

2021 Weather in Review: Fire Island National Seashore

Weather and climate play significant roles in driving both physical and ecological processes. For example, the active processes that shape the North Atlantic coastline are largely the result of meteorological events such as wind-driven waves. For research and long-term ecological monitoring, weather and climate data provide the potential for correlations to be made with observed physical and ecological pattern data. This resource brief provides a summary of both historic and current (2021) weather data for Fire Island National Seashore (FIIS), New York (NY). Because tide levels and wind can be significant for coastal parks, the annual water level and wind data are included.

Temperature

Overall, 2021 was the 4th warmest year on record with an average temperature of 53.9°F — 3.3 degrees above average (Table 1). The warmest month was July with an average of 74.7 degrees — 3.8 degrees above the monthly average. All twelve months had higher than average temperatures, with December having the highest departure— 7.2 degrees above average. Seasonally, autumn, spring, and summer fell within "much above normal" temperatures, while winter fell within "above normal" temperatures (Figure 1).

Table 1. Suffolk County, New York average monthly, average annual, and departures from long-term average temperatures. Departures from average are based on a comparison of 2021 average temperatures to relevant averages from 1895-2020. Data are available at the NOAA National Centers for Environmental Information, Climate at a Glance: County Time Series website.

Month (2021)	Average temperature (°F)	Departure from average long-temperature (°F)
January	33.0	+3.2
February	32.1	+1.9
March	41.6	+3.9
April	50.0	+3.0
May	58.4	+1.2
June	69.6	+3.2
July	73.4	+1.2
August	74.7	+3.8
September	68.5	+3.9
October	60.6	+6.4
November	44.0	+0.1
December	41.4	+7.2
Annual	**53.9**	**+3.3**

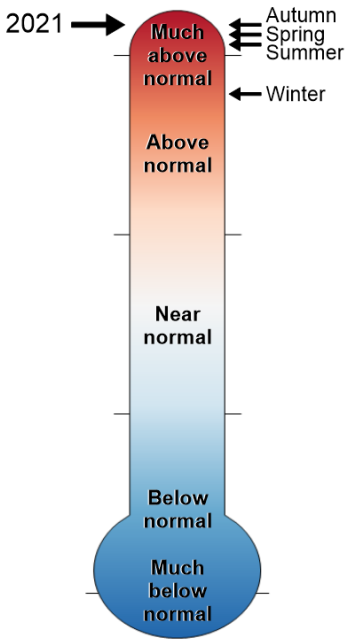


Figure 1. Suffolk County, New York annual and seasonal temperature rankings from 1895-2021. Of the 127 records, 2021 was the 4th warmest year. Seasonally, it was the 18th warmest winter, 6th warmest spring, 8th warmest summer, and the 4th warmest autumn. Data are available at the NOAA National Centers for Environmental Information, Climate at a Glance: County Time Series website.

Precipitation

Overall, 2021 was the 62nd driest year on record with a total of 42.63 inches of precipitation (Table 2). Six months had less than average precipitation including November which had the least at 1.20 inches — 2.67 inches below average. October had the highest amount of precipitation at 6.24 inches — 2.59 inches above average. Seasonally, summer fell within "above normal" levels, while spring fell within "near normal" levels. Autumn and winter seasons fell within "below normal" levels (Figure 2).

Table 2. Suffolk County, New York monthly and annual total precipitation and departures from long-term average totals. Departures from average are based on a comparison of 2021 precipitation levels to relevant averages from 1895-2020. Data are available at the NOAA National Centers for Environmental Information, Climate at a Glance: County Time Series website.

Month (2021)	Total precipitation (in)	Departure from average long-term precipitation (in)
January	2.26	-1.39
February	3.87	+0.40
March	3.24	-1.01
April	3.68	-0.22
May	4.81	+1.11
June	1.72	-1.65
July	5.47	+2.07
August	4.60	+0.66
September	5.13	+1.58
October	6.24	+2.59
November	1.20	-2.67
December	1.41	-2.67
Annual	**42.63**	**-1.19**

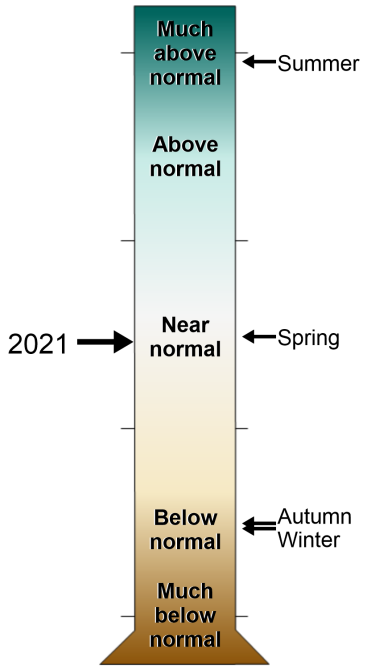


Figure 2. Suffolk County, New York annual and seasonal precipitation rankings from 1895-2021. Of the 127 records, 2021 was the 62nd driest year. Seasonally, it was the 26th driest winter, 63rd driest spring, 12th wettest summer, and 27th wettest autumn. Data are available at the NOAA National Centers for Environmental Information, Climate at a Glance: County Time Series website.



Temperature and Precipitation Trends (1895–2021)

Temperature and precipitation data are gathered from the U.S. Climate Divisional Database, which stores data from January 1895 to the present, and can be accessed via the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI) website (Figure 3). Users can choose different geographic scales (i.e., global, national, statewide), different temporal scales, and display them in various types of graphical formats. Temperature and precipitation data presented in this brief are for Suffolk County, NY.

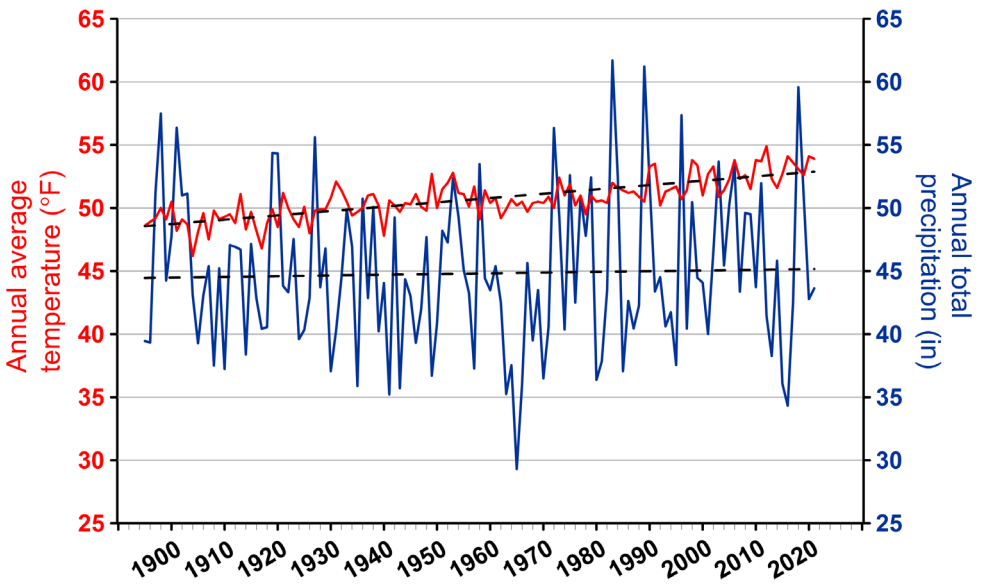


Figure 3. Suffolk County, New York yearly average temperature and precipitation levels from 1895 to 2021. Dashed lines represent the 1895-2021 trend for each parameter; +0.3°F/decade increase for temperature and +0.06 in/decade increase for precipitation. Data are available at the NOAA National Centers for Environmental Information, Climate at a Glance: County Time Series website.

Tide Levels

Water level data for the ocean side of FIIS was collected from the NOAA National Water Level Observation Network (NWLON) station 8531680 located at Sandy Hook, NJ. Water level data for the bay side of FIIS was not collected or reported in 2021 year due to non-functioning weather stations or buoys in Great South Bay.

The data is graphed to show the difference in the predicted tide level verses what was observed (Figure 4). The offsets in height reflect the effect from storm surge on the normal, astronomically driven tide level.

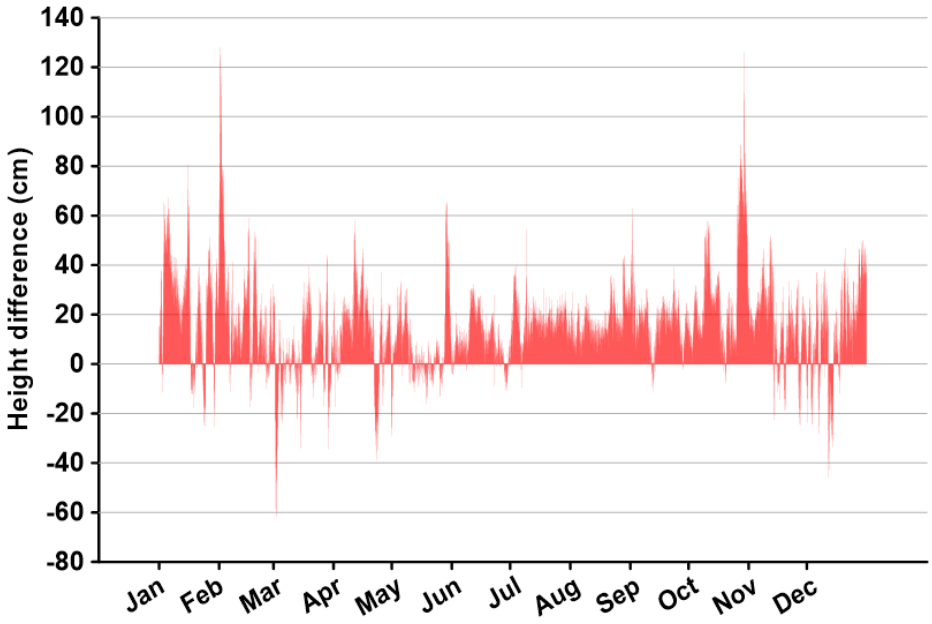


Figure 4. The difference in the predicted and observed tide levels at Sandy Hook, New Jersey for 2021. Data are available at the NOAA Tides & Currents website.

Wind

Wind data (wind speed and direction) was also collected from the NOAA NWLON station 8531680, located at Sandy Hook, NJ. Wind data for the bay side of FIIS was not collected or reported in 2021 due to non-functioning weather stations or buoys in Great South Bay. Each direction is divided up into categories called bins that are color coated to represent the frequency of a certain wind speed. The length of the bin represents the number of times wind comes from a given direction as well as the speed of the wind. The longer the length of the bin, the more frequent the given speed was recorded (Figure 5).

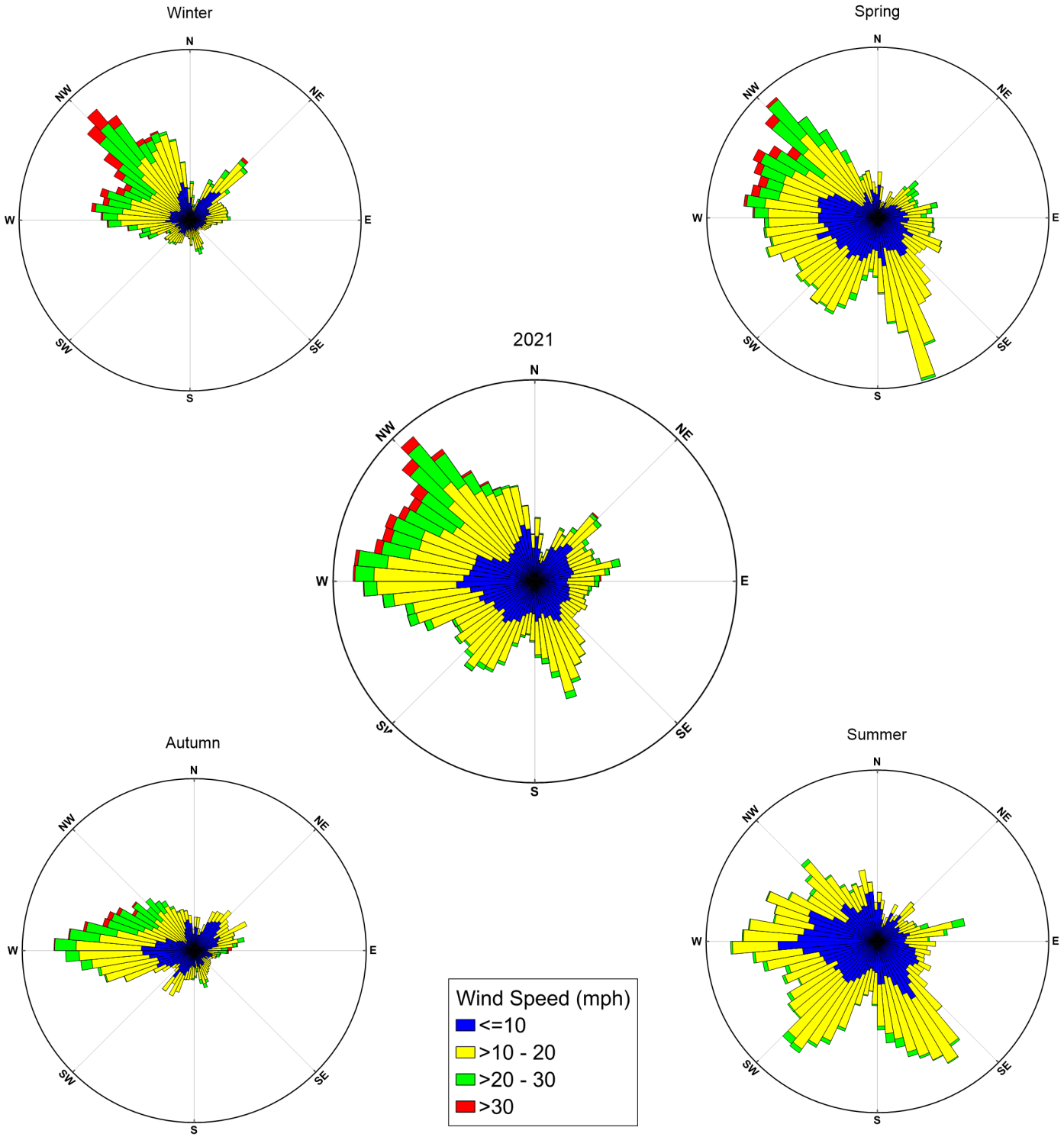


Figure 5. Wind charts reflecting both the seasonal and annual wind direction and speed at Sandy Hook, New Jersey during 2021. Each direction is divided into categories called bins that are color coated to represent the frequency of a certain wind speed. The length of the bin represents the number of times wind comes from a given direction as well as the speed of the wind. The longer the length of the bin, the more frequent the given speed was recorded. Data are available at the NOAA Tides & Currents website.

Northeast Coastal and Barrier Network
University of Rhode Island
Dept. Natural Resources Science
Coastal Institute, Room 105
1 Greenhouse Road, Kingston, RI 02881
https://www.nps.gov/im/ncbn/index.htm