



Mid-Atlantic Network

Weather & Climate Resource Brief



Fredericksburg and Spotsylvania National Military Park 2011 Status & Trends

In 2011, seven weather observing stations were selected to report the weather of Fredericksburg and Spotsylvania NMP which is located in the Eastern Piedmont climate division.

2011 was characterised by:

- significantly above average temperatures resulted in the 2nd warmest year on record;
- the growing season was about one week longer than the 30-year average;
- higher than normal rainfall restored drought conditions to normal.

Temperature: In 2011, temperatures were well above the 30-year normal despite a cold January and a chilly October. Temperatures were continuously above normal from February through September, resulting in the 2nd warmest

year in the 117 year record of the Eastern Piedmont.

Despite the cold January, the remaining winter months were warmer, resulting in the 43rd warmest winter. The spring was much warmer than normal due to very mild nights, particularly in May and June. Overall, this season ranked as the 2nd warmest on record. The summer months featured consistently warmer-than-average weather, especially in July, becoming the 7th warmest. The number of hot days was well above normal, with the highest readings topping out at 100°F (37.8°C) compared to the long-term mean of 96.5°F (35.8°C) at Louisa, VA. After a cool October, the next two autumn months were warmer than average to produce the 7th warmest fall in the Eastern Piedmont. The number of sub-freezing days was just above normal. The length of the growing season was about a week longer when compared to the 1981–2010 average at Louisa, VA.

Objectives

1. 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.

Precipitation: The dry winter and spring were offset by wet summer and fall. Annual precipitation was 5.4 in (137 mm) above normal, or about an average month of rain and snow, coming in at the 19th wettest year on record. The number of heavy precipitation days was slightly above the long-term average.

January and February were noted by little precipitation, followed by a wetter March. This resulted in the 21st driest winter for the Eastern Piedmont region since 1895. The spring was slightly

Importance

Climate is a dominant factor driving physical and ecological processes, and is responsible for short- and long-term changes that have profound effects on park ecosystems. Individual storm events do occasionally alter the structure of plant and animal communities. Future climate changes will likely cause migrations of plant and animal communities both northward and to higher

elevations. Superimposed on these trends is a long history of human use in the region, with its associated landscape fragmentation that will influence the ability of the plant and animal communities of the MIDN's parks to adapt to climate changes. Because of its influence on the ecology of the park units and the surrounding areas, climate was identified as a high-priority vital sign.



Management Applications

- Illustrate the effects of local climate change.
- Document how 2011 weather compares to long-term average.
- Help interpret natural resource observations in relation to 2011 weather.
- Provide a baseline for future comparisons.

Long-term Monitoring

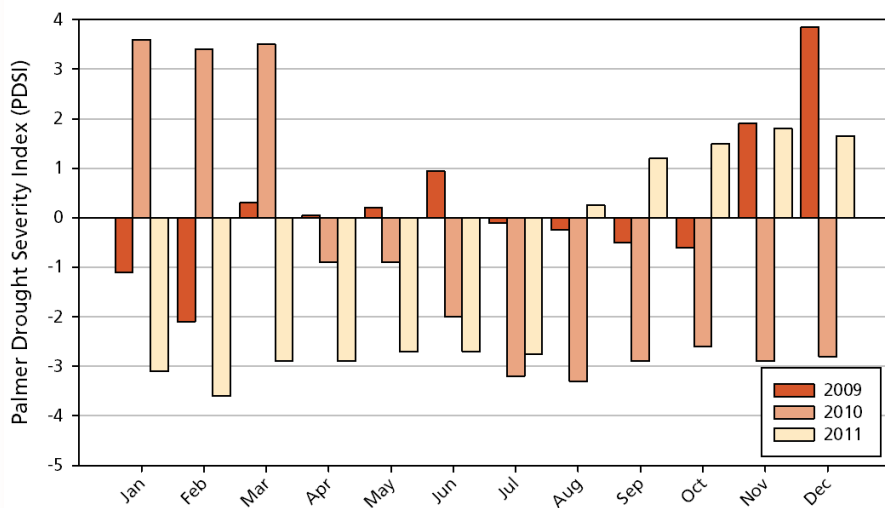
A total of 32 weather observing stations were selected across the network based on their proximity to the network parks, the representativeness of the station to each park's elevation profile, the type and frequency of observations, the period of record of the data, data availability, and the percentage of time a station reports a particular parameter. Some of the stations with a longer period of record are used for comparison to a

30-year normal, while others are used to illustrate monthly averages. Two drought indices are used to estimate the severity of drought in an area. The Palmer Drought Severity Index (PDSI) is based on soil moisture, while the United States Drought Monitor (DM) – Drought Intensity Index is a synthesis of multiple indices (including the PDSI) and impacts which represents a consensus of federal and academic scientists.

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moister, but became progressively drier to produce an average ranking, the 63rd wettest in 117 years. Summer rainfall

varied across the region but was characterized by a dry latter half of August followed by bouts of heavy rain associated with Hurricane Irene in late August and the direct effects of tropical storm Lee



Palmer Drought Severity Index (PDSI) for the Western Piedmont, 2009–2011. Scale values are: 0 to ± 2 = near normal; ± 2 to ± 3 = moderate drought/moist; ± 3 to ± 4 = severe drought/very moist; ± 4 and above = extreme drought/moist.

in early September. The summer was the 15th wettest on record. The autumn was relatively wet with October having the highest rainfall of the three months. Snowfall was well below normal, with 6.2 in (15.7 cm) at Louisa, compared to the long-term average of 17.7 in (45.0 cm). Much of the snow for 2011 fell in January and the number of snowy days was about normal.

Drought: 2011 started under severe drought conditions. Spring rainfall improved the drought status, with the additional summer rainfall bringing the drought severity index to positive numbers for the fall months. The full report can be found at: <http://science.nature.nps.gov/im/units/midn/Protocol-WeatherandClimate.cfm>

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Photos by James Comiskey (front) and Sarah Wakamiya (below).

A Final Note

The Weather and Climate Monitoring Protocol is led by Paul Knight, Pennsylvania State Climatologist, and his team including Kyle Imhoff, Chad Bahrmann, and Sonya Miller at the Pennsylvania State Climate Office. In addition to the summary information available in technical reports, a near real-time data stream is available for the selected weather observing stations, along with monthly, seasonal, and annual summaries at: http://climate.met.psu.edu/gmaps/NPS_DEVELOPMENT/interface.php. This project is a collaborative effort with the Eastern Rivers and Mountains Network.



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

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