



Mid-Atlantic Network

Weather & Climate Resource Brief



Eisenhower National Historic Site & Gettysburg National Military Park **2013 Status & Trends**

In 2013, two weather observing stations were selected to report the weather of Eisenhower NHS and Gettysburg NMP which are located in the Lower Susquehanna climate division.

2013 was characterized by;

- *above average temperatures;*
- *the growing season was about two weeks shorter than the 30-year average;*
- *a moderately wet year, especially in the fall restored drought conditions to normal.*

Temperature: In 2013, temperatures were above the 30-year normal, resulting in the 22nd warmest year in the 119 year record for the Lower Susquehanna division. Surprisingly, the annual maximum temperature at the Biglerville station was 0.6°F (0.4°C) below normal and the annual minimum was 1.0°F (0.6°C) above

normal, resulting in a mean increase of 0.2°F (0.1°C) compared with the 1981-2010 average annual temperature. The growing season was just over two weeks shorter than the long-term average.

The year began rather mild, but temperatures dropped in February, and yet colder in March which averaged as much as 3.7°F (2.0°C) below the long-term average for that month. However, the number of cold days (days with max temperatures $\leq 32^{\circ}\text{F}/0^{\circ}\text{F}$) was similar to the long-term trend. Spring saw temperatures staying above seasonal levels in April and again in June. The summer was not as warm as in previous years, with August readings averaging 1.7°F to 2.4°F (0.9°C to 1.3°C) below the normal temperatures. Both the average annual maximum temperatures and the highest temperatures recorded were below the 30-year average. Autumn featured a warm October and a very chilly Novem-

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.*

ber, while December was warmer than average.

Precipitation: 2013 was the 45th wettest on record for the Lower Susquehanna. Annual snowfall was above normal at 28.8 in (73.1 cm) compared to the long-term average of 25.9 in (65.8 cm).

While January averaged near normal precipitation, February and March averaged below-normal precipitation, resulting in the 33rd driest winter on record. Spring ranked as normal, though April was very dry and June was very wet. The

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 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.

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.

2013 Status & Trends...

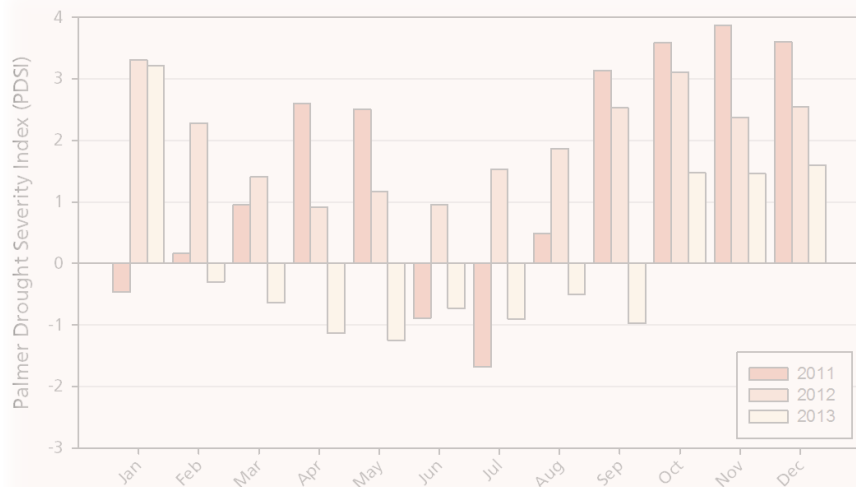
region had above-average rainfall during two of the three summer months, with 3.5 in (90 mm) in July and 5.3 in (135

mm) during August. There was no direct contribution to rainfall from tropical storms or hurricanes during this period. Autumn had an above-average amount with 14.0 in (356 mm) of rain and snow

falling compared with the long-term average of 10.3 in (262 mm). Rainfall in October was well above average. The autumn ranked as the 2nd wettest in 119 years, yet the annual precipitation total was surprisingly 1.8 in (46 mm) below the 30-year average from 1981–2010.

Drought: 2013 was moist to start and end the year with values exceeding very moist conditions in January and then approaching moist conditions in December; however, regular rain became infrequent in the spring and summer. When compared with the last two years, 2013 was noticeably drier during the growing season.

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



Palmer Drought Severity Index (PDSI) for the Lower Susquehanna, 2011–2013. Positive values indicate periods of above normal precipitation (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).

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Photos by Steve Dacosta (front header) and James Comiskey (front and back).

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/NPS/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 • Eisenhower NHS • Fredericksburg & Spotsylvania NMP • Gettysburg NMP • Hopewell Furnace NHS • Petersburg NB • Richmond NBP • Shenandoah NP • Valley Forge NHP

November 2014