

2021 Weather in Review: Assateague 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 Assateague Island National Seashore (ASIS), Maryland (MD). 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 58.9°F — 3 degrees above average (Table 1). 2021 had the 2nd warmest autumn on record at the park. The warmest month was August with an average of 78.3 degrees — 3.2 degrees above the monthly average. Seasonally, autumn fell within "much above normal" temperatures, while spring and summer nearly reaching the highest category level. Winter also fell within "above normal" temperatures (Figure 1).

Table 1. Worcester County, Maryland 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 long-term average temperature (°F)
January	38.2	+2.0
February	37.7	+0.8
March	48.8	+4.6
April	56.4	+3.4
May	63.9	+1.1
June	73.7	+2.3
July	78.2	+1.9
August	78.3	+3.2
September	71.5	+2.3
October	65.3	+6.6
November	48.0	-0.2
December	47.0	+7.6
Annual	**58.9**	**+3.0**

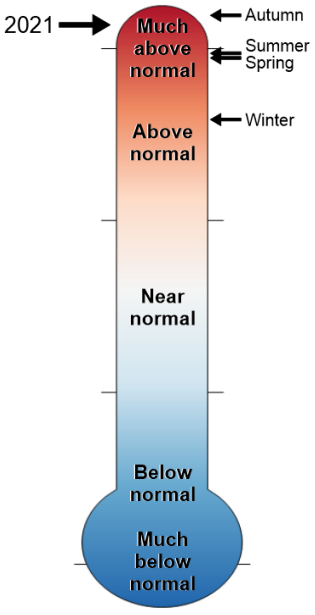


Figure 1. Worcester County, Maryland annual and seasonal temperature rankings from 1895-2021. Of the 127 records, 2021 was the 4th warmest year. Seasonally, it was the 24th warmest winter, 11th warmest spring, 10th warmest summer, and the 2nd warmest autumn. Data are available at the NOAA National Centers for Environmental Information, Climate at a Glance: County Time Series website.

Precipitation

Overall, 2021 was the 45th driest year on record with a total of 40.61 inches of precipitation (Table 2). Eight months had lower than average amounts of precipitation. November had the lowest amount of precipitation in 2021 at 1.13 inches — 1.85 inches below the average monthly rainfall. February had the highest amount at 6.52 inches — 3.17 inches above average. Seasonally, winter reached "above normal" levels, spring and summer reached "above normal" levels, while autumn fell to "much below normal" levels (Figure 2).

Table 2. Worcester County, Maryland 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 long-term average precipitation (in)
January	3.12	-0.36
February	6.52	+3.17
March	3.51	-0.52
April	2.06	-1.27
May	3.22	-0.11
June	4.02	+0.46
July	5.50	+1.25
August	5.10	+0.50
September	2.06	-1.57
October	2.89	-0.55
November	1.13	-1.85
December	1.48	-1.98
Annual	**40.61**	**-2.82**

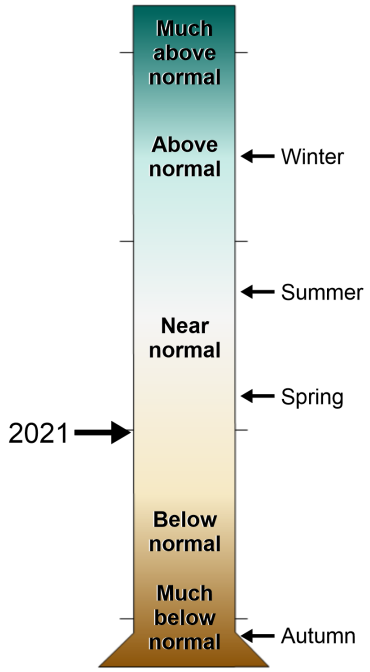


Figure 2. Worcester County, Maryland annual and seasonal precipitation rankings from 1895-2021. Of the 127 records, 2021 was the 45th driest year. Seasonally, it was the 30th wettest winter, 52nd driest spring, 56th wettest summer, and 6th driest autumn. Data are available at the NOAA National Centers 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 Worcester County, MD.

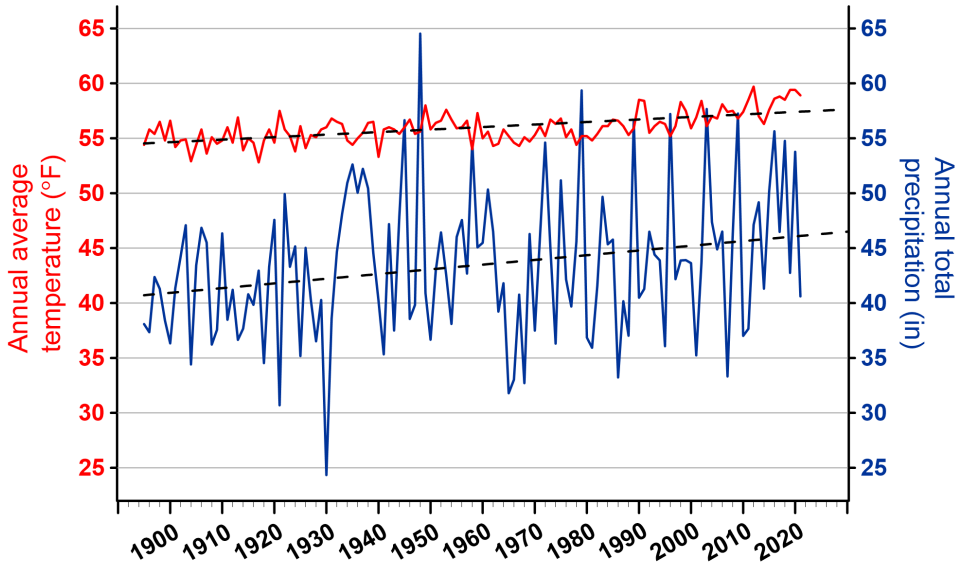


Figure 3. Worcester County, Maryland yearly average temperature and precipitation levels from 1895 to 2021. Dashed lines represent the 1895-2021 trend for each parameter; +0.2°F/decade increase for temperature and +0.43 in/decade increase for precipitation. Data are available at the NOAA National Centers for Environmental Information, Climate at a Glance: County Time Series website.

Tide Levels

Water level data is collected from the NOAA National Water Level Observation Network (NWLON) station 8570283 in the vicinity of the inlet at the northern end of the island. Located at the inlet of Ocean City, MD, this station has records dating back to 1978.

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.

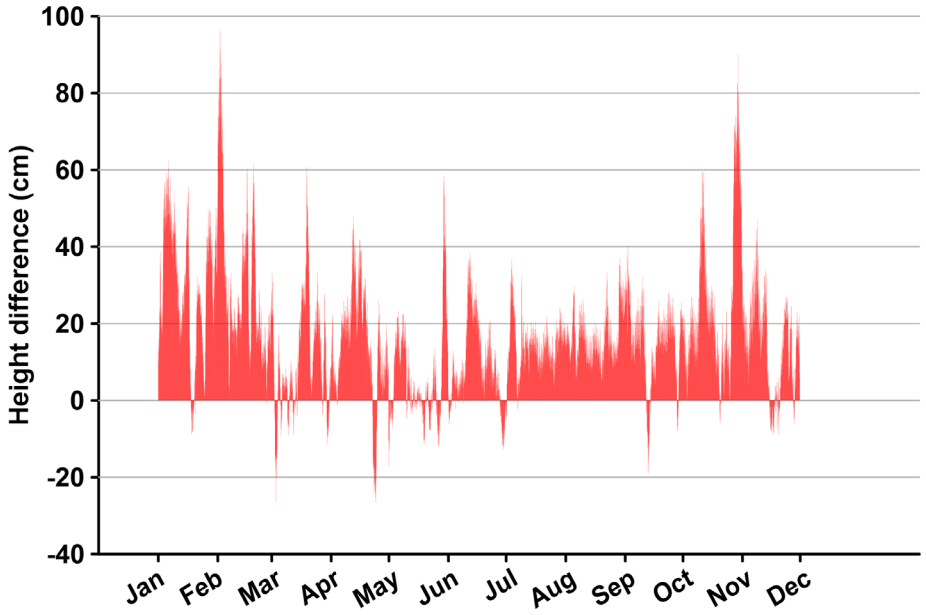


Figure 4. The difference in the predicted and observed tide levels at the NOAA NWLON station 8570283 located at the inlet of Ocean City, Maryland during 2021. Data are available at the NOAA Tides & Currents website.

Wind

Wind data (wind speed and direction) is also collected from the NOAA NWLON station 8570283 located at the inlet of Ocean City, MD. 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).

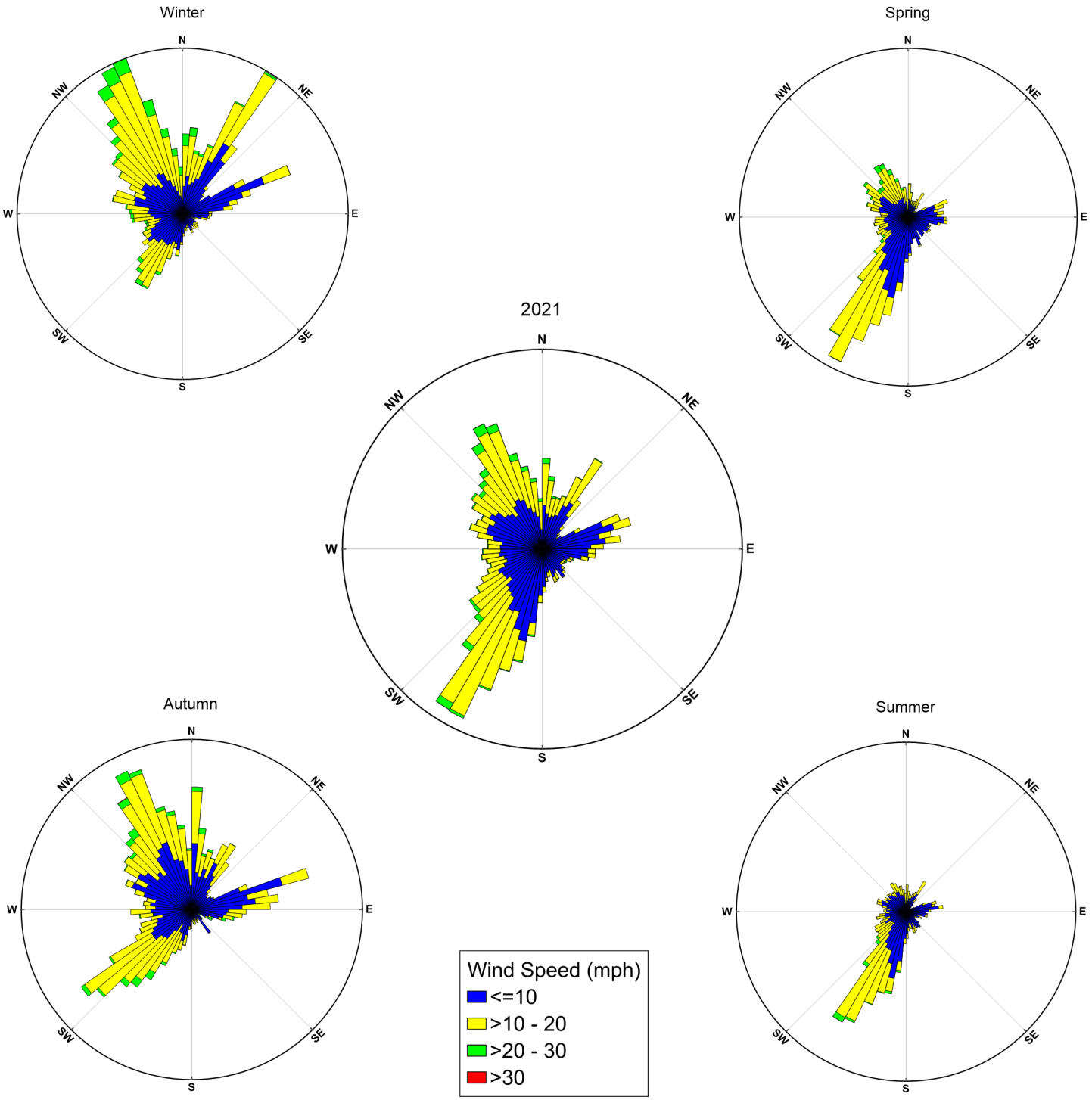


Figure 5. Wind charts reflecting both the seasonal and annual wind direction and speed at the NOAA NWLON station 8570283 located at the inlet of Ocean City, Maryland during 2021. Each direction is divided up into categories called bins that are color coated to represent the frequency of a certain wind 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. Data are available at the NOAA Tides & Currents website.

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