CLIMATIC SERVICES IN THE SOIL SCIENCE DEPARTMENT

John W. Enz, Lynn J. Brun and Jay K. Larsen

The North Dakota State Climate Center is part of the Department of Soil Science at NDSU. The objective of the climate center is to provide climatic data and to promote the use of climatic data and information in activities throughout the state. The climatic data for all National Weather Service stations in the state are maintained and regularly updated in the center's climatic data library. These data are readily available and have been used for many research purposes, both on campus and in the private sector. Fifteen to 25 requests for climatic data and information have been received per month during the past year.

STATEWIDE SOIL MOISTURE SURVEY

Each fall personnel from the Soil Conservation Service collect soil samples from about 60 sites located at 30-35 mile intervals across the state. A map showing the plant available soil water is developed using fall precipitation and soil moisture data from these sites. The most recent map showing stored soil water on November 1, 1982 is shown in Figure 1 (Enz **et al.**, 1983). During the spring, the overwinter change in stored soil water is estimated from winter precipitation. About 40 to 60 percent of the water trapped as snow is stored in the soil during spring snow melt. New soil water estimates are disseminated to the newspapers throughout the state.

Stored soil water data are useful on a regional basis for estimating next year's crop and fallow acreage, statewide crop production, seed, herbicide, and fertilizer demand, and participation in government farm programs. These data are also used in local management such as fallow/recrop decisions, crop choices, estimating production for financial planning and marketing strategy. Many of these decisions are easier if growing season precipitaton probabilities are considered (Brown **et al.**, 1981). Data so far have stressed general state-wide soil moisture conditions; however, there is a real need for regional and local studies of soil moisture in order to benefit producers directly.

Enz and Brun are associate professors and Larsen is research assistant, Department of Soil Science.

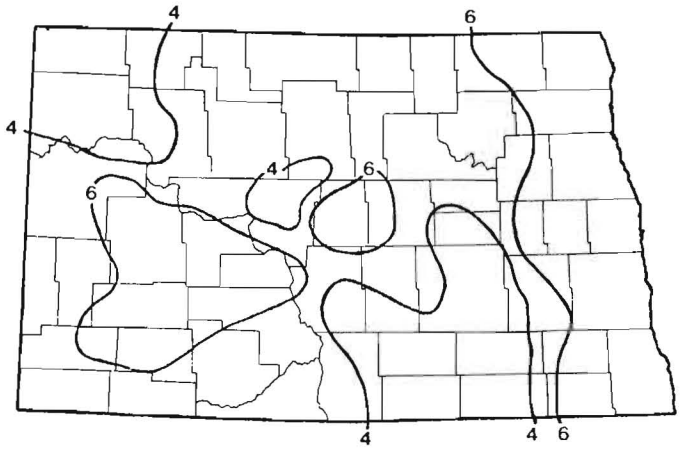

Figure 1. Available soil water (inches) on November 1, 1982.

SEASONAL CLIMATIC SUMMARIES

Following each season and for the entire growing season, a climatic summary of the state is released to the press (Enz and Stoltz, 1982). These summaries, prepared in cooperation with the Bismarck National Weather Service Office, consist of isoline maps showing average season temperatures, total precipitation, and departures from normal. Generally each season has an outstanding feature that is further highlighted. Examples include the wet October last fall and the warm 1982-83 winter.

ALMANACS

An almanac showing the daily sunrise and sunset times, temperature extremes and the year of occurrence, normal maximum and minimum temperatures, and normal heating degree days is prepared for Bismarck and Fargo on a monthly basis. Daily temperatures, heating degree days, and precipitation for the same month last year are included for comparison. These almanacs are most interesting because the trends in temperature and daylength are evident.

STATION SUMMARIES

Computer programs that will summarize climatic data in various ways and identify the warmest, coldest,

Table 1. Monthly temperature (°F) statistics for Langdon, North Dakota based on the period of record, 1896-1980.

Month	Avg. Max. Temp.	Avg. Min. Temp.	Mean Monthly Temp.	Std. Dev. of Mean	Record Temperatures With The Year Of Occur. Max.	Year	Min.	Year	Avg. Number of Days In Month When the Max. ≥90	Max. ≥32	Min. ≤32	Min. ≤0
Jan	11.0	−10.4	0.0	7.2	52	1942	−50	1916	0	2.6	31.0	23.6
Feb	17.1	−5.5	5.8	6.8	55	1958	−48	1936	0	4.5	28.2	18.1
Mar	30.9	8.5	19.7	6.3	77	1910	−40	1948	0	15.5	30.3	9.4
Apr	49.5	26.5	38.0	4.8	97	1980	−15	1936	0.1	28.1	22.5	0.5
May	65.2	37.8	51.5	4.1	105	1934	6	1967	0.5	30.9	9.6	0
Jun	73.6	48.5	61.0	3.1	106	1933	24	1964	1.3	30.0	0.9	0
Jul	79.5	53.1	66.3	3.0	112	1936	30	1898	3.1	31.0	0	0
Aug	78.1	50.5	64.3	3.0	102	1949	30	1896	3.5	31.0	0.2	0
Sep	68.1	41.3	54.7	3.4	101	1931	15	1928	0.9	30.0	5.3	0
Oct	54.5	30.1	42.3	4.9	91	1963	−7	1919	0	29.6	18.8	0.2
Nov	32.9	14.3	23.6	5.0	71	1975	−31	1958	0	16.3	29.1	5.0
Dec	17.7	−1.9	7.9	6.4	64	1939	−42	1916	0	4.9	31.0	17.3

wettest, and driest months on record are being developed. These data will be tabulated and published for the branch experiment stations and other selected stations.

An example of some of the temperature data to be included is shown for Langdon, ND in Tables 1 and 2. Statistics in Table 1 include average maximum and minimum temperatures, record temperatures and year of occurrence, and the number of days when the maximum and minimum temperatures are above or below selected temperatures for each month of the year. Table 2 gives precipitation probabilities for each month.

Table 2. The probability (%) of receiving at least the indicated amount of precipitation per month at Langdon, ND (1896-1980).

Month	Precipitation per month—Inches 0.25	0.50	0.75	1.00	2.00	3.00	4.00	5.00	6.00
	percent								
Jan	90	55	22	17	5	0	0	0	0
Feb	82	52	30	17	2	0	0	0	0
Mar	90	72	47	30	15	0	0	0	0
Apr	97	82	75	62	20	5	2	0	0
May	97	97	87	77	52	30	10	5	5
Jun	100	100	100	100	72	50	15	10	5
Jul	100	97	95	92	72	42	20	7	2
Aug	97	97	92	87	65	35	17	10	0
Sep	95	90	82	75	40	25	7	5	2
Oct	90	80	62	55	15	2	2	0	0
Nov	80	62	27	22	7	5	0	0	0
Dec	85	60	25	15	0	0	0	0	0

CURRENT WEATHER DATA

Current climatic data are useful to Extension and Experiment Station personnel whenever extreme weather conditions occur. For example, they may be used to assess the severity of early fall or late spring frosts, the extent of heavy rain, or the influence of high temperatures. When this information is readily available, university personnel can issue timely news releases or bulletins to help farmers and ranchers deal with the extreme conditions.

The Department of Soil Science and the Bismarck National Weather Service are cooperating to provide these data to university personnel on a daily basis by the end of this summer. In addition, a summary will be maintained for each station throughout the growing season. This summary will include precipitation totals, mean temperatures, and growing degree days. These data will be compared to long term averages or normals to assess the current season. Models may be used to predict crop growth stages.

LITERATURE CITED

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