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2021 Weather in Review: Valley Forge National Historical Park

In all, 2021 was extremely warm but total precipitation was near normal. The year ended as the 4th warmest and 59th wettest on record.

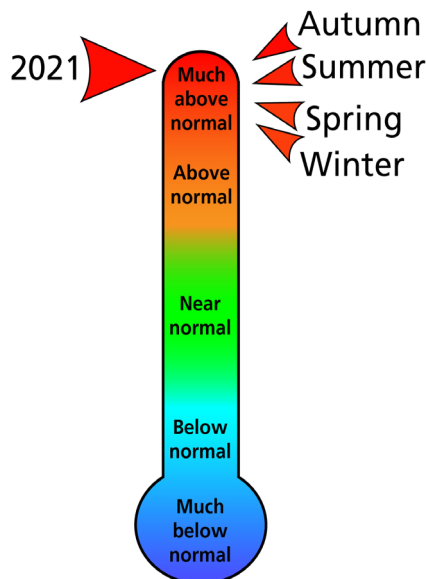
Data indicate that over the long term, annual average temperature and annual total precipitation have both increased (+0.25 °F per decade and +0.34 inches per decade, respectively).

This brief provides county-scale weather data for Chester and Montgomery counties, PA, including data from 1895–2021 (i.e. period of record). Data and analyses herein are courtesy of the [National Oceanic and Atmospheric Administration's \(NOAA\) Climate at a Glance Program](https://www.noaa.gov/).

Temperature

In total, 2021 was the 4th warmest year ever recorded at the park with all seasons being very warm (Figure 1). Eleven months had higher than normal temperatures with March, October, and December all being more than 5 °F above long-term averages (Table 1).

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	33.3	+3.9
February	31.4	+0.7
March	44.8	+5.1
April	53.1	+2.7
May	61.5	+0.5
June	72.2	+2.5
July	76.0	+1.6
August	76.3	+4.0
September	68.7	+3.1
October	61.2	+7.2
November	43.0	-0.1
December	41.2	+8.1
2021	55.2	+3.2

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>.

Precipitation

The year was near normal for total precipitation, but the summer was wet and the autumn was dry. It was the 59th wettest year recorded at the park (Figure 2). In all, 45.8 inches of precipitation fell, only 0.25 inches greater than the long-term average (Table 2).

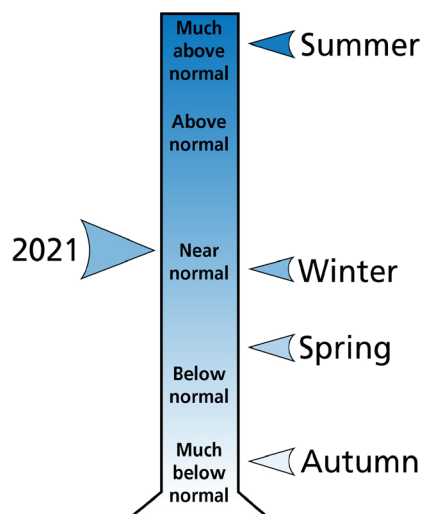


Figure 2. Seasonal and annual precipitation rankings. An arrow at the top of the figure would represent the wettest year/season on record (since 1895); at the bottom, the driest year/season on record. Data are available at <https://www.ncdc.noaa.gov/cag/county/rankings>.

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	1.79	-1.65
February	4.35	+1.33
March	3.93	+0.14
April	2.08	-1.63
May	4.13	+0.17
June	3.78	-0.27
July	5.04	+0.43
August	6.28	+1.75
September	7.92	+3.96
October	4.20	+0.76
November	1.03	-2.34
December	1.28	-2.41
2021	45.82	+0.25

Temperature and Precipitation (1895–2021)

Data for Chester and Montgomery counties, PA indicate that annual average temperature has increased approximately +0.25 °F per decade and annual total precipitation has increased approximately +0.34 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 3.1–9.0 °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.

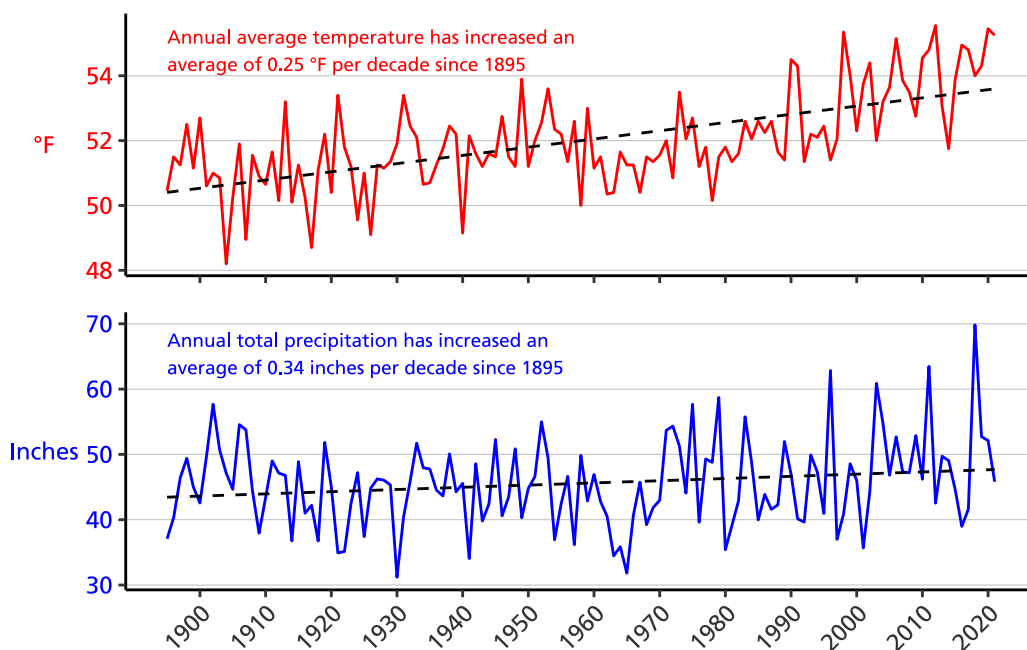


Figure 3. Annual average temperature (°F) and annual total precipitation (in.) from 1895–2021 for Chester and Montgomery counties, PA. Dashed lines represent linear estimates of change. Data are available at <https://www.ncdc.noaa.gov/cag/county/time-series>.

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