Climate of Nebraska

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Unpublished climatological summaries have been prepared for a wide variety of users to fit specific applications.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.

State and Station Normals are available at:
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Topographic Features- Nebraska comprises 77,227 square miles, of which 705 square miles are water. On the eastern boundary, formed by the Missouri River, the elevation rises from less than 900 feet above sea level in the southeast to 1,200 feet in the northeast. The elevation also increases near the Wyoming border. The landscape changes from gently rolling prairie in the east to rounded sand hill in the north central part, to the high plains of the western section.

Nebraska has three topographical regions. The eastern third and southwestern quarter of the State comprise approximately 42,000 square miles of gently rolling prairie composed of deep silt loam or sandy loam soils. The 20,000 square mile sand hill section consists of rounded hills interspersed with numerous small basins, valleys, and lakes. The high plains section, mainly in the western panhandle, has broad tablelands and considerable bottom land.

The entire State is drained by the Missouri River system. The major tributary is the Platte River, which has two main branches. Other important tributaries are the Niobrara River in the north and the Republican and Big Blue rivers in the south.

Nebraska's climate is typical of the interior of large continents in the middle latitudes. Summers are hot and the winters are cold, with large seasonal and year to year variations in temperature and precipitation. The State lies in the path of alternating and interacting masses of air with different characteristics and sources. Consequently, the weather is subject to frequent and often sharp changes. The Rocky Mountains profoundly influence the climate. Air crossing the Rockies from the west loses much of its moisture on the windward sides of the mountains and becomes warmer as it descends on the eastern slopes. As a result, only small amounts of moisture reach the State from the Pacific Ocean. Downslope winds (Chinooks) from the Rockies occasionally cause large and rapid rises in temperature, particularly during the winter.

Temperature- Mean monthly temperatures, in degrees Fahrenheit, vary from the upper teens to the mid 20s in January to the mid and upper 70s in July. During December, January and February, the northeast has the coldest mean monthly temperatures; from April through September, the panhandle has the coolest mean monthly temperatures.

The average annual number of days with maximum temperatures of 90° F or higher varies from around 70 in portions of south-central Nebraska to fewer than 30 in the higher elevations of the panhandle. Temperatures above 100° F have occurred statewide in the months June through September. The highest temperatures occur in July and sometimes exceed 115° F.

The range for the average annual number of days with minimum temperatures of 0° F or lower decreases from about 25 in the north to 10 in the southeast. Extreme minima of -40° F and lower have been recorded at many locations in the west and north. Although winters in Nebraska are classed as cold, there are usually several periods of mild pleasant weather, when

thawing occurs. The number and duration of mid-winter mild intervals increases southwestward across the State.

The average date of the last freeze in spring varies from about April 25th in the southeast to May 25th in small areas of the northwest; the first freeze in the fall ranges from mid-September to mid-October. On rare occasions, light freezes have been noted during June, July and August in the panhandle and north-central areas which are subject to extreme cold air drainage on calm, clear nights.

Precipitation- The moisture for most of Nebraska's precipitation comes from the Gulf of Mexico, which at its nearest point lies about 800 miles from the State's southeast corner and nearly 1,100 miles from most points in the panhandle. This remoteness from the Gulf and the variability in the trajectories of moisture-laden Gulf winds are the principal reasons for the westward decrease in average precipitation across the State and the large year-to-year variations in precipitation.

The average annual precipitation over the eastern third of the State is about 27 inches; in the central third, 21; and in the western third, 18. Average precipitation decreases rather uniformly from 36 inches in the southeast corner to 13 inches in part of the west-central panhandle. Of the yearly total, 75 to 80 percent falls in the warm half–year, April through September, and 40 to 50 percent during May, June and July; a distribution highly favorable for agriculture. At times, moist air from the Gulf is deflected eastward, resulting in little or no precipitation for the State. On other occasions, a persistent southerly or southeasterly wind can transport sufficient Gulf moisture into the area to produce widespread and abundant precipitation for several days.

A large percentage of the late spring and summer rainfall is produced by thunderstorms which occur on an average of 45 to 50 days per year in most sections of the State. These storms usually develop in warm moist air of a low-pressure system. Thunderstorms often are accompanied by heavy rainfall that may cause some flooding. Some summers in Nebraska can be very hot and dry. When these dry periods occur, severe damage can be seen in the State's crops.

Snowfall in Nebraska ranges from 21 inches in the south to 45 inches in the northwest. Much of the high plains can expect to have early snows in October and late snows into April. While this is a rare occurrence, it is something to keep in mind.

Climate and the Economy- The climate and soils of Nebraska favor agricultural activities. Corn, winter wheat, sorghum and soybeans are the leading commercial crops in the eastern third and southwestern quarter of the State. The sand hill section is important for hay and cattle production. In the high plains section, spring wheat, potatoes and sugar beets are the leading crops; beets are irrigated in the North Platte Valley.