



Mid-Atlantic Network

Weather & Climate Resource Brief



Fredericksburg & Spotsylvania NMP

Petersburg National Battlefield & Richmond National Battlefield Park 2014 Status & Trends

In 2014, four weather observing stations were selected to report the weather of Petersburg National Battlefield and Richmond National Battlefield Park. The parks are located in the Eastern Piedmont and Tidewater climate divisions of Virginia.

2014 was characterized by:

- Lower than average annual temperatures with a very cold winter and a cool summer.
- A mild spring and fall that resulted in a growing season that was a few days longer than normal.
- An annual precipitation total that was slightly less than average.

Temperature: In 2014, annual temperatures were slightly below the 30-year normal despite a particularly warm spring. Overall, 2014 was tied as the 46th

coolest year in the 120 year record for the Eastern Piedmont.

The winter began colder than normal with January temperatures more than 4°F (2°C) lower than average in some locations. February and March were also unusually cold and the 2014 winter ultimately ranked as the 16th coldest since the late 1800's. Given the 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 was the 18th warmest on record for the area. The trend reversed again in summer with temperatures in August being more than 4°F (2°C) below normal in some locations. Ultimately, the summer was the 43rd coolest on record. Maximum temperatures reached 101.0°F (38.3°C) at Richmond and the number of hot days was relatively close to normal.

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.

Although November was very cold, a warm October and mild December created a slightly warmer than average fall season. The length of the growing season was a few days longer than normal.

Precipitation: Despite some unusual precipitation amounts during certain seasons, total precipitation for the year was only slightly below normal in the Eastern Piedmont and the Tidewater.

Although monthly precipitation was highly variable, total precipitation for the winter was near normal. Nevertheless, annual snowfall totals for 2014 were

Climate Change

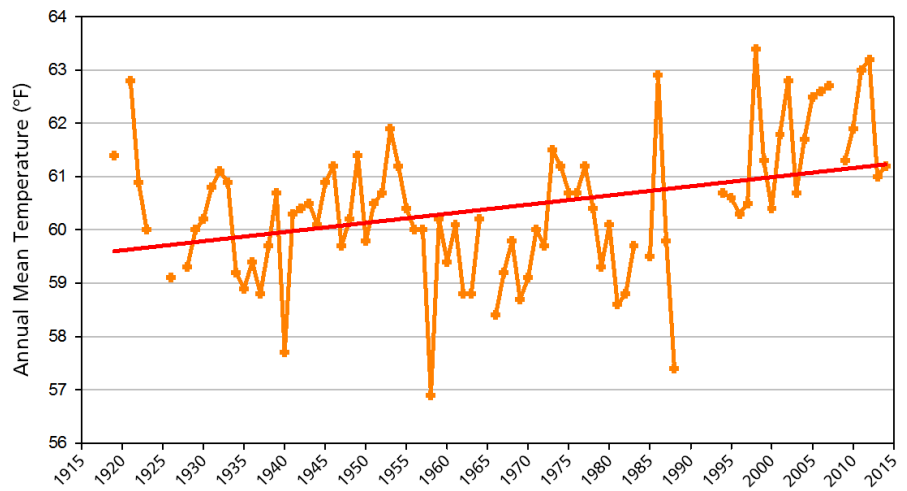
Climate change will affect natural and cultural resources in parks across the country. In order to characterize the extent of the threat, the National Park Service recently completed a climate change exposure assessment for 289 parks. In the study, recent climate conditions were compared to historical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

tiple 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>.



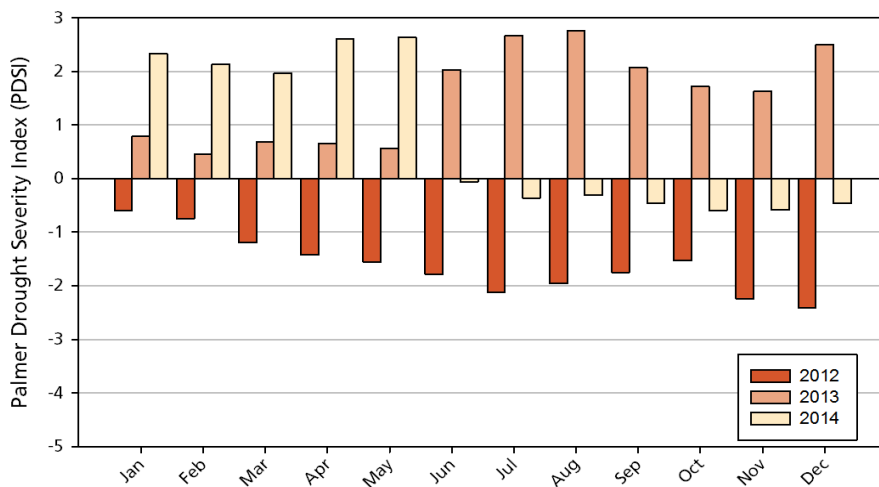
Long-term Trends

A trend assessment of many weather metrics was conducted in 2014. The annual mean temperature for a nearby weather station (Hopewell, 1917-2014) is shown to the right. The trend line (in red) indicates that annual mean temperatures have increased at Hopewell. 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...

above the long-term average. In all, 14.5 in (36.8 cm) was tallied at Richmond and 9.3 in (23.6 cm) at Hopewell.



Palmer Drought Severity Index (PDSI) for the Eastern 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).

The spring was quite wet, being the 18th wettest in the Eastern Piedmont and the 26th wettest in the Tidewater since 1895. The two wettest days of the year occurred on June 10th-11th, with a total of

5.4 in (137.1 mm) of rain.

Precipitation during the summer was variable across the region. Ultimately, it was the 42nd driest summer on record in the Eastern Piedmont but near normal in the Tidewater region. Autumn precipitation was relatively average at most locations.

Drought: According to the Palmer Drought Severity Index, soil moisture was moist until the warm spring and the dry summer dropped values closer to normal. Compared with 2013, it was moister during the first part of 2014 but drier during the late summer and fall.

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 James M. Thomas (below).

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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