/tide to the upper beach/dune. Minor damage to the 14 th Ave. crossover 15th Ave. to Wildwood border: Up to 20' of sloped erosion, 1' - 2' in height. Wave runup/tide to the upper beach/dune.	Minor
WILDWOOD CITY	Minor erosion and redistribution of sand. No major incidents or damage observed or reported. Wave runup/tide to the upper beach. Evidence of minor ponding.	Minor
WILDWOOD CREST	Minor erosion and redistribution of sand. No major incidents or damage observed or reported. Wave runup/tide to the upper beach/dune. Evidence of ponding.	Minor
LOWER TWP. DIAMOND BEACH	Up to 30' of sloped erosion, 1' in height. No major incidents or damage observed or reported. Wave runup/tide to the upper beach/dune	Minor
CAPE MAY CITY	Up to 20' of sloped erosion, 1' to 2' in height. Vertical dune scarp, up to 6' in height and 4' in width at Wilmington Ave. Wave runup/tide to the upper beach/dune.	Minor
LOWER TWP./WEST CAPE MAY	Up to 20' of sloped erosion, 1' to 2' in height. No major incidents or damage observed or reported.	Minor
CAPE MAY POINT	Minor erosion and redistribution of sand. No major incidents or damage observed or reported.	Minor
LOWER DELAWARE BAY	North Cape May/Villas: Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper beach/dune. No major incidents or damage observed or reported.	Minor
	Del Haven/Pierces Point/Reeds Beach: Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
DELAWARE BAY/RIVER	East Point: Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper beach/geotubes/gabion baskets. Additional ACB mats exposed at geotube project site – revealed one damaged block. No major incidents or damage reported.	Minor

DELAWARE BAY/RIVER (continued)	<u>Heislerville Dike:</u> Some minor sloughing observed - much of which is pre-existing. No major incidents or damage reported.	Minor
	<u>Bivalve (Commercial):</u> Gabion baskets at NJ State Police Marine – Bivalve Station in deteriorated state – much of which is pre-existing. No major incidents or damage reported. .	Minor
	<u>Fortescue:</u> Minor sloped erosion and redistribution of sand. Windblown sand accumulation on adjacent roads. Ponding on the road noted within area. No major incidents or damage reported.	Minor
	<u>Gandy’s Beach:</u> Scour noted around concrete bin block revetment. Some windblown sand. 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> Road beginning to erode due to storms. Debris noted in area. Wave runup/tide to the upper beach.	Minor
	<u>Oakwood Beach:</u> Minor sloped erosion and redistribution of sand. Windblown sand noted along northern extents of area. Some additional erosion and some minor damage to sand fence at the southern end. Wave runup/tide to the upper beach. Debris noted on the beach.	Minor