National Capital Region Network

National Park Service
U.S. Department of the Interior

Inventory and Monitoring Division

NPS / Alicia Lafever

2021 Weather in Review: Catoctin Mountain Park

In all, 2021 was extremely warm, and the year ended as the 4th warmest on record (since 1895). In contrast, annual total precipitation was close to normal, though the summer was very wet and the autumn was extremely dry.

Data indicate that over the long term, annual average temperature and annual total precipitation have both increased (+0.21 °F per decade and +0.28 inches per decade, respectively).

This brief provides county-scale weather data for Frederick County, Maryland. In particular, the brief summarizes 2021 weather and compares it to 126 years of historical data (1895–2020). 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 ever recorded at the park. All of the seasons were very warm (Figure 1). Ten months had higher than normal temperatures with March, October, and December all being more than 4.5 °F above long-term averages (Table 1).

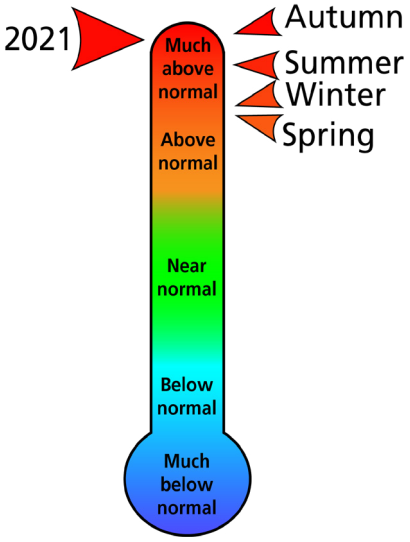

Figure 1. Seasonal and annual temperature rankings. An arrow at the top of the figure would represent the warmest year/season on record (since 1895); at the bottom, the coldest year/season on record. Winter = Jan–Mar, Spring = Apr–June, Summer = July–Sept, Autumn = Oct.–Dec. Data are available at www.ncdc.noaa.gov/cag/county/rankings.

Table 1. Average monthly and annual temperature and departures from long-term averages. Departures from average are based on a comparison of 2021 average temperatures to relevant averages from 1895-2020. Data are available at www.ncdc.noaa.gov/cag/county/time-series.

Month/ Year	Average temperature (°F)	Departure from average (°F)
January	33.8	+3.3
February	32.6	+0.4
March	45.9	+4.6
April	54.2	+2.7
May	61.1	-0.7
June	72.1	+2.0
July	75.8	+1.3
August	76.1	+3.5
September	68.0	+2.1
October	61.6	+7.0
November	42.8	-0.6
December	41.4	+7.7
2021	55.4	+2.7

Precipitation

Though total precipitation for the year was near normal, 2021 had a very wet summer and an extremely dry autumn (Figure 2). The year ended as the 55th wettest on record. In all, 42.85 inches of precipitation fell, just 0.66 inches above than the long-term average (Table 2).

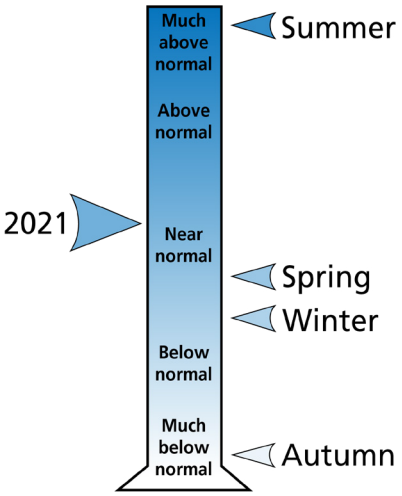

Figure 2. Seasonal and annual precipitation rankings. An arrow at the top of the figure would represent the wettest year/season on record (since 1895); at the bottom, the driest year/season on record. Winter = Jan–Mar, Spring = Apr–June, Summer = July–Sept, Autumn = Oct–Dec. Data are available at www.ncdc.noaa.gov/cag/county/rankings.

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 www.ncdc.noaa.gov/cag/county/time-series.

Month/ Year	Total precipitation (in.)	Departure from average (in.)
January	1.84	-1.25
February	3.92	+1.18
March	2.59	-0.95
April	2.89	-0.61
May	3.63	-0.40
June	4.42	+0.33
July	4.28	+0.32
August	4.77	+0.85
September	9.67	+6.00
October	2.91	-0.51
November	1.15	-1.89
December	0.78	-2.42
2021	42.85	+0.66

Temperature and Precipitation (1895–2021)

Data for Frederick County, MD indicate that annual average temperature has increased approximately +0.21 °F per decade and annual total precipitation has increased approximately +0.28 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 3.1–9.2 °F (from a best-case to worst-case scenario, respectively). Annual total precipitation is expected to increase by 7–14% (see Gonzalez et al., 2018 for details).

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

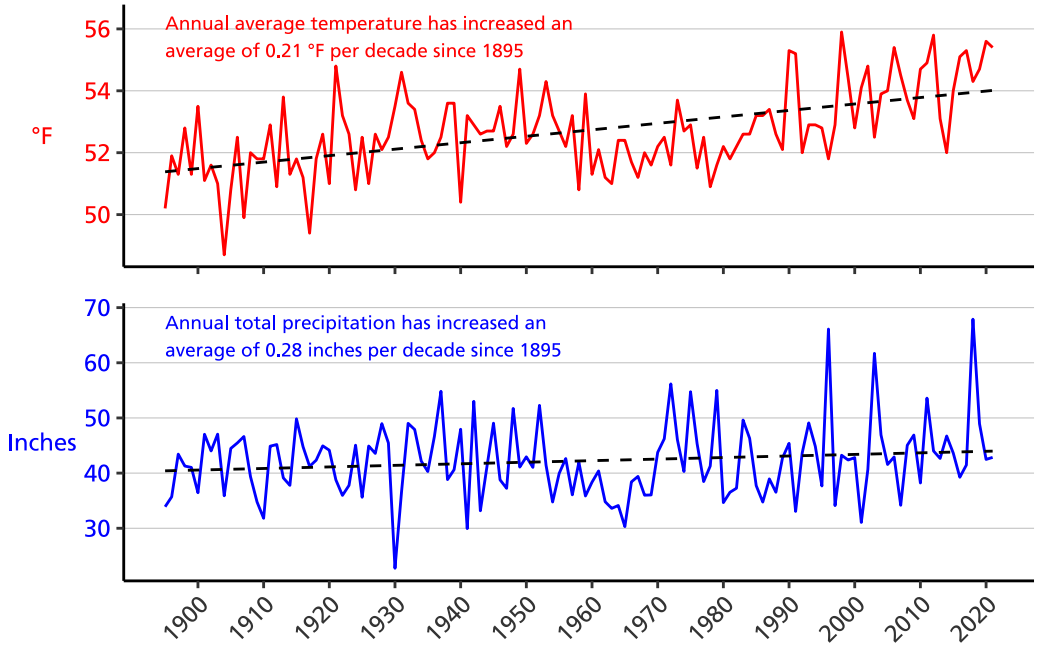

Figure 3. Annual average temperature (°F) and annual total precipitation (in.) from 1895–2021 for Frederick County, MD. Dashed lines represent linear estimates of change. Data are available at www.ncdc.noaa.gov/cag/county/time-series.

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Parks monitored: *Antietam NB • Catoctin Mountain Park • Chesapeake & Ohio Canal NHP • George Washington MP • Harpers Ferry NHP • Manassas NBP • Monocacy NB • National Capital Parks - East • Prince William Forest Park • Rock Creek Park • Wolf Trap NP for PA*

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