

# Welcome to the 17th Annual State of the Shore Media Event



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Get the shades and sunscreen out! Several early weather forecasts already predict a hot and dry summer season throughout New Jersey, with much less rainfall compared to last year. With sunnier days and warmer temperatures, even more people will be flocking to the Garden State's beautiful coastline over the next several months.

And thankfully, we're ready for them.

Due to a relatively calm winter storm season, most coastal areas only experienced minor flooding in terms of magnitude and frequency. Such mild weather conditions – combined with the ongoing success of various beach nourishment projects – indicate that most

beaches will likely regain their full width before the true dog days of summer.

The 17th annual State of the Shore Report will further explain and examine these observations. A collaboration of scientists and

environmental managers, this report is provided by New Jersey Sea Grant Consortium to media and tourism representatives throughout New Jersey to illustrate the ever-changing conditions of our shoreline.

This year's report also focuses on current El Niño conditions and how that directly impacts the upcoming Atlantic-basin hurricane season. Overall, it seems total smooth sailing ahead.

And as always, we urge all beachgoers to have FUN while foremost remaining SAFE and ALERT. New Jersey experienced eight rip current-related fatalities in 2017, the State's highest number of drowning deaths recorded in just one year. Thankfully that number dropped in 2018; one casualty due to rip currents, another because of high surf, and a third unknown. But starting in 2019, the goal is for that total to remain at zero. Through the Rip Current Awareness campaign, New Jersey Sea Grant's mission is to raise awareness around such deadly ocean hazards. Included in this year's press kit, please find more information on ways we are working with coastal specialists and extension agents to encourage and promote beach safety.

Above all, we wish everyone a happy-go-lucky summer at the beloved Jersey Shore!





# State of the Shore

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**DR. JON K. MILLER**

Overall, New Jersey's beaches are in excellent condition heading into Memorial Day Weekend and the unofficial start of the Jersey Shore summer. Information on storm intensity collected by NOAA at locations in Atlantic City and off the coast of Cape May and Sea Bright confirms that New Jersey's beaches benefited from a relatively calm storm season for a third straight year. Unlike the past several seasons when tropical systems threatened the New Jersey coast, the fall of 2018 came and went without so much as a whimper. Similarly, the winter and spring seasons were notable for their lack of major Nor'Easters. Although it may seem like just yesterday, this winter actually marked six years since Superstorm Sandy devastated the northern part of the New Jersey coastline, and three since Winter Storm Jonas battered the southern half of the state. In the time since, nearly all of New Jersey's beaches have been fortified by beach nourishment projects. When combined with the recent lack of storms, this has left New Jersey's beaches in very good condition for the upcoming season.

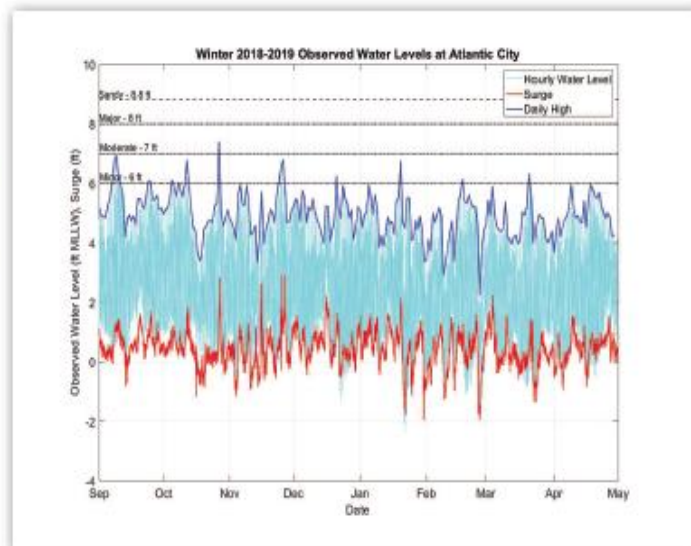
## Coastal Storms

Coastal storms can generate a variety of impacts with consequences ranging from severe (loss of structures during Sandy) to minor (nuisance flooding). Two of the more typical impacts commonly associated with coastal storms are flooding and beach erosion. Coastal flooding is typically caused by a combination of precipitation and storm surge. Storm surge is the extra water that piles up along the coast due to either local or distant storms. A key factor in determining the amount of flooding that occurs during a storm is its timing with respect to tides. Small storms that occur during periods of higher tides can generate more flooding than larger storms that occur during periods of lower tides. While much of the focus is often placed on the elevation of flood waters, impacts are often also strongly related to flood duration, which can prevent inland areas from draining.

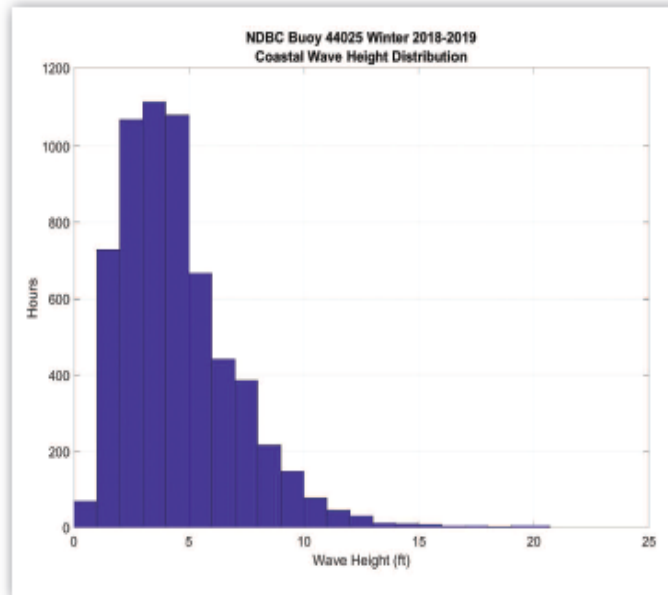
In coastal communities, beach erosion is often also a major concern due to the protection beaches provide the community. Beach erosion is related to the total water level along the coast (storm surge plus tides) as well as the energy of the waves and the duration of the storm.

The total water level influences what portion of the beach will be impacted during a storm, while the size of the waves determines the erosion potential. Although often overlooked, storm duration is important because it determines how much of a storm's erosion potential is realized.

Generally speaking, most coastal areas only experienced minor coastal flooding this past winter both in terms of magnitude and frequency. Water levels at the Atlantic City tide gauge (shown below) only exceeded the minor flood threshold (> 6 ft above mean lower low water - MLLW) a total of eleven times, with only one of those events exceeding the moderate flood threshold (>7 ft above MLLW). The



# 'e Report



majority of the flooding events occurred early on in the winter, with six minor floods being recorded in September and October alone. A similar pattern is reflected in the wave data (shown below), where after a turbulent start, the wave conditions stabilized and remained below 15 feet from December through April.

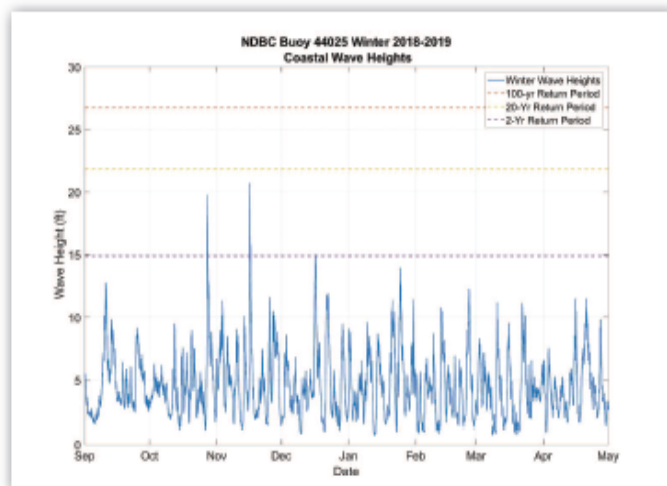
The first coastal storm event of the season occurred in early September. Persistent onshore winds with gusts in excess of 40 mph elevated water levels over a period of four days between September 8th and September 12th. Unfortunately, this time period corresponded to a time of spring tides, when coastal water levels are typically at their highest. As a result, even though the storm system only generated a relatively small surge (<2ft), water levels exceeded the minor flooding threshold during six of the twelve high tides during that period. Fortunately for New Jersey's beaches, offshore wave heights remained relatively low throughout the event, peaking at less than 14 feet (as measured by NOAA NDBC buoy 44025). Later in the month two quick moving storms actually generated larger storm surges, but since they occurred during a period of lower astronomical tides, they only produced a brief period of minor flooding.

In early October, two small storms combined with higher than normal tides to create two short-duration, minor flood events. However the action picked up in mid-October, as the remnants of Hurricane Michael passed through the state. Although New Jersey was never really threatened by the storm itself, its

remnants brought moisture and high winds to the state. In many places the wind gusts exceeded 40 mph, which was sufficient to generate a relatively small storm surge event (<2ft) that lasted several days. Due to the timing of the event, as the tides were coming off a spring tide cycle, the maximum water level achieved during the storm peaked at 6.77 feet above Mean Lower Low Water (MLLW), in spite of the relatively small surge.

In late October, it was the remnants of Hurricane Willa that passed through the state generating a very intense but short-lived coastal response. Wind gusts in excess of 50 mph and rainfall accumulations of over two inches were recorded throughout the state. Unfortunately the event occurred during a spring tide, which magnified its impact and resulted in widespread moderate coastal flooding. Although the storm received much less publicity than recent events such as Sandy and Jonas, the water levels recorded during the event were among the 20th highest ever recorded in Atlantic City and Sandy Hook. While the storm did generate some beach erosion due to the large waves (~ 20 ft) that it generated, its impact was mitigated somewhat by the fact that it was relatively short lived. The wave heights peaked and rapidly fell over a period of several hours, while the storm surge lasted less than 36 hours.

November was perhaps the stormiest month of the season, with three events generating storm surges in excess of two feet. A rapidly moving storm on the 15th generated the fourth highest storm surge of the year and the largest wave heights. The storm, which will forever be more remembered for its inland impacts which included treacherous road conditions related to unexpected accumulations of



snow and ice, generated wind gusts in excess of 60 mph along the coast. Those winds provided enough energy to create offshore waves in excess of 20 feet. Fortunately, the storm occurred during a period of lower than average tides which limited the amount of coastal flooding and beach erosion. A more significant event in terms of coastal impact occurred towards the end of the month. A storm system on the 24th generated peak wind gusts in excess of 70 mph. Unlike the storm earlier in the month, this one occurred during a spring tide cycle, and persisted over a period of several days. The storm surge peaked at just over 2.9 feet twice during the storm. The result was a prolonged three-day period of coastal flooding during which the water level reached as high as 6.8 feet MLLW. Fortunately, the offshore wave heights remained relatively small throughout the storm, limiting the amount of beach erosion associated with the storm.

The remainder of the winter storm season was remarkably quiet. From December through April, only four storms exceeded the minor flood threshold. In each case, the duration of the flooding was extremely short. This period of calm was also reflected in the wave data, as not a single wave larger than 15 feet was measured between December and April. The most significant event of the latter half of the winter occurred during a snow storm in mid-January. The event produced a storm surge of 2.2 feet, and generated water levels of 6.8 feet MLLW. Fortunately, beach erosion impacts during the event were limited by its short duration and small waves.

## Tropical Outlook

The latest forecast from Colorado State's Tropical Meteorology Project calls for a slightly below normal Atlantic-basin hurricane season, as current El Niño conditions are expected to persist and perhaps strengthen through the summer. El Niño conditions in the Pacific influence hurricane activity in the Atlantic by creating high wind shear in the upper atmosphere which makes it more difficult for tropical disturbances to intensify into hurricanes. Other factors in the prediction include slightly below normal sea surface temperatures in the tropical Atlantic and anomalously cool North Atlantic waters. Warmer surface waters provide the fuel for intensifying developing storms. The net result is a seasonal forecast which is down slightly from last year, and near the long-term average with a projected 13

named storms, five hurricanes, and two major hurricanes. The long-term averages are for 12.1 named storms, 6.4 hurricanes, and 2.7 major hurricanes. The probability of a major hurricane making landfall along the U.S. coastline is 48% which is slightly below the long-term average of 52%. Closer to home, the forecasted probability of a major hurricane making landfall in New Jersey during the 2019 hurricane season is approximately 1%, which is consistent with the long-term average. New Jersey residents would be wise to remember however that it only takes a single storm to create catastrophic impacts. The public is urged to keep the devastation experienced in recent storms such as Harvey, Irma, Maria, and Michael, as well as the dramatic impacts of Superstorm Sandy, in mind, and to be prepared to heed the advice of the National Weather Service and State and local officials when a storm is approaching. Information on hurricane preparedness can be found on the New Jersey Office of Emergency Management website at: <http://www.ready.nj.gov/plan-prepare/hurricanes.shtml>.

## Current Conditions

Overall, New Jersey enters this summer season with its beaches in extremely good shape. The past two winter storm seasons have been relatively mild which has allowed the beaches to remain fairly robust. Many communities have benefited from the addition of sand through beach nourishment projects since Sandy, and the majority of that sand remains in the system, ready to absorb the impact of future storms. As is typical in the late spring/early summer, beaches are currently in their most narrow configuration; however they will likely regain their width in the coming months as offshore sand bars migrate towards the coastline and reattach. Due to the relatively mild winter, it is likely that the beaches will regain their full width early on in the summer season which is good news for coastal residents, businesses, and visitors. As always, beach goers are urged to use caution when entering the water early in the season as the presence of sand bars increases the likelihood of rip currents, and most lifeguard crews are not fully staffed until mid to late June. The rip current risk is especially high near any gaps in the sandbars and adjacent to any coastal structures. More information on rip currents and rip current safety is available at: [njseagrant.org/ripcurrents](http://njseagrant.org/ripcurrents).

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