



Weather of Bluestone National Scenic River, Gauley River National Recreation Area, and New River Gorge National River

Eastern Rivers and Mountains Network Summary Report for 2014

Natural Resource Data Series NPS/ERMN/NRDS—2015/812



ON THE COVER

Mist over insignificant rapid, Gauley River, Gauley River National Recreation Area.
Photograph by: Jim Vanderhorst.

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The National Park Service, Natural Resource Stewardship and Science office in Fort Collins, Colorado, publishes a range of reports that address natural resource topics. These reports are of interest and applicability to a broad audience in the National Park Service and others in natural resource management, including scientists, conservation and environmental constituencies, and the public.

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All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner.

This report received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data. Data in this report were collected and analyzed using methods based on established, peer-reviewed protocols and were analyzed and interpreted within the guidelines of the protocols.

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List of Key Acronyms

ASOS	Automated Surface Observing System
BLUE	Bluestone National Scenic River
COOP	National Weather Service Cooperative Observer Program
CWOP	Citizen Weather Observer Program
ERMN	Eastern Rivers and Mountains Network
GARI	Gauley River National Recreational Area
GOES	Geostationary Operational Environmental Satellite
IFLOWS	Integrated Flood Observing and Warning System
NADP	National Atmospheric Deposition Program
NARR	North American Regional Reanalysis
NCDC	National Climatic Data Center
NERI	New River Gorge National River
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NR	National River
NRA	National Recreation Area
NSR	National Scenic River
NWS	National Weather Service
PDSI	Palmer Drought Severity Index
POR	Period of Record
PRISM	Parameter-elevation Regressions on Independent Slopes Model
RAWS	Remote Automated Weather Stations
USDM	United States Drought Monitor
USGS	United States Geological Survey

Introduction

Weather and climate are widely recognized as key drivers of terrestrial and aquatic ecosystems, affecting biotic as well as abiotic ecosystem characteristics and processes. Global and regional scale climatic patterns, trends, and variations are critical to the cycling of elements, nutrients, and minerals through ecosystems and can deliver pollutants from regional and even global sources (National Assessment Synthesis Team 2001). These variations and trends influence the fundamental properties of ecologic systems such as soil-water relationships and plant-soil processes and their disturbance rates and intensity. Information obtained from meteorological monitoring will be useful to interpreting and understanding changes in species composition, community structure, water and soil chemistry, and related landscape processes (Marshall and Piekielek 2007).

The purpose of this report is to provide a concise weather and climate summary for the period from January 1 through December 31, 2014, and to place current patterns and trends in an appropriate historical and regional context (Marshall et al. 2012). It is our intention that this report will satisfy an inherent interest in meteorological phenomena and meet a portion of the Eastern Rivers and Mountains Network (ERMN) Weather and Climate Monitoring 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.

To accomplish this objective, a variety of atmospheric data streams were evaluated for their quality, longevity, and applicability to the ERMN parks. Since no single weather observing network contains all the pertinent measures of atmospheric phenomena to assess ecosystem health, an objective analysis of the data networks was developed and outlined in the Weather and Climate Monitoring Protocol for the Eastern Rivers and Mountains Network and Mid-Atlantic Network of the National Park Service (Marshall et al. 2012). Through this analysis, a select number of weather/climate observing stations were chosen as representative of each park and these are the primary data sources used to profile climate summary and trends.

In addition to a suite of summary tables, graphs, and narratives, we specifically identify a series of key weather indicators to report status and trends. This report includes a summary of several of these indicators for the period of record of selected stations (ending on December 31, 2013). These key indicators are further described in the protocol (Marshall et al. 2012) and summarized in the body of this report.

Climate of the Central and Southern West Virginia Region

Bluestone National Scenic River (NSR) is located in West Virginia (WV) Climate Division 5, “Southern,” while Gauley River National Recreation Area (NRA) is located in WV Climate Division 4, “Central.” New River Gorge National River (NR) is located within both. A climate division is a region that is reasonably homogenous with respect to climatic and hydrologic characteristics (<http://www.esrl.noaa.gov/psd/data/usclimdivs/data/map.html> [NOAA 2013]) and is frequently used for compiling climate statistics. West Virginia is divided into six climate divisions.

The two climate divisions encompassing these parks are generally considered to have a humid, continental type of climate, but the varied physiographic features have a marked effect on the weather and climate of the various parts of this region. The prevailing westerly winds carry most of the weather disturbances that affect the region from the interior of the continent, with the Atlantic Ocean having only an occasional influence on the climate of the area (Davey et al. 2006). Coastal storms do, at times, affect the day-to-day weather, especially in the winter. Infrequently, storms of tropical origin can have a significant effect, causing severe floods in some instances.

Temperatures are moderately continental, with the tempering effects of the Great Lakes contributing to cloud production in the winter and mountain-valley circulation clouds reducing the heat at times during the summer. The lowest readings in the winter occur with polar air masses of Canadian origin settling over the region after a fresh snowfall. The highest readings of the summer happen when the sub-tropical fair weather system, the Bermuda high, pushes westward into the Carolinas; its clockwise circulation will direct hot, humid air from the Gulf region into the Ohio Valley and West Virginia. The humid southwest winds ascending the crest of the Appalachians can produce widespread afternoon thunderstorms. On average, Gauley River National Recreational Area tends to have a greater number of hot days (temperatures above or equal to 90.0°F/32.0°C) than New River Gorge National River and Bluestone National Scenic River. The last freeze typically occurs in mid-May and the first frosts appear in October.

Precipitation is fairly evenly distributed throughout the year. Annual amounts generally range between 36–52 in (914–1,321 mm), while the majority of places receive 38–44 in (965–1,118 mm). Greatest amounts usually occur in the late spring and summer months, while February is the driest month, having about 2 in (51 mm) less than the wettest months. During the warm season, the uneven heating over the irregular terrain leads to numerous thunderstorms which typically form over the mountains.

Surface winds blow from the west and northwest in the cold season and from the southwest during the warm half of the year. Thunderstorms follow a frequency that matches the solar cycle, occurring between the equinoxes and reaching a peak near the summer solstice. Hail is relatively infrequent, but flash floods and damaging thunderstorm winds affect parts of the region each summer. On average, tornadoes pass through the area about once every three years. The direct effects of an Atlantic hurricane are uncommon, though remnant rains from hurricanes and tropical storms have contributed to the region’s worst floods. Ice storms, which can cause significant disruption, occur at

irregular intervals and are primarily confined to the months between December and March (Kocin and Uccellini 2004).

Observing Stations

Eleven weather observing stations, comprising three observing networks, were selected around Bluestone NSR, Gauley River NRA, and New River Gorge NR. Representative stations within a 100-km range of each park were chosen based on several criteria, including proximity to the park, the representativeness of the station to the park elevation profile, the type and frequency of observations, the period of record of the data, and data availability (Marshall et al. 2012). Moreover, the percentage of time a station reports particular parameters (e.g., temperature) can influence data inclusion. One station, Oak Hill, WV (OAKW2), was excluded in 2014 due to this criterion and was subsequently replaced with temperature and precipitation data from nearby Ansted Hawks Nest, WV (HWKW2); therefore, 10 of the 11 stations were used for this report (Figure 1, Table 1).

Two stations, Beckley Airport (1963-current) and Summersville Lake (1968-current), were used for a long-term trend analysis using the period of record for both stations ending December 31, 2013. Graphs of these long-term trends are shown in the Appendix section of this document. For temperatures, long-term means and the standard deviation above and below the long-term mean are computed for each indicator. Because precipitation distributions do not fall on a normal curve like temperature distributions do, standard deviations are not computed for the precipitation indicators.

The following are the climate indicators selected for each of the parks:

- Highest Annual Maximum Temperature – A measure of the individual highest maximum temperature each year
- Average Annual Mean Temperature – A measure of the composite mean temperature (averaging the maximum and minimum on a daily basis) for an entire year
- Annual Number of Hot Days (Maximum Temperature equal to or exceeding 90 °F)- A measure of warm season heat using a threshold of days with 90F maxima
- Lowest Annual Minimum Temperature – A measure of the individual lowest minimum temperature each year
- Annual Number of Cold Nights (Minimum Temperature equal to or below 32 °F) – A measure of the cold season chill using a threshold of days with 32F minima
- Growing Season Length (Number of Days Between Last Freeze in Spring and First Freeze in Fall) – A measure of the local growing season as tallied by the total number of days between the last 32F in the spring and the first 32F in the fall
- Annual Precipitation – A measure of total liquid (and its equivalent melted snow) for all days
- Annual Snowfall – A measure of total solid precipitation (includes sleet and hail; does not include freezing rain)

- Annual Number of Extreme Precipitation Days (Liquid equal to or greater than 2.00”) – A measure of frequency of heavy precipitation events during each year
- Winter Precipitation (January 1 – March 31) – The three month total precipitation including rain and melted snow
- Spring Precipitation (April 1 – June 30) - The three month total precipitation
- Summer Precipitation (July 1 – September 30) - The three month total precipitation
- Autumn Precipitation (October 1 – December 31) - The three month total precipitation including rain and melted snow

The average value of a climate element over 30 years is defined as a climatological normal, which is calculated and established by NOAA’s National Climatic Data Center (NCDC). Every ten years, NCDC computes new thirty-year climate normals for selected temperature and precipitation elements for a large number of U.S. climate and weather stations. The current (as of 2014) normals cover the period 1981–2010. In this report, the 30-year normals established by NCDC are used as the baseline for comparisons (e.g., departures from normal). In cases where data for the 30-year normal period are not available, we use alternative comparisons such as the new pseudo-normal from NCDC or a recent 10-year period. In some cases, sufficient data may simply not be available to calculate normals. For metrics that NCDC may not routinely calculate a normal, such as the number of days with more than 2 in (55 mm) of rain or liquid equivalent, normals will be calculated using the same time period (e.g., 1981–2010) as the current NCDC standard. Throughout the report, descriptions of a station’s values as compared to the normals are described as a difference from the “average”, “mean”, “typical”, “long-term value”, as well as “normal”, to improve the readability of the document. However, all of these terms are comparing a value from one year at that station to that station’s normal, whether it be the 30-year normal or the pseudo-normal calculated on a shorter time frame.

The NCDC also calculates and provides climatological ranks for selected temperature and precipitation elements (<http://www.ncdc.noaa.gov/temp-and-precip/ranks.php>). Data and statistics are as of January 1895 providing a substantial period of record to place the current year in historical context.

In addition to the summary information available in this report, a near real-time data stream has been made available to the ERMN through a Web interface for the selected stations along with monthly, seasonal, and annual summaries. The Web interface is accessible through the following link: <http://climate.met.psu.edu/NPS/interface.php>.

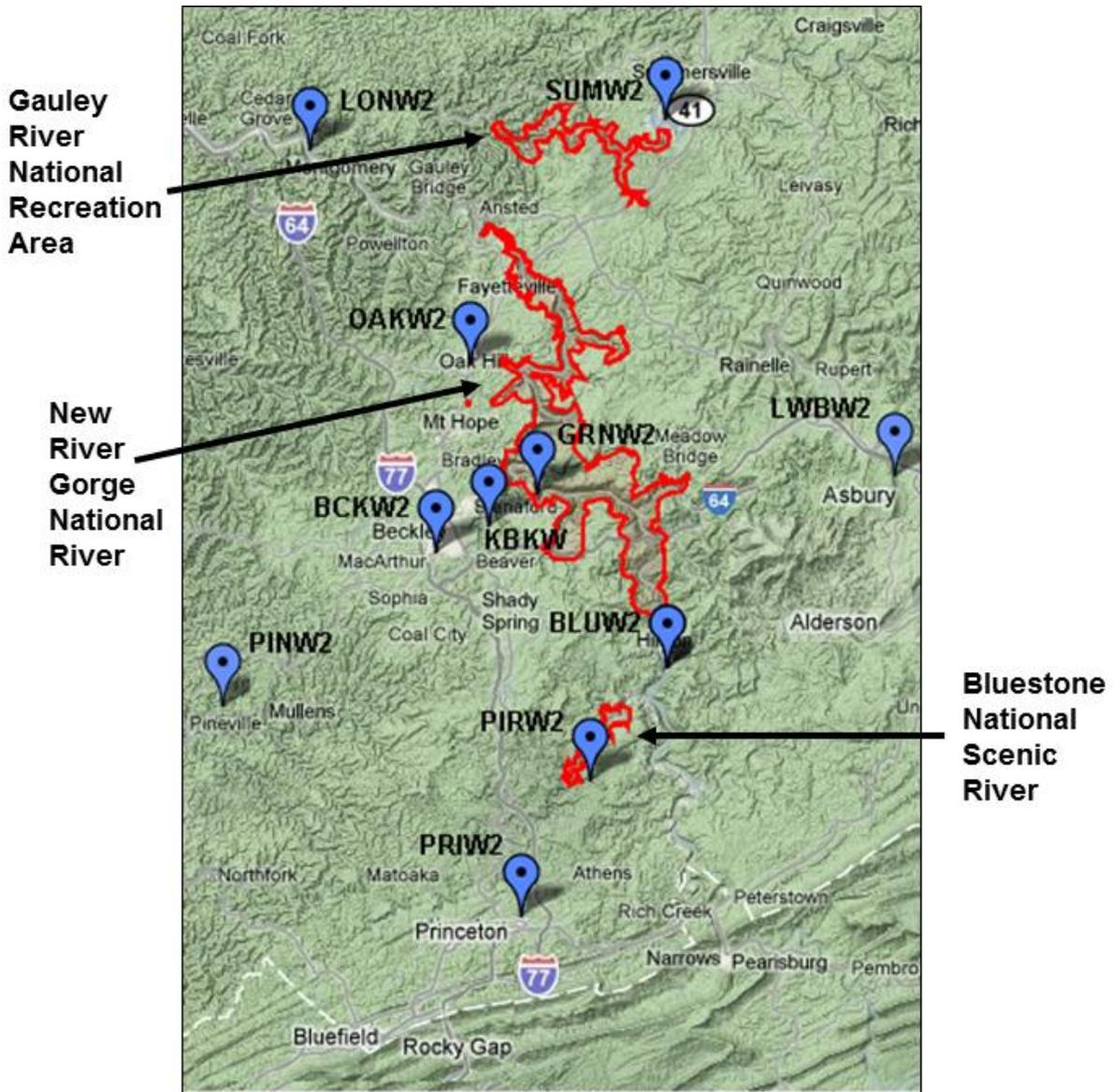


Figure 1. Location of weather observing stations around Bluestone National Scenic River, Gauley River National Recreation Area, and New River Gorge National River. See Table 1 for station names.

Table 1. List of weather observing stations around Bluestone National Scenic River, Gauley River National Recreation Area, and New River Gorge National River selected as best representative of the parks in 2014.

Station	Observing Network	Station Name	Period of Record (POR)		Percentage of Time Reporting Temperature for 2014	Percentage of Time Reporting Precipitation for 2014	Percentage of Time Reporting Temperature for entire POR	Percentage of Time Reporting Precipitation for entire POR
BLUW2	COOP	Bluestone Lake	03/01/1943	Present	-	100.0	96.5	99.6
OAKW2	COOP	Oak Hill	10/01/1941	Present	-	-	94.5	94.5
LONW2	COOP	London Locks	07/01/1934	Present	96.7	97.8	90.3 ¹	89.3
SUMW2	COOP	Summersville Lake	02/01/1967	Present	93.4	97.3	97.2	98.4
PRIW2	COOP	Princeton	07/01/1940	Present	-	98.9	-	98.7
∞ LWBW2	COOP	Lewisburg 3 N	09/11/1852	Present	100.0	100.0	94.3 ²	65.4
BCKW2	COOP	Beckley VA Hospital	12/01/1893	Present	95.6	98.6	79.2 ³	77.1
KBKW	ASOS	(Beckley) Raleigh County Memorial Airport	05/15/1963	Present	99.2	100.0	99.9	99.9
PINW2	COOP	Pineville	01/06/1908	Present	87.1	80.8	63.0	63.0
GRNW2	RAWS	Grandview	01/01/2005	Present	99.5	99.5	98.0	97.8
PIRW2	RAWS	Pipestem	06/09/2005	Present	100.0	100.0	97.8	97.8

¹LONW2 began reporting temperature on 8/4/1936.

²LWBW2 began reporting temperature on 4/17/1900.

³BCKW2 began reporting temperature on 4/1/1896.

Temperature Summary

The 2014 calendar year averaged below normal compared with the long-term means for temperature (Tables 2, 3, and 4) and continued the reversal of the warming trend that began in 2012. All three winter months averaged significantly below normal, but January brought the largest negative departures of the year (Figures 2 and 3).

The lowest readings, which were between -1 and -9 degrees Fahrenheit (°F) (-18.3 to -22.8 degrees Celsius [°C]) during the winter, were measured on January 7, 2014 at most sections. The lowest value for the year near the parks occurred in Summerville Lake, WV, and was -9.0°F (-22.8°C) (Table 2). The number of sub-freezing days was more than the long-term mean and the number of cold nights was well above the average (Table 2). The winter ranked as the 5th to 12th coldest in 120 years for the climate divisions encompassing the parks (60 is the mid-point; Table 5).

The spring saw much milder conditions return such that the period from April to June of 2014 ranked as the 10th to 14th warmest in 120 years (Figures 2 and 3; Table 5). Record early warmth was noted during the second week of May (May 12-14) as readings rose to 84°F (28.9°C) in some locations. An outbreak of chilly weather followed the warm spell in the latter part of May and brought some sections their last frost (on May 17-18), so the growing season in parts of each park began later than the average date (Table 2). Most of this spring's warmth can be attributed to mild nights and rather warm days during May and June (Figures 2 and 3).

The summer months of July–August–September were cool due to rather cool July and August days (Figure 2). September averaged very close to normal with slightly cooler than average maximums (Figure 3). No record maximums were recorded during the period and the summer ranked as the 14th to 19th coolest in 120 years of records (Table 5). The highest readings of the year, near 90°F (32.2°C) occurred on July 12-13 (Table 2).

Overall, autumn ranked near the average of the last 120 years for temperature; between 63rd and 69th with 60 being the long-term mean (Table 5). Frosts and freezes occurred later than the average date, with most sections noticing sub-freezing readings (<32°F [$<0^{\circ}\text{C}$]) on October 30-31. As a result, the length of the growing season was longer (by about 9-18 days) (Table 2) than the 1981–2010 normal lengths at two of the primary locations. While October averaged near to above normal (Figures 2 and 3), it was November which had the largest negative departures of the season with as much as -8.5°F (-4.7°C) (Table 4). The average annual temperature ranged from -2.3°F (-1.2°C) to -0.7°F (-0.4°C), making 2014 the 14th and 17th coolest since 1895.

The maps in Figures 2 and 3 were created using estimates from the Parameter-elevation Regressions on Independent Slopes Model (PRISM). PRISM uses an interpolation scheme for temperature between actual observations and corrects these estimates for changes in topography across the region (Daly et al. 2002). More information can be found at <http://www.prism.oregonstate.edu/>.

Table 1. Status of 2014 temperature indicators compared to the 30-year normal (1981–2010) and the station period of record at the Beckley Airport (KBKW) and Summersville Lake (SUMW2) stations.

Temperature Indicator	Beckley Airport, WV 2014	Beckley Airport, WV 1981–2010	Beckley Airport, WV 1963-2013 Mean (1 SD)	Summersville Lake, WV 2014	Summersville Lake, WV 1981-2010	Summersville Lake, WV 1968-2013 Mean (1 SD)
Average Annual Temperature	51.2°F 10.7°C	51.9°F 11.1°C	51.5 (50.3 – 52.7) °F 10.8 (10.2 – 11.5) °C	49.4°F 9.7°C	50.8°F 10.4°C	51.0 (49.8– 52.2) °F 10.6 (9.9 – 11.2) °C
Average Annual Maximum Temperature	60.6°F 15.9°C	61.3°F 16.3°C	NA	60.6°F 15.9°C	61.3°F 16.3°C	NA
Maximum Temperature	86.0°F 30.0°C	88.2°F 31.2°C	88.4 (85.6 – 91.2) °F 31.3 (29.8 – 32.9) °C	88.0°F 31.1°C	89.5°F 31.9°C	89.9 (87.3 – 92.5) °F 32.2 (30.7 – 33.6) °C
Hot Days (days with Tmax≥90°F/32°C)	0	1	1 (0 – 3)	0	2	3 (0 – 7)
Average Annual Minimum Temperature	41.6°F 5.3°C	42.5°F 5.8°C	NA	38.4°F 3.6°C	40.2°F 4.6°C	NA
Minimum Temperature	-9.0°F -22.8°C	-4.8°F -20.4°C	-4.2 (-12.1 - 3.6) °F -20.1 (-24.5 – -15.8) °C	-9.0°F -22.8°C	-5.3°F -20.7°C	-5.2 (-12.6 - 2.1) °F -20.7 (-27.8 – -16.6) °C
Cold Days (days with Tmax≤32°F/0°F)	24	25	NA	34	27	NA
Sub-freezing Days (days with Tmin≤32°F/0°C)	118	107	112 (103 – 121)	126	126	122 (109 – 136)
Sub-zero Days (days with Tmin≤0°F/-17.8°C)	8	2	NA	14	3	NA
Growing Season Length (days between last spring Tmin 32°F/0°C and first fall Tmin 32°F/0°C)	196	174	162 (146 – 178)	178	169	164 (152 – 177)

**Bluestone National Scenic River,
Gauley River National Recreation Area,
and New River Gorge National River
Departure from Average Monthly Maximum Temperature
2014 vs. 1981–2010**

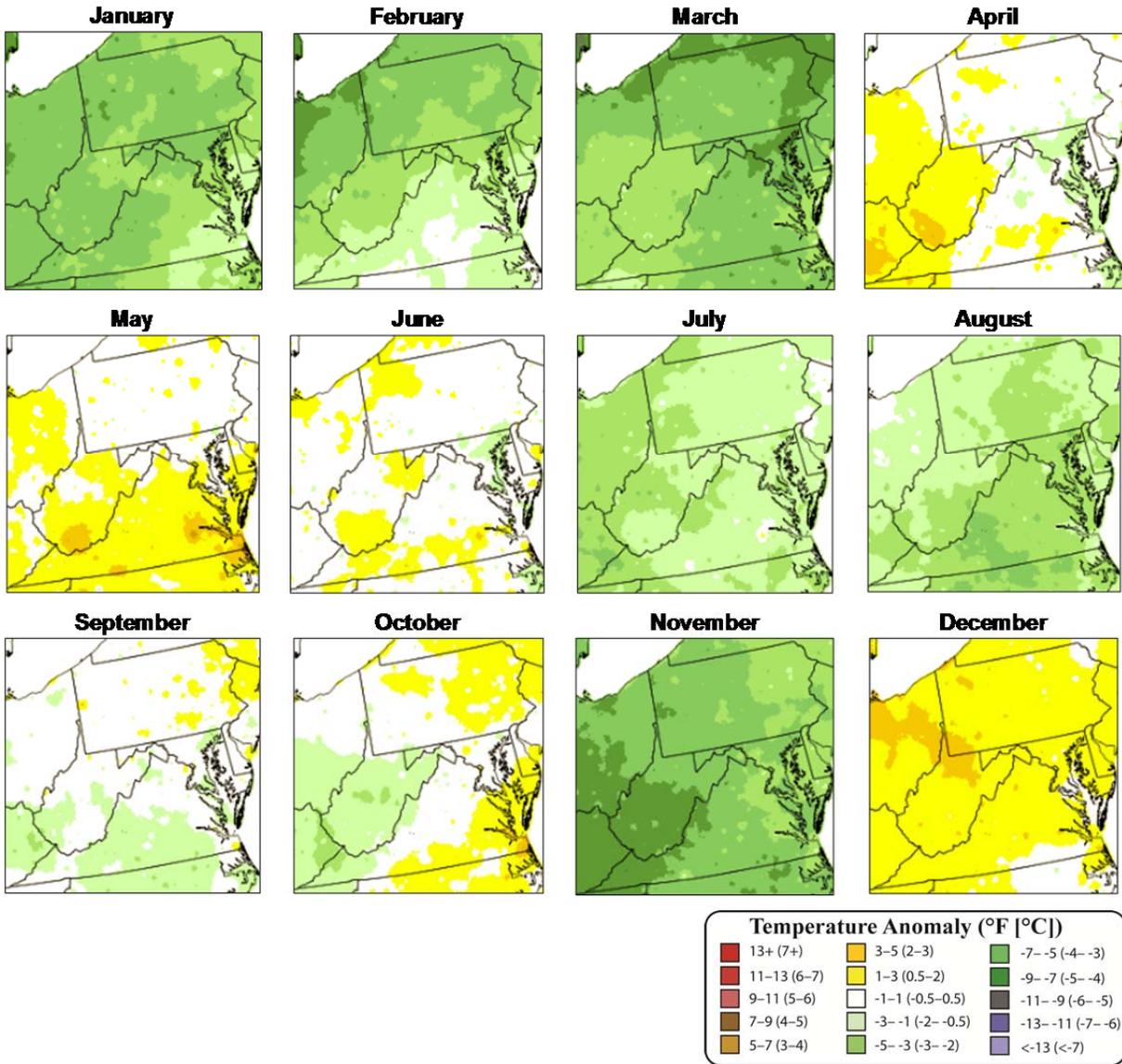


Figure 2. Maps showing departure from average monthly maximum temperature compared to the 30-year normal (1981–2010).

**Bluestone National Scenic River,
Gauley River National Recreation Area,
and New River Gorge National River
Departure from Average Monthly Minimum Temperature
2014 vs. 1981–2010**

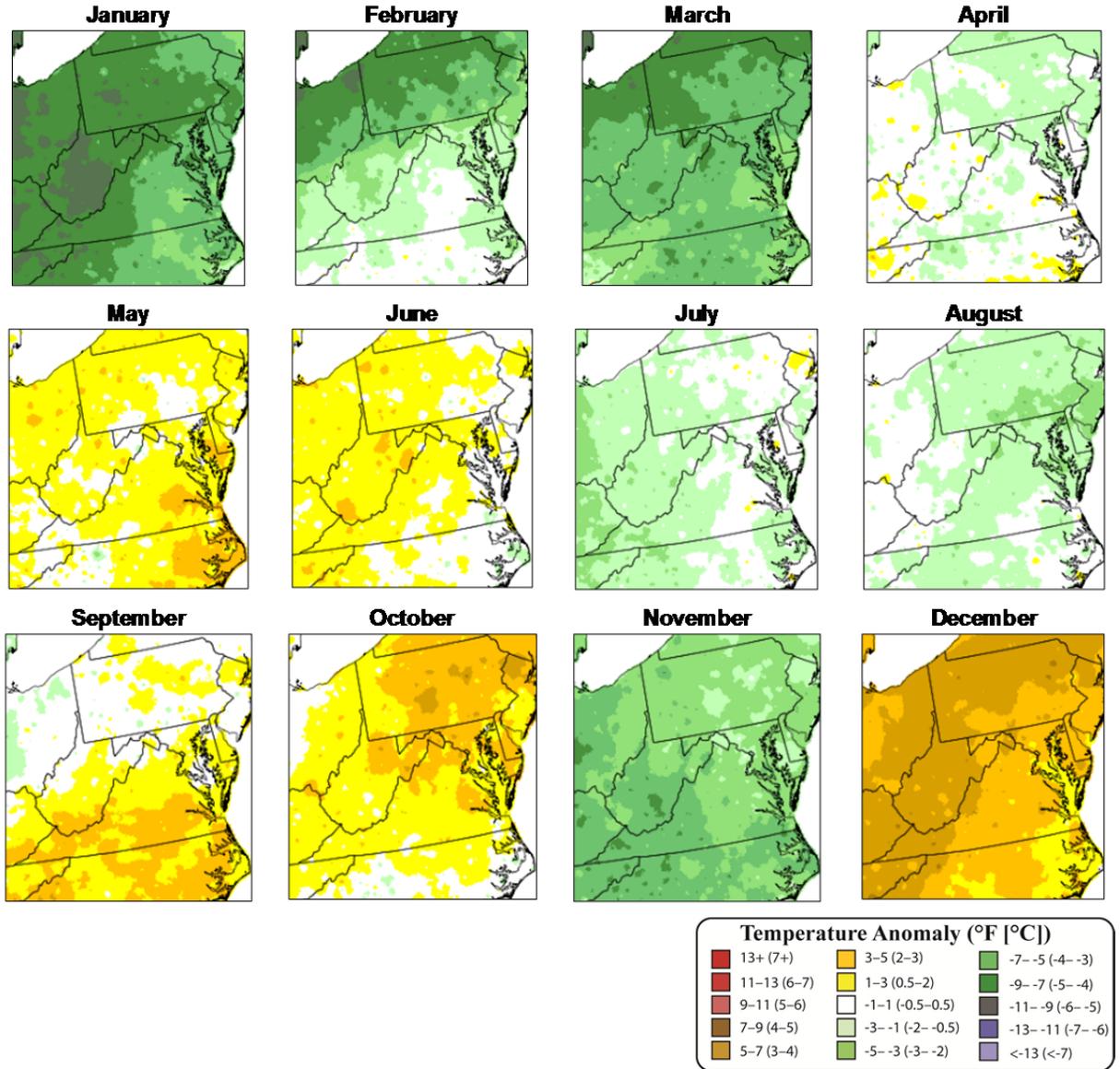


Figure 3. Maps showing departure from average monthly minimum temperature compared to the 30-year normal (1981-2010).

Table 3. Summary of monthly average temperatures for 2014 for the select station.

Station Name	Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
^Oak Hill, WV	OAKW2	24.7°F	31.1°F	37.5°F	54.3°F	63.8°F	71.4°F	70.8°F	69.7°F	66.3°F	54.9°F	38.6°F	39.2°F	51.9°F
		-4.1°C	-0.5°C	3.1°C	12.4°C	17.7°C	21.9°C	21.6°C	20.9°C	19.1°C	12.7°C	3.7°C	4.0°C	11.1°C
London Locks, WV	LONW2	26.4°F	33.5°F	40.0°F	56.2°F	64.6°F	73.5°F	73.3°F	72.7°F	68.3°F	56.9°F	40.6°F	40.3°F	53.9°F
		-3.1°C	0.8°C	4.4°C	13.4°C	18.1°C	23.1°C	22.9°C	22.6°C	20.2°C	13.8°C	4.8°C	4.6°C	12.2°C
Summersville Lake, WV	SUMW2	M	29.4°F	35.5°F	53.1°F	61.2°F	70.0°F	67.9°F	68.2°F	63.8°F	53.1°F	34.6°F	36.0°F	52.1°F
		M	-1.4°C	1.9°C	11.7°C	16.2°C	21.1°C	19.9°C	20.1°C	17.7°C	11.7°C	1.4°C	2.2°C	11.2°C
Lewisburg, WV	LWBW2	20.6°F	29.7°F	35.1°F	50.9°F	61.2°F	69.0°F	68.5°F	67.3°F	64.1°F	51.8°F	35.0°F	36.0°F	49.1°F
		-6.3°C	-1.3°C	1.7°C	10.5°C	16.2°C	20.6°C	20.3°C	19.6°C	17.8°C	11.0°C	1.7°C	2.2°C	9.5°C
Beckley VA Hospital, WV	BCKW2	20.6°F	28.6°F	34.8°F	50.6°F	59.9°F	66.8°F	65.4°F	65.2°F	62.0°F	50.5°F	34.6°F	36.3°F	47.9°F
		-6.3°C	-1.9°C	1.6°C	10.3°C	15.5°C	19.3°C	18.6°C	18.4°C	16.7°C	10.3°C	1.4°C	2.4°C	8.8°C
Beckley Airport, WV	KBKW	23.7°F	31.6°F	38.3°F	54.9°F	63.5°F	70.0°F	69.0°F	68.7°F	65.4°F	53.2°F	38.2°F	37.3°F	51.2°F
		-4.6°C	-0.2°C	3.5°C	12.7°C	17.5°C	21.1°C	20.6°C	20.4°C	18.6°C	11.8°C	3.4°C	2.9°C	10.7°C
Pineville, WV	PINW2	24.0°F	M	38.1°F	M	M	71.9°F	70.5°F	70.3°F	66.8°F	54.6°F	37.6°F	38.4°F	52.5°F
		-4.4°C	M	3.4°C	M	M	22.2°C	21.4°C	21.3°C	19.3°C	12.6°C	3.1°C	3.6°C	11.4°C
Grandview, WV	GRNW2	23.9°F	30.9°F	38.0°F	54.3°F	62.0°F	68.2°F	67.5°F	66.8°F	62.7°F	51.7°F	39.4°F	35.7°F	50.1°F
		-4.5°C	-0.6°C	3.3°C	12.4°C	16.6°C	20.1°C	19.7°C	19.3°C	17.1°C	10.9°C	4.1°C	2.0°C	10.1°C
Pipestem, WV	PIRW2	24.9°F	32.1°F	38.7°F	54.3°F	62.7°F	68.8°F	68.0°F	67.0°F	63.2°F	52.6°F	37.7°F	36.1°F	50.5°F
		-3.9°C	0.1°C	3.7°C	12.4°C	17.0°C	20.4°C	20.0°C	19.4°C	17.3°C	11.5°C	3.2°C	2.3°C	10.3°C

M = missing data (Monthly statistics are reported as ' M' if more than four days of data are missing).

^ = Data was missing for all of 2014 at OAKW2. Ansted Hawks Nest SP, WV (HWKW2) was used as a proxy station for this data.

Table 4. Summary of 2014 departure from normal temperature based on 30-year normal (1981-2010) for the selected stations.

Station Name	Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
^Oak Hill, WV	OAKW2	-7.5°F	-5.7°F	-6.3°F	-0.1°F	2.1°F	1.3°F	-2.1°F	-2.8°F	0.4°F	0.4°F	-7.3°F	3.8°F	-1.9°F
		-4.2°C	-3.2°C	-3.5°C	-0.1°C	1.2°C	0.7°C	-1.2°C	-1.6°C	0.2°C	0.2°C	-4.1°C	2.1°C	-1.1°C
London Locks, WV	LONW2	-8.4°F	-4.2°F	-5.6°F	0.6°F	0.8°F	1.0°F	-2.9°F	-2.7°F	-0.6°F	-0.7°F	-7.1°F	2.2°F	-2.3°F
		-4.7°C	-2.3°C	-3.1°C	0.3°C	0.4°C	0.6°C	-1.6°C	-1.5°C	-0.3°C	-0.4°C	-3.9°C	1.2°C	-1.3°C
Summersville Lake, WV	SUMW2	M	-3.0°F	-4.5°F	3.0°F	2.5°F	3.5°F	-2.3°F	-0.9°F	1.2°F	0.8°F	-8.5°F	2.6°F	1.4°F
		M	-1.7°C	-2.5°C	1.7°C	1.4°C	1.9°C	-1.3°C	-0.5°C	0.7°C	0.4°C	-4.7°C	1.4°C	0.8°C
Lewisburg, WV	LWBW2	-7.9°F	-2.0°F	-4.2°F	1.1°F	2.6°F	2.2°F	-1.8°F	-1.8°F	2.1°F	0.6°F	-6.0°F	4.7°F	-0.9°F
		-4.4°C	-1.1°C	-2.3°C	0.6°C	1.4°C	1.2°C	-1.0°C	-1.0°C	1.2°C	0.3°C	-3.3°C	2.6°C	-0.5°C
Beckley VA Hospital, WV	BCKW2	-8.0°F	-2.9°F	-4.0°F	1.6°F	2.4°F	1.9°F	-2.7°F	-1.9°F	1.5°F	0.2°F	-6.4°F	4.5°F	-1.2°F
		-4.4°C	-1.6°C	-2.2°C	0.9°C	1.3°C	1.1°C	-1.5°C	-1.1°C	0.8°C	0.1°C	-3.6°C	2.5°C	-0.7°C
Beckley Airport, WV	KBKW	-7.4°F	-2.8°F	-3.8°F	2.8°F	3.7°F	2.6°F	-1.6°F	-1.0°F	2.2°F	0.0°F	-5.7°F	3.1°F	-0.6°F
		-4.1°C	-1.6°C	-2.1°C	1.6°C	2.1°C	1.4°C	-0.9°C	-0.6°C	1.2°C	0.0°C	-3.2°C	1.7°C	-0.3°C
Pineville, WV	PINW2	-7.6°F	M	-4.7°F	M	M	1.8°F	-3.2°F	-2.7°F	0.8°F	0.1°F	-6.6°F	3.9°F	M
		-4.2°C	M	-2.6°C	M	M	1.0°C	-1.8°C	-1.5°C	0.4°C	0.1°C	-3.7°C	2.2°C	M

M = missing data (Monthly statistics are reported as 'M' if more than four days of data are missing).

^ = Data was missing for all of 2014 at OAKW2. Ansted Hawks Nest SP, WV (HWKW2) was used as a proxy station for this data.

Table 5. Seasonal and annual temperature and precipitation rankings for 2014 over 120 years (1 = warmest/wettest year and 120 = coldest/driest year) for West Virginia Climate Division 4 (top) and 5 (bottom).

WV Climate Division 4 Rankings "Central"	Jan–Feb–Mar WINTER	Apr–May–Jun SPRING	Jul–Aug–Sep SUMMER	Oct–Nov–Dec AUTUMN	Jan – Dec ANNUAL
Temperature-2014	115	14	96	63	96
Precipitation-2014	93	80	104	33	92
WV Climate Division 5 Rankings "Southern"					
WV Climate Division 5 Rankings "Southern"	Jan–Feb–Mar WINTER	Apr–May–Jun SPRING	Jul–Aug–Sep SUMMER	Oct–Nov–Dec AUTUMN	Jan – Dec ANNUAL
Temperature-2014	108	10	91	69	93
Precipitation-2014	98	87	53	23	78

Precipitation Summary

Liquid precipitation (rain and melted snow, ice, sleet, etc.; hereafter, precipitation) for the region generally averaged below the long-term mean except near Gauley River NRA where there was slightly above normal precipitation (Table 6). Most of the wettest days occurred during the summer (Table 7). Two unusually dry periods were noted from May 2-9 and May 18-29 when there was no measurable rain (Table 7). Snowfall was above normal (Table 6). The number of days with excessive rainfall (>1.0 in [25 mm]) was below the long-term average for south-central West Virginia (Table 6).

The winter started much below normal (Figure 4), as January averaged approximately 69 percent of normal precipitation in Beckley, WV, and only 44 percent in Bluestone Lake, WV (Tables 8 and 9). February was much wetter (Figure 4), with between 111 percent and 194 percent of average precipitation (Tables 8 and 9); some fell in the form of snow. Monthly precipitation in March was below normal again, with 2.5–4.3 in (63-110 mm) accumulating across the central and southern districts of West Virginia (Table 8). Winter precipitation, including rain and snow (liquid equivalent), was ranked between 27th and 22nd driest in 120 years of record keeping (Table 5).

Spring 2014 brought piecemeal moist conditions during April and May and near normal weather in June (Figure 4), averaging the 40th driest in climate division 4 and 33rd driest in climate division 5 (Table 5). By far, April was the driest month of this season, as 57-122 percent of normal rain was reported (Table 9). Three of the year's dry spells occurred during April and May (Table 7). June brought more frequent and sporadic rainfall. Pineville tallied only 77 percent of average rainfall, while Lewisburg measured 132 percent of normal rainfall; these stations are about 62 miles apart.

The summer months of July, August, and September showed considerable contrast; the southern valleys averaged near-normal rainfall, but the eastern and central mountains were rather dry (Figure 4). Three of the wettest days of 2014 occurred during the summer. On August 22, an average of 1.68 in (50.8 mm) was tallied in the region and on September 20, approximately 2.47 in (42.7 mm) fell (Table 7). The summer ranked the 16th driest in the central West Virginia climate division, and the 53rd wettest in the southern division (Table 5).

Autumn brought increasingly above normal precipitation to the region (Figure 4). October was quite wet with most sections averaging from 148-225 percent of the normal rainfall (Table 9); however, November was notably drier in the central West Virginia climate division. For example, Summersville Lake, WV, had 52 percent of normal rainfall, but Princeton, WV, tallied 99 percent with 2.70 in (69.6 mm) (Tables 8 and 9). December turned a bit wetter with more than 112 percent of normal rain and snow tallied at Oak Hill, WV (Table 9). Overall, 2014 brought between 84-104 percent of average annual precipitation, which ranged from -7.75 in (-197 mm) to +0.35 in (+9 mm). It was, overall, a drier than average year for much of the region.

Table 2. Status of 2014 precipitation indicators compared to the 30-year normal (1981–2010) and the station period of record the Beckley Airport (KBKW) and Summersville Lake (SUMW2) stations.

Precipitation Indicator	Beckley Airport, WV 2014	Beckley Airport, WV 1981–2010	Beckley Airport, WV 1963-2013 Mean (min – max)	Summersville Lake, WV 2014	Summersville Lake, WV 1981-2010	Summersville Lake, WV 1968-2013 Mean (min – max)
Annual Precipitation	37.5 in 952.5 mm	41.2 in 1,046 mm	41.5 (32.6 – 57.1) in 1,054 (828 – 1,450) mm	40.15 1,020 mm	47.9 in 1,217 mm	47.3 (35.8 – 62.7) in 1,201 (909 – 1,593) mm
Autumn (Oct, Nov, Dec) Precipitation	10.49 in 266 mm	8.5 in 216 mm	8.7 (3.8 – 12.8) in 220 (97 – 325) mm	10.28 in 261 mm	10.2 in 259 mm	10.1 (4.3 – 16.8) in 257 (109 – 427) mm
Heavy Precipitation Days (days with ≥ 1.0 in [25 mm] rain)	5	7	NA	7	9	NA
Extreme Precipitation Days (days with ≥ 2.0 in [51 mm] rain)	1	1	1 (0 – 3)	0	1	1 (0 – 3)
Micro-drought (strings of 7+ days without rain)	3	3	NA	6	5	NA
Annual Snowfall	59.9 in 152.1 cm	62.0 in 157.5 cm	59.6 (24.2 – 142.7) in 1,514 (614 – 3,625) mm	41.4 in 105.2 cm	38.7 in 98.3 cm	39.2 (7.9 – 84.3) in 996 (201 – 2,141) mm
Measurable Snow Days (days with ≥ 0.1 in [0.3 cm] snow)	35	38	NA	16	21	NA
Moderate Snow Days (days with ≥ 3.0 in [7.6 cm] snow)	3	6	NA	6	5	NA
Heavy Snow Days (days with ≥ 5.0 in [12.7 cm] snow)	3	2	NA	2	1	NA

Table 7. Top five wettest days and top five dry spells (consecutive days with a trace or less of liquid precipitation) during 2014 from stations London Locks (LONW2), Beckley Airport (KBKW), and Summersville Lake (SUMW2).

Wettest Days in 2014	Dry Spells in 2014
May 15: 2.16 in (54.9 mm)	May 18-29
May 16: 1.95 in (49.5 mm)	Apr. 16-24
Aug. 22: 1.68 in (42.7 mm)	July 1-8
Sept. 3: 1.54 in (39.1 mm)	May 2-9
July 24: 1.49 in (37.8 mm)	Mar. 5-12

**Bluestone National Scenic River,
Gauley River National Recreation Area,
and New River Gorge National River
Percent of Average Monthly Precipitation
2014 vs. 1981–2010**

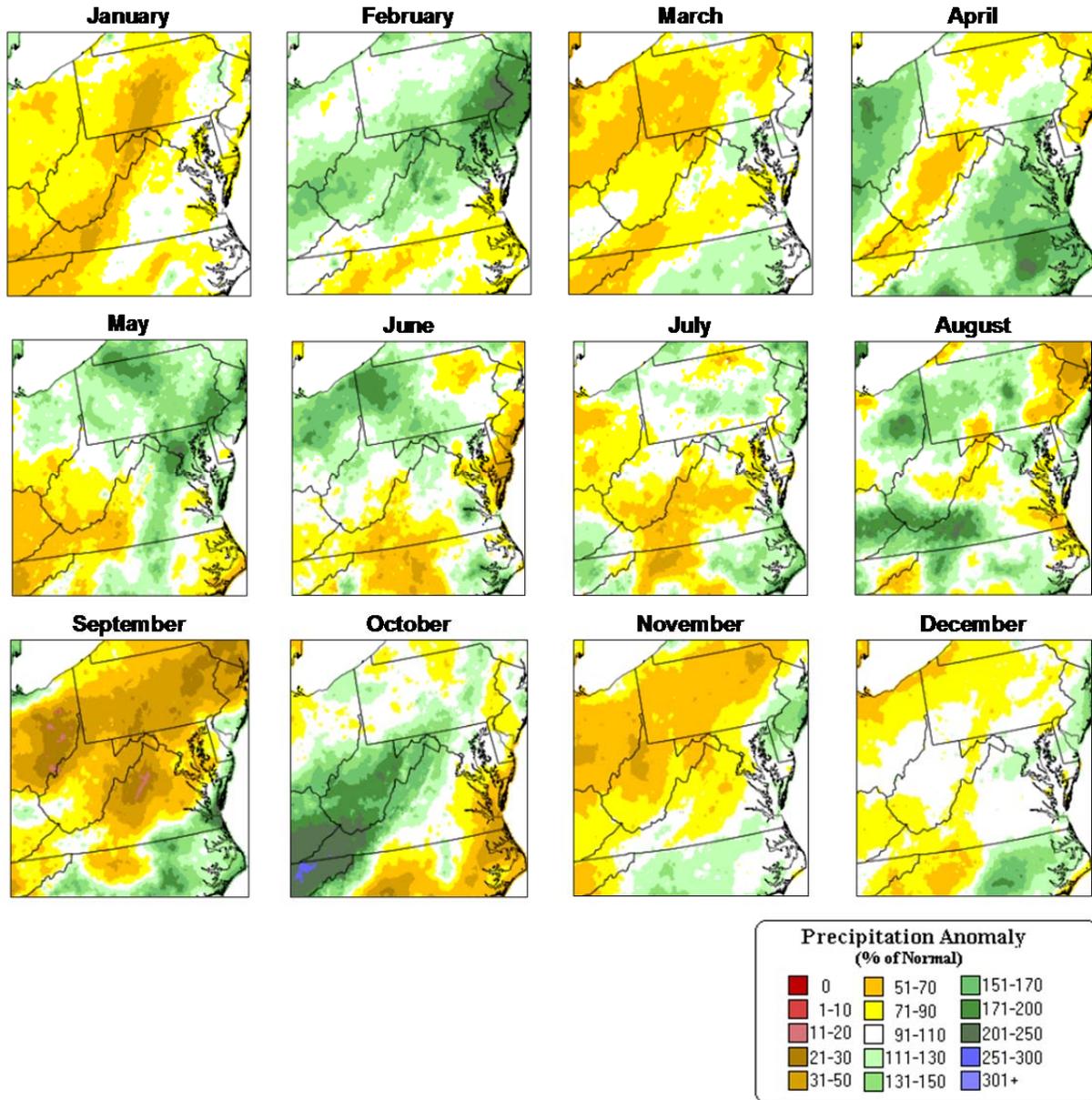


Figure 4. Maps showing percent of average monthly precipitation compared to the 30-year normal (1981-2010).

Table 8. Summary of 2014 monthly total precipitation for selected stations.

Station Name	Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Bluestone Lake	BLUW2	1.3 in	3.7 in	2.5 in	3.2 in	2.7 in	3.9 in	1.8 in	6.3 in	2.4 in	4.7 in	2.1 in	2.9 in	37.5 in
		32.0 mm	93.0 mm	62.7 mm	81.5 mm	69.6 mm	98.0 mm	46.7 mm	160.8 mm	61.2 mm	120.4 mm	52.6 mm	72.6 mm	951.2 mm
^Oak Hill	OAKW2	2.3 in	3.6 in	0.6 in	2.5 in	4.6 in	4.5 in	5.4 in	3.5 in	2.7 in	4.3 in	2.9 in	3.7 in	40.4 in
		57.9 mm	91.2 mm	14.5 mm	62.5 mm	115.8 mm	113.5 mm	136.4 mm	88.9 mm	67.3 mm	110.0 mm	73.9 mm	93.0 mm	1024.9 mm
London Locks	LONW2	3.2 in	5.5 in	4.3 in	3.0 in	4.3 in	M	3.3 in	4.0 in	3.6 in	4.5 in	1.9 in	2.9 in	40.4 in
		80.5 mm	139.2 mm	109.5 mm	75.9 mm	109.5 mm	M	82.8 mm	102.4 mm	90.9 mm	113.0 mm	48.5 mm	72.9 mm	1025.1 mm
Summersville Lake	SUMW2	2.0 in	4.7 in	3.2 in	2.5 in	3.9 in	3.6 in	3.0 in	5.3 in	1.8 in	5.8 in	1.8 in	2.7 in	40.2 in
		50.0 mm	118.4 mm	80.3 mm	62.5 mm	98.6 mm	90.9 mm	77.2 mm	135.1 mm	45.7 mm	147.6 mm	45.7 mm	67.8 mm	1019.8 mm
Princeton	PRIW2	2.1 in	3.0 in	2.5 in	2.3 in	4.3 in	2.7 in	2.8 in	6.3 in	2.1 in	5.4 in	2.7 in	2.5 in	38.8 in
		52.8 mm	77.0 mm	63.8 mm	59.4 mm	110.0 mm	67.8 mm	71.1 mm	159.0 mm	53.8 mm	136.9 mm	69.6 mm	64.3 mm	985.5 mm
Lewisburg 3 N	LWBW2	1.9 in	3.5 in	2.6 in	4.1 in	3.9 in	4.9 in	2.3 in	3.5 in	1.6 in	4.1 in	2.5 in	2.8 in	37.8 in
		49.0 mm	89.4 mm	67.1 mm	104.6 mm	99.8 mm	125.5 mm	57.4 mm	88.4 mm	39.9 mm	104.4 mm	63.8 mm	70.9 mm	960.1 mm
Beckley VA Hospital	BCKW2	1.6 in	3.0 in	2.5 in	2.5 in	3.7 in	4.9 in	2.4 in	4.6 in	2.7 in	5.1 in	2.1 in	3.1 in	38.2 in
		39.6 mm	74.9 mm	64.5 mm	63.2 mm	93.7 mm	123.7 mm	61.0 mm	117.3 mm	69.3 mm	129.5 mm	54.4 mm	78.5 mm	969.8 mm
Beckley Airport	KBKW	1.9 in	3.2 in	2.7 in	2.7 in	3.9 in	3.9 in	2.4 in	4.1 in	2.2 in	5.3 in	2.2 in	3.0 in	37.5 in
		49.3 mm	81.5 mm	68.8 mm	68.1 mm	98.3 mm	98.0 mm	61.2 mm	104.4 mm	56.4 mm	134.6 mm	55.9 mm	75.9 mm	952.5 mm
Pineville	PINW2	M	M	3.1 in	M	M	3.2 in	4.6 in	7.3 in	2.4 in	M	2.9 in	2.5 in	M
		M	M	77.5 mm	M	M	82.0 mm	116.6 mm	184.7 mm	62.0 mm	M	73.7 mm	63.5 mm	M
Grandview	GRANDVIEW	1.8 in	3.2 in	3.6 in	2.8 in	3.8 in	5.3 in	3.4 in	3.9 in	4.6 in	5.7 in	2.4 in	2.9 in	43.3 in
		44.5 mm	82.3 mm	92.2 mm	71.6 mm	97.3 mm	134.6 mm	85.3 mm	98.0 mm	116.3 mm	145.5 mm	59.7 mm	73.2 mm	1100.6 mm
Pipestem	PIPESTEM	1.5 in	2.3 in	2.8 in	3.2 in	3.0 in	3.6 in	2.0 in	6.7 in	0.9 in	4.6 in	2.2 in	2.6 in	35.3 in
		38.9 mm	58.9 mm	71.1 mm	80.0 mm	75.7 mm	91.7 mm	51.3 mm	168.9 mm	21.8 mm	116.6 mm	55.6 mm	64.8 mm	895.4 mm

* M = missing data (Monthly statistics are reported as 'M' if more than 4 days of data are missing).

^ = Data was missing for all of 2014 at OAKW2. Ansted Hawks Nest SP, WV (HWKW2) was used as a proxy station for this data.

Table 9. Summary of 2014 percent of normal precipitation based on 30-year normal (1981–2010) for selected stations. Stations with a Period of Record less than 10 years not included in this table.

Station name	Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Bluestone Lake	BLUW2	44	138	73	94	66	114	42	191	83	182	79	99	97
^Oak Hill	OAKW2	72	121	14	57	89	104	87	85	79	148	83	112	85
London Locks	LONW2	102	194	116	81	88	M	65	104	116	177	55	89	104
Summersville Lake	SUMW2	59	150	83	62	77	79	51	120	52	182	52	74	84
Princeton	PRIW2	72	111	78	73	105	75	64	184	75	225	99	88	101
Lewisburg	LWBW2	61	122	77	122	91	132	56	110	48	160	87	86	94
Beckley VA Hospital	BCKW2	56	120	77	73	81	136	46	135	93	211	74	103	95
Beckley Airport	KBKW	69	116	76	80	83	97	48	118	74	206	75	100	91
Pineville	PINW2	M	M	80	M	M	77	87	193	76	M	90	69	M

^ = Data was missing for all of 2014 at OAKW2. Ansted Hawks Nest SP, WV (HWKW2) was used as a proxy station for this data.

Drought Status

There are a number of drought indices used to estimate the severity of drought in an area, using algorithms that incorporate recent temperatures, rainfall, soil moisture, and other information (<http://www.drought.gov>). The main indices we report are the Palmer Drought Severity Index (PDSI) and the United States Drought Monitor (DM) – Drought Intensity Index. While both indices provide excellent summary information on broad-scale conditions, local conditions (such as at the park scale) may vary.

The PDSI is a soil moisture algorithm calibrated for relatively homogeneous regions and is calculated on a monthly basis using precipitation and temperature data, as well as the water content of the soil. The values vary between extremely moist (>4.0) and extreme drought (<-4.0), with “normal” values ranging between -1.9 and 1.9 . Monthly PDSI values for West Virginia Climate Division 4 in 2014 are shown in Figure 5 and Climate Division 5 values are seen in Figure 6.

The DM – Drought Intensity Index is a synthesis of multiple indices (including the PDSI) and impacts and represents a consensus of federal and academic scientists (NIDIS 2014). The DM produces a summary map of drought intensity for the nation and all states each week. It is on a scale ranging from abnormally dry (D0) to exceptional drought (D4). Mid-month (i.e., the second or third week) values for West Virginia and the Northeast are shown for 2014 in Figures 7 and 8, respectively.

According to the PDSI for WV Climate Division 4 for 2014, PDSI values fell neither above 1.9 nor below -1.9 , indicating that it was generally near normal during all seasons for the West Virginia Parks of that division ($-1.9 < \text{PDSI} < 1.9$). September was the only month that came close to hitting the “moderately moist” threshold, indicating a slightly dry month (PDSI ~ 1.5 , Figure 5). PDSI values were slightly below normal (“slightly dry”) during the months of January through August. October trickled over into the slightly above normal (“slightly moist”) range, and November through December were right on target for normal. WV Climate Division 5 experienced a similar PDSI pattern for the first seven months of the year with values near normal but in the “slightly dry” range. August through December, however, flip-flopped into the “slightly moist” range.

The DM – Drought Severity Index for West Virginia (Figure 7) and the Northeast (Figure 8) indicated a near average year, with the most widespread drought conditions (“abnormally dry”, indicated in yellow) near the WV parks during the growing season (May through September) occurring in May 2014. The most widespread drought conditions in the Northeast occurred during the month of October. Most of the indicated areas were only under “abnormally dry” conditions, but a few areas of New York, Connecticut, Rhode Island, and Massachusetts were under “moderate drought” conditions (indicated in peach).

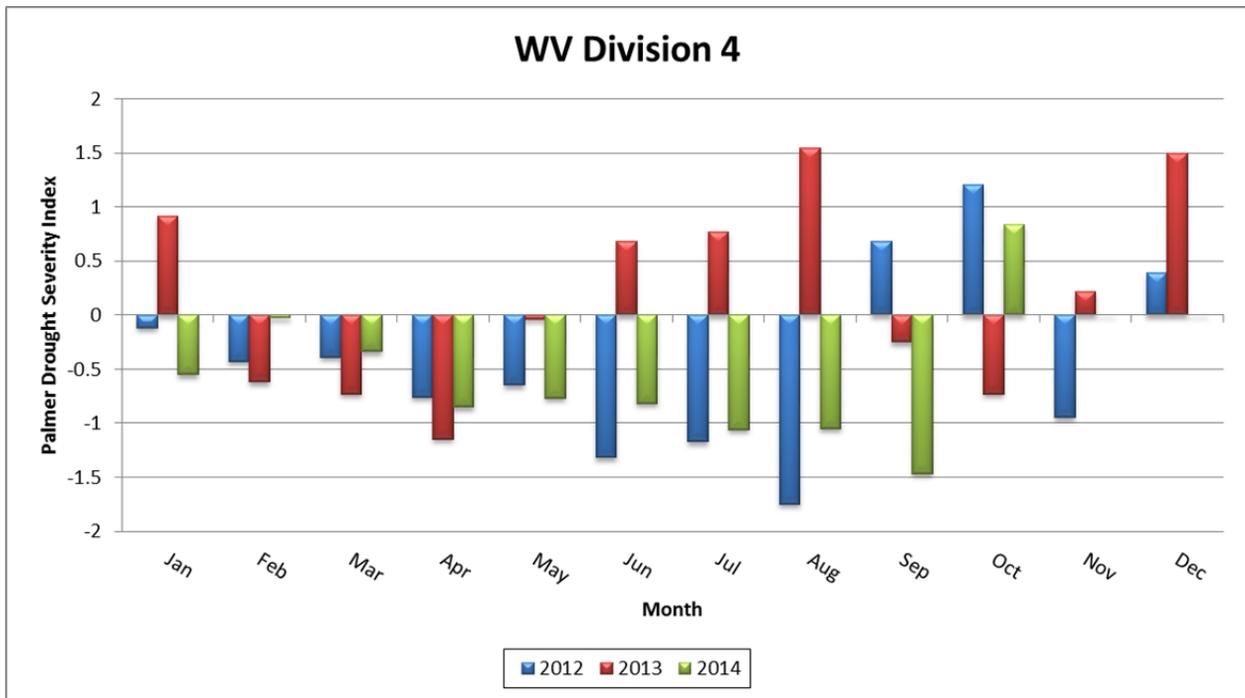


Figure 5. Monthly Palmer Drought Severity Index (PDSI) values for West Virginia Climate Division 4, 2012–2014.

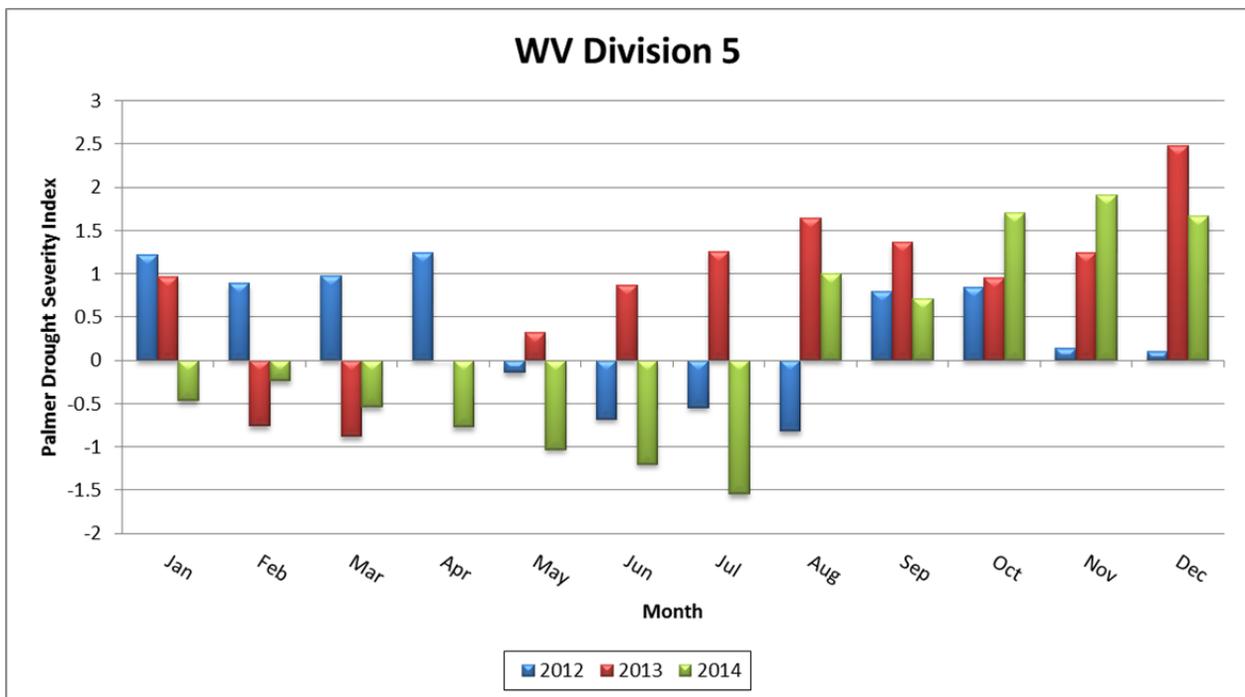


Figure 6. Monthly Palmer Drought Severity Index (PDSI) values for West Virginia Climate Division 5, 2012–2014.

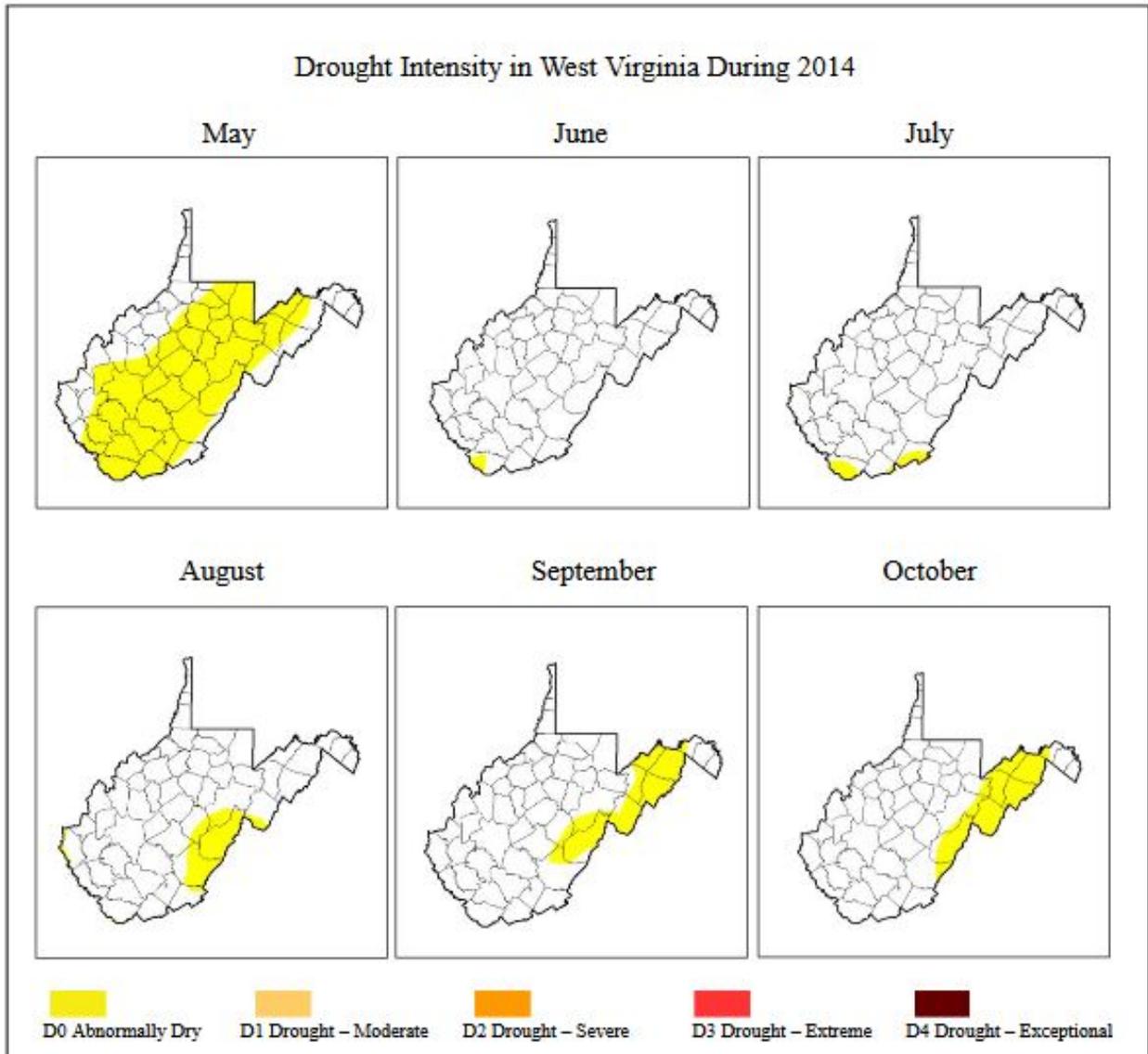


Figure 7. Mid-month values of the United States Drought Monitor (DM) - Drought Intensity Index for West Virginia in 2014.

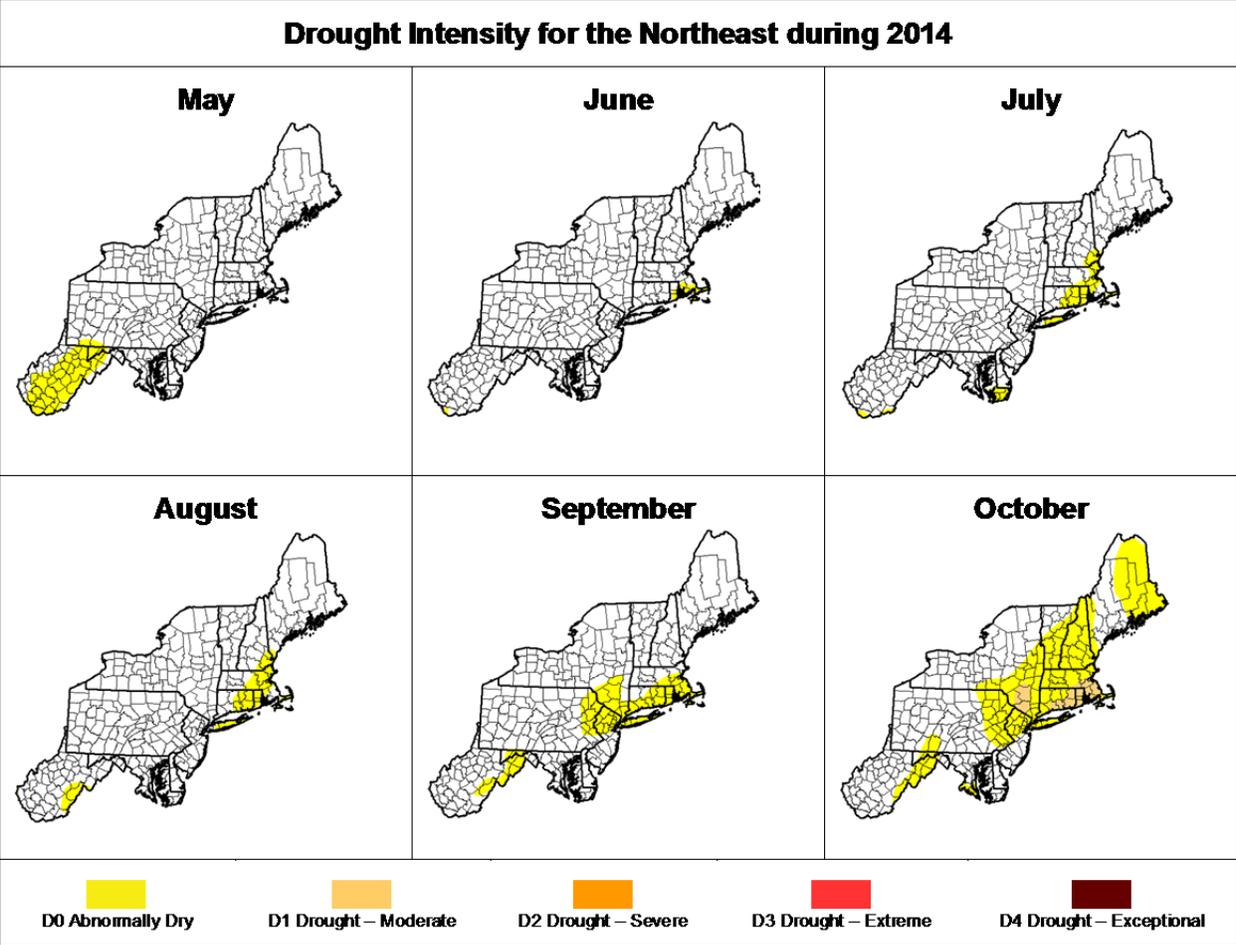


Figure 8. Mid-month values of the United States Drought Monitor (DM) - Drought Intensity Index for the Northeast in 2014.

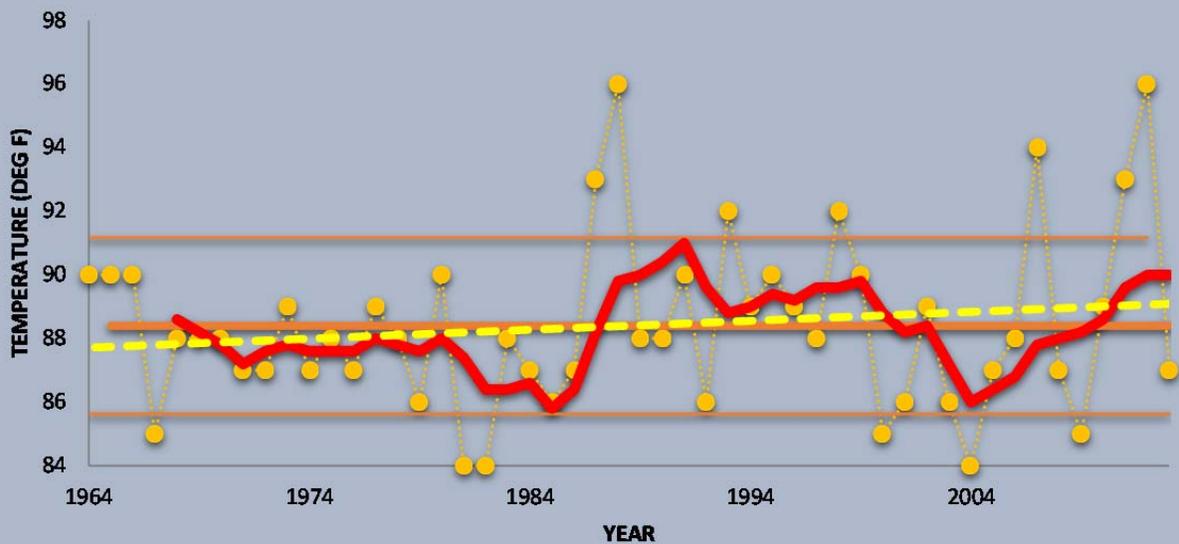
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Appendix

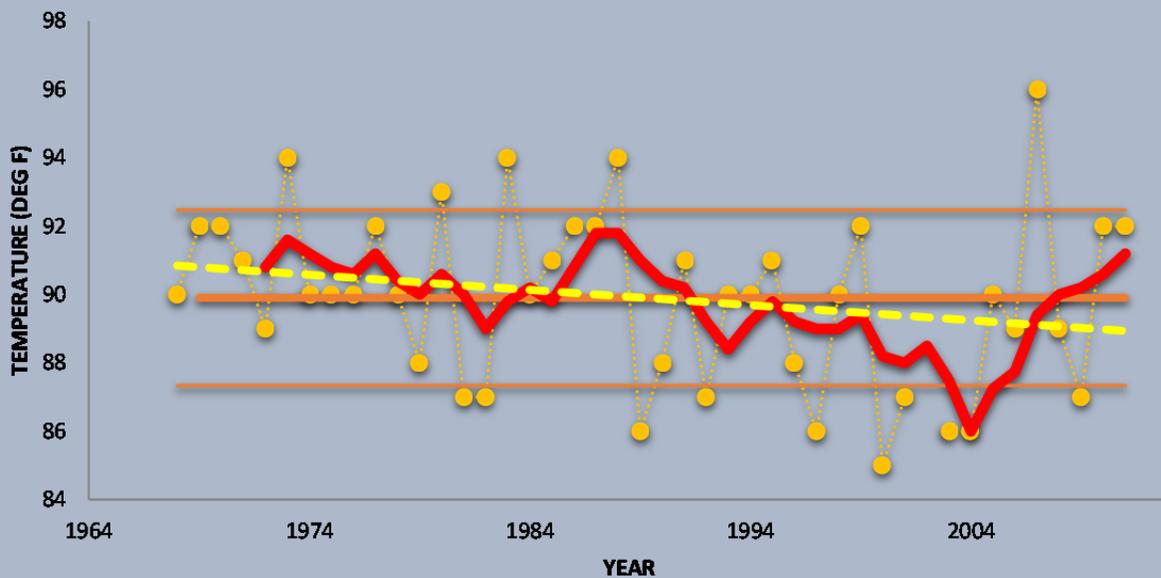
Below are graphs illustrating long-term trend analysis for multiple climate indicators. For temperature indicators, yearly values are marked by the dotted orange line, the 5-year moving average is indicated by the thick red line, the long-term linear trend is shown by the dotted yellow line, the long-term mean is marked by the thick orange line, and the first standard deviation above and below the long-term mean are delineated by the solid orange lines. Similarly for precipitation indicators, yearly values are marked by the dotted teal line, the 5-year moving average is indicated by the thick green line, the long-term linear trend is shown by the dotted yellow line, and the long-term mean is delineated by the thick light blue line.

Highest Annual Maximum Temperature - Beckley, WV

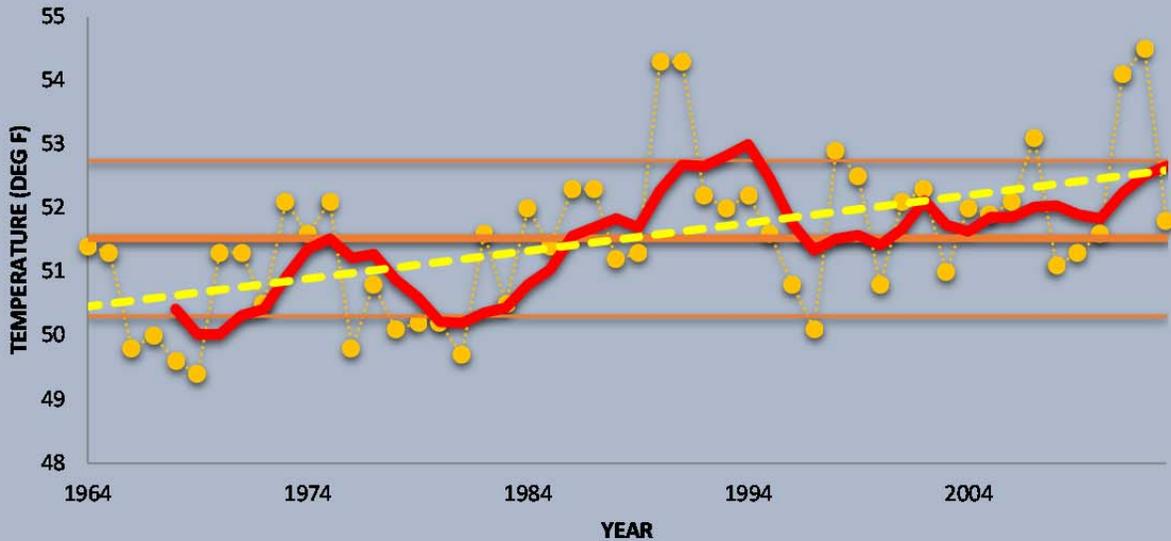


Annual Maximum Trends: Though the stations are relatively close to each other (only 56.7km apart), the trends are small (less than 2°F over the POR) and opposite each other. The average annual maximum temperature is 88.4°F (1SD ranges from 85.6-91.2°F) at Beckley and 89.9°F (1SD ranges from 87.3-92.5°F) at Summersville Lake (Table 2).

Highest Annual Maximum Temperature - Summersville Lake, WV

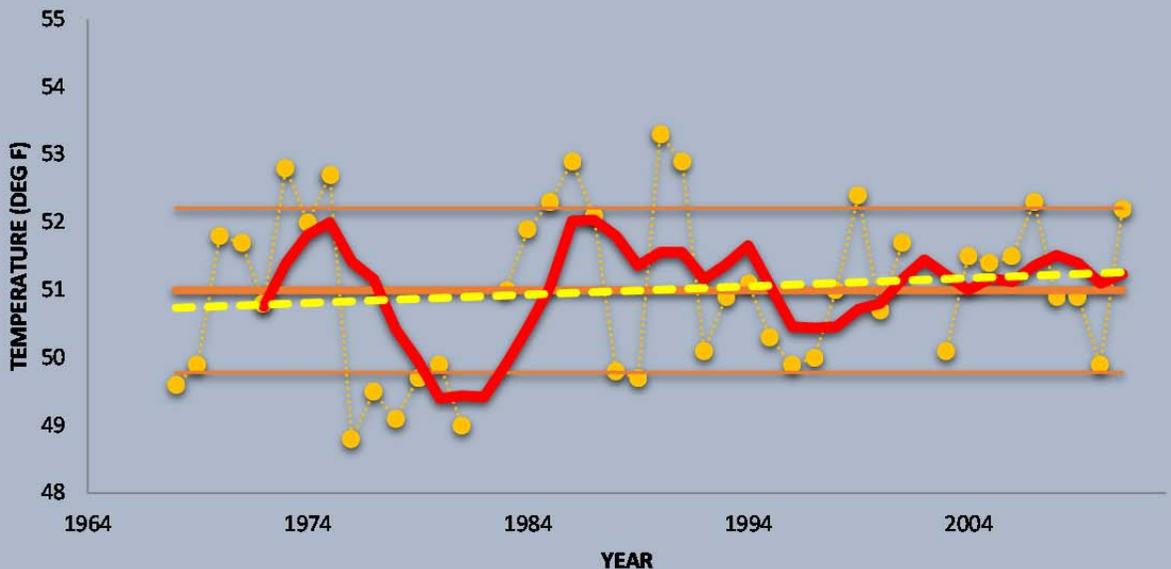


Average Annual Mean Temperature - Beckley, WV

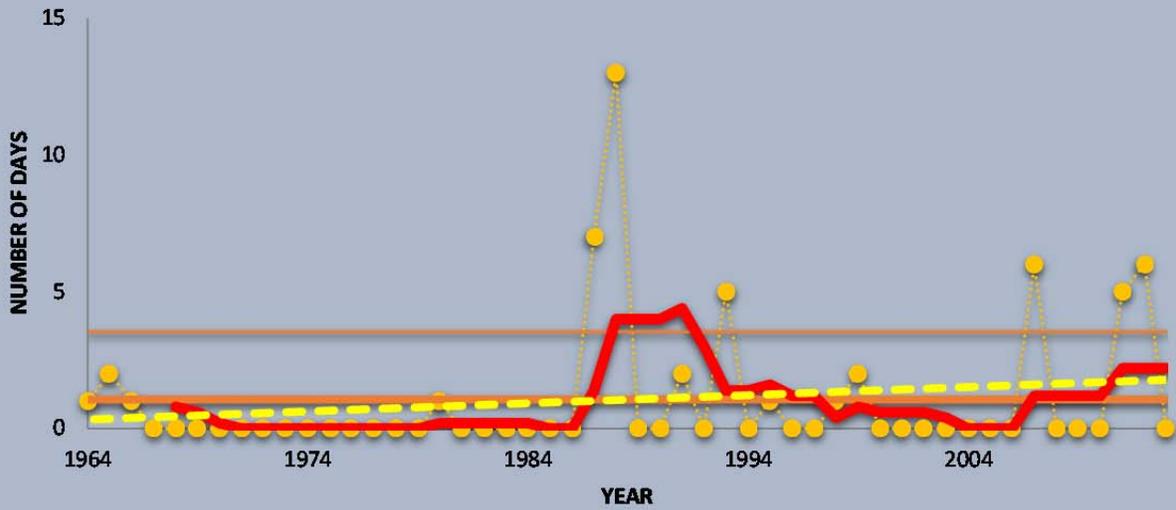


Annual Mean Trends: Both stations exhibit a rise in the average annual temperature with a trend greater than 2°F (1.3°C) at Beckley during the last 50 years. The average annual mean temperature at Summersville Lake is 51.0°F (1SD ranges from 49.9-52.2°F) and 51.5°F (1SD ranges from 50.3-52.7°F) at Beckley (Table 2).

Average Annual Mean Temperature - Summersville Lake, WV

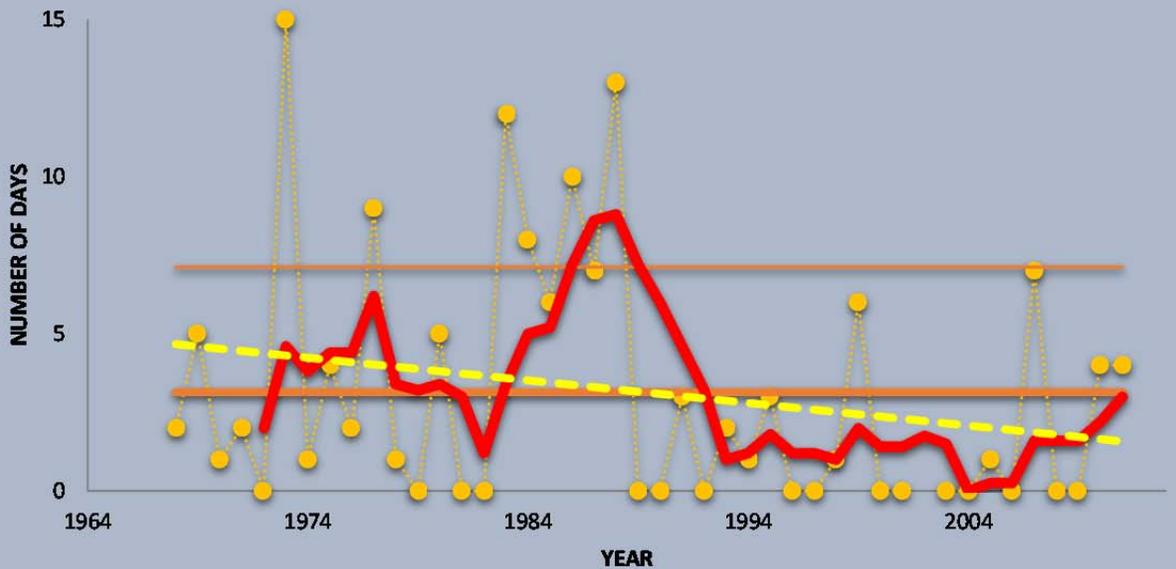


Annual Number of Hot Days (Max Temp $\geq 90^{\circ}\text{F}$) - Beckley, WV

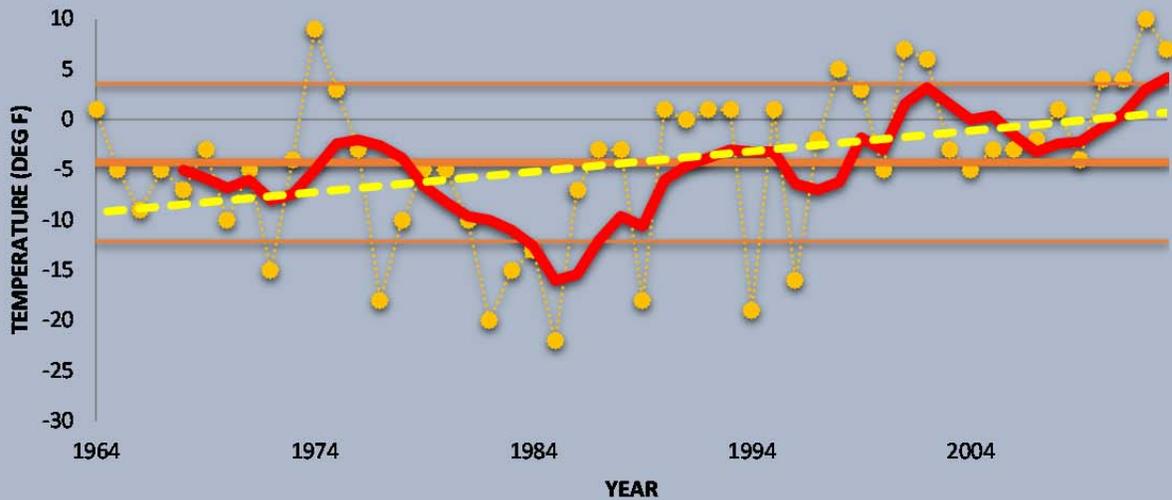


Annual Number of Hot Days: While Beckley shows a slight increase, Summersville Lake has shown a gradual decrease in hot summer days. The average number of annual hot days is 1 (1SD ranges from 0-3) at Beckley and 3 (1SD ranges from 0-7) at Summersville Lake (Table 2).

Annual Number of Hot Days (Max Temp $\geq 90^{\circ}\text{F}$) - Summersville Lake, WV

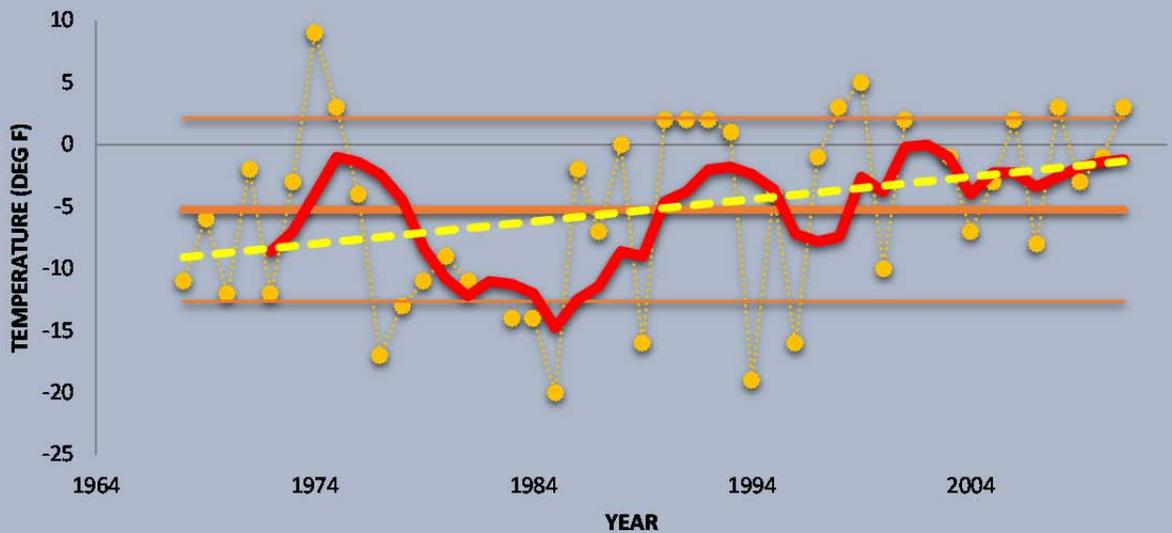


Lowest Annual Minimum Temperature - Beckley, WV

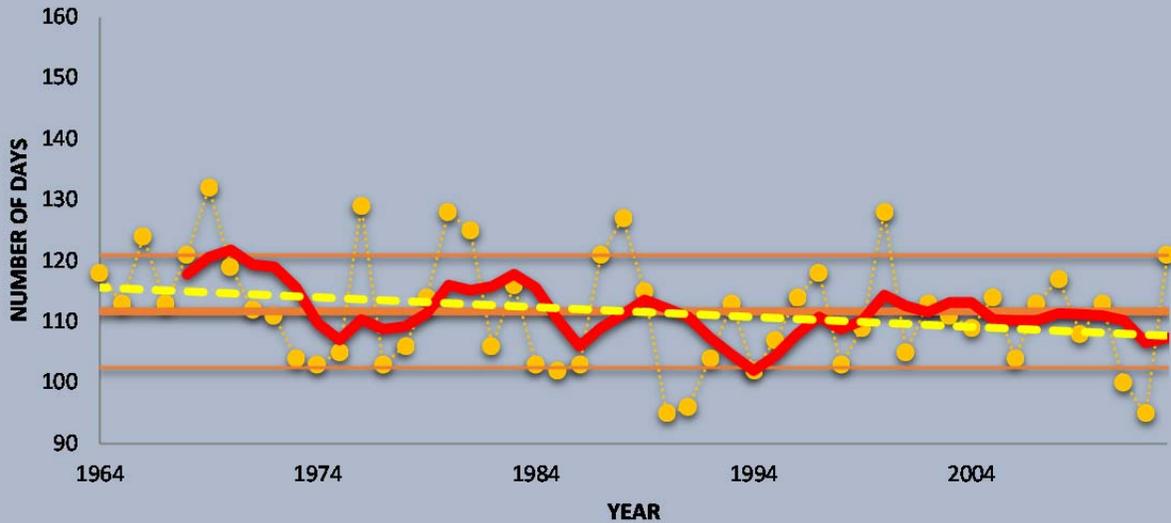


Annual Lowest Minimum Temperature: The trend at each station is the same with annual minimums below 0°F (-17°C) becoming less frequent. The average annual minimum temperature is -5.2°F (1SD ranges from -12.6-2.1°F) at Summersville Lake and -4.2°F (1SD ranges from -12.1-3.6°F) at Beckley (Table 2).

Lowest Annual Minimum Temperature - Summersville Lake, WV

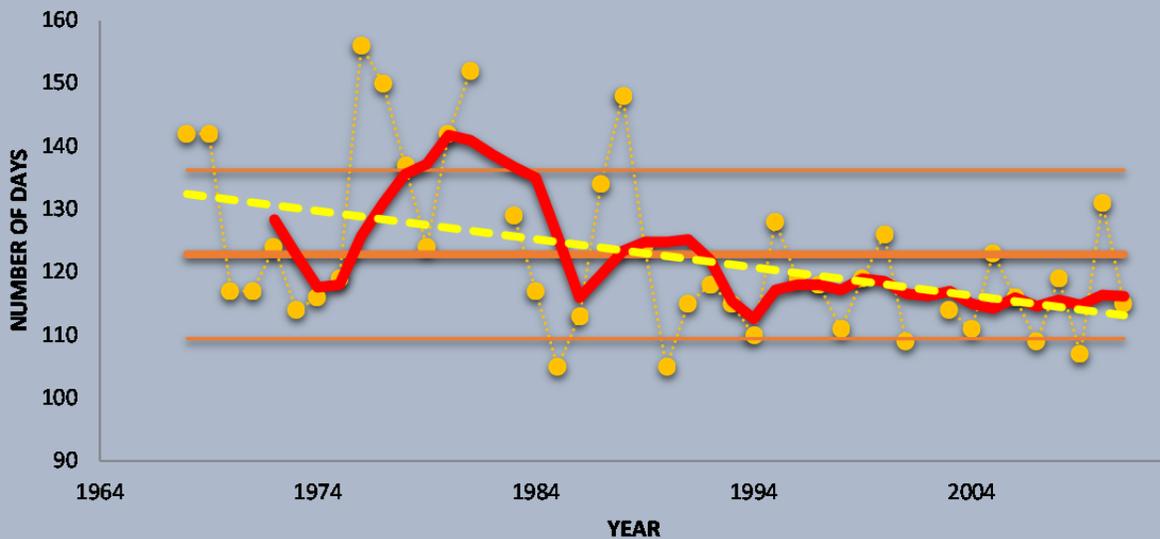


Number of Days with Minimum Temperature $\leq 32^{\circ}\text{F}$ - Beckley, WV

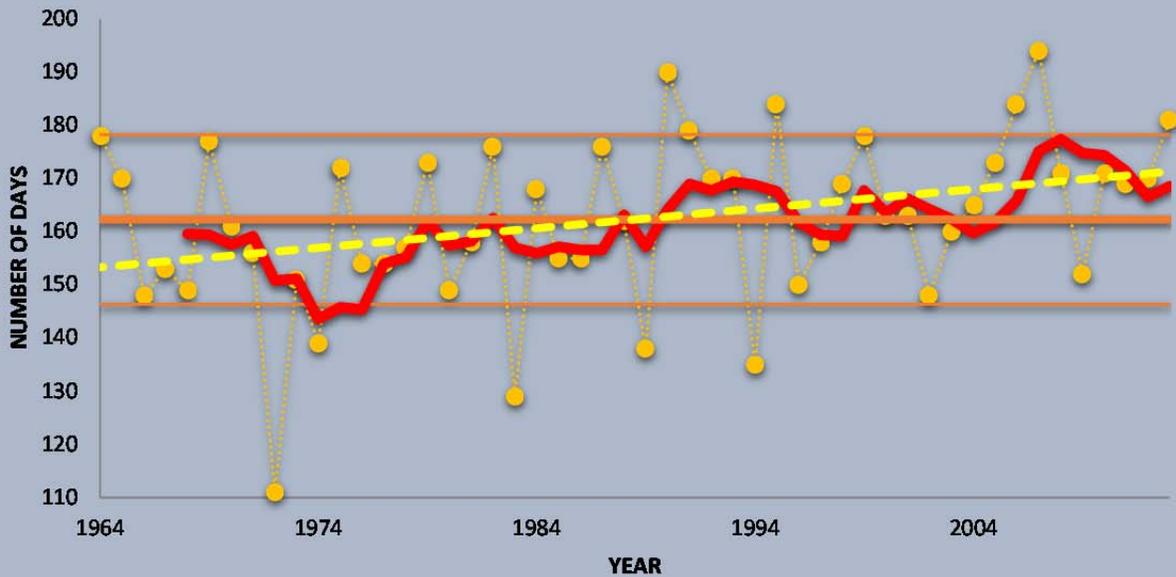


Annual Number of Days with Minimums at or below Freezing: The trend does show a steady decrease with about 25 fewer nights below freezing now compared to 50 years ago at Summersville Lake, but only about 10 fewer nights at Beckley. Minimum temperatures are very sensitive to any changes in the local surroundings. The average number of nights is 112 (1SD ranges from 103-121) at Beckley and 122 (1SD ranges from 109-136) at Summersville Lake (Table 2).

Number of Days with Minimum Temperature $\leq 32^{\circ}\text{F}$ - Summersville Lake, WV

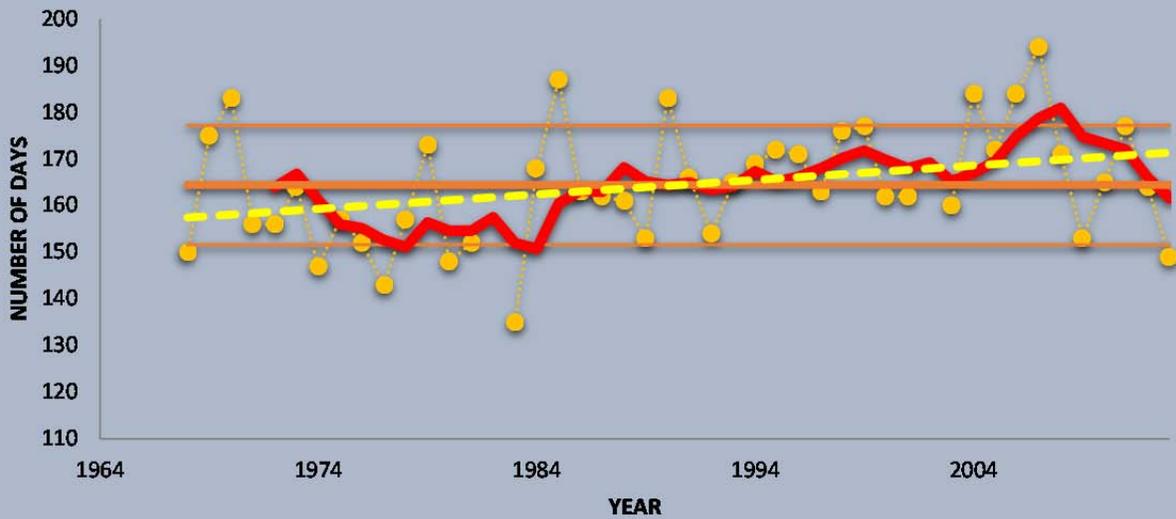


Growing Season Length - Beckley, WV

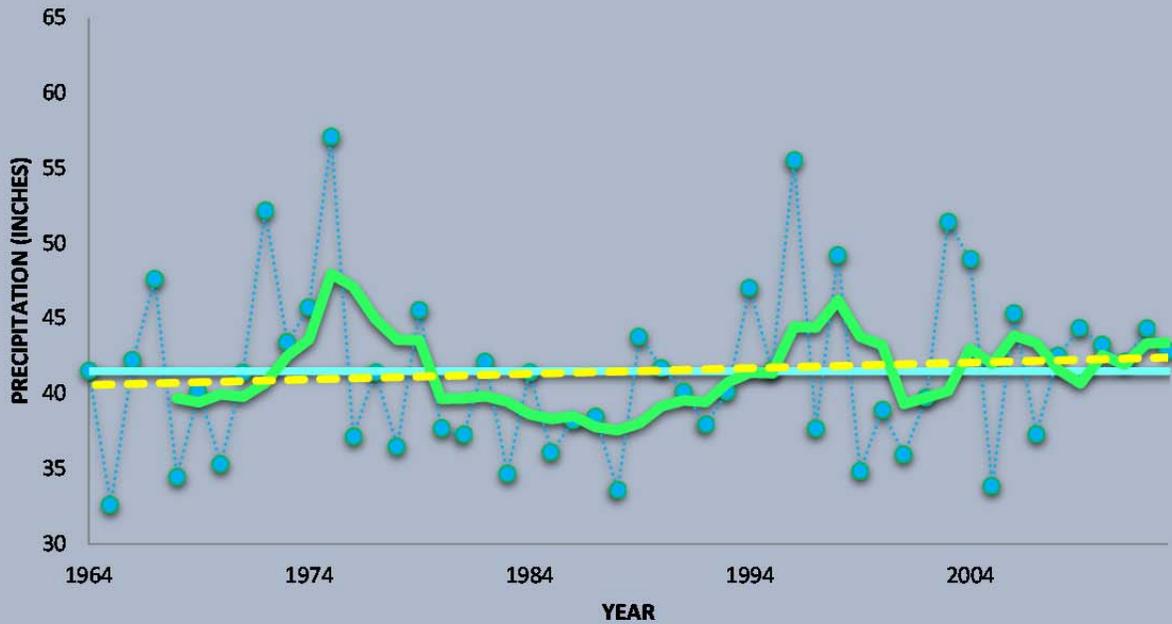


Growing Season Length Trends: Both stations show an increase in the length of the growing season ranging from two to three weeks. The average annual number of days in the growing season is 164 (1SD ranges from 152-177) at Summersville Lake and 162 (1SD ranges from 146-178) at Beckley (Table 2).

Growing Season Length - Summersville Lake, WV

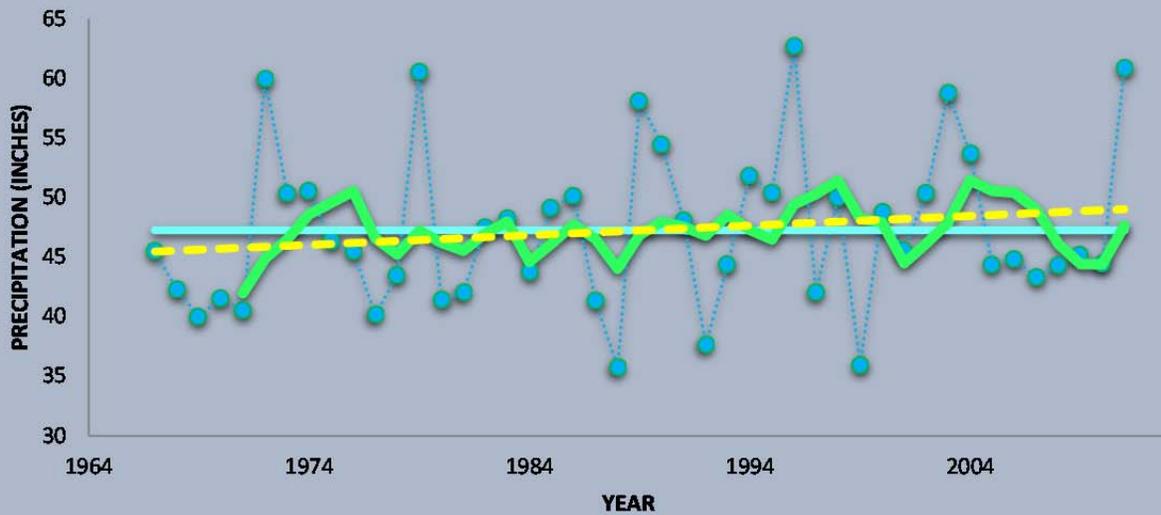


Annual Precipitation - Beckley, WV

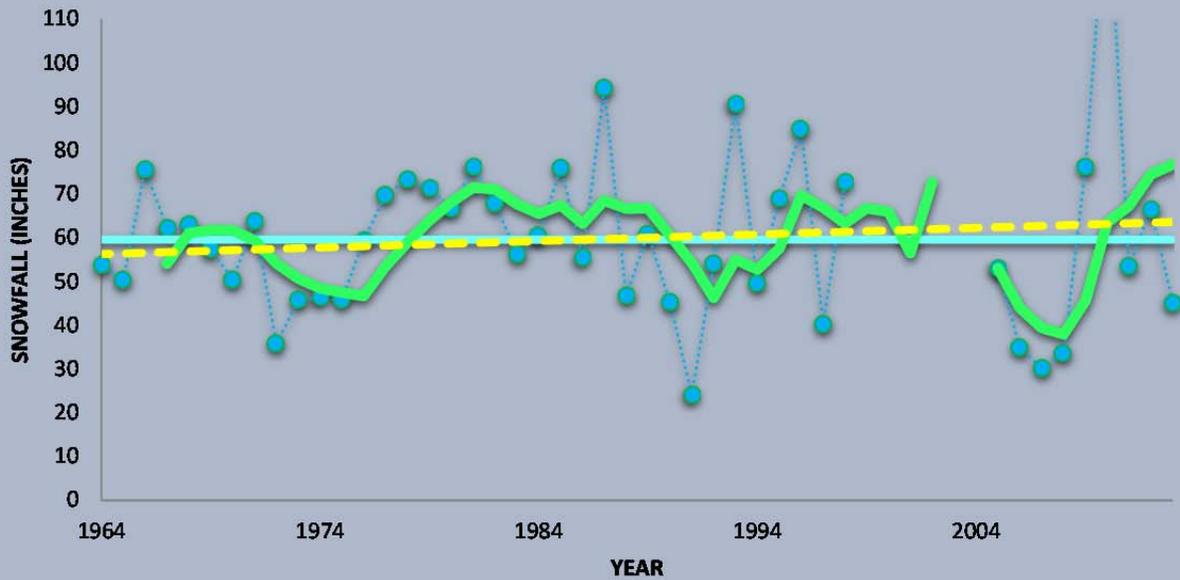


Annual Precipitation Trends: Both show a small rise of the order of an additional month's worth of precipitation. The average annual precipitation at Beckley is 41.5 in. (min of 32.6 in and max of 57.1 in) and 47.3 in (min of 35.8 in and max of 62.7 in) at Ebensburg (Table 6).

Annual Precipitation - Summersville Lake, WV

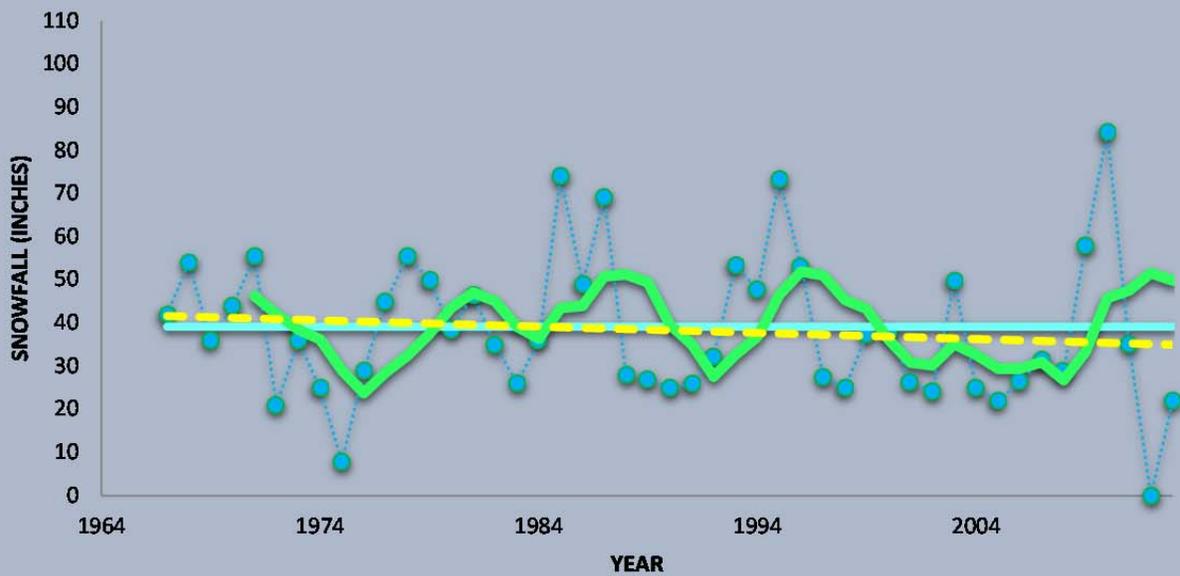


Annual Snowfall - Beckley, WV

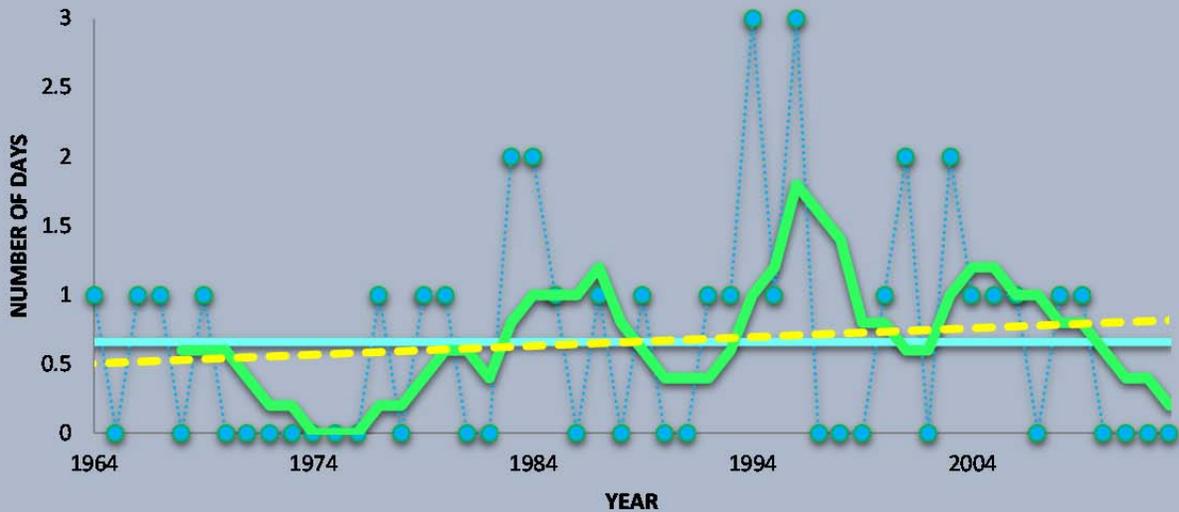


Annual Snowfall Trends: Beckley shows a small increase while Summersville Lake exhibits a slow decrease. The average annual snowfall amount at Summersville Lake is 39.2 in. (min of 7.9 in and max of 84.3 in) and 59.6 in (min of 24.2 in and max of 142.7 in) at Beckley (Table 6).

Annual Snowfall - Summersville Lake, WV

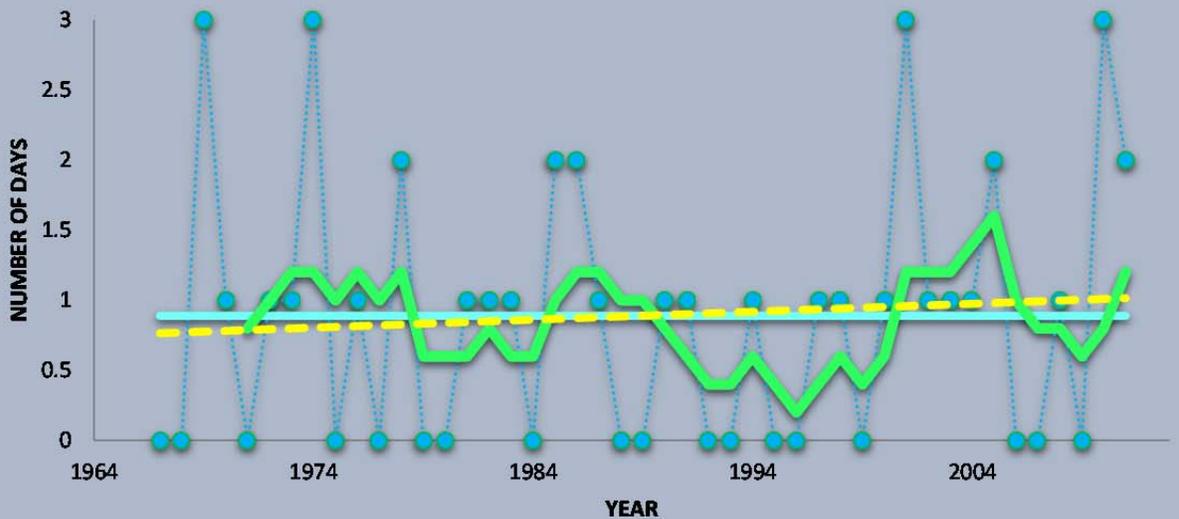


Number of Extreme Precipitation (≥ 2.00 ") Days - Beckley, WV

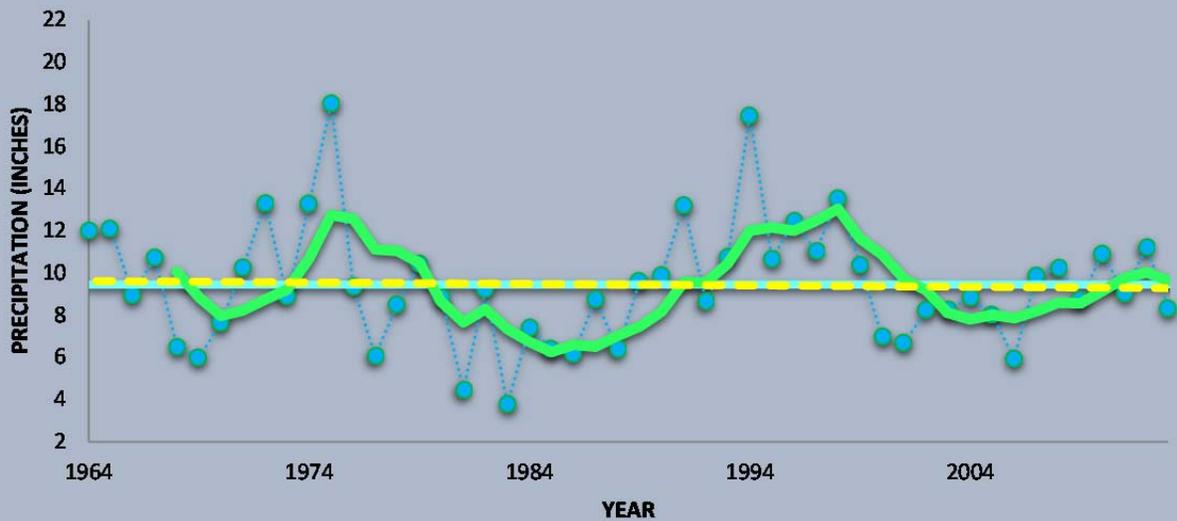


Annual Number of Extreme Precipitation Events: Both stations show a slow increase (about $\frac{1}{2}$ day over the past ~70 years) in the number of very wet days. The average number of days at Beckley is 1 (min of 0 and max of 3) and 1 (min of 0 and max of 3) at Summersville Lake (Table 6).

Number of Extreme Precipitation (≥ 2.00 ") Days - Summersville Lake, WV

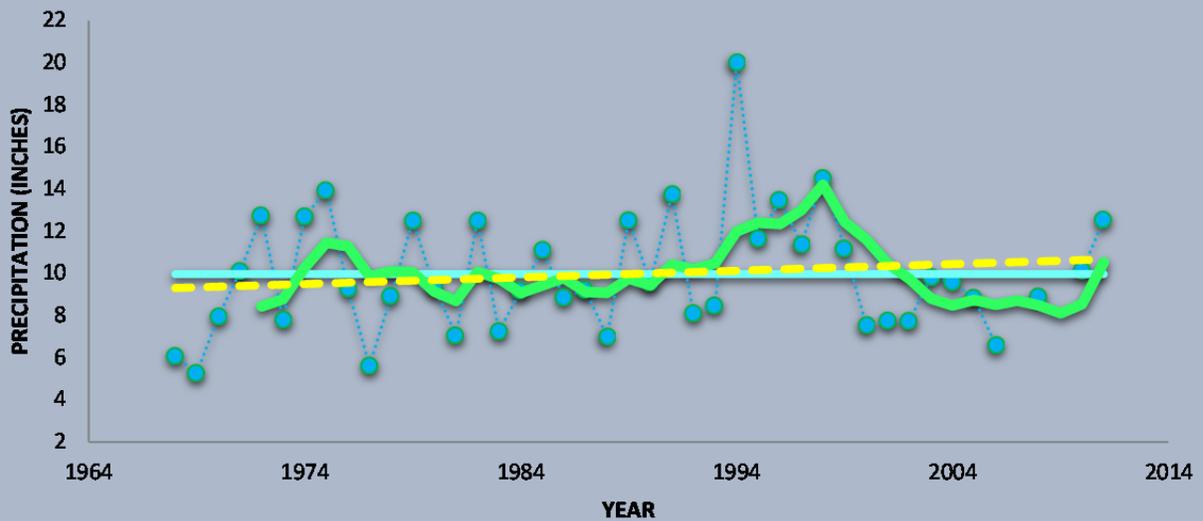


Winter Precipitation (Jan. 1 - Mar. 31) - Beckley, WV

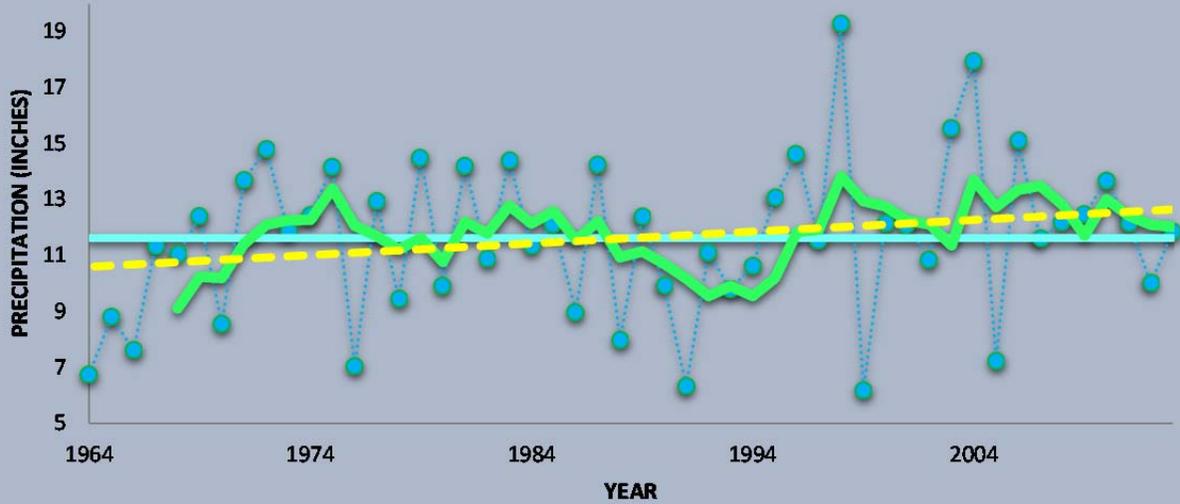


Winter Precipitation Trends: Summersville Lake shows a very slight increase, whereas Beckley displays no trend. Summersville Lake's winter precipitation has ranged between 5.3 in to as much as 20.0 in over its period of record while Beckley has ranged from 3.8 in to 18.1 in.

Winter Precipitation (Jan. 1 - Mar. 31) - Summersville Lake, WV

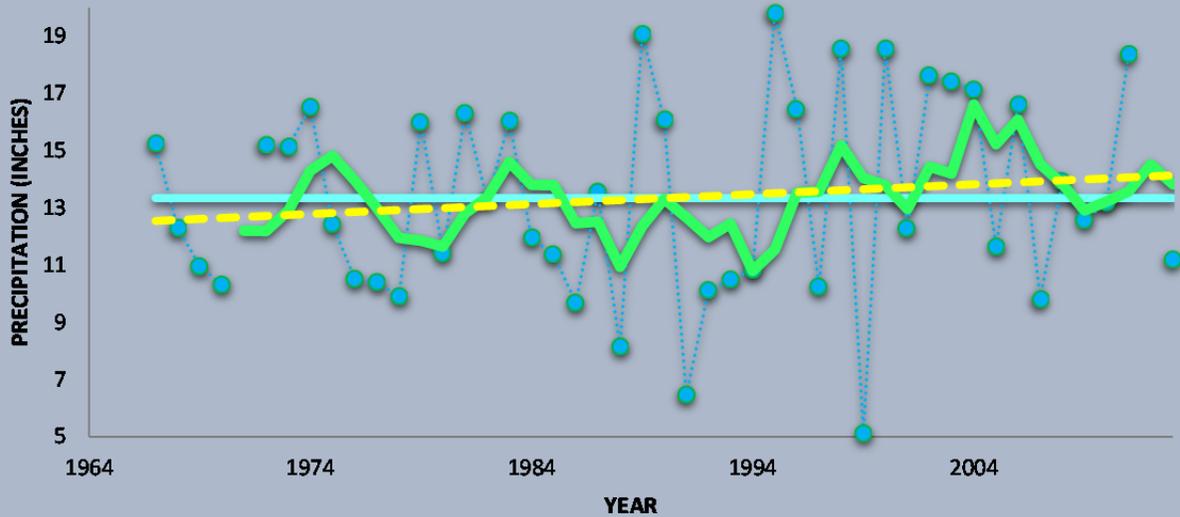


Spring Precipitation (Apr. 1 - June 30) - Beckley, WV

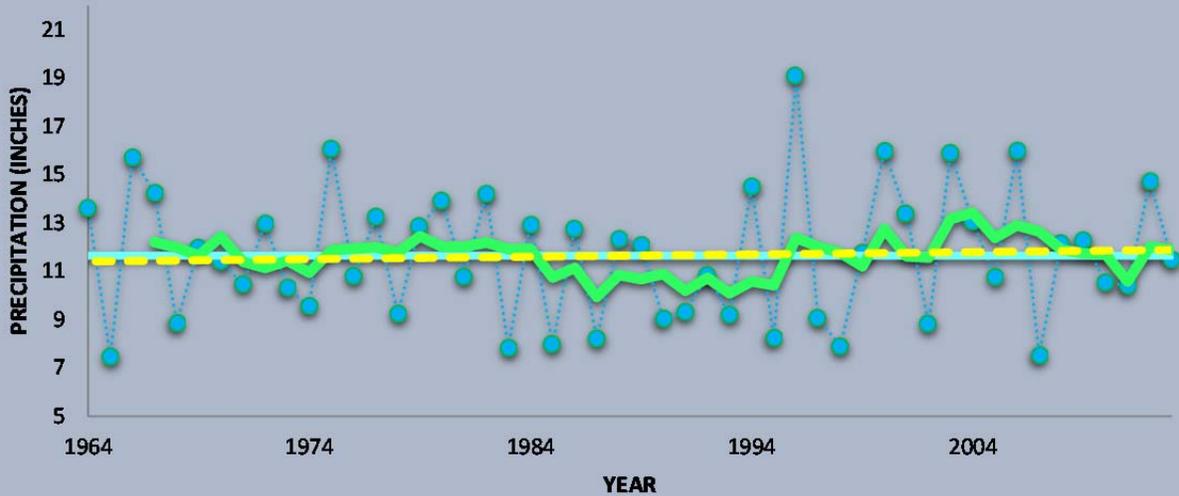


Spring Precipitation Trends: Both stations show an increase (about 20%) during the last 50 years. Beckley has seen as much as 19.3 in and as little as 6.2 in during the spring while Summersville Lake has seen between 5.1 and 19.8 in.

Spring Precipitation (Apr. 1 - June 30) - Summersville Lake, WV

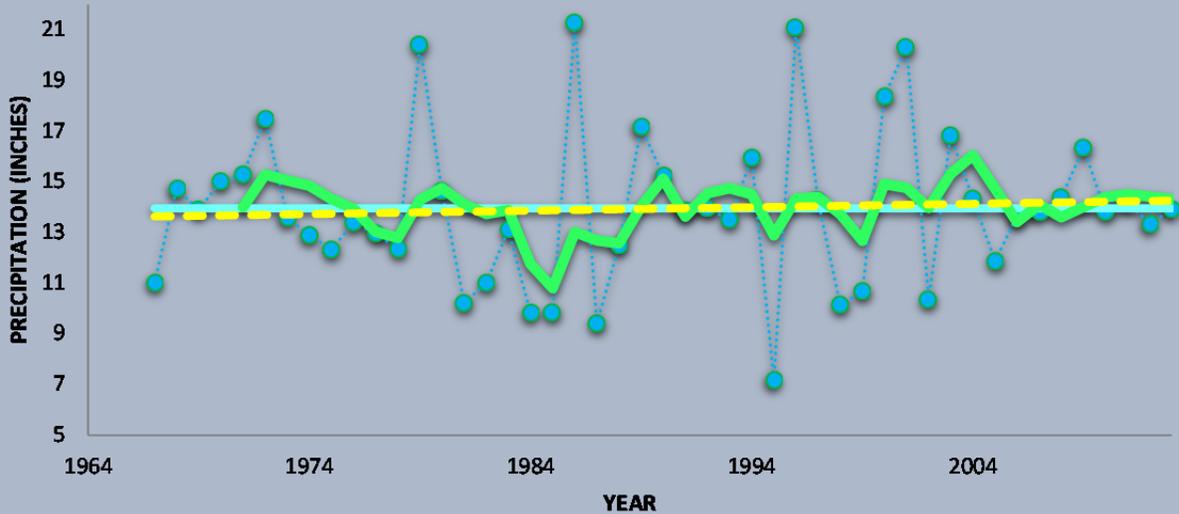


Summer Precipitation (July 1 - Sep. 30) - Beckley, WV

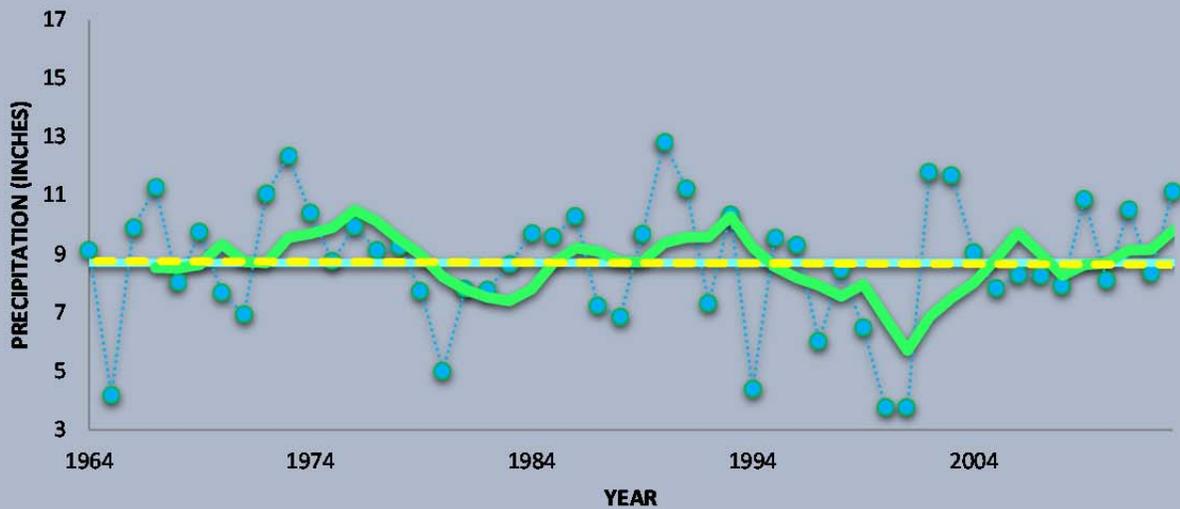


Summer Precipitation Trends: Both stations show a slight increase over their POR. Summersville Lake's summer precipitation has ranged between 7.5 to 19.1 in. while Beckley has seen a minimum of 7.2 in to a maximum of 21.3 in.

Summer Precipitation (July 1 - Sep. 30) - Summersville Lake, WV

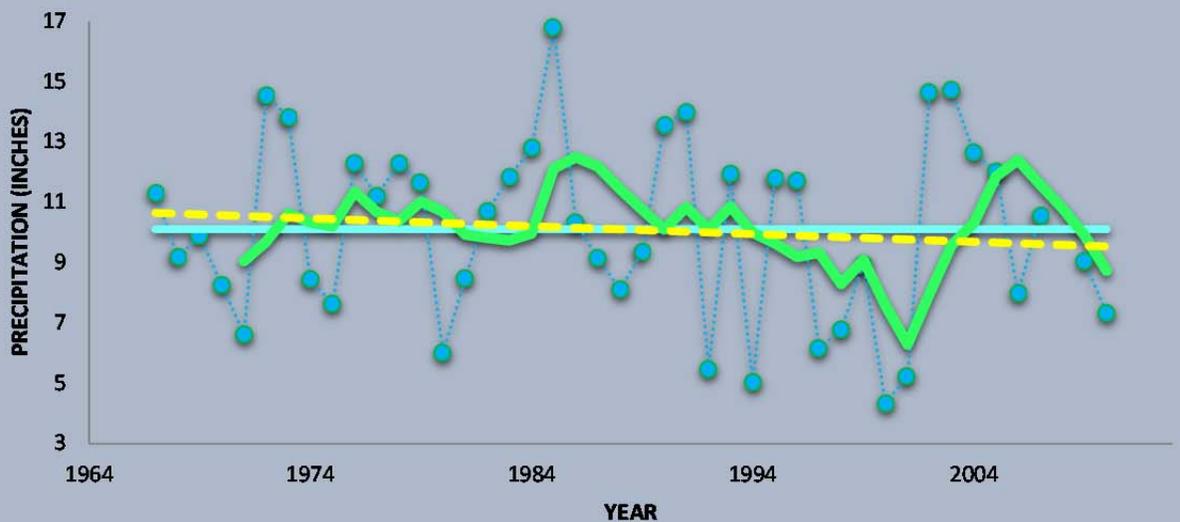


Autumn Precipitation (Oct. 1 - Dec. 31) - Beckley, WV



Autumn Precipitation Trends: Summersville Lake shows a small (between 1-2" over the past ~70 years), but steady decrease in autumn precipitation with Beckley demonstrating no change. The average sum of precipitation during the autumn is 8.7 in (min of 3.8 and max of 12.8 in) at Beckley compared to an average of 10.1 in (min of 4.3 and max of 16.8 in) at Summersville Lake.

Autumn Precipitation (Oct. 1 - Dec. 31) - Summersville Lake, WV



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National Park Service
U.S. Department of the Interior



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