



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

Weather of 2007

Natural Resource Data Series NPS/ERMN/NRDS—2010/074



ON THE COVER

Mist over Insignificant rapid, Gauley River, Gauley River National Recreation Area.

Photograph by: Jim Vanderhorst.

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Gauley River National Recreation Area,
and New River Gorge National River**
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List of Key Acronyms

BLUE	Bluestone National Scenic River
COOP	National Weather Service Cooperative Observer Program
CWOP	Citizen Weather Observer Program
ERMN	Eastern Rivers and Mountains Network
FAA	Federal Aviation Administration
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
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

Purpose of the Report

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 the 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 January 1 to December 31, 2007, and to place current patterns and trends in an appropriate historical and regional context (Knight et al., in preparation). It is our intention that this report will satisfy an inherent interest in meteorological phenomena and meet the Eastern Rivers and Mountains Network (ERMN) Weather and Climate Monitoring objectives:

- Document long-term trends in weather and climate through seasonal and annual summaries of selected parameters (e.g., multiple forms of precipitation, temperature).
- Identify and document extremes and averages of climatic conditions for common parameters (e.g., precipitation, air temperature) and other parameters where sufficient data are available (e.g., wind speed and direction, solar radiation).
- Provide information on near real-time weather parameters, historical climate patterns, and climate station metadata from a single, easy-to-use Internet portal.

To accomplish these objectives, 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 (Knight et al., in preparation). Through this analysis, a select number of weather/climate observing stations were chosen as representative of each park; 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 climatological indicators to report status and trends on an annual basis and periodically in separate and more thorough reports. These key indicators are further described in the protocol (Knight et al., in preparation) and summarized in the body of this report.

Weather Summary

Calendar year 2007 began very mild, but winter returned with persistent chill from late January until later February. A winter storm brought widespread snow around February 6–7. Another bout of rather cold air was noted in mid-April with unusually late snow showers (a departure of 3–5°F (1.8–3°C) from normal maximum temperature for April). One of the heaviest rainstorms of the year occurred on April 15, with some sections receiving more than 2.2 inches (6 cm) in one day. (more than 130 percent of normal precipitation for April). A relatively dry and warm period dominated the remainder of spring and summer with more than the average number of hot days (Table 1). Warm weather in September became one of the warmest Octobers in decades (departures of 7–9°F (3–5°C) for maximum temperature in October). November was cool and December was moist in most sections. Snowfall and rainfall for 2007 were a bit below the long-term average (Table 1).

Long-term Trends

The slow lengthening of the growing season continues to be the most pronounced regional trend. In 2007, this trend was exhibited by an average ‘last’ frost (about May 8–20) and a late first freeze (October 29–30), so the season was similar to recent years. The trend toward milder winter nights did register a small setback in 2007, as a late January to mid-February cold snap produced several sub-zero (-17°C) mornings (Table 1). The significant increase in autumn rainfall was evident with a moist October and a wet December. The fall season has shown a significant rise in precipitation during the last century.

The factors that influence seasonal trends are ocean temperature anomalies. The longer term effects of a change in water temperatures to lower (cool) values around the rim of the North Pacific adjacent to North America are impacting autumn temperatures (warmer than usual Sept–Oct) as well as the frequency of cold air outbreaks during the winter in West Virginia (more often). A minimum in solar activity, often associated with a decrease in annual temperatures, was also noted in 2007.

Table 1. Summary of 2007 significant climate indicators for the West Virginia parks.

Weather Indicator	2007 Statistics	Comments on Trends
Hot Days (Tmax > 32°C/90°F)	3–31 days	Above the 30-year mean of 1–7 days
Cold Days (Tmax < 0°C/32°F)	15–30 days	Below the 30-year mean of 20–0 days
Winter Minimums (Lowest Temp)	~ -18°C -1°F	Above the longterm average of -19°C -3°F
Growing Season (Days between last 0°C/32°F in spring and first 0°C/32°F in fall)	149–203 days	Near the 30-year mean of 175–200 days
Total Precipitation (Calendar Year - Inches)	33–41 inches	Below the average of 36–52 inches
Annual Snowfall (Calendar Year - Inches)	9–74 inches	A bit below 30-year mean of 15–70 inches

Climate of the Central and Southern West Virginia Region

Gauley River National Recreation Area lies in West Virginia (WV) Climate Division 4 “Central,” while Bluestone National Scenic River lies within WV Climate Division 5 “Southern.” New River Gorge National River lies in both. A climate division is a region that is reasonably homogenous with respect to climatic and hydrologic characteristics and is frequently used for compiling climate statistics (<http://www.esrl.noaa.gov/psd/data/usclimate/map.html>). WV 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. 2007). 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 flooding 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 NRA tends to have a greater number of hot days (temperatures above or equal to 90.0°F [32.0°C]) than New River Gorge NR and Bluestone NSR. 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

A total of 27 weather-observing stations comprising five observing networks (Table 2) were selected around Bluestone NSR, Gauley River NRA, and New River Gorge NR. The station identifiers in blue text (Figure 1) indicate those from which data has been used within this report. Stations that are not in the blue or bold text contain incomplete data for 2007 (Table 3). In addition to the summary information available in this report, a Web-interface is available that has a variety of data sources in near real-time (Figure 2). We encourage you to take a few minutes to go through the tutorial that describes the attributes of this site:

http://climate.met.psu.edu/gmaps/NPS_DEVELOPMENT/NPStutorial.2.26.08.pdf. Select NPS Inventory and Monitoring Network in the upper right corner and then directly below this, choose a network. You can also filter climate monitoring stations by various categories.

Table 2. List of the five weather observing networks around Gauley River NRA, New River Gorge NR, and Bluestone NSR.

Observing Network	Number of Stations
COOP	16
RAWS	5
FAA	4
CWOP	2
NADP	1

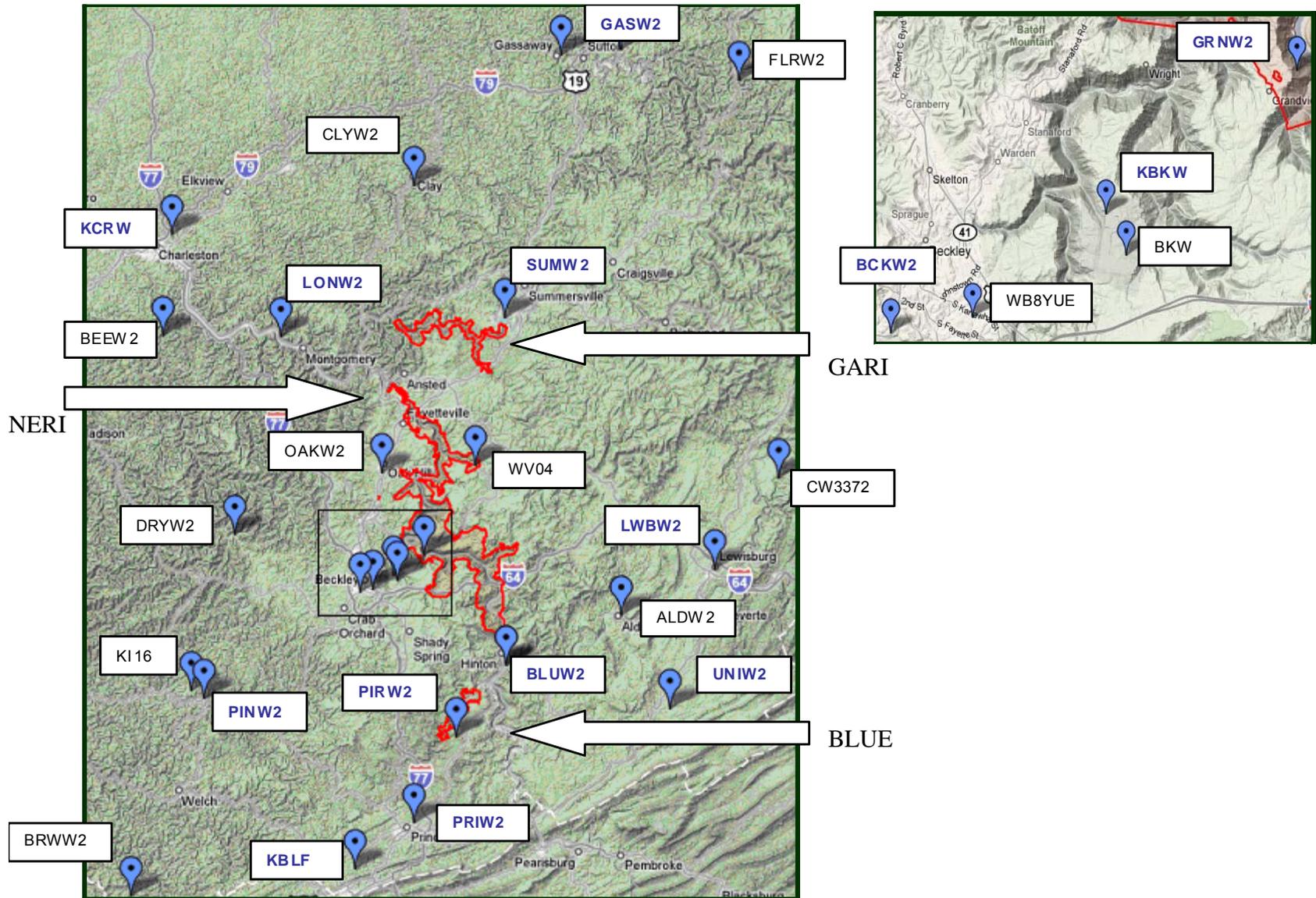


Figure 1. Location of weather observing stations around Bluestone National Scenic River (BLUE), Gauley River National Recreation Area (GARI), and New River Gorge National River (NERI).

Table 3. List of weather observing stations around Bluestone NSR, Gauley River NRA, and New River Gorge NR. Those that are in bold have been selected as representative of the parks, in large part, due to the percent time of reporting during 2007. RAWS sites were not included because normal values were not yet available. Not all data networks are shown here – missing are: IFLOWS, GOES, NADP, and CWOP because their data is either incomplete or not quality assured.

Station	Network	Station Name	Period of Record (POR)		Percentage of Time Reporting Temperature for 2007	Percentage of Time Reporting Precipitation for 2007	Percentage of Time Reporting Temperature for entire POR	Percentage of Time Reporting Precipitation for entire POR
ALDW2	COOP	Alderson	08-01-1948	Present	91.5	91.2	20.7	78.5
BCKW2	COOP	Beckley	08-01-1948	Present	100.0	99.7	80.2	80.5
BLUW2	COOP	Bluestone Lake	03-01-1943	Present	14.8	98.6	78.9	79.2
DRYW2	COOP	Dry Creek	12-01-1961	Present	77.2	76.4	17.7	98.8
LWBW2	COOP	Lewisburg	04-01-1987	Present	100.0	100.0	99.1	98.8
OAKW2	COOP	Oak Hill	08-01-1948	Present	91.0	91.2	98.4	98.5
UNIW2	COOP	UNION 3 SSE	04-01-1978	Present	41.4	100.0	96.7	98.6
CLYW2	COOP	Clay	04-01-1897	Present	66.3	82.2	9.1	50.4
GASW2	COOP	Gassaway	05-01-1951	Present	100.0	98.4	99.3	99.5
HVAW2	COOP	Hacker Valley	08-01-1960	Present	100.0	100.0	19.2	99.2
LONW2	COOP	London Locks	08-01-1948	Present	100.0	98.6	98.4	97.8
SUMW2	COOP	Summersville Lake	07-01-1966	Present	98.4	95.9	65.7	66.5
PINW2	COOP	Pineville	08-01-1948	Present	100.0	99.7	98.7	99.0
PRIW2	COOP	Princeton	08-01-1948	Present	-	99.2	-	90.5
KBLF	FAA	Bluefield	01-01-1972	Present	98.9	98.9	99.2	99.3
KCRW	FAA	Charleston	02-05-1949	Present	98.9	98.9	21.5	21.5
KBKW	FAA	Beckley	05-15-1963	Present	98.9	98.9	77.7	77.7
KI16	FAA	Pineville	01-01-2004	Present	98.9	98.9	86.5	86.5
PIRW2	RAWS	Pipestem	06-09-2005	Present	98.4	98.4	99.3	99.3
BRWW2	RAWS	Berwind	09-14-2005	Present	100.0	100.0	92.1	92.1
FLRW2	RAWS	Flatwoods	06-09-2005	Present	100.0	100.0	99.8	99.8
GRNW2	RAWS	Grandview	01-01-2005	Present	100.0	100.0	99.7	99.7
BEEW2	RAWS	Bee Mountain	09-14-2005	Present	100.0	100.0	99.5	99.5

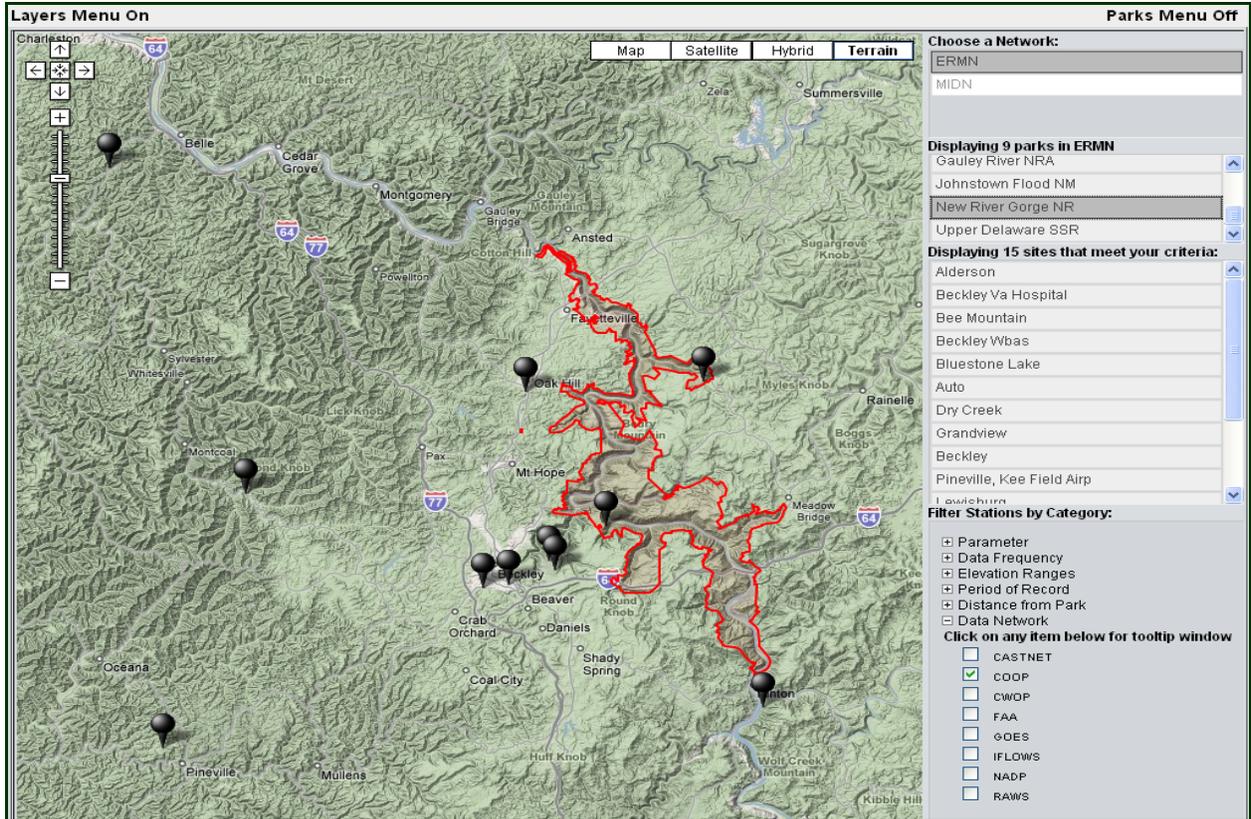


Figure 2. A snapshot of the Web-interface that is available at http://climate.met.psu.edu/gmaps/NPS_DEVELOPMENT/interface.php/.

Temperature Summary

The first two weeks of 2007 began as many Januaries have during this decade with rather mild and moist weather. However, at mid-month, wintry weather returned and stayed consistently through mid-February (Tables 4 and 5; Figures 3 and 4). The winter's heaviest snowfall came in the first week of February when between 4–8 inches (10–22 cm) of snow fell across the region. Another snowstorm affected the area on February 17–18 with 2–5 in (5–12 cm). The bitter chill gave way to more seasonable chill interspersed with a few warm spells until early April. A ten-day period of unseasonably cold and snowy weather, accompanied by late hard freezes, occurred from April 6–16. The cold snap ended with a powerful nor'easter bringing one of the year's heaviest single-day rainfalls on April 15. May featured a mid-month cool spell which marked the last wide-spread frost of the season, but the rain ended and it turned exceptionally dry. Maps in Figures 3 and 4 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. More information can be found at: <http://www.prism.oregonstate.edu/>.

The summer of 2007 had several episodes of hot weather (warm season daily departures $>+5^{\circ}\text{F}$ [$+2.8^{\circ}\text{C}$]) from May 26–June 2, August 2–11 (the longest spell), and September 5–10. Oddly, the most anomalously warm weather did not occur until September 23–October 10, when readings averaged more than 10°F (5.6°C) above the long-term mean for this three-week period. A heavy rain storm dropped readings back to seasonal levels in late October. The first frosts occurred across the area on October 29. November and December were marked by alternating cool and warm spells, though the cool spells lasted longer in November and the result was that temperatures averaged slightly below normal (Figures 3 and 4). The season's first snowfall came in the higher elevation on November 16 and wide-spread snow on December 6. The year concluded with two weeks of mild weather, which made December warmer than normal and the 9th warmest autumn on record (Table 6).

The trend in 2007 showed a slight increase in cold winter days and a marginal increase in the frequency of sub-freezing nights. Summer of 2007 brought a greater-than-average number of hot days (Table 7). The temperature trend is upward at a rate of about 1.0°F (0.56°C) per decade (Figure 5).

Table 4. Summary of monthly average temperatures for 2007 from reporting sites that represent Bluestone NSR, Gauley River NRA, and New River Gorge NR.

Station Location	ID	ID Number	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Pineville, WV	PINW2	467029	1.97°C 35.55°F	-2.86°C 26.86°F	9.07°C 48.32°F	10.82°C 51.48°F	17.91°C 64.23°F	21.78°C 71.20°F	22.17°C 71.90°F	25.29°C 77.52°F	20.74°C 69.33°F	15.54°C 59.98°F	6.28°C 43.30°F	3.71°C 38.68°F	12.70°C 54.86°F
Summersville Lake, WV	SUMW2	468614	4.36°C 32.84°F	-5.82°C 21.52°F	8.06°C 46.50°F	9.12°C 48.42°F	16.70°C 62.06°F	20.21°C 68.37°F	20.34°C 68.61°F	23.37°C 74.06°F	18.90°C 66.02°F	14.77°C 58.58°F	5.44°C 41.80°F	3.23°C 37.81°F	11.23°C 52.21°F
London Locks, WV	LONW2	465365	3.89°C 39.00°F	-2.32°C 27.82°F	10.39°C 50.71°F	11.88°C 53.38°F	19.04°C 66.27°F	22.98°C 73.37°F	23.36°C 74.05°F	26.48°C 79.66°F	22.17°C 71.90°F	17.42°C 63.35°F	7.85°C 46.13°F	5.19°C 41.34°F	14.03°C 57.25°F
Gassaway, WV	GASW2	463361	2.40°C 36.32°F	-4.62°C 23.68°F	8.64°C 47.55°F	10.43°C 50.78°F	18.51°C 65.32°F	22.11°C 71.80°F	22.26°C 72.06°F	25.12°C 77.21°F	20.91°C 69.63°F	16.13°C 61.04°F	6.65°C 43.97°F	3.43°C 38.18°F	12.67°C 54.80°F
Hacker Valley, WV	HVAW2	463798	1.28°C 34.41°F	-5.86°C 21.45°F	7.79°C 46.02°F	8.71°C 47.67°F	16.18°C 61.13°F	19.49°C 67.08°F	19.71°C 67.48°F	22.60°C 72.68°F	18.63°C 65.53°F	14.53°C 58.15°F	5.49°C 41.88°F	3.09°C 37.56°F	10.97°C 51.74°F
Beckley, WV	BCKW2	460580	0.29°C 32.53°F	-5.46°C 22.18°F	7.29°C 45.13°F	8.18°C 46.72°F	15.06°C 59.11°F	18.35°C 65.03°F	18.93°C 66.08°F	22.17°C 71.90°F	17.77°C 63.98°F	13.46°C 56.23°F	4.15°C 39.47°F	2.76°C 36.97°F	10.24°C 50.44°F
Lewisburg, WV	LWBW2	465224	0.19°C 32.35°F	-4.71°C 23.52°F	6.94°C 44.50°F	8.53°C 47.35°F	16.04°C 60.87°F	19.93°C 67.88°F	20.41°C 68.73°F	23.39°C 74.10°F	18.50°C 65.30°F	13.92°C 57.06°F	4.29°C 39.73°F	2.02°C 35.63°F	10.79°C 51.42°F

^a1 day missing; ^b2 days missing; ^c3 days missing; ^d4 days missing.
Monthly statistics not reported if more than 4 days are missing.

6

Table 5. Summary of departure from normal temperature based on 30-year normal (1971–2000) for 2007 from reporting sites that represent Bluestone NSR, Gauley River NRA, and New River Gorge NR.

Station Location	ID	ID Number	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pineville, WV	PINW2	467029	1.92°C 3.455°F	4.74°C -8.53°F	2.46°C 4.42°F	-0.90°C -1.62°F	1.13°C 2.04°F	0.61°C 1.10°F	-1.22°C -2.20°F	2.57°C 4.62°F	1.63°C 2.93°F	3.06°C 5.50°F	-0.72°C -1.30°F	1.59°C 2.87°F
Summersville Lake, WV	SUMW2	468614	2.24°C 4.03°F	-5.54°C -9.98°F	3.77°C 6.79°F	-0.54°C -0.98°F	1.86°C 3.35°F	1.04°C 1.87°F	-1.06°C -1.91°F	2.81°C 5.06°F	1.62°C 2.92°F	3.76°C 6.77°F	-0.28°C -0.50°F	2.46°C 4.42°F
London Locks, WV	LONW2	465365	2.83°C 5.10°F	-4.98°C -8.97°F	3.19°C 5.71°F	-0.34°C -0.62°F	1.87°C 3.37°F	1.15°C 2.07°F	-0.92°C -1.66°F	2.75°C 4.95°F	1.89°C 3.40°F	3.47°C 6.25°F	-0.48°C -0.87°F	1.80°C 3.24°F
Gassaway, WV	GASW2	463361	2.90°C 5.22°F	-6.01°C -10.82°F	2.47°C 4.45°F	-1.07°C -1.92°F	1.63°C 2.93°F	0.89°C 1.60°F	-1.36°C -2.46°F	2.34°C 4.21°F	1.68°C 3.03°F	3.36°C 6.04°F	-0.52°C -0.93°F	1.43°C 2.57°F
Beckley, WV	BCKW2	460580	2.25°C 4.05°F	-5.18°C -9.32°F	3.12°C 5.61°F	-1.04°C -1.88°F	0.78°C 1.40°F	0.35°C 0.63°F	-1.12°C -2.02°F	2.83°C 5.09°F	1.88°C 3.38°F	3.52°C 6.33°F	-0.74°C -1.33°F	2.37°C 4.26°F
Lewisburg, WV	LWBW2	465224	1.97°C 3.54°F	-4.77°C -8.59°F	2.39°C 4.31°F	-1.13°C -2.05°F	1.09°C 1.97°F	0.82°C 1.48°F	-0.92°C -1.66°F	2.83°C 5.10°F	1.50°C 2.70°F	3.15°C 5.67°F	-0.76°C -1.37°F	1.68°C 3.02°F

Gauley River NRA, New River Gorge NR, Bluestone NSR
 Departure from Average Monthly Maximum Temperature
 2007 vs. 1971–2000

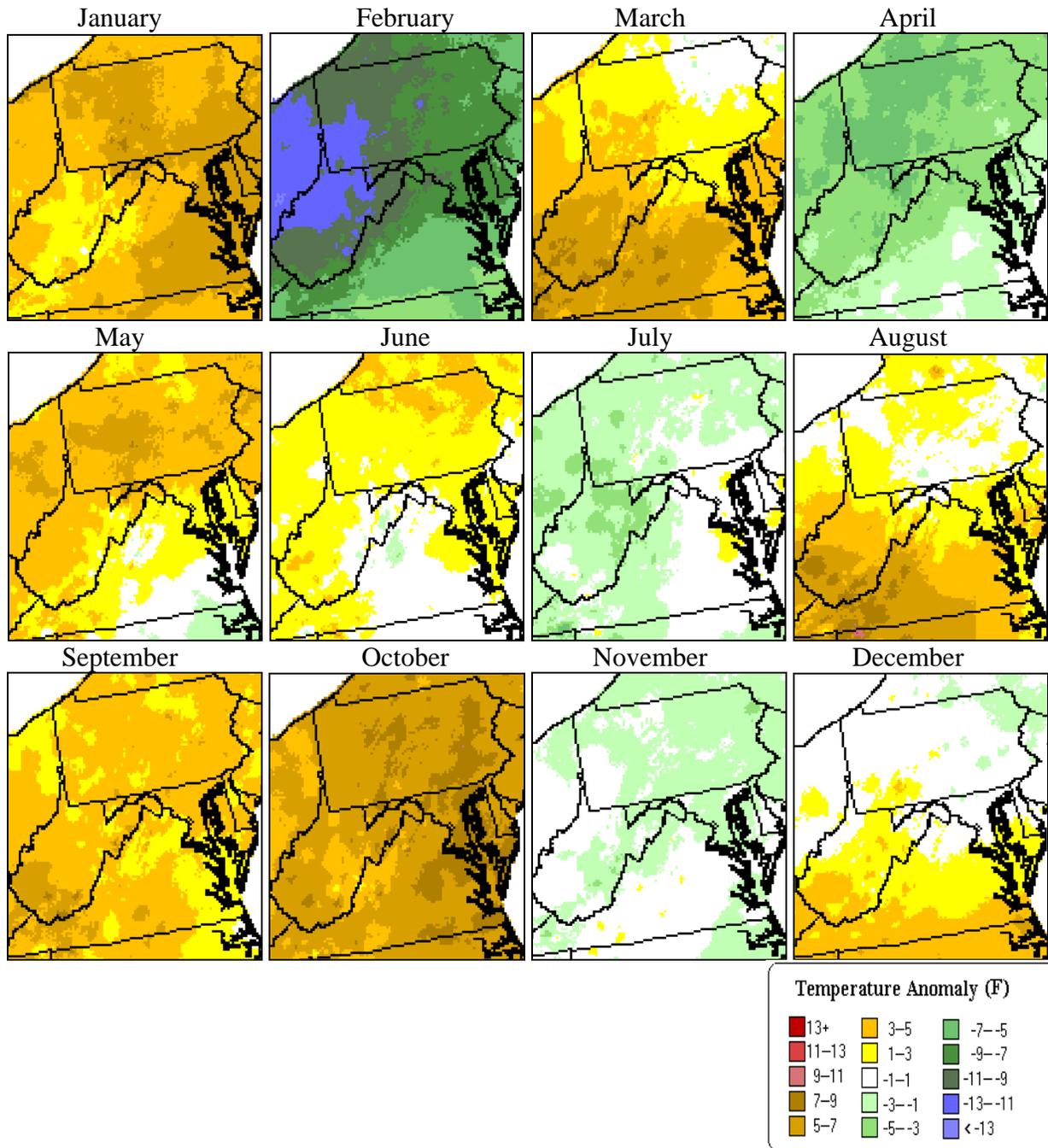


Figure 3. Maps showing departures from average maximum daily temperatures for each month in calendar year 2007 as compared with the normal based on the period 1971–2000.

Gauley River NRA, New River Gorge NR, Bluestone NSR
 Departure from Average Monthly Minimum Temperature
 2007 vs. 1971–2000

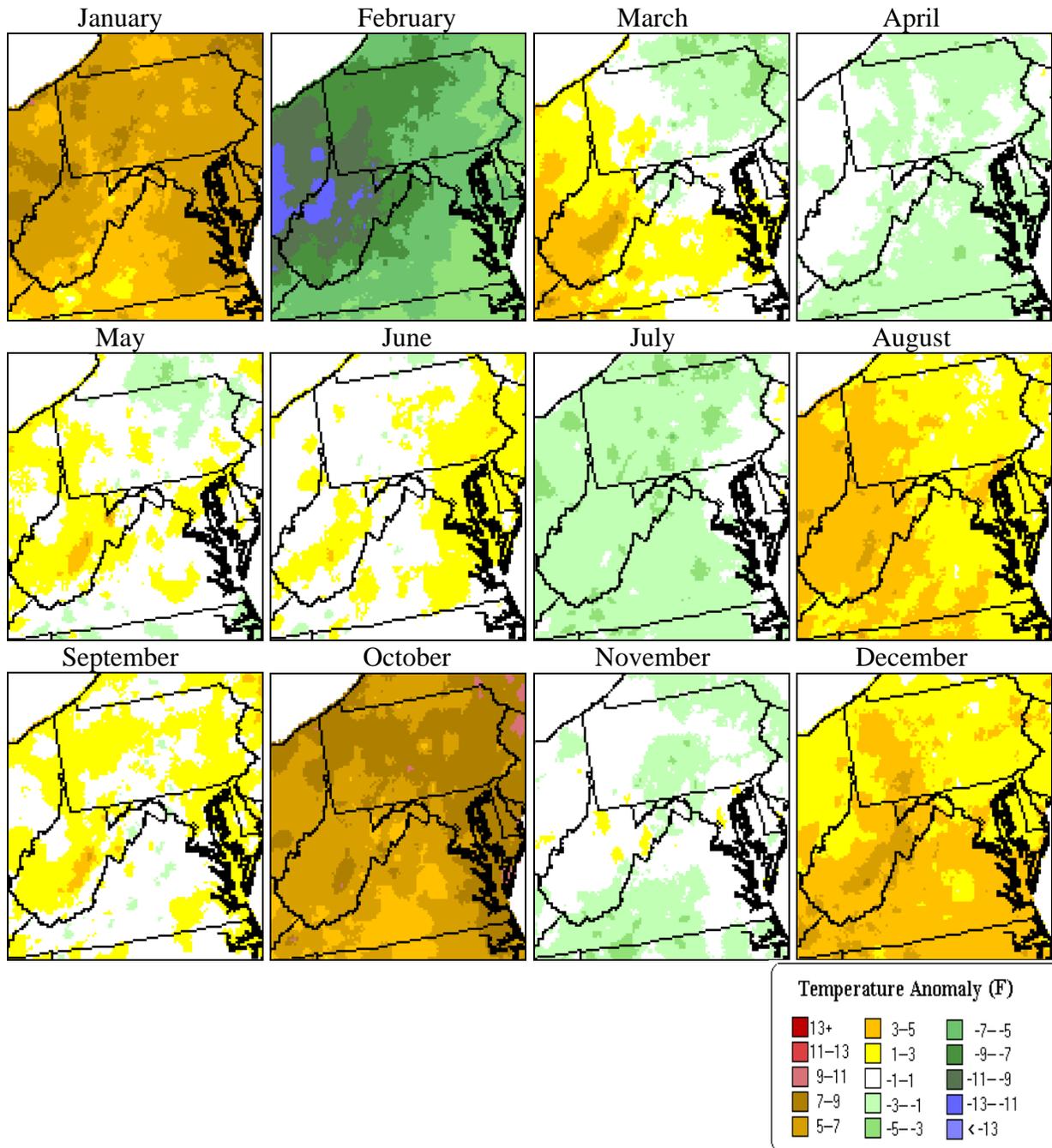


Figure 4. Maps showing departures from average minimum temperatures for each month in calendar year 2007 as compared with the normal based on the period 1971–2000.

Table 6. Seasonal temperature and precipitation rankings over 114 years for WV Climate Division 3 for 2007.

Climate Division Rankings West Virginia Zone 3	Jan–Feb–Mar Winter	Apr–May–Jun Spring	July–Aug–Sep Summer	Oct–Nov–Dec Autumn
Temperature 2007	60	42	15	11
Precipitation 2007	49	66	47	14

1=Warmest or Wettest; 114 = Coldest or Driest

Table 7. Status of 2007 temperature indicators compared to the 30-year normal (1971–2000) at the Beckley (KBKW) stations.

Temperature Indicator	Beckley, WV (KBKW) 2007	Beckley, WV (KBKW) 1971–2000
Number of days with Tmax ≤0°C/32°F	29	26.6
Number of days with Tmin ≤0°C/32°F	113	110.7
Number of days with Tmin ≤-17°C/0°F	1	3.6
Number of days with Tmax ≥32°C/90°F	6	1
Number of days between last 32°F in Spring and first 32°F in Fall	194	-

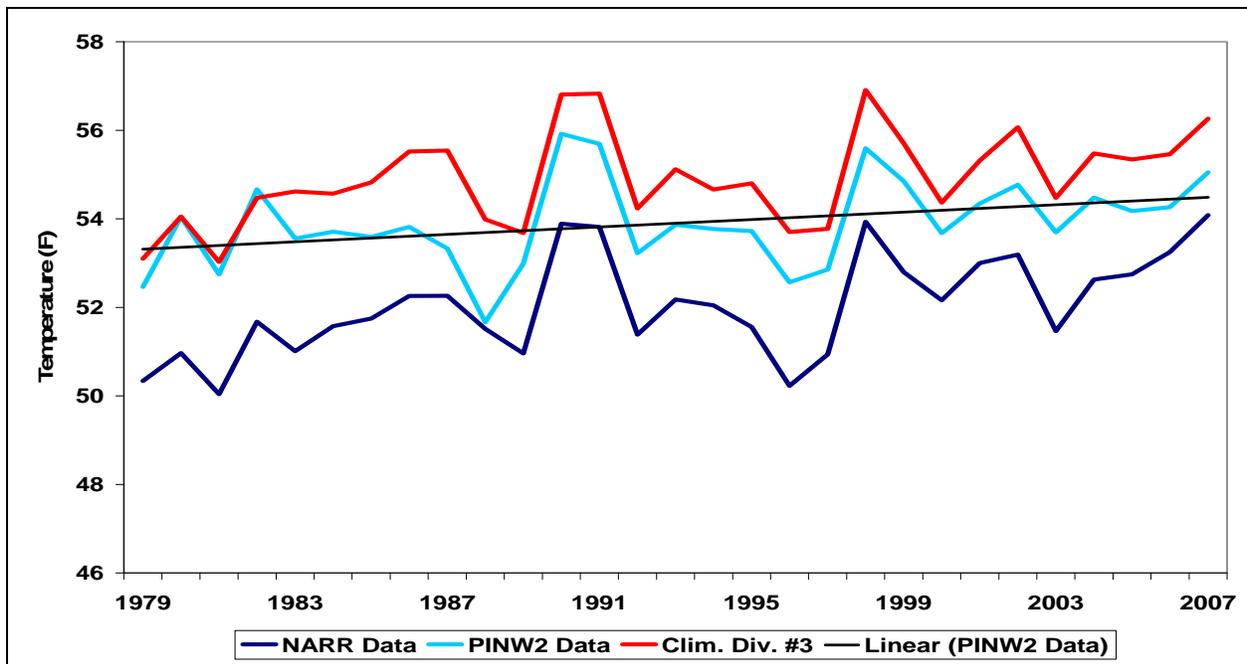


Figure 5. Annual temperature trends for Bluestone NSR, Gauley River NRA, and New River Gorge NR, as seen from three distinct data sources. The red line shows WV climate division 3 data which is composed of more than 10 climate stations in the West Virginia counties adjacent to the park. The dark blue line is the temperature trend for a 32-km square box centered near Gauley River NRA, New River Gorge NR, and Bluestone NSR as derived from the North American Regional Reanalysis data set (NARR). This gridded database was the initial conditions for the numerical weather prediction models. The light blue shows the trend from a single Cooperative (COOP) weather station at Pineville, WV. The agreement between all three data sources indicates the reliability of the NARR data as a good proxy for actual park observations.

Precipitation Summary

Both January and February were drier than average across the region (Tables 8 and 9; Figure 6). In spite of the below normal precipitation, snowfall was near normal for this period since the majority of the precipitation fell as snow from mid-January until the third week of February. Two significant winter storms occurred on February 7 and 17–18 with all sections receiving more than 2 in (5 cm) of snow and higher elevations received about 12 in (30 cm). March saw near normal rain and snowfall. April featured the most wide-spread wet weather of the year, which was centered on a powerful nor'easter on April 15 (Table 10).

The warm season of 2007 started and ended with very dry conditions (Figure 6). After a very wet April, May saw significant rainfall on only a handful of days. More routine showers and thunderstorms returned in June, but the scattered nature of this rain left most sections with a deficit (Figure 6), leading to one of the driest springs in decades (Table 6). A bout of heavy thunderstorms in later July brought several reports of severe weather (Appendix) and also raised rainfall above the long-term mean for the month. August had several heavy thunderstorms in the first half of the month (see Appendix), and then from late August until early October rainfall was sparse with no contribution of moisture from the Tropics. Three long, dry spells occurred during this period (Table 10). Rain returned in earnest starting on October 24. After a brief dry spell at the beginning of November, rainfall was regular until the end of the year. In fact, frequent disturbances during December made it the 2nd wettest month of 2007.

Overall, precipitation for 2007 was slightly below normal at most locations (Tables 1 and 9); however, the thirty-year trend shows very little change (Figure 7). Notably, annual snowfall was well-below normal in 2007 (Table 11).

Maps showing percent of average precipitation for each month in calendar year 2007, as compared with the normal, based on the period 1971–2000, are shown in Figure 6. Departure values are reported in percent of normal. Maps were created using estimates from the Parameter-elevation Regressions on Independent Slopes Model (PRISM). PRISM uses an interpolation scheme for precipitation between actual observations and corrects these estimates for changes in topography across the region. More information can be found at: <http://www.prism.oregonstate.edu/>.

Table 8. Summary of precipitation in 2007 for reporting sites that represent Bluestone NSR, Gauley River NRA, and New River Gorge NR.

Station Location	ID	ID Number	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Bluestone Lake, WV	BLUW2	460939	6.37 cm	4.24 cm	10.41 cm	14.86 cm	4.07 cm	11.53 cm	13.54 cm	2.59 cm	3.99 cm	11.00 cm	4.46 cm	8.84 cm	95.91 cm
			2.51 in	1.67 in	4.10 in	5.85 in	1.60 in	4.54 in	5.33 in	1.02 in	1.57 in	4.33 in	1.76 in	3.48 in	37.76 in
Princeton, WV	PRIW2	467207	6.035 cm	3.10 ^a cm	8.31 cm	10.06 cm	5.21 cm	6.76 ^a cm	12.98 cm	1.17 cm	2.97 cm	10.59 ^a cm	3.38 cm	8.56 ^a cm	79.15 cm
			2.37 in	1.22 ^a in	3.27 in	3.96 in	2.05 in	2.661 ^a in	5.11 in	0.46 in	1.17 in	4.17 ^a in	1.33 in	3.37 ^a in	31.16 in
Pineville, WV	PINW2	467029	9.85 cm	5.21 cm	10.01 cm	14.12 cm	3.43 cm	9.70 cm	15.70 cm	1.25 cm	3.20 cm	7.62 cm	6.76 cm	9.50 ^a cm	86.85 cm
			3.88 in	2.05 in	3.94 in	5.56 in	1.35 in	3.82 in	6.18 in	0.49 in	1.26 in	3.00 in	2.66 in	3.74 ^a in	34.20 in
Summersville Lake, WV	SUMW2	468614	8.73 ^d cm	6.60 ^a cm	10.26 cm	11.53 ^a cm	4.95 cm	8.46 cm	16.97 cm	12.04 cm	8.71 ^a cm	9.60 cm	8.84 ^b cm	9.65 ^d cm	116.36 cm
			3.44d in	2.60a in	4.04 in	4.54 ^a in	1.95 in	3.33 in	6.68 in	4.74 in	3.43 ^a in	3.78 in	3.48 ^b in	3.80 ^d in	45.81 in
London Locks, WV	LONW2	465365	7.42 cm	4.70 cm	8.71 cm	12.85 cm	3.66 cm	5.23 ^a cm	16.31 ^b cm	3.30 ^a cm	4.83 ^b cm	9.96 cm	8.69 cm	10.06 cm	66.04 cm
			2.92 in	1.85 in	3.43 in	5.06 in	1.44 in	2.06 ^a in	6.42 ^b in	1.30 ^a in	1.90 ^b in	3.92 in	3.42 in	3.96 in	26.00 in
Gassaway, WV	GASW2	463361	7.92 ^b cm	6.02 ^a cm	9.25 ^b cm	12.29 cm	3.56 cm	3.18 ^a cm	16.00 cm	8.81 cm	6.40 cm	9.86 cm	8.08 cm	14.43 ^a cm	105.80 cm
			3.12 ^b in	2.37 ^a in	3.64 ^b in	4.84 in	1.40 in	1.25 ^a in	6.30 in	3.47 in	2.52 in	3.88 in	3.18 in	5.68 ^a in	41.65 in
Hacker Valley, WV	HVAW2	463798	12.04 cm	9.17 cm	16.21 cm	15.24 cm	6.15 cm	.64	29.82 cm	11.23 cm	9.42 cm	12.20 cm	10.21 cm	17.04 cm	160.41 cm
			4.74 in	3.61 in	6.38 in	6.00 in	2.42 in	4.60 in	11.74 in	4.42 in	3.71 in	4.80 in	4.02 in	6.71 in	63.15 in
Beckley, WV	BCKW2	460580	8.18 cm	3.96 cm	12.50 cm	13.74 cm	5.54 cm	5.82 cm	12.98 cm	6.93 cm	5.26 cm	8.81 cm	5.13 cm	8.92 cm	84.02 cm
			3.22 in	1.56 in	4.92 in	5.41 ^a in	2.18 in	2.29 in	5.11 in	2.73 in	2.07 in	3.47 in	2.02 in	3.51 in	33.08 in
Lewisburg, WV	LWBW2	465224	8.22 cm	5.04 cm	11.26 cm	11.79 cm	6.97 cm	7.25 cm	8.84 cm	3.43 cm	6.71 cm	10.97 cm	3.84 cm	9.60 cm	93.91 cm
			3.24 in	1.99 in	4.43 in	4.64 in	2.74 in	2.85 in	3.48 in	1.35 in	2.64 in	4.32 in	1.51 in	3.78 in	36.97 in
Union, WV	UNIW2	469011	6.20 cm	3.54 cm	6.33 cm	9.12 cm	4.24 cm	8.53 cm	11.76 cm	5.74 cm	4.62 cm	11.48 cm	1.76 cm	7.24 cm	80.57 cm
			2.44 in	1.40 in	2.49 in	3.59 in	1.67 in	3.36 in	4.63 in	2.26 in	1.82 in	4.52 in	0.69 in	2.85 in	31.72 in

a = 1 day is missing, b = 2 days missing, c = 3 days missing, d = 4 days missing

Monthly statistics not reported if more than 4 days are missing

Table 9. Summary of 2007 percent of normal precipitation based on 30-year normal (1971–2000) for reporting sites that represent Bluestone NSR, Gauley River NRA, and New River Gorge NR.

Station Location	ID	ID Number	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Bluestone Lake, WV	BLUW2	460939	83	63	119	179	41	136	127	31	55	167	70	135	100
Princeton, WV	PRIW2	467207	75	45	96	119	52	73	132	14	39	166	50	130	82
Pineville, WV	PINW2	467029	100	63	100	143	27	95	122	13	37	98	82	108	74
Summersville Lake, WV	SUMW2	468614	95	85	104	120	41	75	121	101	96	114	106	109	96
London Locks, WV	LONW2	465365	85	63	91	138	30	49	127	31	54	150	98	114	57
Gassaway, WV	GASW2	463361	89	73	86	129	31	27	117	72	65	126	81	149	85
Hacker Valley, WV	HVAW2	463798	104	89	129	119	42	85	186	84	84	123	89	146	116
Beckley, WV	BCKW2	460580	103	58	155	160	52	66	113	78	65	138	71	121	84
Lewisburg, WV	LWBW2	465224	102	68	122	141	65	76	84	38	90	156	50	122	81
Union, WV	UNIW2	469011	95	56	78	111	42	100	128	72	58	179	27	124	88

Gauley River NRA, New River Gorge NR, Bluestone NSR
 Percent of Average Monthly Precipitation
 2007 vs. 1971–2000

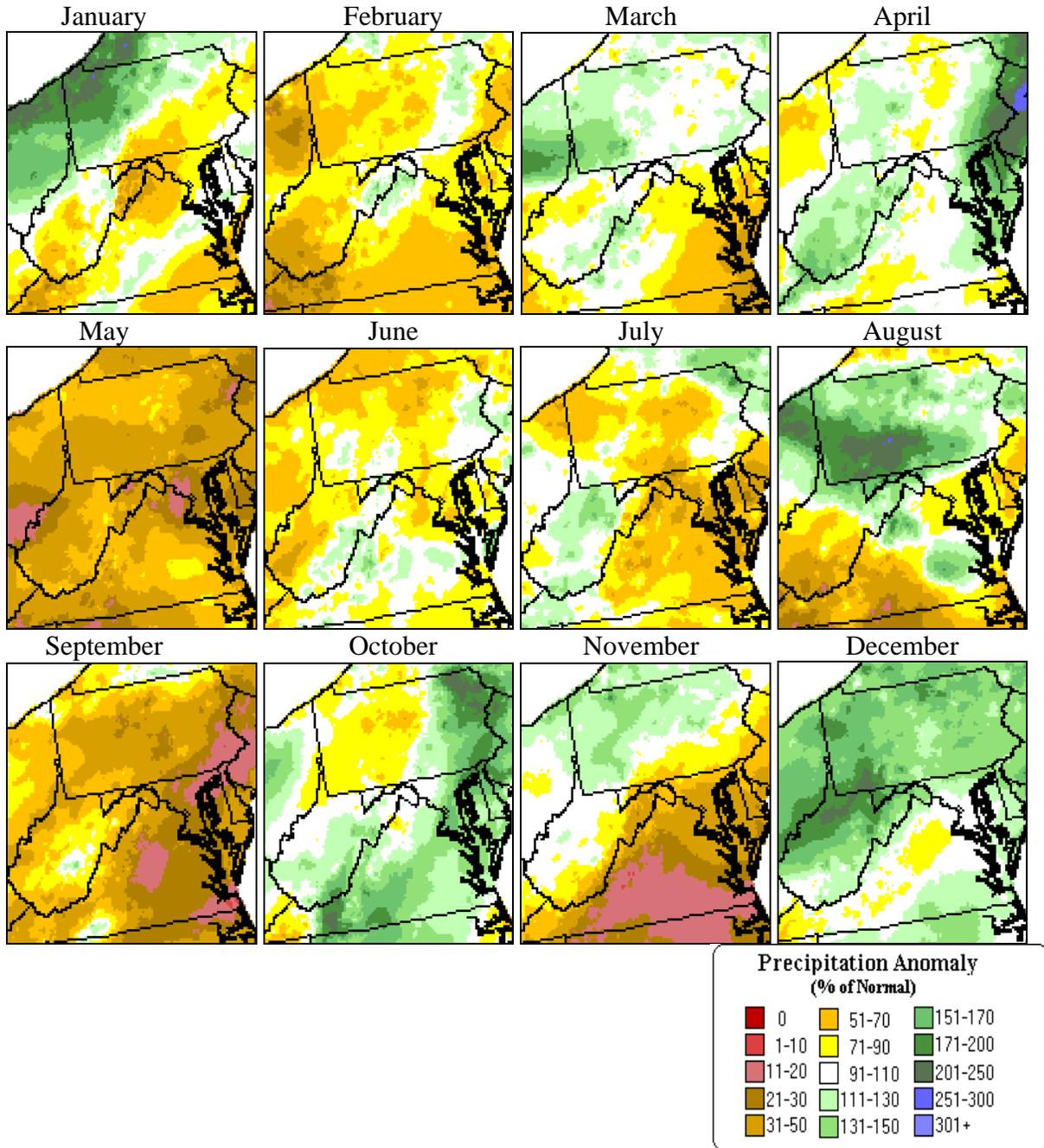


Figure 6. Maps showing percent of average precipitation for each month in the calendar year 2007 as compared with the normal based on the period 1971–2000.

Table 10. A comparison of wettest single calendar days during 2007 with the longest periods with a trace or less of rainfall during the same year.

Wettest Days in 2007	Dry Spells in 2007
Oct. 25: 2.8–6.1 cm (1.10–2.40 in)	Aug. 23–Sept. 10
Apr. 15: 4.3–5.6 cm (1.70–2.20 in)	May 19–Jun. 02
Mar. 16: 2.6–3.4 cm (1.02–1.34 in)	Sep. 29–Oct. 09
Mar. 02: 2.6–3.5 cm (1.02–1.38 in)	Sep. 16–Sep. 27
Nov. 15: 2.4–3.0 cm (0.94–1.18 in)	May 08–May 16
Jul. 19: 2.4–4.9 cm (0.94–1.93 in)	Oct. 28–Nov. 05
Jul. 25: (part of area) 3.3 cm (1.30 in)	Mar. 03–Mar. 09

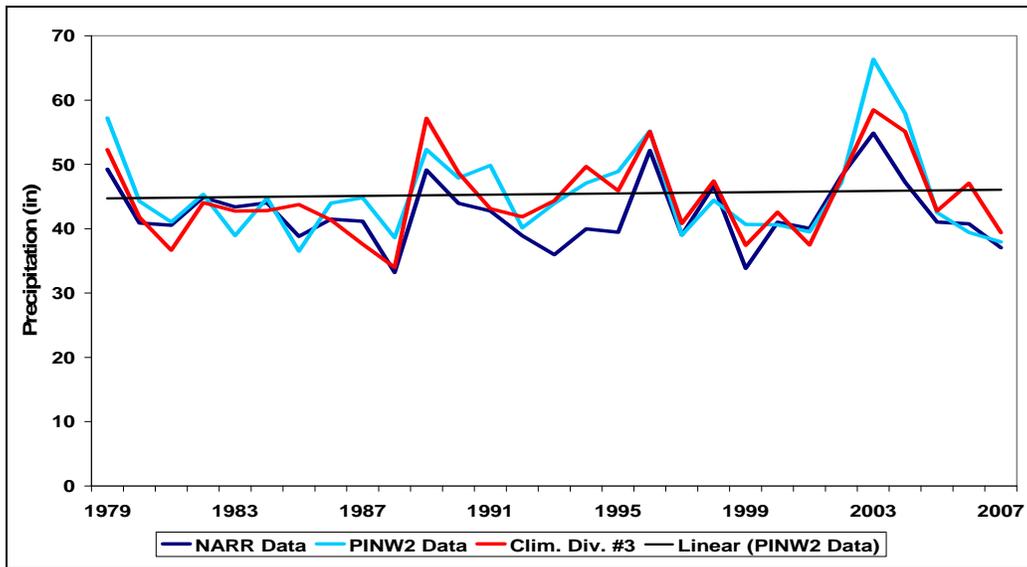


Figure 7. Annual precipitation trends for Bluestone NSR, Gauley River NRA, and New River Gorge NR, are shown by three separate lines. The red line tracks the climate division data (Div #3 in West Virginia) which represents an aggregate of more than a dozen sites near the parks. The dark blue line marks the trend of a grid box within Gauley River NRA, New River Gorge NR, and Bluestone NSR from a North American Reanalysis data set. The light blue line shows the annual precipitation for a nearby single weather station at Pineville, West Virginia. The 30-year trends show very little change.

Table 11. Status of 2007 precipitation indicators compared to the 30-year normal (1971–2000) at the Beckley station. The trend in 2007 showed a decrease in annual snowfall.

Precipitation Indicators	Beckley, WV (KBKW) 2007	Beckley, WV (KBKW) 1971–2000
2007 Snowfall	30.3	58.6
Number of strings of 7+ days without rain	2	-
Number of days ≥ 2.5 cm (1.00 in) rain	5	6.8
Number of days ≥ 5.1 cm (2.00 in) rain	1	-
Number of days with ≥ 0.3 cm (0.1 in) snow	34	-
Number of days with ≥ 2.5 cm (1 in) snow	11	16.2
% of Precipitation falling as snow from Jan 1–March 31	27.3	-
Number of days with thunderstorms	74	-

Drought Status

The U.S. Drought Monitor (USDM; <http://www.drought.unl.edu/dm/monitor.html>) tracks drought conditions across the nation on a weekly basis and it incorporates data and expert input from a wide variety of state and federal agencies. The USDM is designed to represent a “broad brush,” regional perspective (e.g., summarized by climate division, state, or region) on drought, and therefore provides an ideal tool for tracking generalized drought conditions across the central section of West Virginia and the enclosed parks. One index used to track drought conditions, the Palmer Drought Severity Index (PDSI), uses temperature and rainfall information to determine dryness; the long-term average is “zero.” Since the PDSI responds to long-term effects, including evaporation, there is usually a lag between long, dry spells, episodes of heavy rain, and changes in the index value.

According to the USDM, by the end of April 2007, the Palmer Drought Severity Index (PDSI) began a steady drop from normal (~0) to abnormally dry (~ -2) (Figure 8). These conditions persisted much of the summer and then rose again as wet weather returned in late October, alleviating some of the drought in the region. When compared with the past few years, the dry early summer of 2007 was akin to 2005, though this past year had fewer and less widespread showers in July and August. Comparative data is illustrated for West Virginia (Figure 9) and the Northeast (Figure 10).

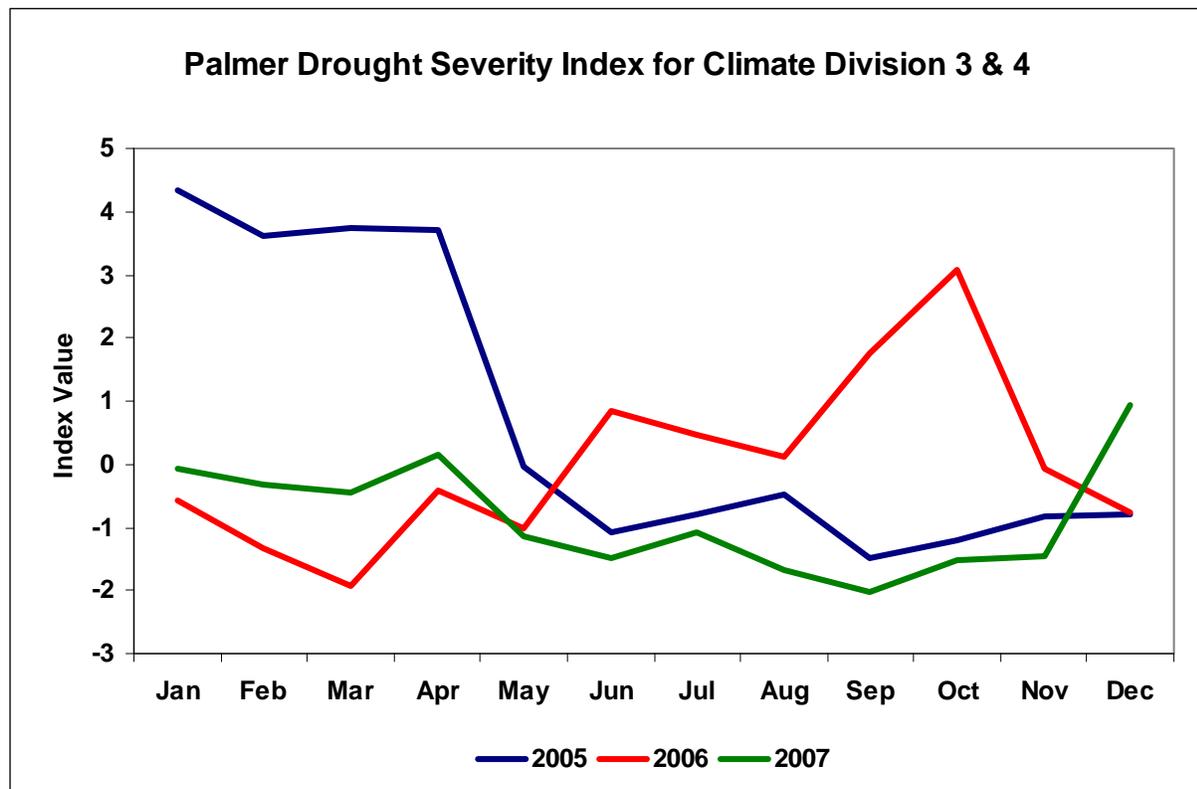


Figure 8. Palmer Drought Severity Index (PDSI) for West Virginia Climate Divisions 3 and 4, 2005–2007.

Drought Severity in West Virginia during 2007

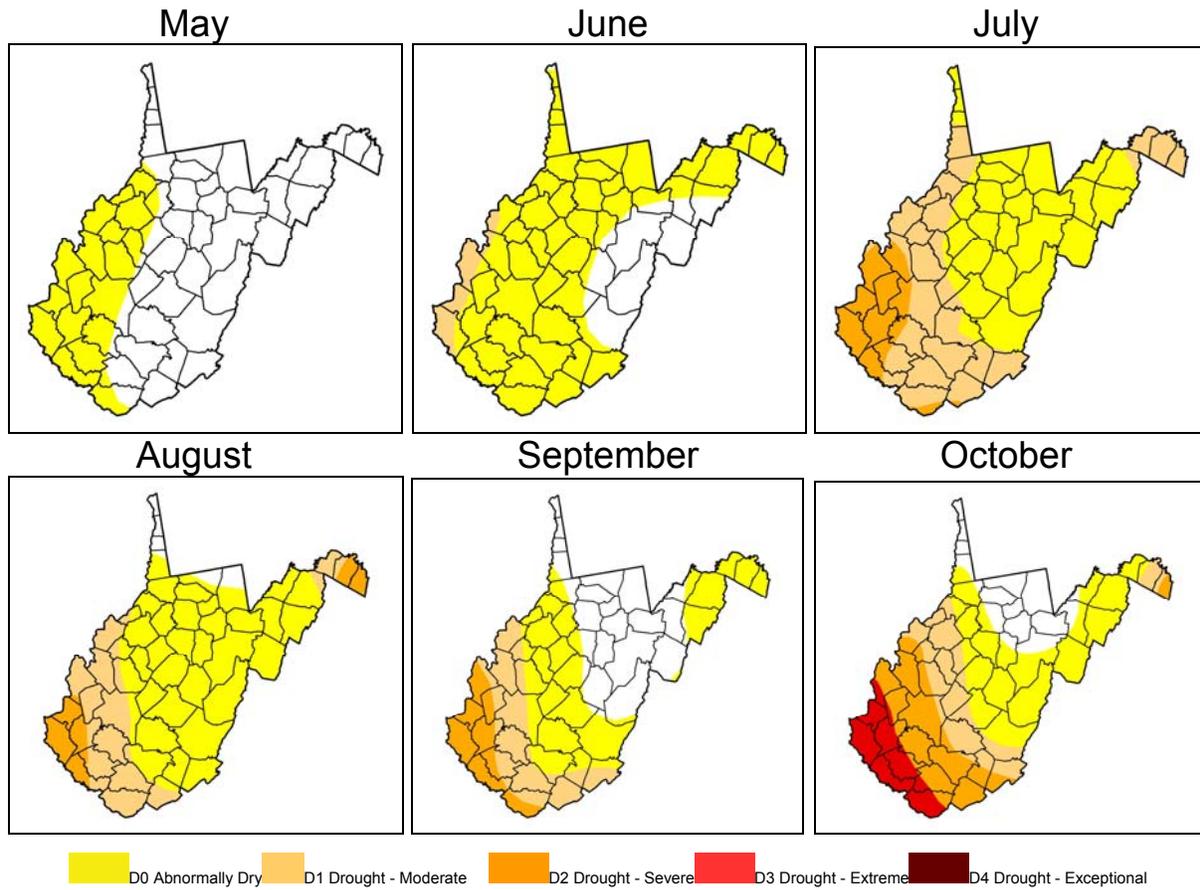


Figure 9. The mid-month values of the PDSI for West Virginia showing that dry conditions encroached on the West Virginia parks during 2007.

Drought Severity for the Northeast during 2007

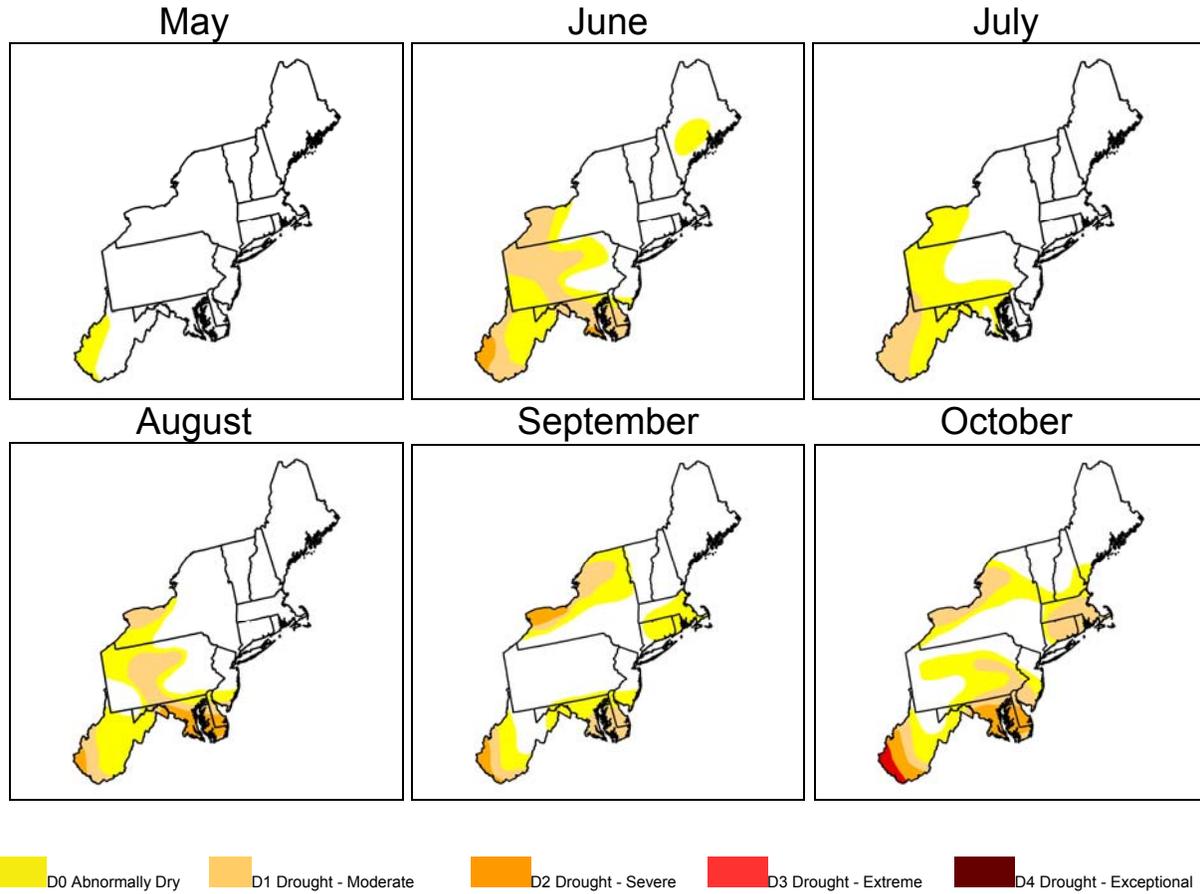


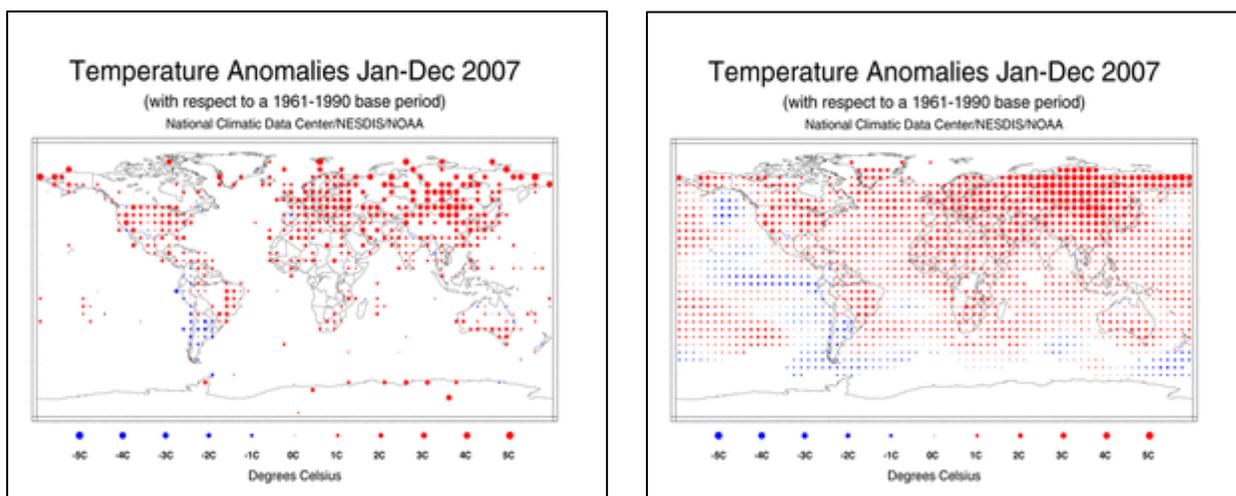
Figure 10. The mid-month values of the PDSI for the Northeast during the 2007 warm season. The Chesapeake Bay area was the most consistently dry region.

Global and National Summary

Warmer-than-average temperatures occurred throughout 2007 in most land areas of the world, with the exception of cooler-than-average anomalies in the southern parts of South America (Figure 11). The largest warmer-than-average anomalies were present throughout high latitude regions of the Northern Hemisphere, including much of North America, Europe, and Asia. Annual temperature anomalies in these regions ranged from 3.6–7.2°F (2–4°C) above the 1961–1990 average.

Notable temperature extremes in 2007 included a heat wave that affected a large portion of the United States throughout the month of August. The Central and Southeastern U.S. were particularly affected, with over 50 deaths attributed to soaring high temperatures. The anomalous warmth exacerbated drought conditions in the Southeastern region and also contributed for 29 all-time record high maximum temperatures and 35 all-time record high minimum temperatures.

In April a devastating cold wave affected much of the central Plains, Midwest, and the Southeast region of the contiguous U.S. Temperatures dipped well below freezing in many areas, prompting nearly 1,240 broken daily minimum-temperature records and producing significant crop damage.



Annual Land Temperature Anomalies in degrees C

Annual Blended Land and Sea Temperature Anomalies in degrees C

Figure 11. Global temperature anomalies for 2007 with respect to a 1961–1990 base period. The map on left is created using data from the Global Historical Climatology Network (GHCN), a network of more than 7,000 land surface observing stations. The map on right is a product of a merged land surface and sea surface temperature anomaly analysis developed by Smith and Reynolds (2005). Temperature anomalies with respect to the 1961–1990 mean for land and ocean are analyzed separately and then merged to form the global analysis.

Snow cover for the boreal winter 2007 across North America was above average and was the 13th largest extent over the 41-year historical record (Figure 12). This was, in part, due to a series of snow and ice storms that struck the U.S. during the month of February. Average North America boreal winter snow cover extent is 17.0 million square kilometers for the 1967–2007 period of record.

Mean Northern Hemisphere snow cover extent during boreal spring (March–May) 2007 was below average (Figure 13). Much of this was due to anomalously warm conditions across Asia, Europe, and most of the contiguous U.S. Spring 2007 snow cover extent on the Northern Hemisphere was the third lowest extent on record. Mean Northern Hemisphere spring snow cover extent for the 1997–2007 period of record is 92.6 million square kilometers.

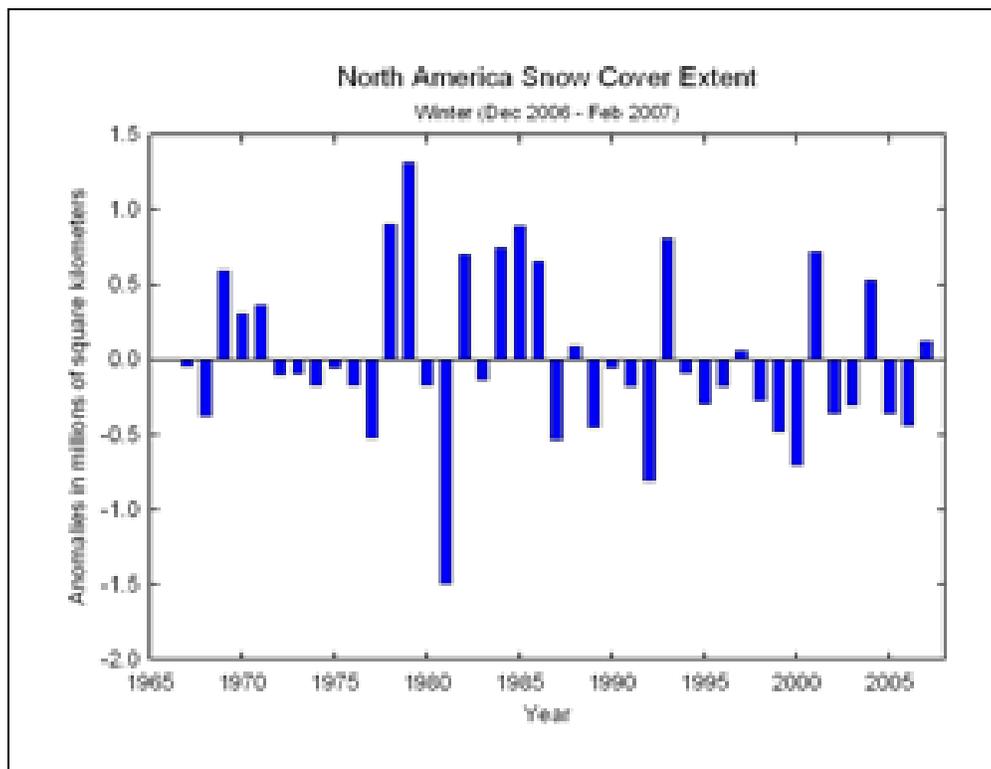


Figure 12. North American snow cover anomalies for 1967–2007 winters (December–February).

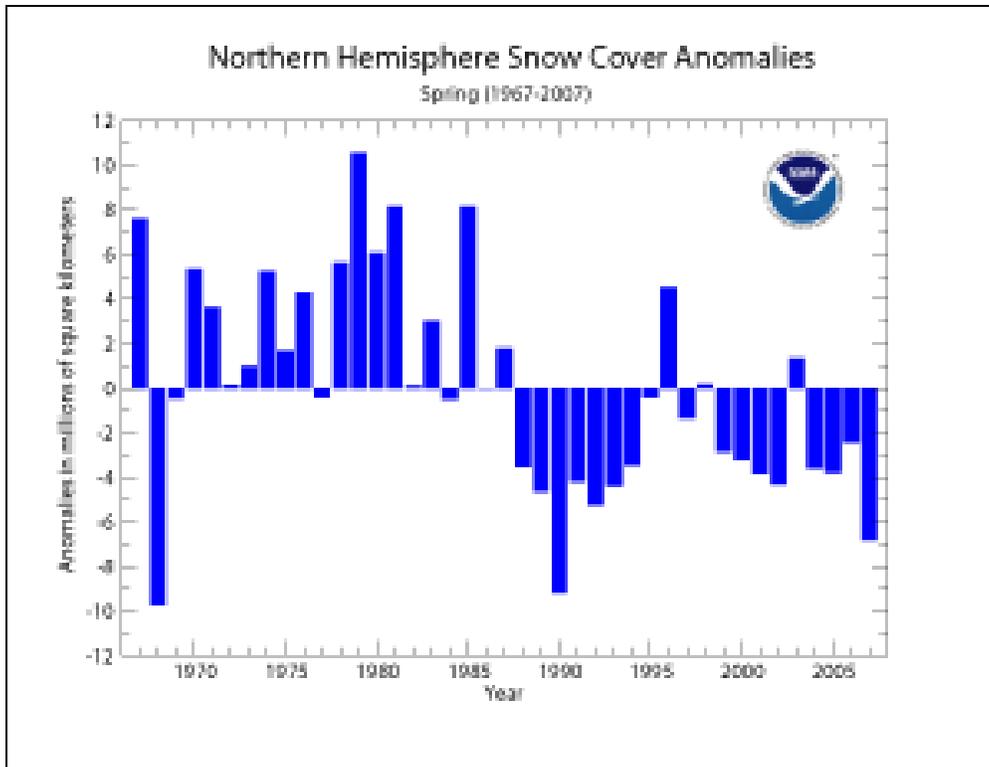


Figure 13. Northern Hemisphere snow cover anomalies for 1967–2007 spring (March–May).

Based on data through the end of the year, 2007 was the 10th warmest year on record for the U.S., with a nationally averaged temperature of 54.2°F (12.4°C). This value is 1.4°F (0.8°C) above the 20th century (1901–2000) mean (Figure 14).

Much warmer-than-average temperatures affected much of the mountain west and parts of the east during 2007. This was the 10th warmest January–December in the 113-year record. Both Kentucky and Tennessee had the fourth warmest years on record. Forty-three of the lower 48 states were either warmer or much warmer than average in 2007. Maine, alone, ranked below average during the 2007 year-to-date period. The anomalous warmth affecting the U.S. in 2007 is also reflected in temperatures in the lower troposphere. Data collected by NOAA's TIROS-N polar-orbiting satellites and adjusted for time-dependent biases by NASA and the Global Hydrology and Climate Center at the University of Alabama in Huntsville indicate that temperatures in the lower half of the atmosphere (lowest 8 km of the atmosphere) over the U.S. were warmer than the 20-year (1979–1998) average for the 10th consecutive year.

Precipitation in the United States during 2007 was variable throughout much of the country, with periods of excessive rainfall, especially across the central third of the U.S., and persistent and developing drought in the southeastern quarter of the country and the far western states. Winter was relatively wet in the South and North Central regions and relatively dry in the West and Southeast (Figures 15 and 16). In the spring, it was the driest March–May on record in the Southeast.

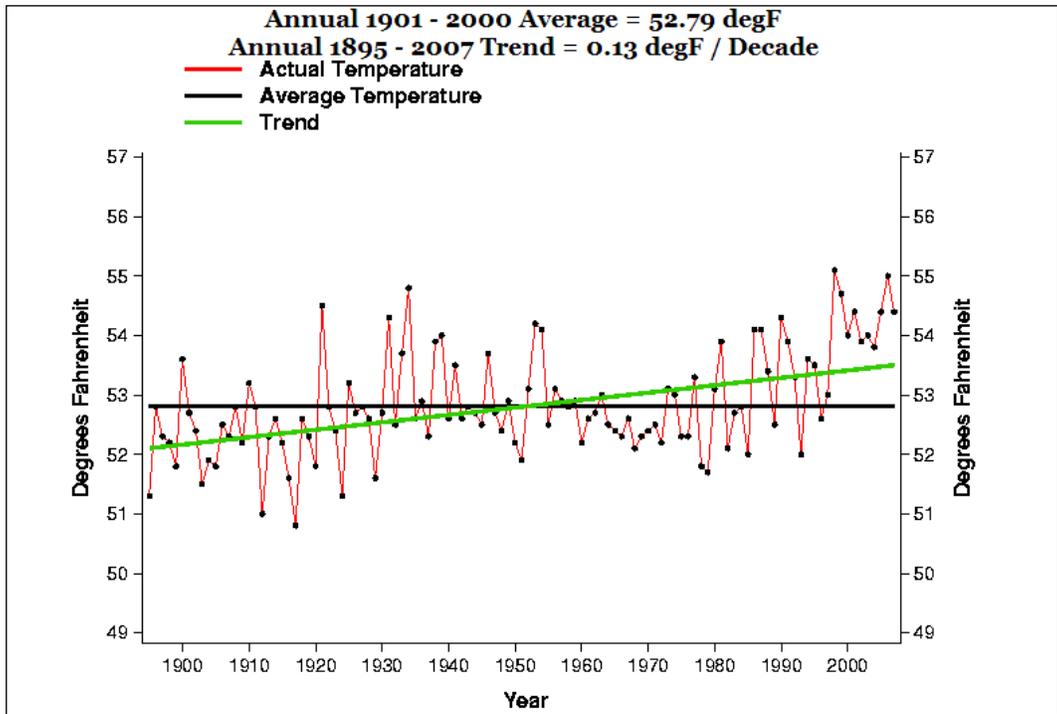


Figure 14. The long-term annual temperature trend for the United States based on the Historical Climate Network (HCN), which is a subset of the Cooperative Network of Weather Observers.

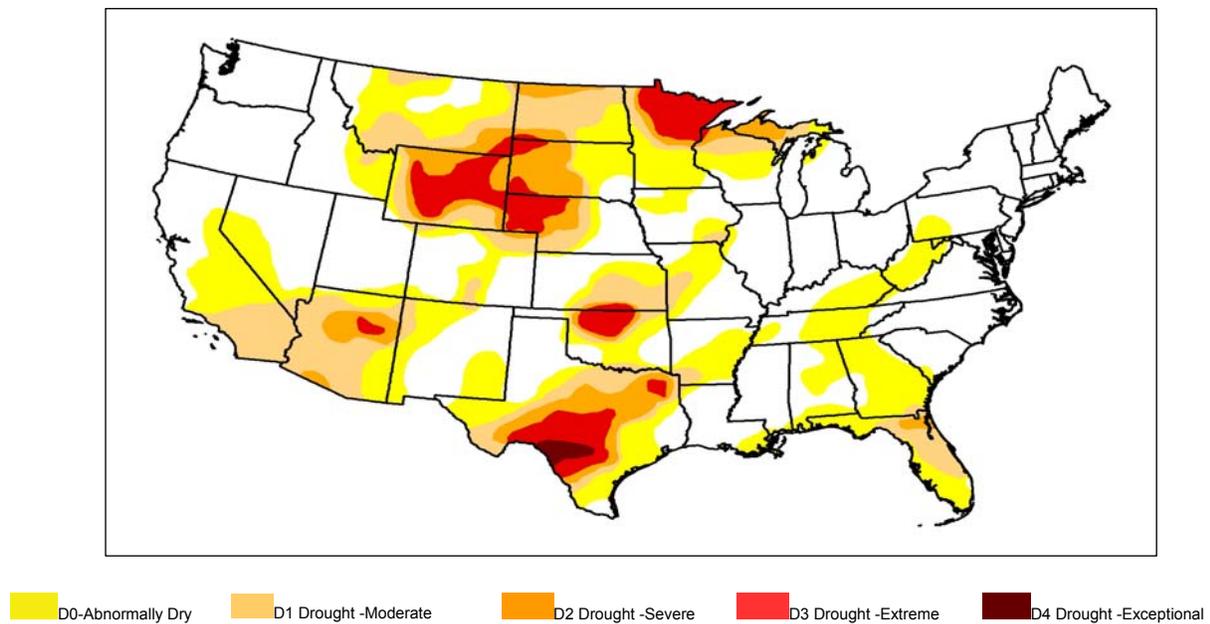
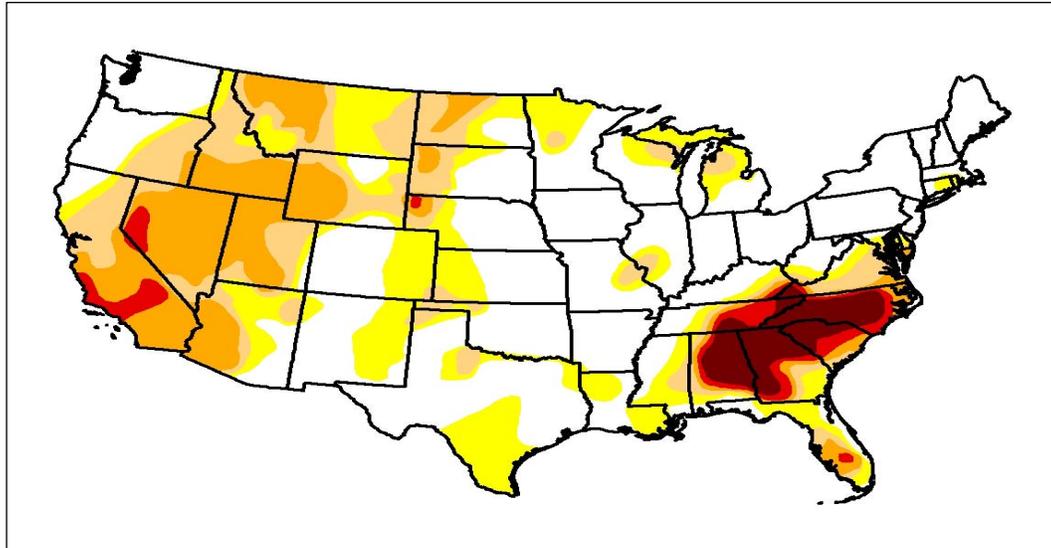


Figure 15. Palmer Drought Severity Index for January 2, 2007. The majority of the Plains were experiencing abnormally dry to moderate drought conditions.



D0-Abnormally Dry
 D1 Drought -Moderate
 D2 Drought -Severe
 D3 Drought -Extreme
 D4 Drought -Exceptional

Figure 16. Palmer Drought Severity Index for December 25, 2007. The center of intensely dry weather had settled into the Southeast United States.

The West was ranked sixth driest and the West North Central region had its third wettest spring on record. In summer, the remnants of Tropical Storm Erin brought excessive rain to Texas, Oklahoma, and Kansas, giving the South its wettest summer on record. Meanwhile, much of the Southeast continued to suffer in drought with its 11th driest summer on record, following the driest spring.

Precipitation across the U.S. during the fall ranked 37th driest, although no regions ranked much above or much below normal. For the contiguous U.S. as a whole, seven months in 2007 were drier than average. The annual temperature trend for the nation, based on the historical climate network (USHCN), shows that 2007 was down slightly from 2006, but still ranked as tied for the sixth warmest year in the past century.

Selected References

- Davey, C. A., K. T. Redmond, and D. B. Simeral. 2007. 2007 Weather and Climate Inventory, National Park Service, Annual Climate Summary for 2004, Organ Pipe Cactus National Monument. Natural Resource Technical Report NPS/WASO/NRTR—2007. National Park Service. Fort Collins, Colorado.
- Kocin, P. J., and L. W. Uccellini. 2004. 2004 Northeast Snowstorms Volume 1: Overview. Meteorological Monographs Vol 32, No 54. American Meteorological Society. Boston, Massachusetts.
- National Oceanic and Atmospheric Administration. 2007. National Climatic Data Center. Climate of 2007 – Annual Review, Global and U.S. Summary. <http://lwf.ncdc.noaa.gov/oa/climate/research/2007/ann/us-summary.html>.

Appendix

The following tables are a tally of all reports of severe weather during 2007 in the counties that encompass GARI, NERI and BLUE. These storm events were provided by the National Climatic Data Center (NCDC). NCDC receives this storm data from the National Weather Service, who acquires their information from a variety of sources. These sources include but are not limited to: county, state and federal emergency management officials, local law enforcement officials, skywarn spotters, NWS damage surveys, newspaper clipping services, the insurance industry and the general public. This Storm Data is an official publication of the National Oceanic and Atmospheric Administration (NOAA) which documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce. Each table contains the location, date, time, description of the severe event, its magnitude and number of deaths, injuries, and property/crop damage associated with the event. The property and crop damage should be considered as a broad estimate.

Clay County

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 WVZ005>010 - 013>020 - 024>032 - 034>040 - 046	2007-02-07	16:00 PM	Heavy Snow	N/A	0	0	0K	0K
2 WVZ005>010 - 013>020 - 024>032 - 034>040 - 046	2007-02-07	16:00 PM	Winter Weather	N/A	0	0	0K	0K
3 Widen	2007-04-15	02:00 AM	Flood	N/A	0	0	10K	0K
4 Clay	2007-07-26	19:25 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
5 Prociuous	2007-07-26	19:57 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
6 Clay	2007-07-27	17:40 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
7 WVZ005>008 - 013>016 - 024>028 - 033	2007-08-16	10:00 AM	Excessive Heat	N/A	0	0	0K	0K
8 Ovapa	2007-08-16	18:10 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
9 WVZ005>008 - 013>016 - 024>027 - 033	2007-09-01	12:00 AM	Drought	N/A	0	0	0K	0K
10 WVZ005>008 - 013>016 - 024>027 - 033	2007-10-01	12:00 AM	Drought	N/A	0	0	0K	0K
TOTALS:					0	0	10K	0

Mag: Magnitude; Dth: Deaths; Inj: Injuries; PrD: Property Damage; CrD: Crop Damage.

Braxton County

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 WVZ005>010 - 013>020 - 024>032 - 034>040 - 046	2007-02-07	16:00 PM	Heavy Snow	N/A	0	0	0K	0K
2 WVZ005>010 - 013>020 - 024>032 - 034>040 - 046	2007-02-07	16:00 PM	Winter Weather	N/A	0	0	0K	0K
3 Frametown	2007-07-26	21:00 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
4 Flatwoods	2007-07-27	15:40 PM	Hail	0.88 in.	0	0	0K	0K
5 Frametown	2007-07-27	17:15 PM	Hail	0.75 in.	0	0	0K	0K
6 WVZ005>008 - 013>016 - 024>028 - 033	2007-08-16	10:00 AM	Excessive Heat	N/A	0	0	0K	0K
7 Gassaway	2007-08-16	19:20 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
8 Frametown	2007-08-16	21:00 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
9 Little Birch	2007-09-27	14:45 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
TOTALS:					0	0	0	0

Mag: Magnitude; Dth: Deaths; Inj: Injuries; PrD: Property Damage; CrD: Crop Damage.

Kanawha County

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 WVZ005>010 - 013>020 - 024>032 - 034>040 - 046	2007-02-07	16:00 PM	Heavy Snow	N/A	0	0	0K	0K
2 WVZ005>010 - 013>020 - 024>032 - 034>040 - 046	2007-02-07	16:00 PM	Winter Weather	N/A	0	0	0K	0K
3 Dunbar	2007-03-14	17:18 PM	Hail	1.25 in.	0	0	0K	0K
4 Pinch	2007-03-14	17:27 PM	Hail	1.00 in.	0	0	0K	0K
5 Dawes	2007-04-15	01:30 AM	Flood	N/A	0	0	200K	0K
6 South Charleston	2007-07-15	18:00 PM	Lightning	N/A	0	0	2K	0K
7 Dawes	2007-07-19	13:40 PM	Hail	0.88 in.	0	0	0K	0K
8 Hugheston	2007-07-26	18:52 PM	Hail	0.75 in.	0	0	0K	0K
9 Mammoth	2007-07-26	19:07 PM	Hail	0.88 in.	0	0	0K	0K
10 St Albans	2007-07-26	19:20 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
11 (crw) Yeager Arpt	2007-07-26	19:31 PM	Thunderstorm Wind	66 kts.	0	0	0K	0K
12 Charleston	2007-07-26	19:35 PM	Hail	0.75 in.	0	0	0K	0K
13 Dunbar	2007-07-26	19:44 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
14 Elkview	2007-07-26	20:00 PM	Hail	0.75 in.	0	0	0K	0K
15 Sissonville	2007-07-27	17:05 PM	Hail	0.75 in.	0	0	0K	0K
16 Clendenin	2007-07-27	17:35 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
17 WVZ005>008 - 013>015 - 024	2007-08-01	12:00 AM	Drought	N/A	0	0	0K	0K
18 WVZ005>008 - 013>016 - 024>028 - 033	2007-08-16	10:00 AM	Excessive Heat	N/A	0	0	0K	0K
19 Clendenin	2007-08-16	17:22 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
20 Sissonville	2007-08-16	17:35 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
21 Clendenin	2007-08-16	17:51 PM	Hail	0.75 in.	0	0	0K	0K
22 South Charleston	2007-08-20	12:13 AM	Thunderstorm Wind	50 kts.	0	0	0K	0K
23 Cross Lanes	2007-08-30	16:07 PM	Thunderstorm Wind	50 kts.	0	0	5K	0K
24 St Albans	2007-08-30	16:10 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
25 WVZ005>008 - 013>016 - 024>027 - 033	2007-09-01	12:00 AM	Drought	N/A	0	0	0K	0K
26 Elkview	2007-09-27	13:29 PM	Hail	1.00 in.	0	0	0K	0K
27 WVZ005>008 - 013>016 - 024>027 - 033	2007-10-01	12:00 AM	Drought	N/A	0	0	0K	0K
28 WVZ005>007 - 013>015 - 024>026 - 033	2007-11-01	12:00 AM	Drought	N/A	0	0	0K	0K
TOTALS:					0	0	207K	0

Mag: Magnitude; Dth: Deaths; Inj: Injuries; PrD: Property Damage; CrD: Crop Damage.

Nicholas County

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 WVZ005>010 - 013>020 - 024>032 - 034>040 - 046	2007-02-07	16:00 PM	Heavy Snow	N/A	0	0	0K	0K
2 WVZ005>010 - 013>020 - 024>032 - 034>040 - 046	2007-02-07	16:00 PM	Winter Weather	N/A	0	0	0K	0K
3 Craigsville	2007-04-15	03:30 AM	Flood	N/A	0	0	10K	0K
4 Richwood	2007-06-14	17:40 PM	Hail	0.88 in.	0	0	0K	0K
TOTALS:					0	0	10K	0

Mag: Magnitude; Dth: Deaths; Inj: Injuries; PrD: Property Damage; CrD: Crop Damage.

Summers County

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 WVZ043 - 045	2007-02-06	15:30 PM	Heavy Snow	N/A	0	0	0K	0K
2 Talcott	2007-05-23	16:45 PM	Thunderstorm Wind	55 kts.	0	0	1K	0K
3 Hinton	2007-06-14	15:30 PM	Hail	1.00 in.	0	0	2K	0K
4 Jumping Branch	2007-06-24	17:25 PM	Thunderstorm Wind	52 kts.	0	0	5K	0K
5 Hinton	2007-06-24	17:40 PM	Hail	0.88 in.	0	0	2K	0K
6 Hinton	2007-08-24	16:38 PM	Hail	1.00 in.	0	0	0K	0K
7 Hinton	2007-08-24	16:38 PM	Thunderstorm Wind	55 kts.	0	0	2K	0K
8 Buck	2007-08-24	17:00 PM	Thunderstorm Wind	55 kts.	0	0	4K	0K
9 Hinton	2007-08-24	17:00 PM	Hail	1.00 in.	0	0	0K	0K
10 WVZ043 - 044	2007-10-09	07:00 AM	Drought	N/A	0	0	0K	0K
TOTALS:					0	0	15K	0

Mag: Magnitude; Dth: Deaths; Inj: Injuries; PrD: Property Damage; CrD: Crop Damage.

Mercer County

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 WVZ042	2007-01-09	15:00 PM	Winter Weather	N/A	0	0	0K	0K
2 WVZ042 - 044	2007-01-21	10:48 AM	Ice Storm	N/A	0	0	0K	0K
3 WVZ042	2007-02-17	11:45 AM	Heavy Snow	N/A	0	0	0K	0K
4 Camp Creek	2007-05-22	18:35 PM	Hail	0.75 in.	0	0	0K	0K
5 Sandlick	2007-05-23	15:05 PM	Hail	0.88 in.	0	0	0K	0K
6 Princeton	2007-06-19	18:40 PM	Hail	0.75 in.	0	0	0K	0K
7 Matoaka	2007-07-30	09:05 AM	Hail	0.75 in.	0	0	0K	0K
8 WVZ042	2007-10-02	07:00 AM	Drought	N/A	0	0	0K	0K
9 WVZ042	2007-11-06	12:00 AM	Drought	N/A	0	0	0K	0K
10 WVZ042	2007-12-01	12:00 AM	Drought	N/A	0	0	0K	0K
11 WVZ042	2007-12-23	12:00 PM	High Wind	52 kts.	0	0	10K	0K
TOTALS:					0	0	10K	0

Mag: Magnitude; Dth: Deaths; Inj: Injuries; PrD: Property Damage; CrD: Crop Damage.

Monroe County

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 PAZ054 - 055	2007-01-15	05:00 AM	Winter Weather	N/A	0	0	OK	OK
2 PAZ054 - 055	2007-01-25	07:00 AM	Winter Weather	N/A	0	0	OK	OK
3 PAZ055	2007-02-13	15:00 PM	Winter Storm	N/A	0	0	OK	OK
4 PAZ054 - 055	2007-03-01	21:00 PM	Winter Weather	N/A	0	0	OK	OK
5 PAZ054 - 055	2007-03-06	01:00 AM	Cold/wind Chill	N/A	0	0	OK	OK
6 PAZ054 - 055	2007-03-07	03:00 AM	Winter Weather	N/A	0	0	OK	OK
7 PAZ054 - 055	2007-03-16	12:00 AM	Heavy Snow	N/A	0	0	OK	OK
8 PAZ054 - 055	2007-04-11	20:00 PM	Winter Weather	N/A	0	0	OK	OK
9 Blakeslee	2007-04-15	15:00 PM	Flood	N/A	0	0	OK	OK
10 PAZ054 - 055	2007-04-15	23:00 PM	Winter Weather	N/A	0	0	OK	OK
11 Brodheadsville	2007-05-31	16:55 PM	Hail	0.88 in.	0	0	OK	OK
12 Echo Lake	2007-06-01	14:00 PM	Thunderstorm Wind	50 kts.	0	0	OK	OK
13 Marshalls Creek	2007-06-01	14:49 PM	Thunderstorm Wind	52 kts.	0	0	OK	OK
14 Shawnee On Delaware	2007-06-01	15:00 PM	Hail	1.00 in.	0	0	OK	OK
15 Shawnee On Delaware	2007-06-01	15:30 PM	Thunderstorm Wind	52 kts.	0	0	OK	OK
16 East Stroudsburg	2007-06-01	16:15 PM	Flash Flood	N/A	0	0	OK	OK
17 Mt Pocono	2007-06-19	18:58 PM	Thunderstorm Wind	52 kts.	0	0	OK	OK
18 Effort	2007-06-19	19:20 PM	Thunderstorm Wind	52 kts.	0	0	OK	OK
19 Stroudsburg	2007-06-19	19:38 PM	Thunderstorm Wind	52 kts.	0	0	OK	OK
20 Stroudsburg	2007-06-27	19:10 PM	Thunderstorm Wind	52 kts.	0	0	OK	OK
21 Analomink	2007-07-10	15:05 PM	Thunderstorm Wind	52 kts.	0	0	OK	OK
22 PAZ055	2007-07-26	07:00 AM	Drought	N/A	0	0	OK	OK
23 Tobyhanna	2007-07-27	18:00 PM	Thunderstorm Wind	52 kts.	0	0	OK	OK
24 PAZ054 - 055	2007-08-01	12:00 AM	Drought	N/A	0	0	OK	OK
25 Long Pond	2007-08-03	19:01 PM	Hail	0.88 in.	0	0	OK	OK
26 Canadensis	2007-08-03	19:30 PM	Lightning	N/A	0	0	10K	OK
27 Marshalls Creek	2007-08-03	19:58 PM	Thunderstorm Wind	50 kts.	0	0	OK	OK
28 Brodheadsville	2007-08-17	14:00 PM	Hail	0.75 in.	0	0	OK	OK
29 Brodheadsville	2007-08-25	18:10 PM	Thunderstorm Wind	50 kts.	0	0	OK	OK
30 Brodheadsville	2007-08-25	20:36 PM	Thunderstorm Wind	50 kts.	0	0	OK	OK
31 PAZ054 - 055	2007-09-01	12:00 AM	Drought	N/A	0	0	OK	OK
32 PAZ054 - 055	2007-11-09	22:00 PM	Winter Weather	N/A	0	0	OK	OK
33 PAZ054 - 055	2007-11-18	12:00 AM	Heavy Snow	N/A	0	0	OK	OK
34 PAZ054 - 055	2007-11-20	12:00 AM	Winter Weather	N/A	0	0	OK	OK

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
35 PAZ054 - 055	2007-12-01	15:00 PM	Winter Weather	N/A	0	0	0K	0K
36 PAZ054 - 055	2007-12-04	12:00 AM	Winter Weather	N/A	0	0	0K	0K
37 PAZ054 - 055	2007-12-07	12:00 PM	Winter Weather	N/A	0	0	0K	0K
38 PAZ054 - 055	2007-12-09	15:00 PM	Winter Weather	N/A	0	0	0K	0K
39 PAZ055 - 069	2007-12-15	22:00 PM	Winter Storm	N/A	0	0	0K	0K
40 PAZ054 - 055	2007-12-26	23:00 PM	Winter Weather	N/A	0	0	0K	0K
41 PAZ054 - 055	2007-12-30	17:00 PM	Winter Weather	N/A	0	0	0K	0K
TOTALS:					0	0	10K	0

Mag: Magnitude; Dth: Deaths; Inj: Injuries; PrD: Property Damage; CrD: Crop Damage.

Greenbrier County

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 WVZ045	2007-01-09	12:00 PM	Winter Weather	N/A	0	0	0K	0K
2 WVZ045	2007-01-21	11:26 AM	Ice Storm	N/A	0	0	0K	0K
3 WVZ045	2007-01-28	15:00 PM	Heavy Snow	N/A	0	0	0K	0K
4 WVZ043 - 045	2007-02-06	15:30 PM	Heavy Snow	N/A	0	0	0K	0K
5 WVZ044 - 045	2007-02-13	12:30 PM	Ice Storm	N/A	0	0	0K	0K
6 WVZ045	2007-02-14	14:00 PM	High Wind	52 kts.	0	0	3K	0K
7 WVZ044 - 045	2007-02-17	12:30 PM	Heavy Snow	N/A	0	0	0K	0K
8 Renick	2007-03-02	06:00 AM	Flood	N/A	0	0	2K	0K
9 Alderson	2007-03-02	08:00 AM	Flood	N/A	0	0	0K	0K
10 Sam Black Church	2007-04-14	09:00 AM	Heavy Rain	N/A	0	0	10K	0K
11 Blake Mills	2007-04-15	03:22 AM	Flash Flood	N/A	0	0	0K	0K
12 Blue Sulphur Spgs	2007-04-15	03:22 AM	Flash Flood	N/A	0	0	0K	0K
13 Fairlea	2007-04-15	03:22 AM	Flash Flood	N/A	0	0	0K	0K
14 Ft Spring	2007-04-15	04:05 AM	Flash Flood	N/A	0	0	0K	0K
15 WVZ045	2007-04-15	09:00 AM	Landslide	N/A	0	0	5K	0K
16 Neola	2007-04-15	11:00 AM	Flash Flood	N/A	0	0	0K	50K
17 WVZ045	2007-04-15	21:00 PM	High Wind	50 kts.	0	0	50K	0K
18 Rupert	2007-05-02	13:40 PM	Hail	0.75 in.	0	0	0K	0K
19 White Sulphur Spgs	2007-05-22	15:45 PM	Hail	0.88 in.	0	0	0K	0K
20 Renick	2007-05-23	16:22 PM	Hail	0.88 in.	0	0	0K	0K
21 Maxwelton	2007-05-31	17:25 PM	Hail	0.88 in.	0	0	0K	0K
22 Quinwood	2007-06-14	14:17 PM	Hail	0.88 in.	0	0	1K	0K
23 Alderson	2007-06-24	18:05 PM	Thunderstorm Wind	52 kts.	0	0	2K	0K
24 Frankford	2007-06-24	19:00 PM	Hail	0.88 in.	0	0	1K	0K
25 Rainelle	2007-07-19	14:29 PM	Hail	1.00 in.	0	0	0K	0K
26 Smoot	2007-07-19	16:00 PM	Thunderstorm Wind	50 kts.	0	0	2K	0K
27 Rainelle	2007-07-26	21:43 PM	Hail	0.75 in.	0	0	0K	0K
28 Rainelle	2007-07-26	21:54 PM	Hail	1.00 in.	0	0	0K	0K
29 Maxwelton	2007-08-24	18:35 PM	Thunderstorm Wind	55 kts.	0	0	1K	0K
30 Renick	2007-08-24	18:37 PM	Hail	1.00 in.	0	0	0K	0K
31 Renick	2007-08-24	18:45 PM	Thunderstorm Wind	55 kts.	0	0	1K	0K
32 Lewisburg	2007-08-25	16:10 PM	Hail	0.75 in.	0	0	0K	0K
33 Lewisburg	2007-08-25	16:15 PM	Hail	0.75 in.	0	0	0K	0K
34 Renick	2007-08-25	16:45 PM	Thunderstorm Wind	60 kts.	0	0	5K	0K

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
35 WVZ044 - 045	2007-12-15	23:00 PM	Ice Storm	N/A	0	0	10K	0K
TOTALS:					0	0	93K	50K

Mag: Magnitude; Dth: Deaths; Inj: Injuries; PrD: Property Damage; CrD: Crop Damage.

Raleigh County

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 WVZ035 - 036	2007-01-21	07:00 AM	Ice Storm	N/A	0	0	5K	0K
2 WVZ005>010 - 013>020 - 024>032 - 034>040 - 046	2007-02-07	16:00 PM	Heavy Snow	N/A	0	0	0K	0K
3 WVZ005>010 - 013>020 - 024>032 - 034>040 - 046	2007-02-07	16:00 PM	Winter Weather	N/A	0	0	0K	0K
4 Leevale	2007-04-15	03:30 AM	Flood	N/A	0	0	25K	0K
5 Shady Spg	2007-06-14	14:22 PM	Hail	0.88 in.	0	0	0K	0K
6 Crab Orchard	2007-06-14	17:30 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
7 Shady Spg	2007-06-24	17:10 PM	Hail	1.00 in.	0	0	0K	0K
8 Coal City	2007-06-24	18:16 PM	Hail	1.00 in.	0	0	0K	0K
9 Daniels	2007-06-24	18:23 PM	Hail	0.88 in.	0	0	0K	0K
10 Cool Ridge	2007-07-26	21:40 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
TOTALS:					0	0	30K	0

Mag: Magnitude; Dth: Deaths; Inj: Injuries; PrD: Property Damage; CrD: Crop Damage.

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NPS 619/105506, 600/105506, 637/105506, September 2010

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