



Mid-Atlantic Network

Weather & Climate Resource Brief



Fredericksburg & Spotsylvania NMP

Hopewell Furnace National Historic Site & Valley Forge National Historic Site 2014 Status & Trends

In 2014, six weather observing stations were selected to report the weather of Hopewell Furnace National Historic Site and Valley Forge National Historic Site. The parks are located in the Southeastern Piedmont climate division of Pennsylvania.

2014 was characterized by:

- Near average annual temperatures with a very cold winter but a warm spring and autumn.
- A growing season that was slightly below average.
- Annual precipitation totals that were above average with a very wet winter and spring.

Temperature: In 2014, average annual temperatures were near normal as a very cold winter was evened out by a warm spring and fall. Overall, 2014 tied as the

63rd warmest year in the 120 year record for the Southeastern Piedmont.

The winter began colder than normal with January temperatures almost 6°F (3°C) lower than average in some locations. February and March were also unusually cold and the 2014 winter ultimately ranked as the 10th coldest since the late 1800's. With such a cold winter, the number of sub-freezing days for the year was above normal.

In contrast to the cold winter, the spring season (April – June) was unseasonably warm and tied as the 29th warmest on record for the Southeastern Piedmont. In total, the summer was only slightly warmer than average and tied as the 50th warmest on record. The maximum temperature for the year as recorded at West Chester was 93.0°F (33.8°C).

Although November was very cold, a warm October and mild December cre-

Objective

Document current status and long-term trends in air temperature and precipitation at multiple temporal scales (e.g., daily, monthly, seasonal, annual, and decadal) and spatial scales (e.g., individual stations and aggregated stations such as climate divisions) utilizing existing weather and climate monitoring programs and datasets.

ated a warmer than average fall season. Despite the warm spring and fall, the growing season was slightly less than historic averages at West Chester.

Precipitation: Precipitation totals in 2014 were greater than normal with the year being the 34th wettest on record.

January started normal but February was very wet. Snowfall was also much higher than average with West Chester reporting 54.7 inches (138.9 cm) compared to a long-term average of 26.5 in (67.3 cm). The spring months had well above average precipitation as well, particularly

Climate Change

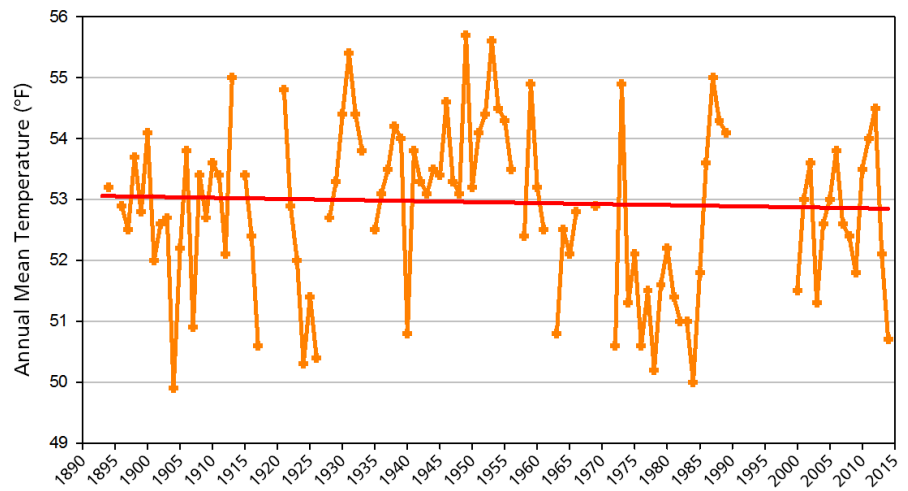
Climate change will affect natural and cultural resources in parks across the country. In order to characterize the extent of the threat, the National Park Service recently completed a climate change exposure assessment for 289 parks. In the study, recent climate conditions were compared to historical normals (i.e. post 1901). For both Hopewell Furnace NHS and Valley Forge

NHS, multiple measures of recent temperature and precipitation metrics were “extreme” when compared to past conditions. For example, the average annual temperature and the average yearly amount of precipitation are now much greater than what occurred historically. For details, please see <http://www.nps.gov/subjects/climatechange/climateexposure.htm>.



Long-term Trends

A trend assessment of many weather metrics was conducted in 2014. The annual mean temperature for a nearby weather station (West Chester, 1893-2014) is shown to the right. The trend line (in red) indicates that annual mean temperatures have decreased slightly at West Chester. This is a single station and weather data can be highly variable and can be influenced by local conditions. There are also some missing recent data. Results should be interpreted with caution.



2014 Status & Trends...

in the months of April and May, and the spring was the 15th wettest since 1895. The wettest day of the year occurred on

May 1st when almost 5 in (127mm) of rain fell at West Chester.

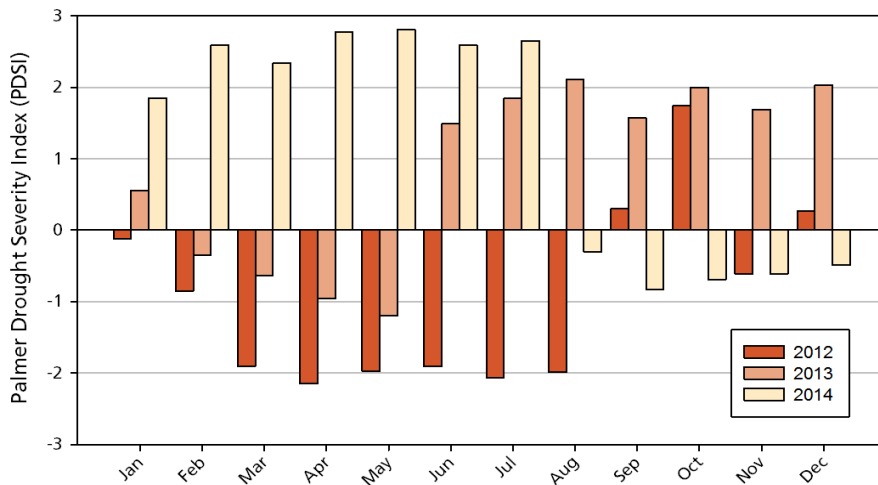
In contrast, the summer season was below normal for precipitation, largely due

to a very dry August and September. For those two months, precipitation totals were 56 percent of normal and it was the 30th driest summer on record. The trend reversed in autumn with most locations receiving slightly more than average rain. It was the 41st wettest autumn in 120 years. There were no direct effects of tropical storms during 2014.

Drought: According to the Palmer Drought Severity Index, soil moisture remained moist during the first seven months of the year. Compared with 2013, the first half of 2014 was noticeably moister, though the summer and autumn were drier.

The full report can be found at: http://science.nature.nps.gov/im/units/midn/monitor/weather_climate.cfm.

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We thank Paul Knight, Kyle Imhoff, Chad Bahrmann, and Sonya Miller at the Pennsylvania State Climate Office for their assistance. Photos by Theresa Rasmussen (front header), James Comiskey (front footer), and Donna M. Higgins (below).



Palmer Drought Severity Index (PDSI) for the Southeastern Piedmont, 2012–2014. Positive values indicate periods of above normal soil moisture (0 to 2: near normal; 2 to 3: moderate moisture; >3: very moist) and negative values indicate periods of drought (0 to -2: near normal; -2 to -3: moderate drought; <-3: severe to extreme drought).

Management Applications

- Illustrate the effects of local climate change.
- Document how yearly weather compares to long-term average.
- Help interpret natural resource observations in relation to that year's weather.
- Provide a baseline for future comparisons.



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Parks monitored: Appomattox Court House NHP • Booker T. Washington NM • Eisenhower NHS • Fredericksburg & Spotsylvania NMP • Gettysburg NMP • Hopewell Furnace NHS • Petersburg NB • Richmond NBP • Shenandoah NP • Valley Forge NHP

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