

# CLIMATIC SUMMARY FOR THE 1996 NORTH DAKOTA GROWING SEASON

by  
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## Introduction

For the second consecutive year, spring arrived late in North Dakota. Average March temperatures ranged from 5 to 8 F below average. On April 1, about 70% of the state still had more than 5 inches of snow on the ground with more than 12 inches in the northeast quarter. Additional snow fell sporadically during the first 10 days of April with more on the 27th and 28th. As a result, average temperatures during April ranged from 2 F below normal in the southwest to 8 F below in the central and northeastern regions. By late April, 4-inch depth soil temperatures recorded by North Dakota Agricultural Weather Network (NDAWN) stations had reached 40 F at only a few southern and western locations.

Field work finally began in May, but proceeded slowly because of continued low temperatures during the first two weeks (5 to 10 F below average) and copious rainfall throughout the month. By mid-May air and soil temperatures increased rapidly, but periodic widespread rainfalls slowed field work. Finally by the end of May, there was rapid progress, but planting was not completed until mid-June, about 3 weeks late. A pleasant summer consisting of adequate rainfall and near normal temperatures ensued. Although there was some concern about crop maturity in the autumn, three weeks of temperatures in the 80's and 90's during late August and early September helped crops mature before a killing frost in late September-early October.

## 30-Year Normals

The use of the term *normal* in climatology is unfortunate. *Normal* is defined by the National Weather Service as a 30-year average for the preceding 3 complete decades and has been used for most of this century to characterize average climatic elements. However, its use often implies that varying weather conditions, or deviations from normal, are somehow abnormal. This is not true. It is absolutely typical or *normal* for temperatures, precipitation, and other climatic elements to vary widely from day to day or from year to year in this region. An average is a valuable mathematical concept used to compare years or locations by masking this variation. Currently, *normal* refers only to an average value for the 30-year period, 1961-1990. Normals are used for comparisons throughout this manuscript.

## May Rainfall

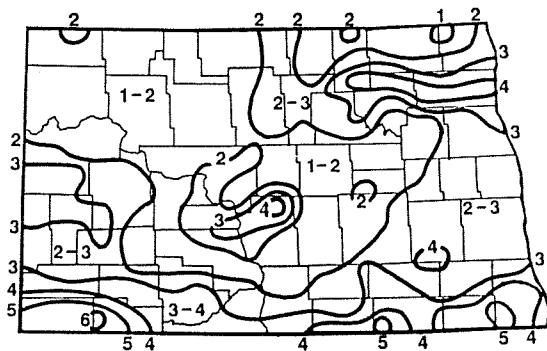


Fig. 1. Total Rainfall (inch): May 1996

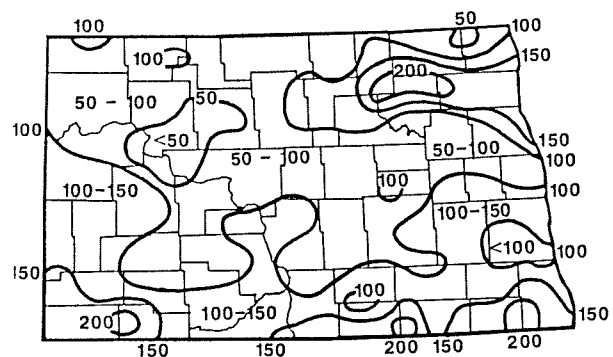


Fig. 2. Percent of normal rainfall; May 1996.

Abundant rainfall throughout May continued to delay planting and caused major concerns for producers especially in the southern and northeastern parts of the state. Amounts ranging from 3 to 6 inches fell along the southern edge of North Dakota (Figure 1). Three to nearly five inches fell in the already saturated area north and east of Devils Lake further exacerbating flooding in the area. These amounts represent 100 to 225 percent of normal (Figure 2).

### June and July Rainfall

June rainfall was near normal, ranging from 2 to 4 inches over most of the state, but it was extremely variable in local areas. Some stations reported less than 50 percent of normal (less than 1.50 inches) while nearby stations received near or above normal amounts. Similarly a few isolated stations reported 5 to 6 inches or nearly twice normal amounts. July rainfall split the state approximately along the NW-SE diagonal. Most of the northeast half received 4 to 7 inches while the southwest half was mostly below normal with amounts ranging from 0.50 to 3 inches. Wet areas in portions of Kidder, Burleigh, Oliver, and Morton counties were the exception.

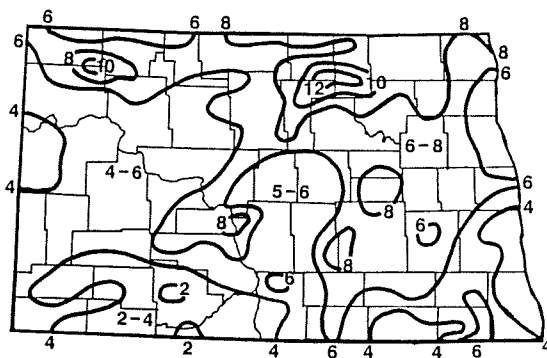


Fig 3. Total Rainfall (inch); June-July 1996.

Total rainfall during June and July was near the normal of 5 to 6 inches over much of North Dakota (Figure 3). However, individual storms often missed some locations which resulted in fairly dry conditions over a significant area in the southeast, south, and west-central regions. Rainfall in these areas was only 50 to 70 percent of normal. There were two small regions, one northwest of Devils Lake and one in northwestern North Dakota that received well above normal rainfall with amounts ranging from 8 to 13 inches (Figure 3). This is 150 to 250 percent of normal rainfall.

### September Rainfall

September was exceptionally wet with rainfall amounts exceeding 200 percent of normal in many areas. Except for a narrow east-west band across the middle of the state that extends into the north-central region, the state received more than 2 inches of rain (Figure 4). Rainfall in southern North Dakota was generally greater than 3 inches and most of the southeast received 4 to 7 inches which is 250 to 400 percent of normal (Figure 5). A narrow band extending from Towner to north of Devils Lake to the Minnesota border received 3 to 5 inches (150 to 300 percent of normal) (Figure 5). Wet soil and crop conditions caused delayed harvesting in several areas, but a dry October helped to compensate.

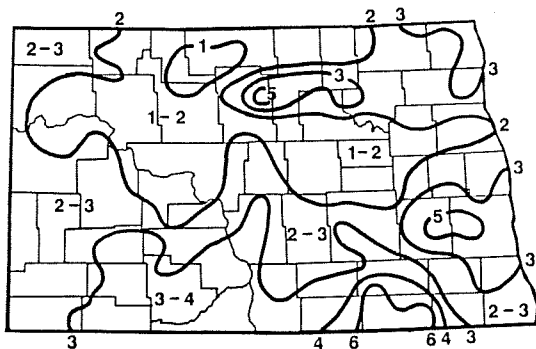


Fig. 4. Total Rainfall (inch): Sept. 1996.

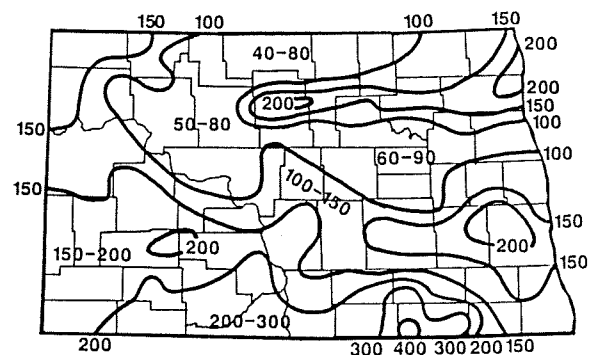


Fig. 5. Percent of normal rainfall; Sept. 1996.

## April - September Rainfall

Despite widespread heavy rains in May, July, and September, total growing season rainfall was below the long term average over most of North Dakota. The wet areas averaged out over the course of the season resulting in a fairly uniform rainfall distribution of 10 to 14 inches. The driest areas in the west-central region totaled only 8 to 10 inches (Figure 6) or 60 to 100 % of normal (Figure 7). The wettest area is in the northeast where total rainfall equaled 16 to 20 inches (125 to 150 percent of normal). Other regions with above average growing season rainfall are found in the south-central, northwest, and extreme west (Figure 7).

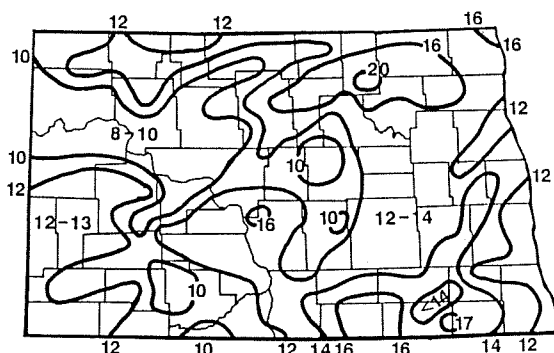


Fig. 6. Total Rainfall (inch): April -Sept. 1996.

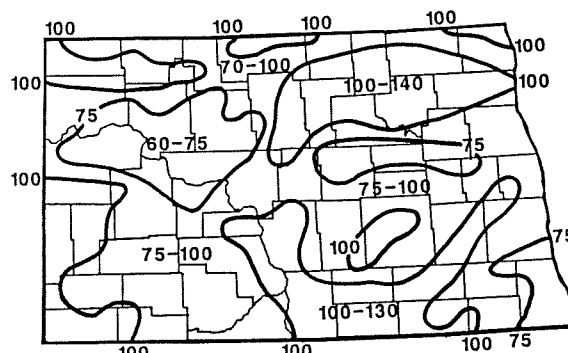


Fig. 7. Percent of normal rainfall; April -Sept. 1996.

## April - September Air Temperature

It was a cool spring in North Dakota because of the late snow cover and wet soil conditions. Average temperatures during April and the first half of May varied from 5 F below normal in the south and west to 8 F below normal in the northeast. They increased rapidly from the low to mid-40's to the upper 50's during the second half of May. During the summer, June temperatures were slightly above normal, July was fairly cool with temperatures 2-5 degrees F below normal, and August was slightly above. Near normal temperatures prevailed in September despite the wet conditions.

Average April through September temperatures were 1 to 2 F below normal over the entire state. Maximum temperatures in the 80's and 90's for 3 weeks during late August and early September helped most late planted crops reach maturity. Producers were aided by a relatively late killing frost that occurred over the period September 29 - October 2 depending on location.

More interesting, however, was the behavior of maximum (daytime) and minimum (nighttime) air temperatures throughout the summer. Average June through August maximum temperatures ranged from 1 to 2 F below the long-term average across the state. However, average minimum temperatures for the same period ranged from 1 to 3 F above normal. The result is a 2 to 5 F reduction in the average daily range of temperature during the 1996 summer. This compares with a 6 to 7 F reduction in the range during the 1995 summer. Similar results have been reported in several areas of the country during the past several years and is the subject of intense debate. Some scientists argue that an enhanced greenhouse effect is really causing lower daytime and higher nighttime temperatures instead of an overall warming which has been predicted, but so far has not materialized. If this is true it is good news for agriculture, since lower maximum temperatures reduce heat and water stress in crops while higher nighttime temperatures help to lengthen the growing season.