

Climate of West Virginia

Introduction

This publication consists of a narrative that describes some of the principal climatic features and a number of climatological summaries for stations in various geographic regions of the State. The detailed information presented should be sufficient for general use; however, some users may require additional information.

The National Climatic Data Center (NCDC) located in Asheville, North Carolina is authorized to perform special services for other government agencies and for private clients at the expense of the requester. The amount charged in all cases is intended to solely defray the expenses incurred by the government in satisfying such specific requests to the best of its ability. It is essential that requesters furnish the NCDC with a precise statement describing the problem so that a mutual understanding of the specifications is reached.

Unpublished climatological summaries have been prepared for a wide variety of users to fit specific applications. These include wind and temperature studies at airports, heating and cooling degree day information for energy studies, and many others. Tabulations produced as by-products of major products often contain information useful for unrelated special problems.

The Means and Extremes of meteorological variables in the Climatography of the U.S. No.20 series are recorded by observers in the cooperative network. The Normals, Means and Extremes in the Local Climatological Data, annuals are computed from observations taken primarily at airports.

The editor of this publication expresses his thanks to those State Climatologists, who, over the years, have made significant and lasting contributions toward the development of this very useful series.

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Topographic Features- The diversity of climatic conditions in West Virginia can be understood best with some background knowledge of the topography and geography. West Virginia has the highest average elevations of any state east of the Mississippi River, 500 feet greater than that of the second highest state-Pennsylvania. The rugged topography of the “Mountain State” features some elevation differences greater than 3,000 feet within individual counties.

West Virginia has an area of over 24,000 square miles, and its main portion is roughly oblong in shape. From southwest to northeast, the distance is about 200 miles, while it averages a little over 100 miles in width. There are two projections: one, the eastern panhandle, juts eastward between Maryland and Virginia; the other, the Northern Panhandle, is a narrow strip stretching northward along the Ohio River between Ohio and Pennsylvania. The easternmost extremity of the State is about 150 miles from the Atlantic Ocean and the southwestern corner adjacent to Kentucky is nearly 400 miles from the ocean. As a result, West Virginia lies beyond the immediate climatic effect of the Atlantic, and its climate is much more of the continental than of the maritime type. The most important aspect of this type of climate is the marked temperature contrast between summer and winter, with four distinct seasons.

Furthermore, the physical configuration of the State accentuates its interior location. Excluding the Eastern Panhandle, the State lies in the Appalachian Plateau; but because the Allegheny Mountains are the most pronounced feature of the eastern part of the plateau it is more appropriate to treat the main part of the State in two stages. The eastern third of the plateau is part of the Allegheny Mountain chain and contains the highest land in the State. Peak elevations in this area range from about 2,500 feet to Spruce Knob's 4,861 feet (above sea level), the highest point in West Virginia. The central and western thirds of the plateau slope generally westward to the Ohio River, which lies at about 550 to 650 feet above sea level. In the north and west, the Appalachian Plateau has been well cut by weather and stream erosion into rounded hills and many fertile and winding valleys. In the south, the plateau has not been eroded as much, and is characterized by flat-topped hills with precipitous slopes.

The Eastern Panhandle is marked by long ridges and valleys oriented southwest-northeast, intersected by winding courses of the Potomac River and its tributaries. The main stream of the Potomac with its North Branch forms the northern border with Maryland's westernmost counties. Summit elevations exceed 4,000 feet, but the land in general slopes eastward away from the main ridgeline to the west and finally reaches the lowest elevation in the State, 274 feet at Harpers Ferry. This section lies in the Atlantic Ocean drainage and is drained by the Potomac River. The remainder of the State drains into the Ohio River.

West Virginia's topography has been described in some detail because its physical features considerably modify the effects of the major climatic controls. The State's latitudinal position places it in the zone of prevailing westerly winds, which are most common in the United States

in the colder half of the year. West Virginia lies near the average path of extratropical cyclones that move in a general easterly direction across the United States. In the warmer half of the year, the State is affected by the showers and thunderstorms that occur in the broad current of air that tends to sweep northeastward from the Gulf of Mexico.

The State has a moderately severe winter climate, accentuated and prolonged in the mountains, with frequent alternations of fair and stormy weather. Summer is marked by hot and showery weather. The heat is less pronounced in the mountains, but they are more subject to thunderstorms and have fewer clear days the year round. Little more can be said in the way of general climatic characteristics, because there are marked variations in the weather elements due to rugged topography. Large differences occur not only between the mountains and plateau areas, but even between different parts of the same county. For example, appreciable differences exist between the bottoms and the upper slopes of the numerous valleys that entrench the Appalachian Plateau.

Temperature- There is about as much temperature contrast across the State from east to west as there is in twice the distance from north to south. This condition prevails throughout the year, though it varies in magnitude with the seasons and cannot be expected to hold every day. Here the general effect of the topography is clear: locations in the mountainous belt, regardless of their latitude, tend to have lower temperatures than those in the rest of the State and combined with their average winter minimum temperatures range from the low 20s (Fahrenheit) in the mountains of Central and Northeastern parts of the State, to near 30 in the extreme southern and southwestern portions of the State., while winter annual maximums range from 40 in the mountains to 45° F in the southern portions of the State. Extremely cold temperatures are possible with several of the mountain based stations having record low temperatures in the -30s. The coldest temperature ever recorded in West Virginia was -37° F.

Spring and autumn mean temperatures average in the 50s, with similar geographical variations. The average date of the last freezing temperature in spring ranges from mid-April in the southwest to mid-May in the mountains; the first occurrence of 32° F in the fall varies from late September to late October.

Despite what has been said about the coolness of the mountains, they can on occasion be as hot as any other part of West Virginia. Temperatures of nearly or over 100° F have been recorded at all observing stations in the State, up to 112° F at Martinsburg. On the average, however, summer temperatures range between 79 and 85 depending on latitude and elevation.

Precipitation- The distribution of mean annual precipitation exhibits some interesting features. Yearly amounts average the greatest in the Central Division, in excess of 50 inches. West of this belt of heavy precipitation, amounts decrease to about 40 inches along the Ohio River. East of the Central Division, there is an abrupt decrease to about 30 inches in the western part of the Eastern Panhandle, with an increase to about 40 inches in the extreme eastern tip of the State. This pattern can be directly related to the fact that the rain and snow producing atmospheric currents generally move across West Virginia on an eastward course. As they approach the mountains, these air current are subject to orographic lifting, which acts to “trigger” potential precipitation or to intensify the rain or snow that may already be falling. As result, average annual precipitation increases from the Ohio eastward to the Appalachians. On the other side of

the mountains, there is the well-marked “rain shadow” where the air currents descend the leeward slopes and precipitation is correspondingly reduced, only to increase again when more favorable topographic influences are encountered farther eastward and where the influence of the ocean and coastal storms is more pronounced.

Mean annual snowfall exhibits the same features, but to a more marked degree. The mountain belt receives over 60 inches of snow a year, on the average. Pickens, at an elevation of 2,700 feet located near the middle of the western boundary of the central mountains, had an average annual snowfall of 145 inches for a recent 30 year period. Annual amounts of over 20 inches have been experienced everywhere else in the State.

West Virginia has thunderstorms on 40 to 50 days out of the year. Thunderstorms are more frequent in the mountains with June and July being the most active months. Violent localized winds are experienced every year in some part of the State, however severe gales are rare. Tornadoes are very rare in West Virginia with only two observed on average each year. Occasionally, remnants of tropical systems will pass through the State dumping rains and causing floods. The storms that do the most damage are the storms that form in the Midwest and flow along the main jetstream to the east. These are the storms which tend to do the flooding and also cause the most wind damage.

Flooding is a problem in all 50 states. West Virginia is definitely affected by flooding. Usually this flooding is of the flash flood variety. The Potomac River will have a major flood every few years.

Climate and the Economy- The State’s diverse climate and topography foster real economy benefits. Mountain resorts take advantage of the cool summer temperatures and attract numerous visitors from hotter locations. Plentiful snow is a boon for the State’s ski resorts. Ample precipitation feeds the many miles of waterways found within the State. These waterways support recreational activities such as fishing, boating, kayaking, canoeing and rafting.