

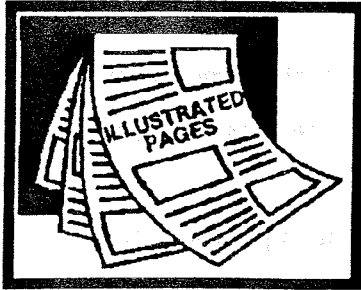
News From

## NDSU EXTENSION SERVICE

North Dakota State University, Box 5655, Fargo, ND 58105

August 12, 1993

### MAY-JULY RAINFALL UP TO 300 PERCENT OF NORMAL



Total rainfall for the May through July period reached up to 24 inches in some North Dakota locations in 1993, or more than 300 percent of normal for the three-month period, reports John Enz, agricultural climatologist at North Dakota State University.

Ironically, says Enz, the 1993 crop season actually opened with concerns about lack of moisture. April was dry across the state except for the extreme southeast. Dryness persisted, and by mid-May it looked like 1993 would be another of the dry springs that have occurred in recent years. Farmers in many areas held off planting rather than seed into dry soil.

Then, during the last 10 days of May, the rains came. By the end of the month 3 to 6 inches had fallen over a large area extending east and south from Minot, Bismarck, Devils Lake and Hillsboro, amounts representing 100 to 200 percent of normal for the entire month. However, precipitation in the northern and western parts of the state was still below normal.

"Normal" is defined as the average for the 30-year period 1961-1990.

Above average rainfall continued during June, ranging from 4 inches in the east to 6 and 7 inches in the central third of the state and back to 4 or 5 inches in the west. Scattered locations received about 3 inches, which is near normal.

During July the frontal pattern that had been producing major storms in Iowa and southern Minnesota occasionally moved north. Several severe storms dropped immense amounts of water across North Dakota.

Total July rainfall was above normal everywhere in the state, ranging from about 5 inches in the southwest and portions of the east to nearly 14 inches at Bismarck. Much of the

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state received more than 8 inches.

July rainfall amounts are more than 200 percent of normal nearly everywhere in the state and range up to 400 to 500 percent of normal over large areas and 643 percent of normal at Bismarck.

Bismarck's July rainfall total of 13.75 inches exceeded the next wettest month on record by 3.85 inches. July 1993 rainfall also set a record at Williston and was fourth wettest at Fargo in 115 years of weather records.

Enz says this July precipitation was probably unprecedented in the 110 years for which instrument records are available in the state. There were also widespread heavy rains in July of 1962 and 1975, but the heaviest precipitation those years was more restricted to the southeast quarter of the state.

The three-month May through July rainfall ranged from 9 to 24 inches across the state, 115 to 300 percent of normal for the period. Nearly half the state received more than 16 inches of rain. The greatest amounts, ranging from 18 to 24 inches, occurred in a 50-mile wide band starting west of Hebron and extending eastward nearly to Fargo.

The three-month total was unprecedented at many locations. At Bismarck, the May-July total rainfall of 20.16 inches was more than 5 inches greater than the old record set in 1914.

Temperatures during the growing season are also a major concern because they determine the rate of development of most plants.

Temperatures during May were near normal in the state, but cool weather beginning in June and intensifying in July delayed plant growth. June temperatures were 3 to 6 degrees below normal, but July temperatures ranged from 6 to 10 degrees below normal.

Accumulation of growing degree days through the growing season has been used as an indicator of crop development. Total corn growing degree days (GDD) for May through July were below normal across North Dakota, ranging from about 200 GDD behind in the east to

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400 in the northwest. Based on the typical accumulation of 20 to 21 corn GDD per day in late July, longer season crops were about 10 to 20 days behind normal development on Aug. 1.

Cumulative GDD for wheat were also below normal, but GDD for wheat are calculated using a base temperature of 32 degrees instead of the 50 degrees used for corn, so GDD for wheat accumulate at a much faster rate. The wheat GDD deficit ranged from only 100 in the southeast to 450 in the west. During July wheat GDD accumulate at about 40 per day, so on average small grains were about 3 to 10 days behind normal on Aug. 1.

Below normal temperatures are often typical of wet years, when large amounts of available energy are used to evaporate water instead of heating soil and air.

Maximum or daytime high temperatures have been much below normal this summer while minimum temperatures have not, probably related to the immense amount of cloud cover associated with June and July rainfall. Lower maximum temperatures have a much greater impact on longer season crops like corn than on small grains, which do better in cool weather.

What is the reason for the unusual moisture and cool temperatures this year? Meteorologists, climatologists and others have variously blamed the 1991 eruption of the Mt. Pinatubo volcano, the periodic warming of the sea surface in the Pacific called El Nino, and global warming. Others have said the weather is God's retribution or nature's punishment for technology's effects.

"I don't believe the heavy rainfall in North Dakota has been caused by any of these," Enz says. "In my opinion rainfall amounts of this magnitude fall within the expected range for our climate. Granted, the amounts have been large and unusually widespread, but rare events do occur, and usually with little or no warning."

The most distinguishing characteristic of the Northern Great Plains climate is its variability, says Enz. He says to consider averaging the drought years of 1988, '89 and '90 with the generally wetter years of 1985, '86 and '93.

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**MAY-JULY RAINFALL—ADD 3**

"The result is what we call normal. 'Normal' is the most useless concept known to mankind, because the weather is never normal. Normal is just the average of all the day to day, month to month and year to year extremes. It is useful for comparison purposes, but nearly useless for prediction."

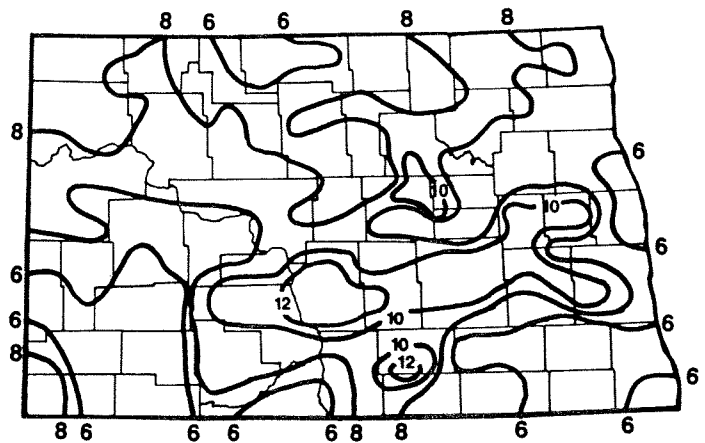
**NDSU Extension Communication**

**Gary Moran**

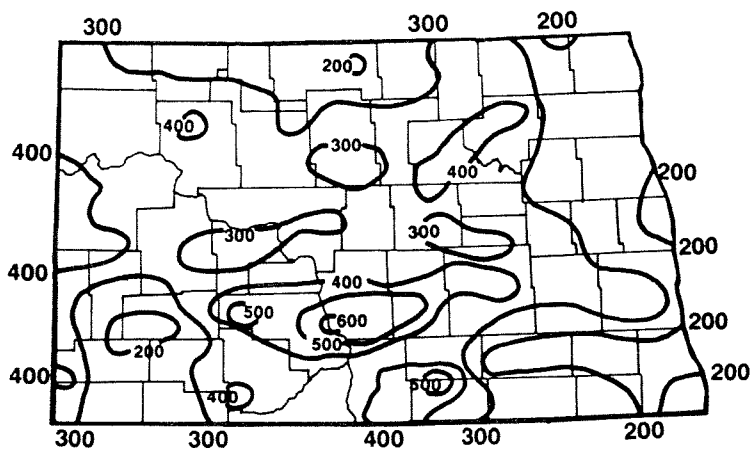
**Agricultural Editor**

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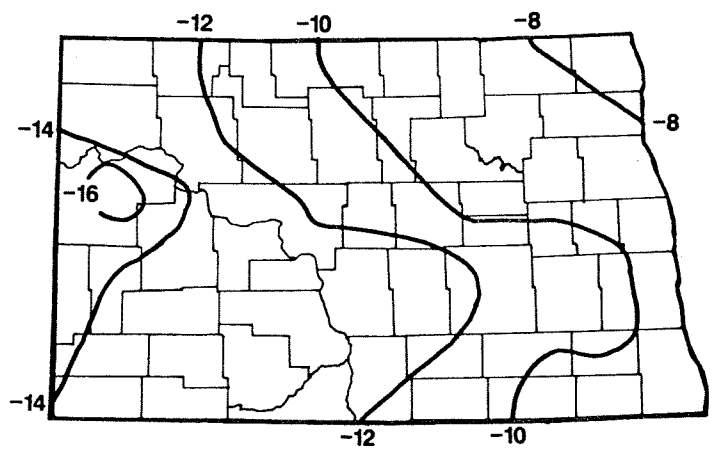
**Enz: 237-8576**



**Total precipitation (inches), July 1993**



**Percent of normal rainfall, July 1993**



**Departure from normal maximum air temperature (F) for July 1993**