



## 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 Bill Dixon, Director 

DATE: September 25, 2020

SUBJECT: Initial Coastal Storm Survey & Damage Assessment  
Atlantic Ocean, Delaware Bay and Raritan Bay shorelines  
Hurricanes Paulette and Teddy/Northeast Events - September 11 – 16 & 18 - 23, 2020

## SUMMARY:

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The 2020 hurricane season continues to be quite active with 23 named storms, 8 hurricanes, and 2 major hurricanes. Several periods of medium- to long-period swells increased the surf heights several times in August and September yet impacts to most beaches were minimal and short-lived. This was due to calm climatic conditions in between the episodes of elevated surf since last winter. Regardless, several 'hot spot' locations continue to be impacted. The Division of Coastal Engineering (DCE) and the respective municipalities continue to monitor those areas closely and keep in close communication with each other regarding the status of these locations. Consistent with the Coastal Storm Survey & Damage Assessment for Isaias and Kyle, several ongoing and recently completed periodic nourishment projects in Cape May County and Monmouth County alleviated some of the pressure at several traditional 'hot spot' locations.

Recently, several tropical systems tracked in areas of the Atlantic Basin where swells increased the surf heights along the New Jersey Coast; most recently and notably were Hurricane Paulette and Hurricane Teddy. Additionally, local weather patterns, some of which were enhanced by remnant tropical activity originating in the Gulf of Mexico, created 2 periods of prolonged moderate onshore winds for New Jersey over the last 2 weekends.

Short- to medium-period seas increased on Friday, September 11<sup>th</sup> through Sunday, September 13<sup>th</sup>, being generated by moderate northeast and east-northeast winds. Seas generally began to transition into a medium- to long-period swell due to introductions of swells from Hurricane Paulette near Bermuda and a brief relaxation in the winds. Surf heights between September 11<sup>th</sup> and September 16<sup>th</sup> ranged from 4 to 8 feet with greater heights observed around jetties, groins, inlets, and piers.

Short- to medium-period seas began to increase once again on Friday, September 18<sup>th</sup> when moderate northeast winds began to plague the area. These conditions persisted through Monday, September 21<sup>st</sup>. Again, seas

generally began to transition into a medium- to long-period swell due to introductions of swells from Hurricane Teddy near Bermuda by Sunday, September 20<sup>th</sup>. By Tuesday, winds became west-northwesterly. Surf heights between September 18<sup>th</sup> and September 23<sup>rd</sup> ranged from 4 to 8 feet with greater heights observed around jetties, groins, inlets, and piers.

Buoys off the New Jersey coast recorded sustained north northeasterly winds over 30 mph with gusts exceeding 40 mph between the dates of September 18<sup>th</sup> and September 23<sup>rd</sup>. Gusts at inland reporting stations were recorded in excess of 30 mph during the peak of the event. Sea heights peaked at nearby buoys at 8 to 11 feet, with buoys further offshore reaching nearly 15 feet. Tides reached near flood and/or minor flood stage levels for most high tide cycles for much of New Jersey's coast between September 17<sup>th</sup> and September 23<sup>rd</sup>. The near flood and minor flood levels reached were a result of the astronomical tide phase, the periods of onshore winds, and the proximity of the large tropical systems off the New Jersey coast.

Staff from DCE conducted a town-by-town visual post-storm survey on Thursday, September 24, 2020. The results of this assessment are contained in this report. During the compilation of this report, the surf conditions around the state ranged from 1 to 2 feet with variable winds generally under 15 mph. A detailed summary listed by municipality from north to south is enclosed.

Of the 79 areas surveyed, 77 were determined to have 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 report.

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.

| <b>LOCATION</b>                      | <b>INSPECTION NOTES</b>   | <b>DAMAGE LEVEL*</b> |
|--------------------------------------|---|----------------------|
| PERTH AMBOY                          | Minor sloped erosion. No major incidents or damage reported.  | Minor                |
| SOUTH AMBOY                          | Minor sloped erosion. No major incidents or damage reported.  | Minor                |
| OLD BRIDGE                           | Minor sloped erosion. No major incidents or damage reported.  | Minor                |
| ABERDEEN                             | No major incidents or damage reported   | Minor                |
| ABERDEEN<br>CLIFFWOOD BEACH          | Sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach and near the road. No major incidents or damage observed or reported.  | Minor                |
| KEYPORT                              | Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. 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 –<br>BAYSHORE<br>FLOODGATE | Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported. Gate was closed consistent with the Operations Manual.   | Minor                |
| KEANSBURG                            | <b>Floodgate Facility to Point Comfort:</b> Minor sloped erosion and redistribution of sand. Various sections of vertical beach scarps up to 2’ in height.<br><b>Point Comfort to Ideal Beach:</b> Up to 20’ of sloped erosion, 1’- 2’ in height. Some wave runup/tide to the upper beach.<br><b>Ideal Beach to Pews Creek:</b> Up to 20’ of sloped erosion, 1’- 3’ in height. Some wave runup/tide to the upper beach. | Minor                |
| MIDDLETOWN                           | <b>Port Monmouth:</b> Up to 20’ of sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.   | Minor                |
|                                      | <b>Belford:</b> Minor sloped erosion along the dike at the ferry terminal. No major incidents or damage observed or reported.   | Minor                |
|                                      | <b>Leonardo:</b> Minor sloped erosion and redistribution of sand.   | Minor                |
| ATLANTIC<br>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 25’ of sloped erosion, 1’- 3’ in height. Some wave runup/tide to the upper beach/dune.  | Minor                |
| MONMOUTH<br>BEACH                    | <b>Riverview Road to Cottage Rd.:</b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dune. No major incidents or damage observed or reported.   | Minor                |
|                                      | <b>Cottage Rd. to South end of Borough:</b> Up to 20’ of sloped erosion, 1’– 3’ in height, with vertical beach scarps south of Cottage Rd.  | Minor                |
| LONG BRANCH                          | <b>Seven Presidents to Brighton Ave.:</b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.   | Minor                |

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|                      | <b>Brighton Ave. to Pullman Ave.:</b> Up to 30' of sloped erosion, 1' – 3' in height. Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.       | Minor |
| DEAL                 | Minor sloped erosion and redistribution of sand with some isolated vertical beach scarps. 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. Some 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 with some isolated vertical beach scarps. Some 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 with some isolated vertical beach scarps. Some 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. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.  | Minor |
| BRADLEY BEACH        | Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.  | Minor |
| AVON                 | Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.  | Minor |
| BELMAR               | Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.  | Minor |
| SPRING LAKE          | Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.  | Minor |
| SEA GIRT             | Minor sloped erosion and redistribution of sand with some isolated vertical beach scarps. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported. | Minor |
| MANASQUAN            | Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.  | Minor |
| POINT PLEASANT BEACH | Up to 60' of sloped erosion, 5' – 7' in height. Some wave runup/tide to the upper beach.  | Minor |
| BAY HEAD             | Up to 60' of sloped erosion, 5' – 7' in height. Some vertical beach scarp at southern section of town. Some wave runup/tide to the upper beach/dune.                                  | Minor |
| MANTOLOKING          | Up to 50' of sloped erosion, 5' – 7' in height. Some wave runup/tide to the upper beach/dune.   | Minor |
| BRICK                | Up to 50' of sloped erosion, 5' – 6' in height. Some wave runup/tide to the upper beach/dune.   | Minor |

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| TOMS RIVER<br>NORMANDY BEACH<br>through MONTEREY<br>BEACH   | Up to 40' of sloped erosion, 4' – 6' in height. Some wave runup/tide to the upper beach/dune.  | Minor    |
| LAVALLETTE  | Up to 30' of sloped erosion, 4' – 6' in height. Some wave runup/tide to the upper beach/dune.  | Minor    |
| TOMS RIVER<br>ORTLEY BEACH                                  | Up to 25' of sloped erosion, 4' – 6' in height. Some wave runup/tide to the upper beach/dune.  | Minor    |
| SEASIDE HEIGHTS   | Up to 25' of sloped erosion, 4' – 6' in height. Some wave runup/tide to the upper beach/dune.  | Minor    |
| SEASIDE PARK  | Up to 25' of sloped erosion, 4' – 6' in height. Some wave runup/tide to the upper beach/dune.  | Minor    |
| BERKELEY TWP.<br>S. SEASIDE PARK                            | Up to 25' of sloped erosion, 4' – 6' in height. Some wave runup/tide to the upper beach/dune.  | Minor    |
| ISLAND BEACH<br>STATE PARK                                  | Reports of wave runup/tide to the upper beach. No major incidents or damage reported to DCE.   | Minor    |
| BARNEGAT LIGHT  | Up to 50' of sloped erosion, 3' – 4' in height. Some wave runup/tide to the upper beach/dune.  | Minor    |
| LONG BEACH TWP.<br>LOVELADIES                               | Up to 50' of sloped erosion, 3' – 4' in height. Some wave runup/tide to the upper beach/dune.  | Minor    |
| HARVEY CEDARS   | Up to 50' of sloped erosion, 3' – 4' in height. Some wave runup/tide to the upper beach/dune. Stretch between Hudson Ave. and Sussex Ave. continuing to experience the most impacts.   | Minor    |
| LONG BEACH TWP.<br>NORTH BEACH                              | Up to 50' of sloped erosion, 3' – 4' in height. Some wave runup/tide to the upper beach/dune.  | Minor    |
| SURF CITY   | Up to 50' of sloped erosion, 3' – 4' in height. Some wave runup/tide to the upper beach/dune.  | Minor    |
| SHIP BOTTOM   | Up to 40' of sloped erosion, 3' – 4' in height. Wave runup/tide to the upper beach/dune.   | Minor    |
| LONG BEACH TWP.<br>BRANT BEACH<br>through N. BEACH<br>HAVEN | Up to 40' of sloped erosion, 3' – 4' in height. Wave runup/tide to the upper beach/dune.   | Minor    |
| BEACH HAVEN   | Up to 40' of sloped erosion, 3' – 4' in height. Wave runup/tide to the upper beach/dune. Approx. 500 linear-foot vertical dune scarp 12' in height, up to 25' deep near Belvoir Ave.   | Minor    |
| LONG BEACH TWP.<br>HOLGATE                                  | Up to 40' of sloped erosion, 3' – 4' in height. Wave runup/tide to the upper beach/dune. Approx. 600 linear-foot vertical dune scarp 2' to 3' in height, up to 6' deep near Pershing Ave.  | Minor    |
| BRIGANTINE  | Up to 30' of sloped erosion, 1' to 3' in height. Some ponding located on the upper beach. Some wave runup/tide to the upper beach/dunes/revetment. Little dry beach in front of promenade  | Minor    |
| ATLANTIC CITY   | <b><u>Inlet Seawall area:</u></b> No incidents or damage observed or reported.   | Minor    |
|   | <b><u>Inlet Jetty to Steel Pier:</u></b><br>Up to 30' of sloped erosion, 1' to 3' in height. Some wave runup/tide to the upper beach/dunes, with some additional vertical dune scarps up to 5' deep and up to 5' in height between Maryland Ave. and Victoria Ave. | Moderate |
|   | <b><u>Steel Pier to South Carolina Ave:</u></b>  |          |

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|                             | Up to 30' of sloped erosion, 1' to 3'. Some wave runup/tide to the upper beach/dunes.<br><b>South Carolina Ave to Ventnor Border:</b> Up to 30' of sloped erosion, 1' to 2' in height. Some wave runup/tide to the upper beach/dunes.  |          |
| VENTNOR                     | Up to 30' of sloped erosion, 1' to 3' in height. Some wave runup/tide to the upper beach/dunes, with some additional vertical dune scarps up to 1' deep and up to 2' in height, south of the pier.   | Minor    |
| MARGATE                     | Up to 25' of sloped erosion, 1' to 2' in height. Some wave runup/tide to the upper beach/dunes.  | Minor    |
| LONGPORT                    | Up to 25' of sloped erosion, 1' to 2' in height. Some wave runup/tide to the upper beach/dunes.  | Minor    |
| OCEAN CITY                  | Up to 30' of sloped erosion, 1' – 3' in height. Some wave runup/tide to the upper beach/dunes. Beachfill completed in early September in northern Ocean City.  | Minor    |
| UPPER TWP.<br>STRATHMERE    | Up to 30' of sloped erosion, 1' – 2' in height. Some wave runup/tide to the upper beach/dunes. Evidence of ponding on the upper beach.   | Minor    |
| SEA ISLE CITY               | Up to 40' of sloped erosion, 1' – 2' in height. Some wave runup/tide to the upper beach. Evidence of ponding on the upper beach.   | Minor    |
| AVALON                      | Up to 30' of sloped erosion, 1' – 2' in height. Some wave runup/tide to the upper beach/dunes.   | Minor    |
| STONE HARBOR                | Up to 30' of sloped erosion, 1' - 2' feet in height. Some wave runup/tide to the upper beach/dunes.  | Minor    |
| NORTH WILDWOOD              | <b>Hereford Inlet &amp; Surf Ave:</b> Up to 20' of sloped erosion, 1' - 2' feet in height from New York Ave. through Surf Ave. No additional damage immediately reported to the seawall. USACE seawall repair ongoing in Anglesea section of inlet.  | Minor    |
|                             | <b>2<sup>nd</sup> Ave. to 15<sup>th</sup> Ave.:</b> Up to 50' of sloped erosion, 2' - 4' in height. I-5 beach access ramps between 4 <sup>th</sup> Ave. and 7 <sup>th</sup> Ave. were significantly damaged. Some vertical beach scarping up to 3' in height from 7 <sup>th</sup> Ave. to 13 <sup>th</sup> Ave.<br><b>15<sup>th</sup> Ave. to Wildwood border:</b> Up to 60' of sloped erosion, 1' - 2' in height. | Moderate |
| WILDWOOD CITY               | Up to 30' of sloped erosion, 1' - 2' in height. Evidence of ponding on upper beach. Some wave runup/tide to the upper beach.   | Minor    |
| WILDWOOD CREST              | Up to 30' of sloped erosion, 1' - 2' in height. Evidence of ponding on upper beach. Some wave runup/tide to the upper beach.   | Minor    |
| LOWER TWP.<br>DIAMOND BEACH | Up to 30' of sloped erosion, 1' - 2' in height. Some wave runup/tide to the upper beach  | Minor    |
| CAPE MAY CITY               | Up to 20' of sloped erosion, 1' - 2' in height. Some wave runup/tide to the upper beach/dunes.   | Minor    |
| LOWER TWP.<br>WEST CAPE MAY | Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.   | Minor    |
| CAPE MAY POINT              | Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.   | Minor    |
| LOWER DELAWARE<br>BAY       | <b>North Cape May/Villas:</b> Minor sloped erosion and redistribution of sand. Wave runup/tide to the upper  | Minor    |

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|                    | beach, dunes and to the vegetation line at several locations.  |       |
|                    | <b><u>Del Haven/Pierces Point/Reeds Beach:</u></b> Minor sloped erosion and redistribution of sand. Some wave runoff/tide to the upper beach, to the vegetation line and to the bulkhead at several locations.   | Minor |
| DELAWARE BAY/RIVER | <b><u>East Point:</u></b> Minor sloped erosion and redistribution of sand near lighthouse site and East Point Rd./Bay Ave. Minor flood stage observed nearby.  | Minor |
|                    | <b><u>Heislerville:</u></b> No major incidents or damage reported. Several pre-existing issues addressed. Additional work still required. Minor flood stage observed nearby.                                     | Minor |
|                    | <b><u>Bivalve (Commercial):</u></b> No major incidents or damage reported. Gabion structures near Marine Police remain in disrepair. Minor flood stage observed nearby.  | Minor |
|                    | <b><u>Fortescue:</u></b> Minor sloped erosion and redistribution of sand. Tide to the upper beach at several locations. Pre-existing large vertical dune scarps still present. Near flood stage observed nearby. | Minor |
|                    | <b><u>Gandy's Beach:</u></b> Minor sloped erosion and redistribution of sand. Tide to the upper beach at several locations. Concrete Bin blocks have been reset. Near flood stage observed nearby.               | Minor |
|                    | <b><u>Lawrence Twp. - (Bay Point):</u></b> No major incidents or damage reported. Near flood stage observed nearby.  | Minor |
|                    | <b><u>Fairfield Twp. (Sea Breeze):</u></b> No major incidents or damage reported. Near flood stage observed nearby.  | Minor |
|                    | <b><u>Oakwood Beach:</u></b> Minor sloped erosion and redistribution of sand. Tide to the upper beach and fences at several locations. Erosion continues at the southern end. Near flood stage observed nearby.  | Minor |