



2020 Weather in Review: Colonial National Historical Park

Weather and climate play significant roles in driving both physical and ecological processes. For example, the active processes that shape the North Atlantic shoreline 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 (2020) weather data for [Colonial National Historical Park](#) (COLO), Virginia (VA). Because tide levels and wind can be significant for coastal parks, the annual water level and wind data are included.

Temperature

James City County

Overall, 2020 was the 2nd warmest year on record, with an average temperature of 61 °F — 2.4 degrees higher than the average annual temperature (Figure 1). Seasonally, summer, autumn, and winter fell within “much above normal” temperatures, while spring fell within “below normal” temperatures. Nine out of twelve months had higher than average monthly temperatures, with March having the greatest increase in at 6.9 degrees above average. Only April, May, and September had lower than average monthly temperatures (Table 1).

Table 1. James City County, Virginia average monthly, average annual, and departures from long-term average temperatures. Departures from average are based on a comparison of 2020 average temperatures to relevant averages from 1895-2019. Data are available at NOAA NCEI: Climate at a Glance (<https://www.ncdc.noaa.gov/cag/county/time-series/VA-095/pcp/all/12/2020-2020>).

Month (2020)	Average temperature (°F)	Departure from long-term average temperature (°F)
January	43.8	+5.2
February	45.5	+5.4
March	54.9	+6.9
April	56.8	-0.1
May	64.0	-2.3
June	75.0	+0.8
July	82.6	+4.3
August	79.4	+2.8
September	70.3	-0.6
October	63.2	+3.2
November	54.8	+5.3
December	42.2	+1.5
Annual	61.0	+2.4

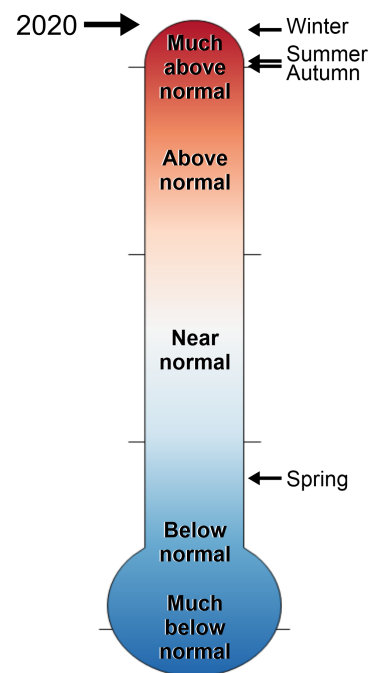


Figure 1. James City County, Virginia annual and seasonal temperature rankings from 1895-2020. Of the 126 records, 2020 was the 2nd warmest year. Seasonally, it was the 3rd warmest winter, 38th coldest spring, 9th warmest summer, and the 10th warmest autumn. Data are available at NOAA NCEI: Climate at a Glance (<https://www.ncdc.noaa.gov/cag/county/rankings/VA-095/tavg/202012>).

York County

Overall, 2020 was the 4th warmest year on record, with an average temperature of 61.4 °F — 2.6 degrees above the average annual temperature (Figure 2). Seasonally, summer, autumn, and winter fell within “much above normal” temperatures, while spring fell within “below normal” temperatures. Ten out of twelve months had higher than average monthly temperatures, with March having the greatest increase in temperature at 6.9 degrees above average. Only May and September had lower than average monthly temperatures (Table 2).

Table 2. York County, Virginia average monthly, average annual, and departures from long-term average temperatures. Departures from average are based on a comparison of 2020 average temperatures to relevant averages from 1895-2019. Data are available at NOAA NCEI: Climate at a Glance (<https://www.ncdc.noaa.gov/cag/county/time-series/VA-199/tavg/all/12/2020-2020>).

Month (2020)	Average temperature (°F)	Departure from long-term average temperature (°F)
January	44.4	+5.4
February	46.0	+5.7
March	55.0	+6.9
April	56.9	+0.1
May	64.1	-2.1
June	75.1	+0.9
July	82.8	+4.4
August	79.6	+2.8
September	70.9	-0.3
October	63.6	+3.1
November	55.3	+5.3
December	42.9	+1.7
Annual	61.4	+2.6

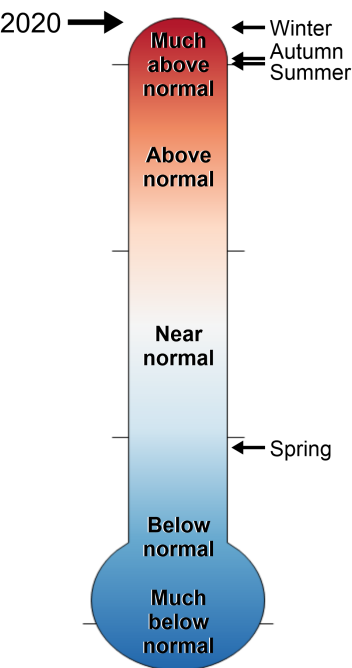


Figure 2. York County, Virginia annual and seasonal temperature rankings from 1895-2020. Of the 126 records, 2020 was the 4th warmest year. Seasonally, it was the 3rd warmest winter, 43rd coolest spring, 10th warmest summer, and the 9th warmest autumn. Data are available at NOAA NCEI: Climate at a Glance (<https://www.ncdc.noaa.gov/cag/county/rankings/VA-199/tavg/202012>).



Precipitation

James City County

Overall, 2020 was the wettest year on record with a total of 69.78 inches of precipitation (Figure 3, Table 3). Seasonally, winter, spring, and autumn fell within “above normal” levels of precipitation while summer and autumn fell within “much above normal” levels. Eight of twelve months had a higher than average monthly precipitation levels, with August having the highest at 11.75 inches — 6.93 inches above average. May was the driest month with 3.14 inches — 0.76 inches below average.

Table 3. James City County, Virginia monthly and annual total precipitation and departures from long-term average totals. Departures from average are based on a comparison of 2020 precipitation levels to relevant averages from 1895-2019. Data are available at NOAA NCEI: Climate at a Glance (<https://www.ncdc.noaa.gov/cag/county/time-series/VA-095/pcp/all/12/2020-2020>).

Month (2020)	Total precipitation (in)	Departure from long-term average precipitation (in)
January	3.31	-0.09
February	4.93	+1.76
March	3.49	-0.39
April	5.01	+1.70
May	3.14	-0.76
June	6.08	+1.87
July	4.79	-0.42
August	11.75	+6.93
September	10.15	+6.23
October	6.19	+2.98
November	4.54	+1.70
December	6.40	+3.10
Annual	69.78	+24.61

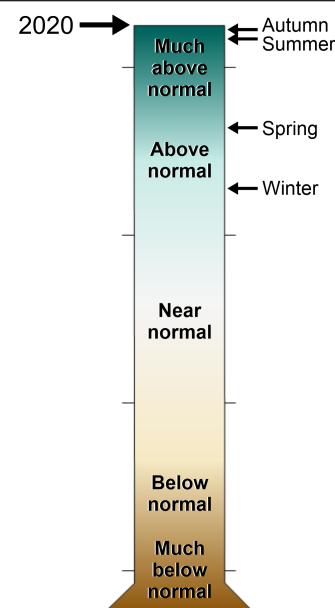


Figure 3. James City County, Virginia annual and seasonal precipitation rankings from 1895-2020. Of the 126 records, 2020 was the wettest year on record. Seasonally, it was the 36th wettest winter, 23rd wettest spring, 4th wettest summer, and 2nd wettest autumn. Data are available at NOAA NCEI: Climate at a Glance (<https://www.ncdc.noaa.gov/cag/county/rankings/VA-095/pcp/202012>).

York County

Overall, 2020 was the wettest year on record, with 67.79 inches of precipitation (Figure 4, Table 4). Seasonally, winter and spring fell within “above normal” levels of precipitation while summer and autumn fell within “much above normal” levels. Nine of twelve months had a higher than average monthly precipitation levels, with August having the highest at 11.31 inches — 6.43 inches above average. May was the driest month with 3.19 inches — 0.60 inches below average.

Table 4. York County, Virginia monthly and annual total precipitation and departures from long-term average totals. Departures from average are based on a comparison of 2020 precipitation levels to relevant averages from 1895-2019. Data are available at NOAA NCEI: Climate at a Glance (<https://www.ncdc.noaa.gov/cag/county/time-series/VA-199/pcp/all/12/2020-2020>).

Month (2020)	Total precipitation (in)	Departure from long-term average precipitation (in)
January	3.28	-0.10
February	4.94	+1.69
March	3.94	+0.06
April	4.77	+1.50
May	3.19	-0.60
June	5.88	+1.76
July	4.24	-1.05
August	11.31	+6.43
September	9.41	+5.48
October	5.37	+2.16
November	5.33	+2.50
December	6.13	+2.82
Annual	67.79	+22.65

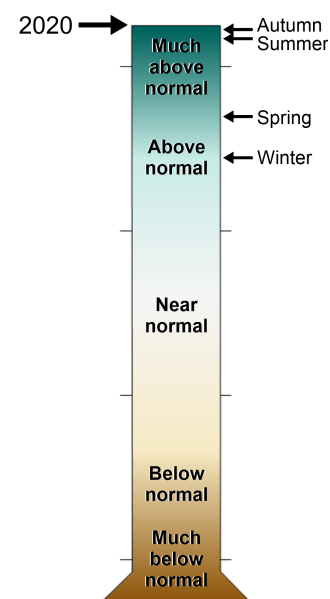


Figure 4. York County, Virginia annual and seasonal precipitation rankings from 1895-2020. Of the 126 records, 2020 was the wettest year. Seasonally, it was the 30th wettest winter, 21st wettest spring, 4th wettest summer, and 2nd wettest autumn. Data are available at NOAA NCEI: Climate at a Glance (<https://www.ncdc.noaa.gov/cag/county/rankings/VA-199/pcp/202012>).

Temperature and Precipitation Trends (1895–2020)

Temperature and precipitation data are gathered from the [U.S. Climate Division Database](#), which stores data from January 1895 through 2020, and can be accessed via the National Oceanic and Atmospheric Administration's (NOAA) [National Centers for Environmental Information](#) (NCEI) website (Figures 5 and 6). 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 James City and York Counties, VA.

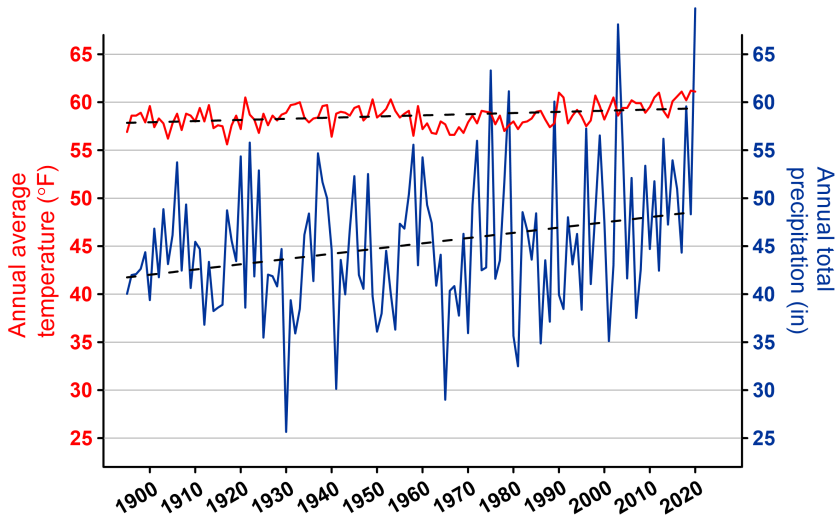


Figure 5. James City County, Virginia yearly average temperature and precipitation from 1895 to 2020. Dashed lines represent the 1895-2020 trend for each parameter; $+0.1^{\circ}\text{F}/\text{decade}$ for temperature and $+0.54\text{ in}/\text{decade}$ for precipitation. Data are available at NOAA NCEI: Climate at a Glance (<https://www.ncdc.noaa.gov/cag/county/time-series/>).

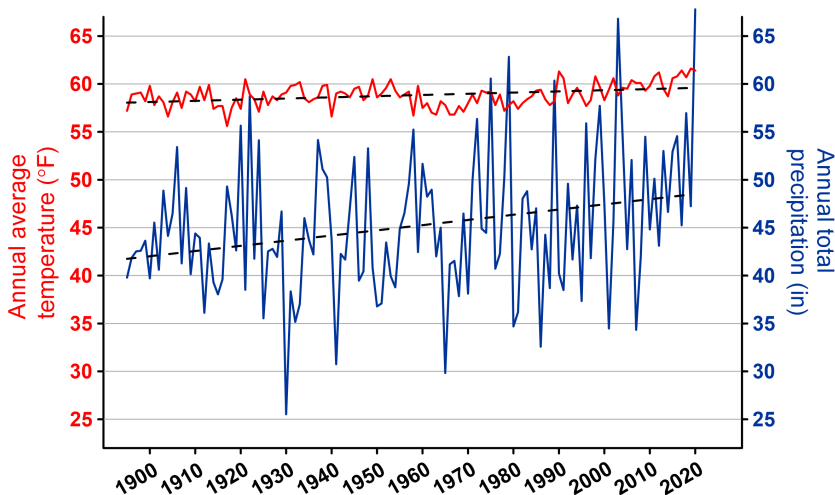
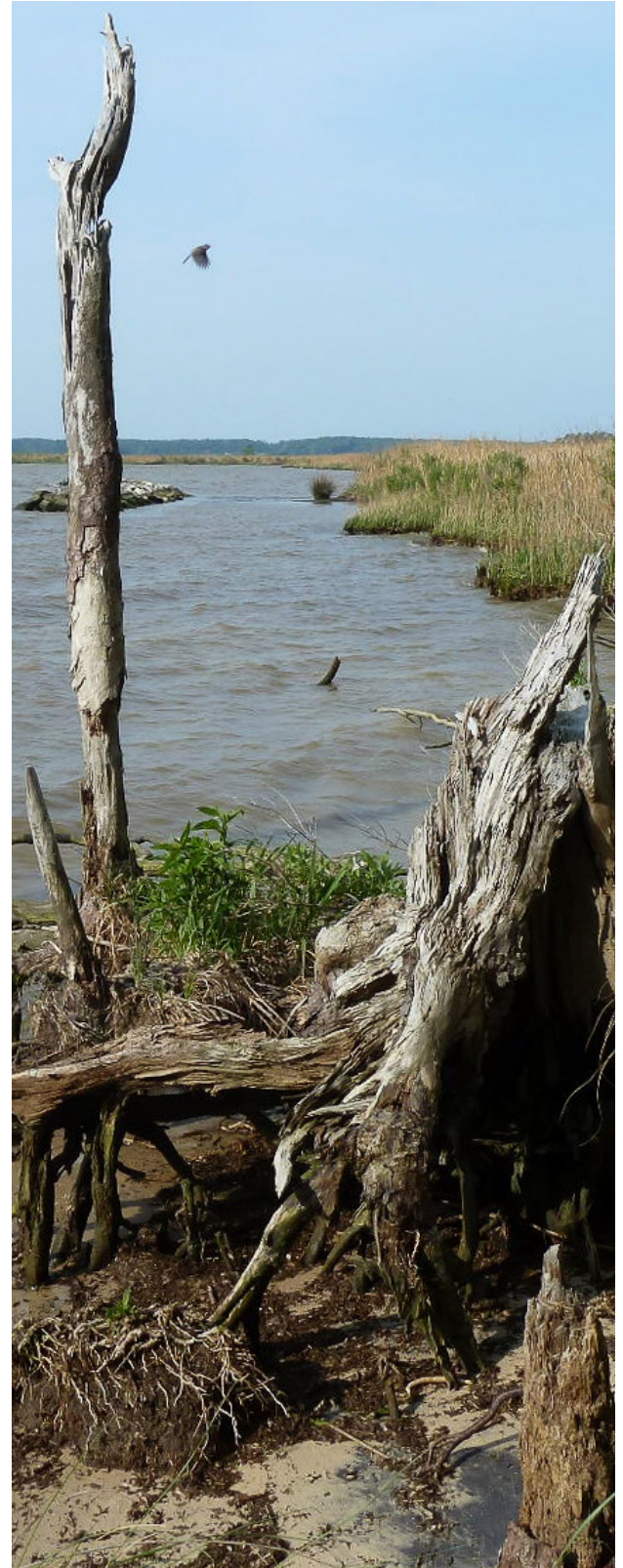


Figure 6. York County, Virginia yearly average temperature and precipitation from 1895 to 2020. Dashed lines represent the 1895-2020 trend for each parameter; $+0.55^{\circ}\text{F}/\text{decade}$ for temperature and $+0.55\text{ in}/\text{decade}$ for precipitation. Data are available at NOAA NCEI: Climate at a Glance (<https://www.ncdc.noaa.gov/cag/county/time-series/>).



Wind

Wind-generated waves can impact shorelines differently depending on wind speed and direction. Wind data are collected from a weather station at Williamsburg Jamestown Airport, VA, and made available through NOAA's NCEI website (Figure 7), and at NOAA's National Water Level Observation Network (NWLON) station 8637689, located at the Yorktown USCG Training Center, VA (Figure 8). 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.

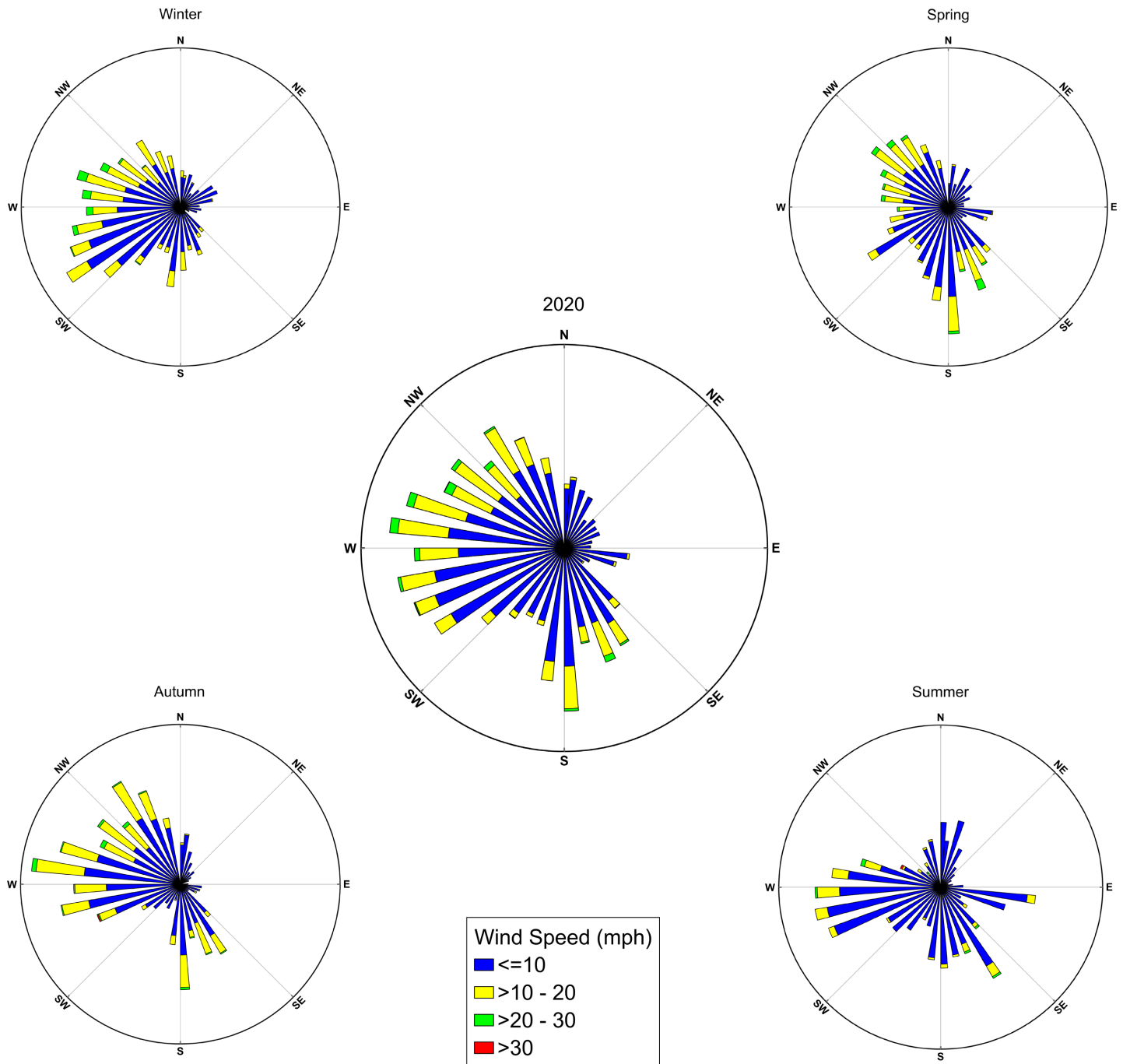


Figure 7. Wind charts reflecting both the seasonal and annual wind direction and speed at the Williamsburg Jamestown Airport, Virginia during 2020. Each direction is divided into categories called bins that are color coated to represent the frequency of a certain wind speed. The length of the bin represents 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 <https://www.ncdc.noaa.gov/cdo-web/datasets/LCD/stations/WBAN:03730/detail>.

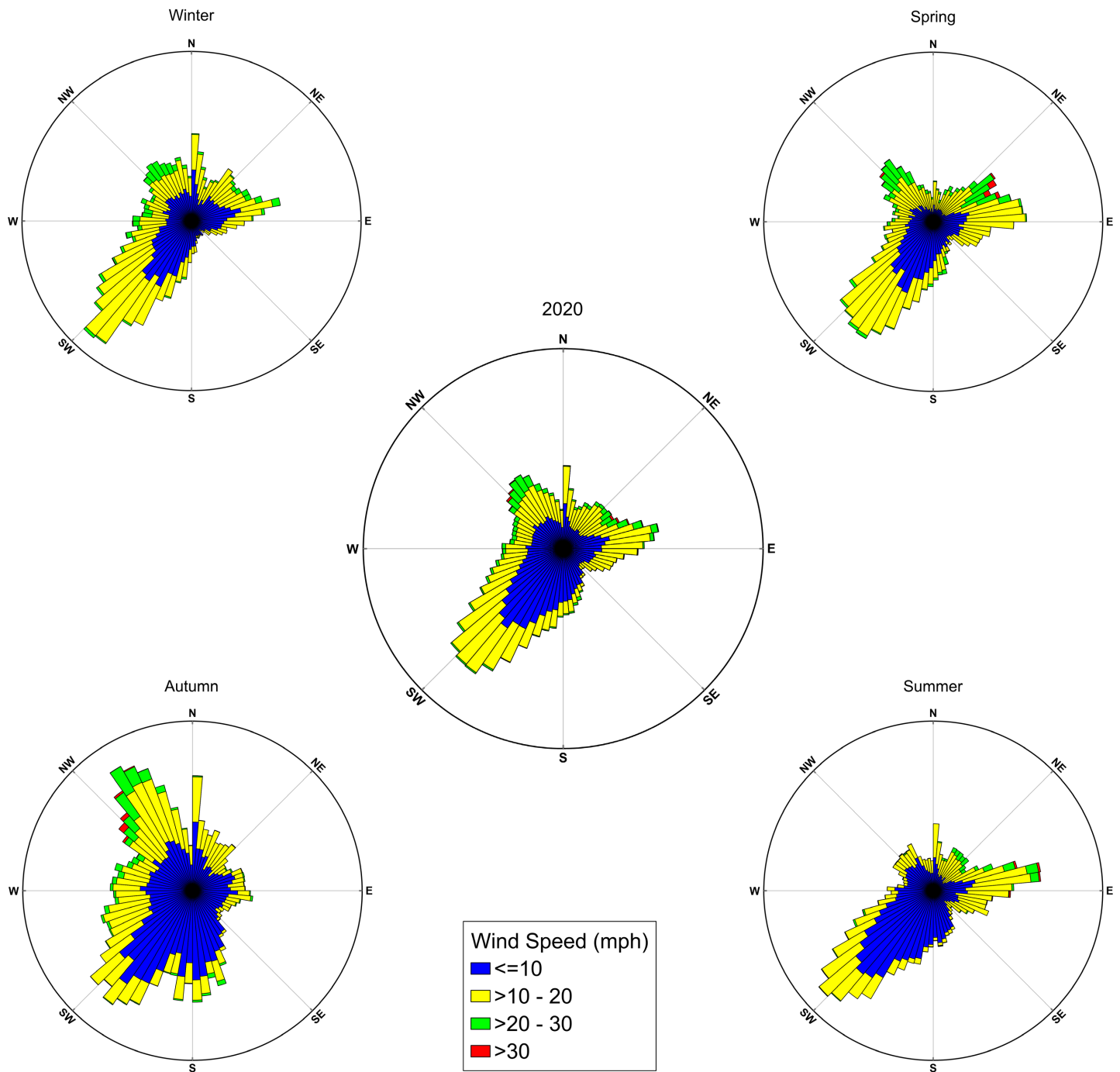


Figure 7. Wind charts reflecting both the seasonal and annual wind direction and speed at NOAA's NWLON station 8637689 located at the Yorktown USCG Training Center, Virginia during 2020. Each direction is divided into categories called bins that are color coated to represent the frequency of a certain 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 <https://tidesandcurrents.noaa.gov/stationhome.html?id=8637689>.



Tide Levels

The extent of Colonial National Historical Park's shoreline falls along the James and York Rivers, and each has unique tidal characteristics. Therefore, two sources of water level data are used to reflect this dynamic. Water level data are obtained from NOAA station 8637712 located at Jamestown Ferry Wharf, VA, and from NOAA station 8637689 located at the Yorktown U.S. Coast Guard (USCG) Training Center, VA. The station at Jamestown Ferry Wharf began collecting data in 2010, while the station at USCG Training Center has records dating back to 2004.

The data are graphed to show the difference in the predicted tide level versus what was observed (Figures 9 and 10). The offsets in height reflect the effect of storm surge on the normal, astronomically driven tide level.

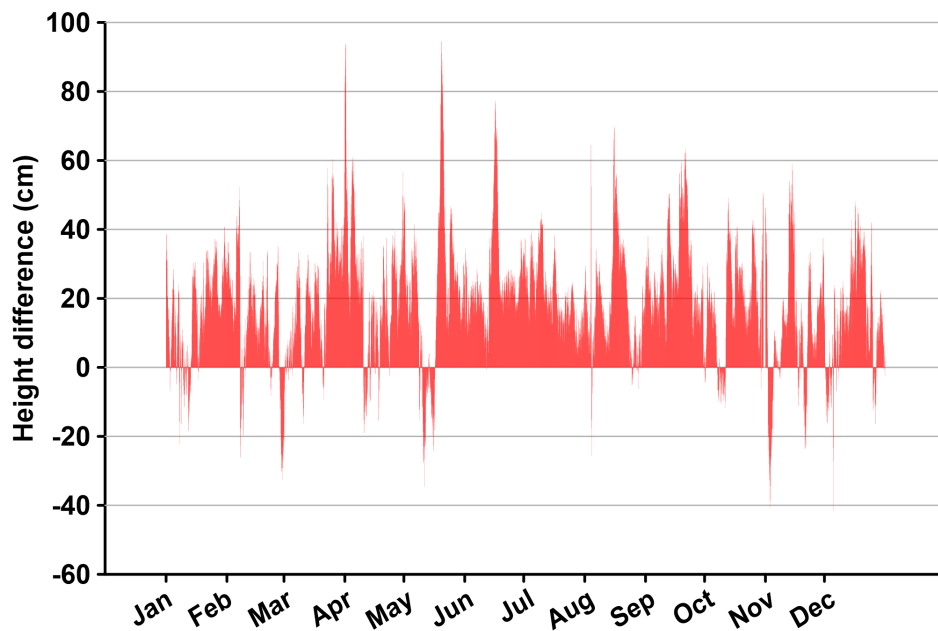


Figure 9. The difference in the predicted and observed tide levels at NOAA station 8637712 located at Jamestown Ferry Wharf, Jamestown, Virginia for 2020. Data are available at <https://tidesandcurrents.noaa.gov/stationhome.html?id=8637712>.

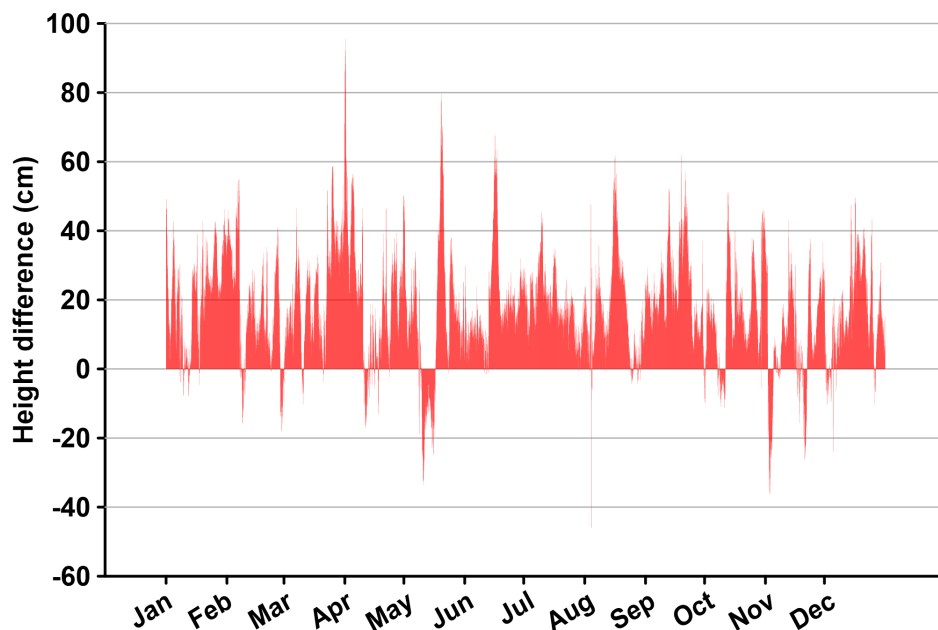


Figure 10. The difference in the predicted and observed tide levels at the NOAA station 8637689 located at the Yorktown U.S. Coast Guard Training Center, Virginia for 2020. Data are available at <https://tidesandcurrents.noaa.gov/station-home.html?id=8637689>.



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>