



## 4.3.12 Nor'Easter

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the Nor'Easter hazard in Gloucester County.

### 2021 HMP Update Changes

- New and updated figures from federal and state agencies are incorporated.
- Previous occurrences were updated with events that occurred between 2015 and 2021.
- A qualitative vulnerability assessment was conducted for the Nor'Easter hazard and it now directly follows the hazard profile.

#### 4.3.12.1 Profile

##### Hazard Description

A Nor'Easter is a cyclonic storm that moves along the East Coast of North America. It is called a Nor'Easter because the damaging winds over coastal areas blow from a northeasterly direction. Nor'Easters can occur any time of the year but are most frequent and strongest between September and April. These storms usually develop between Georgia and New Jersey within 100 miles of the coastline and typically move from southwest to northeast along the Atlantic Coast of the United States (NWS 2013). A Nor'Easter event can cause storm surges, waves, heavy rain, heavy snow, wind, and coastal flooding. Nor'Easters have diameters that can span 1,200 miles, impacting large areas of coastline. The forward speed of a Nor'Easter is usually much slower than a hurricane, so with the slower speed, a Nor'Easter can linger for days and cause tremendous damage to those areas impacted.

In order to be called a Nor'Easter, a storm must have the following conditions, as per the Northeast Regional Climate Center (NRCC):

- Must persist for at least a 12-hour period
- Have a closed circulation
- Be located within the quadrilateral bounded at 45°N by 65°W and 70°W and at 30°N by 85°W and 75°W
- Show general movement from the south-southwest to the north-northeast
- Contain wind speeds greater than 23 miles per hour (mph) (NJOEM 2019)

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northeastern United States every year, with at least two considered severe (Storm Solutions USA n.d.). New Jersey can be impacted by 10 to 20 Nor’Easters each year, with approximately five to 10 of those having significant impact on the State. The intensity of a Nor’Easter can rival that of a tropical cyclone in that, on occasion, it may flow or stall off the mid-Atlantic coast resulting in prolonged episodes of precipitation, coastal flooding, and high winds.

For the purpose of this HMP, only Nor’Easter events are being further discussed within this hazard profile, due to their significant historical impact on Gloucester County and the South Jersey region. For information flooding related to Nor’Easters, refer to Section 5.4.7 (Flood) and Section 5.4.10 (Hurricane). For information on severe winter storms, refer to Section 5.4.14.

## Location

The entire State of New Jersey, including Gloucester County, is susceptible to the effects of Nor’Easters; however, coastal communities and other low-lying areas are particularly vulnerable. Nor’Easters usually form off the east coast near the Carolina, and then follow a track northwards along the coast until they blow out to sea. Although the county is inland in comparison to other parts of New Jersey, Gloucester County does border the eastern part of the Delaware River and is in relatively close proximity to the Atlantic Ocean. The County is therefore exposed to the direct and indirect impacts of a Nor’Easter including rain, snow, wind, and coastal flooding in tidally influenced areas, such as those along the Delaware River (Encyclopedia Britannica 2021).

## Extent

The magnitude or severity of a severe winter storm or Nor’Easter depends on several factors including a region’s climatological susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, and time of occurrence during the day (e.g., weekday versus weekend), and time of season.

The extent of a severe winter storm can be classified by meteorological measurements and by evaluating its societal impacts. NOAA’s National Climatic Data Center (NCDC) is currently producing the Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two-thirds of the United States. The RSI ranks snowstorm impacts on a scale from 1 to 5. It is based on the spatial extent of the storm, the amount of snowfall, and the interaction of the extent and snowfall totals with population (based on the 2000 Census). The NCDC has analyzed and assigned RSI values to over 500 storms since 1900 (NOAA 2011). Table 5.4.7-1 presents the five RSI ranking categories.

Table 4.3.12-1. RSI Ranking Categories

Category	Description	RSI Value
1	Notable	1-3
2	Significant	3-6
3	Major	6-10
4	Crippling	10-18



Category	Description	RSI Value
5	Extreme	18.0+

Source: NOAA-NCDC 2011

Note: RSI = Regional Snowfall Index

## Previous Occurrences and Losses

Many sources provided historical information regarding previous occurrences and losses associated with Nor'Easters throughout the State of New Jersey and Gloucester County; therefore, the loss and impact information for many events varies depending on the source. The accuracy of monetary figures discussed is based only on the available information in cited sources.

### FEMA Major Disasters and Emergency Declarations

Between 1954 and 2020, FEMA included the State of New Jersey in seven Nor'Easter-related major disaster (DR) or emergency (EM) declarations classified as one or a combination of the following disaster types: severe storm, snow storm, high tides, flooding, coastal storm, coastal flooding, or tropical depression. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. Gloucester County has been included in seven Nor'Easter-related declarations. Table 4.3.12-2 lists FEMA DR and EM declarations for Gloucester County.

*Table 4.3.12-2. FEMA Declarations for Nor'Easter Events in Gloucester County*

FEMA Declaration Number	Date(s) of Event	Date Declared	Event Type
EM-3181	February 16, 2003 - February 17, 2003	March 20, 2003	Snowstorm
DR-1588	April 1, 2005 - April 3, 2005	April 19, 2005	Severe Storms and Flooding
DR-1694	April 14-20, 2007	April 26, 2007	Severe Storms and Inland and Coastal Flooding
DR-1873	December 19-20, 2009	February 5, 2010	Severe Snowstorm
DR-1897	March 12-April 15, 2010	May 7, 2010	Severe Storms and Flooding
DR-4033	August 13, 2011 - August 15, 2011	September 15, 2011	Severe Storms and Flooding
DR-4231	June 23, 2015	July 22, 2015	Severe Storm

Source: FEMA 2021

### U.S Department of Agriculture Disaster Declarations

The USDA Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and in counties that are contiguous to a designated county. Gloucester County was not included in declarations related to Nor'Easters from 2015 to 2021 (USDA 2021).



For this 2022 Plan update, other known Nor'Easter events that have impacted Gloucester County between 2015 and 2021 are identified in Table 4.3.12-3. Events identified in the 2015 Plan are included in Appendix E. For detailed information on damages and impacts to each municipality, refer to Section 9 (jurisdictional annexes).

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Table 4.3.12-3. Nor'Easter Events in Gloucester County, 2015 to 2021

Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Gloucester County Designated?	Location	Description
February 16-17, 2015	Heavy Snow	N/A	N/A	Gloucester County	A low pressure system emerged east off the North Carolina coast and spread snow throughout New Jersey, with heavy snow occurring across central to southern New Jersey from the evening of the 16th into the morning of the 17th. Snowfall totals primarily between 4 to 7 inches occurred across central to southern New Jersey, with mainly less than 4 inches occurring across northern New Jersey. The snow caused accidents and impacted the morning commute on the 17th.
March 5, 2015	Heavy Snow	N/A	N/A	Gloucester County	Waves of low pressure that formed along a sinking cold front brought New Jersey heavy snow and the southern half of the state its heaviest snow of the season. Snowfall averaged 4 to 9 inches with the highest amounts in central New Jersey.
April 20, 2015	Heavy Rain	N/A	N/A	Westville Township, NJ	Heavy rain caused poor drainage flooding on the New Jersey Turnpike north of Interchange 2 (U.S. Route 322) in Gloucester County. Precipitation totals through the morning included 1.88 inches in Mullica Hill, 1.77 inches in Logan Township and 1.40 inches in Beckett.
July 14, 2015	Heavy Rain	N/A	N/A	Franklin Township, NJ	Heavy rain from thunderstorms fell across extreme southern Gloucester County during the late morning of the 14th. A CoCoRaHS observer measured 2.94 inches of rain.
January 22-24, 2016	Winter Storm	DR-4264	N/A	Gloucester County	<p>An impulse from the west coast traversed the midsection of the country, then developed into a low pressure system as it tracked across the Gulf states before intensifying along the Carolina coast into a major nor'easter, producing record snowfall in parts of New Jersey on January 23rd. It then moved out to sea after passing by the mid-Atlantic coast early on January 24th.</p> <p>Snow began falling during the Friday afternoon on January 22nd, then continued, heavy at times, Friday night into early Sunday morning. Wind gusts up to 60 MPH produced blizzard conditions as visibilities dropped to one-quarter mile or less in spots. Schools and many businesses recessed early on Friday afternoon in anticipation</p>



Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Gloucester County Designated?	Location	Description
					of the storm. Philadelphia International Airport canceled all Saturday flights, and 155 departures and 133 arrivals scheduled for Sunday.
July 16, 2016	Heavy Rain	N/A	N/A	Washington Township, NJ	A cold frontal boundary along with several shortwaves and a sea breeze produced numerous showers and thunderstorms across the southern and central portions of New Jersey during the afternoon and evening hours of the 16th. Almost two and a half inches of rain fell from thunderstorms.  Just over two inches of heavy rain fell from thunderstorms.  Two inches of rain fell from thunderstorms.
July 28, 2016	Heavy Rain	N/A	N/A	Newfield Township, NJ	A cold frontal boundary moved southward into the region. This led to the development of afternoon showers and thunderstorms. Some of thunderstorms became severe with locally heavy rainfall as well. Many locations saw between 2 and 3 inches of heavy rainfall total for this event in Southern NJ. Almost three inches of rain fell in an hour with thunderstorms.
July 29, 2016	Heavy Rain	N/A	N/A	Washington Township, NJ	A cold frontal boundary moved southward into the region. This led to the development of afternoon showers and thunderstorms. Some of thunderstorms became severe with locally heavy rainfall as well. Many locations saw between 2 and 3 inches of heavy rainfall total for this event in Southern NJ. Almost three inches of heavy rain fell with thunderstorms.
September 19, 2016	Heavy Rain	N/A	N/A	Gloucester County	The remnants of tropical storm Julia and a frontal boundary interacted leading to several rounds of rainfall over the region.
January 7, 2017	Winter Storm	N/A	N/A	Gloucester County	Snow began falling around dawn on January 7th, then continued heavy at times through the day before moving off the coast around sunset. Total snowfall reports ranged between 6 and 8 inches including 7.0 inches in Pitman, 6.1 inches in Williamstown, and 6.0 inches in West Deptford. Strong winds the following day produced blowing and drifting snow.
March 14, 2017	Winter Storm	N/A	N/A	Gloucester County	Low pressure systems across the Ohio Valley and Carolinas phased. This led to a rapidly developing storm which tracked just offshore. A few inches of snow fell across the county with a sharp gradient in totals. ice accumulations were up to 1/4 inch.



Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Gloucester County Designated?	Location	Description
May 5, 2017	Heavy Rain	N/A	N/A	Washington Township, NJ	Low pressure moving from Tennessee into western New York state lifted a warm front north through the state late Friday morning into early Friday afternoon on May 6, 2017. In advance of a cold front, which followed Friday evening, several rounds of heavy rainfall with embedded thunder traversed the state Friday morning into the afternoon. Heavy rainfall over 2 inches fell in Gloucester County.
July 23, 2017	Heavy Rain	N/A	N/A	Clayton Township, NJ	A stalled frontal boundary was the focus for several rounds of thunderstorms that produced damaging winds and flooding in spots. Several thousand people lost power throughout the state. Just over three inches of rain fell with almost half an inch in five minutes. CWOP station in Washington Township recorded just over four inches of rain.
July 24, 2017	Heavy Rain	N/A	N/A	Washington Township	A stalled frontal boundary was the focus for several rounds of thunderstorms that produced damaging winds and flooding in spots. Several thousand people lost power throughout the state. Almost five inches of rain fell. Rainfall total from last night of almost three inches.
August 23, 2017	Heavy Rain	N/A	N/A	West Deptford Township, NJ	Severe thunderstorms formed in a hot and humid airmass ahead of a cold front. Just over three inches of rain fell in Gloucester County.
January 4, 2018	Winter Storm	N/A	N/A	Gloucester County	An area of low pressure tracked up the east coast interacting with a cold front which lead to rapid development of a winter storm across the state. Snowfall ranged from 4 to 6 inches across the county.
March 6, 2018	Winter Storm	N/A	N/A	Gloucester County	A broad area of low pressure extending from the Ohio Valley to the Piedmont of South Carolina consolidated off the Virginia Capes during the early morning of March 7th. This new primary low moved northeast and gradually deepened as it passed east of the Delaware and New Jersey coasts on March 7th. The snow fell heavy at times away from the coast. Snowfall amounts near the New Jersey Turnpike generally ranged from 6 to 12 inches, with a sharp decrease to the southeast. Banding and thundersnow produced pockets of heavy snow in the western sections of the county, closer to the Delaware River. Further east, snow mixed with rain during parts of the event which tempered snowfall amounts. Some reported snowfall totals include: 6.5 inches in West Deptford, 6.5 inches in



Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Gloucester County Designated?	Location	Description
					Sewell, 6.5 inches in Mantua, 5.5 inches in Williamstown, and 5.0 inches in Pitman.
March 21, 2018	Winter Storm	N/A	N/A	Gloucester County	A complex area of low pressure over the middle Atlantic, which involved several individual centers, slowly consolidated off the Virginia Capes Tuesday morning, March 20th into Wednesday March 21st along a frontal boundary. Precipitation began as rain during the evening hours on March 20th. After a lull during the overnight hours, rain mixed with snow during the morning and early afternoon hours of the 21st before changing over to all snow around noon, falling heavy at times through the evening hours. Some reported snowfall amounts include: 12.0 inches at West Deptford, 9.1 inches at Pitman, 8.0 inches at Sewell, and 7.8 inches near Turnersville.
April 16, 2018	Coastal Flood	N/A	N/A	Gloucester County	A strong backdoor cold front moved from northeast to southwest across the area late Saturday afternoon April 15th into Sunday morning April 16th. Not only was there a significant drop in temperature coinciding with the passage of the front, but also a stark difference between high temperatures on Saturday and Sunday. Moderate coastal flooding along the tidal Delaware River and its tidal tributaries. There were a number of road closures including New Jersey Route 47 in Westville and US Route 130 in Logan Township. Peak tide was 9.47 feet MLLW at Philadelphia.
September 10, 2018	Coastal Flood	N/A	N/A	Gloucester County	A persistent onshore flow and unusually high astronomical tides associated with the new moon resulted in widespread moderate coastal flooding along the bays and other tidal waterways in central and southern New Jersey. The flooding occurred across three consecutive high tide cycles, from the evening of September 9 through the early hours of September 11. Moderate flooding occurred along the Delaware River and its tidal tributaries in Gloucester County. The tide gauge at Philadelphia reached 9.65 feet MLLW.
November 26, 2018	Coastal Flood	N/A	N/A	Gloucester County	A coastal storm resulted in tidal flooding along the northern part of the New Jersey coast and along the tidal Delaware River. Moderate tidal flooding occurred along the tidal Delaware River and its tidal



Date(s) of Event	Event Type	FEMA Declaration Number (if applicable)	Gloucester County Designated?	Location	Description
					tributaries. Some roads were flooded. The tide gauge at Marcus Hook, Pennsylvania reached 8.77 feet MLLW.

Source: NOAA NRCS 2021

Note: Unless explicitly stated, no property damage or crop loss was reported for the events.

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## Probability of Future Occurrences

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Gloucester County will continue to experience the direct and indirect impacts of Nor'Easters. Secondary hazards may include flooding, extreme wind, erosion, infrastructure deterioration or failure, utility failures, power outages, water quality and supply concerns, and transportation delays, accidents, and inconveniences.

As with any weather phenomenon, it is nearly impossible to assign probabilities to Nor'Easters, except over the long-term. High activity seasons are when storm activity exceeds the historical 75<sup>th</sup> percentile. This means that seasons with this number of storms are expected to occur during one out of four years. Lower activity seasons are defined as when storm activity falls below the historical 75<sup>th</sup> percentile; meaning this number of storms are expected to occur during three out of four years (Cornell University 2013)

In Section 4.4, the identified hazards of concern for Gloucester County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for nor'easter in the county is considered 'frequent' (100 percent annual probability; a hazard event may occur multiple times per year). The ranking of the nor'easter hazard for individual municipalities is presented in the jurisdictional annexes.

## Climate Change Impacts

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Due to the increase in greenhouse gas concentrations since the end of the 1890s, New Jersey has experienced a 3° F (1.67° C) increase in the State's average temperature (ONJSC 2021), which is faster than the rest of the Northeast region (2° F [1.1° C]) (Melillo 2014) and the world (1.5° F [0.8° C]) (Meyer 2014). This warming trend is expected to continue. By 2050, temperatures in New Jersey are expected to increase by 4.1 to 5.7° F (2.3° C to 3.2° C) (Horton 2015).

Since the end of the twentieth century, New Jersey has experienced slight increases in the amount of precipitation it receives each year, and over the last 10 years there has been a 7.9 percent increase. By 2050, annual precipitation in New Jersey could increase by 4 percent to 11 percent (Horton 2015). By the end of this century, heavy precipitation events are projected to occur two to five times more often (Walsh 2014) and with more intensity (Huang 2017) than in the last century. New Jersey will experience more intense rain events, less snow, and more rainfalls (Fan 2014).

According to NOAA, sea level rise can amplify factors that currently contribute to Nor'Easters and other types of severe weather: high tides, storm surge, high waves, and high runoff from rivers and creeks. Other secondary hazards that could occur along the Mid-Atlantic coast in response to sea level rise include:

- *Bluff and upland erosion* – Shorelines composed of older geologic units that form headland regions of the coast will retreat landward with rising sea level. As sea level rises, the uplands are eroded and sandy materials are incorporated into the beach and dune systems along the shore and adjacent compartments.
- *Overwash* – As sea level rise occurs, storm overwash will become more likely.



- *Shoreline retreat* - The combination of rising sea level and stronger storms can create the potential to accelerate shoreline retreat in many locations (Gutierrez 2007).

A warmer atmosphere means storms have the potential to be more intense and occur more often (Coumou 2012). In New Jersey, extreme storms typically include coastal nor'easters, snowstorms, spring and summer thunderstorms, tropical storms, and on rare occasions hurricanes. Most of these events occur in the warmer months between April and October, with nor'easters occurring between September and April. Over the last 50 years, in New Jersey, storms that resulted in extreme rain increased by 71 percent (Walsh 2014) which is a faster rate than anywhere else in the United States (Huang 2017). As temperatures increase so will the energy in a storm system, increasing the potential for more intense tropical storms (Huang et al. 2017), especially those of Category 4 and 5 (Melillo 2014).

In Philadelphia, Pennsylvania and Reedy Beach, Delaware (the nearest tidal gages to Gloucester County on the Delaware River), sea-level has risen at a rate of approximately 0.11 to 0.15 inches per year since the beginning of the 20th century (NOAA 2021), and this rate will continue to increase. The amount of greenhouse gases that are emitted is tied to rates of sea-level rise. By 2050, New Jersey will likely experience at least a 0.9 to 2.1-foot increase (above the levels in 2000; all emissions scenarios), 1.4 to 3.1-foot increase by 2070 (moderate emissions scenario), and potentially a 2.0 to 5.1-foot increase by 2100 (moderate emissions scenario).

Impacts of climate change can lead to shoreline erosion, coastal flooding, and water pollution; affecting man-made coastal infrastructures and coastal ecosystems. Coastal areas may be impacted by climate change in different ways. These areas are sensitive to sea level rise, changes in the frequency and intensity of storms, increase in precipitation, and warmer ocean temperatures (EPA 2017). As noted above, temperatures are predicted to increase in Gloucester County, which lead to an increase in intensity and frequency of severe storm. This increase may lead to more weather patterns that cause coastal erosion events. Rising sea levels will also exacerbate erosional issues.

#### 4.3.12.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable to the identified hazard. For the Nor'Easter hazard, all of Gloucester County has been identified as potentially exposed or vulnerable. Therefore, all assets in the County (population, structures, critical facilities and lifelines), as described in Section 3, are vulnerable to a Nor'Easter.

#### Impact on Life, Health and Safety

The impact of a Nor'Easter on life, health and safety is dependent upon several factors including the severity of the event and whether or not adequate warning time was provided to residents. Typically, a Nor'Easter has a longer duration (potentially lasting days) than a hurricane or tropical storm event, which normally pass through an area in a matter of hours. It is assumed that the entire County's population could be exposed to this hazard (wind and rain/snow) and secondary impacts discussed earlier associated with a Nor'Easter. Further, residents



may be displaced or require temporary to long-term sheltering. Refer to Figures 5.4.6-2 and 5.4.6-3 in Section 4.3.10 (Hurricanes and Tropical Storms) which display the peak gust wind speeds of the 100- and 500-year mean return period probabilistic wind events modeled in Hazus v4.2.

## Impact on General Building Stock

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The entire County's building stock is exposed to the wind and/or rain/snow from the Nor'Easter hazard. Gloucester County is estimated to have 113,093 buildings, with a replacement cost value (structure and content) of approximately \$59.3 billion. Refer to Section 4.3.7 (Flood), Section 4.3.10 (Hurricane), Section 4.3.13 (Severe Weather), and Section 4.3.14 (Severe Winter Weather) for more information about the wind, rain, and snow hazard impacts to the building stock in Gloucester County.

## Impact on Critical Facilities

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All of Gloucester County's critical facilities are exposed to the wind and/or rain/snow from the Nor'Easter hazard. All of Gloucester's critical facilities are also considered lifelines. Refer to Section 4.3.7 (Flood), Section 4.3.10 (Hurricane), Section 4.3.13 (Severe Weather), and Section 4.3.14 (Severe Winter Weather) for more information about the wind, rain, and snow hazard impacts to the critical facilities in Gloucester County.

## Impact on the Economy

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Nor'Easter events can greatly impact the economy, including: loss of business function, damage to inventory (utility outages), relocation costs, wage loss, and rental loss due to the repair/replacement of buildings. Damages to buildings can impact a community's economy and tax base. In addition, damages to buildings and critical infrastructure, as well as road closures, can delay emergency response services during these events.

## Future Changes That May Impact Vulnerability

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Understanding future changes that affect vulnerability can assist in planning for future development and ensure establishment of appropriate mitigation, planning, and preparedness measures. Several factors are examined in this section to assess hazard vulnerability.

### Projected Development

As discussed and illustrated in Section 3 (County Profile), areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by a Nor'Easter event if structures do not consider current mitigation measures against flooding, rain, wind, and snow. Therefore, it is the intention of the County and all participating municipalities to discourage development in vulnerable areas or to encourage higher regulatory standards at the local level.

### Projected Changes in Population

According to the 2019 5-year population estimates from the American Community Survey, the population of Gloucester County (i.e., 291,165 persons) has increased by approximately 1.0-percent since 2010. Even though



the population has decreased, any changes in the density of population can impact the number of persons exposed to Nor'Easter events. Refer to Section 3 (County Profile) for more information about population trends in the County.

#### Climate Change

Climate is defined not simply as average temperature and precipitation but also by the type, frequency and intensity of weather events. Both globally and at the local scale, climate change has the potential to alter the prevalence and severity of events like hurricanes. The projections of increasing precipitation are characteristic of a large area of the Northern Hemisphere in the northern middle latitudes, as well as increases in heavy precipitation events. This may result in increased coastal and inland flooding risks. Over the last century, global sea level has risen by about 8 inches. Sea level has risen faster along the coastal and inland shores of New Jersey as compared to the global average (NOAA 2021).

While predicting changes to the prevalence or intensity of Nor'Easter events and their affects under a changing climate is difficult, understanding vulnerabilities to potential changes is a critical part of estimating future climate change impacts on human health, society and the environment (EPA 2020).

#### Change of Vulnerability Since the 2016 HMP

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Overall, the County's vulnerability has not yet changed significantly; the entire County continues to be exposed and potentially vulnerable to the Nor'Easter hazard. Hazards that relate to Nor'Easter events (i.e., flood, hurricane, severe weather, and severe winter weather) use an updated building stock and critical facility data to assess the County's risk to flood, wind, rain, and snow. The building inventory was updated using RS Means 2020 values, which is more current and reflects replacement cost versus the building stock improvement values reported in the 2016 HMP. As a result, this analysis is an improvement to the overall risk assessment for the County.