



NPS / N. Lewis

2021 Weather in Review: Shenandoah National Park

In all, 2021 was much warmer than average and had below-normal precipitation. The year ended as the 4th warmest and 41st driest on record. Data indicate that over the long term, annual average temperature and annual total precipitation have both increased (+0.17 °F per decade and +0.42 inches per decade, respectively).

This brief provides county-scale weather data averaged from all of the counties surrounding the park, including

data from 1895–2021 (i.e. period of record). These counties include Albemarle, Augusta, Greene, Madison, Page, Rappahannock, Rockingham, and Warren counties, VA. Individual weather station data may vary from what is reported here. In particular, high elevations in the park may have experienced weather conditions that are different from those displayed in this brief. Data and analyses herein are courtesy of the National Oceanic and Atmospheric Administration's (NOAA) Climate at a Glance Program.

Temperature

In total, 2021 was the 4th warmest year recorded in the counties surrounding the park, and all seasons were warmer than normal (Figure 1). Ten months had higher than normal temperatures with March, October, and December all being more than 4 °F above long-term averages (Table 1).

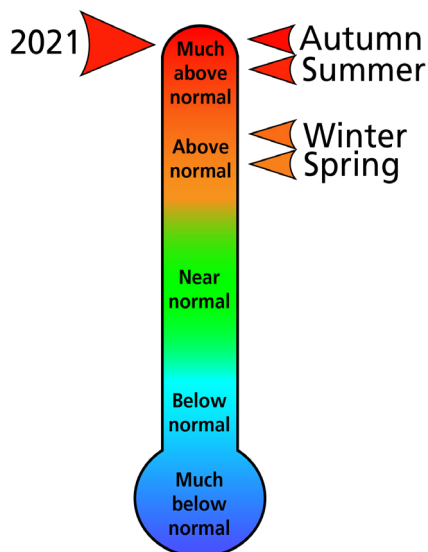


Figure 1. Seasonal and annual temperature rankings. An arrow at the top of the figure would represent the warmest year/season on record (since 1895); at the bottom, the coldest year/season on record. Data are available at <https://www.ncdc.noaa.gov/cag/county/rankings>.

Table 1. 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 <https://www.ncdc.noaa.gov/cag/county/time-series>.

Month/ Year	Average temperature (°F)	Departure from average (°F)
January	34.8	+2.9
February	34.4	+0.4
March	46.5	+4.2
April	54.0	+1.9
May	61.0	-0.5
June	70.8	+1.6
July	75.2	+2.1
August	75.2	+3.7
September	67.1	+1.8
October	60.8	+6.5
November	43.2	-0.6
December	44.1	+9.5
2021	55.6	+2.8

Precipitation

The year 2021 was the 41st driest year recorded across the park's eight counties (Figure 2). The summer was moderately wet, though the other seasons were relatively dry. In total, 37.5 inches of precipitation fell, 3.4 inches less than the long-term average (Table 2).

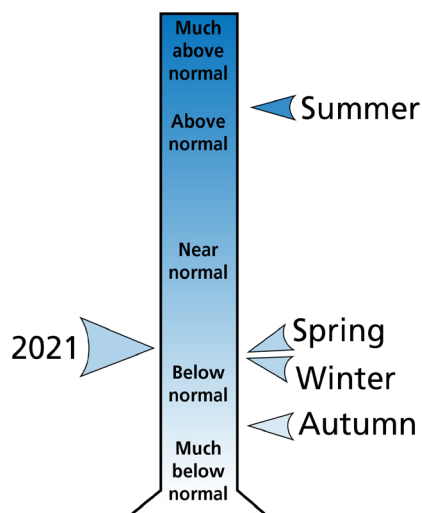


Figure 2. Seasonal and annual precipitation rankings. An arrow at the top of the figure would represent the wettest year/season on record (since 1895); at the bottom, the driest year/season on record. Data are available at <https://www.ncdc.noaa.gov/cag/county/rankings>.

Table 2. Monthly and annual total precipitation and departure from long-term averages. Departures from average are based on a comparison of 2021 precipitation to relevant averages from 1895–2020. Data are available at <https://www.ncdc.noaa.gov/cag/county/time-series>.

Month/Year	Total precipitation (in.)	Departure from average (in.)
January	2.00	-0.85
February	3.43	+0.96
March	1.75	-1.55
April	3.42	+0.16
May	1.99	-1.98
June	4.05	-0.07
July	2.67	-1.43
August	6.59	+2.54
September	5.83	+2.23
October	4.33	+0.96
November	1.10	-1.77
December	0.33	-2.59
2021	37.50	-3.41

Temperature and Precipitation (1895–2021)

Data for counties surrounding the park indicate that annual average temperature has increased approximately +0.17 °F per decade and annual total precipitation has increased approximately +0.42 inches per decade since 1895 (Figure 3).

National Park Service scientists have forecast future changes in climate too. Models estimate that by 2100, annual average temperature at the park will increase by 3.1–8.8 °F (from a best-case to worst-case scenario, respectively). Annual total precipitation is expected to increase by 8–14% (see Gonzalez et al., 2018 for details).

Data in this brief are preliminary and were retrieved from NOAA on 01/10/22.

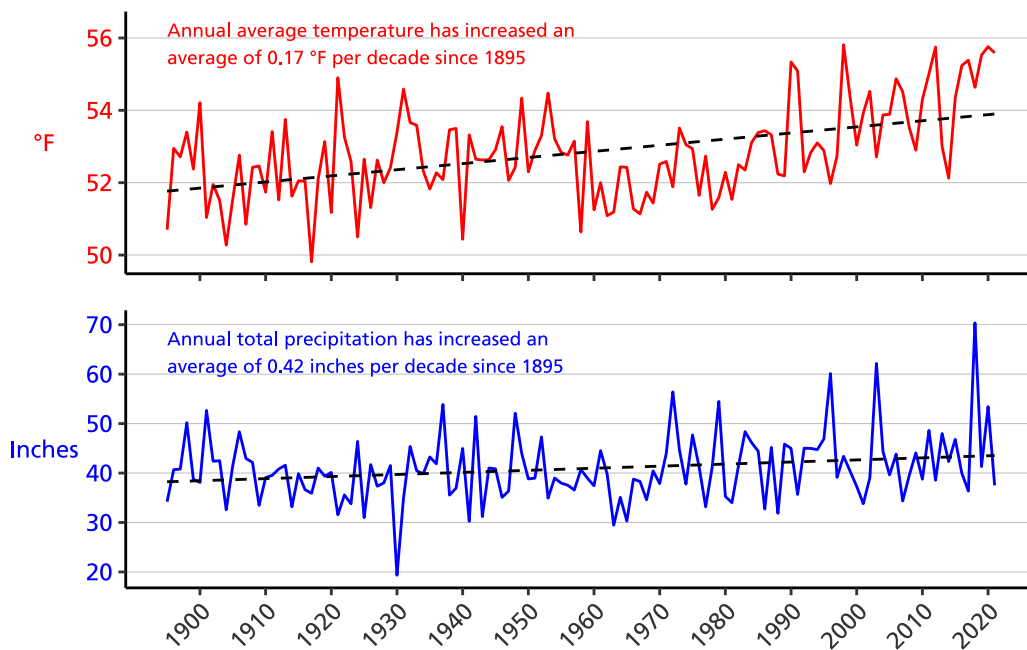


Figure 3. Annual average temperature (°F) and annual total precipitation (in.) from 1895–2021 for counties surrounding the park. Dashed lines represent linear estimates of change. Data are available at <https://www.ncdc.noaa.gov/cag/county/time-series>.

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