



## State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

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# MEMORANDUM

TO: David Rosenblatt, Assistant Commissioner

FROM: Chris Constantino for Bill Dixon, Director 

DATE: October 17, 2019

SUBJECT: Initial Coastal Storm Survey & Damage Assessment  
Atlantic Ocean, Delaware Bay and Raritan Bay shorelines  
Nor'easter/ Subtropical Storm Melissa October 8 - 13, 2019

## SUMMARY:

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The New Jersey coast has been experiencing an active period of wave activity since Hurricane Dorian in late August. Since most of the waves during this time frame were medium- to long-period swell in nature and were not substantial in height, the impacts to most beaches were minimal. In fact, accretion was noted after several of these events, at several locations. Regardless, several 'hot spot' locations remained more vulnerable and continued to experience varying levels of erosion. The Division of Coastal Engineering (DCE) and the respective municipalities continued to monitor those areas closely and keep in close communication with each other regarding the status of these locations.

On October 8<sup>th</sup>, the area began to experience the effects of a nor'easter developing off the East Coast moving towards the area south of Cape Cod. The combination of this low, a subsequent nearby low-pressure system and an area of high pressure over eastern Canada created a pressure gradient with a fetch of over 700 miles. On October 10<sup>th</sup> the storm began to take on some tropical characteristics and on October 11<sup>th</sup> the National Hurricane Center began advisories on the system designating it as Subtropical Storm Melissa. By October 14<sup>th</sup>, the system had moved away towards the Canadian Maritimes and transitioned into an extratropical system.

The combination of the long fetch and the approaching full moon (October 13<sup>th</sup>) brought the tides to at least minor flood stage for 6 high tides at Cape May and Atlantic City, and 4 high tides at Sandy Hook; 2 of those tides in Atlantic City and Cape May reached moderate flood stage. As a result, heavy surf and abnormally high tides plagued areas of the East Coast from Cape Hatteras north through New England from Wednesday October 9<sup>th</sup> through Sunday October 14<sup>th</sup>.

At the buoys off the New Jersey coast, sustained northeasterly to north-northeasterly winds were recorded at 36 mph with gusts reaching 45 mph; inland reporting stations were recorded near 35 mph during the peak of the event. Seas heights exceeded 10 feet for over 3 days and peaked at 15 feet. As a result, surf ranging from 6 to 10 feet developed with greater heights observed around jetties, groins, inlets, and piers throughout the state during the height of the event; elevated surf conditions subsided by Monday October 14<sup>th</sup>.

Staff from DCE conducted a town-by-town visual post-storm surveys on Tuesday October 15<sup>th</sup>. 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 under 15 mph. A detailed summary listed by municipality from north to south is enclosed.

Of the 105 areas surveyed, 82 were determined to have minor beach or dune erosion, 15 had moderate beach or dune erosion and 8 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) are not 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.

<u>LOCATION</u>	<u>INSPECTION NOTES</u>	<u>DAMAGE LEVEL*</u>
PERTH AMBOY	No major incidents or damage reported.	Minor
SOUTH AMBOY	No major incidents or damage reported.	Minor
OLD BRIDGE	No major incidents or damage reported.	Minor
ABERDEEN	No major incidents or damage reported.	Minor
ABERDEEN CLIFFWOOD BEACH	Sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach and road. No major incidents or damage observed or reported.	Moderate
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. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
KEANSBURG – BAYSHORE 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 prior to each high tide cycle between October 9 <sup>th</sup> – October 15 <sup>th</sup> . Peak water tidal elevation was recorded on October 11 with an elevation of 6.6 MLLW.	Minor
KEANSBURG - IDEAL BEACH	Up to 50' of sloped beach erosion up to 2' in height with some areas of vertical beach scarping near Ideal Beach up to 3' in height. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
MIDDLETOWN	<b>Port Monmouth:</b> Up to 50' of sloped beach erosion up to 2' in height. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
	<b>Belford:</b> Some vertical erosion up to 8' high on the dike at the ferry terminal (typical) – much of which was pre-existing. No major incidents or damage observed or reported.	Minor
	<b>Leonardo:</b> 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
ATLANTIC HIGHLANDS	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach. No major incidents or damage observed or reported.	Minor
HIGHLANDS	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 BRIGHT	<b><u>North Beach to Via Ripa Way:</u></b> Up to 25' of sloped erosion. Little to no beach in front of the Sandy Hook entrance. Some wave runup/tide to the seawall/upper beach/dunes. Some new sinkholes were noted at north end.	Moderate
	<b><u>Via Ripa Way to Center St.:</u></b> Up to 40' of sloped erosion. Some wave runup/tide to the seawall/upper beach/dunes.	Minor
	<b><u>Center St. to Driftwood Cabana Club:</u></b> Up to 25' of sloped erosion. Little to no beach at high tide. Some wave runup/tide to the seawall/upper beach/dunes.	Moderate
	<b><u>Driftwood Cabana Club to Monmouth Beach border:</u></b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
MONMOUTH BEACH	<b><u>Riverview Road to Seacrest Rd.:</u></b> Up to 25' of sloped erosion; redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
	<b><u>Seacrest Rd. to Cottage Rd:</u></b> Up to 25' of sloped erosion. Approx. 1,800 feet of vertical dune scarp up to 5' in height north of Monmouth Bath and Tennis Club	Moderate
	<b><u>Cottage Rd. to South end of Town:</u></b> Up to 25' of sloped erosion; redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
LONG BRANCH	Up to 25' of sloped erosion; redistribution of sand. Some wave runup/tide to the upper beach/wall/dunes. No major incidents or damage observed or reported.	Minor
DEAL	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/seawall.	Minor
ALLENHURST	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/seawall.	Minor
LOCH ARBOUR	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.	Minor
ASBURY PARK	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.	Minor
NEPTUNE OCEAN GROVE	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
BRADLEY BEACH	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
AVON	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.	Minor
BELMAR	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.	Minor
SPRING LAKE	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
SEA GIRT	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
MANASQUAN	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.	Minor

POINT PLEASANT BEACH	<b><u>Manasquan Inlet to Trenton Ave.:</u></b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.	Minor
	<b><u>Trenton Ave. to Washington Ave.:</u></b> Areas of moderate sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Moderate
	<b><u>Washington Ave. to South end of Town:</u></b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.	Minor
BAY HEAD	<b><u>Osborne Ave to Karge St.:</u></b> Areas of heavy sloped erosion and redistribution of sand. Wave runup/tide to the upper beach/dunes. Damage to crossovers and dune fence.	Moderate
	<b><u>Karge St. to Johnson St.:</u></b> Areas of heavy sloped erosion and redistribution of sand. Wave runup/tide into the dunes. Damage to crossovers and dune fence.	Major
	<b><u>Johnson St. to South end of Town:</u></b> Areas of heavy sloped erosion and redistribution of sand. Wave runup/tide to the upper beach/dunes. Damage to crossovers and dune fence.	Moderate
MANTOLOKING	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
BRICK	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
TOMS RIVER NORMANDY BEACH	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
LAVALLETTE	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
TOMS RIVER ORTLEY BEACH	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
SEASIDE HEIGHTS	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
SEASIDE PARK	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	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	No major incidents or damage reported to DCE at time of report.	Minor
BARNEGAT LIGHT	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes. No major incidents or damage reported.	Minor
LONG BEACH TWP. LOVELADIES	Up to 40' of sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
HARVEY CEDARS	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
LONG BEACH TWP. NORTH BEACH	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
SURF CITY	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
SHIP BOTTOM	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.	Minor
LONG BEACH TWP. BRANT BEACH through N. BEACH HAVEN	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor

BEACH HAVEN	<b><u>N. Beach Haven border to Berkeley Ave.:</u></b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
	<b><u>Berkeley Ave. to Holyoke Ave.:</u></b> Moderate sloped erosion. Some wave runup/tide into the dunes. Additional vertical scarping of the dune face near Belvoir Ave. and near Glendola Ave – up to 3’ deep. Damage to crossovers and dune fence.	Moderate
	<b><u>Holyoke Ave. to Nelson Ave.:</u></b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
LONG BEACH TWP. HOLGATE	<b><u>Nelson Ave. to Tebco Terrace.:</u></b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
	<b><u>Tebco Terrace to Pershing Ave.:</u></b> Moderate sloped erosion up and into the dunes. Additional vertical scarping of the dune face – 10’ deep, up to 12’ in height.	Major
	<b><u>Pershing Ave to Steel/Wooden Terminal Groin:</u></b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes. Additional accretion observed south of the Terminal Groin.	Minor
BRIGANTINE	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes/revetment.	Minor
ATLANTIC CITY	<b><u>Inlet Seawall area:</u></b> No incidents or damage observed or reported.	Minor
	<b><u>Inlet Jetty to Seaside Ave.:</u></b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
	<b><u>Seaside Ave. to Tennessee Ave.:</u></b> Moderate sloped erosion. Some wave runup/tide to the upper beach and into the dunes. Some areas of additional vertical scarping of the dune face – up to 12’ in height between Victoria Ave. and Metropolitan Ave.	Major
	<b><u>Tennessee Ave. to Ventnor border:</u></b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
VENTNOR	<b><u>Atlantic City border to Cambridge Ave.:</u></b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
	<b><u>Cambridge Ave. to Margate border:</u></b> Moderate sloped erosion and vertical dune scarps - up to 4’ in height. Damage to crossovers and dune fence. Some wave runup/tide to the upper beach/dunes.	Moderate
MARGATE	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
LONGPORT	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor

OCEAN CITY	<b>Surf Ave. to Pennlyn Place:</b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
	<b>Pennlyn Place to Moorlyn Terrace:</b> Moderate sloped erosion up to and into the dunes. Vertical dune scarps up to 5' in height from Pennlyn to 5 <sup>th</sup> St. and from 7 <sup>th</sup> St. to Music Pier. Total dune loss from 5 <sup>th</sup> St. to 7 <sup>th</sup> St. Damage to crossovers and dune fence.	Major
	<b>Moorlyn Terrace to 59<sup>th</sup> St.:</b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
UPPER TWP. STRATHMERE	<b>Seaview Ave. to Winthrop Ave.:</b> Significant to total loss of dune between Seaview Ave. and Seacliff Ave. Overwash reported onto Seaview Ave. and Neptune Ave. Moderate sloped erosion up to and into the dunes and additional vertical scarping of the dune face between Seacliff and Winthrop Ave. Damage to crossovers and dune fence.	Major
	<b>Winthrop Ave. to Whale Beach:</b> Up to 50' of sloped erosion, up to 2' in height. Some wave runup/tide to the upper beach/dunes.	Minor
SEA ISLE CITY	<b>Whale Beach to 36<sup>th</sup> St:</b> Up to 50' of sloped erosion, up to 2' in height. Some wave runup/tide to the upper beach/dunes.	Minor
	<b>36<sup>th</sup> St. to 45<sup>nd</sup> St.:</b> Moderate sloped erosion up to and into the dunes. Some areas of additional vertical scarping of the dune face – up to 15' deep and up to 8' in height. Damage to crossovers and dune fence.	Major
	<b>45<sup>th</sup> to 85<sup>th</sup> St.:</b> Up to 45' of sloped erosion, up to 2' in height. Some wave runup/tide to the upper beach/dunes.	Minor
	<b>85<sup>th</sup> St. to 93<sup>rd</sup> St.:</b> Moderate sloped erosion up to and into the dunes. Some areas of additional vertical scarping of the dune face - up to 16' deep and up to 8' in height. Damage to crossovers and dune fence.	Major
	<b>93<sup>rd</sup> St. to Bridge:</b> Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach/dunes.	Minor
AVALON	<b>Inlet Jetty to 16<sup>th</sup> St.:</b> Moderate sloped erosion and additional loss of dune and/or exposure of the bulkhead/revetment. Some wave runup/tide to the upper beach and into the dunes.	Moderate
	<b>16<sup>th</sup> St to Stone Harbor border:</b> Up to 25' of sloped erosion, up to 2' feet in height. Some wave runup/tide to the upper beach/dunes.	Minor

STONE HARBOR	<b><u>Avalon border to 105<sup>th</sup> St. and 111<sup>th</sup> to 120<sup>th</sup> St.:</u></b> Up to 25' of sloped erosion, up to 2' feet in height. Some wave runup/tide to the upper beach/dunetoe.	Minor
	<b><u>105<sup>th</sup> St. to 111<sup>th</sup> St:</u></b> Up to 25' of sloped erosion, up to 2' feet in height. Some areas of additional vertical scarping of the dune face - up to 5' deep and up to 4' in height.	Moderate
	<b><u>111<sup>th</sup> St. to 120<sup>th</sup> St.:</u></b> Up to 25' of sloped erosion, up to 2' feet in height. Some wave runup/tide to the upper beach/dunes.	Minor
	<b><u>120<sup>th</sup> St. to the Terminal groin:</u></b> Up to 40' of sloped erosion, up to 2' feet in height. Some areas of additional vertical scarping of the dune face - up to 8' deep and up to 10' in height.	Moderate
NORTH WILDWOOD	<b><u>Hereford Inlet &amp; Surf Ave:</u></b> Up to 30' of sloped erosion, up to 2' feet in height. Some areas of additional vertical scarping of the dune face - up to 4' deep and up to 5' in height.	Moderate
	<b><u>2<sup>nd</sup> Ave. to 15<sup>th</sup> Ave.:</u></b> Up to 40' of sloped erosion, up to 4' in height - to the revetment/bulkhead between 2 <sup>nd</sup> Ave. and 7 <sup>th</sup> Ave. Additional vertical scarping of the dune face from 7 <sup>th</sup> Ave. to 10 <sup>th</sup> Ave. - up to 15' deep and up to 12' in height.	Major
	<b><u>15<sup>th</sup> Ave. to Wildwood Border:</u></b> Up to 40' of sloped erosion, up to 3' in height. Some wave runup/tide to the upper beach/dunes.	Minor
WILDWOOD CITY	Up to 60' of sloped erosion, up to 2' in height. Evidence of ponding on upper beach. Some wave runup/tide to the upper beach.	Minor
WILDWOOD CREST	Up to 60' of sloped erosion, up to 2' in height. Some ponding on upper beach. Some wave runup/tide to the upper beach.	Minor
LOWER TWP. DIAMOND BEACH	Up to 45' of sloped erosion, up to 2' in height. Some wave runup/tide to the upper beach.	Minor
CAPE MAY CITY	Up to 25' of sloped erosion, up to 2' in height. Some wave runup/tide to the upper beach/dunes.	Minor
LOWER TWP. WEST CAPE MAY	Minor sloped erosion and redistribution of sand. Some wave runup/tide to the upper beach.	Minor
CAPE MAY POINT	Up to 15' of sloped erosion, up to 2' in height. Some wave runup/tide to the upper beach/dunes.	Minor

DELAWARE BAY/RIVER	<b>North Cape May/Villas:</b> Up to 15' of sloped erosion, up to 1' in height. Wave runup/tide on the upper beach, dunes and to the vegetation at several locations. Minor to moderate flood level observed nearby.	Minor
	<b>Del Haven/Pierces Point/Reeds Beach:</b> Up to 15' of sloped erosion, up to 2' in height. Wave runup/tide on the upper beach, to the vegetation and to the bulkhead at several locations. Minor to moderate flood level observed nearby.	Minor
	<b>East Point:</b> Moderate sloped erosion and redistribution of sand. Wave runup/tide on the upper beach, to the vegetation and to the revetment/bulkhead at several locations. Sand Bags exposed and damaged further and additional bayside vegetation loss near Lighthouse. Minor flood level observed nearby.	Moderate
	<b>Heislerville:</b> No notable erosion or damage. Potholes identified on dike. Minor flood level observed nearby.	Minor
	<b>Bivalve (Commercial):</b> No major incidents or damage reported. Some sinkholes at bulkhead. Minor flood level observed nearby.	Minor
	<b>Fortescue:</b> Moderate sloped erosion. Wave runup/tide on the upper beach, to the vegetation and the bulkhead at several locations. Additional vertical scarping of the dune face - up to 10' deep and up to 12' in height. Minor flood level observed nearby.	Moderate
	<b>Gandy's Beach:</b> No major incidents or damage reported. Wave runup/tide to the concrete blocks. Minor flood level observed nearby.	Minor
	<b>Lawrence Twp - (Bay Point):</b> Wave runup/tide to vegetation and onto the revetment at several locations. Minor flood level observed nearby. No additional damage.	Minor
	<b>Fairfield Township (Sea Breeze):</b> Wave runup/tide to the vegetation and onto the revetment at several locations. Minor flood level observed nearby. No additional damage.	Minor
<b>Oakwood Beach:</b> Minor sloped erosion and redistribution of sand. Wave runup/tide on the upper beach, to the vegetation or the bulkhead at several locations. Minor flood level observed nearby.	Minor	

**\* 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