National Park Service
U.S. Department of the Interior

Northeast Region
Philadelphia, Pennsylvania

Climate Summary, Shenandoah National Park

Natural Resources Report NPS/NER/NRR—2007/017

ON THE COVER

From top left to bottom right:

Ice along Skyline Drive; courtesy of the National Park Service, Shenandoah National Park, Nature & Science (Environmental Factors - Weather) Archives; http://www.nps.gov/shen/naturescience/weather.htm.

A couple pausing to take in a scenic view from Skyline Drive; courtesy of National Park Service, Shenandoah National Park, History & Culture Archives; http://www.nps.gov/shen/historyculture/skylinedrive.htm.

Landslides after heavy rain storms; courtesy of the National Park Service, Shenandoah National Park, Nature & Science (Environmental Factors - Hydrological Activity) Archives; http://www.nps.gov/shen/naturescience/hydrologicactivity.htm.

Climate Summary, Shenandoah National Park

Natural Resources Report NPS/NER/NRR—2007/017

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U.S. Department of the Interior
National Park Service
Northeast Region
Philadelphia, Pennsylvania

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General Climate Description

The Shenandoah National Park (Shenandoah) sits astride the northern extent of the Blue Ridge Mountains, running generally north to south between Front Royal, Virginia and Afton, Virginia. Shenandoah is long and relatively thin, with close to a full degree of latitude difference between the northern and southern end, and bordered by the Shenandoah Valley on the west and the western Piedmont of Virginia to the east. The bulk of Shenandoah lies at an elevation above the surrounding country, with peaks above 4,000 feet rising above the surrounding countryside at an elevation about 1,000 feet, and very little flat terrain.

A significant problem with summarizing climate within Shenandoah lies in its varying terrain and sparseness of data. The varying terrain leads to a host of microclimates, which are poorly represented by the limited coverage of stations within Shenandoah. Thus to summarize the climate of Shenandoah, proxies have to been used to represent what is thought to occur at similar locations. However, it is highly likely that Shenandoah National Park employees will know of locations within Shenandoah that are very different than those described in this summary. In a nutshell, the data is insufficient to summarize Shenandoah end-to-end in a rigorous fashion.

The distribution of stations in and around Shenandoah, those in the Shenandoah National Park Climate Database, can be seen in Figure 1. Note that, although coverage is widespread, much of it is either outside of Shenandoah or is part of the Automated Flood Warning System IFLOWS network, a relatively low-quality precipitation network; thus, a number of variables of interest cannot be observed for much of the park—those variables must rely on proxies from other nearby observing locations.

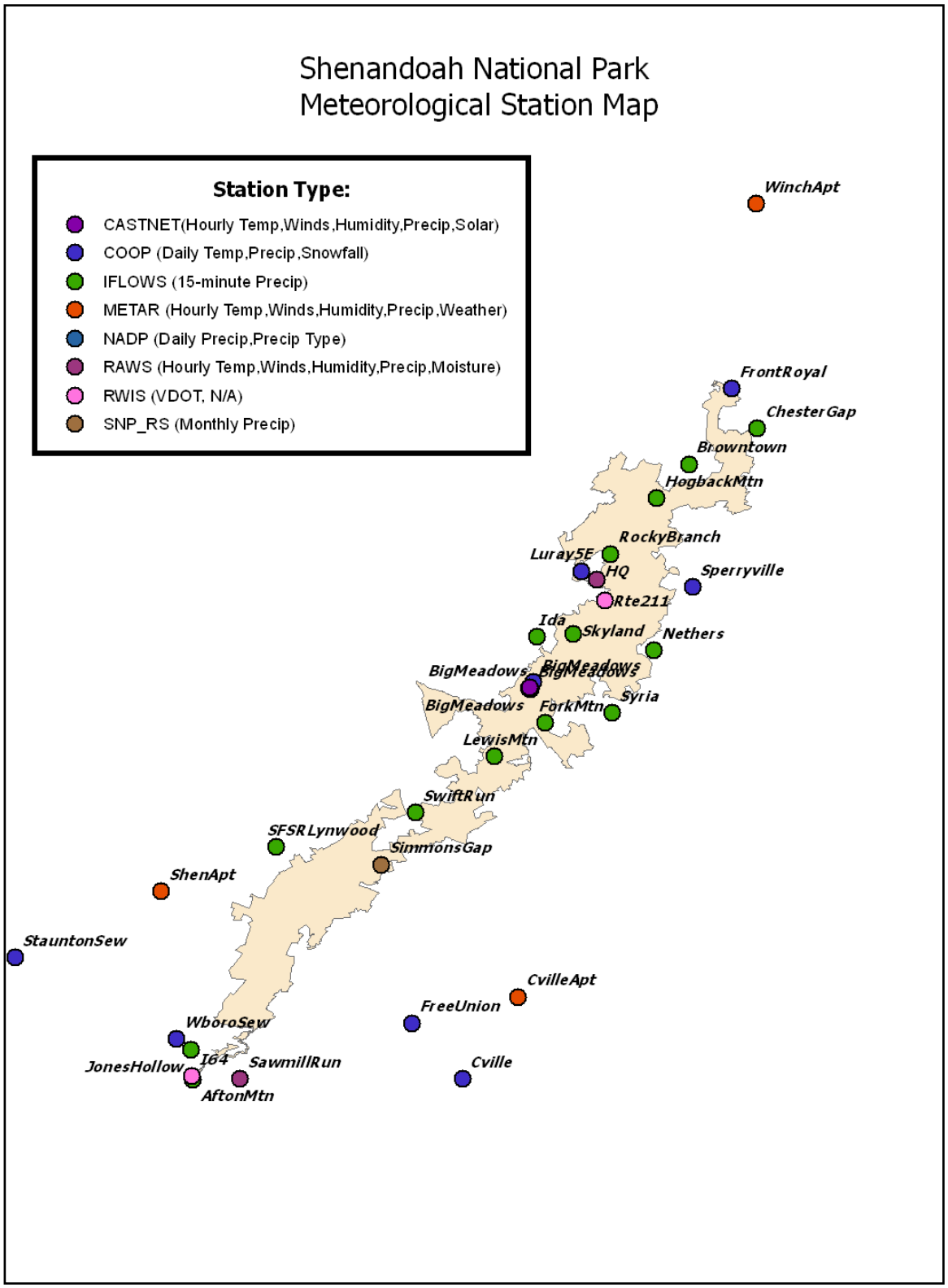

Figure 1. Shenandoah National Park Met Station map.

Precipitation

The primary drivers for the precipitation climate in the park are similar to those for the surrounding countryside, albeit with modifications due to the high relief and varied terrain. One of the greatest influences is the proximity to the Atlantic Ocean and its "river" of warm water, commonly called the Gulf Stream. In winter, storms generally move or "track" from west to east and, in the vicinity of the East Coast, move northeastward, paralleling the coast and the Gulf Stream. This shift to a northeast track results, in part, from the tendency of the storm to follow the boundary between the cold land and the warm Gulf Stream waters. These storms grow rapidly as they follow the coast, and as they move northeastward, moisture-laden air from the storm crosses Virginia from the east and northeast. The eastern slopes and foothills of the Blue Ridge Mountains, including Shenandoah, are the prime recipients of this moisture and can see some very large events. Some results from this ocean moisture conveyance include the record snowfalls of January 1996, in which Big Meadows in the north central portion of the park, at over 3500 ft, received nearly 50 inches of snowfall from a single two-day storm. Compare that to Charlottesville, which at 900 feet received "only" 21 inches over the same period, or even Luray, which at 1400 ft received "only" 27 inches.

Other seasons in the Shenandoah National Park also see an influence from enhanced oceanic moisture. Tropical storms and hurricanes, with very high moisture levels, frequently come inland and deliver high precipitation totals to Shenandoah. Hurricane Isabel, for example, dropped over 5 inches of precipitation in one day in Charlottesville (and did significant damage), but in Shenandoah precipitation totals for that day were well over 10 inches at Big Meadows and other mountain stations. Note that all of the official measuring stations at Big Meadows were damaged in that storm and were not able to record the official rainfall totals.

There are also some drastic modifications to precipitation possible from orographic lifting (the movement of air up rising terrain), enhancing the precipitation from air laden with the ocean-source moisture. An extreme example of this was the June 1995 event, in which a relatively common thunderstorm turned into a terrain-locked (the flow was up against the mountains, and the storm cell was "stuck" there) and orographically-enhanced record breaker. In the space of about 9 hours, over 27 inches of precipitation fell, causing a complete slope failure on a mountainside in a Madison County portion of Shenandoah and sending trees and boulders the size of houses tumbling down the mountainside in a raging torrent.

As a comparison of annual averages, the precipitation at Big Meadows annually averages about 55 inches, while Luray, just down the mountains on the western side, averages about 41 inches, and Front Royal on the northern tip averages about 42 inches. Some Shenandoah Valley stations are in the "rain shadow" of Shenandoah (and also the mountains to their west), including the driest station in the state, Dale Enterprise, which records only 35 inches of precipitation annually. Note that of the lower elevation stations surrounding Shenandoah, Charlottesville, and Sperryville are a bit anomalous, averaging close to 48 inches annually—this is due to their particular respective locations which, although not at high relief, lie the edge of the Piedmont and receive the benefit of the ocean moisture conveyance that the Shenandoah Valley does not, primarily due to the presence of the Blue Ridge, much of it in Shenandoah National Park.

Unfortunately, a good comparison within the Shenandoah National Park is not practical with currently available data. While there are quite a few stations, the IFLOWS stations are somewhat unreliable in their long-term averages. A good rule of thumb for estimating precipitation at unknown locations for high elevation would be to use the Big Meadows totals, as Big Meadows is at 3,500 feet, close to the highest elevations, and is fairly central to the park. Likewise, for lower elevation stations in the southern end, a good proxy would be Waynesboro Cooperative Observer Network (COOP) totals, or the Sawmill Run RAWS data. For the northern end, lower elevations can use Front Royal data. Big Meadows annual average water-equivalent precipitation and seasonal snowfall are shown, respectively, in Figures 2 and 3.

In that comparative vein, there is also a significant difference also between the western side of Shenandoah and the eastern side; as such, Sperryville, outside the park on the east, and Luray, outside the park on the west, could work well as proxies. The difference between the two sides has much to do with the separation of circulation by the Blue Ridge. On the western side of the Blue Ridge and Shenandoah National Park, a rain shadow exists between the Alleghenies further west, across the Shenandoah Valley, and the Blue Ridge. As previously mentioned, Dale Enterprise is one of the driest COOP stations in the state, located squarely in this region, close to Harrisonburg. On the eastward side, the enhanced moisture from the oceanic circulation, along with limited orographic lifting, increases precipitation over that on the westward side. As mentioned previously, Sperryville averages 48.5 inches of precipitation annually, while directly over the Blue Ridge, up and over Thornton Gap and down the other side of the Blue Ridge, Luray only receives about 41.5 inches annually.

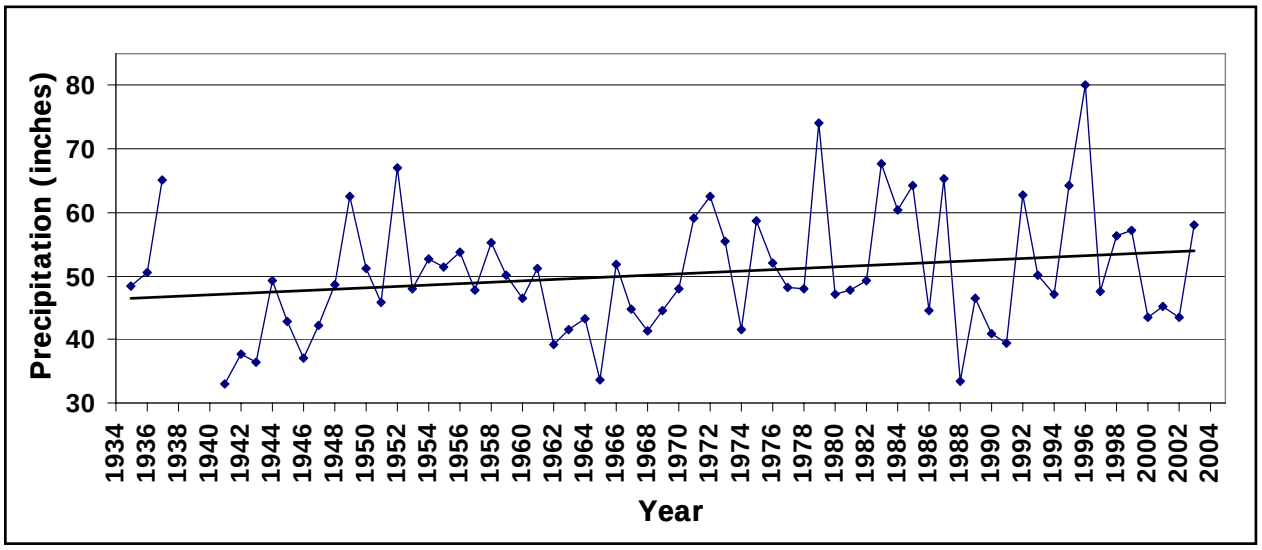

Figure 2. Big Meadows annual average precipitation, 1935–2003.

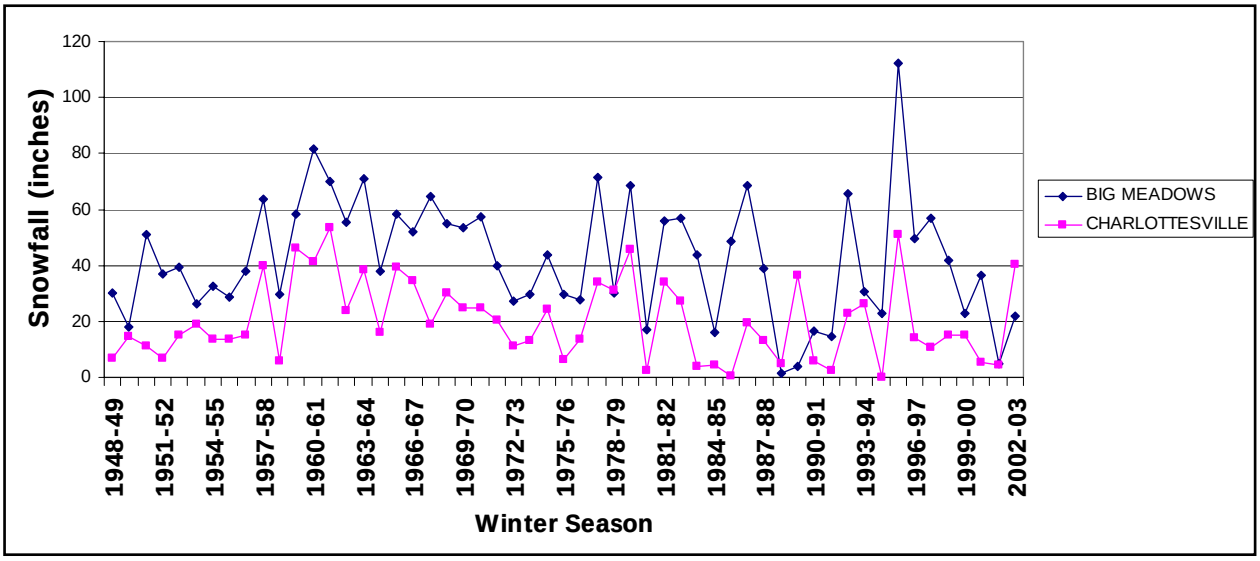

Figure 3. Big Meadows annual seasonal snowfall, 1948/1949–2002/2003, NCDC Climatological Data.

Temperature

The temperature climatology in Shenandoah National Park is quite variable across its high relief, with the highest elevations typically ten degrees Fahrenheit, or more, cooler than the surrounding countryside. For example, Big Meadows averages 46.5°F annually, while Luray averages 54°F, Front Royal 54°F, and Sperryville 55°F (Figure 4). This leads to a winter climate at Big Meadows similar to that of Chicago (with snowfall averages even greater than Chicago, due to elevation and proximity to the ocean). Lower elevations are much warmer and experience less snowfall. Because Shenandoah is so long north to south, there can also be a significant difference in the temperature across that distance, depending on the air masses controlling the climate.

As previously mentioned, there are a variety of microclimates in Shenandoah, making an exact characterization difficult. Eastern and western slopes will differ, as will northern and southern slopes. Likewise, the location of a gap or a peak will affect the immediately surrounding terrain through channeling of air and orographic effects. As a result, there might be locations in Shenandoah which are shady all year, keeping the temperature low and providing a much different profile than those which are completely exposed.

The Big Meadows annual average time series for 1935–2003 from the Cooperative Observer Network is shown in Figure 4. Again, note that this data is not representative of the time series for the entire Shenandoah National Park due to the high relief of the park.

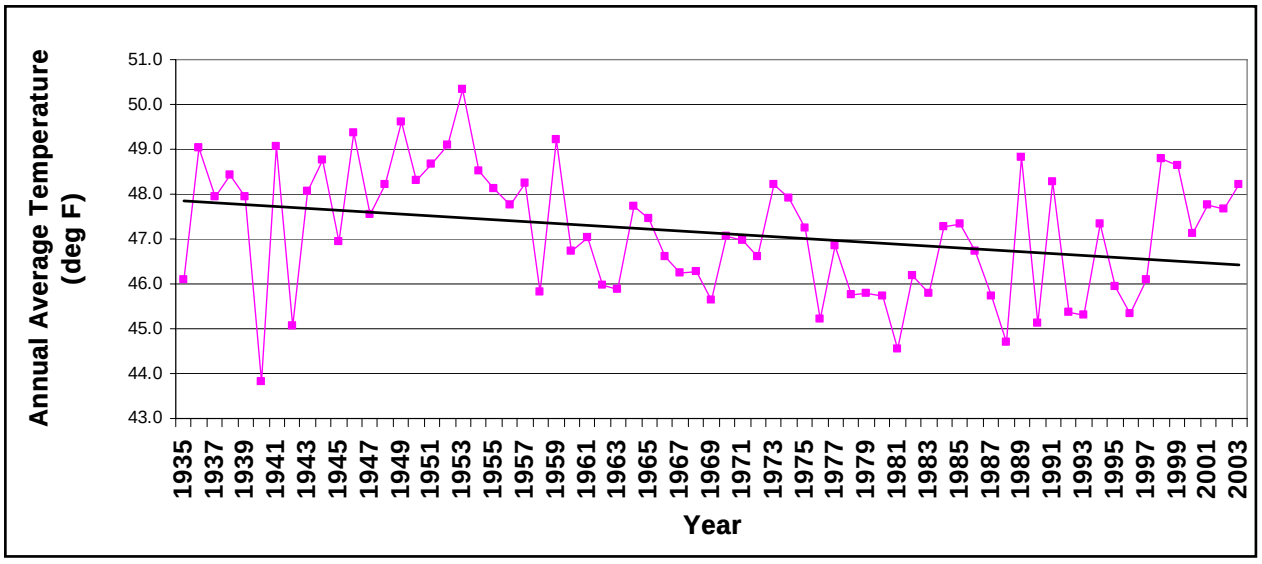

Figure 4 Big Meadows annual average temperature, 1935–2003, NCDC Climatological Data.

Relative Humidity

The relative humidity profile in the Shenandoah National Park has two separate points of interest. Because of the dependence of relative humidity on temperature, the morning relative humidity (at sunrise) will, on average, be the highest recorded during the day, and the afternoon (at the warmest time of day) will, on average, be the lowest. Thus the representation in Figure 5, the monthly mean morning and afternoon relative humidity, is the most accurate method of characterizing the relative humidity climate of Shenandoah National Park.

Relative humidity levels reflect the fact that the Shenandoah National Park climate is a moist one, with no dry seasons and typically plenty of water in the air (Figure 5). While there are certainly air masses from the north and west that will bring air with very little moisture and relative humidities as low as 20% or so, these are typically short-lived events, and the norm, even at the warmest part of the day, is over 60% relative humidity.

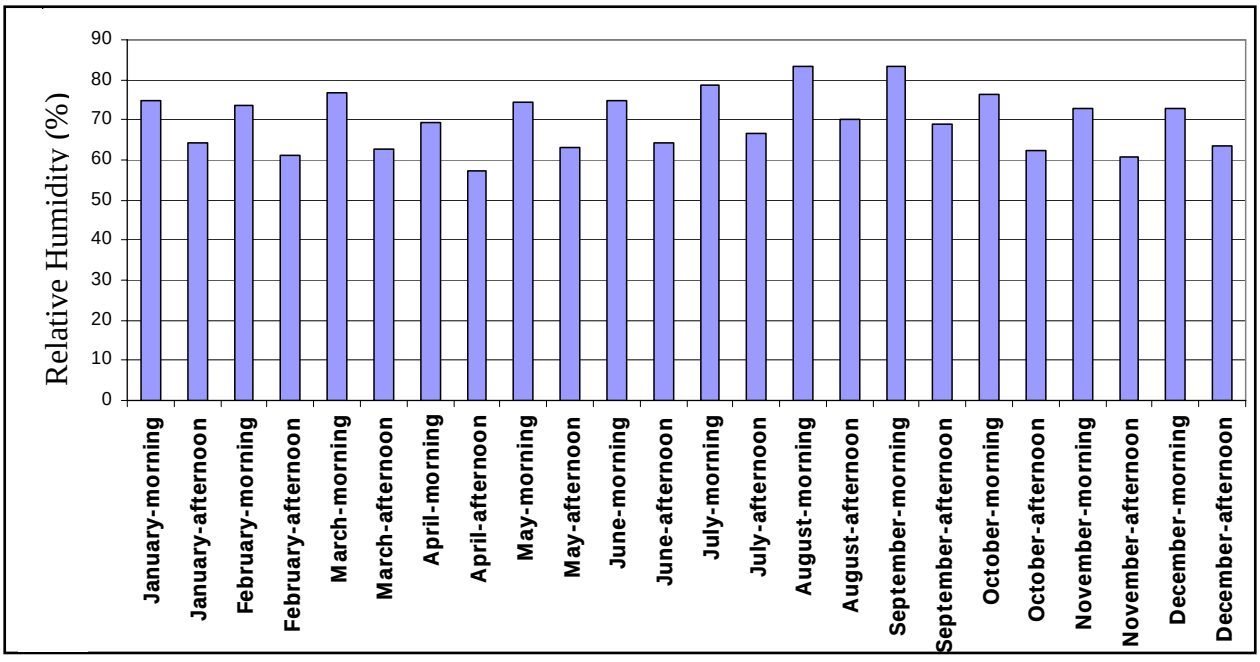

Figure 5. Big Meadows mean morning and afternoon relative humidity, 1989–2005, EPA CASTNET.

Cloudiness

Overall, the Shenandoah National Park and surrounding areas experience fewer cloudy days than those categorized either as clear or partly cloudy, though this varies considerably from season to season. Winter is usually the cloudiest, with about half of the days considered as cloudy, while summer boasts almost two-thirds of its days as clear to partly cloudy. The transitional seasons, spring and fall, lie somewhere in-between. These data are presented in Table 1.

This seasonal shift is largely related to the mean position of the circumpolar vortex—the "jet stream." This region of high winds in the upper atmosphere, which circles the Northern Hemisphere from west to east, serves to divide colder, polar air to its north from the warmer, tropical air to its south. It also serves as the primary focus for the development of all mid-latitude (non-tropical) storm systems in North America.

When winter cools the polar region, this "jet stream" expands to the south, bringing large-scale storms and frontal passages through Virginia. This gives rise to the large number of cloudy days during the colder months of the year. Conversely, the warmth of summer causes the jet to contract northward and leave most of the cloud generation to scattered thunderstorms and the occasional tropical system (or remnant thereof).

Table 1. Cloudy day percentages by month, season, and annually, 1958-2005 (*Local Climatological Data – Annual Summary 2005*, National Climatic Data Center [NCDC], U. S. Dept. of Commerce, Asheville, NC).

	Percent of Days	
Time Period	Clear to Partly Cloudy	Cloudy
January	48%	52%
February	48%	52%
March	52%	48%
April	55%	45%
May	56%	44%
June	62%	38%
July	63%	37%
August	63%	37%
September	60%	40%
October	63%	37%
November	53%	47%
December	50%	50%
Winter	50%	50%
Spring	54%	46%
Summer	63%	38%
Fall	59%	41%
Annual	56%	44%

Winds

The wind profile for Shenandoah is best illustrated by the breakdown of wind directions by month, shown in Table 2. The data illustrate that the predominant wind direction for all months is from the west-northwest, with northwest a close second. The one exception is in September, when the predominant direction includes a northerly component. Wind speed by month is shown in Figure 6.

Table 2. Percentage of wind direction by month and annually at Big Meadows, 1989–2005, EPA CASTNET. These data are a summary of the proportion of counts of hourly wind direction by month.

	Month												
Direction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
E	2.1%	2.2%	3.4%	3.4%	5.1%	6.6%	6.7%	6.9%	6.5%	3.8%	1.7%	2.1%	4.2%
ESE	4.0%	3.7%	5.9%	6.8%	6.7%	7.0%	6.5%	8.4%	9.4%	5.8%	3.6%	3.9%	6.0%
SE	3.4%	3.5%	4.3%	4.2%	5.1%	5.7%	5.0%	5.2%	5.5%	4.5%	3.6%	3.1%	4.4%
SSE	4.2%	4.3%	5.1%	4.8%	4.5%	5.6%	5.1%	5.2%	5.4%	5.4%	4.2%	3.5%	4.8%
S	5.8%	5.6%	6.5%	7.5%	6.4%	7.1%	5.5%	5.6%	5.6%	6.1%	6.2%	5.8%	6.1%
SSW	8.4%	9.3%	7.4%	8.0%	6.5%	6.4%	4.6%	5.3%	5.4%	6.8%	10.0%	8.8%	7.2%
SW	6.7%	7.1%	6.2%	6.1%	6.4%	6.2%	5.0%	5.1%	4.8%	5.7%	8.3%	7.1%	6.2%
WSW	8.3%	7.1%	6.4%	5.8%	6.3%	5.6%	5.5%	6.0%	4.3%	5.8%	7.8%	8.0%	6.4%
W	9.1%	7.9%	6.0%	5.5%	7.1%	7.3%	8.6%	7.2%	5.3%	6.4%	8.9%	9.0%	7.3%
WNW	25.2%	23.1%	20.1%	17.9%	16.8%	16.5%	19.7%	14.1%	13.9%	17.6%	20.9%	25.7%	19.3%
NW	15.6%	18.3%	18.3%	16.7%	13.6%	9.0%	10.8%	8.7%	11.2%	17.6%	16.4%	15.2%	14.3%
NNW	2.4%	4.5%	4.4%	5.3%	5.5%	4.3%	3.9%	5.4%	5.3%	4.5%	3.5%	3.1%	4.3%
N	3.2%	2.1%	3.0%	4.3%	5.5%	6.1%	6.7%	7.7%	11.7%	7.0%	3.6%	2.8%	5.3%
NNE	0.5%	0.6%	1.0%	1.4%	1.5%	1.8%	2.0%	3.0%	1.6%	1.0%	0.6%	0.7%	1.3%
NE	0.3%	0.4%	1.1%	0.9%	1.1%	1.8%	1.8%	3.2%	1.8%	0.9%	0.2%	0.4%	1.2%
ENE	0.7%	0.6%	1.0%	1.4%	1.8%	3.1%	2.5%	3.0%	2.4%	1.2%	0.5%	0.7%	1.6%

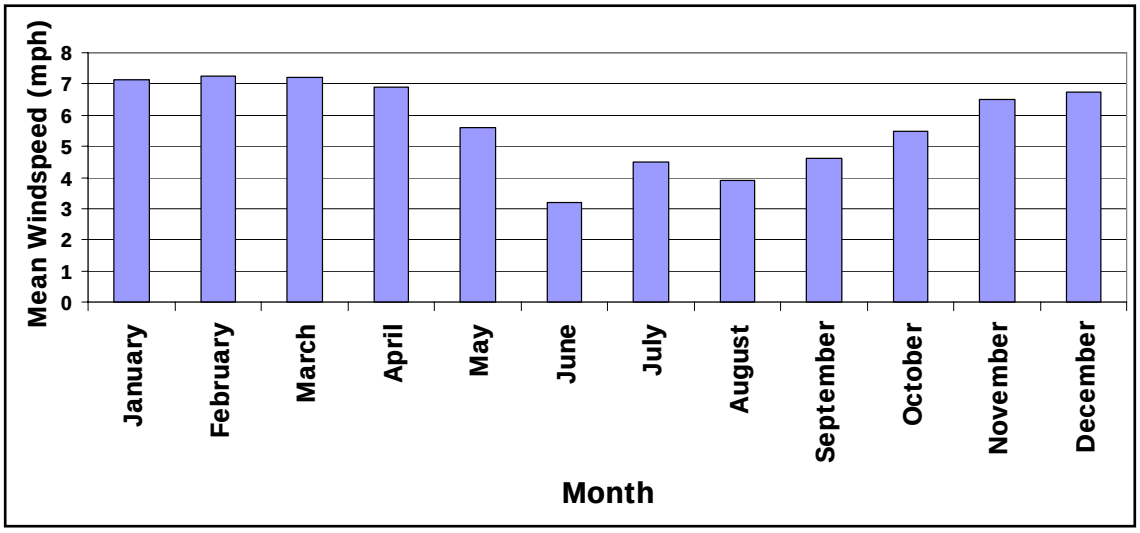

Figure 6. Mean wind speed, by month, for Big Meadows, 1989–2005, EPA CASTNET.

Solar Radiation

As the energy provider for the earth's circulation, any trend in the sun's radiation reaching the earth, or solar insolation, will drive changes in climates on the earth. While there are certainly cycles of solar radiation, fortunately, the sun emits radiation very consistently, or at least within a very small range of variability.

Trends in cloudiness and atmospheric moisture will affect the amount of direct solar radiation reaching the surface, so a measure of direct solar radiation cannot only measure that quantity, but can perhaps serve as a proxy for changes in cloudiness. However, Figure 7 reveals no significant trend in direct solar radiation at Big Meadows for the 17 years from 1989–2005. This does not mean that there have been no trends in cloudiness or other components of the atmosphere, but it does illustrate that, if they exist, they are at least offsetting.

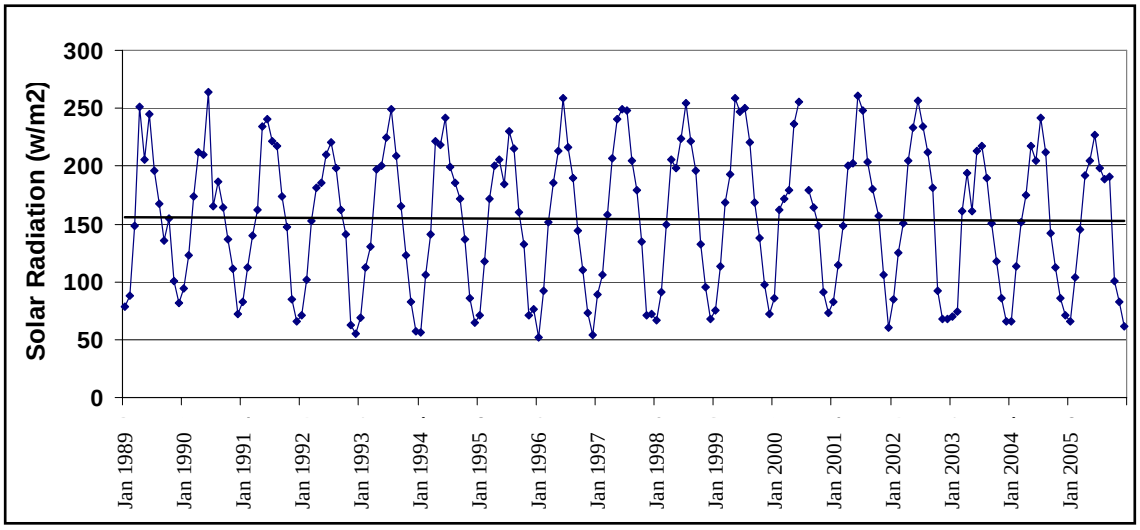

Figure 7. Big Meadows direct solar radiation, 1989–2005, EPA CASTNET.

Sunrise and Sunset Times

Sunrise (or sunset) occurs when the upper edge of the disk of the sun appears to be just even with the horizon—on its way up or down, as the case may be.

Also quite useful, are the times of the beginning and end of civil twilight. Civil twilight begins before sunrise, when the center of the disk of the sun is six degrees below the horizon. It ends when the center of the sun's disk is 6 degrees below the horizon after sunset.

In a practical sense, civil twilight marks the times before sunrise or after sunset when there is usually enough light to carry out normal outdoor activities without artificial lighting. This can be particularly valuable for getting the maximum from the Shenandoah National Park experience.

The exact time at which these events occur depend not only on latitude, longitude, and time of the year, but also on many other factors, such as atmospheric conditions, the observer's elevation, relationship to the local horizon, and even how tall the observer stands. For general guidance, however, astronomical tables can be calculated, based on a set of standardized criteria (clear skies, no obstructions, a smooth earth, etc.).

Below, Figure 8 is a graphic representation of the approximate times of sunrise and sunset, as well as the beginning and end of civil twilight, for the Shenandoah National Park. Although latitudinal and longitudinal changes across Shenandoah will cause these times to vary slightly, elevation and the local terrain will generally have more effect on the experience of any individual observer. One with an unobstructed ridge top view to the east will certainly see the sun rise quite a bit sooner than one down in a shady hollow.

Figure 8. Sunrise, sunset, and twilight times for Shenandoah National Park, U.S. Naval Observatory.

Growing Season

The varied terrain of the Shenandoah National Park gives rise to a great deal of variation in the growing season, even over very short distances. Different plant species can possess quite different sensitivities to cold, so the critical temperatures, which define the beginning and end of their respective growing seasons, depend upon the species.

Two temperature thresholds which are commonly used are 32°F and 28°F. An occurrence of the former is typically referred to as a "frost," while the latter would be called a "freeze" (also known as a "hard freeze").

These cold events at the opening and close of the growing season are usually found on clear, calm nights, when the ground surface cools most rapidly. The air near the ground thus cools most; and, by dawn, a significant layer of cold air can have formed.

This cold and denser air tends to flow downhill and can accumulate in low-lying areas, often leaving somewhat higher elevations in a layer of relatively warmer air. This phenomenon, known as cold-air pooling, can cause the effective growing seasons at some lower elevation locations to be shortened. Conversely, the season at some higher spots can see a lengthening. (It's no coincidence that Thomas Jefferson was able to grow artichokes at Monticello, his home at the top of a small mountain in nearby Albemarle County, VA.)

As one ascends further, however, eventually adiabatic cooling (the decreasing air temperatures at increasing altitude, due to the air becoming "thinner") out weighs the effect of staying above the cold layer, and the growing season shortens again. For this reason, visitors to the park in the spring and fall may see areas at intermediate elevations with blossoms appearing earlier or leaves remaining green after all others have turned their autumn hues.

Table 3 presents the probability of occurrence for numerous thresholds for each type of event or category. As an example, the probability of a temperature at or below the threshold temperature of 28°F later than May 16th at Big Meadows is 0.10. The table can be read similarly for the Fall Freeze dates, and the Freeze Free Period is a composite of the two.

Table 3. Freeze data for Big Meadows, 1971–2000, from NCDC Monthly Station Climate Summaries, February 2004.

Freeze Data									
Spring Freeze Dates (Month/Day)									
Temp (F)	**Probability of later date in spring (thru Jul 31) than indicated(*)**								
	.10	**.20**	**.30**	**.40**	**.50**	**.60**	**.70**	**.80**	**.90**
36	6/16	6/08	6/03	5/29	5/25	5/21	5/16	5/11	5/03
32	5/31	5/25	5/20	5/17	5/13	5/09	5/05	5/01	4/25
28	5/16	5/10	5/06	5/03	4/29	4/26	4/23	4/19	4/13
24	5/02	4/27	4/24	4/21	4/18	4/15	4/12	4/09	4/04
20	4/21	4/16	4/12	4/09	4/06	4/03	3/31	3/28	3/22
16	4/13	4/07	4/03	3/31	3/27	3/24	3/21	3/16	3/11
Fall Freeze Dates (Month/Day)									
Temp (F)	**Probability of earlier date in fall (beginning Aug 1) than indicated(*)**								
	.10	**.20**	**.30**	**.40**	**.50**	**.60**	**.70**	**.80**	**.90**
36	9/08	9/14	9/17	9/21	9/24	9/27	9/30	10/04	10/10
32	9/15	9/21	9/25	9/28	10/02	10/05	10/08	10/13	10/18
28	9/26	10/02	10/07	10/11	10/15	10/19	10/23	10/28	11/03
24	10/10	10/16	10/20	10/24	10/28	11/01	11/04	11/09	11/15
20	10/18	10/24	10/28	11/01	11/04	11/08	11/11	11/16	11/22
16	10/29	11/05	11/10	11/15	11/19	11/23	11/28	12/03	12/10
Freeze Free Period									
Temp (F)	**Probability of longer than indicated freeze free period (Days)**								
	.10	**.20**	**.30**	**.40**	**.50**	**.60**	**.70**	**.80**	**.90**
36	151	141	133	127	121	115	109	101	91
32	167	158	151	146	141	136	131	124	115
28	196	187	180	174	168	162	156	149	140
24	218	209	203	197	192	187	181	175	166
20	235	227	221	216	211	207	202	196	188
16	265	255	248	242	236	230	224	217	207

* Probability of observing a temperature as cold, or colder, later in the spring or earlier in the fall than the indicated date.

Appendix. Selected Shenandoah National Park data summaries.

The following tables are supplemental data summaries from selected stations in and around Shenandoah National Park.

Tables include Automated Flood Warning System Integrated Flood Observing and Warning System (AFWS IFLOWS) station precipitation summaries, monthly precipitation from the Simmons Gap Ranger Station, and Cooperative Observer Network summaries.

The first table is a precipitation summary from the AFWS IFLOWS stations in and very near the park. Precipitation is collected for the stations at 15-minute intervals, and is unofficial; data are not quality-controlled. Thus, while the summaries can be useful, the information from them can and will contain errors, either systematic or event-related.

The second table is hourly precipitation, by month, sent to us by the Simmons Gap Ranger Station. This data is also unofficial and is included primarily because it delivers data for a poorly represented portion of the park.

The last eight tables present 30-year normals, or, in some cases, shorter-term averages, of temperature and/or precipitation at available Cooperative Observer Network stations in and around the park. The data are quality-controlled and are official data from the National Climatic Data Center.

AFWS IFLOWS Stations, 2001–2006 average monthly precipitation.

Gage Name	LID	Lat (deg N)	Lon (deg W)	Elev (ft)	County	Gage ID	Jan. (in)	Feb. (in)	Mar. (in)	Apr. (in)	May (in)	Jun. (in)	Jul. (in)	Aug. (in)	Sep. (in)	Oct. (in)	Nov. (in)	Dec. (in)	Ann. (in)
Afton Mtn	1197	38.03	78.86	621.8	Nelson	2654	1.38	1.30	3.67	2.78	3.45	1.73	3.15	2.53	4.63	3.91	4.66	2.78	35.95
Big Meadows	1406	38.52	78.43	1071.9	Page	5184	1.48	1.78	4.20	3.90	3.54	5.35	4.16	3.28	11.13	2.96	3.66	1.62	47.06
Browntown	1418	38.81	78.23	298.7	Warren	5156	1.29	1.48	3.64	3.27	2.40	2.24	1.49	1.53	6.15	1.86	2.81	2.52	30.68
Chester Gap	1413	38.85	78.15	609.6	Warren	5134	1.55	1.52	3.66	3.70	3.54	3.32	1.86	2.95	6.18	3.81	4.59	2.76	39.44
Fork Mountain	1328	38.48	78.42	1158.2	Madisn	3959	1.02	1.26	1.63	1.48	2.39	3.85	3.86	3.47	6.28	4.10	3.12	1.55	34.03
Hogback Mtn	1411	38.76	78.28	1057.6	Warren	5124	1.49	1.97	3.88	3.82	4.36	4.67	3.51	3.03	5.38	3.39	3.18	2.33	41.02
Ida	1403	38.59	78.43	1005.8	Page	5166	1.64	2.03	4.15	3.59	3.65	5.12	3.29	3.42	6.96	3.57	3.68	2.64	43.74
Jones Hollow	1242	38.07	78.86	426.7	Augusta	2676	1.24	1.91	3.96	2.51	3.37	2.41	2.04	2.54	5.86	3.33	4.64	2.51	36.31
Lewis Mtn Camp	1401	38.44	78.48	1036.3	Page	3658	1.63	2.18	4.97	3.65	3.18	3.53	4.01	3.72	7.08	3.25	2.39	3.09	42.68
Nethers	1326	38.57	78.28	240.8	Madisn	3963	1.34	1.74	3.92	3.01	4.77	4.12	3.98	3.63	6.20	4.40	3.90	2.58	43.59
Rocky Branch	1405	38.69	78.33	505.9	Page	5176	2.05	2.62	4.70	3.77	1.81	5.14	3.85	4.10	7.67	3.86	3.39	2.92	45.87
SFSR Lynwood	1441	38.32	78.76	308.7	Rockhm	2666	1.14	1.58	2.77	2.72	2.39	3.12	2.06	2.83	4.95	2.23	2.63	2.03	30.45
Skyland	1404	38.59	78.38	1149.0	Page	5174	1.16	1.47	4.95	3.93	4.31	5.55	4.00	2.72	6.07	3.01	3.47	1.60	42.25
Swift Run	1448	38.37	78.58	432.8	Rockhm	5286	1.73	1.50	3.13	2.54	2.58	2.89	2.64	2.92	6.53	2.02	4.12	2.24	34.84
Syria	1325	38.49	78.33	243.8	Madisn	3965	1.58	2.01	4.12	3.17	3.16	3.55	3.84	3.48	5.83	4.50	3.85	1.97	41.05

Simmons Gap Ranger Station monthly precipitation 1980–2004.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1980	3.94	0.65	4.11	8.44	4.88	1.48	7.39	1.94	2.35	3.26	2.80	0.82	42.06
1981	0.12	6.47	1.28	2.25	3.99	3.98	7.84	2.86	3.18	6.33	0.67	3.45	42.42
1982	0.88	2.99	3.77	3.62	5.48	6.59	5.24	1.15	2.76	3.80	4.07	2.12	42.47
1983	1.54	5.76	4.28	9.19	4.10	3.39	0.91	2.84	3.80	9.33	6.07	6.59	57.80
1984	1.50	9.42	6.68	6.40	3.15	1.52	3.49	7.17	2.94	2.91	4.44	1.85	51.47
1985	2.41	3.01	2.01	0.69	4.08	2.30	4.78	5.36	0.40	7.36	15.01	0.94	48.35
1986	1.29	3.43	2.11	4.74	2.63	3.18	3.22	6.32	3.19	1.45	4.09	5.65	41.30
1987	4.09	3.60	1.94	10.61	2.31	4.19	1.27	1.28	14.00	0.97	4.75	2.88	51.89
1988	2.18	1.56	2.19	1.72	8.09	3.19	5.36	4.28	3.78	1.38	4.56	1.76	40.05
1989	2.16	2.97	5.58	2.74	8.73	6.96	7.69	5.87	7.27	7.57	2.39	1.59	61.52
1990	4.09	2.08	3.96	3.39	6.58	0.12	3.29	5.56	2.16	11.11	1.42	5.36	49.12
1991	2.83	1.87	5.51	1.16	1.90	4.06	7.30	1.85	0.36	0.87	3.39	6.40	37.50
1992	3.97	2.71	3.96	4.17	6.05	5.88	6.43	4.10	5.29	1.96	8.08	4.95	57.55
1993	3.40	3.08	11.21	7.54	3.61	3.39	3.45	2.00	3.92	2.48	5.40	4.58	54.06
1994	4.72	5.79	6.62	1.84	2.69	5.02	4.88	6.34	4.38	2.47	4.27	2.50	51.52
1995	9.60	1.02	2.42	1.81	4.27	10.16	5.15	0.74	7.42	8.77	4.45	2.32	58.13
1996	9.10	2.82	4.34	2.55	6.12	5.96	4.14	4.14	12.77	3.66	4.06	6.58	66.24
1997	2.20	1.57	4.58	2.46	1.61	2.93	5.22	1.90	8.19	2.40	8.30	1.85	43.21
1998	9.01	8.18	5.16	5.83	7.11	3.94	1.64	3.67	1.38	2.06	1.56	2.67	52.21
1999	7.15	1.39	3.65	1.90	2.84	2.14	2.50	3.50	16.65	1.83	4.39	2.96	50.90
2000	2.28	1.56	2.88	4.23	2.46	8.25	6.90	3.50	7.67	0.00	2.10	2.52	44.35
2001	2.52	1.22	4.40	1.58	3.39	5.81	3.91	5.82	3.16	1.45	2.05	2.48	37.79
2002	1.46	0.72	3.96	4.68	2.26	1.38	5.12	1.65	3.40	6.49	5.07	2.90	39.09
2003	3.05	6.10	5.05	4.58	8.27	8.80	5.20	6.17	18.10	3.10	7.11	5.06	80.59
2004	1.30	2.46	1.94	4.60	4.85	5.95	6.69	2.96	17.85	1.56			
Average:	3.47	3.30	4.14	4.11	4.46	4.42	4.76	3.72	6.25	3.78	4.60	3.37	50.07

Temperature and/or precipitation averages at a Cooperative Observer Network station.

Luray 5E, Virginia

NCDC 1971–2000 Monthly Normals
Latitude: 38.67 degrees
Longitude: -78.37 degrees
Elevation: 1400 feet
Station period of record: 03/01/1941–07/26/2006

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Max. Temperature (F)	46	50.1	59	70.6	78.1	84.7	87.9	86	80.9	70.5	60.7	49.5	68.7
Highest Mean Max. Temperature (F)	56.5	59.6	66.1	77.8	83.3	87.9	93.7	89.9	87.3	75.7	68.3	60.1	93.7
Year Highest Occurred	1990	1976	1977	1985	1977	1994	1977	1988	1998	1984	1994	1984	1977
Lowest Mean Max. Temperature (F)	34.9	38.6	51.9	64.3	74.1	80.4	83.6	82.2	76.9	61.7	51.4	37.9	34.9
Year Lowest Occurred	1977	1979	1993	1983	1994	1992	1984	2000	1984	1976	1995	1989	1977
Mean Temperature (F)	34.3	37.3	44.9	54.9	62.9	70.4	74.1	72.4	66.6	55.7	47.1	37.5	54.8
Highest Mean Temperature (F)	44.6	45.5	50.6	60.6	68.3	73.1	77.8	76.9	71.5	63.5	54	46.5	77.8
Year Highest Occurred	1990	1990	1977	1985	1991	2000	1988	1988	1998	1984	1985	1984	1988
Lowest Mean Temperature (F)	22.6	26.6	39.9	50.6	58.4	66.9	72.1	69	63.3	50	40.6	26.9	22.6
Year Lowest Occurred	1977	1978	1993	1975	1994	1974	1984	1992	1984	1976	1976	1989	1977
Mean Min. Temperature (F)	22.6	24.5	30.8	39.2	47.7	56	60.2	58.7	52.2	40.8	33.5	25.4	41
Highest Mean Min. Temperature (F)	33.1	32.1	35.6	43.3	53.3	60.4	64.5	63.8	56.7	51.3	41.6	32.8	64.5
Year Highest Occurred	1998	1998	1973	1985	1991	2000	1988	1988	1971	1984	1985	1984	1988
Lowest Mean Min. Temperature (F)	10.2	13.4	25.6	34	42.6	52.2	56.9	53.9	47.7	34.5	26.8	15.9	10.2
Year Lowest Occurred	1977	1978	1981	1971	1994	1977	1983	1981	1983	1974	1976	1989	1977
Mean Precipitation (in.)	3.08	2.64	3.38	3.15	3.92	3.98	3.77	3.51	4.35	3.49	3.49	2.85	41.61
Highest Precipitation (in.)	8.03	7.85	8.91	7.81	7.73	10.71	6.65	7.05	17.29	9.49	14.21	7.98	17.29
Year Highest Occurred	1998	1998	1994	1987	1971	1972	1996	1984	1996	1972	1985	1992	1996
Lowest Precipitation (in.)	0.21	0.34	1.07	0.61	1.1	0.94	0.88	1.13	0.91	0.1	0.65	0.34	0.1
Year Lowest Occurred	1981	1978	1981	1986	1977	1999	1998	1981	1998	2000	1981	1985	2000
Heating Degree Days (F)	951	776	625	305	122	14	0	6	48	310	537	854	4548
Cooling Degree Days (F)	0	0	0	3	56	174	281	233	94	20	1	0	862

Temperature and/or precipitation averages at a Cooperative Observer Network station.

Free Union, Virginia.

NCDC 1971–2000 Monthly Normals
Latitude: 38.10 degrees
Longitude: -78.59 degrees
Elevation: 570 feet
Station period of record: 07/01/1955–03/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Max. Temperature (F)													
Highest Mean Max. Temperature (F)													
Year Highest Occurred													
Lowest Mean Max. Temperature (F)													
Year Lowest Occurred													
Mean Temperature (F)													
Highest Mean Temperature (F)													
Year Highest Occurred													
Lowest Mean Temperature (F)													
Year Lowest Occurred													
Mean Min. Temperature (F)													
Highest Mean Min. Temperature (F)													
Year Highest Occurred													
Lowest Mean Min. Temperature (F)													
Year Lowest Occurred													
Mean Precipitation (in.)	3.41	2.91	3.74	3.39	4.58	4.33	5.08	3.9	4.37	3.97	3.95	3.15	46.78
Highest Precipitation (in.)	8.33	7.21	8.24	10.83	9.42	11.57	11.74	8.57	16.98	13.03	13.95	6.54	16.98
Year Highest Occurred	1978	1998	1993	1983	1990	1972	1991	1984	1987	1976	1985	1973	1987
Lowest Precipitation (in.)	0.19	0.34	0.82	0.84	1	0.3	0.68	0.65	0.36	0.02	0.61	0.2	0.02
Year Lowest Occurred	1981	1978	1981	1985	1997	1980	1977	1995	1985	2000	1981	1980	2000
Heating Degree Days (F)													
Cooling Degree Days (F)													

Temperature and/or precipitation averages at a Cooperative Observer Network station.

Front Royal, Virginia.

NCDC 1995–2005 Monthly Averages
Latitude: 38.90 degrees
Longitude: -78.18 degrees
Elevation: 930 feet
Station period of record: 12/01/1995–07/24/2006

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Max. Temperature (F)	44.3	46.8	53.3	65.9	73.5	81.8	85.9	85.1	77.8	66.4	57	45.7	65.2
Highest Mean Max. Temperature (F)	50.8	50.3	59.6	69.8	81	84.7	92.5	87.7	85.1	70.6	64	53	67.9
Year Highest Occurred													
Lowest Mean Max. Temperature (F)	35.6	39.7	45.3	61.4	67.4	77.7	81.7	81.7	74.6	64.3	49.2	37.7	62.6
Year Lowest Occurred													
Mean Temperature (F)	34.5	36.6	42.5	53.9	62	70.8	74.5	73.8	66.7	55.3	46.3	36.1	54.4
Highest Mean Temperature (F)	41.2	40.5	48	56.5	69.3	72.4	79.2	76.1	71.8	57.9	51	42.8	56.9
Year Highest Occurred													
Lowest Mean Temperature (F)	26.9	30.8	37.2	49.6	58.2	68.2	70.9	71.1	63.7	53.2	40	28	52.3
Year Lowest Occurred													
Mean Min. Temperature (F)	24.6	26.3	31.7	41.8	50.5	59.7	63.2	62.6	55.5	44.1	35.6	26.6	43.5
Highest Mean Min. Temperature (F)	31.7	32	36.4	43.9	57.6	61.6	66.8	65.5	58.5	47.8	39.3	32.6	45.9
Year Highest Occurred													
Lowest Mean Min. Temperature (F)	18.2	21.9	26.4	37.9	45.8	56.9	59.2	59.8	52.2	41.3	30.8	18.3	42
Year Lowest Occurred													
Mean Precipitation (in.)	3.297	2.55	3.78	3.153	3.928	4.324	3.345	3.566	6.533	2.633	3.444	2.015	42.309
Highest Precipitation (in.)	10.25	6.96	5.58	5.06	6.18	8.17	5.68	7.02	13.24	6.67	8.81	3.47	62.15
Year Highest Occurred	1996	1998	2001	2002	1996	2003	2003	2001	2004	2005	1997	2003	1996
Lowest Precipitation (in.)	0.85	0.24	2.37	1.2	1.42	1.21	0.32	1.8	0.83	0.2	0.61	1.09	32.36
Year Lowest Occurred	2004	2002	2004	1997	1999	1999	1998	2004	2005	2000	1998	1997	2000
Heating Degree Days (F)													
Cooling Degree Days (F)													

Temperature and/or precipitation averages at a Cooperative Observer Network station.

Sperryville, Virginia.

NCDC 1996–2005 Monthly Averages
Latitude: 38.66 degrees
Longitude: -78.23 degrees
Elevation: 750 feet
Station period of record: 12/01/1995–07/26/2006

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Max. Temperature (F)	45.1	48.6	55.6	67.1	74	82.8	86.7	85.8	79.4	68.1	58.9	47	66.8
Highest Mean Max. Temperature (F)	51.8	52.8	61.8	69.6	78.1	85.1	91.2	89.2	87.2	73.3	65.1	54.2	69.5
Year Highest Occurred													
Lowest Mean Max. Temperature (F)	38.4	40.4	49.3	62.9	69.2	78.8	83.2	83.3	75.9	64.9	51.1	39.3	64.2
Year Lowest Occurred													
Mean Temperature (F)	34.9	37.7	43.8	54.5	61.5	71	74.6	74	67.6	56	46.6	36.9	55.2
Highest Mean Temperature (F)	42.1	42	48.7	57.1	66.6	72.5	77.8	75.7	73	58.8	51.1	42.6	58
Year Highest Occurred													
Lowest Mean Temperature (F)	29.1	31.9	38.3	51.3	58.3	68.7	71.4	71.8	64.9	53.6	40.6	29.2	53.4
Year Lowest Occurred													
Mean Min. Temperature (F)	24.7	26.9	32	41.8	49.6	59.1	62.5	62.3	55.9	43.9	34.8	26.8	43.5
Highest Mean Min. Temperature (F)	34.1	33.3	35.6	44.8	55.8	62.1	64.5	64.6	58.7	48.4	38.3	30.9	46.5
Year Highest Occurred													
Lowest Mean Min. Temperature (F)	19.8	23.4	27.4	39.6	45.3	56.8	57.9	60.2	51.7	40.7	30	19.2	42.3
Year Lowest Occurred													
Mean Precipitation (in.)	3.782	2.92	4.268	3.402	4.255	4.591	4.35	3.702	7.612	2.97	4.156	3.09	48.351
Highest Precipitation (in.)	9.07	8.01	6.05	5.28	6.8	7.27	6.46	6.46	14.45	7.62	6.86	5.4	67.6
Year Highest Occurred	1998	1998	2001	1998	2003	2000	1996	1996	1999	2005	2005	2003	1996
Lowest Precipitation (in.)	1.11	0.55	2.2	1.41	1.7	1.05	0.97	1.97	0.59	0.05	1.03	1.74	38.29
Year Lowest Occurred	2002	2002	2000	1997	1997	1999	1998	1998	1998	2000	1998	2001	2001

Temperature and/or precipitation averages at a Cooperative Observer Network station.

Waynesboro Sewage Plant, Virginia.

NCDC 2000–2005 Monthly Averages
Latitude: 38.08 degrees
Longitude: -78.88 degrees
Elevation: 1280 feet
Station period of record: 01/01/2000–07/26/2006

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Max. Temperature (F)	44.5	47.8	55.2	66	72.9	80.9	83.2	83.6	76.3	66.4	58	44	64.7
Highest Mean Max. Temperature (F)													
Year Highest Occurred													
Lowest Mean Max. Temperature (F)													
Year Lowest Occurred													
Mean Temperature (F)	33.3	36.1	42.6	53.1	60.9	69.7	72.5	72.6	65.1	54.4	45.6	33.7	53.2
Highest Mean Temperature (F)													
Year Highest Occurred													
Lowest Mean Temperature (F)													
Year Lowest Occurred													
Mean Min. Temperature (F)	22.2	24.4	30	40.2	48.8	58.4	61.8	61.5	53.9	42.4	33.3	23.4	41.7
Highest Mean Min. Temperature (F)													
Year Highest Occurred													
Lowest Mean Min. Temperature (F)													
Year Lowest Occurred													
Mean Precipitation (in.)	1.466	1.99	3.627	3.767	3.265	4.435	5.095	3.952	6.2133	2.902	4.615	2.768	45.432
Highest Precipitation (in.)	2.31	4.93	5.62	5.21	6.99	7.2	8.3	6.03	13.75	7.09	7.91	5.05	65.81
Year Highest Occurred	2005	2003	2001	2003	2003	2003	2004	2000	2004	2005	2005	2003	2003
Lowest Precipitation (in.)	0.73	0.53	1.95	1.84	2.08	0.64	3.41	1.29	0.68	0	1.01	1.84	31.36
Year Lowest Occurred	2002	2002	2004	2001	2001	2002	2002	2002	2005	2000	2000	2000	2001

Temperature and/or precipitation averages at a Cooperative Observer Network station.

Staunton Sewage Plant, Virginia.

NCDC 1971–2000 Monthly Normals
Latitude: 38.18 degrees
Longitude: -79.09 degrees
Elevation: 1640 feet
Station period of record: 01/01/1893–07/24/2006

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Max. Temperature (F)	40.5	44.2	53.1	63.3	71.6	79.2	83.3	81.8	75.5	65.3	54.6	44.5	63.1
Highest Mean Max. Temperature (F)	50	53.1	59.8	68.8	77.2	83.2	88.4	86	83.2	71	61.7	53.7	88.4
Year Highest Occurred	1974	1990	1977	1994	1991	1987	1987	1993	1998	1984	1999	1984	1987
Lowest Mean Max. Temperature (F)	29.4	32.4	45.4	57.7	66.3	73.2	78.4	78.1	70.7	57.1	48	33.1	29.4
Year Lowest Occurred	1977	1979	1993	1987	1992	1972	1971	1992	1975	1976	1976	1989	1977
Mean Temperature (F)	30.7	33.6	41.7	50.8	59.8	67.9	72.1	70.5	63.9	52.1	43.1	34.4	51.7
Highest Mean Temperature (F)	41.1	40.7	47.4	54.7	65.5	71.3	77	74.3	70.5	58	50.8	41.7	77
Year Highest Occurred	1974	1976	1977	1994	2000	2000	1999	1995	1998	1984	1999	1984	1999
Lowest Mean Temperature (F)	19.5	21.6	36.6	47.3	55.9	63.8	68.9	67.1	60.2	46.3	36.6	20.5	19.5
Year Lowest Occurred	1977	1978	1993	1982	1994	1972	1971	1982	1982	1988	1976	1989	1977
Mean Min. Temperature (F)	20.8	22.9	30.3	38.3	47.9	56.5	60.9	59.2	52.2	38.9	31.6	24.2	40.3
Highest Mean Min. Temperature (F)	32.2	30.5	36.9	43.1	54.6	61.4	66.1	64.1	57.7	48.5	39.9	32.5	66.1
Year Highest Occurred	1974	1998	1973	1998	2000	2000	1999	1995	1998	1971	1999	1998	1999
Lowest Mean Min. Temperature (F)	9.6	10.5	26.3	31.6	43.2	52.2	56.7	53.3	46.8	31.5	25.2	7.9	7.9
Year Lowest Occurred	1977	1978	1984	1971	1994	1993	1983	1976	1982	1988	1976	1989	1989
Mean Precipitation (in.)	2.91	2.50	3.23	2.92	3.81	3.57	3.82	3.5	3.78	3.37	2.95	2.49	38.85
Highest Precipitation (in.)	7.21	10.37	7.57	8.68	8.21	13.4	8.94	9.24	12.82	9.65	11.85	6.28	13.4
Year Highest Occurred	1996	1998	1993	1987	1971	1995	1991	1974	1996	1976	1985	1973	1995
Lowest Precipitation (in.)	0.12	0.23	0.73	0.93	1.42	0.84	1.27	0.57	0.04	0.02	0.68	0.35	0.02
Year Lowest Occurred	1981	1977	1981	1976	1991	1999	1983	1976	1985	2000	1981	1980	2000
Heating Degree Days (F)	1066	880	723	426	191	34	6	10	95	409	657	950	5447
Cooling Degree Days (F)	0	0	0	0	28	119	226	180	60	9	0	0	622

Temperature and/or precipitation averages at a Cooperative Observer Network station.

Big Meadows 2, Virginia.

NCDC 1971–2000 Monthly Normals
Latitude: 38.52 degrees
Longitude: -78.44 degrees
Elevation: 3540 feet
Station period of record: 01/01/1935–11/30/2003

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Max. Temperature (F)	34.8	37.7	45.4	55.8	64.4	71.5	75.4	73.4	67.5	57.8	48.1	38.7	55.9
Highest Mean Max. Temperature (F)	44.4	46.7	52	63.7	69.2	75.1	79.7	78.5	72.6	65.4	54.2	47.9	79.7
Year Highest Occurred	1974	1990	1977	1999	1991	1993	1987	1988	1998	1991	1994	1984	1987
Lowest Mean Max. Temperature (F)	24	27.2	38	50	60.5	67	70.6	69.1	61.9	51.1	41.1	27.1	24
Year Lowest Occurred	1977	1978	1996	1983	1992	1972	1996	1996	1996	1976	1997	1989	1977
Mean Temperature (F)	25.8	28.6	35.8	45.4	54.5	62.1	66.1	64.4	58.5	48.2	39.1	29.9	46.5
Highest Mean Temperature (F)	36.1	35.6	42.4	50.4	59.3	65.3	70.1	67.6	64.1	55.5	47	39.5	70.1
Year Highest Occurred	1974	1990	1973	1999	1982	1973	1999	1978	1998	1984	1985	1984	1999
Lowest Mean Temperature (F)	15	18.6	29.7	40.5	47.9	57.9	62.2	60.7	54.5	40.5	32.8	17.7	15
Year Lowest Occurred	1977	1978	1993	1975	1994	1992	1976	1976	1988	1988	1995	1989	1977
Mean Min. Temperature (F)	16.8	19.4	26.2	35	44.5	52.7	56.7	55.4	49.4	38.5	30.1	21.1	37.2
Highest Mean Min. Temperature (F)	27.7	25.8	34.5	39.7	50.2	57.1	61	60.3	55.5	47.8	39.9	31	61
Year Highest Occurred	1974	1998	1973	1985	1998	1973	1994	1995	1998	1971	1985	1984	1994
Lowest Mean Min. Temperature (F)	5	10	19.8	30.1	33.8	46.9	51.8	49.1	42.1	27.5	23.2	8.2	5
Year Lowest Occurred	1994	1978	1993	1988	1994	1992	1976	1992	1988	1988	1976	1989	1994
Mean Precipitation (in.)	4.12	3.38	3.91	4.1	5.1	5.15	4.9	4.36	6.04	5.13	4.87	3.82	54.88
Highest Precipitation (in.)	11.13	11.45	9.55	11.48	11.6	18.03	11.34	8.01	19.87	15.07	21.33	8.41	21.33
Year Highest Occurred	1996	1984	1993	1987	1971	1972	1981	1979	1996	1972	1985	1992	1985
Lowest Precipitation (in.)	0.29	0.52	1.05	1.71	1.75	1.01	0.74	1.09	0.69	0.12	0.69	0.84	0.12
Year Lowest Occurred	1981	1978	1981	1995	1977	1980	1983	1991	1978	2000	1998	1980	2000
Heating Degree Days (F)	1216	1021	905	589	334	117	43	75	207	526	778	1087	6898
Cooling Degree Days (F)	0	0	0	0	7	29	76	56	10	2	0	0	180

Temperature and/or precipitation averages at a Cooperative Observer Network station.

Charlottesville 2 W, Virginia.

NCDC 1971–2000 Monthly Normals
Latitude: 38.03 degrees
Longitude: -78.52 degrees
Elevation: 870 feet
Station period of record: 01/01/1893–07/26/2006

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Max. Temperature (F)	44.7	48.7	57.8	69	76.3	83.9	88	86.4	80.1	69.5	59.2	48.5	67.7
Highest Mean Max. Temperature (F)	54.3	57.2	64.5	75.8	82.1	88.3	94.3	91.2	87.9	75.3	66.5	58.2	94.3
Year Highest Occurred	1990	1976	1977	1994	1991	1986	1977	1988	1998	1984	1999	1984	1977
Lowest Mean Max. Temperature (F)	33.9	36.8	50.5	62.6	71.6	78.1	84	82.1	75.3	62.4	52.8	37.3	33.9
Year Lowest Occurred	1977	1979	1993	1983	1992	1972	2000	1992	1975	1976	1996	1989	1977
Mean Temperature (F)	35.5	38.7	46.9	57.1	65.2	72.9	76.9	75.4	69.2	58.3	48.9	39.3	57
Highest Mean Temperature (F)	44.4	45.6	53	62.1	71.4	75.9	81	79	74.8	64.6	55.7	47.1	81
Year Highest Occurred	1990	1990	2000	1985	1991	1981	1987	1988	1998	1984	1999	1984	1987
Lowest Mean Temperature (F)	25.5	28.4	40.5	52.1	61	68.4	73	71.7	66.3	53.1	42.8	27.1	25.5
Year Lowest Occurred	1977	1979	1993	1983	1992	1992	1984	1992	1975	1987	1996	1989	1977
Mean Min. Temperature (F)	26.2	28.6	36	45.1	54	61.8	65.8	64.3	58.3	47	38.5	30	46.3
Highest Mean Min. Temperature (F)	34.6	34.3	41.8	49	60.8	65.3	69.3	67.7	62.7	56	44.9	36.7	69.3
Year Highest Occurred	1990	1991	2000	1985	1991	1981	1987	1980	1971	1971	1999	1994	1987
Lowest Mean Min. Temperature (F)	17.1	19.9	30.5	41.5	48.1	57.7	61.8	60.8	54.9	40.4	32.8	16.9	16.9
Year Lowest Occurred	1977	1979	1993	1983	1994	1992	1984	1976	1988	1987	1996	1989	1989
Mean Precipitation (in.)	3.71	3.30	4.05	3.34	4.86	4.46	4.94	4.14	4.85	4.22	3.74	3.26	48.87
Highest Precipitation (in.)	9.7	8.02	8.25	9.82	10.53	12.81	14.83	7.97	17.96	12.7	13.06	7.42	17.96
Year Highest Occurred	1978	1998	1994	1983	1971	1972	1994	1984	1987	1976	1985	1973	1987
Lowest Precipitation (in.)	0.21	0.42	1.1	0.87	1.63	0.79	1.1	1.25	0.62	0.01	0.9	0.37	0.01
Year Lowest Occurred	1981	1978	1981	1985	1986	1999	1987	1995	1985	2000	1981	1980	2000
Heating Degree Days (F)	915	738	562	250	83	6	0	1	29	236	485	798	4103
Cooling Degree Days (F)	0	0	0	11	87	241	370	321	155	26	1	0	1212

As the nation's primary conservation agency, the Department of the Interior has responsibility for most of our nationally owned public land and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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U.S. Department of the Interior

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