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The March-April 1969 Snowmelt Floods in the Red River of the North, Upper Mississippi, and Missouri Basins

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SILVER SPRING, MD.
April 1971

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School in Minot, N. Dak., protected from flood waters by emergency dikes erected on basis of early warnings.
Photographed by North Dakota National Guard on April 11, 1969, 8 days before flood crested.

U.S. DEPARTMENT OF COMMERCE
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The March–April 1969 Snowmelt Floods in the Red River of the North, Upper Mississippi, and Missouri Basins

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ABSTRACT. The 1969 snowmelt floods in the Red River of the North, Upper Mississippi, and Missouri Basins rank among the most severe in this region in terms of crest stages reached and damages sustained. Record flooding occurred at many places in the Red River of the North Basin and on tributaries of the Missouri River in the Dakotas and Iowa. Record or near-record flooding also occurred along tributaries of the Upper Mississippi River in Minnesota and Iowa and along the main stream from the headwaters down to Davenport, Iowa. Nine deaths were reported, and total damage was estimated at $151 million. Accurate and timely flood forecasts and Operation Foresight, the federally sponsored cooperative effort to reduce or alleviate flood damage, kept the death toll low, and prevented at least $100 million in additional damage. Existing flood-control projects prevented damage amounting to another $97 million.

The 1969 snowmelt floods were the result of a very wet autumn, an extremely heavy winter snowfall, and an unusually cold winter. The first extensive melting occurred in mid-March, at which time the snow cover was of record amounts in many areas because there had been little or no previous melting. Following several days of melting, which produced record or near-record streamflow in various tributaries, especially in Iowa and southern Nebraska, an abnormally cold air mass moved into the region, bringing record low temperatures on the last few days of March. The low temperatures caused much of the melt water seeping down through the snow cover to freeze and thus reduced runoff and streamflow. These below freezing temperatures resulted in the retention of the snow cover well into April, when melting temperatures are normal. Melting resumed after the first few days of April, and this, plus several wet spells during the month, produced severe flooding in areas that had not experienced March flooding and in many areas that had. If March had been warm and wet as in 1965, instead of abnormally cold and dry, the 1969 floods would very likely have been the most severe on record for all three basins.

INTRODUCTION

The March-April 1969 snowmelt floods in the Red River of the North, Upper Mississippi, and Missouri Basins set new record crest stages or reached near-record stages on various tributaries in Iowa, Minnesota, the Dakotas, and Montana (tables 1 and 2, and figs. 1 and 2).

In the Red River of the North Basin, the flood was the most severe since 1897 along the main channel from the headwaters to Grand Forks, N. Dak. New record stages were established on Red Lake River at Crookston, Minn., on the Sheyenne River at West Fargo, N. Dak., and at various locations on the Souris River in North Dakota.

In the Upper Mississippi Basin, near-record to record flooding occurred on tributaries in Minnesota and Iowa. Along the main stream from St. Paul to Winona, Minn., and at scattered points down to Davenport, Iowa, crest stages were the second

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highest of record, having been exceeded only by those of the 1965 flood.

In the Missouri Basin, record flooding occurred on some tributaries in Montana, the Dakotas, and Iowa. Flooding along the main stream of the Missouri River was confined to the reach from Nebraska City, Nebr., to the Mississippi River.

The weather conditions responsible for this outstanding flood were: (1) heavy September and October rainfalls, (2) an unusually cold and wet winter with a very heavy snowfall accumulation and very little intermittent melting, (3) the onset of warm, above-normal temperatures beginning in mid-March, and (4) above-normal April rainfall over much of the Upper Mississippi and Lower Missouri Basins.

Flood damage was estimated at $151 million, and nine deaths were reported. Accurate and timely forecasts by the Weather Bureau, plus Operation Foresight (appendix B), kept the death toll low and prevented damage amounting to at least $100 million, exclusive of the $97 million of potential damage avoided by existing flood-control projects.

FLOOD AREA AND BASIN DESCRIPTIONS

The flood area covered portions of three major river basins, namely: the Red River of the North, Upper Mississippi, and the Missouri Basins. It covered portions of 10 states: Montana, North Dakota, South Dakota, Minnesota, Wisconsin, Iowa, Nebraska, Kansas, Missouri, and Illinois.

The Red River of the North Basin, is adjacent to the Upper Mississippi Basin on the northwest. The river rises in west-central Minnesota only a short distance from the headwaters of the Minnesota River, a tributary of the Mississippi River. It flows northward about 400 miles to the Canadian border, forming the boundary between Minnesota and North Dakota, and is the largest northward-flowing river in the United States. Its drainage area in the United States is about 40,200 mi.^{2} including about 3,800 mi^2 of closed basins in North Dakota but excluding the area in North Dakota drained by the Souris River, which empties into the main stream well north of the Canadian border. Most of the basin was severely affected by the flood.

The Upper Mississippi River drains an area of about 188,000 mi.^{2} Most of the basin experienced flooding in March-April 1969.

The Missouri Basin comprises an area of about 529,400 mi.^{2} but less than 15 percent of it had severe flooding.

ANTECEDENT CONDITIONS

The 1968-69 winter (Dec.-Feb.) in the Central and North-Central States was one of the severest of record in terms of continued cold weather, persistent cloudiness, heavy snowfall, long duration of the snow cover, and high water equivalent of the snow cover. The unusual weather resulted from a general southward displacement from normal of the storm tracks across the area of interest. The reasons for the displacement and the effects on the general weather have been described in detail (Green 1969, Wagner 1969, Stark 1969). Weather highlights for selected stations are listed in table 3. The weather was well summarized as follows, by the Headquarters of the Weather Bureau's Central Region at Kansas City, Mo.

Hydrologically, the 1968-69 winter began in October when two to three times the normal precipitation occurred over eastern Kansas, eastern Nebraska, and most of Iowa and Minnesota. November was relatively dry, but the soil remained wet until freezeup. Heavy snows began about December 10 and were repeated two weeks later. Light to moderate snowfalls occurred at frequent intervals in December, January, February, and the first week of March. Once established, the snow blanket gradually increased so that extensive areas had a continuous cover for more than 90 days. Precipitation for the December-February period was well above normal over most of the area of interest.

The southward displacement of storms in the 1968-69 winter resulted in unusual cloudiness. Sunshine was about three-quarters of the average for winter, which was one reason for the below-normal temperatures over the area.

Temperatures for December and January averaged 5 to 10°F below normal, and showed little spatial variation. February averages were mostly near normal. The first half of March was characterized by temperatures 10 to 15°F below normal, which were below freezing over most of the area.

The surface layers of the atmosphere were more humid than usual, and the combination of cold, moist air and below-normal sunshine permitted little evaporation of the snow cover. It was estimated that in much of the area at least three-fourths of the winter precipitation was still on the ground in early March.

The situation was such as to indicate a potentially outstanding snowmelt flood even under normal melting conditions (Posey 1969).

Red River of the North Basin

Winter temperatures ranged 2 to 10°F below normal in December and January, but February temperatures averaged slightly over 3°F above normal (fig. 3). However, since the average normal February temperature for the basin is about 8°F, there was no melting from this warmer than normal weather. Average March temperatures (fig. 4) ranged between 12 and 18°F, or about 2 to 10°F below normal (fig. 5). Most of the basin had no melting degree-days (above 32°F) during the entire month, and no part of it had more than 10 melting degree-days, so there was no appreciable melting in March.

Winter (Dec.-Feb.) precipitation (figs. 6 and 7), practically all snow (fig. 9), was well above normal for each of the 3 months, reaching 300 percent in three scattered portions of the basin (fig. 8). March

was relatively dry, with precipitation averaging less than one-half inch (fig. 10), or less than 50 percent of normal (fig. 11). The precipitation, however, was mostly snow, which, added to the already unusually deep snow cover (fig. 13), further intensified the very serious flood potential. The water equivalent of the snow cover at mid-March averaged about 4 inches (fig. 14), and was about the same at the end of the month (fig. 15).

Upper Mississippi Basin

Average temperatures in December and January ranged from 2 to 6°F below normal (fig. 3). In February the temperatures ranged from near normal in the extreme southern portion of the basin to about 4°F above normal in the northern portion. Temperatures were warm enough in parts of Illinois, Iowa, and Missouri to cause some melting and, in some cases, temporary disappearance of the snow cover (figs. 12 and 13). What little melting did occur in February was gradual, and no flooding was reported anywhere in the basin.

March was a relatively cold month, with temperatures ranging from about 2 to over 8°F below normal (fig. 5). The low temperatures, however, were concentrated in the first half and the last few days of the month. The onset about mid-March of the first widespread, prolonged, warm spell (fig. 16) produced the first extensive, appreciable melting of the season. The resultant flooding is described in THE MARCH-APRIL FLOODS.

Precipitation was above normal over the entire basin in December and January, but mostly below normal in February (fig. 6). Wisconsin, eastern Minnesota, and western Illinois had less than 50 percent of normal this month, but averaged above normal for the 3-month period (fig. 8). March precipitation (fig. 10) was below normal over almost the entire basin (fig. 11), but much of it, especially in the first half of the month, was snow. In mid-March the water equivalent of the snow cover was near a maximum over most of the basin, ranging up to over 10 inches in southwestern Minnesota and eastern South Dakota (fig. 14).

Missouri Basin

December and January temperatures were well below normal over the entire basin, ranging from about 2°F below normal near the junction with the Mississippi River to more than 20°F below normal in Montana (fig. 3). February temperatures averaged near normal except for slightly below normal in Nebraska and northern Kansas, and more than 6°F below normal in Montana. Some melting occurred in the southern portion of the basin when daily average temperatures in the last week of February exceeded 32°F, and flooding was reported on some tributaries in Iowa and Kansas. The Nishnabotna River at Hamburg, Iowa, exceeded flood stage on February 25, and the Big Blue River at Blue Rapids, Kans., on February 26. The latter river reached its highest crest stage of the season on February 27 (table 1).

March temperatures (fig. 4) averaged 5 to 10°F below normal over the entire basin (fig. 5). Most of the abnormally cold weather, however, occurred in the first half and the last few days of the month. Rapid, widespread, prolonged warming in mid-March resulted in rapid melting and extensive flooding, as described in THE MARCH-APRIL FLOODS.

Precipitation was generally above normal in every month of the winter (fig. 6), and totaled from 4 to over 6 inches, or 300 to 400 percent of normal in the eastern Dakotas, southwestern Minnesota, and extreme northwestern Iowa (figs. 7 and 8). Most of this precipitation was in the form of snow (fig. 9). March precipitation was generally light, with totals of less than 1 inch, or 50 to 100 percent of normal, over most of the basin lying in the area of interest (figs. 10 and 11). However, precipitation was generally normal or slightly above normal in southwestern Minnesota, northwestern Iowa, southeastern South Dakota, northeastern Nebraska, and Kansas, with totals exceeding 2 inches in many places. The water equivalent of the snow cover on March 14 was unusually high, with amounts between 6 and 10 inches in tributary basins in northwestern Iowa, southwestern Minnesota, southeastern North Dakota, and eastern South Dakota (fig. 14).

THE MARCH-APRIL FLOODS

Red River of the North Basin

There was no flooding in the Red River of the North Basin in March. Normal daily average temperatures for March ranged from 20 to 25°F, and daily average temperatures for March 1969 (fig. 4) were 2 to 10°F below normal (fig. 5). Figures 16, 17, and 18 show that there were no melting degree-days over most of the basin in this month, and, consequently, very little melting. During the month the water equivalent of the snow cover at Fargo, N. Dak., diminished only 0.4 inch, from a high of 3.5 inches on March 1-15 to a low of 3.1 inches on March 31. Precipitation during this period totaled only 0.54 inch, much of which was in the form of snow, which amounted to 3.0 inches for the month. The maximum temperature at Fargo for the month was 37°F.

On April 1 snow depths over the basin ranged from one-half foot to about 3 feet (fig. 20), with an average water equivalent of about 4 inches for the

basin (fig. 15). April opened with a warming trend, and daily mean temperatures were well above 32°F by the end of the first week (fig. 19). Melting was well under way when a storm brought rain to the basin on April 7-9. Storm rainfall exceeded 2 inches in the extreme southern portion of the basin. The snow cover was rapidly depleted (fig. 20). For example, of the 32 inches of snow on the ground at McHenry, N. Dak., on April 3, only a trace remained on the 12th. By mid-April there was little measurable snow remaining on the basin.

Streams rose rapidly as a result of the combined snowmelt and rainfall runoff, and some exceeded flood stages beginning April 8 (table 1 and fig. 25). Some streams were above flood stage for a few days only, but continued rapid melting and additional rain maintained flooding on most streams into May, and at places on the Souris River into June. Crest stages were reached in April, however, with few exceptions. Record stages were established on the Sheyenne, Buffalo, Red Lake, and Souris Rivers (table 1). Crest stages on the Red River of the North did not set new records, but above Oslo, Minn., they were the highest since 1897 (table 1). Figure 31 compares the 1969 flood hydrograph for the Red River of the North at Grand Forks, N. Dak., with hydrographs of other major floods.

Upper Mississippi Basin

On March 1, snow depths over the basin ranged from zero at many places in the southern portion to over 50 inches in northern Iowa. The first half of March was unusually cold over most of the basin, but temperatures warmed up sufficiently about midmonth to produce melting (figs. 16, 17, and 32) and runoff. Streams in eastern and central Iowa and at scattered places in Minnesota, Wisconsin, Illinois, and Missouri rose above flood stages (table 1). Many of these streams crested in this month (fig. 1).

March flooding would have been much more severe but for two factors: (1) precipitation for the month (fig. 10) was below normal (fig. 11) over almost the entire basin, and (2) temperatures in the last week of the month dropped to record or near-record lows for this time of year in the northern and central portions of the basin (table 3 and figs. 18 and 32). These low temperatures caused freezing of the melt water from the mid-month warming, causing it to remain in the snow cover and temporarily slowed down or halted melt runoff. Numerous streams dropped below flood stage by the end of the month. On many streams in Iowa, the only flooding was in March, but other streams again rose above flood stage in early April with the advent of above-normal melting temperatures (Andrews 1969) and more than 1 inch of rain on April 4-5 (fig. 23). Some of the larger streams remained above flood stage through the late March cold spell and well into April. In some cases, flood stage persisted into May, as at various places on the Minnesota River, for example.

The stations where floods crested in April are shown in figure 1. Many streams crested in both March and April, with some streams dropping to below flood stage between crests (table 1). Most of the smaller streams began overflowing about the end of the first week in April, with crests occurring before midmonth. In central and western Minnesota rainfall of 1 to slightly over 2 inches during the period April 7-9 was an important factor in rapidly bringing the already swollen or overflowing streams to abnormally high flood crests between April 9 and 14. New record crest stages experienced on the Rum and Minnesota Rivers in Minnesota and on the West Fork Des Moines River in Iowa were reached by April 14 (table 1 and figs. 26 and 27). These were the only new record stages established in the Upper Mississippi Basin.

Streams in the lower part of the basin, south of the heavy snow cover, rose above flood stages as a result of several moderate to heavy April rains. The storms of April 1-6 and 13-19 produced rainfall maxima in Illinois, Iowa, and Missouri of 2 and 3 inches (figs. 23 and 24).

Most of the rain in the first storm fell on April 4-5, and in the second storm on April 14-18. There was some light rain between these two wet periods. A final storm on April 25-28 produced 2- to 3-inch rainfall maxima in Minnesota and Iowa. Most streams crested before this storm, but it served to extend recession of the streamflow well into May in many cases.

The main stream of the Mississippi River did not rise generally above flood stages until about April 10 (table 1 and figs. 28 and 29). Normal and above-normal April rains (fig. 22) totaled about 2 to 4 inches throughout most of the basin (fig. 21). The rains delayed return of streamflow to below flood stages into May (table 1 and figs. 28 and 29), but except for a few places along the lower main stream, crest stages were reached in April. Only at Hannibal, Mo., was the highest crest observed in May, and that was on May 1. The river crested at Alton, Ill., and at St. Louis, Mo., on May 2 and May 1, respectively, but these crest stages were secondary to the April crests.

The weather conditions associated with the flooding of the Mississippi River at Minneapolis, Minn., are summarized graphically in figure 32. The graphs show a rapid depletion of the snow cover during the period March 16-23, when insolation and temperature were above normal. During this period the water equivalent of the snow cover over the Upper Mississippi Basin was reduced generally by

anywhere from 2 to over 4 inches (figs. 14 and 15). An invasion of cold air dropped temperatures to below normal during the period March 24-31 (fig. 32), and melting was practically halted until April (fig. 18). A return to normal temperatures beginning April 1, with dew points above 32°F and an accumulation of 40 to over 80 melting degree-days in the first 8 days (fig. 19), rapidly depleted the snow cover (fig. 20), and very little of it remained at midmonth. For another example, 47-inch snow cover on March 16 at Swea City, Iowa, in the West Fork Des Moines Basin, had been reduced to 22 inches on the 27th in spite of a 5-inch snowfall on March 19-20. Melting practically ceased until April 1, when it resumed and by April 7 eliminated the remaining 19-inch snow cover.

Crest stages on the Mississippi River from St. Paul to Winona, Minn., and at several places as far downstream as Davenport, Iowa, were the second highest of record, exceeded only by the 1965 flood (table 1). If the March-April 1969 precipitation over the basin had been as much as that of March-April 1965, which averaged about 200 percent of normal, there is little doubt but that the 1969 flood would have set many more new record crest stages than it did.

Missouri Basin

March flooding in this basin was restricted to the Yellowstone River in Montana and to some streams in Iowa, Nebraska, Kansas, and Missouri (table 1 and fig. 1). For example, the Nishnabotna River in Iowa, Buffalo Creek in Kansas, and the Big Blue River at Blue Rapids, Kans., rose above flood stages on February 25-26. This flooding was produced mostly by the melting of a heavy snowfall on February 14-15, and a lighter one on February 20-21. These two snowfalls extended the heavy snow cover southward well into Kansas (figs. 12 and 13). Melting temperatures following the second snowfall caused these streams to overflow, but flooding lasted a few days only. Except for Buffalo Creek, flood stages were again exceeded in mid-March. Flooding on the Loup River at Columbus, Nebr., on March 19-20, was caused primarily by ice jams. The Wood River in Nebraska was also in flood at the same time.

March temperatures (fig. 4) in this basin, as in the Upper Mississippi, were anywhere from 2 to 10°F below normal (fig. 5), most of the cold weather being concentrated in the first half of the month and in the last few days, when some record low temperatures for that time of year were established (table 3). In between these two cold periods, temperatures rose well above normal, and there were enough melting degree-days in Iowa and Nebraska (figs. 16, 17, and 18) to cause considerable melting. At Lake Park, Iowa, in the Little Sioux River Basin, for example, the snow cover of 45 inches on March 14 was reduced to 30 inches by March 19, when low temperatures set in again. At the end of the month, the snow cover was 14 inches. Similarly, at Sioux City, Iowa, of the 4.1-inch water equivalent of the snow cover on March 16, only a trace remained on March 28, in spite of a 2-inch snowfall with a 0.7-inch water equivalent on March 19-20. A similar situation prevailed in Nebraska.

Farther north, however, temperatures were lower, and there was less melting. A snowstorm on March 18-19, which deposited as much as 6 inches of wet snow in central and east central South Dakota and up to 9 inches in southwestern Minnesota, replenished much of the melt water previously lost. At many places in these areas, the water equivalent of the snow cover on March 28 (fig. 15) showed little depletion from that on March 14 (fig. 14).

In the southern part of the basin there was very little snow on the ground, even at the beginning of March (fig. 13). A general 2- to 6-inch snowfall in Missouri on March 7-9 provided about the only March melt-water potential in that state. While Kansas was almost bare of snow on March 1 (fig. 13), it did get considerable snow in the period March 2-8, with totals amounting to over 12 inches in the western and central parts, and the southwestern part received an additional foot or so on March 14-15. March snowfall throughout most of Kansas was well above average for the month. The snow melted rapidly, however, and there was practically no snow left on the ground by March 17 except in the southwestern part (fig. 13).

The only flooding on the lower Yellowstone River resulted from ice jamming and lasted only one day, but a new record crest stage was established at Glendive, Mont., on March 20 (table 1).

On April 1, the only appreciable general snow cover remaining in the basin excluding the Rockies was in northeastern Montana, the Dakotas, Minnesota, and northwestern Iowa (fig. 20). In these areas there had been relatively little depletion of the snow cover in March, and the water equivalent values at the end of the month (fig. 15) were only slightly less than those at midmonth (fig. 14), when they were at near maximum for the season. For example, there was still 4 to 7 inches of water equivalent in the James River Basin in the Dakotas and in the Vermillion River Basin in South Dakota, and 5 to 8 inches in the Big Sioux River Basin in South Dakota.

April was a warmer than normal month, and precipitation (fig. 21) was above normal in the upper and lower portions of the basin, but precipitation in the central portion was somewhat below normal (fig. 22). The April 1 snow cover (fig. 20) melted rapidly

(fig. 19), and by April 9 little snow remained except in the headwater areas in the Rockies, central and northwestern North Dakota, and the Black Hills of South Dakota (fig. 20).

Several wet spells during April contributed additional runoff. During the period April 1-6, 3-inch rainfalls were reported in southeastern Nebraska and northern Missouri (fig. 23). A widespread storm brought 3-inch rains to eastern Nebraska, western Iowa, and to various places in Kansas and northern Missouri during the period April 13-19 (fig. 24). The last wet spell of the month, April 25-28, deposited as much as 3 to 4 inches of precipitation over eastern Montana, eastern Wyoming, western South Dakota, southwestern Iowa, eastern Kansas, and northwestern Missouri. In the northern part of the basin much of this precipitation was in the form of snow. One to over 2 feet of snow fell at various places in eastern Montana, eastern Wyoming, and western South Dakota. This late snowfall melted rapidly, and very little remained on the ground at the end of the month. For example, the fresh 29-inch snow cover on April 27 at Alva, Wyo., in Belle Fourche Basin, had dwindled to 5 inches on April 30.

The April melting was rapid, and most of the tributaries rose above flood stage by the end of the first week of the month or shortly thereafter (table 1 and fig. 30). River stages at numerous places were heightened by ice jams. New record stages were established on the Pipestem River in North Dakota, the James River in the Dakotas, and the Little Rock, Rock, and Big Sioux Rivers in Iowa (table 1). The crest measurements of April 9-10 on the Big Sioux River exceeded their previous record stages all the way down to Akron, Iowa. About 80,000 to 100,000 acres were inundated. North Sioux City and Renner, S. Dak., had to be totally evacuated, while partial evacuation was required at Baltic and Dell Rapids, S. Dak. Only minor flooding occurred on the Missouri River, and this did not generally persist for more than 1 or 2 days. All tributaries and the main stream had receded to below flood stage by May 2.

FLOOD DAMAGE AND SAVINGS

The March-April 1969 floods in the three basins caused property damage estimated at $151 million (table 4) and at least nine deaths. Damage was about $29 million less than in the 1965 floods (Paulhus and Nelson 1967). At least 25,000 persons were evacuated from their homes. Estimates of the homeless as a result of the floods included 15,000 in North Dakota; 4,000 in South Dakota; 3,100 in Minnesota; 950 in Illinois; 900 in Iowa; and 800 in Wisconsin.

Advance planning through Operation Foresight (appendix B) and accurate forecasting averted outright disaster in many localities. It was estimated that at least $100 million in damage was avoided (table 4). This estimate does not include an additional $97 million in damage prevented by existing flood-control projects. The above estimates of damage sustained and savings effected by accurate forecasts and Operation Foresight are appreciably less than the preliminary estimates made as the floods subsided (American Society of Civil Engineers 1969, and Nelson 1969). The cost to the Federal government for implementing Operation Foresight was approximately $13.9 million, or about 14 percent of the estimated savings effected.

The U.S. Army Corps of Engineers, chief flood-control agency of the Federal government, provided assistance in construction and reinforcement of levees. The funds expended for this were estimated to be about one-fourth the amount that would have been required if Operation Foresight had not been in effect. The Corps placed 1,000 technical experts or engineers in critical areas, provided 10 million sandbags, built more than 200 miles of emergency dikes, and approved construction contracts in some 400 communities. An additional force of 2,100 servicemen and National Guardsmen fought the floods shoulder to shoulder with townspeople. Over 5 million bushels of grain were moved out of the flood zones under supervision of the Interstate Commerce Commission. All these operations prevented millions of dollars in additional property loss (Nelson 1969).

The lot of the homeless was made somewhat easier and possible sickness averted by the American Red Cross, which served them and the workers some 250,000 meals.

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R.F. Evans, Special Studies Branch, Office of Hydrology, compiled and plotted data for some of the precipitation and temperature maps, and made preliminary analyses of these maps.

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Paulhus, J. L. H., and Nelson, E. R., "The March-May 1965 Floods in the Upper Mississippi, Missouri, and Red River of the North Basins," *ESSA Technical Report* WB-4, August 1967, 100 pp.

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APPENDIX A

Flood data. Data on flood and crest stages (table 1 and figs. 1 and 2) and dates of flooding were obtained from the Weather Bureau River District Offices at the following cities:

Moline, Ill.
Des Moines, Iowa
Sioux City, Iowa
Topeka, Kans.
Minneapolis, Minn.
Kansas City, Mo.
St. Louis, Mo.
Billings, Mont.
Helena, Mont.
Norfolk, Nebr.
Omaha, Nebr.
Bismarck, N. Dak.
Fargo, N. Dak.

Other agencies, notably the U.S. Army Corps of Engineers and the U.S. Geological Survey, were involved in collecting these data. Estimates of flood damages sustained and damages averted by Operation Foresight and existing flood-control projects were provided by the Corps.

Precipitation. The maps of figure 6 are copies of the maps published by the Environmental Data Service in its *Climatological Data National Summary.* These maps are based on selected stations only. The isopleths on the maps of figures 7, 8, 10, 11, 21, 22, 23, and 24 are based on data for all precipitation stations (figs. 33-45) published in the monthly *Local Climatological Data.*

Snow depth (snow on ground). The weekly snow-cover maps of figures 12 and 13 are copies of those issued jointly by the Environmental Data Service, U.S. Department of Commerce, and Statistical Reporting Service, U.S. Department of Agriculture, in the *Weekly Weather and Crop Bulletin.* These maps are based on selected stations only. The snow-depth map of figure 20 is based on all stations for which snow-on-ground data are published in the

monthly *Local Climatological Data.* Additional snow-depth data are listed in appendix C, which also explains how they were obtained.

Snowfall. The monthly snowfall maps of figure 9 are copies of the maps published by the Environmental Data Service in its monthly *Climatological Data National Summary.* These maps are based on selected stations only.

Temperature. The monthly temperature maps of figure 3 are copies of those published by Environmental Data Service in its monthly *Climatological Data National Summary*, and are based on selected stations only. The March temperature maps of figures 4 and 5 and the degree-day maps of figures 17, 18, and 19 are based on monthly and daily data for all temperature stations (figs. 33-45) published in the monthly *Local Climatological Data.*

Water equivalent. The water-equivalent maps of figures 14 and 15 are copies of maps prepared by the Weather Bureau River Forecast Center at Kansas City, Mo., chiefly on the basis of data presented in appendix C. These basic data, plus additional snow-depth and water-equivalent data, were obtained from observations made at official Weather Bureau stations and by field surveys conducted cooperatively by the Weather Bureau, Corps of Engineers, and Bureau of Reclamation. The data were compiled and edited through the facilities of the Regional Hydrologist, Weather Bureau Central Region, Kansas City, Mo., and the River District Office at Fargo, N. Dak. The locations of many of the snow-survey sites may be determined from the climatological station maps of figures 33-45.

APPENDIX B

Source—Chapter II, "ESSA and Operation Foresight," ESSA/PI690030, May 1969

In a White House press release on March 1, 1969, President Nixon expressed his concern about the spring flood threat and ordered a major effort by Federal agencies to undertake all feasible preparations to reduce or alleviate the flood damage and suffering. He instructed George A. Lincoln, Director of the Office of Emergency Preparedness, to coordinate an extraordinary Federal planning and operational effort to supplement State and local resources. In a letter dated March 1, 1969 Mr. Lincoln urged the Corps of Engineers to aggressively utilize available authorities under Public Law 99, 84th Congress, to meet the serious and imminent flood threat. These actions, resulting from the early warning of the flood potential by the ESSA Weather Bureau made possible preparedness activities on a scale never before attempted for anticipated flooding.

PL-99 funds had not been used in this way in the past. Liberalization permitted extensive preflood actions by the Corps of Engineers and improved the outlook for avoiding much of the damages that have occurred with similar flooding in past years. PL-99 funds were made available to protect public areas where local finances were inadequate. Aid was in the form of levee contracts, sandbags, polyethylene film, pumps, and lumber. Technical assistance was given to survey potential trouble spots and supervise contracts. To qualify for the use of PL-99 funds in this way, a community had to demonstrate that it had a feasible protection plan and could furnish the necessary right-of-ways and labor for the construction of levees.

The President's directive initiating *Operation Foresight* was greeted with enthusiasm and action at the State and local levels throughout the threatened areas. Actions taken by Federal, State, and local agencies in the areas concerned were extensive. A few of these actions are enumerated to illustrate the cooperation that was developed and the preparations that were possible:

Corps of Engineers—The majority of the organizational effort and work of preparing for the flood and instituting preventive measures fell to the Corps. With the release of more than $16 million of PL-99 funds, the Corps had the task of organizing State and local officials to get contracts underway and protective measures completed before the flooding occurred. The Corps carried out reconnaissance of rivers and streams to identify obstructions to free flow. It staffed information centers to expedite handling of very heavy volumes of requests for information and on-site technical assistance. Communications nets were strengthened with additional equipment, and a large number of engineers was transferred from other sections of the country to assist.

Office of Emergency Preparedness—The Denver and Battle Creek regions of the Office of Emergency Preparedness held numerous meetings jointly with other agencies, such as the American Red Cross, the Corps of Engineers, and ESSA Weather Bureau, to discuss emergency preparedness measures that could and should be taken to prepare for the potential flood threat.

American Red Cross—The ARC announced its plans for dealing with the flood emergency on March 11 and initiated many planning meetings with its

State and local representatives to discuss means for handling its responsibilities during and after the flooding. The Red Cross' primary concern was in caring for people evacuated from their homes.

Department of Transportation—The *Coast Guard* made plans for, and subsequently provided, boats and helicopters for the evacuation of flood victims from unprotected areas. The *Federal Aviation Administration* made plans to protect vital communications and air navigation aids.

The Department of Agriculture—USDA advised farmers to take necessary pre-emergency actions to minimize losses of livestock, machinery, and stored crops due to flooding. It also made plans to provide inspectors to supervise post-flood cleanup operations where food was concerned, such as grocery stores, restaurants, and food

State Actions—A number of States declared emergencies so that all State resources could be brought to bear in assisting local communities with their problems. County plans were prepared for providing essential public services during the emergencies. Numerous flood planning meetings were held at the local level, usually with the participation of Federal agencies such as the Weather Bureau and the Corps of Engineers. State National Guards committed heavy equipment for levee work, and Guard personnel were committed to emergency evacuation of personnel, security patrols of flooded areas, and manning of control points. State Highway Commissions made trucks available for evacuation of property and levee construction.

Local Actions—The activities at the local level are too numerous to mention. There were few cases noted in which public apathy, disbelief in the forecasts, or failure to take positive action allowed flooding that could and should have been avoided. On the positive side, local Civil Defense officials developed flood protection manuals and plans outlining how the community was to deal with the situation and established emergency operating centers as focal points for coordinating all actions within the community. Plans previously developed for other emergencies, such as nuclear attacks and tornadoes, facilitated action in the flood threat. The construction industry, through local Associated General Contractor chapters, acted in an advisory capacity based on their operation of Plan Bulldozer to provide sources of men, materials and equipment. Emergency plans had to be developed for levee construction or for raising existing levees where crests were expected to be above the level of permanent protection. Frequently, this involved local bond issues (and elections) to permit the community to obtain the right-of-way for the levee, a pre-requisite to receiving PL-99 assistance. Plans were made for obtaining labor (volunteer and paid) for levee construction and security patrols for levees once constructed. Plans also were made for providing essential care for those people forced to move from their homes. In many cases, typhoid innoculations were given to small children as a precautionary measure. Community planning and community action to deal with the flood emergency were unprecedented. Colonel George Orr, Civil Defense Director in Iowa, and State and county Civil Defense directors in the other affected States all stressed that the long leadtime of the warnings made it possible to organize and coordinate the activities of the many political jurisdictions involved in flood prevention.

In summary, *Operation Foresight* was a remarkable success and an outstanding example of the benefits to be derived from good warnings of natural disasters, effective organization, and cooperative efforts of Federal, State, and local authorities.

APPENDIX C

Data in tables 1 through 12 were obtained from field surveys at about 1500 locations in those states affected by the 1969 snowmelt floods, and supplement those published in *Local Climatological Data.* Collection of these data was a coordinated effort by the Weather Bureau; the U.S. Army Corps of Engineers; Bureau of Reclamation, U.S. Department of Interior; and private power companies. No attempt was made to identify specific observations with individuals or organizations. The data were assembled and edited by Keith Blessum, Hydrologic Specialist at the River District Office, Fargo, N. Dak., working under the general supervision of the Regional Hydrologist, Weather Bureau Central Region, Kansas City, Mo.

Observation points are listed alphabetically by states and municipalities, with further identification, when outside city or town limits, by airline distance in miles and direction. The abbreviations, SOG and WE, indicate depth of snow on ground and water equivalent in inches, respectively. In most cases the water-equivalent value given is the average of a series of core samples cut in the immediate vicinity of the point indicated. Samples were weighed and converted to inches of water equivalent. The majority of core samples were cut with 8-inch tubes and cutters, but some samples were taken with 4- and 6-inch tubes.

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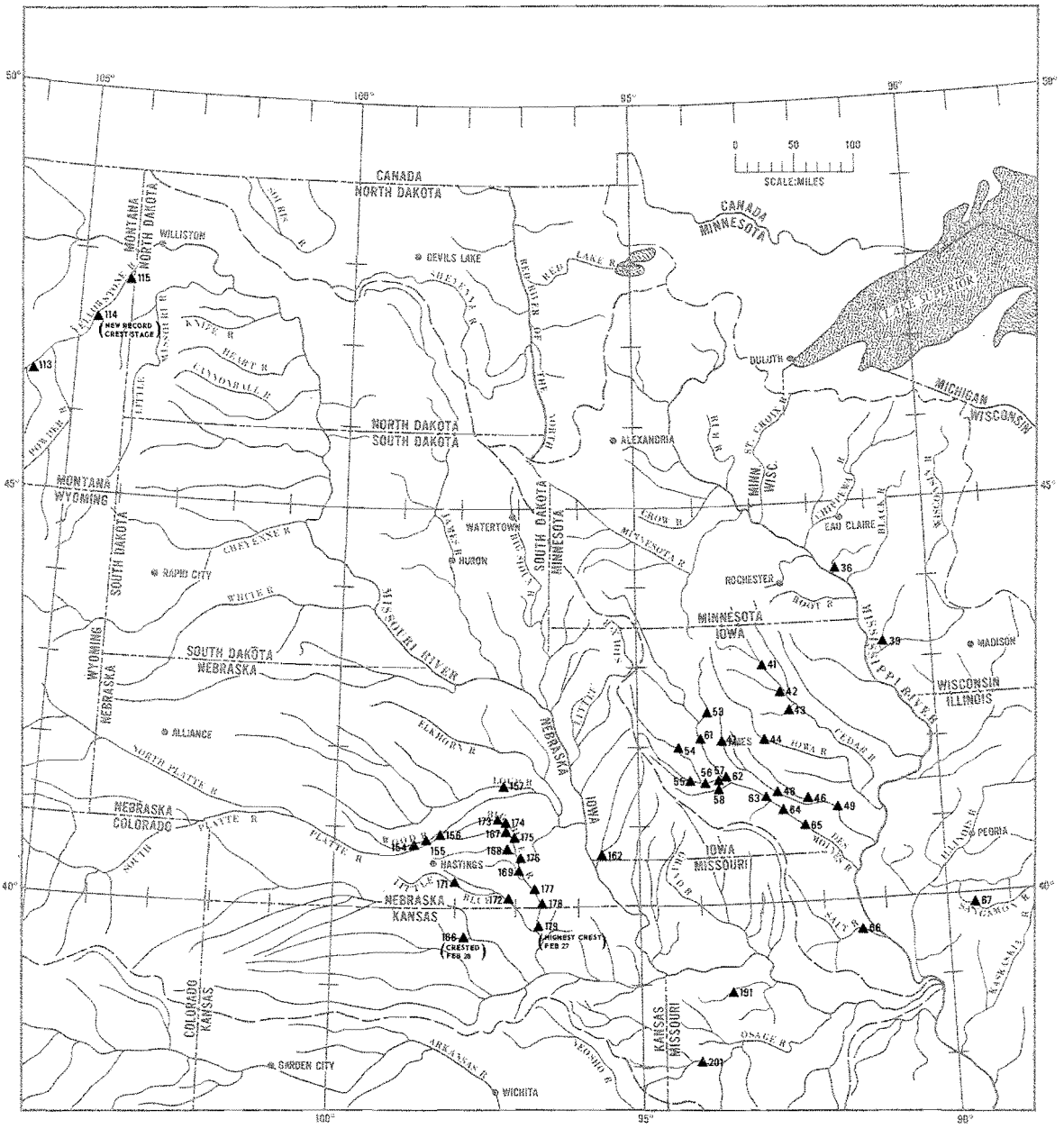

FIGURE 1.—River stations where flood crested in March (index numbers are identified in table 1).

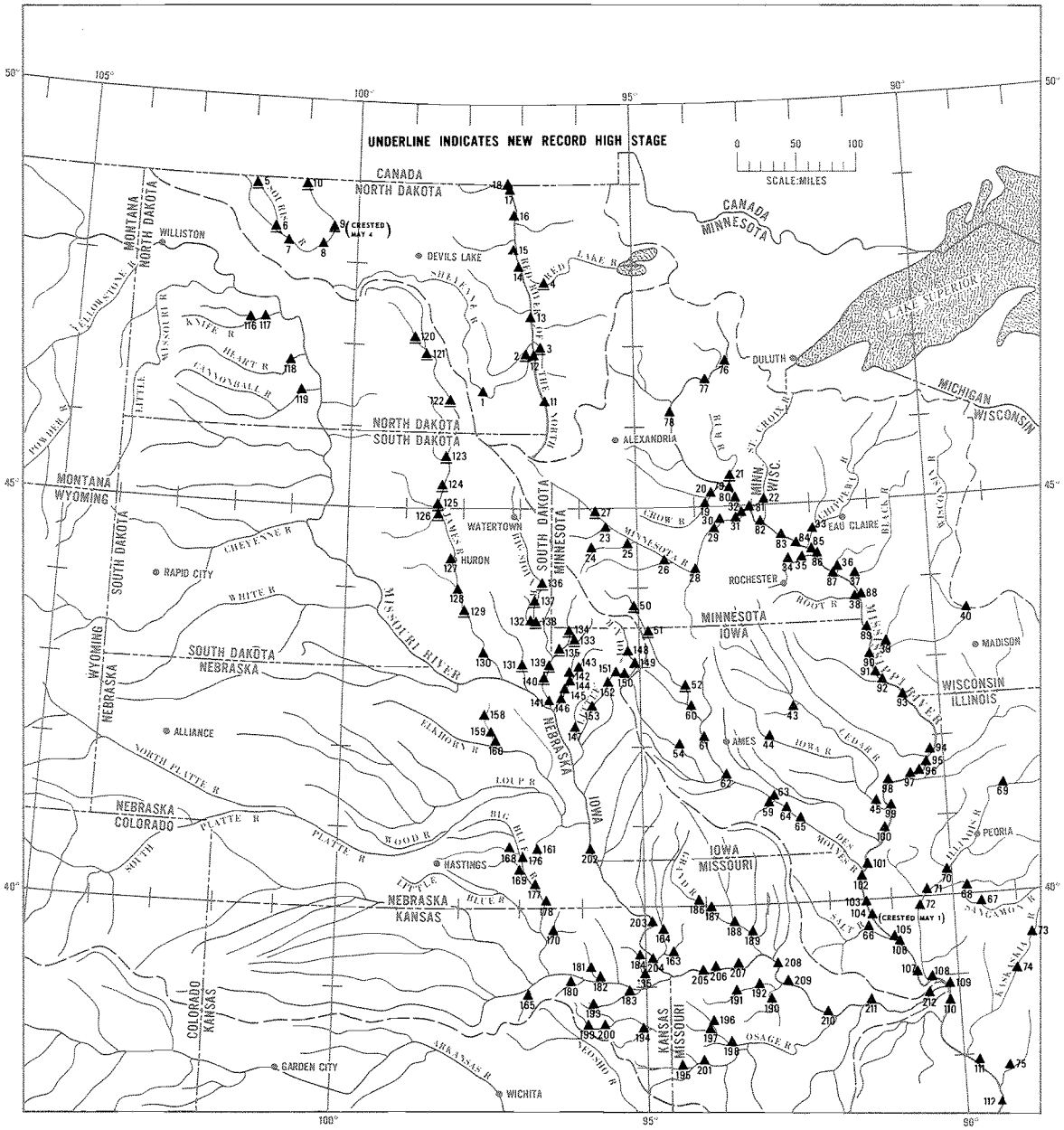

FIGURE 2. – River stations where flood crested in April (index numbers are identified in table 1).

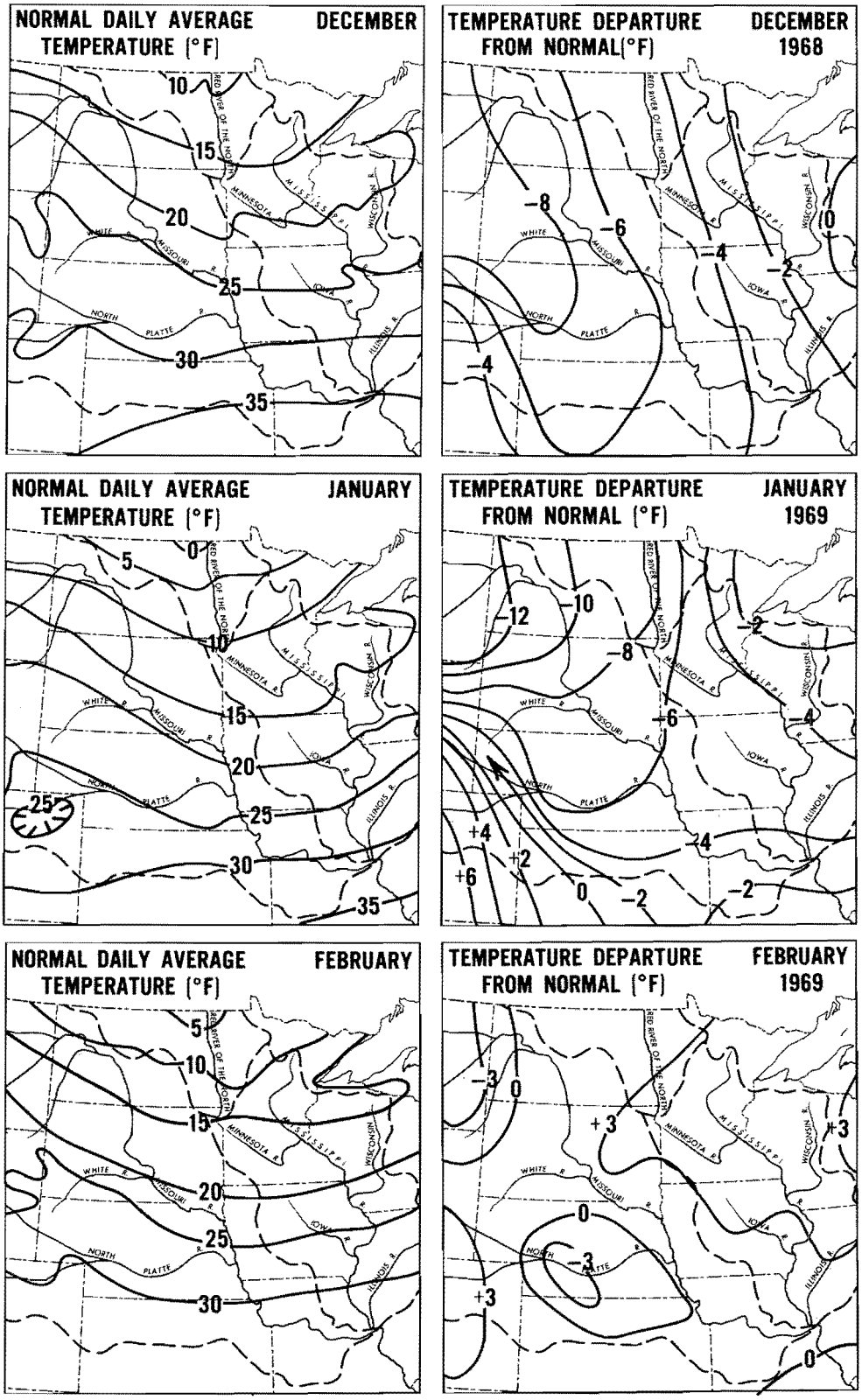

FIGURE 3. — Normal daily average temperature (°F) and departure from normal (°F), December 1968, January and February 1969.

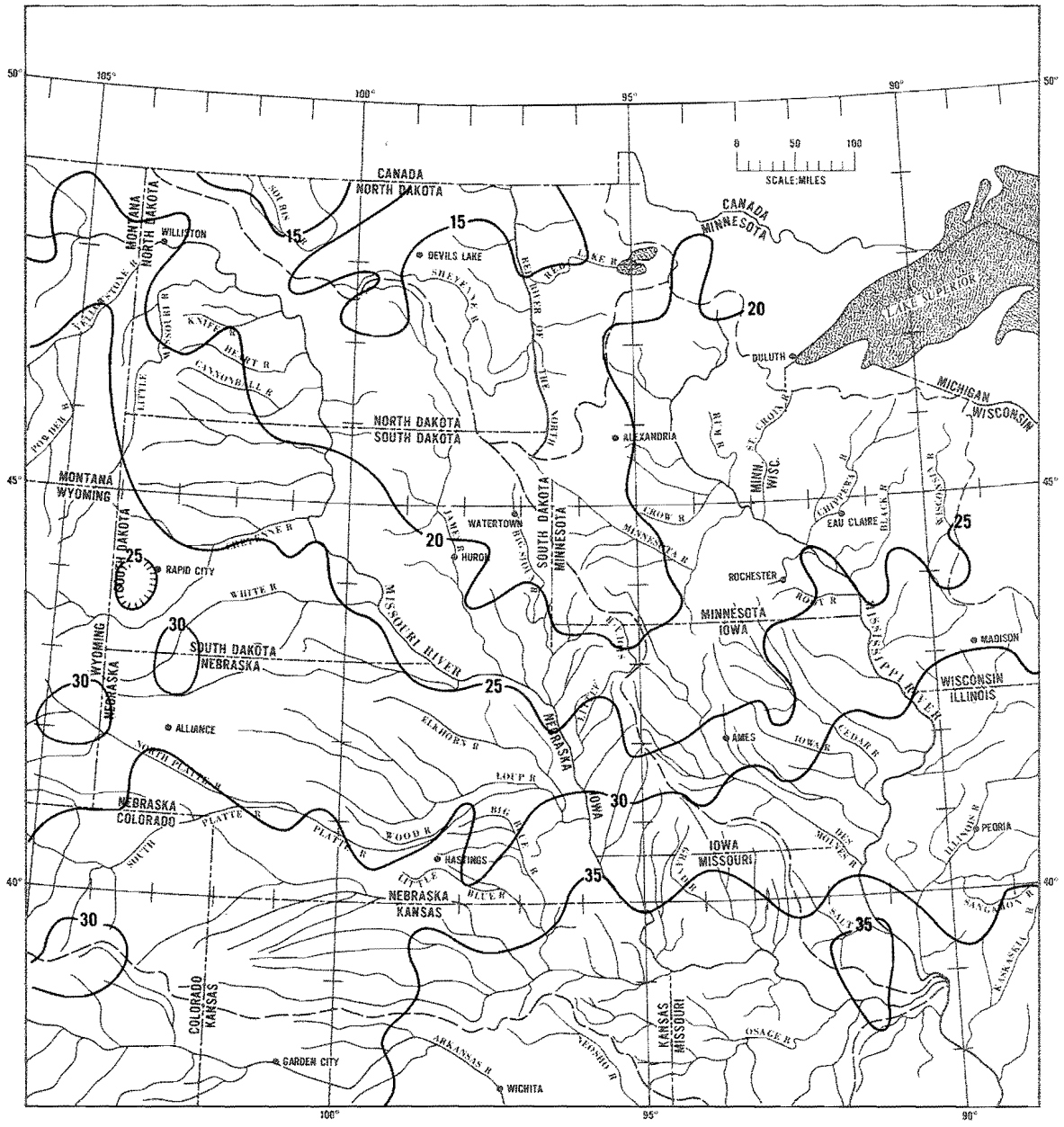

FIGURE 4.—Average daily temperature (°F), March 1969.

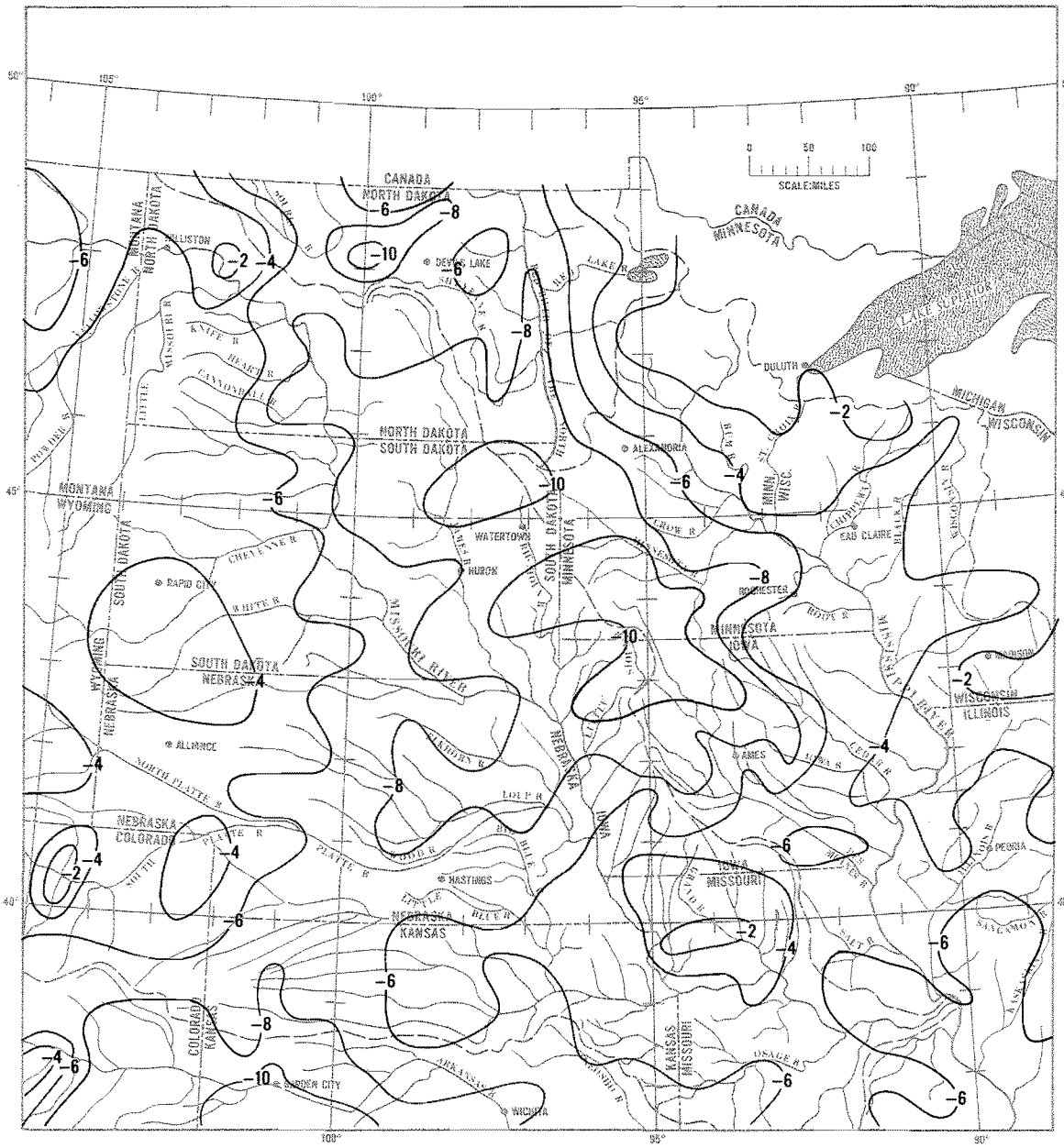

FIGURE 5.—Mean daily temperature departure from normal (°F), March 1969.

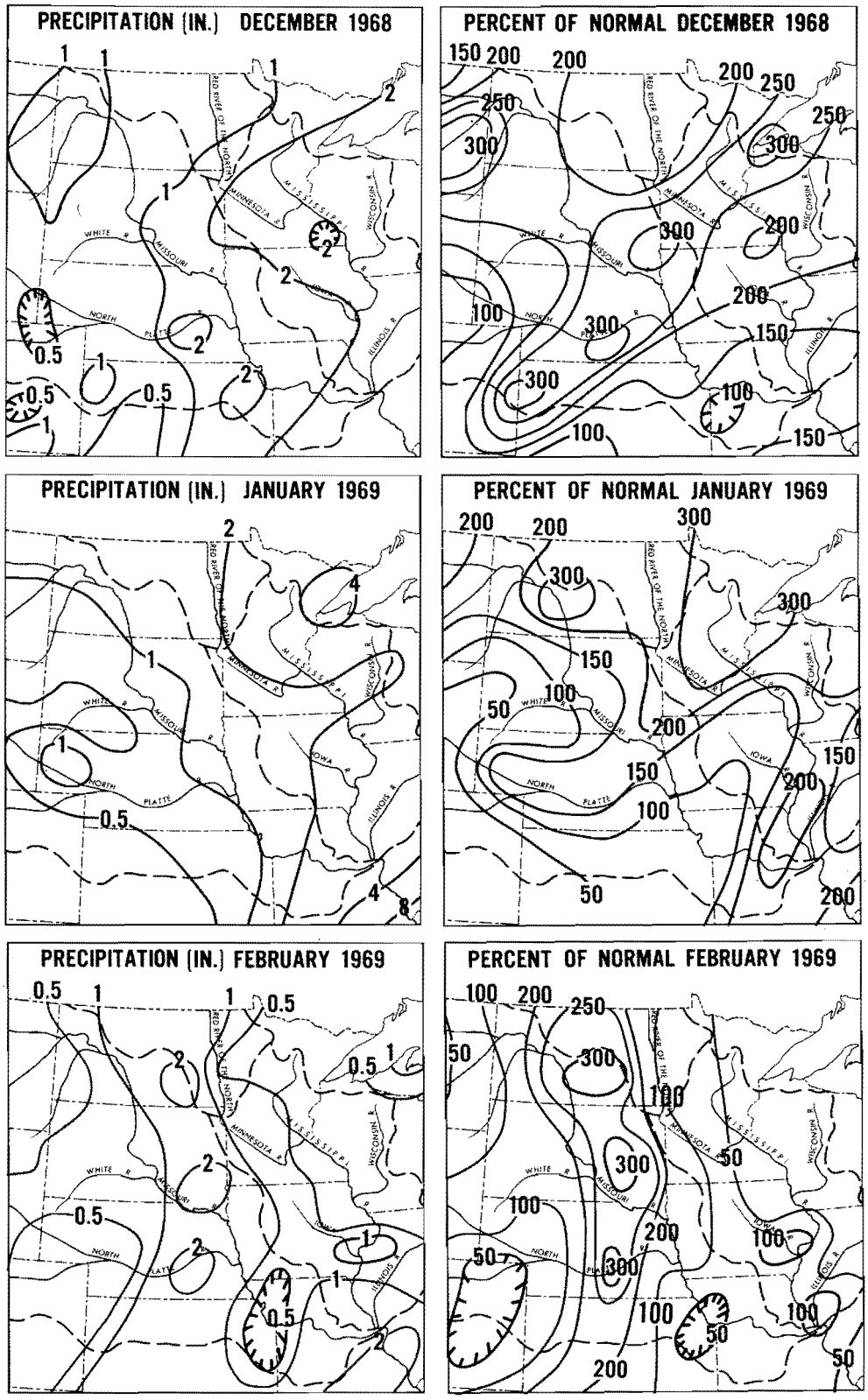

FIGURE 6. – Total monthly precipitation (in.) and percent of normal, December 1968, January and February 1969.

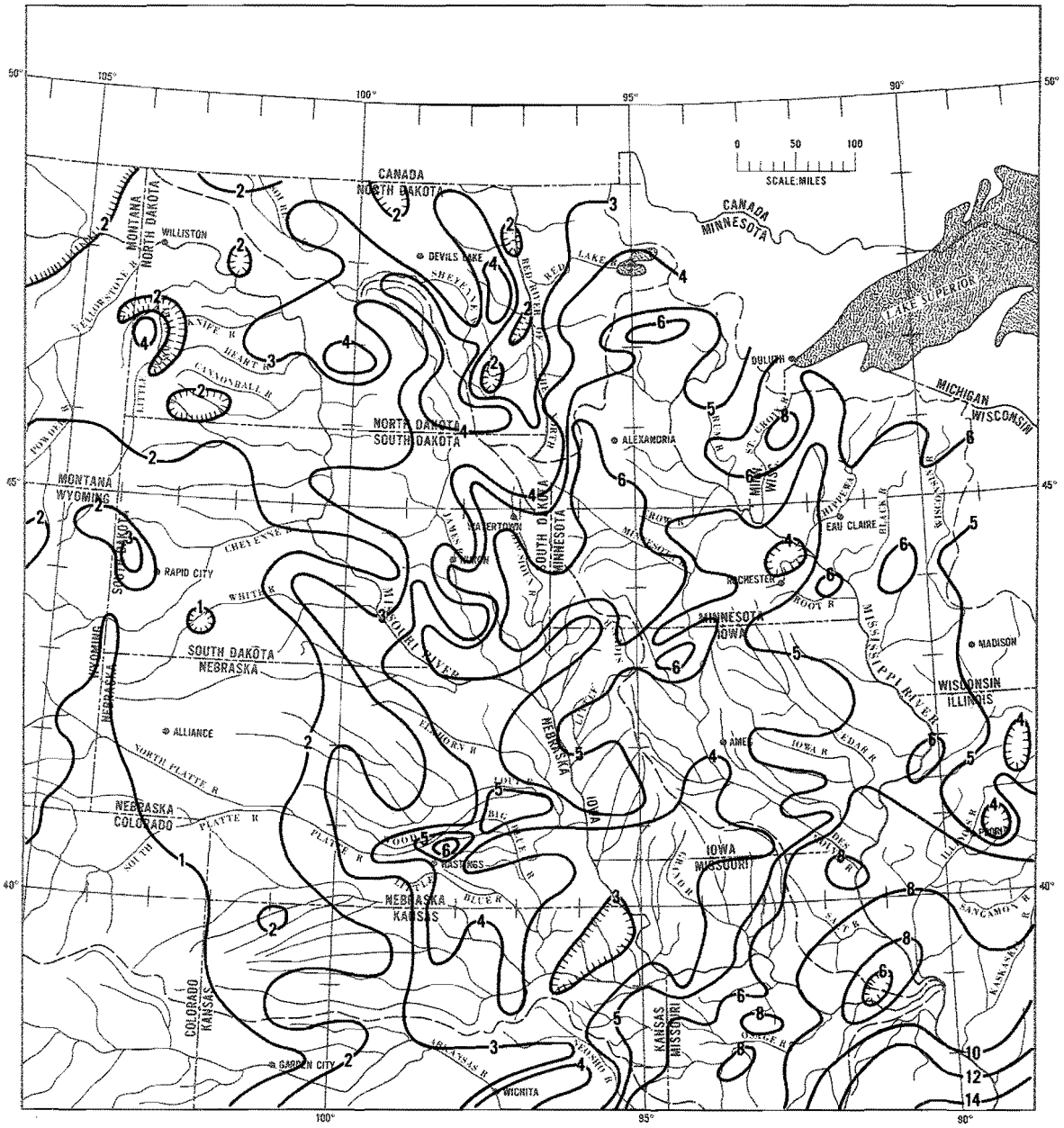

FIGURE 7.—Total winter precipitation (in.), December 1968, January and February 1969.

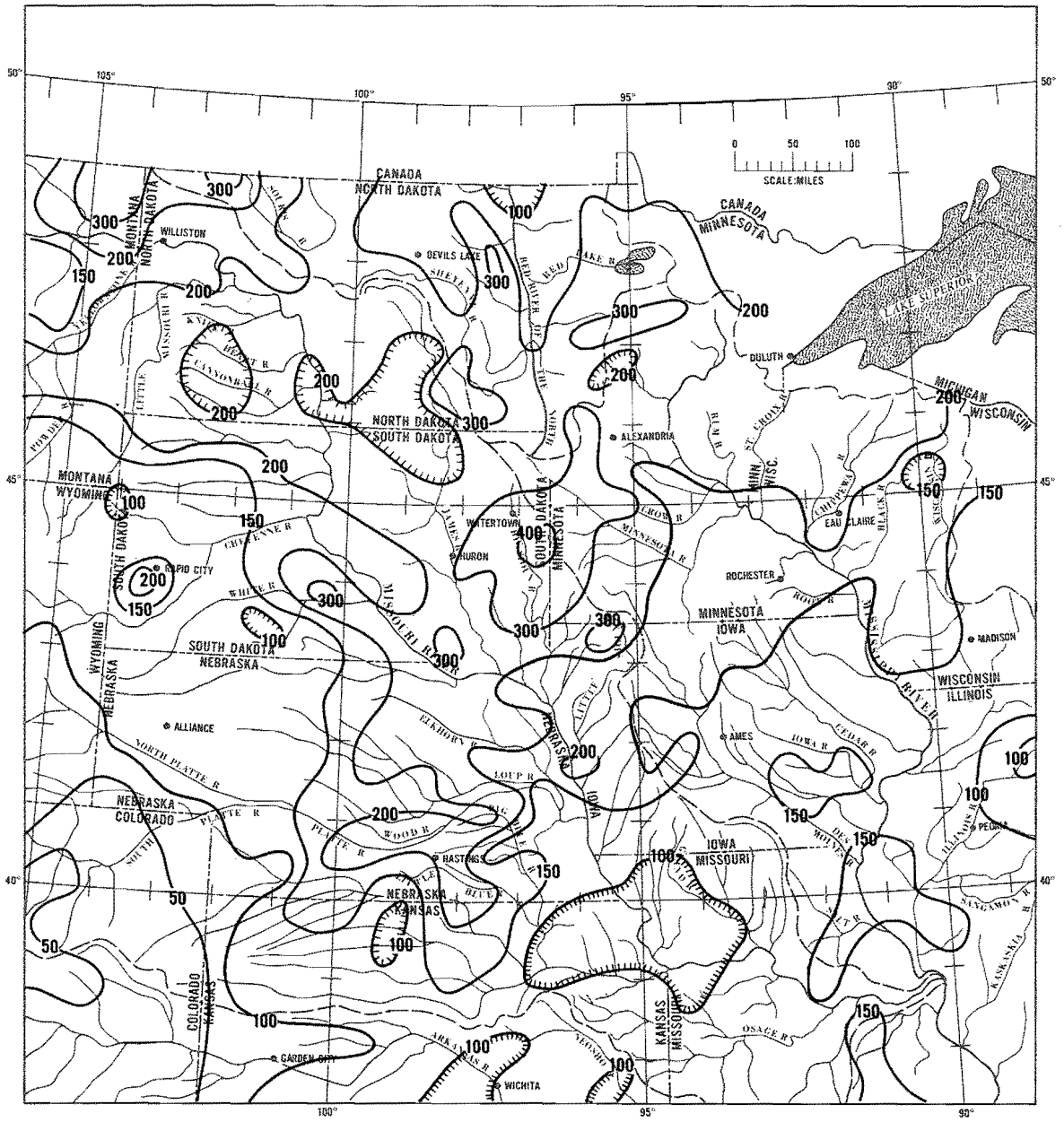

FIGURE 8.—Percent of normal winter precipitation, December 1968, January and February 1969.

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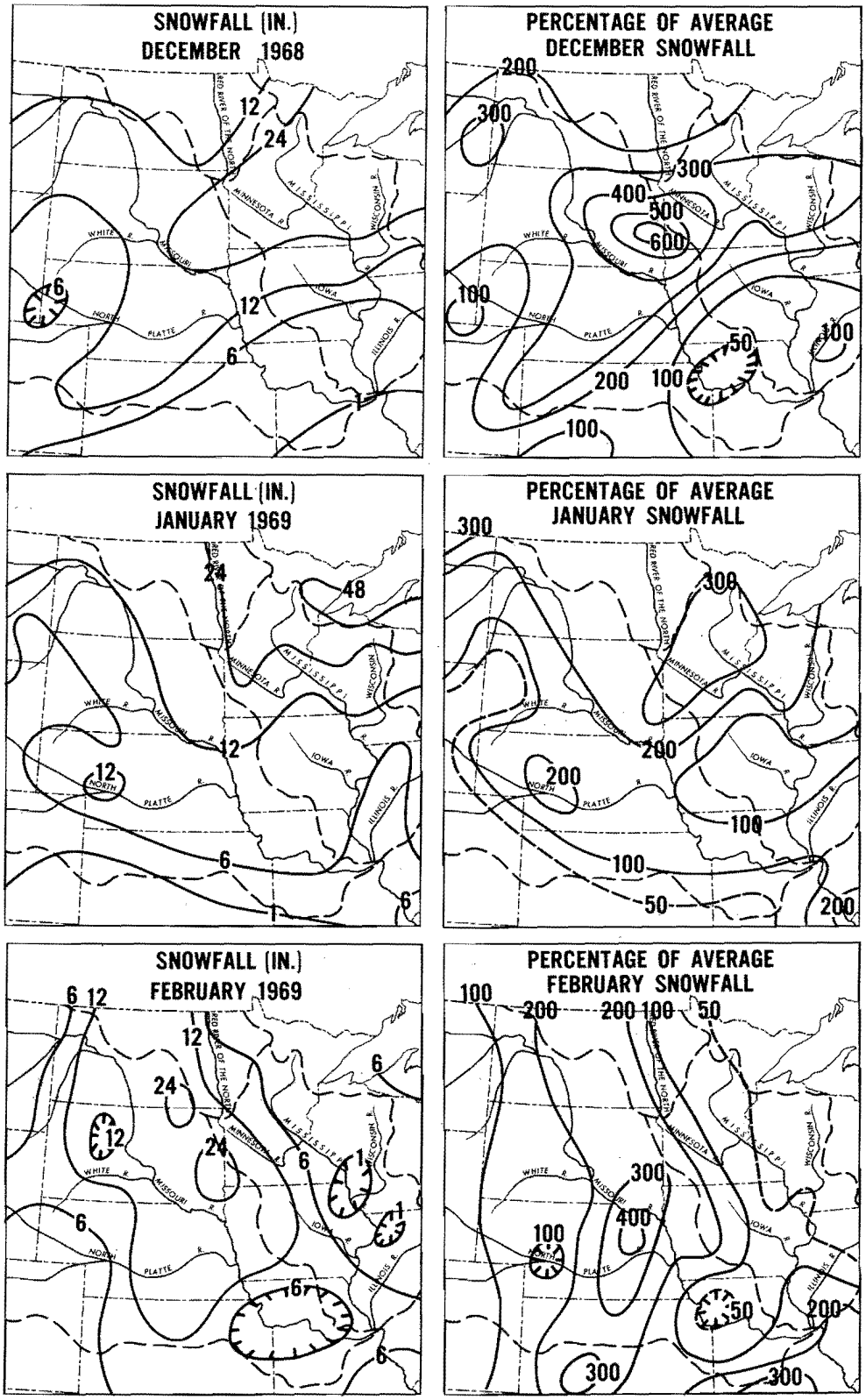

FIGURE 9.—Total monthly snowfall (in.) and percent of average, December 1968, January and February 1969.

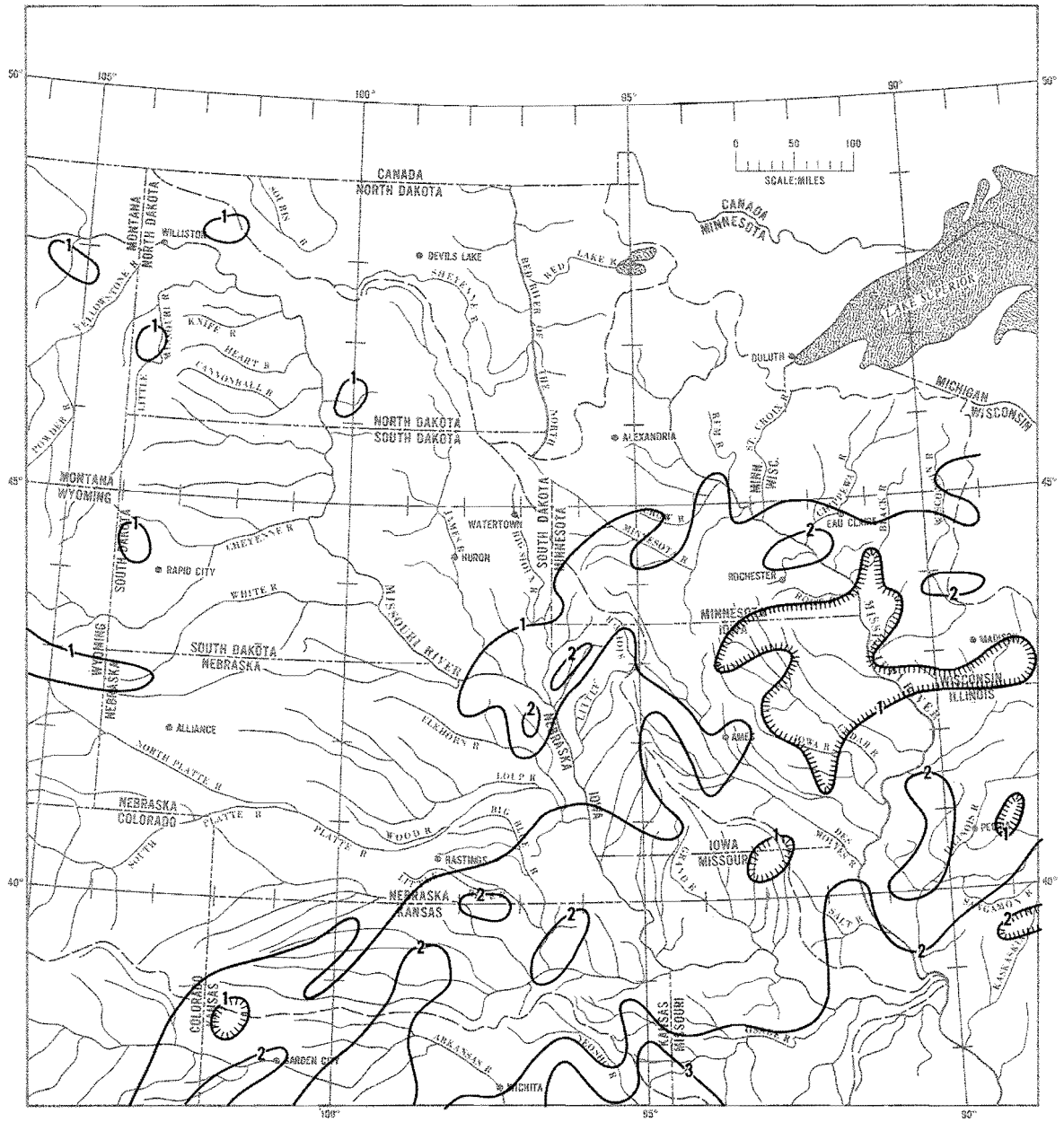

FIGURE 10. — Total monthly precipitation, (in.) March 1969.

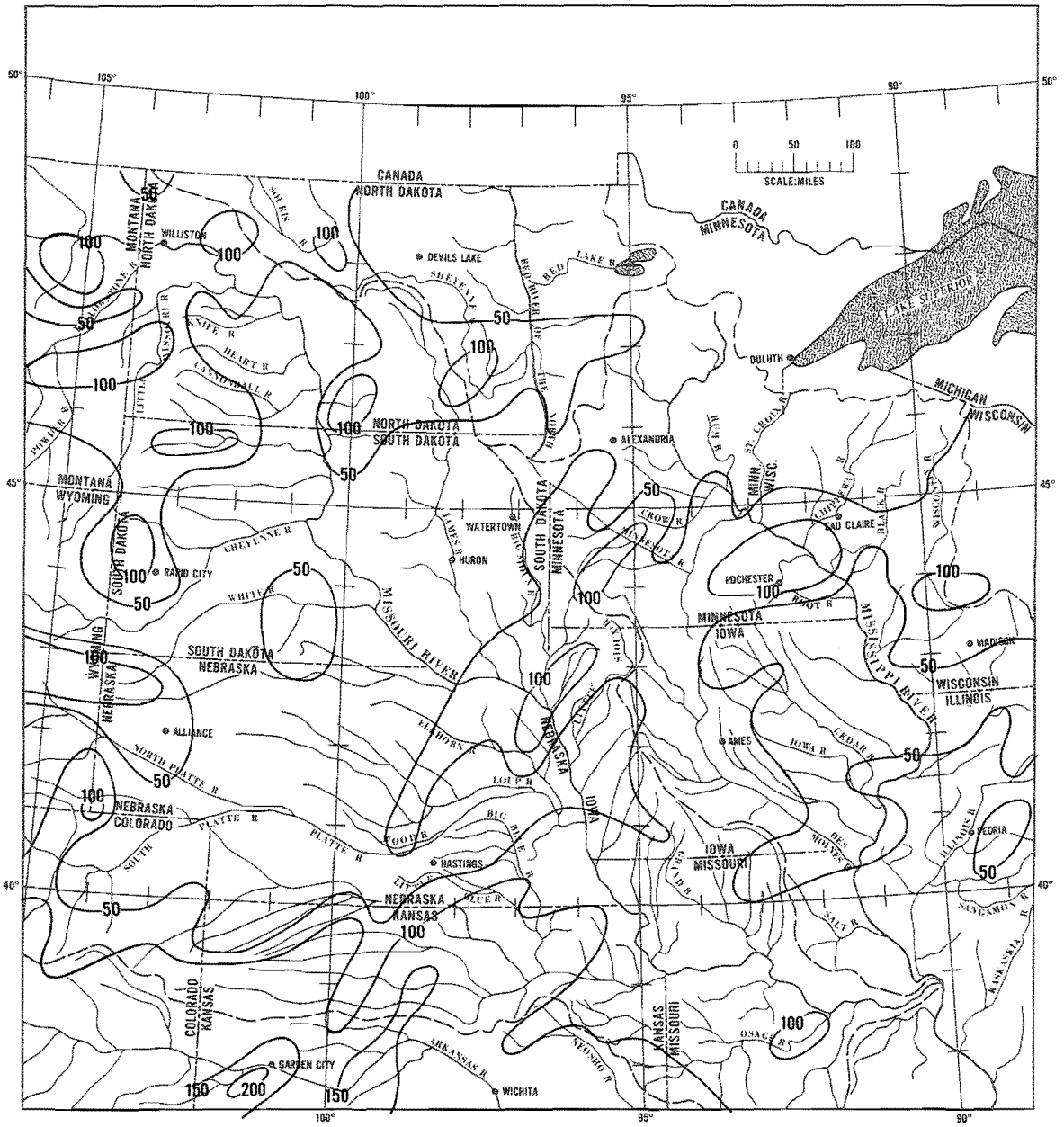

FIGURE 11.—Percent of normal precipitation, March 1969.

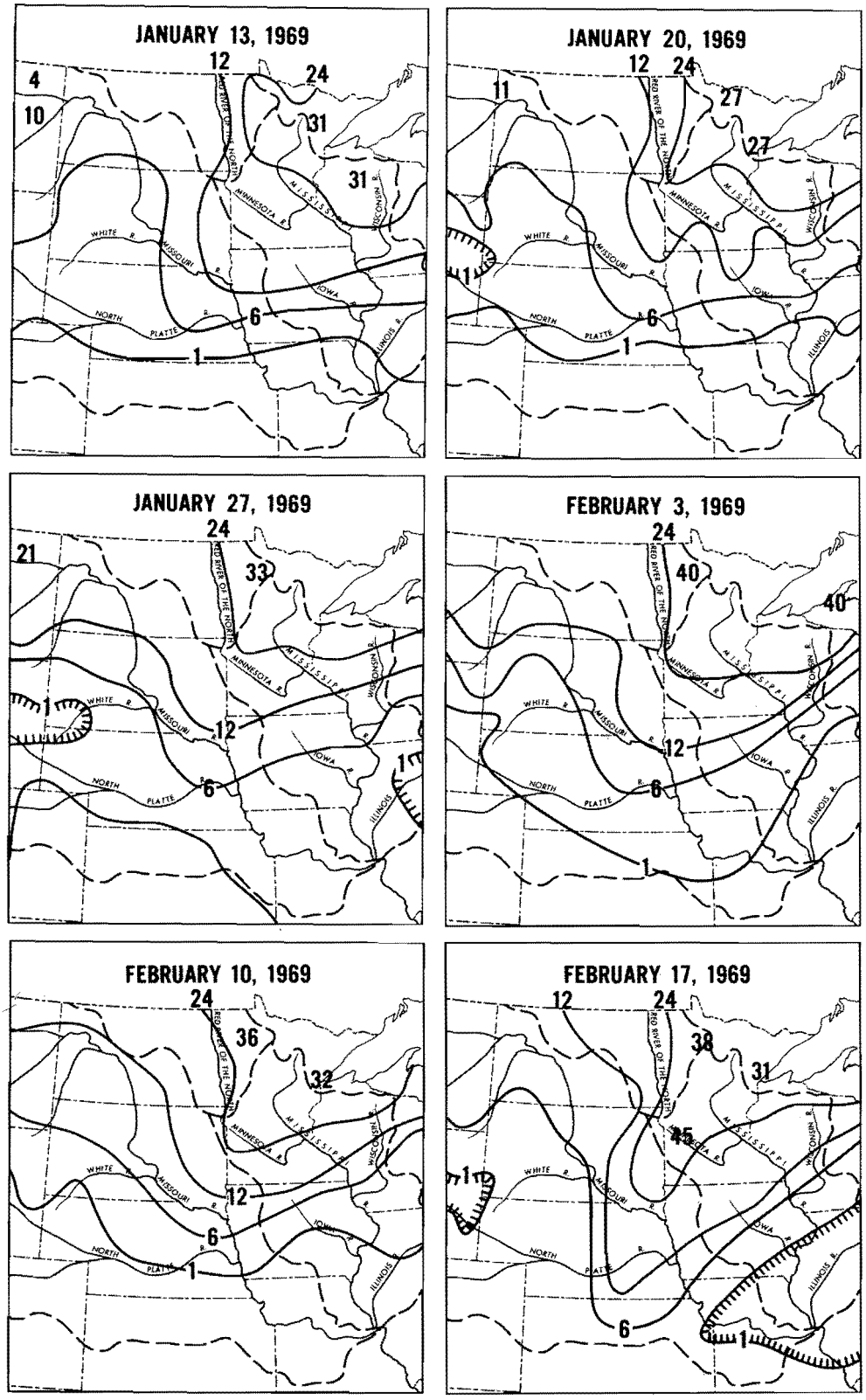

FIGURE 12. — Weekly depth (in.) of snow on ground, January 13 to February 17, 1969.

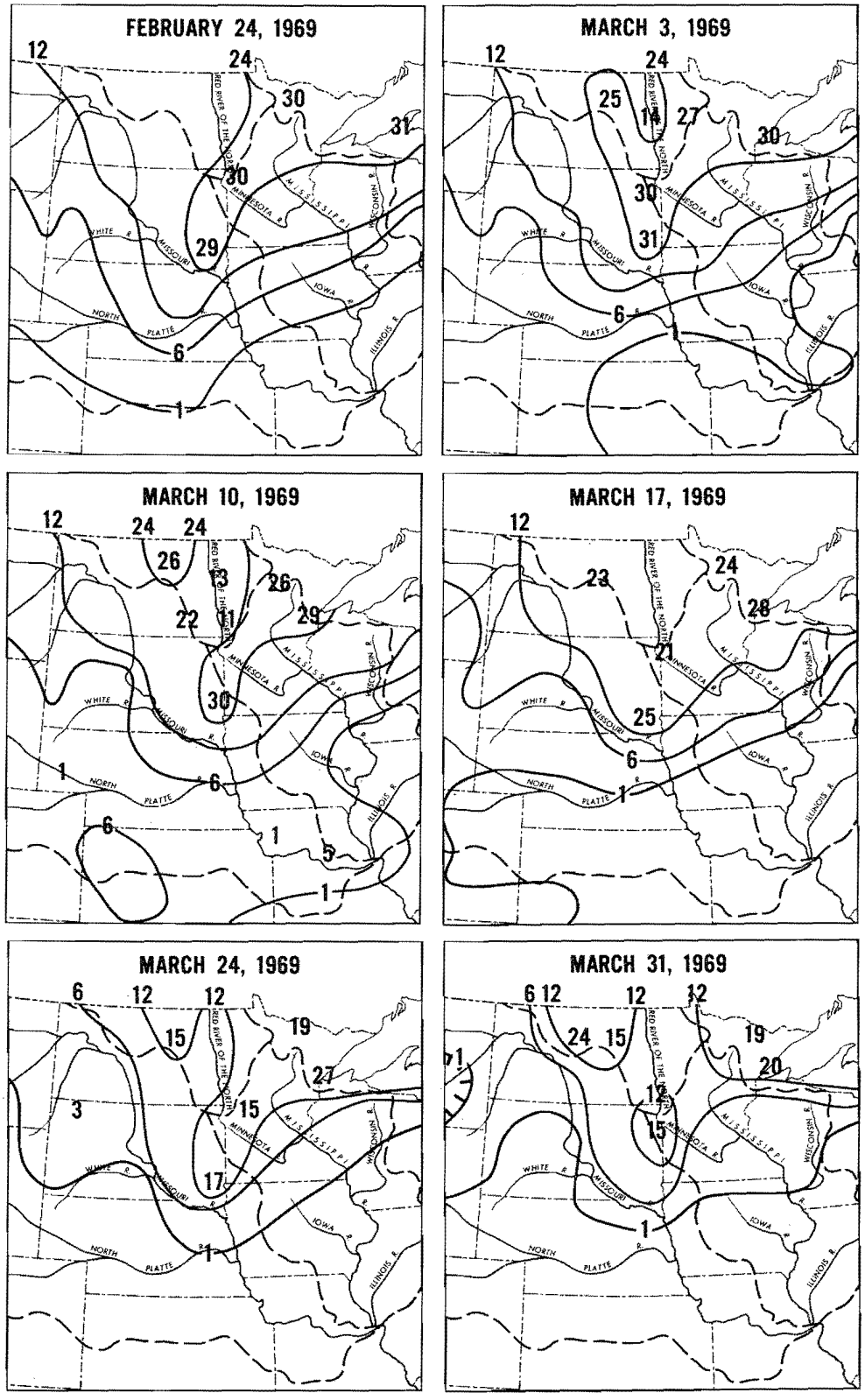

FIGURE 13. — Weekly depth (in.) of snow on ground, February 24 to March 31, 1969.

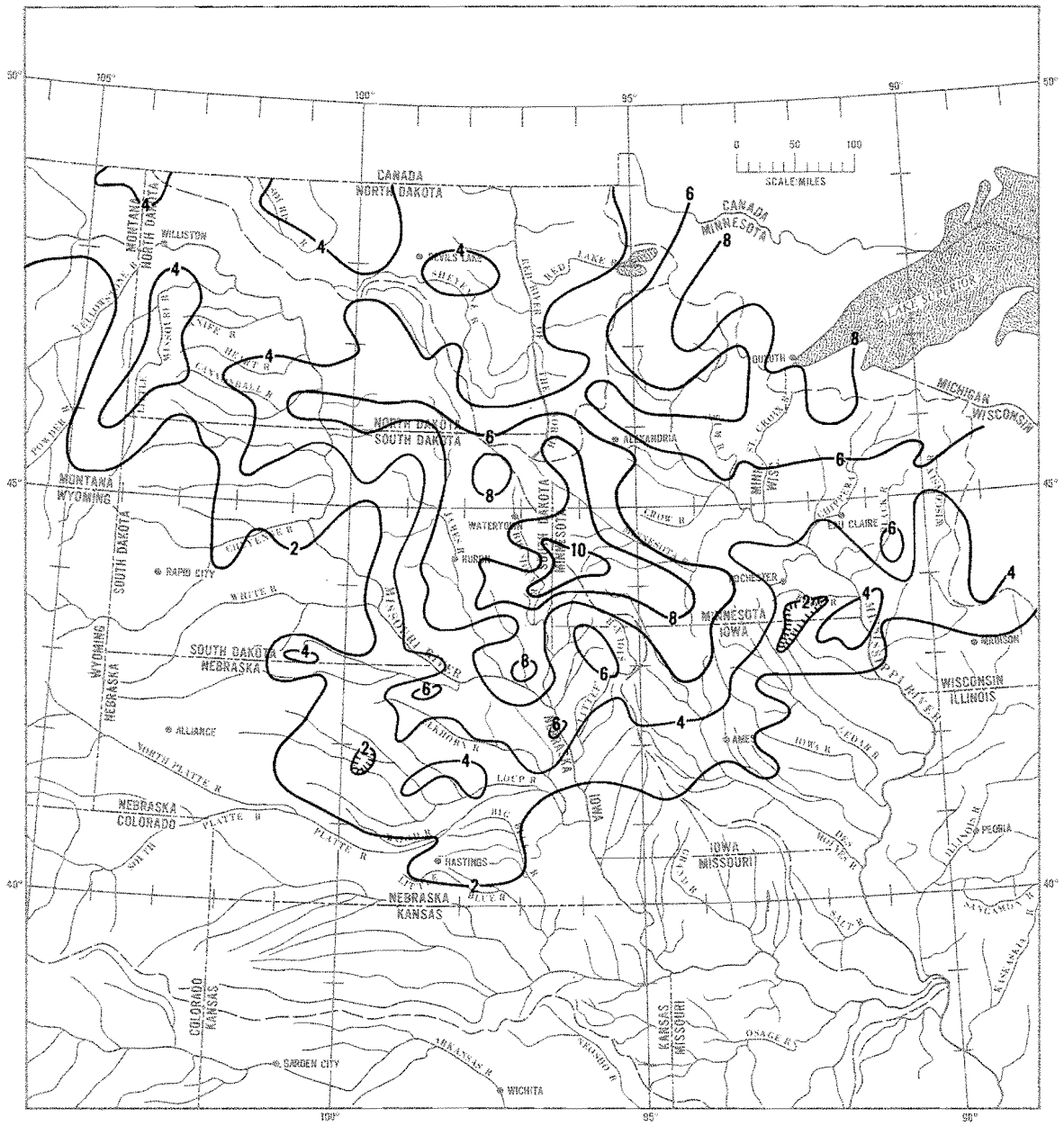

FIGURE 14. – Water equivalent of snow on ground (in.), March 14, 1969.

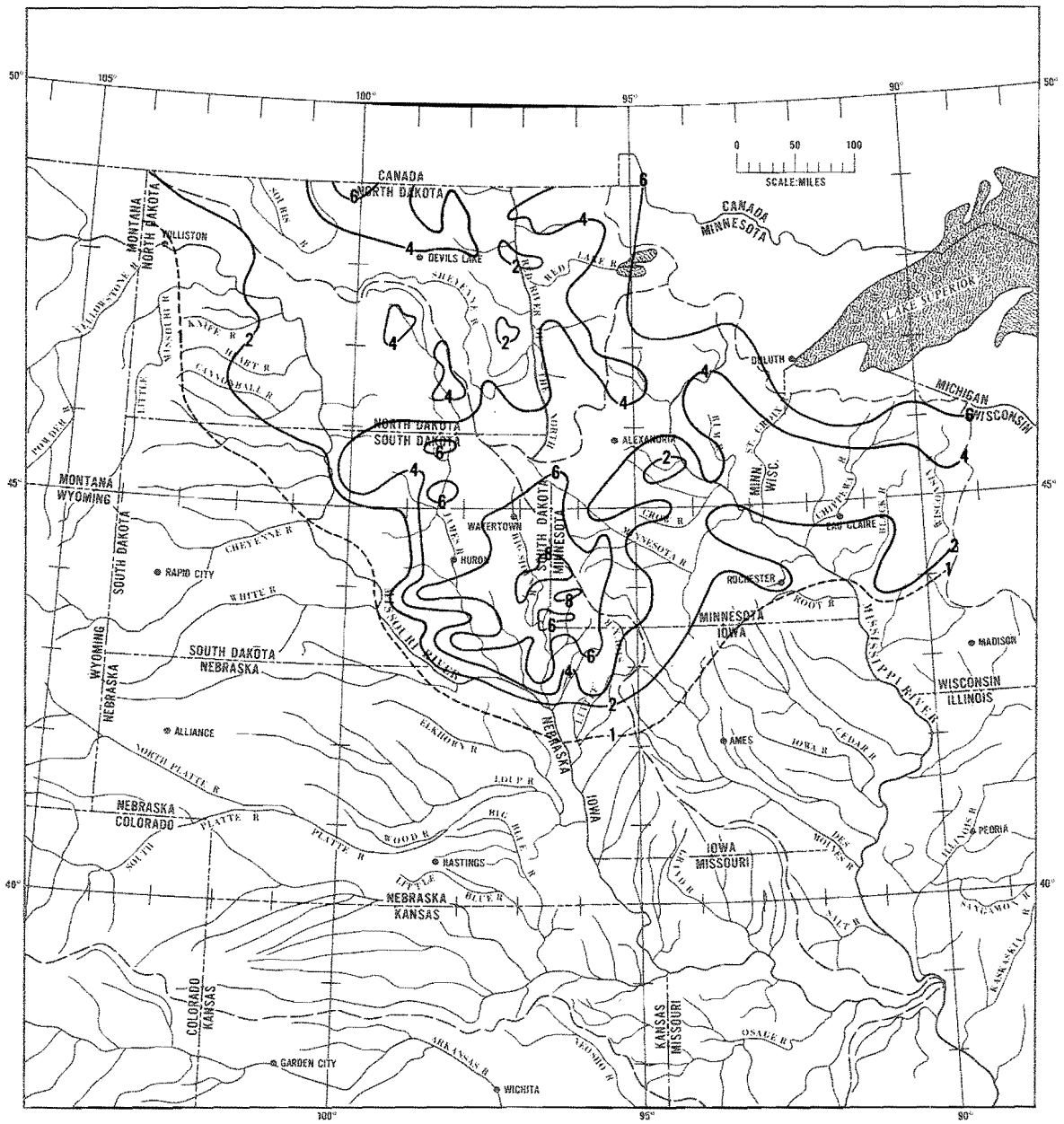

FIGURE 15. – Water equivalent of snow on ground (in.), March 28, 1969.

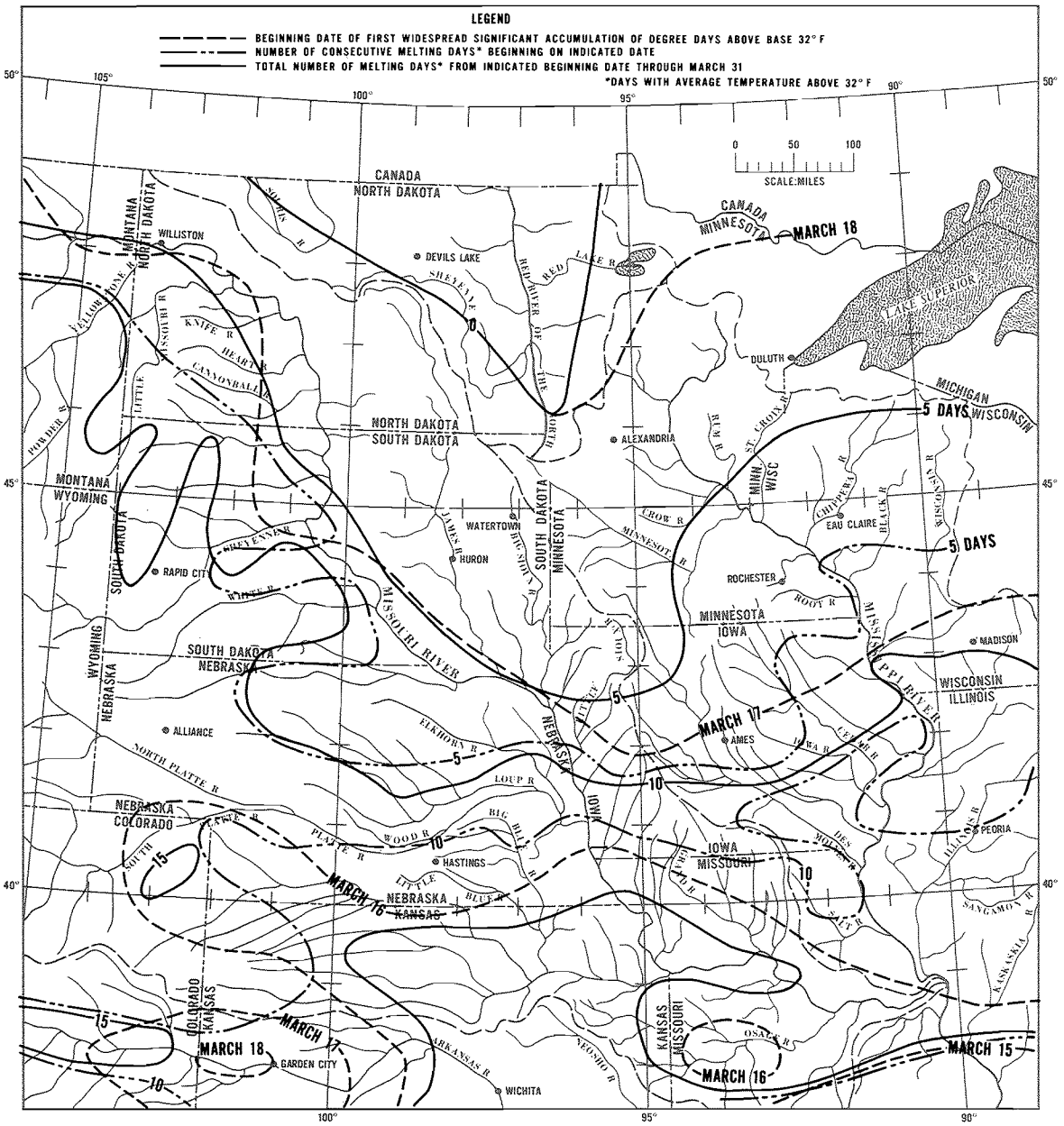

FIGURE 16. – Number of days with average temperature above 32°F in first prolonged March warm spell and beginning date.

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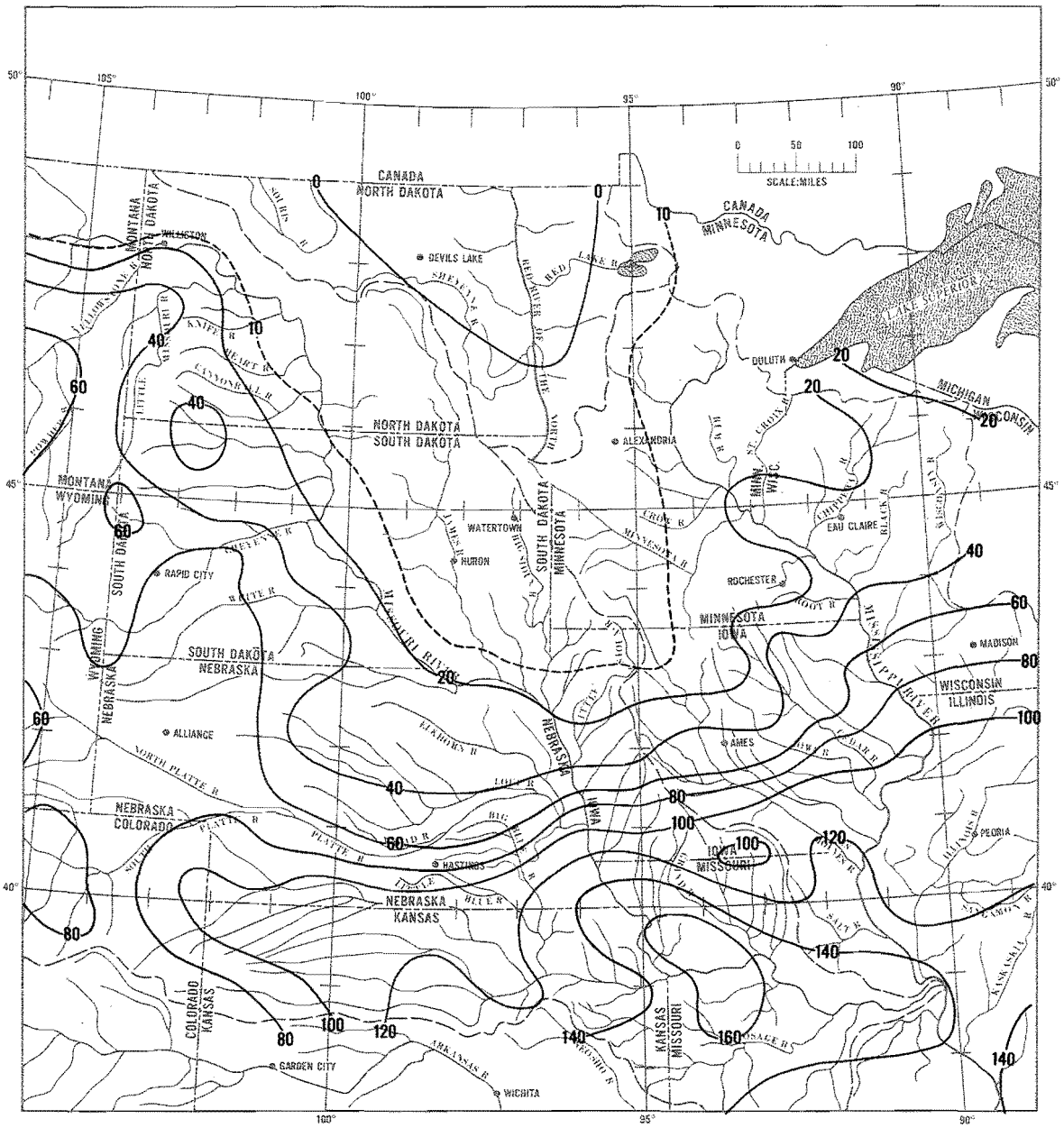

FIGURE 17.—Accumulated melting degree days (°F), March 16-23, 1969.

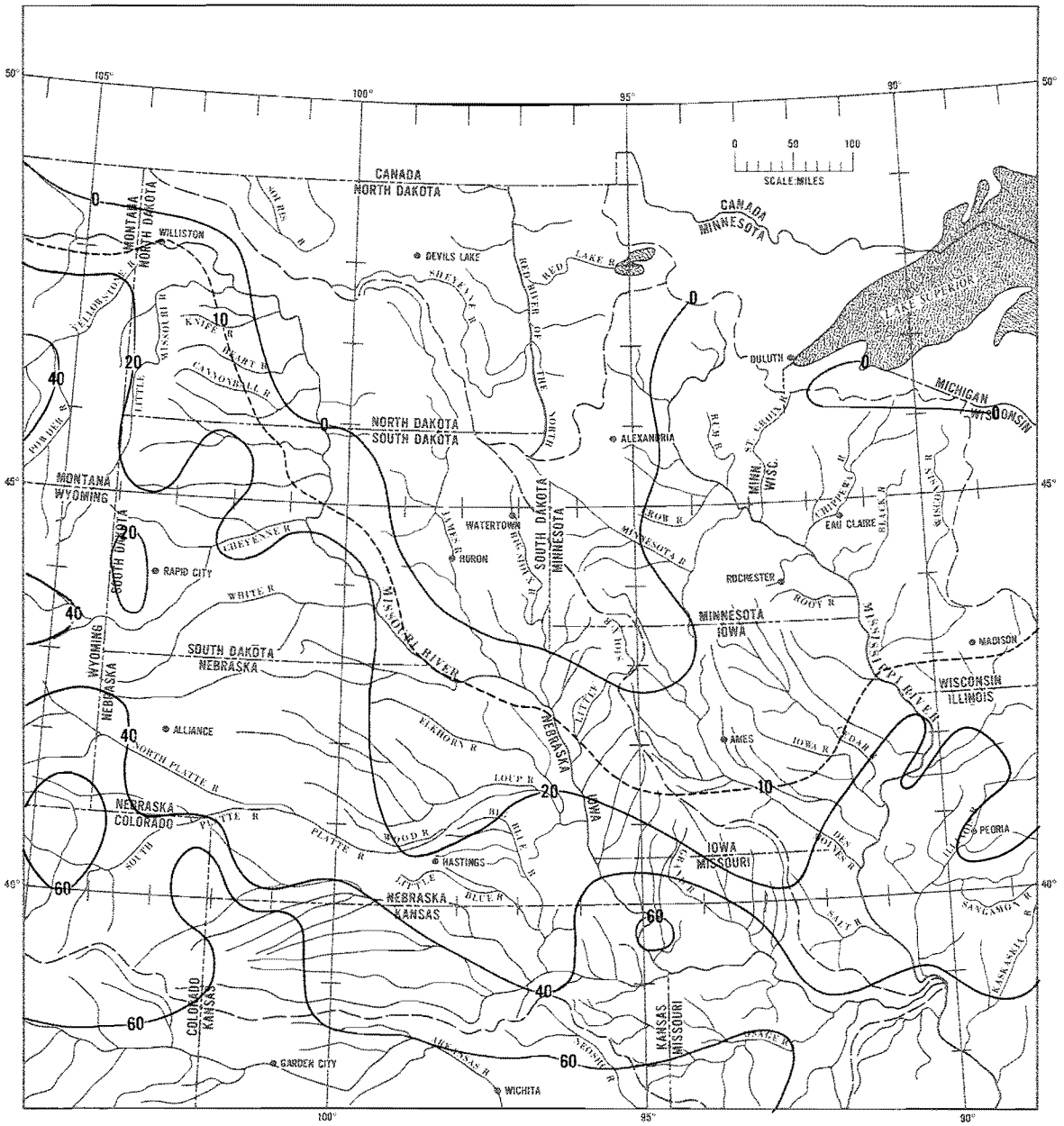

FIGURE 18. – Accumulated melting degree-days (°F), March 24-31, 1969.

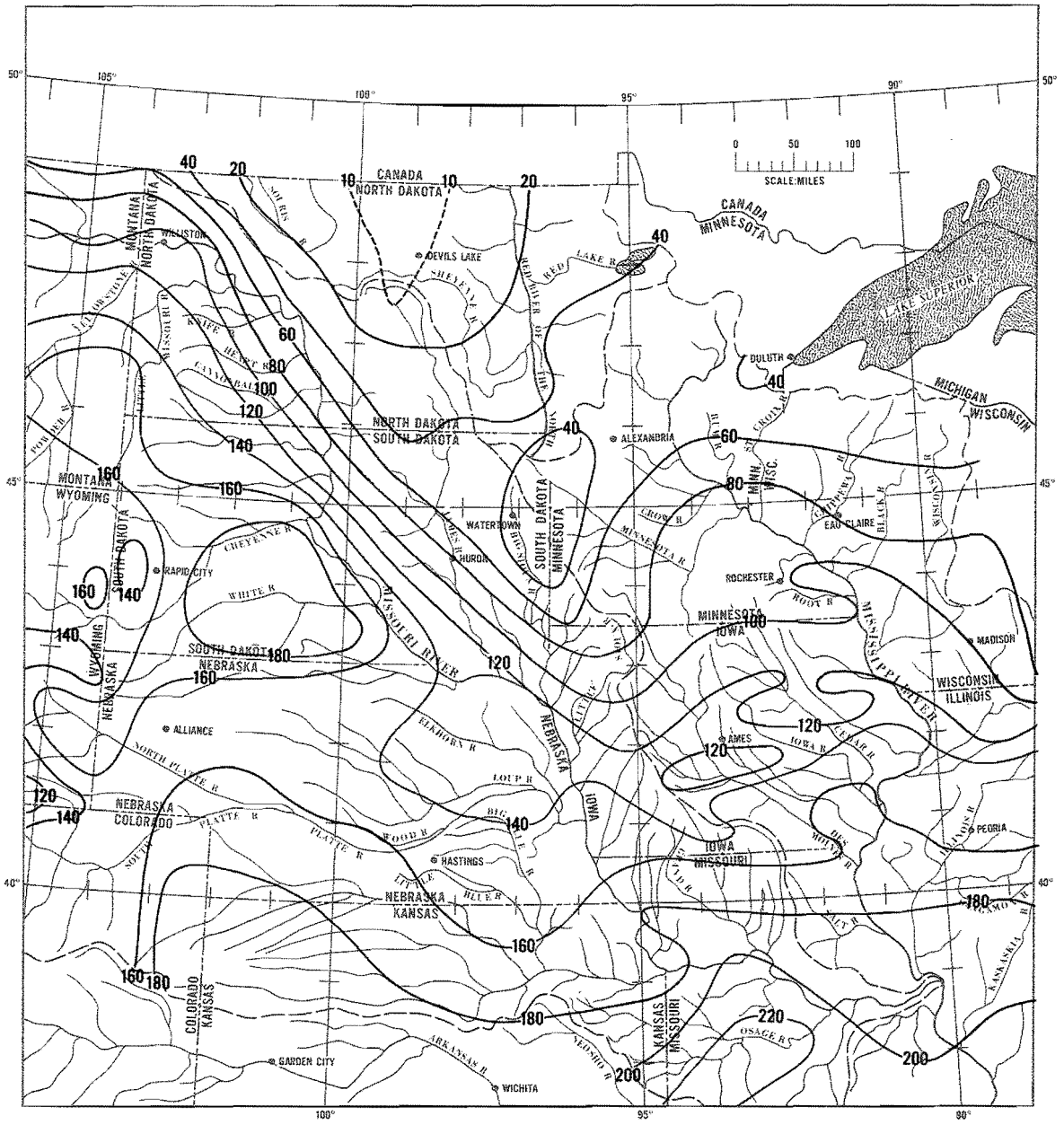

FIGURE 19.—Accumulated melting degree-days (°F), April 1-8, 1969.

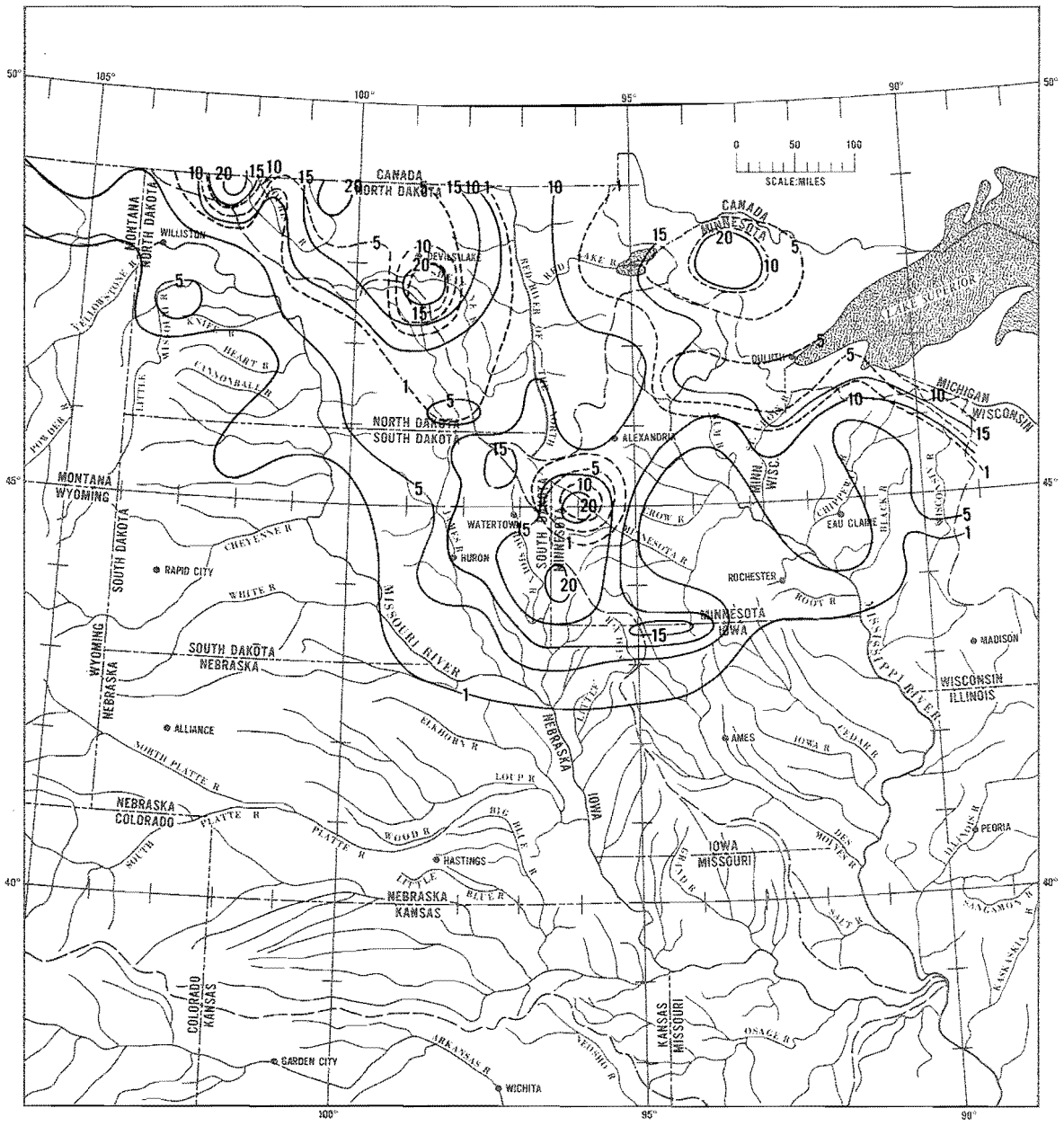

FIGURE 20. – Depth of snow on ground (in.), April 1 and April 9, 1969.

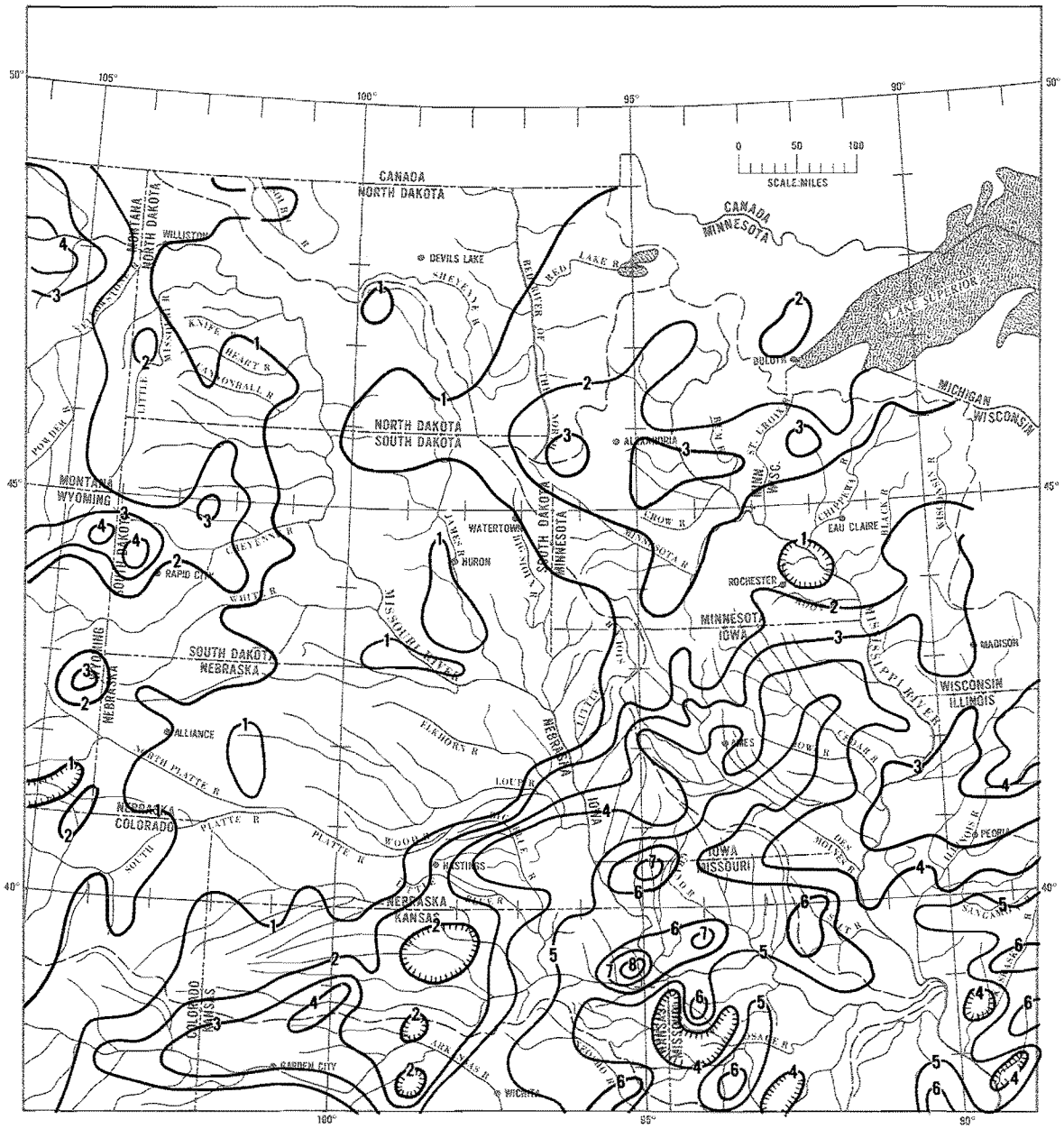

FIGURE 21.—Total monthly precipitation (in.), April 1969.

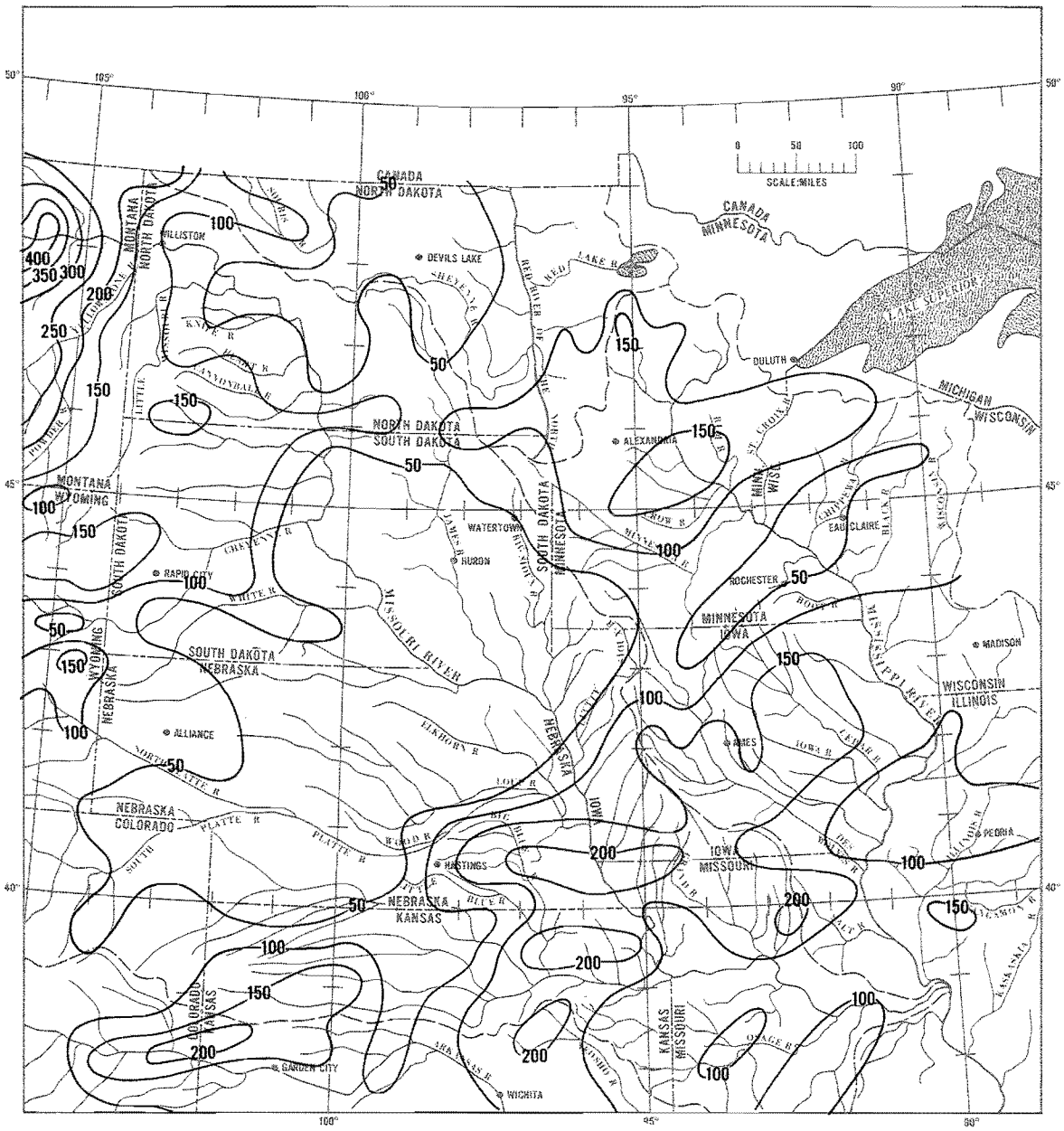

FIGURE 22. — Percent of normal precipitation, April 1969.

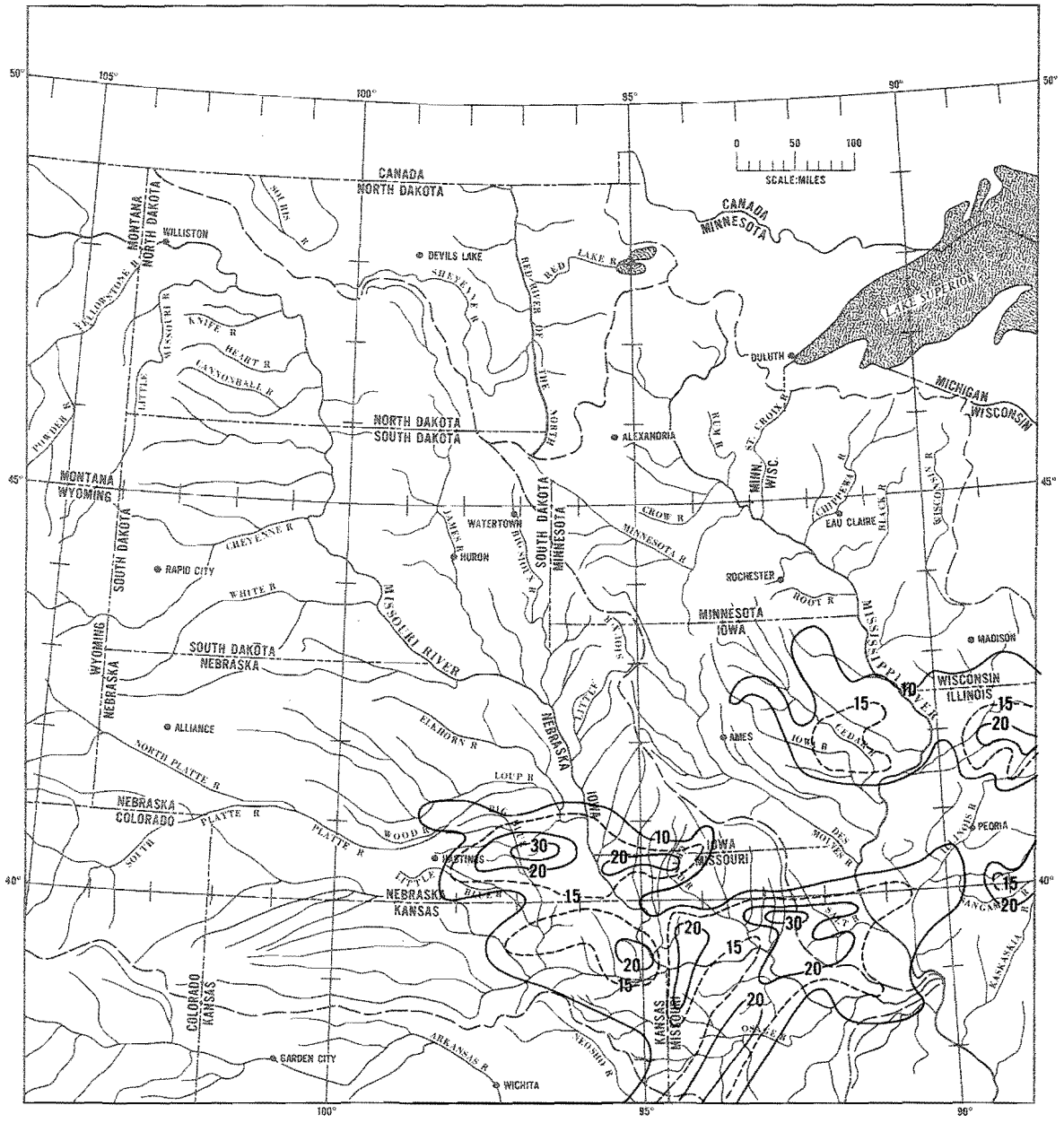

FIGURE 23. – Total storm precipitation (0.1 in.), April 1-6, 1969.

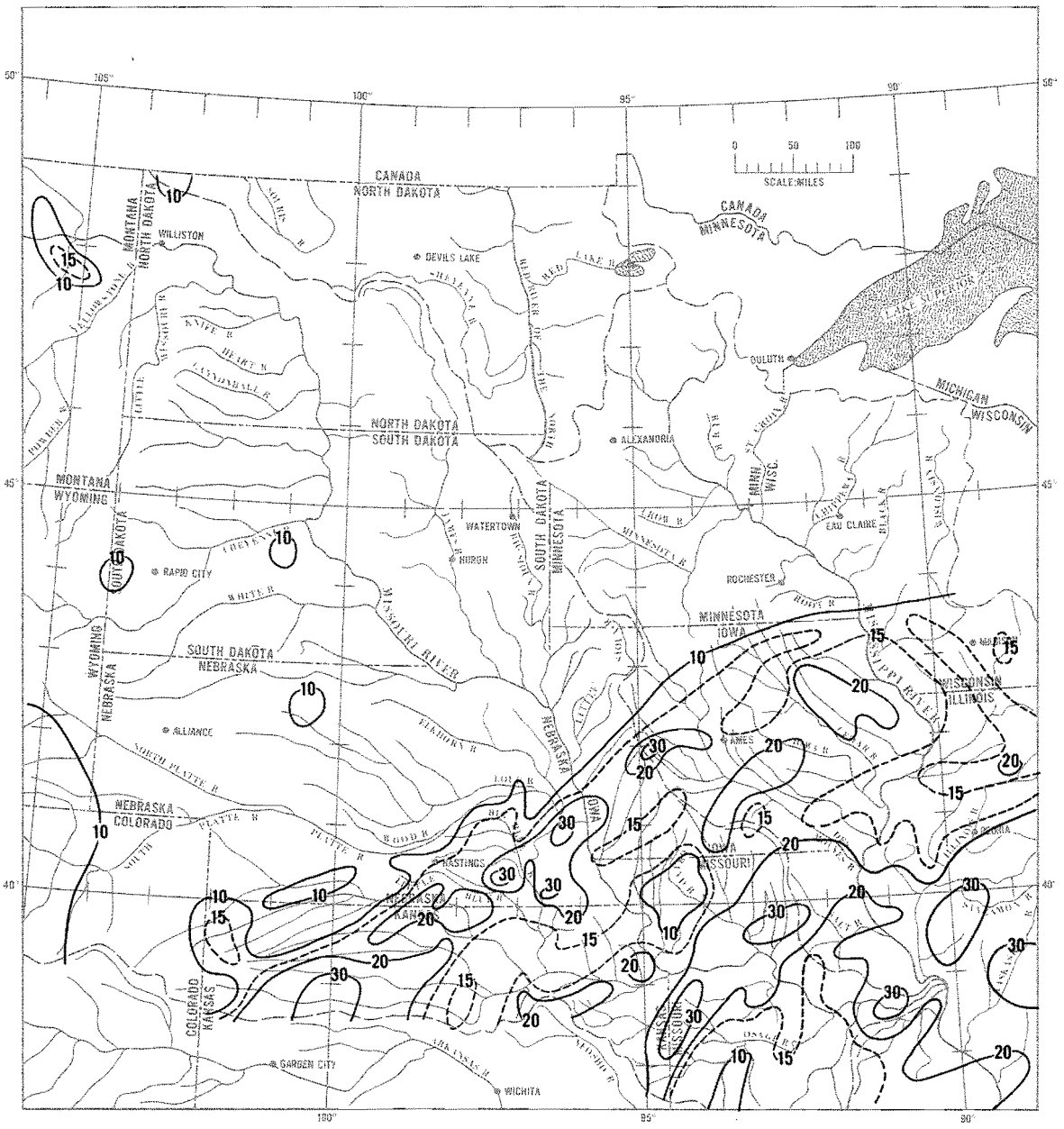

FIGURE 24.—Total storm precipitation (0.1 in.), April 13-19, 1969.

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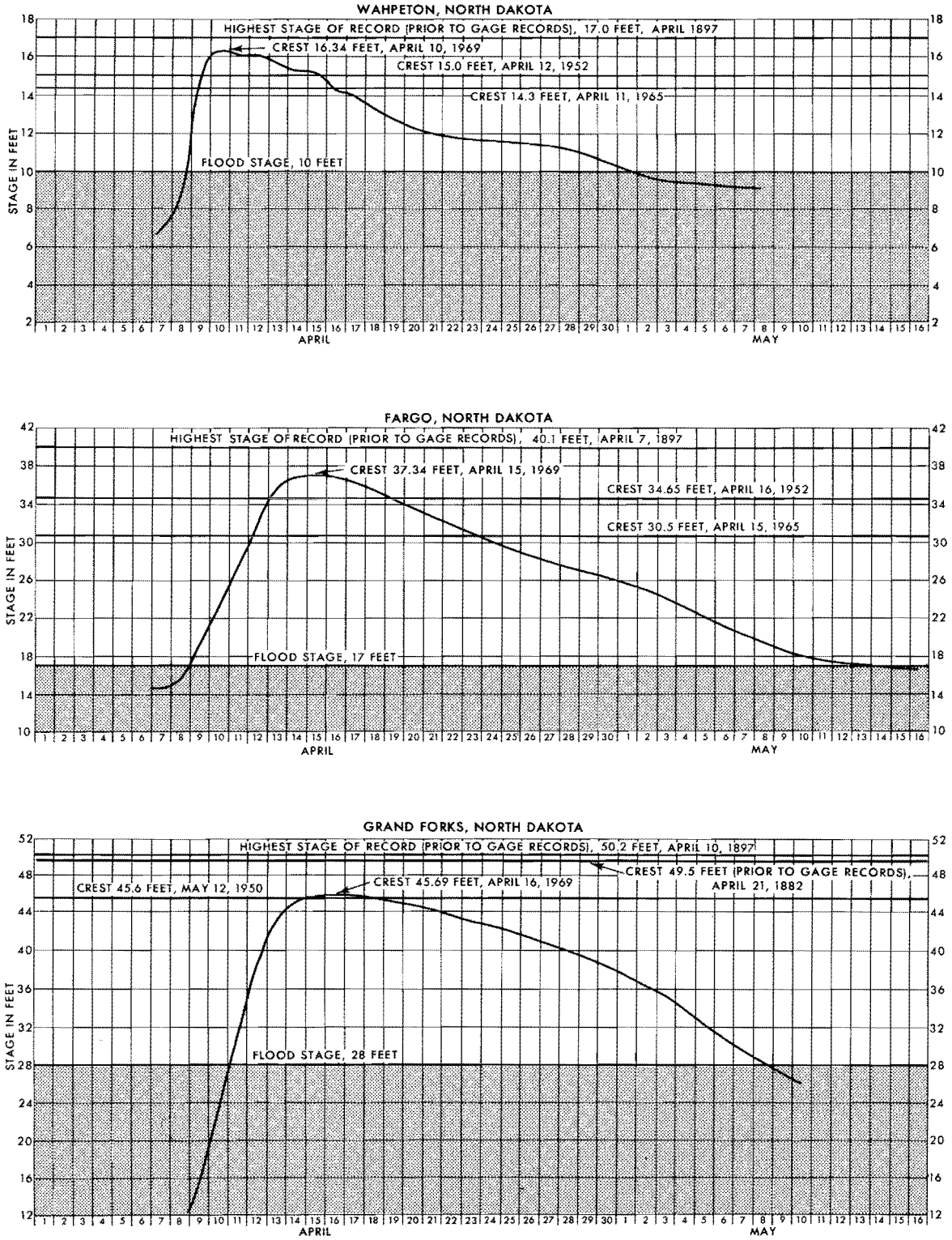

FIGURE 25. — April-May 1969 river stage hydrographs: Red River of the North at Wahpeton, Fargo, and Grand Forks, N. Dak.

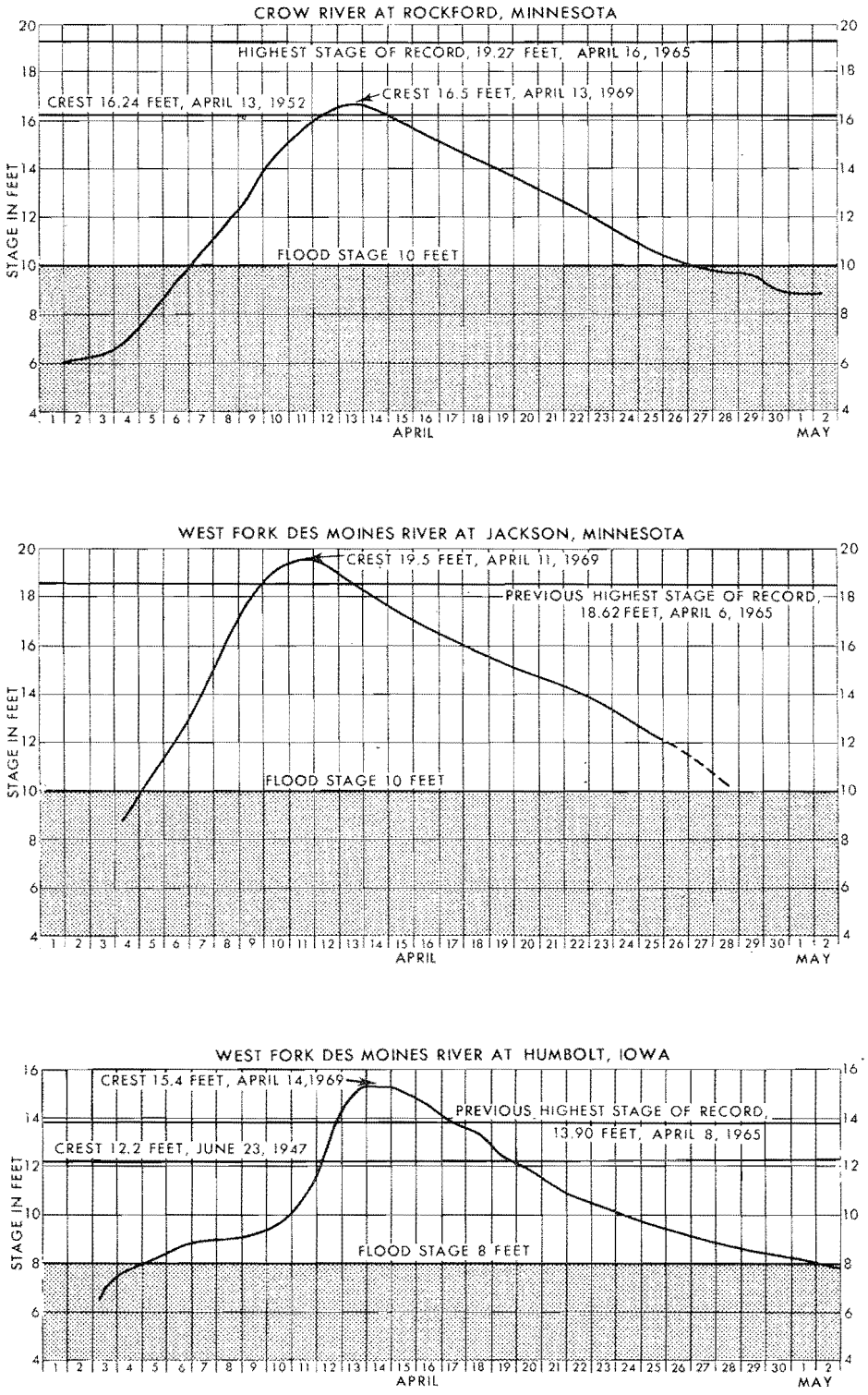

FIGURE 26.—April-May 1969 river stage hydrographs: Crow River at Rockford, Minn., and West Fork Des Moines River at Jackson, Minn., and Humboldt, Iowa.

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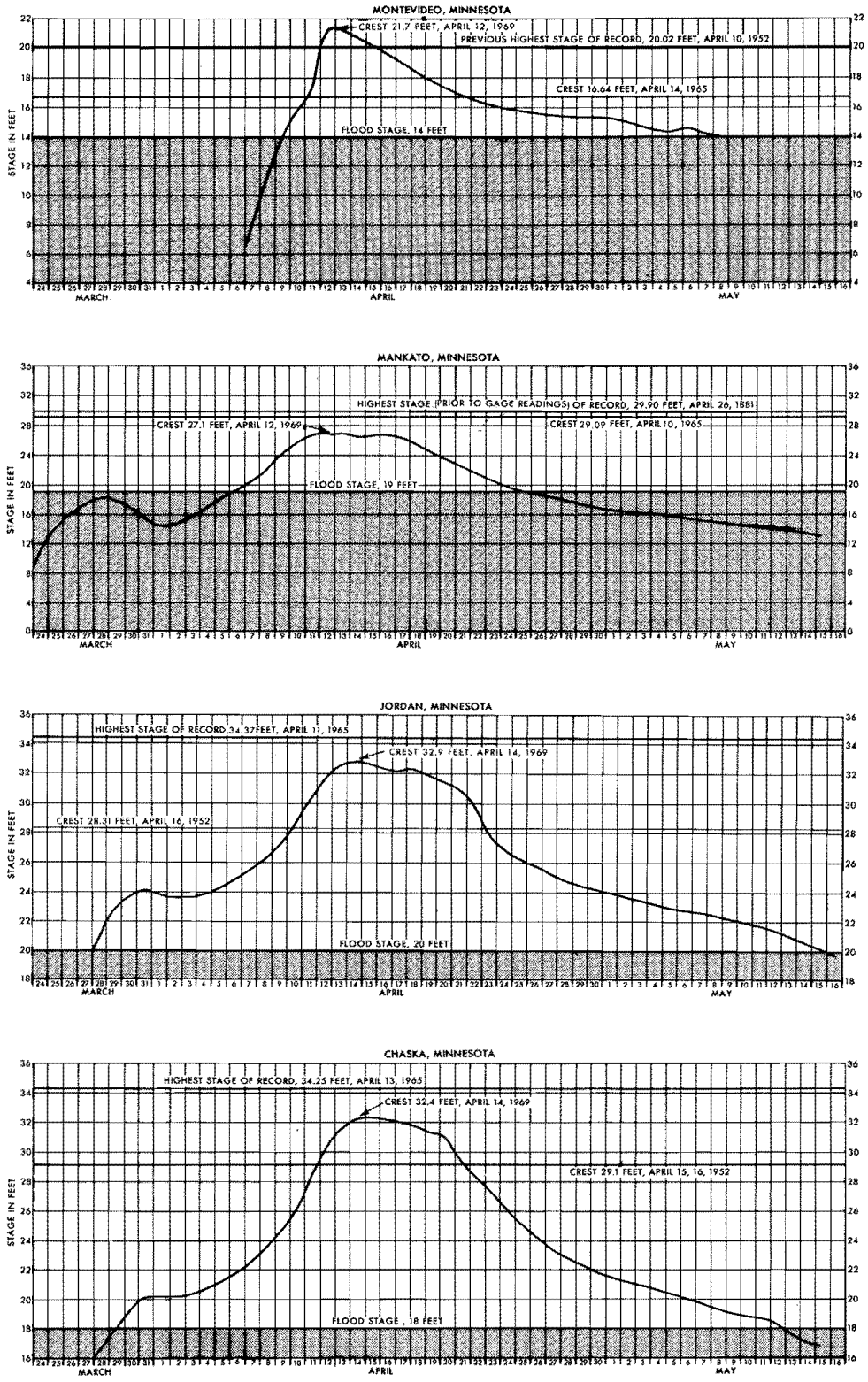

FIGURE 27.—March-May 1969 river stage hydrographs: Minnesota River at Montevideo, Mankato, Jordan, and Chaska, Minn.

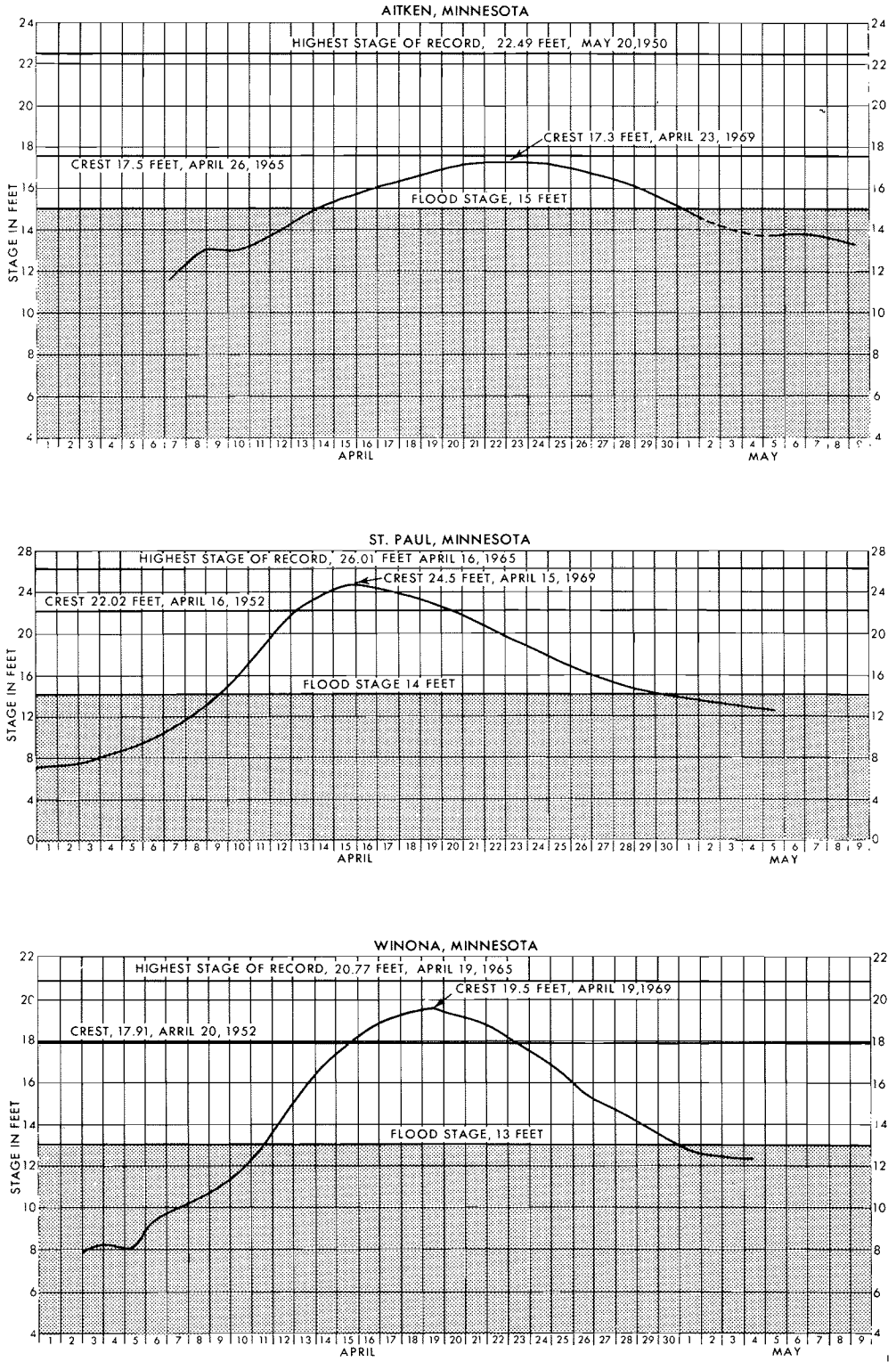

FIGURE 28. – April-May 1969 river stage hydrographs: Mississippi River at Aitken, St. Paul, and Winona, Minn.

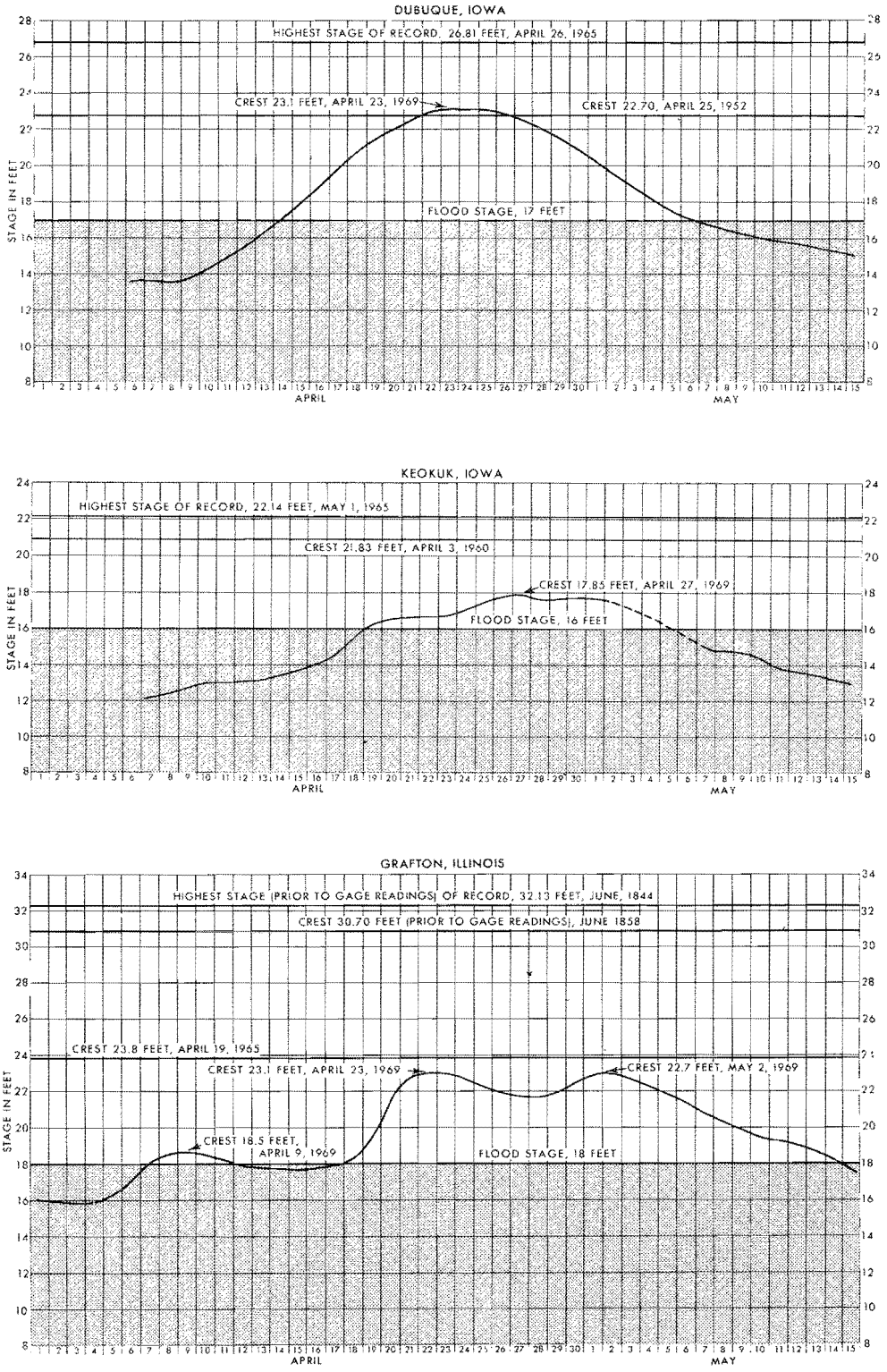

FIGURE 29.—April-May 1969 river stage hydrographs: Mississippi River at Dubuque and Keokuk, Iowa, and Grafton, Ill.

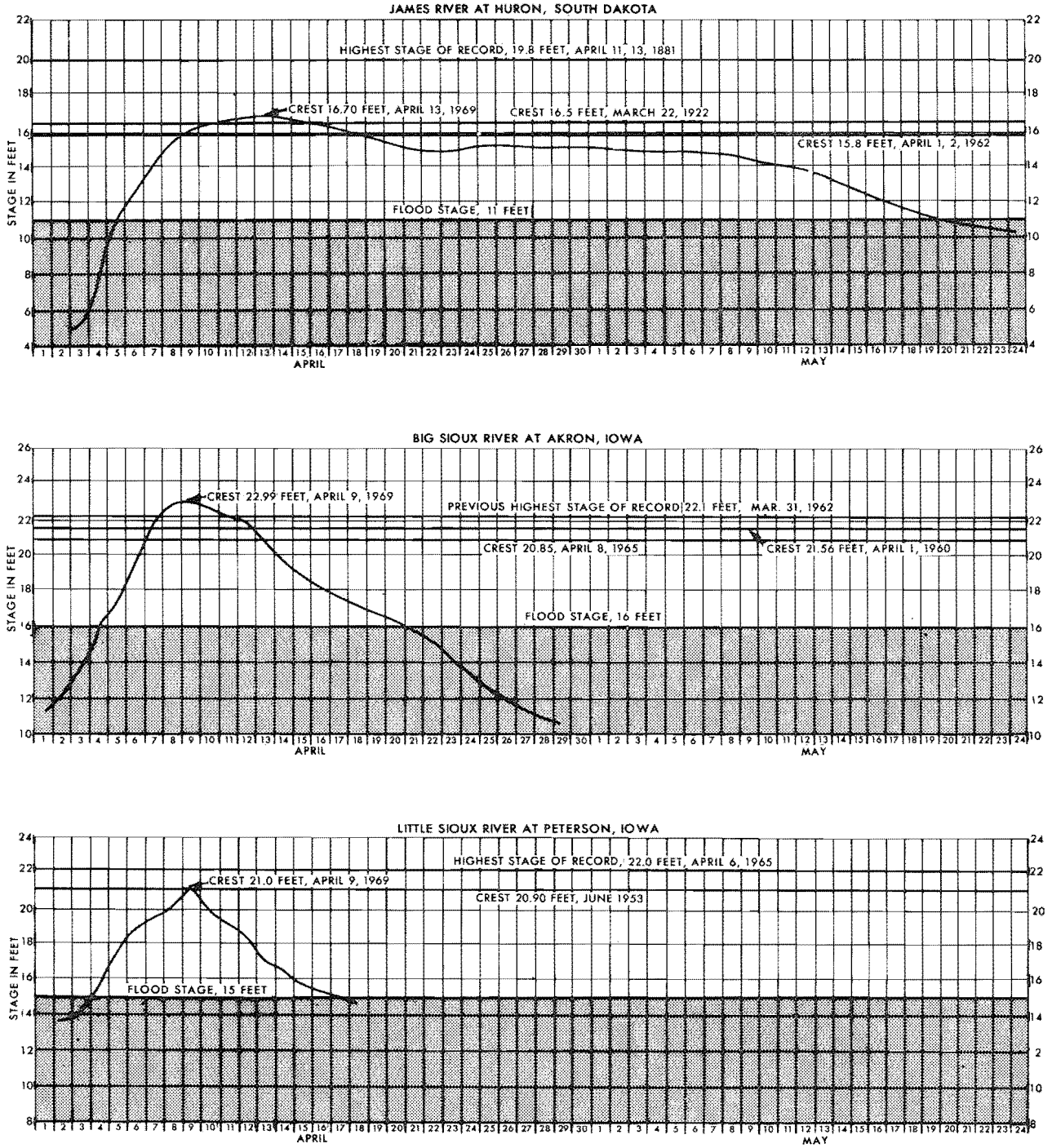

FIGURE 30.—April-May 1969 river stage hydrographs: James River at Huron, S. Dak., Big Sioux River at Akron, Iowa, and Little Sioux River at Peterson, Iowa.

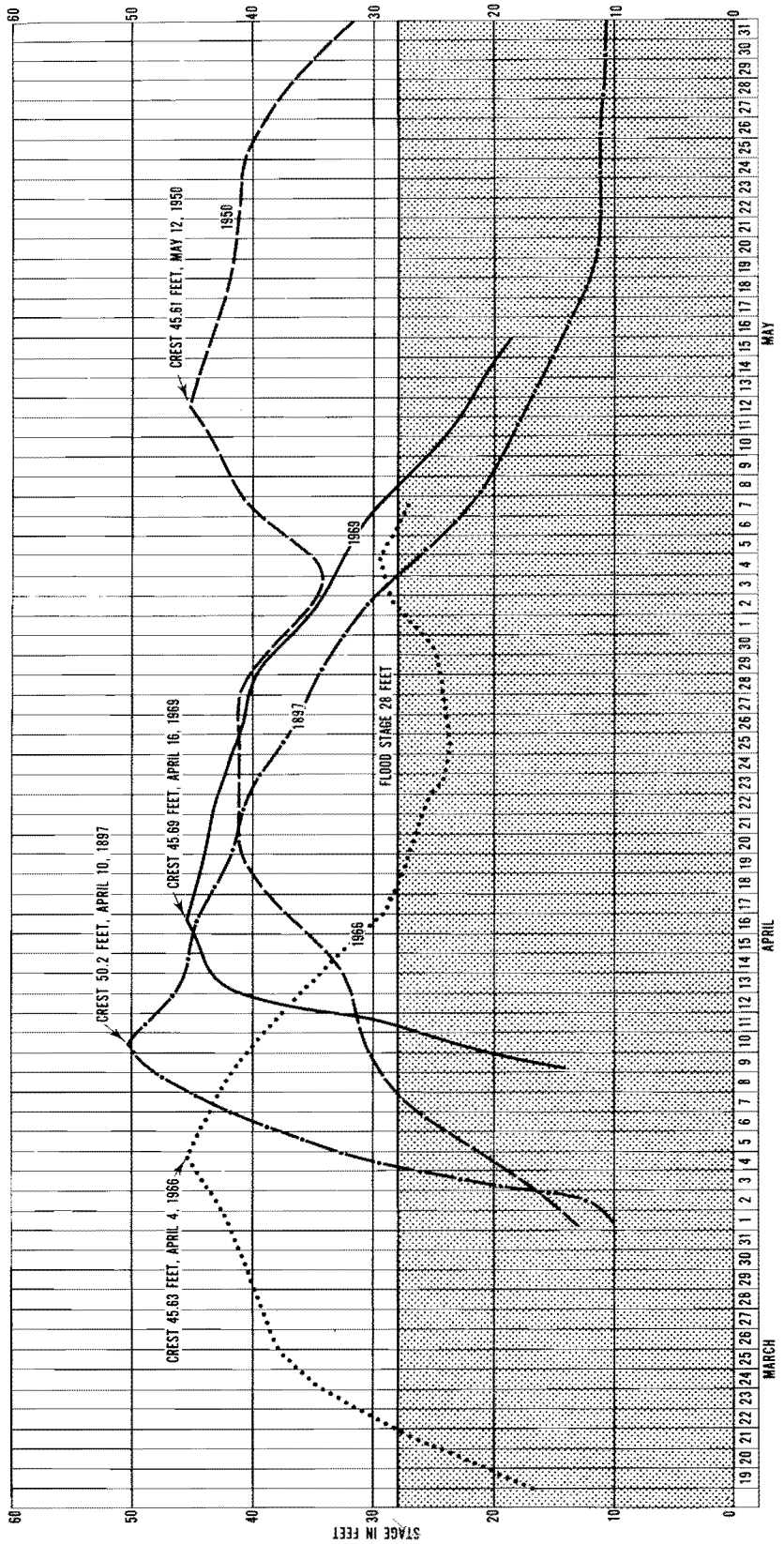

FIGURE 31. – Comparison of Red River of the North 1969 flood hydrograph for Grand Forks, N. Dak., with hydrographs of other major floods.

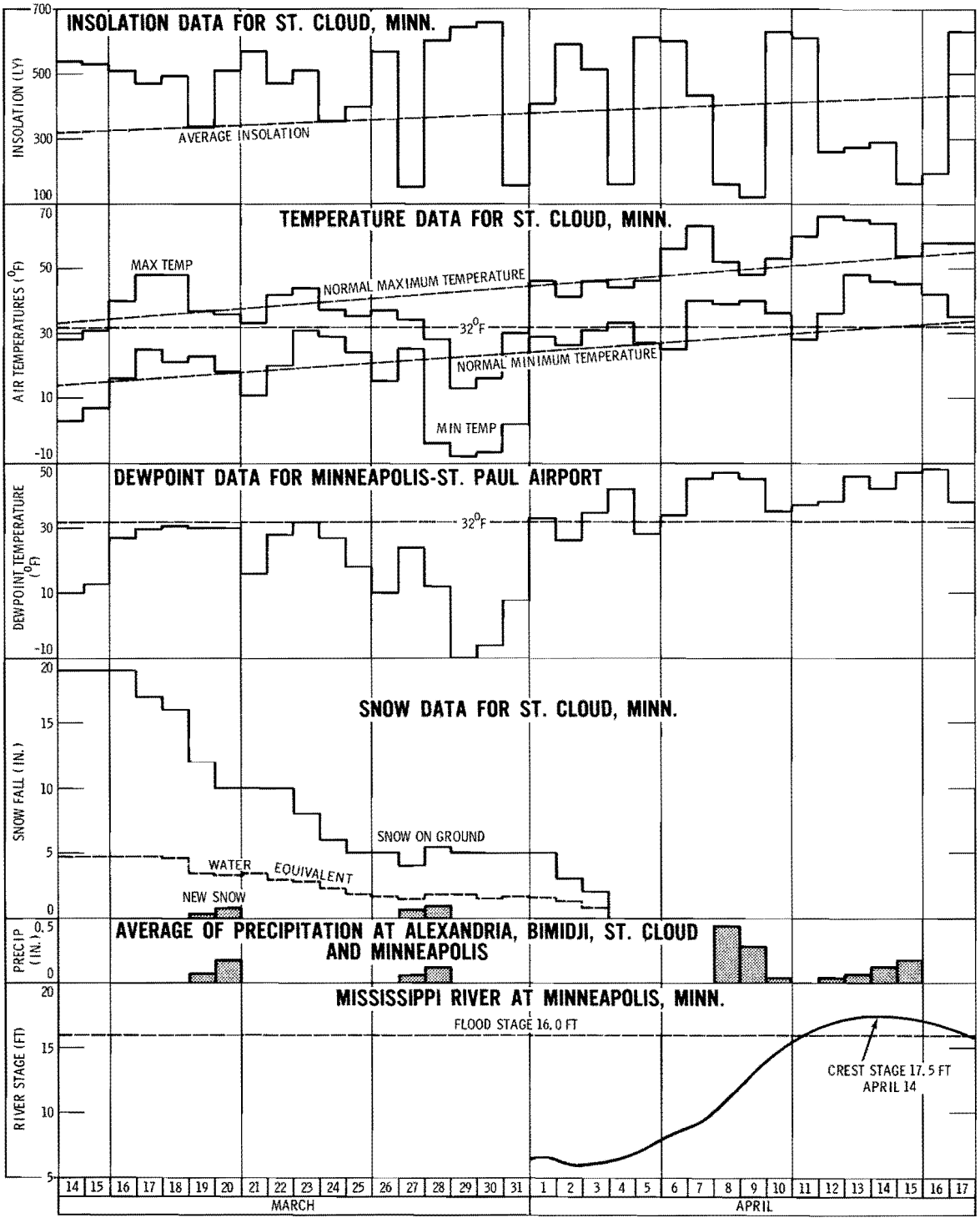

FIGURE 32.—Weather conditions associated with April 1969 flood on the Mississippi River at Minneapolis, Minn. Similar conditions prevailed over other river basins in Minnesota, Wisconsin, Iowa, and the Dakotas. These areas experienced the first severe flooding of the season during the first half of April.

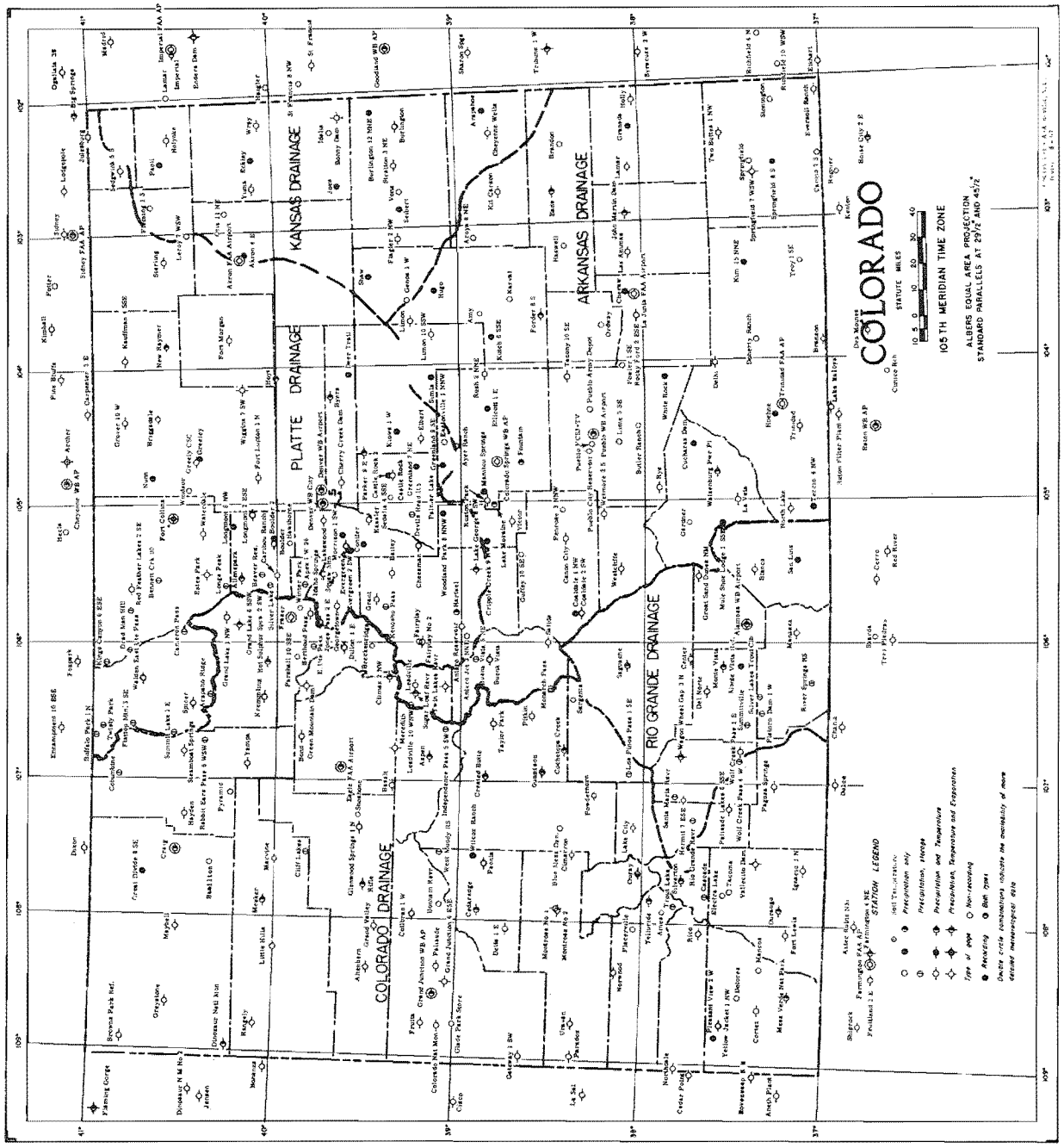

FIGURE 33.—Colorado climatological stations.

FIGURE 34. — Illinois climatological stations.

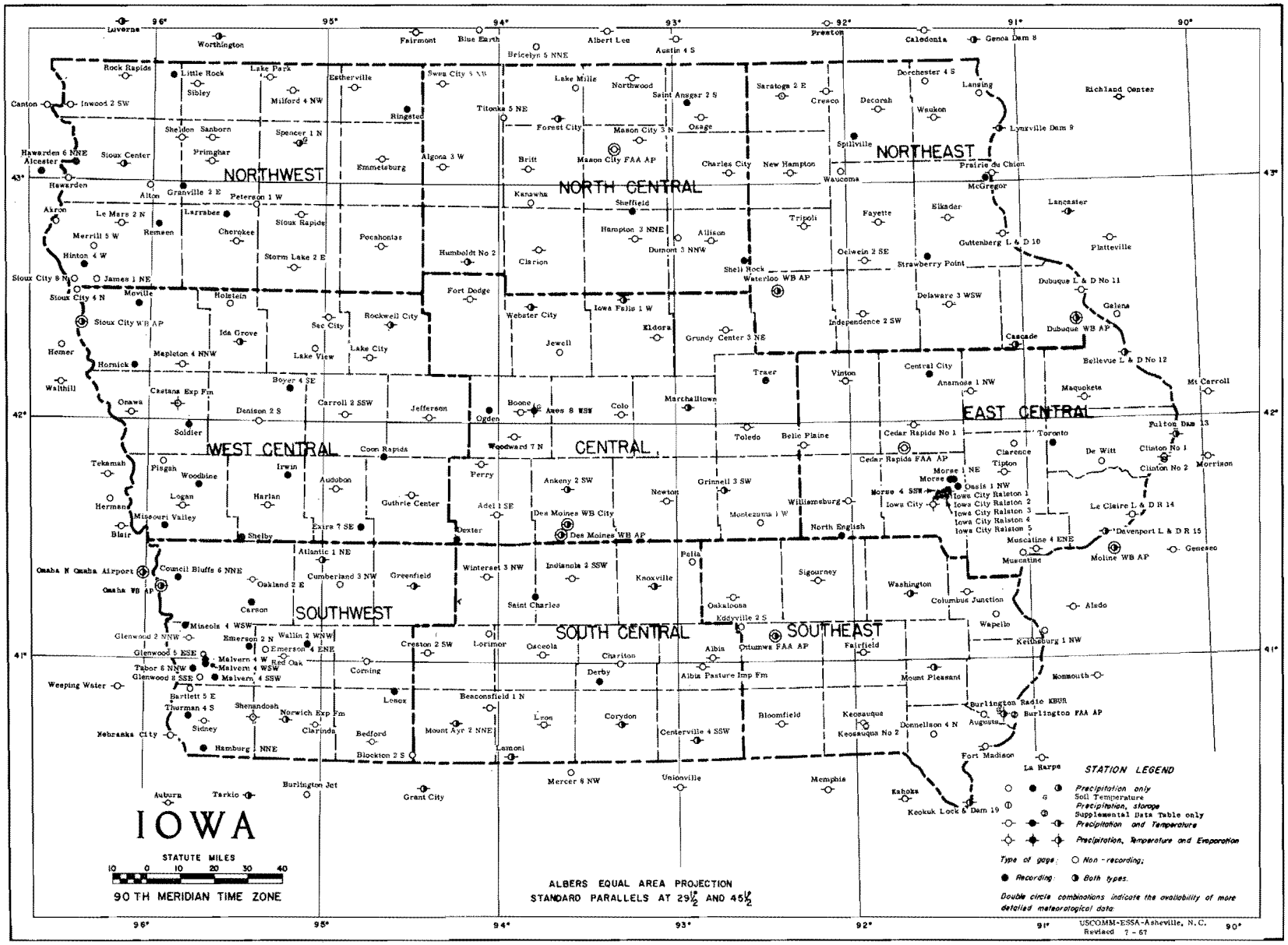

FIGURE 35.—Iowa climatological stations.

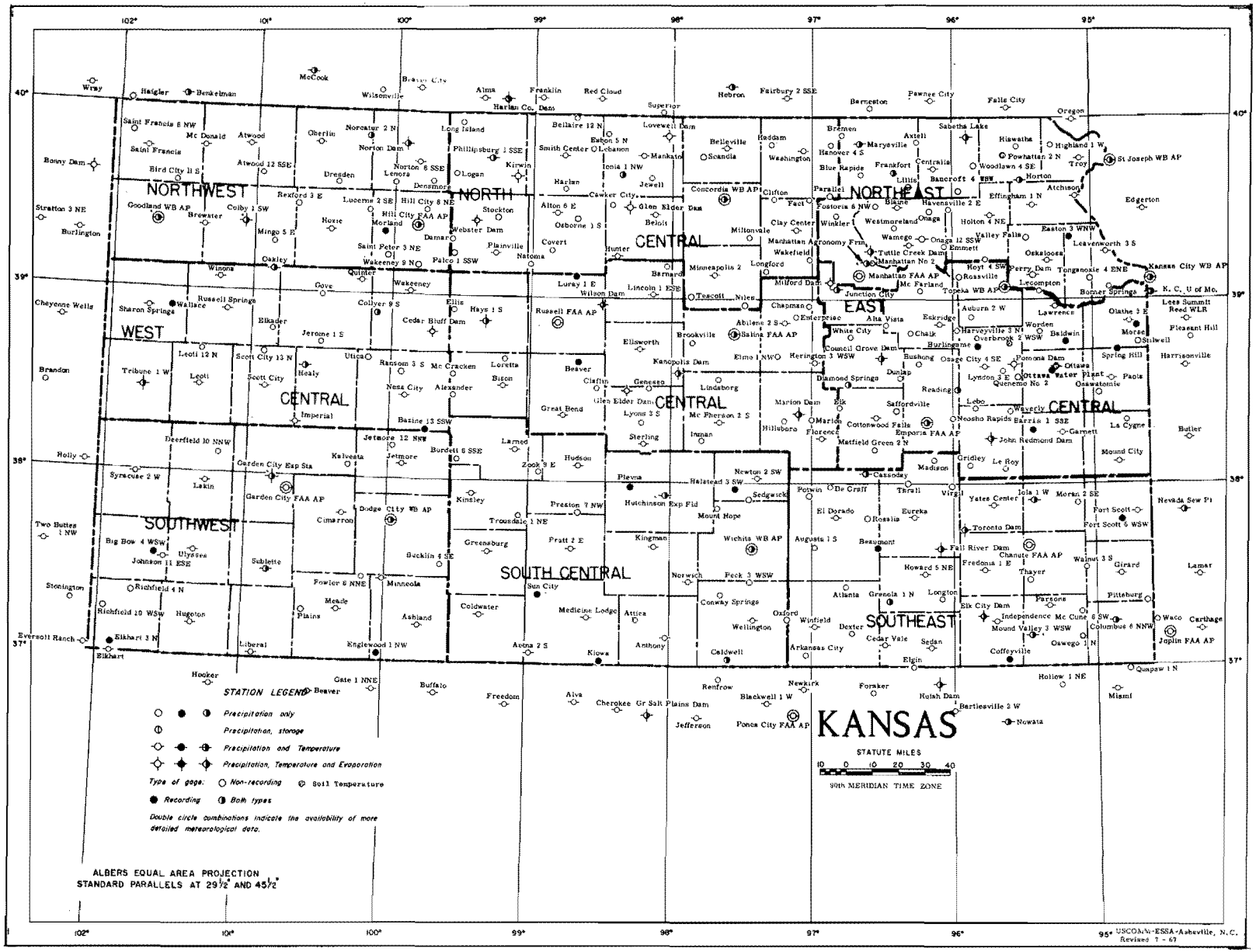

FIGURE 36.—Kansas climatological stations.

FIGURE 37. — Michigan climatological stations.

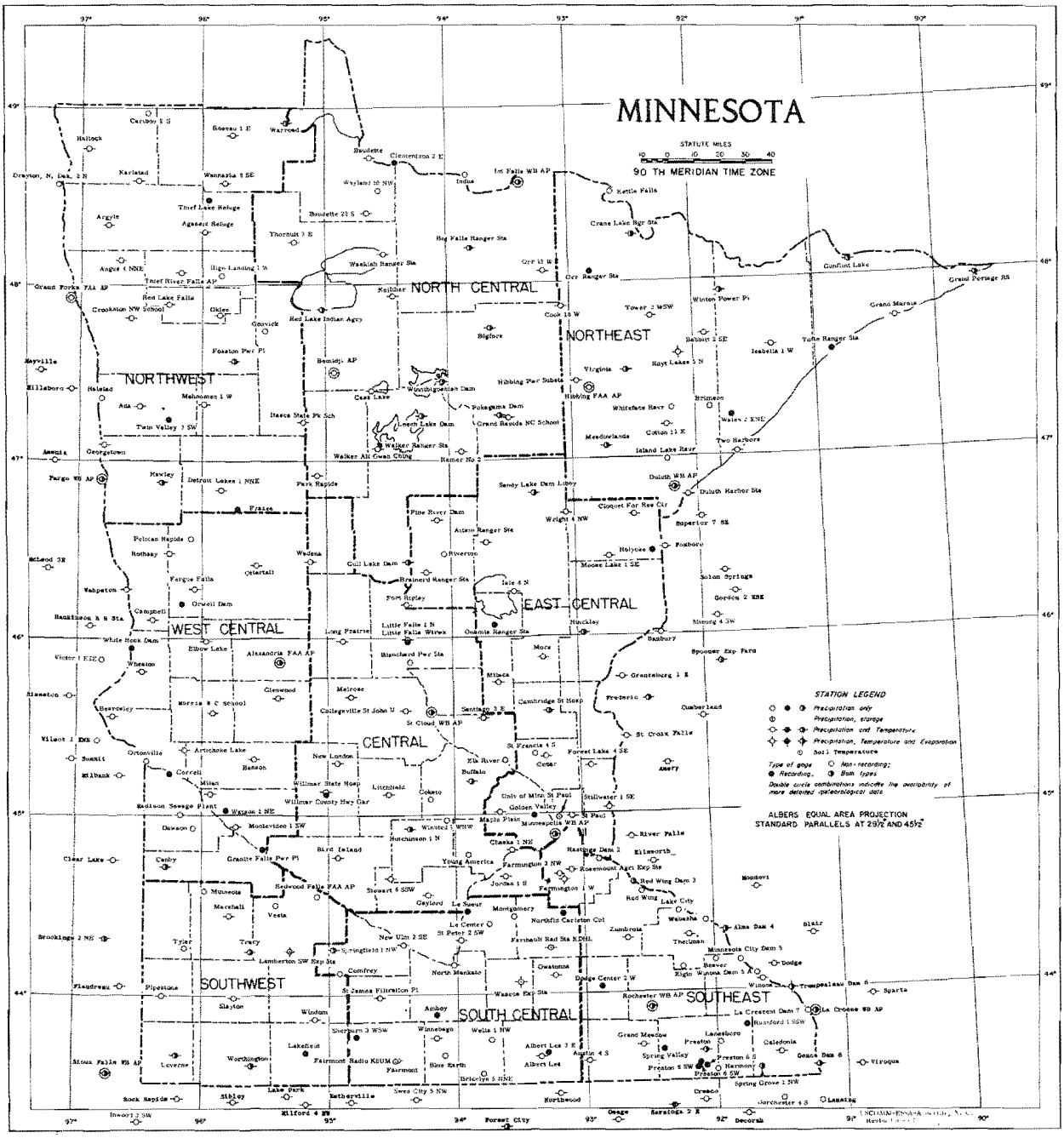

FIGURE 38. — Minnesota climatological stations.

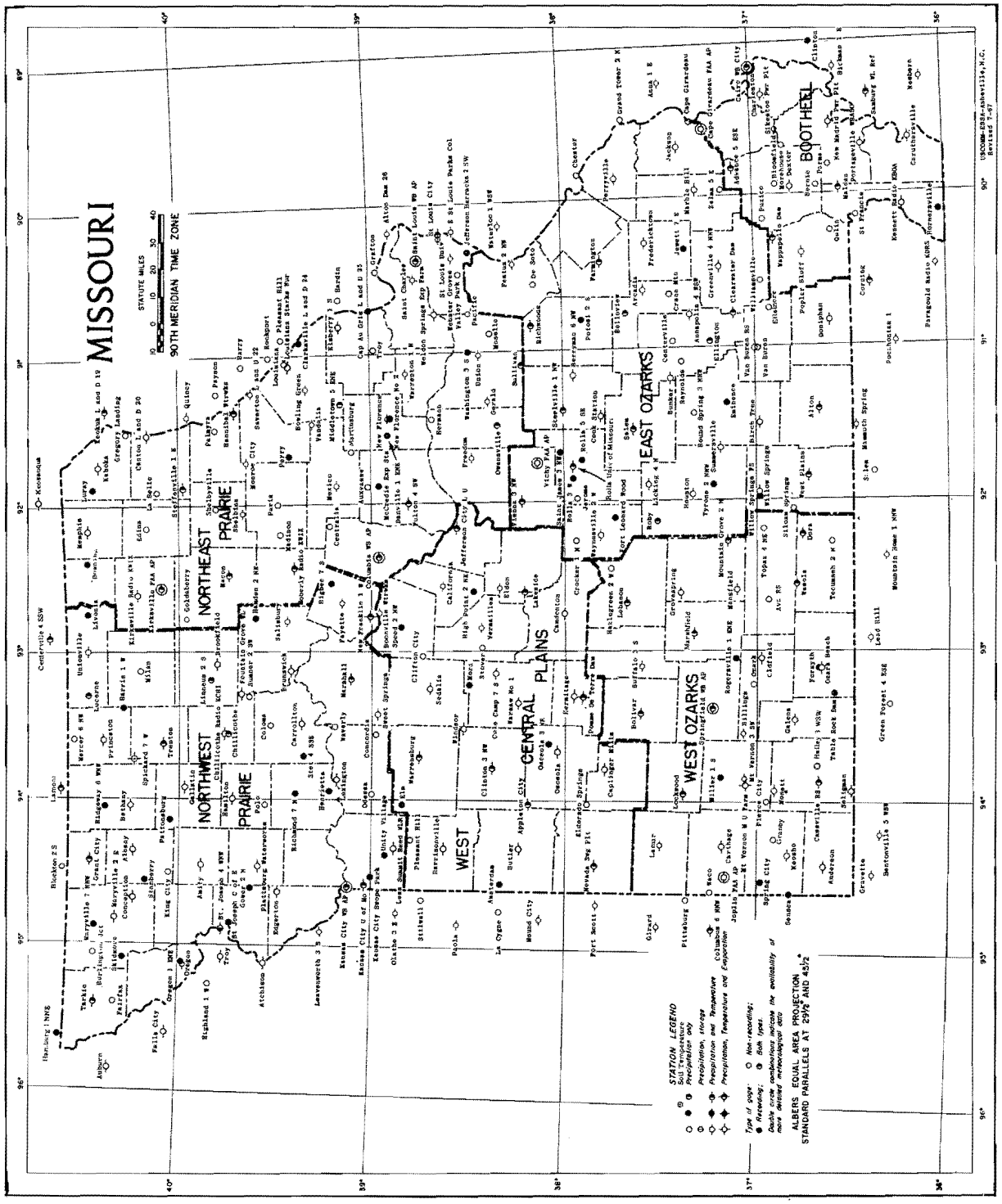

FIGURE 39. – Missouri climatological stations.

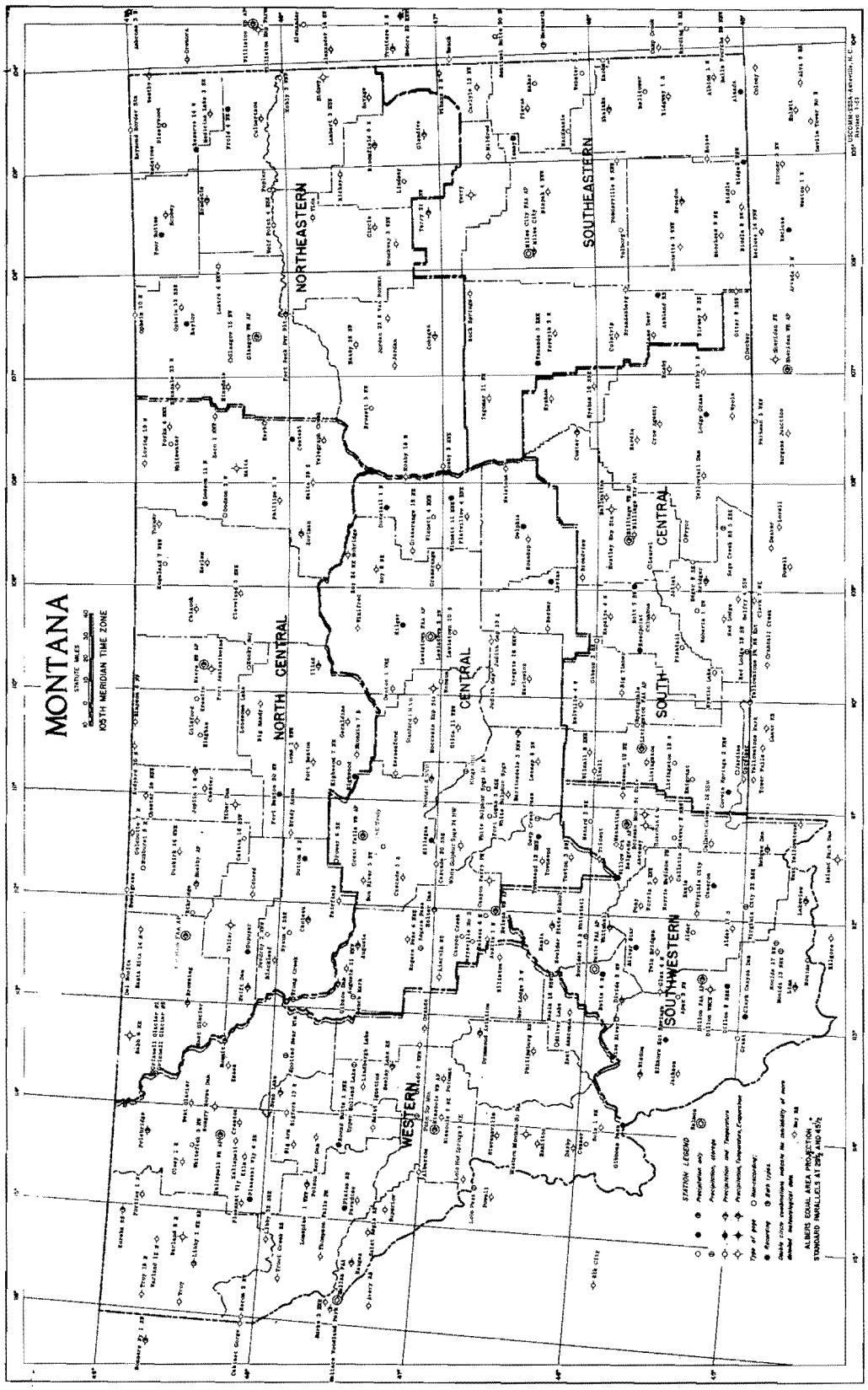

FIGURE 40.—Montana climatological stations.

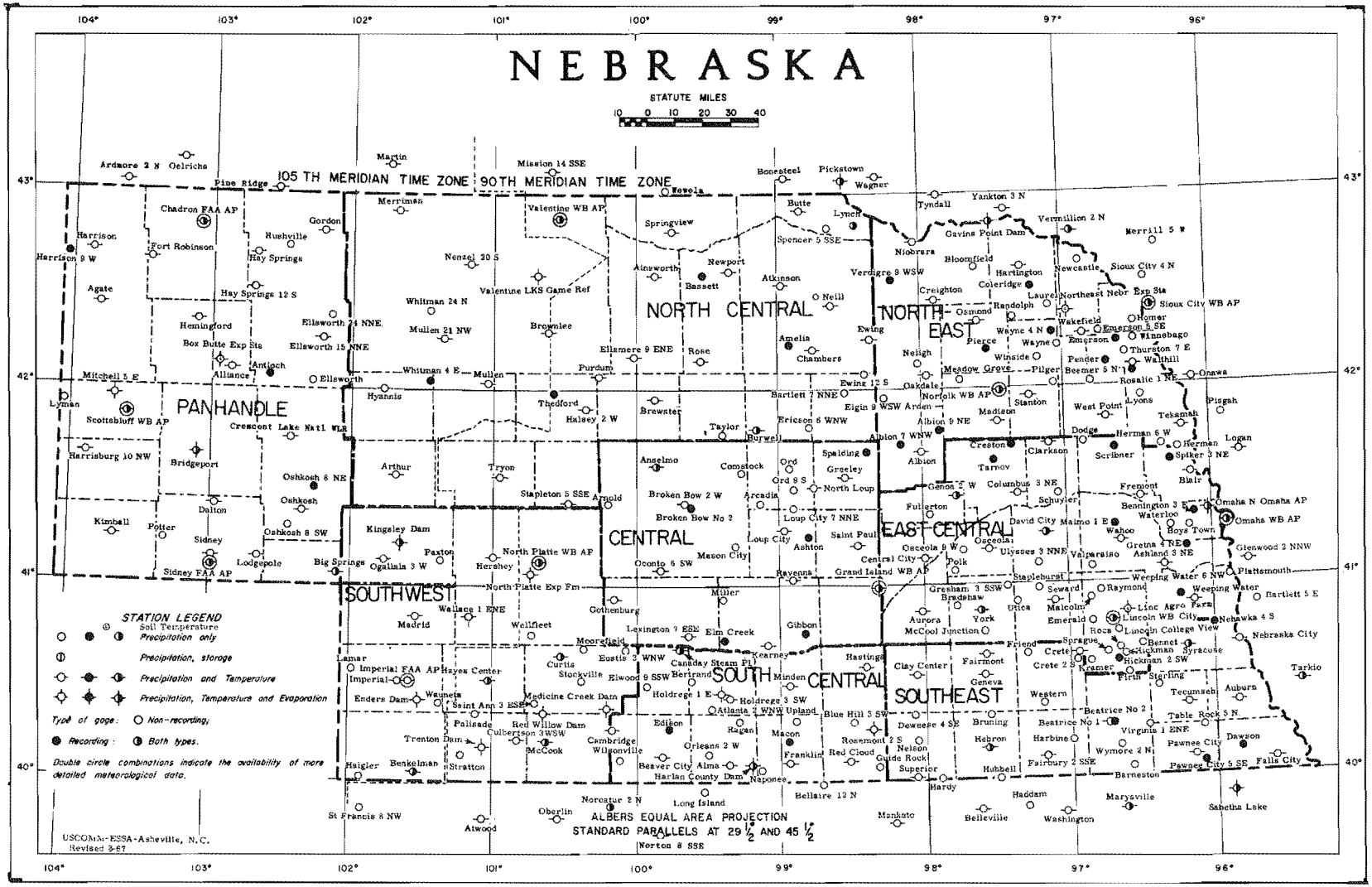

FIGURE 41.—Nebraska climatological stations.

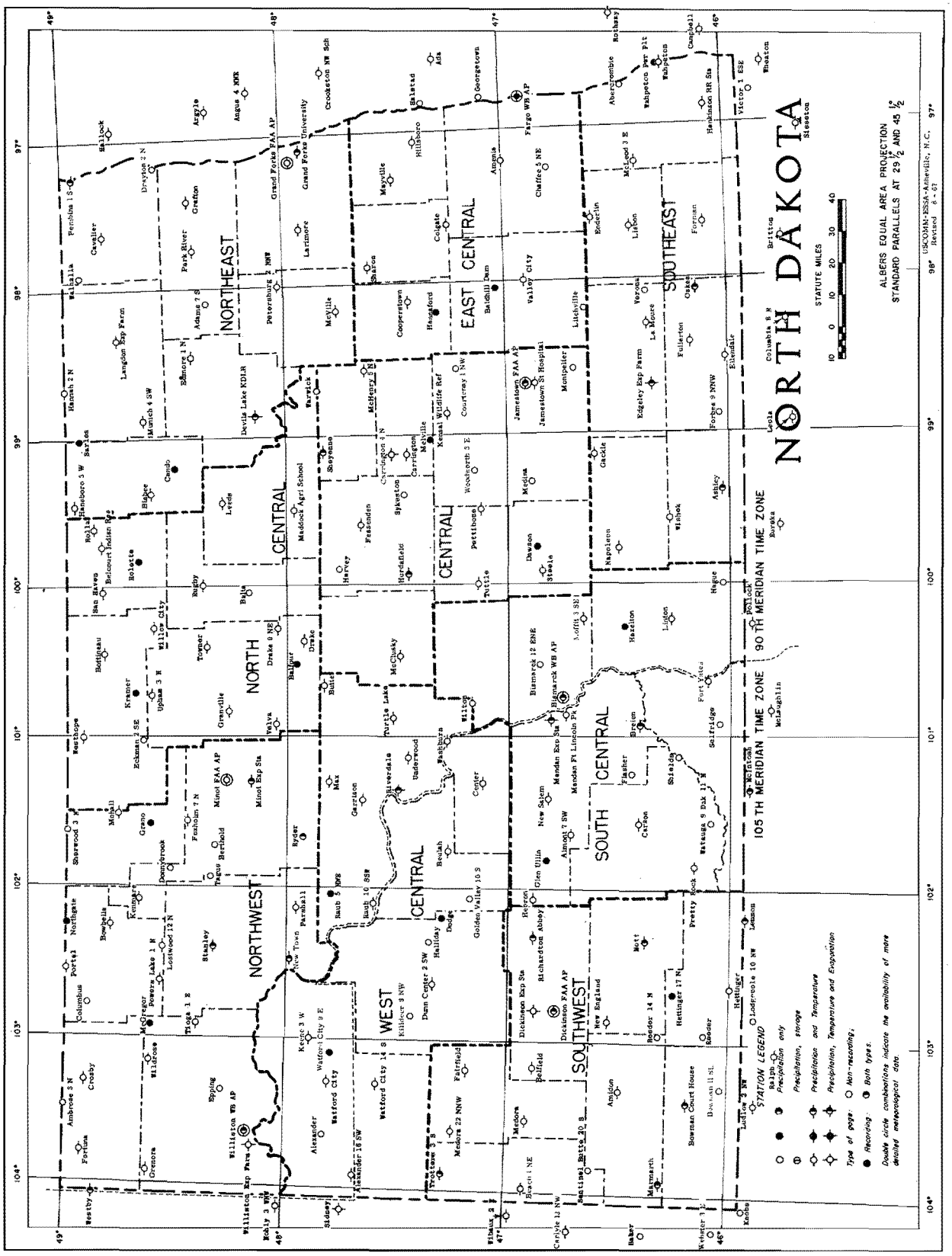

FIGURE 42. — North Dakota climatological stations.

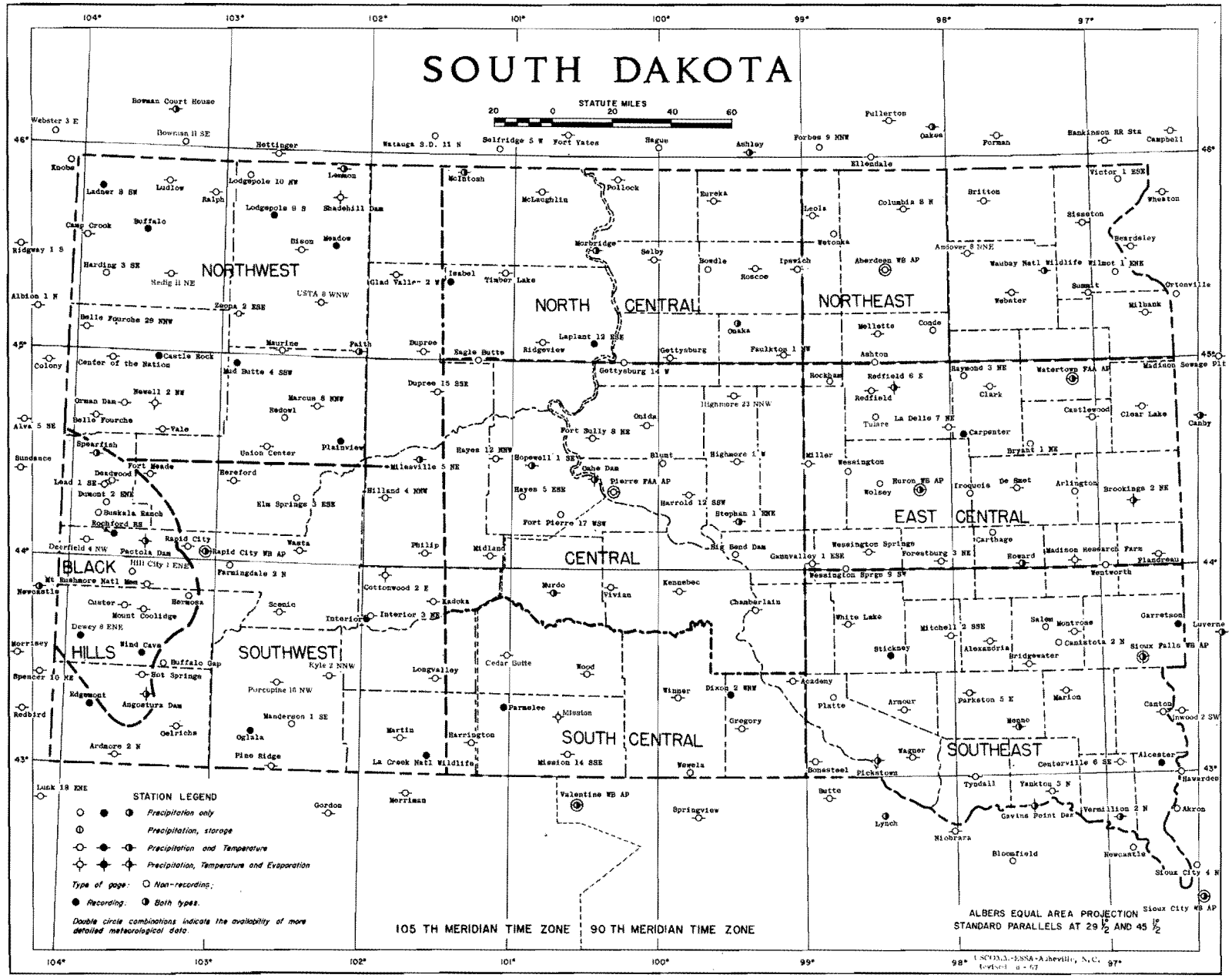

FIGURE 43. — South Dakota climatological stations.

FIGURE 44.—Wisconsin climatological stations.

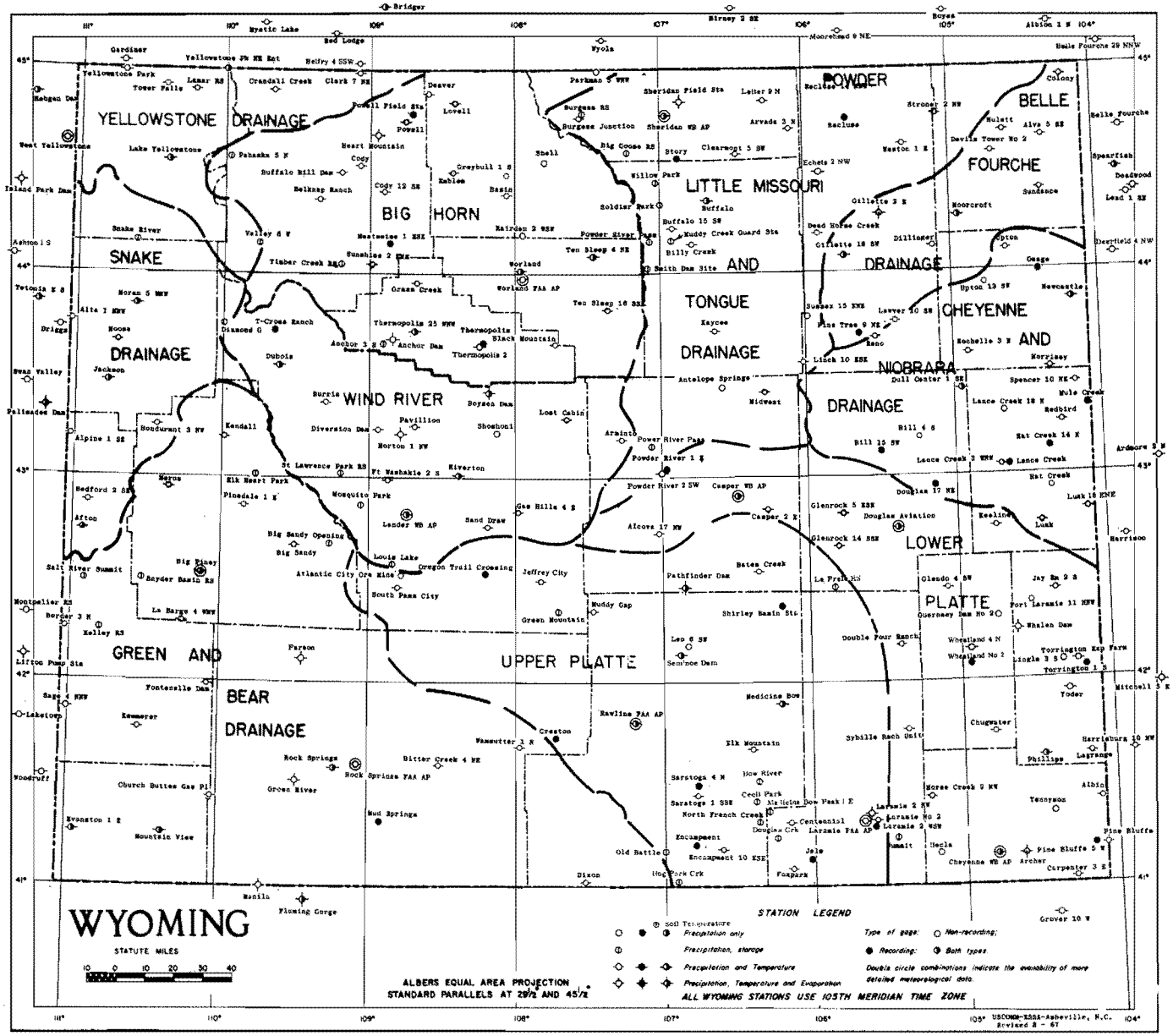

FIGURE 45. — Wyoming climatological stations.

TABLE 1.—*Flood stage and comparative crest stage data: Red River of the North, Upper Mississippi, and Missouri Basins*

River and station Map index no. in ( )	Flood stage	Above flood stages dates March-May 1969		Month and year *Crest March-May 1969		Month and year Previous maximum crest of record		Month and year Previous second highest crest of record	
		From-	To-	Stage	Date	Stage	Date	Stage	Date
	Ft.			Ft.		Ft.		Ft.	
Red River of the North Basin									
Sheyenne:									
Lisbon, N. Dak. (1)	14.6	Apr. 10	Apr. 14	16.36	Apr. 12	16.23	Mar. 30, 1966	16.02	Apr. 14, 1965
		Apr. 19	Apr. 29	16.54	Apr. 24				
West Fargo, N. Dak. (2)	16.5	Apr. 11	May 6	21.7	Apr. 17	21.04	Mar. 22-23, 1966	20.75	Apr. 19, 1965
Buffalo:									
Dilworth, Minn. (3)	12	Apr. 9	Apr. 23	25.55	Apr. 11	23.56	June 11, 1962		
Red Lake:									
Crookston, Minn. (4)	15	Apr. 9	Apr. 20	27.33	Apr. 12	25.8	Apr. 13, 1965	25.7	May 7, 1950
Souris:									
Sherwood (nr), N. Dak. (5)	18b	Apr. 9	May 1	24.72	Apr. 11	23.80	Apr. 28, 1948	p22+	1927
Foxholm (nr), N. Dak. (6)	8b	Apr. 9	May 22	15.84	Apr. 17-18	14.79	May 16, 1948		
Minot (abv), N. Dak. (7)	15	Apr. 8	Apr. 13	17.04	Apr. 10				
		Apr. 16	May 8	20.36	Apr. 19	p26	1882	23	Apr. 1904
Verendrye (nr), N. Dak. (8)	17b	Apr. 28	May 1	17.05	Apr. 30	H17.7	Apr. 8, 1949		
Bantry (nr), N. Dak. (9)	7b	Apr. 11	June 14	13.80	May 4	13.76	Apr. 13, 1949		
Westhope (nr), N. Dak. (10)	7b	Apr. 9	June 27	17.6	Apr. 19	H16.9	Apr. 20, 1949		
Red River of the North:									
Wahpeton, N. Dak. (11)	10	Apr. 8	May 1	16.34	Apr. 10	p17.0	Apr. 1897	15.0	Apr. 12, 1952
Fargo, N. Dak. (12)	17	Apr. 8	May 14	37.34	Apr. 15	p40.1	Apr. 7, 1897	p37.8	Apr. 11, 1882
Halstad, Minn. (13)	24	Apr. 11	May 3	38.29	Apr. 18	p38.5	1897	35.5	Mar. 27, 1966
Grand Forks, N. Dak. (14)	28	Apr. 11	May 8	45.69	Apr. 16	p50.2	Apr. 10, 1897	49.5	Apr. 21, 1882
Oslo, Minn. (15)	28	Apr. 12	May 9	36.9	Apr. 17	37.08	Apr. 5, 1966	35.1	Apr. 4, 1967
Drayton, N. Dak. (16)	32	Apr. 14	May 15	41.35	Apr. 23	42.15	Apr. 8, 1966	40.4	Apr. 22, 1965
Pembina, N. Dak. (17)	42	Apr. 16	May 15	49.7	Apr. 26	52.9	May 14, 1950	51.7	May 1, 1950
Emerson, N. Dak. (18)	781.5	Apr. 18	May 14	787.61	Apr. 26	791.2	Apr. 18, 1897	790.9	May 13, 1950
Upper Mississippi Basin									
Crow:									
Delano, Minn. (19)	8	Apr. 4	Apr. 28	15.6	Apr. 12				
Rockford, Minn. (20)	10	Apr. 7	Apr. 27	16.5	Apr. 13	19.27	Apr. 16, 1965	16.24	Apr. 13, 1952
Rum:									
St. Francis, Minn. (21)	8.5	Apr. 10	Apr. 19	11.6	Apr. 13	11.57	Apr. 20, 1965	11.03	Apr. 13, 1952
St. Croix:									
Stillwater, Minn. (22)	87	Apr. 11	Apr. 25	92.3	Apr. 16	94.1	Apr. 18, 1965	89.71	Apr. 14, 1952
Yellow Medicine:									
Granite Falls (nr), Minn. (23)	6	Apr. 8	Apr. 21	14.9	Apr. 10	17.5	June 1919	12.41	June 18, 1957
Redwood:									
Marshall, Minn. (24)	7	Apr. 9	Apr. 9	7.6	Apr. 9	11.05	Apr. 6, 1951	10.14	June 17, 1957
Redwood Falls, Minn. (25)	6	Apr. 6	Apr. 18	14.6	Apr. 9	p17.0	1917	15.92	June 18, 1957
Cottonwood:									
New Ulm (nr), Minn. (26)	11	Apr. 4	Apr. 18	19.2	Apr. 10	J20.86	Apr. 8, 1965	16.94	July 9, 1947
Minnesota:									
Montevideo, Minn. (27)	14	Apr. 9	May 11	21.7	Apr. 12	20.02	Apr. 10, 1952	16.80	Apr. 11, 1951
Mankato, Minn. (28)	19	Apr. 6	Apr. 25	27.1	Apr. 12	p29.90	Apr. 26, 1881	29.09	Apr. 10, 1965
Jordan, Minn. (29)	20	Mar. 27	May 16	32.9	Apr. 14	34.37	Apr. 12, 1965	28.31	Apr. 16, 1952
Chaska, Minn. (30)	18	Mar. 29	May 12	32.4	Apr. 14	34.25	Apr. 13, 1965	29.1	Apr. 15,16, 1952
Savage, Minn. (31)	698	Mar. 30	May 17	716.9	Apr. 15	719.35	Apr. 14, 1965	714.2	Apr. 16, 1962
Mendota, Minn. (32)	699	Apr. 7	May 7	714.7	Apr. 15	717.46	Apr. 16, 1965	712.57	Apr.14-15,1952
Chippewa:									
Durand, Wis. (33)	11	Apr. 9	Apr. 13	12.5	Apr. 10	p18.4	Sept. 12, 1884	16.93	Apr. 2, 1967
Zumbro:									
Zumbro Falls, Minn. (34)	18	Apr. 4	Apr. 5	20.1	Apr. 5	30.80	July 22, 1951	p30.5	Apr. 1888
Theilman, Minn. (35)	38	Apr. 5	Apr. 7	40.6	Apr. 5	45.75	Mar. 2, 1965	45.2	Apr. 7, 1965
Trempealeau:									
Dodge, Wis. (36)	7	Mar. 26	Mar. 26	7.0	Mar. 26	10.42	Mar. 28, 1967	10.35	Apr. 4, 1956
		Apr 7	Apr. 9	7.6	Apr. 7				
Black:									
Galesville (nr), Wis. (37)	12	Apr. 7	Apr. 9	12.6	Apr. 7	14.63	Apr. 1, 1967	14.31	Sept. 11, 1938
Root:									
Hokah, Minn. (38)	47	Apr. 4	Apr. 6	49.1	Apr. 5	50.8	Mar. 2, 1965	50.0	Mar. 9, 1950
Kickapoo:									
Steuben, Wis. (39)	8	Mar. 25	Mar. 28	8.7	Mar. 27	13.66	July 22, 1951	12.33	Mar. 28, 1961
		Apr. 7	Apr. 10	8.8	Apr. 9				
Wisconsin:									
Portage, Wis. (40)	17	Apr. 9	Apr. 12	17.2	Apr. 11	20.5	Sept. 14, 1938	19.6	May 10,1960
Shell Rock:									
Marble Rock, Iowa (41)	4	Mar. 24	Mar. 28	4.5	Mar. 25	12.0	Mar. 27, 1961	9.35	Apr. 7, 1951
West Fork Cedar:									
Finchford, Iowa (42)	12	Mar. 23	Mar. 27	13.7	Mar. 25	17.28	June 27, 1951	15.91	Apr. 7, 1965

TABLE 1.—*Flood stage and comparative crest stage data: Red River of the North, Upper Mississippi, and Missouri Basins—Continued*

River and station Map index no. in ( )	Flood stage	Above flood stages dates March-May 1969		Month and year Crest March-May 1969		Month and year Previous maximum crest of record		Month and year Previous second highest crest of record	
		From-	To-	Stage	Date	Stage	Date	Stage	Date
	Ft.			Ft.		Ft.		Ft.	
Upper Mississippi Basin (cont'd):									
Black Hawk Creek:									
Hudson, Iowa (43)	12	Mar. 20	Mar. 22	15.2	Mar. 19	16.93	Mar. 31, 1960	15.46	Feb. 21, 1953
		Mar. 25	Mar. 26	12.95	Mar. 25				
		Apr. 5	Apr. 5	13.05	Apr. 5				
Iowa:									
Marshalltown, Iowa (44)	13	Mar. 18	Mar. 30	17.67	Mar. 20	17.74	June 4, 1918	17.63	Apr. 6, 1965
		Apr. 4	Apr. 5	14.2	Apr. 4				
Wapello, Iowa (45)	10	Mar. 27	Apr. 4	11.9	Apr. 1	17.25	Apr. 13, 1965	17.02	Apr. 5, 1960
		Apr. 11	Apr. 14	10.4	Apr. 12-13				
North Skunk:									
Sigourney, Iowa (46)	16	Mar. 21	Mar. 22	17.0	Mar. 22	25.33	Mar. 31, 1960	23.9	June 14, 1966
Skunk:									
Ames, Iowa (47)	10	Mar. 19	Mar. 21	12.1	Mar. 20	12.6	Apr. 6, 1965		
Oskaloosa, Iowa (48)	15	Mar. 19	Mar. 25	18.2	Mar. 22	p25.8	May 23, 1944	21.26	June 15, 1947
Brighton, Iowa (49)	14	Mar. 24	Mar. 27	15.3	Mar. 25				
West Fork Des Moines:									
Jackson, Minn. (50)	10	Apr. 5	Apr. 28	19.5	Apr. 11	18.62	Apr. 6, 1965	17.43	June 8, 1953
Estherville, Iowa (51)	7	Apr. 4	Apr. 30	17.7	Apr. 12	15.61	Apr. 10, 1965	15.53	June 8, 1953
Humboldt, Iowa (52)	8	Apr. 5	May 2	15.4	Apr. 14	13.90	Apr. 8, 1965	12.2	June 23, 1947
Boone:									
Webster City, Iowa (53)	10	Mar. 24	Mar. 26	11.55	Mar. 25	p19.1	June 10, 1918	18.55	June 22, 1954
North Raccoon:									
Jefferson, Iowa (54)	10	Mar. 20	Apr. 12	15.9	Mar. 26	22.3	June 23, 1947	19.5	June 22, 1954
				14.5	Apr. 7				
		Apr. 18	Apr. 20	10.1	Apr. 18				
South Raccoon:									
Redfield, Iowa (55)	14	Mar. 18	Mar. 20	16.6	Mar. 19	29.04	July 2, 1958	24.3	June 12, 1947
Raccoon:									
Van Meter, Iowa (56)	13	Mar. 18	Mar. 30	17.6	Mar. 25	21.77	July 3, 1958	21.6	June 13, 1947
Des Moines (SW 18th St.), Iowa (57)	12	Mar. 25	Mar. 29	14.8	Mar. 26	19.8	June 13, 1947	18.8	Apr. 2, 1960
North:									
Norwalk, Iowa (58)	14	Mar. 17	Mar. 20	21.4	Mar. 19	25.3	June 13, 1947	22.6	July 1, 1959
		Mar. 25	Mar. 27	18.3	Mar. 25				
Cedar Creek:									
Bussey, Iowa (59)	16.5	Apr. 27	Apr. 27	17.0	Apr. 27	#28.45	June 1946	28.06	July 2, 1958
Des Moines:									
Fort Dodge, Iowa (60)	10	Apr. 11	Apr. 20	12.8	Apr. 15	19.62	June 23, 1947	19.28	June 21, 1954
Boone, Iowa (61)	12	Mar. 25	Mar. 26	12.8	Mar. 25	25.35	June 22, 1954	22.89	Apr. 9, 1965
		Apr. 4	Apr. 10	14.5	Apr. 7				
		Apr. 13	Apr. 21	14.4	Apr. 16				
Des Moines (SE 14th St.), Iowa (62)	21	Mar. 22	Apr. 1	26.3	Mar. 27	p30.5	May 31, 1903	29.78	Apr. 11, 1965
		Apr. 7	Apr. 12	24.2	Apr. 11				
		Apr. 15	Apr. 22	24.2	Apr. 19				
Tracy, Iowa (63)	14	Mar. 26	Apr. 19	15.55	Mar. 28	26.5	June 14, 1947	p25.0	May 31, 1903
				15.9	Apr. 11				
Eddyville, Iowa (64)	15	Mar. 26	Apr. 19	16.9	Mar. 28	28.1	June 14, 1947	24.8	May 31, 1903
				17.5	Apr. 10				
Ottumwa, Iowa (65)	10	Mar. 27	Apr. 19	10.4	Mar. 28	23.0	May 31, 1903	21.1	June 7, 1947
				11.6	Apr. 17				
Salt:									
New London, Mo. (66)	19	Mar. 25	Mar. 25	19.8	Mar. 25	29.92	Aug. 2, 1958	28.8	June 21, 1928
		Apr. 6	Apr. 7	19.75	Apr. 6				
		Apr. 20	Apr. 20	19.85	Apr. 20				
Sangamon:									
Riverton, Ill. (67)	13	Mar. 25	Mar. 30	15.7	Mar. 28	31.52	May 19, 1943		
		Apr. 6	Apr. 7	13.7	Apr. 6				
		Apr. 10	Apr. 27	14.5	Apr. 11				
				15.9	Apr. 15				
				20.3	Apr. 20				
Petersburg, Ill. (68)	497	Apr. 21	Apr. 22	498.2	Apr. 21	507.9	May 20, 1943	502.3	July 1, 1951
Illinois:									
La Salle, Ill. (69)	20	Apr. 18	Apr. 19	20.0	Apr. 18	31.0	May 22, 1943	30.2	Jan. 22, 1961
Havana, Ill. (70)	14	Apr. 20	May 2	15.3	Apr. 25	27.3	May 25, 1943	23.5	Oct. 12, 1926
Beardstown, Ill. (71)	18	Apr. 19	May 6	17.0	Apr. 25	29.7	May 26, 27, 1943	26.2	Apr. 29-30, 1944
Meredosia, Ill. (72)	428	Apr. 1	May 18	434.5	Apr. 25	428.61	May 26, 1943		
Kaskaskia:									
Shelbyville, Ill. (73)	13	Apr. 19	Apr. 21	14.1	Apr. 20	22.37	June 29, 1957	21.17	May 19, 1943
Vandalia, Ill. (74)	18	Apr. 15	Apr. 23	19.3	Apr. 17	27.39	June 29, 1951	25.7	June 15, 1957
				23.2	Apr. 19				
Big Muddy:									
Murphysboro, Ill. (75)	16	Apr. 10	May 7	23.7	Apr. 23	37.97	May 12, 1961	36.01	Jan. 28, 1949

TABLE 1.—*Flood stage and comparative crest stage data: Red River of the North, Upper Mississippi, and Missouri Basins—Continued*

River and station Map Index No. in ( )	Flood stage	Above flood stages dates March-May 1969		Month and year Crest March-May 1969		Month and year Previous maximum crest of record		Month and year Previous second highest crest of record	
		From-	To-	Stage	Date	Stage	Date	Stage	Date
	Ft.			Ft.		Ft.		Ft.	
Upper Mississippi Basin (cont'd)									
Mississippi:									
Libby, Minn. (76)	13	Apr. 14	May 11	16.4	Apr. 21	20.02	May 17, 1950	15.76	Apr. 25, 1966
Aitkin, Minn. (77)	15	Apr. 14	May 1	17.3	Apr. 23	22.49	May 20, 1950	17.5	Apr. 26, 1965
Fort Ripley, Minn. (78)	10	Apr. 9	May 2	13.1	Apr. 13	13.55	Apr. 16, 1965	13.3	May 22, 1950
Anoka, Minn. (79)	838	Apr. 10	Apr. 20	841.4	Apr. 13				
Minneapolis, Minn. (80)	16	Apr. 11	Apr. 17	17.5	Apr. 14	20.0	Apr. 16, 1965	19.5	Apr. 14, 1952
St. Paul, Minn. (81)	14	Apr. 9	Apr. 30	24.5	Apr. 15	26.01	Apr. 16, 1965	22.02	Apr. 16, 1952
Hastings, Minn. (82)	15	Apr. 10	May 2	24.3	Apr. 16	25.4	Apr. 17, 1965	20.93	Apr. 16, 1952
Red Wing, Minn. (83)	14	Apr. 12	Apr. 26	18.8	Apr. 17	20.9	Apr. 18, 1965	20.7	Apr. 18, 1952
Lake City, Minn. (84)	16	Apr. 11	Apr. 27	20.2	Apr. 17	22.18	Apr. 19, 1965	19.15	Apr. 18, 1952
Wabasha, Minn (85)	12	Apr. 10	May 3	17.6	Apr. 17	20.05	Apr. 19, 1965	p17.1	June 18, 1880
Alma, Wis. (86)	16	Apr. 14	Apr. 23	17.6	Apr. 18	19.85	Apr. 19, 1965	16.3	Apr. 19, 1952
Winona, Minn. (87)	13	Apr. 11	Apr. 30	19.5	Apr. 19	20.77	Apr. 19, 1965	17.91	Apr. 20, 1952
LaCrosse, Wis. (88)	12	Apr. 11	Apr. 30	15.7	Apr. 20	17.9	Apr. 21, 1965	16.5	June 19, 1880
Lansing, Iowa (89)	18	Apr. 19	Apr. 25	18.9	Apr. 22	22.52	Apr. 22, 1965	p19.9	June 20 or 21, 1880
McGregor, Iowa (90)	18	Apr. 15	Apr. 30	21.6	Apr. 22	25.38	Apr. 24, 1965	21.50	June 22, 1880
Guttenberg, Iowa (91)	15	Apr. 14	May 3	19.9	Apr. 22	23.65	Apr. 24, 1965	20.1	1880
Cassville, Wis. (92)	17	Apr. 14	May 4	20.5	Apr. 23				
Dubuque, Iowa (93)	17	Apr. 14	May 5	23.1	Apr. 23	26.81	Apr. 26, 1965	22.70	Apr. 25, 1952
Clinton, Iowa (94)	16	Apr. 17	May 7	21.25	Apr. 25	24.85	Apr. 28, 1965	20.92	Apr. 28, 1952
LeClaire, Iowa (95)	10	Apr. 17	May 8	14.6	Apr. 26	17.75	Apr. 28, 1965	14.0	Apr. 27, 1952
Moline, Ill. (96)	13.5	Apr. 18	May 6	17.4	Apr. 26-27	20.6	Apr. 28, 1965	16.6	Apr. 27, 28, 1952
Davenport, Iowa (97)	15	Apr. 18	May 6	19.3	Apr. 27	22.48	Apr. 28, 1965	20.9	Mar. 10, 1868
Muscatine, Iowa (98)	16	Apr. 18	May 7	21.2	Apr. 26	24.81	Apr. 29, 1965	21.05	Apr. 28, 1952
Keithsburg, Ill. (99)	12	Apr. 11	May 16	17.2	Apr. 26	20.36	Apr. 27, 1965	17.1	Apr. 29, 1951
Burlington, Iowa (100)	15	Apr. 18	May 10	18.4	Apr. 30	21.0	Apr. 30, 1965	18.94	June 1851
Keokuk, Iowa (101)	16	Apr. 19	May 5	17.85	Apr. 27	22.14	May 1, 1965	21.83	Apr. 3, 1960
Gregory Landing, Mo. (102)	15	Apr. 18	May 10	18.3	Apr. 27	22.71	May 1, 1965	22.31	Apr. 4, 1960
Quincy, Ill. (103)	17	Apr. 18	May 10	20.2	Apr. 29	24.80	Apr. 28, 1965	24.38	Apr. 4, 1960
Hannibal, Mo. (104)	16	Apr. 6	Apr. 7	16.2	Apr. 6	24.59	May 1, 1965	23.4	Apr. 4, 1960
		Apr. 11	May 14	20.45	May 1				
Louisiana, Mo. (105)	15	Apr. 6	Apr. 9	15.9	Apr. 7	22.6	June 22, 1947	22.1	June 10, 1947
		Apr. 15	May 15	19.2	Apr. 21			22.1	May 1, 1965
Clarksville, Mo. (106)	25	Apr. 6	Apr. 9	26.0	Apr. 7	32.53	June 22, 1947	32.2	May 2, 1965
		Apr. 15	May 16	29.5	Apr. 22				
Winfield, Mo. (107)	26	Apr. 8	Apr. 8	26.0	Apr. 8	33.64	June 24, 1947	32.7	May 2, 1965
		Apr. 19	May 15	30.0	Apr. 22				
Grafton, Ill. (108)	18	Apr. 7	Apr. 12	18.5	Apr. 9	p32.13	June 1844	p30.70	June 1858
		Apr. 17	May 14	22.9	Apr. 22				
Alton, Ill. (109)	21	Apr. 8	Apr. 10	21.8	Apr. 9	p36.94	June 1844	34.43	May 24, 1943
		Apr. 19	May 8	26.2	Apr. 22				
				25.8	May 2				
St. Louis, Mo. (110)	30	Apr. 21	Apr. 23	31.1	Apr. 21	p41.32	June 27, 1844	40.28	July 22, 1951
		May 1	May 3	30.9	May 1				
Chester, Ill. (111)	27	Apr. 9	Apr. 11	27.6	Apr. 10	p39.83	June 30, 1844	39.28	July 23, 1951
		Apr. 20	May 7	31.25	Apr. 23				
Cape Girardeau, Mo. (112)	32	Apr. 10	Apr. 12	32.4	Apr. 11	p42.53	July 4, 1844	42.37	May 27, 1943
		Apr. 20	May 7	36.1	Apr. 24				
Missouri Basin									
Yellowstone:									
Miles City, Mont. (113)	15	Mar. 19	Mar. 19	16.11	Mar. 19	H21.7	Mar. 20, 1944		
Glendive (nr), Mont. (114)	54	Mar. 20	Mar. 20	62.8	Mar. 20	60.5	Mar. 19, 1959		
Sidney, Mont. (115)	19	Mar. 21	Mar. 21	21.0	Mar. 21	23.85	Mar. 22, 1947	21.7	Mar. 30, 1952
Spring Creek:									
Zap, N. Dak. (116)	14	Apr. 3	Apr. 8	20.27	Apr. 6	20.03	Apr. 7, 1952	p20+	1913
Knife:									
Hazen, N. Dak. (117)	21	Apr. 3	Apr. 9	24.75	Apr. 7	27.01	June 24, 1966	26.3	Mar. 26 or 27, 1943
Heart:									
Mandan, N. Dak. (118)	17	Apr. 3	Apr. 9	22.84	Apr. 4	25.75	Apr. 4, 1952	24.7	Mar. 26, 1943
Cannonball:									
Breien, N. Dak. (119)	8	Apr. 4	Apr. 7	13.9	Apr. 4	22.30	Apr. 19, 1950	17.4	Mar. 27, 1943
Pipestem:									
Buchanan, N. Dak. (120)	8	Apr. 9	Apr. 15	12.08	Apr. 10	11.89	Apr. 9, 1950	10.77	Apr. 17, 1950
James:									
Jamestown, N. Dak. (121)	12	Apr. 10	Apr. 17	16.9	Apr. 11	*17.8	May 13, 1950		
La Moure, N. Dak. (122)	8.2	Apr. 9	Apr. 18	16.17	Apr. 14	15.34	May 16, 1950		
Columbia, S. Dak. (123)	11	Apr. 9	July 27	16.4	Apr. 11	16.89	May 24, 1950	16.53	Apr. 17, 1952
				17.1	Apr. 23				
Stratford, S. Dak. (124)	14	Apr. 11	Aug. 29	18.2	Apr. 19	18.13	Apr. 19, 1952		
Ashton, S. Dak. (125)	13	Apr. 7	May 27	21.2	Apr. 13	19.59	Apr. 23, 24, 1952	19.14	May 19, 1950
				20.6	Apr. 24				
Redfield, S. Dak. (126)	20	Apr. 6	May 5	24.9	Apr. 13	22.12	Apr. 11, 1952		
				22.4	Apr. 24				
Huron, S. Dak. (127)	11	Apr. 5	May 20	16.70	Apr. 13	H19.8	Apr. 11, 13, 1881	16.5	Mar. 22, 1922
				15.2	Apr. 25				
Forestburg, S. Dak. (128)	12	Apr. 4	May 25	17.2	Apr. 9	18.2	Mar. 1922	18	Mar. 1920
Mitchell, S. Dak. (129)	14			18.3	Apr. 11	12.98	Mar. 23, 1966		
Scotland (nr), S. Dak. (130)	13	Apr. 2	May 31	18.55	Apr. 13	18.74	Apr. 3, 1962	16.23	Apr. 23, 1952

TABLE 1.—*Flood stage and comparative crest stage data: Red River of the North, Upper Mississippi, and Missouri Basins—Continued*

River and station Map Index No. in ( )	Flood stage	Above flood stages dates March-May 1969		Month and year *Crest March-May 1969		Month and year Previous maximum crest of record		Month and year Previous second highest crest of record	
		From-	To-	Stage	Date	Stage	Date	Stage	Date
	Ft.			Ft.		Ft.		Ft.	
Missouri Basin (cont'd)									
Vermillion:									
Wakonda (nr), S. Dak. (131)	14	Apr. 3	Apr. 15	17.17	Apr. 6	16.94	Apr. 1, 1960	16.63	June 13, 1947
Skunk Creek:									
Sioux Falls, S. Dak. (132)	10	Apr. 4	Apr. 8	10.5	Apr. 5	17.78	June 17, 1957	12.16	Mar. 29, 1952
				13.2	Apr. 6				
Little Rock:									
Doon (nr), Iowa (133)	15	Apr. 3	Apr. 9	19.7	Apr. 5	18.0	Mar. 29, 1960		
Rock:									
Rock Rapids, Iowa (134)	9	Apr. 5	Apr. 10	17.5	Apr. 8	14.5	Mar. 29, 1962		
Rock Valley, Iowa (135)	11	Apr. 3	Apr. 12	17.3	Apr. 7	p17.0	1897	16.91	Mar. 30, 1962
Big Sioux:									
Flandreau, S. Dak.(136)	6	Apr. 6	Apr. 15	12.0	Apr. 9	9.2	June 17, 1957	8.3	Apr. 3, 1951
Del Rapids, S. Dak. (137)	12	Apr. 6	Apr. 18	16.5	Apr. 9	15.14	Mar. 30, 1962	14.93	June 18, 1957
Sioux Falls, S. Dak. (138)	10	Apr. 6	Apr. 13	14.2	Apr. 10				
Hawarden, Iowa(139)	15	Apr. 4	Apr. 20	24.6	Apr. 9	23.2	Mar. 30, 1962	22.3	Apr. 1, 1960
Akron, Iowa (140)	16	Apr. 4	Apr. 21	22.99	Apr. 9	22.08	Mar. 31, 1962	21.56	Apr. 1, 1960
Sioux City, Iowa (141)	99	Apr. 8	Apr. 17	110.7	Apr. 10	110.90	Apr. 3, 1960	109.15	Apr. 2, 1962
West Branch Floyd:									
Struble, Iowa (142)	14	Apr. 1	Apr. 7	15.4	Apr. 4	15.63	Mar. 28, 1962		
Floyd:									
Alton, Iowa (143)	12	Apr. 1	Apr. 9	17.8	Apr. 4	18.35	Mar. 28, 1962	17.36	Apr. 1, 1965
LeMars, Iowa (144)	20	Apr. 3	Apr. 8	23.9	Apr. 4	p26.4	June 8, 1953	22.8	Mar. 29, 1960
Merrill, Iowa (145)	12	Apr. 3	Apr. 8	16.6	Apr. 5	18.4	June 7, 1934	18.0	June 8, 1953
James, Iowa (146)	16	Apr. 2	Apr. 9	21.6	Apr. 5	25.3	June 8, 1953	22.4	Mar. 29, 1962
West Fork Little Sioux:									
Holly Springs, Iowa (147)	18	Apr. 5	Apr. 5	18.7	Apr. 5	25.2	Mar. 30, 1960	22.46	Mar. 28, 1962
Little Sioux:									
Spencer, Iowa (148)	10	Apr. 3	Apr. 21	16.2	Apr. 7	20.05	June 8, 1953	17.2	Apr. 6, 1965
Gillett Grove, Iowa (149)	12	Apr. 4	Apr. 19	17.8	Apr. 8	18.67	Apr. 7, 1965	17.87	June 9, 1953
Linn Grove, Iowa (150)	12	Mar. 29	Apr. 24	21.1	Apr. 9	22.35	Apr. 6, 1965	20.9	June 10, 1953
Peterson, Iowa (151)	15	Apr. 4	Apr. 17	21.0	Apr. 9	22.0	Apr. 6, 1965	20.90	June 10, 1953
Cherokee, Iowa (152)	17	Apr. 3	Apr. 16	23.8	Apr. 7	27.2	Apr. 6, 1965	p25.7	June 1891
Correctionville, Iowa (153)	19	Apr. 4	Apr. 16	23.6	Apr. 8	p29.34	June 23or24, 1891	25.86	Apr. 7, 1965
Wood:									
Gibbon, Nebr. (154)	15	Mar. 19	Mar. 20	15.8	Mar. 20	16.79	June 15, 1967	16.23	July 1, 1965
Alda, Nebr. (155)	10	Mar. 19	Mar. 22	11.6	Mar. 21	12.22	June 16, 1967	11.06	July 3, 1965
Grand Island, Nebr. (156)	4.8	Mar. 20	Mar. 23	5.25	Mar. 22	5.8	June 17, 1967	5.2	June 27, 1968
Loup:									
Columbus, Nebr. (157)	11	Mar. 19	Mar. 20	13.45	Mar. 20	14.42	Aug. 14, 1966	p12.0	June 23, 1947
North Branch Elkhorn:									
Osmond (nr), Nebr. (158)	10	Apr. 2	Apr. 2	10.7	Apr. 2				
Pierce (nr), Nebr. (159)	12	Apr. 2	Apr. 4	13.8	Apr. 2	15.15	Mar. 28, 1962	p14.79	May 11, 1944
Hadar (nr), Nebr. (160)	12	Apr. 2	Apr. 4	14.0	Apr. 3				
Salt Creek:									
Roca, Nebr. (161)	15	Apr. 4	Apr. 4	19.0	Apr. 4	p26.0	May 8, 1950	22.70	July 10, 1958
Nishnabotna:									
Hamburg, Iowa (162)	18	Feb. 25	Mar. 4	21.5	Mar. 2	27.3	Mar. 7, 1949	25.8	Mar. 2, 1965
		Mar. 17	Mar. 21	25.25	Mar. 18				
		Mar. 25	Mar. 26	19.3	Mar. 25				
Little Platte:									
Smithville, Mo. (163)	24	Apr. 4	Apr. 5	24.1	Apr. 5	44.8	July 20, 1965	37.4	1947
		Apr. 27	Apr. 28	26.4	Apr.27				
Platte:									
Agency, Mo. (164)	20	Apr. 27	Apr. 29	22.7	Apr. 28	35.0	July 20, 1965	30.46	June 23, 1947
Lyon Creek:									
Woodbine (nr), Kans. (165)	17	Apr. 27	Apr. 27	22.7	Apr. 27	p34.8	July 1951	31.44	Oct. 7, 1967
Buffalo Creek:									
Jamestown, Kans. (166)	16	Feb. 26	Mar. 1	17.6	Feb. 28	19.31	Sept. 12, 1961	p18.5	1948
Lincoln Creek:									
Seward (nr), Nebr. (167)	15	Mar. 18	Mar. 22	18.0	Mar. 21	20.53	June 17, 1957	19.55	June 15, 1967
West Fork Big Blue:									
Dorchester (nr), Nebr. (168)	15	Mar.19	Mar. 23	20.5	Mar. 20	p24.8	July 10, 1950	20.28	Mar. 30, 1960
		Apr. 4	Apr. 5	19.0	Apr. 4				
Turkey Creek:									
Wilber (nr), Nebr. (169)	11	Mar. 18	Mar. 23	14.0	Mar. 20	p15.5	June 1957	14.92	Mar. 28, 1960
		Apr. 4	Apr. 7	13.5	Apr. 4				
		Apr. 17	Apr. 20	13.7	Apr. 18				

TABLE 1.—*Flood stage and comparative crest stage data: Red River of the North, Upper Mississippi, and Missouri Basins—Continued*

River and station Map Index No. in ( )	Flood stage	Above flood stages dates March-May 1969		Month and year Crest March-May 1969		Month and year Previous maximum crest of record		Month and year Previous second highest crest of record	
		From-	To-	Stage	Date	Stage	Date	Stage	Date
	Ft.			Ft.		Ft.		Ft.	
Missouri Basin (cont'd)									
Black Vermillion:									
Frankfort, Kans. (170)	19	Apr. 27	Apr. 27	25.85	Apr. 27	p30.2	Aug. 3, 1948	29.40	May 30, 1965
Little Blue:									
Deweese, Nebr. (171)	8	Mar. 18	Mar. 20	11.9	Mar. 19	14.6	May 22, 1965	13.3	June 17, 1957
Fairbury, Nebr. (172)	10	Mar. 18	Mar. 21	11.1	Mar. 18,19	16.41	Sept. 6, 1958		
Big Blue:									
Surprise, Nebr.(173)				8.9	Mar. 20	11.5	July 19, 1965		
Ulysses, Nebr. (174)	15	Mar. 18	Mar. 21	19.4	Mar. 20	23.5	June 17, 1957	21.1	June 16, 1967
Seward, Nebr.(175)	18	Mar. 20	Mar. 22	#18.6	Mar. 20	22.83	June 16, 1967	22.34	June 18, 1957
Crete, Nebr. (176)	18	Mar. 18	Mar. 26	27.35	Mar. 21	29.80	June 16, 1967	28.74	July 10, 1950
		Apr. 4	Apr. 7	24.25	Apr. 5				
Beatrice, Nebr.(177)	16	Mar. 20	Mar. 26	23.15	Mar. 23	28.30	June 4, 1951	27.7	June 23, 1947
		Apr. 5	Apr. 7	19.25	Apr. 6				
Barneston, Nebr. (178)	18	Mar. 21	Mar. 25	22.55	Mar. 24	34.3	June 9, 1941	29.76	June 23, 1947
		Apr. 6	Apr. 6	18.0	Apr. 6				
Blue Rapids, Kans. (179)	1101	Feb. 26	Mar. 2	1105.7	Feb. 27				
		Mar. 22	Mar. 25	1102.3	Mar. 22				
Mill Creek:									
Paxico, Kans. (180)	19	Apr. 26	Apr. 27	29.8	Apr. 27	p34.7	July 12, 1951	27.64	June 21, 1967
Soldier Creek:									
Delia (nr), Kans. (181)	12	Apr. 27	Apr. 27	21.2	Apr. 27	p24	June 21, 1951	21.45	June 12, 1967
Topeka (nr), Kans. (182)	12	Apr. 27	Apr. 27	14.15	Apr. 27	20.11	June 12, 1967	19.9	June 12, 1967
Wakarusa:									
Lawrence (nr), Kans.(183)	23	Apr. 28	Apr. 29	28.3	Apr. 28	31.59	July 12, 1951	30.86	June 21,22,1967
Stranger Creek:									
Easton, Kans. (184)	15	Apr. 27	Apr. 28	20.6	Apr. 27				
Tonganoxie (nr), Kans. (185)	22	Apr. 27	Apr. 29	23.9	Apr. 27	28.72	Oct. 13, 1961	28.54	Aug. 1, 1958
Grand:									
Pattonsburg, Mo. (186)	25	Apr. 27	Apr. 27	26.95	Apr. 27	p34.25	June 1947	31.0	July 7, 1951
Gallatin, Mo. (187)	21	Apr. 27	Apr. 28	21.65	Apr. 28	p40	July 8, 1909	37.7	June 2, 1929
Chillicothe, Mo.(188)	24	Apr. 28	Apr. 29	28.7	Apr. 28	33.8	June 7, 1947	p33.6	July 1909
Sumner, Mo. (189)	26	Apr. 17	Apr. 20	30.3	Apr. 19	39.5	June 7,8,1947	37.80	June 16, 1967
Lamine:									
Clifton City, Mo. (190)	19	Apr. 5	Apr. 6	23.2	Apr. 5	H35.3	Sept. 18, 1905	32.5	June 29, 1951
Blackwater:									
Valley City, Mo. (191)	20	Mar. 23	Mar. 26	27.5	Mar. 24	31.75	Sept. 14, 1961	31.4	July 20, 1965
		Apr. 4	Apr. 6	27.0	Apr. 5				
		Apr. 17	Apr. 19	26.0	Apr. 18				
		Apr. 27	Apr. 27	22.1	Apr. 27				
Blue Lick, Mo.(192)	25	Apr. 7	Apr. 9	26.75	Apr. 8	H41.25	Nov. 18, 1928	37.5	July 23, 1965
		Apr. 18	Apr. 22	27.25	Apr. 21				
Dragoon Creek:									
Burlingame, Kans. (193)	15	Apr. 15	Apr. 15	20.7	Apr. 27	p23.4	June 26, 1946	20.67	July 13, 1963
Pottawatomie Creek:									
Lane, Kans. (194)	23	Apr. 28	Apr. 28	23.4	Apr. 28	33.9	Sept. 14, 1961	p32.8	Nov. 17, 1928
Little Osage:									
Horton, Mo. (195)	23	Apr. 5	Apr. 7	24.0	Apr. 6				
		Apr. 17	Apr. 20	24.3	Apr. 18				
		Apr. 28	Apr. 28	23.2	Apr. 28				
Big Creek:									
Blairstown, Mo. (196)	20	Apr. 5	Apr. 5	21.15	Apr. 5	25.40	Sept. 14, 1961		
		Apr. 18	Apr. 19	22.3	Apr. 18				
		Apr. 27	Apr. 27	21.5	Apr. 27				
South Grand:									
Urich, Mo. (197)	22	Apr. 18	Apr. 18	23.75	Apr. 18	26.84	Sept. 15, 1961		
Brownington, Mo. (198)	19	Apr. 21	Apr. 21	19.5	Apr. 21	H39.9	Nov. 19, 1928	35.0	May 9, 1961
Marais des Cygnes:									
Reading (nr), Kans. (199)	18	Apr. 17	Apr. 17	19.25	Apr. 17	26.8	Oct. 7, 1967	25.65	June 21, 1967
		Apr. 27	Apr. 28	26.4	Apr. 27				
Melvern, Kans. (200)	23	Apr. 27	Apr. 28	26.4	Apr. 28	H30.8	July 11, 1951	27.4	Sept. 5, 1951
Osage:									
Schell City, Mo. (201)	25	Mar. 26	Mar. 30	28.3	Mar. 28	45.1	June 17, 1951	42.0	May 22, 1943
		Apr. 7	Apr. 8	25.95	Apr. 7				
		Apr. 19	Apr. 23	27.4	Apr. 20				
		Apr. 29	May 2	27.55	Apr. 30				
Missouri:									
Nebraska City, Nebr. (202)	18	Apr. 13	Apr. 14	18.36	Apr. 13	27.66	Apr. 18, 1952	J25.8	Mar. 6, 1949
St. Joseph, Mo. (203)	17	Apr. 13	Apr. 19	17.6	Apr. 17	27.2	Apr. 29, 1881	26.82	Apr. 22,23,1952
		Apr. 27	Apr. 27	18.25	Apr. 27				

TABLE 1.—*Flood stage and comparative crest stage data: Red River of the North, Upper Mississippi, and Missouri Basins—Continued*

River and station Map Index No. in ( )	Flood stage	Above flood stages dates March-May 1969		Month and year Crest March-May 1969		Month and year Previous maximum crest of record		Month and year Previous second highest crest of record	
		From-	To-	Stage	Date	Stage	Date	Stage	Date
Missouri Basin (cont'd)									
Missouri (cont'd):									
Leavenworth, Kans. (204)	19	Apr. 27	Apr. 27	19.8	Apr. 27	27.6	Apr. 23, 1952	24.4	July 21, 1965
Napoleon, Mo. (205)	17	Apr. 28	Apr. 28	19.1	Apr. 28	34.1	June 1844	28.6	July 15, 1951
Lexington, Mo. (206)	22	Apr. 5	Apr. 6	22.3	Apr. 5	p33.9	June 1844	33.3	July 15, 1951
		Apr. 17	Apr. 19	23.5	Apr. 18				
		Apr. 27	Apr. 29	26.0	Apr. 28				
Waverly, Mo. (207)	18	Apr. 17	Apr. 21	19.94	Apr. 19	28.2	July 14, 1951	28.1	Apr. 24, 1952
		Apr. 27	Apr. 30	22.5	Apr. 28				
Glasgow, Mo. (208)	25	Apr. 19	Apr. 19	25.23	Apr. 19	36.7	July 18, 1951		
		Apr. 28	Apr. 29	26.10	Apr. 29				
Boonville, Mo. (209)	21	Apr. 18	Apr. 20	23.2	Apr. 19	32.82	July 17, 1951	p32.7	June 21, 1844
		Apr. 28	Apr. 30	22.59	Apr. 29				
Jefferson City, Mo. (210)	23	Apr. 19	Apr. 20	23.2	Apr. 19	p38.1	June 1844	34.2	July 18, 1951
Hermann, Mo. (211)	21	Apr. 6	Apr. 9	23.4	Apr. 7	p35.5	June 1844	33.05	July 19, 1951
		Apr. 19	Apr. 22	25.75	Apr. 19				
		Apr. 29	May 2	25.0	Apr. 30				
St. Charles, Mo. (212)	25	Apr. 7	Apr. 9	26.1	Apr. 8	p40.1	June 27, 1844	37.3	July 20, 1951
		Apr. 19	Apr. 23	27.9	Apr. 20				
		Apr. 30	May 2	27.6	Apr. 30				

* Stage adjusted to present site and datum
\# Highest stage reported
___ Exceeded previous maximum crest of record
b Bankfull stage
H High water mark
J Ice jam
p Prior to gage readings

TABLE 2.—*Major floods in order of magnitude: Red River of the North, Upper Mississippi, and Missouri Basins*

Red River of the North Basin

Sheyenne River

West Fargo, N. Dak.
Zero of gage - 877.19 feet
Drainage area - 8,870 square miles (5)
Flood stage - 16 feet
Period of record - 1929-1969

Crest Stage Feet	Date
21.7	Apr.17,1969
21.0	Mar.22-23,1966
20.75	Apr.19,1965
20.6	May 11, 1950
20.5	Apr.18,1947
20.5 (7)	Apr.9-10,1952
20.4	Apr.3,1966
19.35	Apr.1,1943
18.8	June 20,1953
18.5	May 7,1948

Red Lake River (cont'd)

Crookston, Minn.
Zero of gage - 832.72 feet
Drainage area - 5,280 square miles
Flood stage - 15 feet
Period of record - 1901-1969

Crest Stage Feet	Date
27.3	Apr.12,1969
25.8	Apr.12,1965
25.7	May 7,1950
25.2	Apr.11,1897
24.3	Apr.3,1966
23.3	Mar.25,1920
21.8	Apr.17,1916
21.1	July 5,1919
23.3	Mar.25,1920
20.3	Apr.24,1904
18.1	June 12,1947
18.1	Apr.8,1948

Red River of the North (cont'd)

Fargo, N. Dak.
Zero of gage - 861.80 feet (1929 adj.)
Drainage area - 6,800 square miles
Flood stage - 17 feet
Period of record - 1901-1969

Crest Stage Feet	Date
40.1 (1)	Apr.7,1897
37.8 (1)	Apr.11,1882
37.3	Apr.15,1969
34.65	Apr.16,1952
34.3	Apr.7,1943
31.2	Apr.6,1916
30.5	Apr.16,1965
30.1	Mar.23,1966
29.8	Mar.30-31,1907
28.9	Apr.15,1947
28.6	July 12,1916
27.8	Apr.12,1951
27.2	Apr.8,1950

Red Lake River

High Landing, Near Goodridge, Minn.
Zero of gage - 1,141.57 (1912 adj.)
Drainage area - 2,300 square miles
Flood stage - 9 feet
Period of record - 1930-1969

Crest Stage Feet	Date
13.4	May 11,1950
12.4	Apr.3,1966
12.1	Apr.12,1965
10.5	Apr.10,1969
10.1	Mar.18,1966
9.2	Apr.11,1944
9.2	Apr.20,1948
8.4	Apr.16,1947

Red River of the North

Wahpeton, N. Dak.
Zero of gage - 942.97 feet (1929 adj.)
Drainage area - 4,010 square miles
Flood stage - 10 feet
Period of record - 1943-1969

Crest Stage Feet	Date
17.0 (1)(2)	Apr.1897
16.3	Apr.10,1969
15.0	Apr.12,1952
14.8 (1)	Apr.1916
14.8 (1)	Apr.2,1943
14.3	Apr.11,1965
14.0	Apr.7,1951
13.9	Mar.16,1966
12.1	June 6,1944
11.9	Apr.12,1947
11.6	Apr.2,1950
11.5	May 10,1950

Halstad, Minn.
Zero of gage - 826.65 feet
Drainage area - 21,800 square miles (5)
Flood stage - 24 feet
Period of record - 1936-1937; 1942-1960; 1961-1969

Crest Stage Feet	Date
38.5 (2)	Apr. 1897
38.3	Apr.18,1969
35.35	Mar.27,1966
35.2	Apr.17,1965
34.0	Apr.17,1947
29.8	Apr.18,1952

TABLE 2.—*Major floods in order of magnitude: Red River of the North, Upper Mississippi, and Missouri Basins—Continued*

Red River of the North Basin (cont'd)

Red River of the North

Grand Forks, N. Dak.
Zero of gage - 778.35 feet (1929 adj.)
Drainage area - 30,100 square miles (5)
Flood stage - 28 feet
Period of record - 1882-1969

Crest Stage Feet	Date
50.2 (3)	Apr.10,1897
49.5	Apr.21,1882
45.7	Apr.16,1969
45.6	Apr.4,1966
45.6	May 12,1950
45.5	Apr.24,1893
44.9	Apr.17,1965
41.7	Apr.16,1948
41.0	Apr.17,1916
41.0	Mar.29,1920
40.7	Apr.22,1947
40.6	Apr.27,1904
40.6	Apr.28,1883

Drayton, N. Dak.
Zero of gage - 755.00 feet (1929 adj.)
Drainage area - 34,800 square miles (5)
Flood stage - 32 feet
Period of record - 1936-1937; 1941-1969

Crest Stage Feet	Date
42.15	Apr.8,1966
41.35	Apr.23,1969
40.4	Apr.22,1965
40.0 (6)	May 12,1950
39.4 (6)	Apr. 1897
39.3 (6)	Apr.26,1950
38.5 (6)	Apr.22,1948
32.1 (6)	Apr.17-19,1943
31.5 (6)	Apr.28,1947
28.8 (6)	Apr.26,1952

Pembina, N. Dak.
Zero of gage - 739.45 feet (1929 adj.)
Drainage area - 40,000 square miles
Flood stage - 42 feet
Period of record - 1912-1969

Crest Stage Feet	Date
52.9	May 14,1950
51.7	May 1,1950
51.3	Apr.11-12,1966
49.7	Apr. 26,1969
48.5 (4)	Apr.27,1948
47.4	Apr.25,1965

Upper Mississippi Basin

Minnesota River

Mankato, Minn.
Zero of gage - 747.925 feet (1929 adj.)
Drainage area - 14,900 square miles
Flood stage - 19 feet
Period of record - 1903-1969

Crest Stage Feet	Date
29.9 (2)	Apr.26,1881
29.1	Apr.10,1965
27.1	Apr.12,1969
26.7 (2)	Mar.26,1897
26.2	Apr.9,1951
25.7	June 26,1908
24.8	Apr.14,1952
24.1	May 29,1903
23.4	June 21,1919
22.6	June 24,1957

Iowa River

Marshalltown, Iowa
Zero of gage - 853.10 feet (1929 adj.)
Drainage area - 1,564 square miles
Flood stage - 13 feet
Period of record - 1915-1928;1933-1969

Crest Stage Feet	Date
17.7 (1)	June 4,1918
17.7	Mar.20,1969
17.6	Apr.6,1965
17.5	Mar.31,1960
16.8	June 13,1947
16.7	Feb.21,1953
16.2	July 15,1962
16.1	Mar.29,1951
16.1	Aug.28,1954
16.1	Feb.26,1951
16.0	June 16,1954

TABLE 2.—*Major floods in order of magnitude: Red River of the North, Upper Mississippi, and Missouri Basins—Continued*

Upper Mississippi Basin (cont'd)

West Fork Des Moines River

Humboldt, Iowa
Zero of gage - 1,053.54 feet (1929 adj.)
Drainage area - 1,372 square miles
Flood stage - 8 feet
Period of record - 1940-1969

Crest Stage Feet	Date
15.4	Apr.14,1969
13.9	Apr.8,1965
12.2	June 23,1947
11.5	Mar.28,1961
11.25	June 22,1954
11.0	Apr.1,1962
10.4	May 20,1944
9.3	July 31,1964
8.9	Sept.2,1962
8.4	Apr.1,1960

Des Moines River

Des Moines, Iowa (SE 14th St)
Zero of gage - 762.52 feet (1929 adj.)
Drainage area - 9,879 square miles
Flood stage - 21 feet
Period of record - 1940-1969

Crest Stage Feet	Date
30.5	May 31,1903
29.8	Apr.11,1965
29.5	June 26,1947
29.4	June 24,1954
28.9	Apr.2,1960
28.0	Mar.31,1951
27.4	Apr.3,1962
26.3	Mar.27,1969
25.7	June 13,1947
25.7	June 13,1967

Mississippi River

St. Paul, Minn.
Zero of gage - 683.68 feet (1929 adj.)
Drainage area - 36,780 square miles
Flood stage - 14 feet
Period of record - 1866-1969

Crest Stage Feet	Date
26.0	Apr.16,1965
24.5	Apr.15,1969
22.0	Apr.16,1952
19.7	Apr.29,1881
18.8	Apr.16,1951
18.6 (2)	July 23,1867
18.0 (2)	Apr.16,1875
18.0	Apr.6,1897
16.8	June 29,1908
16.7	June 29,1957
16.6	Apr.6 and 9,1916
16.4	Apr.21,1873

La Crosse, Wis.
Zero of gage - 625.83 feet (1929 adj.)
Drainage area - 62,840 square miles
Flood stage - 12 feet
Period of record - 1873-1969

Crest Stage Feet	Date
17.9	Apr.21,1965
16.5 (1)	June 19,1880
15.7	Apr.20,1969
15.3	Apr.20,1952
14.9	Apr.19,1951
14.6	Apr.6,1967
14.5	May 8-9,1888
14.4	Oct.17.1881
14.3	May 7,1954
14.2	Apr.2,1920
13.7	Apr.17,1922
13.7	Apr.10,1897

Davenport, Iowa:
Zero of gage - 542.00 feet (1929 adj.)
Drainage area - 88,449 square miles
Flood stage - 15 feet
Period of record - 1860-1969

Crest Stage Feet	Date
22.5	Apr.28,1965
20.9	Mar.10,1868
19.4	June 27,1892
19.3	Apr.27,1969
18.6	Apr.28,1952
18.6	May 15-16,1888
18.4	June 26,1880
18.3	Apr.28-29,1951
17.7	Oct.25-27,1881
17.45	Apr.15,1967
17.1	Apr.23,1922
17.1	Apr.9,1920

Keokuk, Iowa:
Zero of gage - 477.41 feet (1929 adj.)
Drainage area - 119,000 square miles
Flood stage - 16 feet
Period of record - 1868-1969

Crest Stage Feet	Date
22.1	May 1,1965
21.8	Apr.3,1960
21.0 (1)	June 6,1851
20.85	May 27,1944
20.25	May 12,1951
20.2	June 8 and 20,1947
19.65	May 16-17,1888
19.6	June 5,1903
19.3	Mar.23,1929
19.25	June 30,1892
17.85	Apr.27,1969

TABLE 2.—*Major floods in order of magnitude: Red River of the North, Upper Mississippi, and Missouri Basins—Continued*

Missouri Basin

James River

Huron, S. Dak.
Zero of gage - 1,223.44 feet (1929 adj.)
Drainage area - 16,800 square miles
Flood stage - 11 feet
Period of record - 1928-1932; 1943-1969

Crest Stage Feet	Date
19.8 (1)	Apr.11,13,1881
16.7	Apr.13,1969
16.5	Mar.22,1922
15.8	Apr.1,2,1962
15.5	Mar.27,1920
15.4	Apr.6,1960
15.25	Apr.15,1952
15.2	Apr.25,1969
14.4	Mar.27,1948
14.2	May 25, 1950
13.9	Mar. 31,1943

Little Sioux River

Cherokee, Iowa
Zero of gage - 1,150.0 feet
Drainage area - 2,182 square miles
Flood stage - 17 feet
Period of record - 1891-1969

Crest Stage Feet	Date
27.2	Apr.6,1965
25.7	June 1891
23.8	Apr.7,1969
22.7	June 11,1953
22.0	June 20,1954
22.2	Apr.6,1951
21.6	Apr.29,1947
21.2	Mar.12,1945
19.0	July 5,1943
18.6	June 13,1944

Big Sioux River

Akron, Iowa
Zero of gage - 1,118.90 feet
Drainage area - 9,030 square miles
Flood stage - 16 feet
Period of record - 1926-1969

Crest Stage Feet	Date
23.0	Apr.9,1969
22.1	Mar.31,1962
21.6	Apr.1,1960
20.85	Apr.8,1965
20.0	June 22,1954
19.8	June 21, 1957
19.8	Apr.1,1952
19.7	Apr.6,1951
19.3	June 8,1953
19.2	June 4,1942
18.6	Mar.12,1936
18.6	Mar.15,1969

West Fork Big Blue River

Dorchester (nr), Nebr.
Zero of gage - 1,403.48 feet (1929 adj.)
Drainage area - 1,200 square miles
Flood stage - 15 feet
Period of record - 1958-1969

Crest Stage Feet	Date
24.8 (1)	July 10,1950
20.5	Mar.20,1969
20.3	Mar.30,1960
19.0	Apr.4,1969
18.3	June 16, 1967
16.4	June 8, 1965
15.85	May 25, 1965
14.7	July 7, 1959
14.1	May 24, 1959
13.8	June 21, 1960

(1) From high water mark
(2) Prior to gage records
(3) Legendary Flood of 1852 probably was higher by 3/10 foot or more
(4) Estimated from data for Emerson, Manitoba
(5) Includes 3,800 square miles in closed basins
(6) Adjusted to present datum
(7) Highest reported

TABLE 3.—*Weather highlights for selected stations, December 1968 through March 1969*

December 1968

Rochester, Minn.....20.7-in. snowfall 2nd greatest of record.
St. Cloud, Minn.....Record precipitation of 1.95 in. Snowfall of 25.4 in. greatest in 41 years.
Billings, Mont.....Average temperature of 19.9°F coldest in 34 years.
Huron, S. Dak.....Snowfall of 26.0 in. greatest in 81 years.
Sioux Falls, S. Dak....Record snowfall of 41.1 in.
North Platte, Nebr.....Average temperature of 19.0°F coldest in 44 years.
Sioux City, Iowa.....Snowfall of 20.6 in. greatest in 71 years.
Goodland, Kans.....1.31-in. precipitation greatest in 27 years.

January 1969

Minneapolis, Minn.....21.6-in. snowfall 4th greatest this century.
St. Cloud, Minn.....2.52-in. precipitation greatest in 72 years.
Billings, Mont.....Sub-zero temperatures 19th to 30th longest period in 75 years.
Bismarck, N. Dak.....1.29-in. precipitation greatest in 58 years.
Sioux Falls, S. Dak....1.71-in. precipitation and 19.6-in. snowfall greatest in 32 years.
North Platte, Nebr.....12.4-in. snowfall equaled 2nd greatest snowfall of record.
Omaha, Nebr.....22 percent possible sunshine least in 58 years.

February 1969

Rockford, Ill.....0.04-in. precipitation driest in 64 years; 2nd driest for any month.
Waterloo, Iowa.....0.02-in. precipitation driest on record.
Havre, Mont.....Average temperature of 1.4°F for period Dec. 1968-Feb. 1969 coldest on record.
Sheridan, Wyo.....0.18-in. precipitation driest in 28 years.
Bismarck, N. Dak.....17.4-in. snowfall greatest in 47 years.
Huron, S. Dak.....1.94-in. precipitation and 22.3-in. snowfall 2nd greatest in 88-year record.
Norfolk, Nebr.....1.86-in. precipitation greatest in 50 years; 19.1-in. snowfall 2nd greatest in 72-yr. record.
Topeka, Kans.....Maximum temperature of 52°F on 5th and 25th lowest in 82-year record.

March 1969

Bismarck, N. Dak.....Minimum temperature of -9°F on 30th coldest of record for so late in season.
Fargo, N. Dak.....Minimum temperatures of -15°F on 29th and -14°F on 30th coldest of record for so late in season.
Minneapolis, Minn.....Minimum temperature of -5°F on 29th coldest of record for so late in season.
Rochester, Minn.....Minimum temperatures of -7°F on 29th and -4°F on 30th coldest of record for so late in season.
Helena, Mont.....Coldest winter in 90-year record.
Aberdeen, S. Dak.....First March in 74-year record that temperature did not reach 40°F.
Sioux Falls, S. Dak....Minimum temperatures of -3°F on 29th and -5°F on 30th coldest of record for so late in season.
Nov.-Mar. snowfall of 94.7 in. greatest of record.
Valentine, Nebr.....Average temperature of 23.5°F 2nd coldest in 54 yrs.
Grand Island, Nebr.....Nov.-Mar. snowfall of 54.4 in. 2nd greatest in 20 yrs.
Sioux City, Iowa.....Minimum temperature of 5°F on 29th coldest of record for so late in season.
Dodge City, Kans.....Average temperature of 31.3°F 2nd lowest in 95-yr. record.

TABLE 4.—*Summary of estimates of flood damage sustained and prevented, and Federal assistance provided (in $1,000)*

State	Damages sustained				Damages prevented				Federal assistance (b)
	Urban (a)	Agricultural	Transportation	Total	Local efforts	Flood control projects	Operation Foresight	Total	
Montana	$ 233	$ 121	$ 10	$ 364	$ ---	$ ---	$ ---	$ ---	$ ---
No. Dakota	17,263	17,388	5,019	39,670	9,751	9,131	12,566	31,448	3,700
So. Dakota	3,586	15,149	8,060	26,795	917	12,000	2,160	15,077	2,733
Minnesota	24,757	33,435	10,803	68,995	25,492	45,012	61,156	131,660	5,380
Wisconsin	3,350	952	1,816	6,118	521	124	7,857	8,502	661
Michigan	9	---	6	15	---	---	---	---	---
Illinois	1,519	350	30	1,899	100	5,048	2,147	7,295	1,254
Iowa	4,315	1,412	898	6,625	254	21,350	13,787	35,391	1,806
Nebraska	38	11	32	81	---	4,238	255	4,493	---
Kansas	---	22	9	31	---	(n.a.)	---	(n.a.)	---
Missouri	(n.a.)	(n.a.)	(n.a.)	69	---	(n.a.)	10	10 (c)	---
TOTALS	$ 55,070 (c)	$ 68,840 (c)	$ 26,683 (c)	$150,662	$ 37,035	$ 96,903 (c)	$ 99,938	$233,876 (c)	$ 15,534

[1]Estimates based on Corps of Engineers reports and as presented by J. R. Carlton, "Operation Foresight and Good Floodplain Management," Meeting preprint 1121, ASCE National Water Resources Engineering Meeting, Memphis, Tenn., Jan. 26-30, 1970.

(a) Includes major part of costs of Operation Foresight and local protective actions estimated at $13.9 million and $3.4 million, respectively.
(b) Federal disaster assistance provided for clearance of debris and wreckage; protective, health and sanitation measures; and repair of streets, roads, bridges, dikes, levees, drainage facilities, public utilities, and public buildings and related equipment.
(c) Incomplete estimate
(n.a.) Not available

TABLE 5.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Iowa*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Akron	27	7.5	2/21	27	7.5	3/5	20	7.5	3/14	19	7.3	3/21	12	5.4	3/24			
Akron, 4 E													8	4.1	3/22			
Akron, 1 W													9	4.1	3/27			
Albia	T	T	2/18															
Algona	21	9.2	2/18															
Algona, 3 W				18	5.1	3/4	14	6.2	3/12	7	3.3	3/18						
"	16	6.0	2/28	6	2.6	3/7	13	5.7	3/14	9	3.3	3/21						
Alton	5	1.9	2/26	14	3.4	3/5				8	3.8	3/21	6	3.4	3/22	11	4.8	3/29
Ames	3	1.1	2/18															
Arnolds Park	13	3.4	2/25							11	3.1	3/20	9	3.1	3/22			
Auburn	10	3.0	2/27															
Blencoe	6	2.4	2/24															
Bloomfield	1	0.3	2/28															
Brighton	T	0.2	2/18															
Britt, 6 W	16	5.3	2/24															
Brooklyn	2	1.0	2/18															
Buckeye	9	1.2	2/18															
Bussey	T	T	2/18															
Calmar, 5 SW										2	0.5	3/19						
Carroll	6	1.5	2/18															
Carson	T	T	2/27															
Charlton	T	T	2/18															
Charles City	12	3.8	2/18	7	0.8	3/4	6	2.1	3/11	3	0.8	3/18						
" "	9	4.0	2/28				6	2.0	3/14									
Charles City, 3 S	10	2.8	2/17															
Cherokee				17	5.7	3/6												
"				16	5.5	3/7												
Cherokee, 3 N	12	1.6	2/4	15	5.4	3/5	15	5.2	3/14	10	3.6	3/18						
"										8	3.4	3/21						
Cherokee, 4 S	5	1.6	2/27										6	3.4	3/23			
Clarence	2	1.4	2/18															
Clarion	17	3.3	2/28															
Clarion, 5 E				14	4.3	3/6												
Clutier	4	2.0	2/18															
Conrad	7	2.4	2/18															
Correctionville	10	3.0	2/11	12	4.4	3/7	11	4.0	3/11	8	3.7	3/18				T	T	4/1
"	15	4.6	2/28				11	4.3	3/14	6	2.5	3/21						
Cushing, 3 E	8	2.8	2/24															
Decorah	12	3.0	2/18															
"	10	3.4	2/25															
Decorah, 2 SW										2	0.9	3/19						
Denison	8	2.1	2/4	9	3.6	3/4	9	3.4	3/14	5	2.7	3/18						
"	10	2.8	2/28	10	3.5	3/7												
Doon										10	5.0	3/19						
Dumont	7	3.2	2/18	6	2.5	3/4	5	1.9	3/11	4	1.4	3/18						
Dumont	9	2.6	2/28	5	2.3	3/7												
Edgewood, 5 E	10	4.0	2/17															
Eldora	5	2.6	2/18				5	1.8	3/12									
Emmetsburg	17	7.4	2/18	22	5.8	3/4				12	6.0	3/21	10	4.4	3/26			
Estherville	15	3.3	2/18	24	7.1	3/3	18	6.3	3/14	4	1.2	3/18	9	3.6	3/26			
Estherville	20	5.9	2/28															
Everly				15	5.0	3/7	11	4.1	3/11	12	4.5	3/18						
"							14	5.0	3/14	8	4.5	3/21						
Fenton										12	5.5	3/21						
Forest City, 7 N				12	4.2	3/3												
Fort Dodge	14	3.5	2/18	15	5.3	3/6												
Fredericksburg, 4 E	10	3.3	2/17															
Fredericksburg, 7 W	11	3.9	2/17															
Galva	18	3.8	2/28															
Garwin	4	1.6	2/21				4	0.8	3/11	T	T	3/18						
Garwin							2	0.3	3/14									
Gilman	7	2.4	2/18				5	2.7	3/11									
Graettinger										14	6.0	3/21						
Grinnell	2	0.5	2/18				3	0.8	3/11									
"	8	1.9	2/28				2	0.5	3/14									
Grundy Center	4	1.9	2/18															
Grundy Center, 3 NE	9	2.0	2/28				8	2.2	3/11	4	1.4	3/18						
" "							8	2.3	3/14									
Guthrie Center	8	1.5	2/18				8	2.0	3/11									
" "	9	2.1	2/28															

TABLE 5.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Iowa—Continued*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Guttenburg	5	2.9	2/18															
"	4	1.8	2/28															
Hampton				12	4.3	3/6												
Hartley													7	3.4	3/22			
Haverhill	6	2.6	2/18				7	2.5	3/11									
Hawarden				17	4.5	3/5	15	5.0	3/11	10	3.5	3/21	6	4.6	3/22			
Holly Springs				12	4.3	3/7				9	3.9	3/18						
" "										7	2.6	3/21						
Holstein				19	5.5	3/7												
Holstein, 3 W										4	2.1	3/20	4	2.5	3/23			
Holy Cross, 4 E	6	4.2	2/17															
Hubbard				9	1.7	3/4												
Hull																13	5.1	3/29
Ida Grove	8	1.8	2/18	5	2.1	3/4	3	1.4	3/14									
" "	12	2.6	2/28	5	1.6	3/7												
Iowa Falls, 1 W	11	3.6	2/18	11	3.2	3/4	9	3.0	3/11	4	1.5	3/18						
" "	14	3.2	2/28				8	3.0	3/14									
James				12	4.8	3/7												
Janesville	12	1.3	2/18															
Jefferson	8	1.7	2/18				9	2.9	3/11	2	1.3	3/18						
Jefferson	13	3.2	2/28				9	3.2	3/14									
Jewell	13	3.1	2/28															
Kanawha	13	3.7	2/18	10	4.0	3/4	10	4.0	3/11	6	4.0	3/18						
"	14	4.2	2/28	10	4.0	3/7				3	-	3/21						
Kennebec	3	0.8	2/11	6	2.3	3/7	5	2.1	3/11									
Kennebec	10	2.6	2/28				4	1.8	3/14									
Kingsley										6	3.1	3/23						
Klemme, 1 SW				13	5.1	3/4												
Lake Park	40	5.2	5/4	20	5.8	3/3				10	5.0	3/21						
" "				40	5.2	3/4												
Lake Park				46	7.6	3/7												
Lakota, 7 N							6	1.5	3/14									
Larchwood				28	8.2	3/3												
Larrabee										6	2.6	3/20	6	3.8	3/23			
LeMars, 2 N				5	1.4	3/4	9	3.9	3/14				6	3.2	3/22			
LeMars, 2 N				12	4.1	3/5												
Little Rock				21	7.3	3/3				13	6.5	3/19						
Little Rock, 4 E													9	5.5	3/22			
Little Rock, 4 W	7	2.5	2/26															
Luxemburg, 4 W	4	3.0	2/17															
Marble Rock	13	4.3	2/18	8	2.4	3/4	7	2.0	3/11									
" "	12	3.0	2/28				6	2.2	3/14									
Marcus													9	5.0	3/23			
Marshalltown	7	0.8	2/28	3	0.8	3/4	2	0.7	3/11									
"							2	0.9	3/14									
Mason City				18	5.3	3/4												
McGregor, 2 E	10	3.0	2/7															
Merrill				13	4.4	3/7				8	1.8	3/21						
Milford										9	4.0	3/21						
Missouri Valley, 4 SW	3	1.5	2/24															
Monona	13	4.1	2/17															
Montezuma	1	1.0	2/18															
Moville				13	4.3	3/7												
Nashua, 2 E	11	4.1	2/17															
Newton	2	1.5	2/18															
Northwood	15	4.6	2/18	15	5.2	3/3				5	3.5	3/18						
"	11	3.7	2/28															
Ocheyedan	18	3.4	2/5	21	5.1	3/7	20	5.0	3/11	14	4.9	3/18	8	3.8	3/22			
"							21	5.1	3/14									
Ogden	8	3.5	2/28	5	1.9	3/7												
Oelwein, 5 E	9	4.0	2/17															
Oelwein, 4 NW	10	2.7	2/17															
Osage	13	3.4	2/18	7	2.0	3/4	5	1.1	3/11									
"	2	2.0	2/28	7	2.6	3/7	5	1.4	3/14									
Oskaloosa	11	3.2	2/28															
Parkersburg	9	3.6	2/18	8	2.8	3/4												
"	10	2.9	2/28															
Paullina, 5 S				19	6.7	3/5												
Pella	1	0.2	2/18															
Perry							7	2.6	3/11									

TABLE 5.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Iowa—Continued*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/23-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Peterson	9	1.8	2/5				6	2.0	3/14									
"	9	1.7	2/11															
Plainfield, 3 N	14	5.0	2/17															
Pocahontas	17	3.9	2/18	19	5.2	3/6	20	5.1	3/11	14	4.2	3/18						
"	22	3.5	2/28	21	7.7	3/7	19	5.0	3/14									
Popejoy	8	2.4	2/18	7	2.3	3/4	7	2.3	3/11	4	1.3	3/18						
"							7	2.2	3/14	3	1.1	3/21						
Postville, 2 SW	11	4.2	2/17															
Primghar	21	5.4	2/28	18	5.6	3/4	9	3.4	3/11									
"				19	6.3	3/7												
Remsen																11	3.9	3/29
Rock Rapids				28	7.3	3/5	20	5.2	3/14	15	6.2	3/19	17	4.7	3/22			
" "													15	5.6	3/24			
" "													15	5.6	3/25			
" "													15	5.6	3/26			
Rockwell City	15	3.3	2/18	17	5/2	3/6	16	4.3	3/11	11	3.4	3/18	6	1.2	3/25			
" "	19	4.0	2/28				15	4.4	3/14	10	2.6	3/21						
Rodman										10	5.0	3/21						
Rock Valley				15	5.0	3/5	16	5.2	3/14	12	6.0	3/19	10	4.4	3/25			
" "				16	5.4	3/7												
Rock Valley, 2 E													10	4.3	3/22			
Sac City	16	3.8	2/18				17	3.9	3/11	11	3.1	3/18						
" "	24	5.1	2/28				14	3.4	3/14									
Sanborn				25	8.3	3/4										11	5.7	3/29
Sergeant Bluff				13	4.1	3/7												
Sheffield	12	1.3	2/18	12	1.4	3/7	8	2.3	3/14	8	1.7	3/18						
Sheldon				25	8.4	3/4												
"				16	3.6	3/5												
Sheldon, 2 N													8	4.0	3/22			
Sheldon, 5 NE										10	6.1	3/21						
Shell Rock	11	3.7	2/18				2	0.8	3/11									
Sibley										16	7.0	3/21						
Sioux Center, 1 S																6	3.1	3/29
Sioux City, 1 N	10	3.3	2/24															
Sioux City, 3 E	9	3.2	2/24															
Sioux City, 5 E													4	2.1	3/23			
Sioux Rapids				19	5.8	3/5												
Sioux Rapids, 7 S													6	2.8	3/23			
Sioux Rapids, 9 S	7	2.4	2/24															
Spencer, 1 N	8	2.7	2/4	18	5.4	3/4	12	4.3	3/11	8	4.2	3/17						
Spencer, 1 N				12	4.4	3/7				5	4.0	3/18						
"										4	3.5	3/19						
Spencer, 8 S	6	1.9	2/24							6	2.6	3/20	5	2.6	3/22			
Stanton				10	3.7	3/7												
Steamboat Rock	8	2.8	2/18															
Storm Lake, 2 E	14	3.2	2/18	19	5.2	3/6	17	5.1	3/11	10	3.4	3/21	7	2.2	3/25			
Strawberry Point, 4 SE	11	4.9	2/17															
Strawberry Point, 5 W	9	3.9	2/17															
Sutherland, 2 SE													8	3.9	3/23			
Swea City, 5 E				20	5.6	3/3												
Toledo	2	1.1	2/18				2	1.0	3/14									
Vinton				2	0.7	3/4												
Waukon	10	2.4	2/11	5	1.5	3/4	4	1.0	3/11	2	0.7	3/18						
"	7	2.2	2/18															
"	6	2.0	2/25															
Waverly, 3 N	6	3.5	2/17															
Waverly, 5 E	13	4.7	2/17															
Webster City	12	2.8	2/18	13	3.6	3/4	11	3.3	3/11	7	2.8	3/18						
" "	15	3.3	2/28	12	3.7	3/7	11	3.4	3/14									
West Union										1	0.2	3/19						
West Union, 4 E	12	4.7	2/17															
West Union, 5 W	8	3.9	2/17															
Williams	11	2.9	2/18	12	3.2	3/4	11	3.3	3/14									
"	16	3.2	2/28															
Williamsburg	3	1.1	2/18															
Winterset	3	0.2	2/18															
Woodward	7	2.2	2/18															
Woodward, 7 N							6	2.8	3/11	3	2.5	3/18						
"							6	2.9	3/14									
Zearing	5	2.1	2/18															

TABLE 6.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Michigan*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Benzonia 2 W	8	3.0	2/25															
Boyne Falls	12	7.1	2/25															
Cadillac 5 SSE	16	5.2	2/25															
Clare 4 W	13	5.7	2/25															
Copemish	13	4.4	2/25															
Frankfort	4	-	2/25															
Gaylord	12	4.4	2/25															
Grawn 1 NE	17	6.4	2/25															
Grayling 4 S	20	5.9	2/25															
Honor	16	5.4	2/25															
Kalkaska	23	7.3	2/25															
Mancelona	12	3.9	2/25															
Marion 5 S	7	5.7	2/25															
Mesick 5 SE	15	4.7	2/25															
Traverse City	10	4.3	2/25															
Vanderbilt 2 NW	15	3.9	2/25															

TABLE 7.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Minnesota.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Ada	19	5.5	2/14	14	5.4	3/6				12	5.2	3/18	11	5.2	3/25	9	4.2	3/31
"	17	5.4	2/21							12	5.7	3/21	9	4.2	3/28	9	4.1	4/3
"	14	5.5	2/28													5	3.0	4/8
Adams, 1 E							5	1.3	3/10									
Adrian													15	5.7	3/26			
Adrian, 2 E													11	6.0	3/23			
"													11	5.4	3/24			
"													11	5.0	3/25			
"													11	4.8	3/26			
Agassiz Refuge	27	2.7	2/7	18	3.7	3/6				19	3.5	3/18	16	3.8	3/25	15	3.5	3/31
Agassiz Refuge	23	3.5	2/14							19	3.5	3/21	16	3.6	3/28			
" "	19	3.6	2/28															
Aitkin	33	7.6	2/5				21	5.3	3/11	18	5.2	3/18	12	3.0	3/25	10	3.3	4/1
"	26	6.8	2/25							17	5.3	3/21	11	2.8	3/28	7	2.7	4/4
Albert Lea	13	4.9	1/28	10	4.6	3/1				9	4.3	3/17						
Amboy, 1 S				15	6.4	3/1	13	4.7	3/13	10	5.1	3/17						
Angus, 2 SE													8	2.9	3/23			
Argyle, 4 E	26	3.8	2/14	17	3.6	3/6	16	3.4	3/14	15	3.3	3/18	13	3.0	3/25	13	3.0	3/31
"	23	3.9	2/21							14	3.9	3/21	13	3.0	3/28	11	2.8	4/3
Ash Lake	37	7.8	2/12															
Austin	12	3.2	2/28	11	3.2	3/4	10	3.1	3/12	6	1.8	3/21						
Backus	28	5.4	2/5	26	7.4	3/2				20	5.6	3/20						
Bagley, 3 NW													16	5.1	3/23			
Baker	10	2.8	2/22				14	3.3	3/11									
Balaton										22	7.2	3/25						
Barnesville							13	3.9	3/11									
Baudette	27	5.2	2/12															
Beardsley	36	3.8	2/18	31	7.0	3/4	31	7.0	3/11	23	5.4	3/18	18	4.7	3/25	17	4.5	4/1
"	35	7.0	2/25							25	5.6	3/21						
Belle Plaine, 1 S							15	4.4	3/14									
Bemidji	28	6.3	2/11	27	6.4	3/2				19	5.2	3/20						
Benson	22	5.4	2/11	28	6.6	3/4	24	6.4	3/11	21	6.4	3/18	16	5.5	3/25			
"	24	5.8	2/18															
"	25	6.3	2/25															
Blomkest													11	5.0	3/26			
Blue Earth				15	6.0	3/1				11	4.7	3/17						
Blue Earth, 3 N							8	2.3	3/14									
Blue Earth, 2 W							19	5.9	3/14									
Breckenridge, 7 ENE							13	3.9	3/11									
Brooks													15	3.6	3/23			
Byron	15	5.0	2/11															
Caledonia	18	4.6	2/11	15	6.2	3/4	14	4.8	3/11	11	3.4	3/18						
"	17	6.0	2/18															
"	15	5.2	2/25															
Callaway	10	-	1/29				18	5.5	3/10				9	2.9	3/22			
Campbell	29	6.1	2/7	24	7.8	3/6	14	4.2	3/14	11	3.6	3/18	9	3.4	3/25	9	3.5	3/31
"	13	7.6	2/21							10	3.5	3/21	9	3.5	3/28	5	1.9	4/3
"	25	7.9	2/28													T	T	4/8
Campbell, 4 S							15	5.0	3/11									
Canby	26	2.8	2/11	38	8.4	3/4	37	8.2	3/11	26	7.2	3/18	23	6.6	3/25	16	5.4	4/1
Canby	33	7.6	2/18							28	7.5	3/21	20	6.3	3/28	8	3.5	4/4
"	34	7.8	2/25															
Carlton, 4 E				14	3.1	3/3												
Chandler, 1 S													22	7.6	3/23			
"													21	7.6	3/24			
Chandler, 1 S													21	7.4	3/25			
"													21	7.6	3/26			
Chatfield, 3 W							10	2.9	3/10									
Chatfield, 4 NW							11	2.9	3/10									
Comfrey	24	5.0	2/18	26	5.0	3/4	24	8.0	3/11	24	8.0	3/18	14	4.1	3/25	6	3.5	4/1
Comfrey										17	6.0	3/21	9	4.3	3/24	3	1.4	4/4
Comfrey, 1 E							17	4.6	3/14									
Comfrey, 12 SW							27	8.0	3/14									
Cook	35	8.2	2/12															
Correll	24	3.8	2/11	24	4.1	3/4	24	4.2	3/11	24	4.5	3/18	24	5.1	3/25	24	5.8	4/1
Correll	24	3.7	2/18							24	4.9	3/21	24	5.5	3/28	24	6.2	4/4
"	24	3.9	2/25															
Cosmos													10	4.7	3/26			
Cottonwood, 3 W													17	5.5	3/25			
Crane Lake	30	5.9	2/18															

TABLE 7.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Minnesota.—Con.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Cromwell, 3 SW	30	5.6	2/3	24	6.2	3/3				17	5.9	3/19						
Crookston	19	2.5	2/7	13	2.3	3/6				12	2.3	3/18	10	1.9	3/25	9	1.7	3/31
"	18	2.8	2/14							12	2.2	3/21	8	1.7	3/28	6	1.6	4/3
"	16	2.5	2/21													T	T	4/8
"	13	2.6	2/28															
Currie, 1 S													20	6.3	3/26	15	6.6	4/3
Detroit Lakes	28	6.3	2/11	25	4.8	3/2	20	6.1	3/10	14	4.9	3/20						
Detroit Lakes, 1 NNE	28	6.6	2/7				20	5.7	3/14	18	5.5	3/18	10	3.5	3/25	9	3.5	3/31
" "	27	6.2	2/14							16	3.5	3/21	9	3.4	3/28	8	2.7	4/3
" "	25	6.9	2/28													T	T	4/8
Dundee													12	4.6	3/26			
Edgerton													17	6.8	3/23			
Edgerton, 1 W													17	6.7	3/24			
"													17	6.6	3/25			
"													17	6.2	3/26			
Elbow Lake, 4 N							13	4.0	3/11									
Ellsworth										22	8.0	3/19	13	6.2	3/24			
"													13	5.8	3/24			
"													13	5.6	3/25			
"													13	5.4	3/26			
Erskine, 3 W	24	5.1	2/18										14	4.7	3/22			
Faribault	31	3.6	2/11										3	2.0	3/25			
Fairmont	24	8.0	2/11	25	6.9	3/24	24	9.0	3/11	18	5.2	3/18	10	3.4	3/25	4	1.1	4/1
"	26	8.2	2/18							14	4.5	3/21	10	3.8	3/26			
"	23	6.6	2/25										8	2.3	3/28			
Fergus Falls, 5 E							20	5.9	3/11									
Fergus Falls, 5 W							14	4.1	3/11									
Florence, 1 E				24	8.7	3/7	31	8.3	3/14									
Forest Lake, 3 S				17	5.1	3/3												
Fort Ripley	37	8.0	2/11	29	7.9	3/4	28	7.7	3/11	26	7.5	3/18	17	5.8	3/25	17	5.7	4/1
Fort Ripley	37	8.0	2/18							22	6.8	3/21	17	5.9	3/28	11	3.9	4/4
" "	35	8.2	2/25															
Fosston	24	5.3	1/28	22	6.5	3/6				18	6.3	3/18	14	4.3	3/25	12	4.2	3/31
"	36	4.8	2/7							16	4.9	3/21	12	4.3	3/28	7	2.8	4/3
"	34	4.8	2/14													T	T	4/8
Fosston	30	6.1	2/21															
"	24	6.3	2/28															
Frazee	25	5.6	1/29															
Fulda, 4 E																12	3.4	4/3
Garden City, 2 W							16	4.5	3/14									
Gary													13	3.3	3/22			
Gonvick													16	5.2	3/23			
Goodridge	16	4.1	2/18															
Good Thunder, 1 W							12	4.1	3/14									
Grand Rapids	31	7.2	2/24															
Granite Falls	24	6.2	2/11	23	6.7	3/4	20	6.4	3/11	14	4.8	3/18						
" "	26	7.2	2/18							8	2.4	3/21						
" "	23	6.2	2/25															
Greenbush	21	4.2	2/18															
Gull Lake Dam	26	4.9	1/27	25	6.4	3/3	24	6.4	3/10	20	5.8	3/21	19	5.1	3/24	17	5.0	3/31
Gull Lake Dam	25	4.5	2/12													10	3.0	4/7
Hallock	24	5.3	2/7	20	5.2	3/6				16	4.1	3/18	12	3.5	3/25	10	3.4	3/21
"	22	5.2	2/14							15	3.9	3/21						
"	20	5.1	2/28															
Halstad	26	2.7	2/7	14	2.9	3/6				10	2.6	3/18	10	2.2	3/28	10	2.2	3/31
Halstad	20	2.8	2/14							11	2.9	3/21				7	2.1	4/3
"	16	2.4	2/21															
"	14	2.5	2/28															
Hanley Falls, 2 N													19	6.3	3/25			
Hardwick													15	5.3	3/23			
Hardwick													15	5.2	3/24			
"													15	5.3	3/25			
"													15	5.7	3/26			
Harmony	22	6.1	2/11	17	5.4	3/4	16	5.0	3/11	11	3.5	3/18						
"	22	8.2	2/18															
Harmony	18	5.5	2/25															
Hastings	22	5.3	2/4															
"	22	5.2	2/18															
"	21	5.0	2/25															
Hawley	26	5.9	1/29															

TABLE 7.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Minnesota.—Con.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Hawley, 3 E							15	5.1	3/10									
Hawley, 8 W	13	3.5	2/22				14	4.3	3/10									
Hawley, 14 NW							15	4.8	3/10									
Hayfield, 8 E							5	1.4	3/10									
Hibbing	34	9.0	2/13															
High Landing, 1 W	18	3.1	2/7	17	3.1	3/6				16	3.1	3/18	13	3.6	3/25	12	3.3	3/31
" "	19	3.2	2/14							16	3.0	3/21	12	3.5	3/28	10	3.1	4/3
" "	18	3.1	2/21													T	T	4/8
" "	15	3.1	2/28															
Hill City	30	5.4	2/13	26	7.6	3/1				19	7.0	3/19						
Hills										19	5.8	3/19						
Hinckley	28	6.8	1/31	22	6.2	3/3	22	5.0	3/11	16	4.7	3/18	11	3.8	3/25	9	4.4	4/1
"	22	6.9	2/25	22	6.9	3/4				14	4.2	3/21	9	3.3	3/28	7	1.5	4/4
Hokah, 1 NE							6	1.6	3/10									
Hokah, 1 S	14	5.3	2/11				10	3.6	3/11	3	1.2	3/18	T	T	3/25			
Hokah, 1 S	11	4.8	2/18															
"	10	3.9	2/25															
Houston, 4 E							23	4.5	3/10									
Hutchinson													9	4.2	3/26			
Jacobson	30	6.9	2/5	25	5.8	3/1				19	6.0	3/19						
Kent, 2 NW							13	4.1	3/11									
Kragnes							15	4.4	3/10									
La Crescent Dam	16	3.8	2/4				9	4.2	3/11									
" " "	14	3.2	2/18															
" " "	11	3.2	2/25															
Lakefield													20	6.4	3/26			
Lake Wilson													13	4.1	3/23			
" "													12	4.1	3/24			
" "													12	4.0	3/25			
" "													12	4.1	3/26			
Lanesboro	16	4.5	2/11	7	3.4	3/4	5	1.2	3/10									
"	15	3.3	2/18															
"	10	3.7	2/25															
Leota													22	6.5	3/23			
"													22	6.6	3/24			
Leota													22	6.6	3/25			
"													22	7.0	3/26			
Leota, 5 E													22	7.2	3/23			
"													22	7.1	3/24			
"													22	7.0	3/25			
Leota, 5 E													22	6.9	3/26			
Lismore, 1 E													14	5.7	3/23			
"													14	5.6	3/24			
"													14	5.6	3/25			
"													14	5.4	3/26			
Litchfield	22	5.6	2/18	14	3.4	3/4	15	4.4	3/11	13	4.4	3/18	9	2.5	3/25	7	2.3	4/1
"	11	3.9	2/25							11	3.3	3/21	10	2.5	3/28	3	1.2	4/4
Long Prairie	36	6.6	2/11	25	7.1	3/4	23	6.6	3/11	21	6.6	3/18	16	5.7	3/25	15	5.0	4/1
" "	36	6.9	2/18							20	6.6	3/21						
" "	29	7.2	2/25															
Luverne				36	6.2	3/5				17	7.0	3/18	16	6.0	3/22			
"													12	5.4	3/25			
"													15	5.8	3/23			
"													15	5.1	3/24			
"													15	4.9	3/25			
Luverne													14	4.6	3/26			
Luverne, 2 N													16	5.2	3/23			
"													16	5.1	3/24			
"													16	5.1	3/25			
"													16	5.6	3/26			
Luverne, 4 S													18	3.6	3/22			
"													16	4.6	3/23			
"													16	5.1	3/24			
"													16	4.9	3/25			
"													16	4.9	3/26			
Madelia, 4 NE							15	3.0	3/14									
Magnolia, 1 W													21	8.1	3/23			
"													21	7.7	3/24			
"													21	7.7	3/25			
"													20	7.6	3/26			

TABLE 7.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Minnesota.—Con.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Mahnomen	11	3.5	2/11	18	4.6	3/2				14	4.9	3/20						
Mahnomen, 1 W	28	4.7	2/7	18	3.7	3/6	18	3.6	3/14	15	3.2	3/18	12	2.9	3/25	11	2.8	3/31
"	28	4.8	2/14							15	3.2	3/21				12	2.9	4/3
"	16	2.9	2/21													T	T	4/8
"	24	4.6	2/28															
Mahnomen, 2 W													13	4.0	3/22			
Mankato				11	5.6	3/1				14	5.1	3/17						
Maplebay	27	6.6	1/28															
Mapleton, 1 N							14	4.5	3/13									
Mapleton, 1 W							13	4.1	3/13									
Marcoux	23	5.3	1/28															
Marshall	32	4.0	2/11	34	4.9	3/4	31	4.8	3/11	26	4.5	3/18	24	6.7	3/25	14	5.5	4/1
"	37	4.5	2/18							10	4.4	3/21	22	6.0	3/28	5	1.8	4/4
"	35	4.7	2/25															
Marshall, 5 SW							31	8.5	3/14									
Melrose	20	5.0	2/18	19	4.5	3/4	18	4.5	3/11	15	3.8	3/18	5	1.1	3/25			
"	20	4.7	2/25															
Milaca	33	7.2	2/11	31	7.9	3/4	28	7.5	3/11	24	7.4	3/18	15	6.0	3/25	12	4.5	4/1
"	33	7.6	2/18															
"	31	7.9	2/25															
Minneota	23	4.6	2/11	27	7.9	3/4	24	6.8	3/11	20	6.0	3/18	17	5.7	3/25	13	5.3	4/1
"	27	6.0	2/18															
"	24	7.0	2/25															
Moose Lake, 1 SE	32	8.2	2/11	28	7.0	3/4	26	7.0	3/11	25	7.0	3/18	22	5.8	3/25	20	6.0	4/1
" "	33	8.3	2/18							24	7.3	3/21	22	5.6	3/28	18	5.8	4/4
Moose Lake, 1 SE	30	7.7	2/25															
Moose Lake, 3 S				25	7.0	3/3												
Montevideo, 1 SW	18	5.1	2/25				14	3.5	3/11	11	2.5	3/18	10	3.0	3/25	8	2.5	4/1
"																6	2.0	4/4
Morris	20	4.1	2/11	22	5.3	3/4	22	5.4	3/11	16	3.9	3/18	6	1.8	3/25	5	1.5	4/1
Morris	21	4.1	2/18							12	3.6	3/21	8	1.0	3/28	16	5.4	4/4
New London	16	4.8	2/11	11	4.6	3/4	8	3.0	3/11	2	1.8	3/18						
" "	15	4.8	2/18															
" "	14	4.7	2/25															
New Richland							13	3.5	3/13									
New Ulm	24	4.2	2/11	17	4.4	3/4	17	4.4	3/11	14	4.0	3/18	2	1.0	3/25	2	0.8	4/1
" "	19	4.5	2/18							10	3.0	3/21	2	1.0	3/28			
" "	20	4.5	2/25															
North Mankato	21	4.5	2/18	18	4.8	3/4	17	4.8	3/14	12	3.4	3/18						
" "	20	5.9	2/25															
Onamia	27	6.8	2/18	21	6.1	3/4	20	6.0	3/11	16	5.1	3/18	8	2.8	3/25	5	1.4	4/1
"	26	6.7	2/25							12	4.8	3/21	5	1.9	3/28	15	4.3	4/4
Ormsby, 4 S							14	4.3	3/14									
Orwell Dam	26	4.5	1/27	22	4.8	3/3	23	5.9	3/10	22	6.0	3/18	19	4.5	3/24			
" "	24	5.7	2/11															
Owatonna, 2 W							17	4.9	3/13									
Pelican Rapids, 10 NE							23	6.7	3/11									
Pelican Rapids, 10 SE							24	7.5	3/11									
Peterson							12	3.5	3/10									
Pine River Dam	23	4.0	1/27	20	5.0	3/3	19	5.2	3/10	19	5.1	3/18	18	4.4	3/24	18	4.9	3/31
Pipestone				30	10.8	3/2							21	7.1	3/22			
"													23	6.6	2/23			
"													22	7.0	3/24			
"													22	6.8	3/25			
"													22	7.3	3/26			
Pipestone, 7 W	12	3.8	2/25															
Pokegama Dam	23	4.0	1/27	28	8.0	3/1	25	6.8	3/10	21	6.9	3/19	18	5.2	3/24	12	4.5	3/31
" "	38	7.1	2/23	28	7.0	3/3										9	3.2	4/7
Porter														20	7.0	3/25		
Preston							5	1.2	3/10									
Ray	32	7.1	2/12															
Reading													14	5.9	3/23			
"													14	5.9	3/24			
"													14	5.6	3/25			
"													14	5.4	3/26			
Red Wing	22	5.0	2/4															
" "	21	4.3	2/18															
" "	19	4.1	2/25															
Remer	35	7.9	2/11	25	7.1	3/3				23	4.9	3/18	20	4.9	3/25	21	4.6	4/1
"	28	5.2	2/18													18	4.4	4/4

TABLE 7.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Minnesota.—Con.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Rockford	21	4.8	2/11				19	4.3	3/11	17	5.3	3/18	8	3.2	3/25	7	2.2	4/1
"	21	5.3	2/25							12	4.4	3/21	12	2.4	3/28			
Roseau	20	3.8	2/18															
Rothsay, 4 E							22	5.8	3/11									
Rothsay, 10 W							15	4.6	3/11									
Russell, 5 S													20	6.5	3/25			
Rustad, 2 E													13	4.2	3/26			
Ruthton, 1 S													20	7.2	3/25			
St. Francis, 4 S	22	5.0	2/11	18	4.5	3/4	17	4.4	3/11	15	4.0	3/18	12	3.4	3/28	10	3.1	4/1
" "	27	5.2	2/18							14	4.0	3/21				2	0.7	4/4
St. Francis, 4 S	20	5.5	2/25															
St. James				23	8.6	3/1				18	7.3	3/17						
St. James, 2 SW							14	4.1	3/14									
Sanborn, 3 N				27	8.0	3/2	19	5.8	3/14									
Sanborn, 2 NE							18	5.2	3/14									
Sandy Lake Dam	26	5.5	1/27	28	7.9	3/1	27	8.3	3/10	23	6.8	3/19	23	7.0	3/24	20	7.0	3/31
" " "	30	8.8	2/23													12	3.8	4/7
Sherburn				25	8.6	3/1				14	6.2	3/17						
Slayton, 2 SE	9	2.6	2/25	23	5.4	3/7				7	3.3	3.19						
Spring Valley							6	1.5	3/10									
Spring Valley, 10 S							5	1.3	3/10									
Steen, 2 E													12	4.8	3/23			
"													11	5.6	3/24			
"													11	5.4	3/25			
"													11	5.4	3/26			
Stewartville, 8 E							17	4.9	3/10									
Storden, 1 S																12	5.4	4/3
Thief River Falls AP	33	3.1	2/14	21	3.0	3/6				14	2.0	3/18	6	1.5	3/25	6	1.2	3/31
" " " "	28	3.0	2/21							16	1.8	3/21	6	1.2	3/28	2	0.3	4/8
" " " "	26	3.1	2/28															
Thief River Falls, 1 NW	21	4.2	2/18										14	4.1	3/23			
Tintah							14	4.1	3/11									
Tracey	15	4.8	1/29										23	7.8	3/26			
Transem							17	4.7	3/11									
Trosky													16	6.1	3/23			
Trosky													16	6.0	3/26			
Trosky, 1 S													16	6.2	3/25			
Trosky, 1 W													16	6.1	3/24			
Tyler	32	8.9	2/11	38	9.4	3/4	32	10.2	3/11	33	10.7	3/18	27	8.8	3/25	24	8.8	4/1
"	34	9.8	2/25	26	8.0	3/7				32	8.7	3/21	26	8.1	3/28	15	6.7	4/4
Ulen													14	4.3	3/22			
Virginia	39	9.7	2/13															
Wadena	25	5.4	2/18	23	5.6	3/4	20	5.5	3/11	15	5.0	3/18	8	3.0	3/25	7	2.0	4/1
"	26	5.8	2/25							11	3.6	3/21	8	2.3	3/28	T	T	4/4
Wales, 2 S				34	9.8	3/3												
Walker	29	6.6	2/11	28	6.9	3/2				19	5.3	3/20						
Walnut Grove, 5 N							16	4.4	3/14									
Warroad	23	4.7	2/18															
Waseca	19	6.1	2/11	19	6.6	3/4	16	6.2	3/11	12	4.9	3/18	6	1.8	3/25	3	0.6	4/1
"	19	6.2	2/18							10	3.7	3/21	4	0.8	3/28			
Waseca, 1 E							13	3.9	3/13									
Waseca, 2 S							15	4.0	3/13									
Waubun	15	3.5	1/28															
Wells, 5 N							11	3.8	3/13									
Wells, 1 NW	16	4.2	2/11	9	2.6	3/4	10	3.1	3/11	13	4.3	3/18						
Wells, 1 NW	16	4.3	2/18															
Wells, 3 NW							14	4.6	3/13									
Whalan							16	4.7	3/10									
Williams	25	5.2	2/18															
Willmar	27	8.6	2/11	20	5.6	3/4	19	5.5	3/11	17	5.2	3/18				11	3.6	4/1
Willmar	28	8.9	2/18															
"	22	5.6	2/25															
Windom	19	4.9	2/25	23	7.1	3/2	17	4.9	3/14	17	6.7	3/18	13	4.7	3/24	5	2.2	4/3
"													12	4.5	3/25			
"													12	3.9	3/26			
Windom, 7 N													13	4.9	3/26			
Winger	24	5.3	1/28															
Winnibigoshish Dam	31	6.9	2/11	26	7.1	3/3	25	7.1	3/10	24	6.8	3/17	20	5.9	3/24	19	7.1	3/31
Winona	20	5.3	2/4				5	3.0	3/11									
"	15	4.2	2/18															

TABLE 7.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Minnesota.—Con.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Wolverton, 1 N													11	3.3	3/26			
Woodstock, 1 S													17	4.8	3/22			
"													17	4.8	3/23			
"													16	5.0	3/24			
"													16	5.4	3/25			
Woodstock, 1 S													16	5.5	3/26			
Woodstock, 6 N													22	6.4	3/22			
"													22	6.4	3/23			
"													22	6.4	3/24			
"													22	6.7	3/25			
Woodstock, 6 N													22	7.0	3/26			
Worthington				23	8.3	3/2				11	4.4	3/18						
Young America	26	7.3	2/11	18	5.0	3/4	18	6.1	3/11	14	5.3	3/18	12	1.2	3/25	7	2.1	4/1
" "	24	6.3	2/18															
Zerkel	28	5.2	2/11	24	5.8	3/2				18	5.1	3/20						
Zumbro Falls	19	-	2/11															

TABLE 7.—*Depth of snow on ground and water equivalent, in inches, February-April 1969, Minnesota.—Con.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Antelope	16	3.0	2/26															
Augusta										10	3.8	3/18						
Bainville	14	3.3	2/16															
Baker	11	2.4	2/27	23	5.6	3/5	24	5.4	3/14	11	3.6	3/21	2	0.6	3/28			
Barber										5	1.6	3/20						
Big Sandy				14	2.8	3/7												
Billings 5 N	4	0.8	2/25															
Box Elder				11	2.2	3/7												
Bredette							16	3.0	3/14	11	2.8	3/21	9	2.7	3/28			
Broadus	8	1.6	2/27				8	1.6	3/14				1	0.1	3/28			
Chester				7	1.5	3/6												
Chinook 15 N				13	3.1	3/6												
Circle				8	1.5	3/3												
Cleveland 5 ENE				8	1.6	3/6												
Craig 10 N										8	4.8	3/18						
Custer 4 W	8	1.5	2/26															
Dodson 3 W				12	2.5	3/4												
Eastern Crossing										6	2.2	3/18						
Eastern Crossing 10 E				8	1.1	3/7												
Ekalaka				20	4.0	3/4				6	2.3	3/21	2	0.5	3/28			
Flowing Wells 4 N	8	1.6	2/28															
Forks 4 NE																		
Forsyth	11	1.6	2/26															
Fort Belknap Agency	15	3.5	2/24															
Fort Benton				16	3.3	3/3												
Fort Peck	13	3.0	2/25	13	2.4	3/3	13	2.6	3/14	9	1.9	3/18	T	T	3/28			
Frazer	11	2.7	2/25															
Fresno Dam				10	2.5	3/6												
Gibson Dam										12	4.6	3/18						
Gilford										13	2.8	3/6						
Glasgow										6	2.0	3/18						
Glendive 18 NW	6	1.1	2/28															
Grass Range										6	1.8	3/20						
Harlem				17	3.4	3/5	19	3.8	3/14	10	3.3	3/21	T	T	3/28			
Havre	10	2.7	2/24	9	2.3	3/5												
Havre 6 SW				20	3.9	3/7												
Havre 22 NW				8	1.7	3/7												
Hingham				11	2.8	3/6												
Hinsdale 8 E	15	3.1	2/25															
Hogeland				13	3.2	3/5												
Joplin				10	1.6	3/3				8	1.6	3/18						
Joplin 1 N				9	1.5	3/6				T	T	3/21						
Joplin 25 N				9	1.8	3/6												
Kremlin				10	3.6	3/6												
Lewistown										5	1.2	3/20						
Lewistown 17 E	10	1.9	2/25															
Lindsay	7	1.6	2/28															
Lloyd				10	3.1	3/6												
Loring 23 NNE				9	2.6	3/4												
Loving										11	3.4	3/20						
Malta	13	2.2	2/25	15	2.1	3/7				5	1.5	3/21	T	T	3/28			
Malta 35 S				23	2.4	3/7	24	2.4	3/14	3	0.9	3/21				1	0.1	4/3
Manchester Br. Gt. Falls										7	3.5	3/18						
Miles City 3 E	11	1.8	2/28															
Miles City 40 E	10	1.8	2/27															
Moccasin							8	1.6	3/14	7	3.2	3/21				1	0.1	4/3
Opheim				13	3.2	3/4	11	2.6	3/14				10	2.6	3/28			
Poplar	17	2.4	2/25	11	1.8	3/7	12	1.9	3/14	6	1.7	3/21	4	1.0	3/28			
Redstone	13	3.3	2/26				14	4.6	3/14	9	4.3	3/21	9	3.8	3/28			
Rocky Boy				11	2.2	3/7												
Roundup 6 S	12	1.4	2/25															
Roundup 20 N										20	3.0	3/20						
Roy 4 W	13	1.9	2/24															
Rudyard				8	2.0	3/6												
Rudyard 30 N										5	1.6	3/20						
Scobey 21 S	15	3.5	2/27															
Simms										6	2.6	3/18						
Simpson				8	1.7	3/7												
Stanford										9	3.8	3/20						
Sunburst	8	1.6	2/28				6	1.6	3/14	3	0.5	3/21	T	T	3/28			
Turner				18	3.6	3/5				12	2.1	3/18						
Vida							25	2.7	3/14									
Volborg 5 N	10	2.1	2/26															
Westby							20	2.5	3/14	12	1.7	3/21	10	1.3	3/28			
Wyola				6	1.3	3/7	8	1.5	3/14				3	0.3	3/28			
Zortman 7 S	13	2.6	2/24															

TABLE 8.—*Depth of snow on ground and water equivalent, in inches, for February–April 1969, Montana.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Albion	11	3.8	2/27				9	3.2	3/12									
"	12	3.7	2/28															
Albion, 2 W										5	1.1	3/15						
Ansley	7	1.8	2/24				4	2.1	3/10									
Atkinson				20	4.0	3/1												
Atkinson, 20 S				14	4.0	3/1												
Aurora	4	0.6	2/4	6	2.3	3/7	6	2.2	3/10									
"	2	0/5	2/4				5	1.6	3/14									
Barneston	4	1.8	2/4															
"	3	0.8	2/5															
Barneston	7	2.0	2/21															
Bartlett	9	2.8	2/27				6	2.3	3/10									
"	8	2.7	2/28															
Bassett	9	2.7	2/25															
Beatrice	15	3.2	2/21															
Beemer	12	4.5	2/28				10	3.6	3/14									
Beemer, 5 N				12	5.7	3/4												
Blue Hill	3	0.7	2/4															
Bradshaw							10	3.1	3/14	4	1.2	3/18						
Broken Bow, 2 W				8	3.0	3/1												
Bruning	6	0.7	2/4															
"	4	0.6	2/7															
Brunswick, 3 W	7	2.9	2/26				6	2.7	3/11	4	1.9	3/21						
Burwell				14	3.9	3/1												
Burwell, 12 N				14	4.0	3/1												
Butte										7	1.4	3/15						
Ceresco	4	1.9	2/27															
Chambers, 5 E	8	2.6	2/28				7	2.6	3/12									
Clarkson	10	3.5	2/28															
Clay Center	18	2.6	1/8	9	4.1	3/6	17	4.8	3/10	4	2.9	3/17						
Clearwater	8	2.4	2/25	6	1.8	3/4												
Columbus										7	1.5	3/15						
Creighton	18	2.5	2/5	14	3.0	3/4	11	4.5	3/14									
"	12	2.5	2/25	12	2.8	3/7												
Crete	3	2.0	2/7															
Crofton, 5 NE	11	3.2	2/24															
Crowell, 2 SE	10	3.5	2/28															
David City	5	2.1	2/7				4	1.4	3/14									
" "	5	1.9	2/11															
" "	11	3.2	2/21															
Deweese	7	2.5	2/4															
Dodge				13	4.3	3/1												
Dorchester							5	2.0	3/14									
Eddyville				7	2.1	3/1												
Elgin, 1 E							9	3.3	3/12									
Elwood	5	1.3	2/5															
"	3	1.2	2/11															
Emerson	13	4.2	2/28	10	4.0	3/4	9	3.5	3/11	8	3.0	3/18	6	2.1	3/25	2	0.8	4/1
"							9	3.1	3/14									
Ewing	15	3.7	2/25	14	3.5	3/4	14	3.8	3/11	10	2.9	3/18	4	2.2	3/25			
Ewing	15	4.2	2/27	14	3.6	3/7	10	3.5	3/12	8	2.4	3/21						
"							14	3.7	3/14									
Ewing, 3 W							8	3.1	3/12									
Fairbury	5	0.9	2/4															
"	2	0.6	2/7															
Fairmont	7	1.5	2/4				5	0.7	3/10									
"	8	3.1	2/24				4	-	3/14									
"	5	2.6	2/28															
Fairmont, 2 W							5	2.4	3/10									
Fremont	7	2.1	2/28				6	2.0	3/10									
Fremont, 3 S	8	2.1	2/28															
Fullerton							7	2.1	3/12									
Gavins Point Dam	13	4.6	2/25															
Gibbon				4	1.7	3/1												
Gresham	8	2.8	2/4				8	3.1	3/10	4	2.4	3/18						
Gresham							10	3.4	3/14									
Hastings	3	0.6	2/7	14	4.5	3/6	6	3.5	3/14	4	2.9	3/17						
"	8	3.0	2/24															
"	6	2.9	2/28															
Hastings, 3 E				8	3.9	3/6												

TABLE 9.—*Depth of snow on ground and water equivalent, in inches, for February–April 1969, Nebraska.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Hastings, 2 W							6	3.2	3/10									
Hebron	3	1.0	2/4															
"	7	1.4	2/19															
Holdredge	5	2.3	2/4															
"	6	2.7	2/24															
Holdredge	4	2.8	2/28															
Hooper	8	2.2	2/28				6	2.0	3/10									
Humphrey	9	3.7	2/28															
Laurel	21	5.9	2/25	19	5.5	3/4	17	5.6	3/14	13	4.9	3/18	5	1.5	3/28			
"	20	5.7	2/28	18	5.5	3/7				12	3.6	3/21						
Lincoln, 2 N	6	1.8	2/24				2	1.3	3/10									
Loup City				12	3.6	3/4												
Lyons	15	3.7	2/28	14	4.6	3/4	12	4.2	3/11	6	2.2	3/18						
"							12	4.4	3/14	3	1.3	3/21						
Madison	12	2.5	2/5	9	2.9	3/4				4	1.6°	3/21						
Madison	11	3.0	2/25	8	3.0	3/7												
"	12	3.7	2/28															
Meadow Grove	13	3.4	2/5	9	3.7	3/4	8	3.6	3.11				2	2.2	3/22			
" "	9	3.2	2/25	8	3.5	3/7	8	3.4	3/14									
" "	10	3.6	2/28															
Miller	6	2.2	2/24	6	1.9	3/1	5	2.2	3/10									
Neligh	10	2.6	2/25	8	2.5	3/4	8	3.2	3/12	4	2.0	3/18	2	0.8	3/25			
"	9	3.0	2/28	7	2.2	3.7	7	3.0	3/14	3	1.5	3/20						
Nelson	11	2.9	1/7				2	0.8	3/6									
"	6	2.2	2/4															
Nelson	10	2.2	2/22															
Norfolk, 3 E							12	4.0	3/10									
North Loup	12	3.8	2/28															
Oakdale	14	3.8	2/25	13	3.8	3/4	11	3.7	3/11	2	0.9	3/21						
"	13	3.8	2/28	11	3.9	3/7	10	3.9	3/12									
Oakdale							10	3.8	3/14									
Oconto, 5 NE	8	3.0	2/28				11	4.4	3/12									
O'Neill	10	3.5	2/27															
"	18	4.1	2/28															
O'Neill, 1 N										6	1.3	3/15						
O'Neill, 2 S							10	3.2	3/10									
O'Neill, 6 S	12	3.2	2/28															
Osceola	12	3.1	2/22	9	3.5	3/7				4	2.5	3/18						
"	8	3.3	2/27															
Osmond	13	4.0	2/25	14	4.2	3/4	14	5.0	3/14	9	3.0	3/21	6	2.3	3/25			
Osmond	15	3.7	2/28	14	5.2	3/7												
Pender										5	2.5	3/21						
Pierce	10	3.5	2/5	15	4.1	3/4	13	4.0	3/14	8	3.0	3/21	T	T	3/25			
"	15	4.2	2/28															
Pilger	12	4.5	2/25	12	4.4	3/7	12	4.4	3/10	5	1.5	3/21						
Pilger	13	4.3	2/28	12	4.1	3/4	12	4.4	3/14									
Plainview				16	4.4	3/1				8	2.0	3/21						
"				17	5.6	3/4												
"				10	4.0	3/7												
Polk	10	2.8	2/4				8	3.6	3/10									
Polk							4	1.6	3/14									
Ragan	3	0.8	2/5															
Randolph	12	2.7	2/5	11	4.0	3/4	11	4.9	3/11	8	4.0	3/18	4	2.4	3/25			
"	14	4.3	2/28	10	4.7	3/7	11	4.7	3/14	7	4.5	3/21						
Red Cloud	2	0.4	2/5															
Riverdale				4	1.7	3/1												
Ruskin				2	0.9	3/6												
St. Helena										4	2.3	3/21						
St. Paul	4	1.2	2/28	4	1.3	3/4	9	1.1	3/11	7	1.6	3/18						
" "				4	1.1	3/7	8	2.7	3/12									
St. Paul							6	0.9	3/14									
St. Paul, 2 SE							5	1.9	3/12									
St. Paul, 2 S	6	2.3	2/27															
Sargent				8	2.9	3/1												
Schuyler	8	3.6	2/26	5	3.4	3/1												
Seward	5	1.7	2/4	4	2.3	3/7	4	2.0	3/10									
"	5	2.1	2/27				4	2.0	2/14									
Shelby, 2 E	5	2.8	2/27															
Spalding	12	3.5	2/28				12	3.5	3/8									
Stanton	17	4.5	2/25	13	3.7	3/4	13	3.3	3/11	2	0.6	3/21						

TABLE 9.—*Depth of snow on ground and water equivalent, in inches, for February–April 1969, Nebraska.*—Continued

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Stanton	16	4.4	2/28				11	2.8	3/14									
Sumner				8	2.2	3/1												
Superior	5	1.4	2/4															
"	2	0.4	2/7															
Sutton							6	3.3	3/14	2	1.6	3/17						
Taylor	8	1.8	2/24	9	3.5	3/1	5	1.8	3/10									
Thedford	8	1.4	2/27															
Thedford, 23 N	8	2.2	2/27															
Uehling				5	2.9	3/7												
Upland	7	2.4	2/4															
Upland	6	2.2	2/7															
"	4	1.3	2/11															
Utica	10	4.5	2/7				8	2.9	3/14	5	2.8	3/14						
"	8	3.3	2/11															
"	13	3.0	2/14															
Valentine, 5 S	9	3.3	2/27															
Wahoo	9	3.1	2/27				6	2.7	3/10									
Wahoo, 3 E	3	2.2	2/27															
Wakefield	13	3.8	2/5	13	4.0	3/4	12	4.6	3/11	4	1.8	3/18	3	1.6	3/25			
"	12	4.2	2/24	12	4.4	3/7	11	4.2	3/14	4	2.0	3/21						
Wakefield	14	4.6	2/25															
Walthill	18	5.3	2/28	16	5.4	3/7				7	2.4	2/18	2	1.1	3/25			
"										5	2.1	3/21						
Wayne													3	1.5	3/25			
Westerville	6	2.1	2/28															
West Point	12	4.0	2/5	12	4.2	3/4	10	3.7	3/10									
" "	12	3.6	2/24	11	4.2	3/7	8	3.3	3/11									
" "	12	4.1	2/25															
" "	13	4.3	2/28															
West Point, 5 S							10	3.6	3/10									
Wilber	10	3.5	2/24															
Winside	14	4.5	2/28				13	4.4	3/14	8	2.7	3/21	6	2.4	3/25			
Winslow	12	2.9	2/28	11	4.0	3/4												
Wood River				4	1.9	2/1												
York	6	3.0	2/4				10	3.4	3/10	3	2.8	3.17						
York	6	2.9	2.7				5	3.2	3/14									
"	5	2.7	2/11															

TABLE 10.—*Depth of snow on ground and water equivalent, in inches, for February–April 1969, North Dakota.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Abercrombie	14	2.9	2/7	12	3.3	3/7	11	3.2	3/11	11	3.5	3/18	9	2.9	3/25	10	3.2	3/31
"	13	2.8	2/14				10	3.2	3/14	10	3.3	3/21	9	3.0	3/28	7	2.4	4/4
"	12	2.7	2/21													T	T	4/8
"	11	3.0	2/28															
Abercrombie, 2 S							10	3.3	3/12									
Abercrombie, 2 NW							14	4.5	3/11									
Adams, 2 N													15	5.7	3/24			
Adrian				16	4.4	3/6												
Alfred, 5 NE																4	2.3	4/2
Alice, 1 S				13	3.5	3/7												
Ambrose, 3 N				20	3.2	3/5												
Amenia	16	3.8	2/7	10	2.9	3/7	11	3.0	3/11	9	2.5	3/18	7	2.4	3/25	7	2.4	3/31
"	13	3.0	2/14				7	2.4	3/14	8	2.8	3/21	6	2.3	3/28	6	2.0	4/4
"	12	2.8	2/21													2	1.0	4/8
"	10	2.5	2/28															
Amidon	10	2.3	1/20	12	3.5	3/3	12	4.4	3/4	3	2.0	3/21				3	0.8	4/2
"	11	2.0	2/25															
Aneta, 3 S													8	1.8	3/22			
Arthur										9	2.1	3/21						
Ashley	7	2.4	1/21															
Ashley	9	3.3	2/24															
Ayr										14	4.8	3/21						
Baldhill Dam	22	3.2	2/7	15	3.1	3/7	17	3.4	3/11	16	3.1	3/18	12	2.9	3/25	13	3.0	3/31
" "	18	3.2	2/14				16	3.1	3/14				12	2.9	3/28	4	1.6	4/8
" "	15	3.2	2/21															
Baldhill Dam	19	3.7	2/28															
Balta													13	3.5	3/22			
Beach	17	3.2	1/31															
"	7	1.4	2/25															
Belcourt, 3 N				34	5.9	3/1												
Belfield	6	2.7	1/20										11	2.9	3/25	6	2.0	4/1
"	23	3.7	2/21															
Belfield, 6 N							13	3.1	3/12									
Belfield, 13 N	16	2.5	2/13															
Belfield, 6 S							14	3.8	3/12									
Bergen	10	1.3	1/21															
"	15	3.2	2/25															
Beulah	5	1.0	1/22	15	2.6	3/7	15	1.9	3/14	10	3.6	3/21	3	1.0	3/25	2	1.0	4/1
"	9	2.0	2/24										2	0.9	3/28			
Binford				13	2.9	3/1				10	3.2	3/20						
Blanchard	10	3.0	2/4															
Bottineau				31	7.3	3/2				16	5.1	3/21						
Bowman	10	2.7	2/26	11	1.8	3/3	11	1.9	3/12	8	3.4	3/18	7	2.4	3/25			
"													6	3.7	3/28			
Bowman, 16 S	10	2.7	2/26															
Brantford	10	2.4	2/18	17	3.9	3/7												
Breien	8	1.2	1/20	24	4.3	3/3	20	5.8	3/14	12	4.1	3/21	7	1.5	3/25	5	2.1	4/1
"	13	2.6	2/24	16	4.3	3/6							6	2.5	3/28			
Buchanan	23	4.1	2/18															
Buchanan, 2 S				29	6.5	3/7												
Buchanan, 5 W																7	3.6	4/2
Bucyrus	6	1.1	1/20															
"	11	1.9	2/24															
"	9	2.3	2/26															
Buffalo, 4 S				10	2.8	3/7												
Buxton													10	2.6	3/22			
Cando				14	3.6	3/1												
Carrington	9	2.0	1/22													10	3.4	4/2
"	12	3.3	2/25															
Carrington, 4 N	15	3.9	2/3															
Carrington, 4 N	12	3.0	2/18															
Carrington, 7 E	25	3.5	2/18	30	4.9	3/7												
Carson	5	1.1	1/20															
"	9	2.1	2/24															
Casselton													8	3.2	3/25			
Cavalier	17	1.4	2/7	10	2.0	3/7	17	2.0	3/11	14	2.0	3/18	8	1.2	3/25	8	1.2	3/31
"	17	2.0	2/21							12	1.5	3/21				6	1.0	4/4
"	16	2.0	2/24													3	0.9	4/8
"	13	1.7	2/28															
Cayuga							15	5.0	3/13				8	1.7	3/26			

TABLE 10.—*Depth of snow on ground and water equivalent, in inches, for February–April 1969, North Dakota.*—Continued

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Chaffee	12	3.6	2/28															
Chaffee, 5 NE	16	2.9	2/7	11	3.5	3/7	12	3.5	3/11	9	3.3	3/21	6	2.1	3/28	6	2.1	3/31
"	14	3.1	2/14				11	3.3	3/14							5	1.8	4/4
"	13	3.8	2/21													T	T	4/8
"	12	3.7	2/28															
Christine	14	3.5	2/22															
Cleveland, 5 NE	18	2.9	2/24															
Colfax, 6 SW													8	2.2	3/26			
Colgate	20	4.7	2/7	15	3.6	3/7	16	3.9	3/11	13	3.8	3/18	10	3.9	3/25	11	3.7	3/31
"	18	5.4	2/14							12	4.1	3/21	10	2.5	3/28	8	3.0	4/4
Colgate	16	3.8	2/21													2	0.7	4/8
"	15	4.3	2/28															
Cooperstown	9	2.1	1/22							13	3.1	3/20						
"	9	2.9	2/25															
Courtenay, 1 NW	25	5.1	2/3															
Crystal, 1 E													9	3.1	3/24			
Crystal Springs	10	2.0	1/31															
Davenport										10	2.5	3/21						
DeLamere							12	3.6	3/13									
Devils Lake	14	2.5	2/6	22	4.2	3/1				18	3.9	3/20						
Dickey				16	4.5	3/6										15	4.5	4/1
Dickey, 5 ESE																17	5.7	4/1
Dickinson	3	0.8	1/20															
"	11	2.5	2/25															
Dickinson, 9 N							11	2.5	3/12									
Dickinson, 4 S							19	3.0	3/12									
Dover, 5 S																22	6.7	4/2
Drayton, 2 N	12	2.6	2/7	16	4.1	3/7	16	4.1	3/11	15	3.6	3/18	14	3.2	3/25	8	2.5	3/31
"	12	4.0	2/14				15	4.1	3/14	14	4.1	3/21	13	4.3	3/28	T	T	4/8
"	15	4.4	2/28															
Dunn Center	21	2.5	2/21															
Dunn Center, 2 SW	26	2.2	2/22	17	2.2	3/6	18	2.3	3/14	8	2.0	3/21	5	0.8	3/28			
Dunseith				22	5.8	3/2												
Dwight							15	4.5	3/12									
Eckelson	14	4.3	2/24															
Edgeley																6	2.3	4/1
Eldridge	12	4.3	2/24															
Elgin							13	3.5	3/10									
Ellendale	9	2.3	1/21															
"	14	3.5	2/24															
Emerado, 1 SE													12	2.8	3/22			
Enderlin, 1 E				9	3.0	3/7												
Epping	11	1.6	1/22															
"	15	3.7	2/24															
Erie										9	2.3	3/21						
Fessenden	11	2.4	2/18															
Fessenden, 3 E				10	2.3	3/7												
Fessenden, 10 W				15	3.5	3/7												
Finley	-	2.7	2/28															
Fordville, 1 E													13	4.4	3/24			
Forman	11	3.4	1/21	35	4.5	3/7	35	4.5	3/11	22	4.5	3/18	16	3.6	3/25	10	3.0	3/31
"	26	3.4	2/7				26	4.7	3/12	22	4.7	3/21				1	0.3	4/4
"	31	4.0	2/21															
"	15	4.3	2/25															
"	33	4.5	2/28															
Fort Ranjom				14	5.1	3/7												
Foxholm, 7 N				26	3.6	3/5												
Fullerton	23	4.0	2/3															
Galchutt	14	3.6	2/22															
Geneseo	20	4.6	1/30															
Gladstone, 3 S							10	2.6	3/12									
Gladstone, 2 NW	6	1.7	2/13															
Glen Ullin	10	2.0	1/20	17	3.4	3/1	16	3.2	3/14	12	4.8	3/21	9	2.8	3/25	6	2.6	4/1
" "	14	2.9	1/31										9	3.2	3/28			
" "	6	1.2	2/13															
Glen Ullin	17	3.7	2/25															
Glen Ullin, 10 SE							13	3.5	3/10									
Grafton	9	2.3	2/5										8	2.2	3/24			
Grand Forks	20	4.2	2/7	14	3.0	3/7	14	3.4	3/11	10	2.9	3/18	6	2.0	3/25	5	1.8	3/31
" "	16	3.4	2/14							9	2.3	3/21	6	2.0	3/28	4	1.5	4/4

TABLE 10.—*Depth of snow on ground and water equivalent, in inches, for February–April 1969, North Dakota.*—Continued

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Grand Forks	15	3.2	2/21													T	T	4/8
" "	16	3.2	2/28															
Grand Rapids				15	4.5	3/6												
Grassy Butte	7	1.9	1/22															
" "	10	2.4	2/24															
Great Bend													17	5.9	3/26			
Halliday	6	1.1	1/22															
"	12	2.2	2/24															
Hankinson	24	5.8	1/30															
Hankinson, 8 ESE							13	4.2	3/13									
Hankinson, 13 SE							12	4.0	3/13									
Hankinson, 9 SW							15	4.4	3/13									
Hankinson, 2 W							15	4.9	3/13									
Harvey	10	1.8	1/21										13	3.5	3/22			
Harvey, 4 N	13	2.9	2/25										12	3.1	3/22			
Harvey, 4 E	11	2.2	2/18															
Hatton, 5 SE													14	4.4	3/22			
Hazelton	12	3.1	1/21															
"	18	4.3	2/24															
Hettinger	12	3.2	2/28	12	3.2	3/6	13	3.7	3/14				T	T	3/25			
Hettinger, 3 NW	14	2.8	2/28															
Horace, 5 SE	14	3.5	2/22															
Hurdsfield	8	1.3	1/22															
"	12	2.4	2/25															
International Peace Garden										27	6.1	3/21						
Jamestown	9	2.7	1/21															
"	14	4.5	2/25															
Jamestown, 6 E	16	5.1	2/24															
Jud																8	3.2	4/1
Kathryn	19	2.9	2/3															
Kenmare	10	2.3	2/18	15	2.6	3/5				12	3.7	3/21						
Kensal, 4 W	14	2.5	2/18															
Kindred	25	4.9	2/3															
Lake Metigoshe				36	6.5	3/2				33	7.2	3/21						
Lakota	9	2.8	2/5															
La Moure, 1 N				20	5.8	3/6												
La Moure, 2 E				26	6.5	3/7												
La Moure, 5 W																9	3.3	4/1
Langdon	10	2.6	2/5															
Larimore	20	3.1	2/7										15	4.6	3/22	12	2.8	3/31
Larimore													20	4.8	3/25			
"													12	2.8	3/28			
Lefor							12	3.1	3/22									
Leonard	11	3.5	2/3							11	3.6	3/21						
Lidgerwood							17	5.4	3/13									
Lisbon	21	4.5	2/7	20	2.1	3/7	19	3.9	3/11	14	4.8	3/18	10	3.1	3/25	10	3.1	3/31
"	20	4.3	2/14							14	4.0	3/21	9	3.0	3/28	16	2.5	4/4
"	22	5.6	2/21													4	1.3	4/8
"	22	4.9	2/28															
Lostwood, 12 N				20	3.4	3/5												
Lucca										6	1.9	3/21						
Ludden	18	5.0	2/25															
Manvel													6	1.7	3/22			
Marmarth	8	1.8	1/20															
"	11	2.4	2/24															
Mayville	15	2.9	2/7	11	3.1	3/7	10	3.0	3/11	9	2.9	3/18	8	2.8	3/25	8	2.9	3/31
"	14	2.8	2/14							9	2.9	3/21	8	2.8	3/28	5	2.1	4/8
"	14	2.9	2/21															
"	11	3.1	2/28															
Mayville, 11 WNW										8	3.3	3/21	8	3.3	3/22			
McHenry, 5 N				13	2.9	3/1												
McLeod, 3 E	15	3.6	2/7	14	3.4	3/7	14	3.5	3/11	12	3.7	3/18	18	3.9	3/21	13	3.8	3/31
"	14	3.6	2/14										12	3.8	3/25	7	1.9	4/4
"	14	3.0	2/21													T	T	4/8
"	13	3.4	2/28															
Medina	3	0.6	1/21															
Medora	17	3.1	2/28	17	2.9	3/6	18	2.9	3/14	5	2.1	3/21	5	1.1	3/25			
Melville, 5 WSW																13	4.3	4/2
Mercer	7	1.6	2/25															
Millarton																4	2.2	4/2

TABLE 10.—*Depth of snow on ground and water equivalent, in inches, for February–April 1969, North Dakota.*—Continued

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Milton, 4 NW													17	5.2	3/24			
Minot	10	1.4	1/21							13	3.1	3/21						
"	13	1.9	2/24															
Minto	9	2.4	2/5															
Mohall	7	1.8	2/18							10	3.0	3/21						
Montpelier	15	3.2	2/3				14	3.8	3/8									
Mooretown							17	5.0	3/13				12	3.8	3/26			
Mott	7	2.0	1/20	20	2.7	3/6	22	2.9	3/14	10	3.0	3/21	5	1.5	3/25	T	T	4/1
"	15	1.7	2/21										2	0.9	3/28			
"	12	2.2	2/24															
Mott, 5 N	12	1.6	2/3															
Neche, 2 N													9	2.2	3/24			
New England	15	2.3	2/3	10	2.7	3/6	13	3.0	3/14	3	1.0	3/21						
" "	15	4.0	2/12															
New England, 8 S	5	1.2	2/3															
New Rockford	12	2.3	1/22															
" "	17	3.8	2/25															
New Rockford, 3 SW	10	2.4	2/18	11	3.0	3/7												
New Salem	15	4.0	2/21	24	3.1	3/6				16	4.5	3/21	6	2.7	3/28			
Nome	9	2.7	1/21															
Nome	13	3.7	2/25															
Nome, 5 SW				12	3.1	3/7												
Northwood, 2 NE	11	3.3	2/4										13	3.6	3/22			
Nortonville, 3 SE																9	3.7	4/1
Park River	20	2.8	2/7				23	3.1	3/4	16	3.0	3/18	15	3.1	3/28	15	3.7	3/31
Park River	18	2.8	2/14							19	3.1	3/21				8	3.0	4/8
" "	13	2.8	2/21															
" "	21	2.9	2/28															
Parshall	9	1.4	1/22															
"	15	2.8	2/24															
Pekin	15	2.9	2/6															
Pembina, 1 S	12	2.6	2/7	12	2.7	3/7	12	2.7	3/11	9	2.6	3/18	8	2.6	3/25	6	2.2	3/31
"	24	2.6	2/14							9	2.6	3/21	6	2.3	3/28	5	1.6	4/4
"	18	2.5	2/21													T	T	4/8
Petersburg, 2 N													8	3.1	3/24			
Pillsbury										13	4.4	3/21						
Pingree, 2 E				13	3.3	3/7												
Pingree, 2 S	9	2.2	2/18															
Pingree, 3 W																9	3.9	4/2
Reeder, 11 NNE	4	1.0	2/3															
Reeder, 12 NNW	16	3.5	2/28	17	5.1	3/6	17	5.1	3/14	6	2.4	3/21	5	2.3	3/25			
"													3	1.4	3/28			
Reynolds													17	4.5	3/22			
Richardton	15	2.7	2/27				18	3.5	3/13	6	2.3	3/20	2	0.8	3/28	1	0.6	4/1
Richardton, 5 S				14	3.1	3/4												
Richardton, 9 S	10	2.3	2/13															
Richardton, 12 S							10	2.5	3/12									
Riverdale	13	2.2	2/25										10	3.3	3/25			
Rolette													14	4.0	3/22			
Rolla										31	7.0	3/20						
Rugby				13	3.7	3/2							13	3.9	3/22			
San Haven				22	5.8	3/2												
Selfridge	12	2.5	2/24															
Sheldon										14	4.6	3/21						
Sheyenne	8	2.6	2/6															
Souris				15	4.2	3/2				11	3.2	3/21						
Spiritwood, 5 S																12	4.1	4/2
Stanley	7	1.3	1/22															
"	12	2.2	2/24															
Starkweather										15	4.4	3/20						
Steel	9	1.8	1/27															
"	12	3.1	2/25															
Sykeston																7	3.7	4/2
Tower City										8	2.8	3/21						
Towner	8	1.9	2/18	15	2.8	3/2												
Tyler							21	6.9	3/13									
Valley City	15	3.8	2/7	9	2.6	3/7	9	2.7	3/11	6	1.5	3/18	5	1.3	3/25	7	1.7	3/31
" "	14	3.9	2/14							7	1.9	3/21	7	1.7	3/28	5	1.0	4/4
" "	10	2.7	2/21													T	T	4/8
" "	10	2.6	2/28															

TABLE 10.—*Depth of snow on ground and water equivalent, in inches, for February–April 1969, North Dakota.*—Continued

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Valley City, 4 E	22	5.6	2/24															
Valley City, 4 W	14	5.0	2/24															
Vang													18	4.3	3/24			
Velva	11	1.8	2/17															
Verona	20	6.1	2/3	18	6.0	3/7												
Wahpeton	25	5.2	2/7	20	5.3	3/7	20	5.3	3/11	17	5.2	3/18	14	4.7	3/25	13	4.7	3/31
"	24	5.2	2/14							16	5.2	3/21	12	4.0	3/28	10	3.4	4/4
"	22	5.5	2/21													7	2.5	4/8
"	20	5.4	2/22															
"	20	5.3	2/28															
Walcott													16	4.9	3/26			
Walhalla	16	2.1	2/7	21	2.9	3/7	24	3.0	3/11	20	2.9	3/18	9	1.2	3/25	T	T	4/4
"	14	2.1	2/14							15	2.8	3/21						
"	15	2.1	2/21															
"	15	2.1	2/28															
Warwick				14	3.2	3/1				13	3.1	3/20						
Watford City	11	2.3	1/22															
" "	17	4.6	2/25															
Watford City, 11 E	12	3.1	2/25															
Watford City, 14 S	15	3.5	2/21	16	3.5	3/7	16	3.5	3/14	7	2.2	3/21	T	T	3/25	T	T	4/1
Watford City, 14 S	17	4.1	2/25										T	T	3/28			
Westhope										15	3.6	3/21						
Whitman, 1 SE													8	3.3	3/24			
Wildrose				16	3.4	3/5												
Williston, 5 W	10	2.7	1/26															
Wilton	5	1.0	1/20															
"	7	1.7	2/24															
Woodworth, 5 E																20	6.0	4/2
Wyndmere	13	3.7	2/3	23	6.4	3/1							8	3.0	3/26			
Ypsilanti							13	4.1	3/8							7	2.7	4/1
Zeeland	6	2.2	1/21															
"	9	2.3	2/24															

TABLE 11.—*Depth of snow on ground and water equivalent, in inches, for South Dakota.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Academy	16	4.1	2/21										1	0.4	3/28			
Alcester													14	5.7	3/27			
Alcester, 5 N													12	5.6	3/27			
Alcester, 5 W													19	7.6	3/27			
Alexandria	18	4.9	2/28	17	4.7	3/7	15	4.9	3/14	8	4.0	3/21	4	1.6	3/28			
Altamont, 4 N	14	3.3	2/25							16	4.8	3/21				16	5.0	3/30
"																12	4.3	4/2
Andover, 8 NNE	44	7.5	2/21	36	8.1	3/7							9	3.4	3/28			
Angostura Dam	4	0.5	2/21	3	0.8	3/7	1	0.6	3/14									
" "	4	0.8	2/28															
Arlington	29	6.0	2/21							24	6.4	3/21	20	7.5	3/28	11	4.2	3/30
"	31	7.5	2/28													9	3.5	4/2
Armour																7	3.0	4/3
Ashton	13	4.6	2/28										9	2.8	3/28			
Avon	7	2.7	2/26															
Baltic, 2 N							22	8.4	3/10									
Barnard													19	6.1	3/28			
Belle Fourche	2	0.2	2/28															
Beresford	14	4.3	2/24										12	4.6	3/22	8	3.8	3/29
Beresford, 4 N													19	6.9	3/27			
Beresford, 1 E													10	4.5	3/27			
Big Bend Dam	11	2.6	2/25															
" " "	13	3.2	2/28															
Blunt							5	1.9	2/14									
Bonilla													12	4.2	3/28			
Bowdle	9	3.0	2/21	17	5.0	3/7				10	5.0	3/21						
Bradley													10	3.9	3/28			
Brandon										22	6.3	3/19						
Brentford	9	2.4	2/25															
Bridgewater	35	7.2	2/21				23	6.9	3/14	13	3.7	3/21	9	3.5	3/28			
Bridgewater	25	7.1	2/28															
Bristol													12	4.8	3/28			
Britton	26	7.1	2/21										16	5.8	3/28			
Brookings	32	7.7	2/28	26	8.0	3/7												
Brookings, 2 N										21	4.5	3/20						
Brookings, 3 N				32	10.4	3/7				21	4.5	3/20				15	5.2	3/31
"																14	4.5	4/2
Brookings, 11 N	16	4.5	2/25							21	4.5	3/20						
Brookings, 2 NE	34	6.5	2/21	32	10.4	3/7	31	9.9	3/14	31	7.5	3/21				18	6.4	4/3
Brookings, 10 S																14	5.0	3/31
Brookings, 10 S																12	4.6	4/2
Bryant, 1 NE	24	6.5	2/7				36	6.3	3/14	18	7.0	3/21	18	6.0	3/28	6	2.7	4/3
Bryant, 4 W										17	5.3	3/21						
Bryant, 4 NW																14	4.7	3/30
"																10	3.8	4/2
Buffalo	7	2.1	2/26															
Buffalo Gap	6	0.5	2/21				3	0.7	3/14									
" "	5	0.9	2/28															
Buskala Ranch	14	2.7	2/21	16	3.3	3/7	16	3.6	3/14	16	3.4	3/21	16	3.4	3/28	12	3.6	4/3
" "	16	2.9	2/28															
Canistota, 3 W				24	7.7	3/6												
Canova				21	6.2	3/6												
Canton													16	6.1	3/22	12	4.9	3/29
"																11	4.3	4/1
Canton, 6 W				18	7.2	3/6												
Carthage	27	7.1	2/4															
Castlewood	27	6.1	2/5	25	6.3	3/7				22	5.6	3/21	16	5.1	3/28			
"	26	5.6	2/21															
"	30	6.4	2/18															
Centerville, 6 SE	36	8.5	2/21	18	7.6	3/6	18	5.9	3/14	10	4.6	3/21	6	3.9	3/28			
Centerville, 6 SE	30	8.8	2/28	20	7.6	3/7												
Chamberlain	12	4.1	2/21															
Chester							25	8.0	3/14	20	8.1	3/21	16	6.1	3/28	12	4.7	3/29
"																10	4.7	4/1
Chester, 2 N				22	6.4	3/6												
Chester, 7 SE																8	3.3	4/3
Chester, 5 S	24	6.0	2/4															
Chester, 3 W																11	4.0	4/3
Claire City													4	3.0	3/26			
Clark	19	4.4	2/21	24	6.2	3/7	24	5.6	3/14	20	6.9	3/21	15	5.3	3/28	6	2.5	4/3

TABLE 11.—*Depth of snow on ground and water equivalent, in inches, for South Dakota.*—Continued

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Clark	26	5.1	2/28															
Clark, 10E										8	3.0	3/21				11	3.8	3/30
Clear Lake	36	8.4	2/5										18	5.9	3/28	6	2.8	4/3
Clear Lake, 2 N	36	6.4	2/21													11	4.4	3/31
" "																6	3/0	4/2
Colton	27	6.0	2/28				22	6.8	3/14	17	6.7	3/21				15	5.5	3/29
"				22	5.9	3/4										11	4.6	4/1
"																6	2.0	4/3
Conde	27	5.7	2/21	36	10.1	3/7	37	10.2	3/14	2.8	9.1	3/21	22	8.8	3/28	6	3.0	4/3
"	36	10.3	2/28															
Cottonwood, 2 E	6	1.5	2/28	7	1.8	3/7	9	1.9	3/14									
Crooks				23	7.7	3/4	22	7.6	3/14									
"				16	5.2	3/7												
Deadwood	2	0.3	2/28				3	0.3	3/14				5	0.8	3/28			
Deerfield, 4 NW	14	2.7	2/21															
Deerfield, 4 NW	16	2.9	2/28															
De Smet, 10 S	11	2.8	2/26															
De Smet, 11 S										12	4.3	3/21				11	4.2	3/30
" "																7	2.3	4/2
Doland													16	6.2	3/28			
Dupree	21	2.9	2/28	21	3.0	3/7	20	3.0	3/14									
Eagle Butte	28	3.0	2/21	30	4.0	3/7				15	2.5	3/21						
Eureka							18	6.3	3/14				9	3.6	3/28			
Faith	9	2.5	2/27															
Faulkton, 4 E	9	2.3	2/25															
Faulkton, 1 NW	20	3.5	2/28				21	3.4	3/14	14	3.1	3/21	4	2.1	3/28			
Ferney													18	5.5	3/28			
Flandreau	23	4.9	2/21	23	6.1	3/7	22	6.0	3/14	19	5.8	3/21	17	6.4	3/28	10	4.1	4/3
"	24	6.8	2/28															
Flandreau, 3 S										12	4.5	3/20				11	4.0	3/31
Flandreau, 3 S																8	3.5	4/2
Forestburg, 3 NE	43	6.3	2.28							20	6.6	3/21	12	5.6	3/28			
Fort Meade	2	0.3	2/28				2	0.6	3/14									
Fort Thompson, 5 E	5	1.4	2/26															
Freeman	17	5.2	2/24															
Gettysburg	6	1.5	2/28	6	1.5	3/7	18	3.7	3/14									
Gettysburg, 6 W	9	2.6	2/25															
Gettysburg, 14 W	12	2.3	2/21															
Gregory													-	2.0	3/21			
Glad Valley, 2 W	25	4.5	2/28										4	0.4	3/28			
Harrington	3	1.2	2/28	8	2.2	3/7	12	2.4	3/14									
Hartford, 4 N																9	2.9	4/3
Henry, 3 W	12	3.3	2/26															
Henry, 5 NW																10	3.3	3/30
"																7	2.4	4/2
Highmore, 1 W	10	1.2	2/21	11	2.5	3/7				5	1.9	3/21						
Houghton													16	5.8	3/28			
Howard	27	5.0	2/21	23	5.8	3/7							15	5.4	3/28	3	2.3	4/3
"	25	5.6	2/28															
Howard, 9 NE																11	4.2	3/29
Howard, 9 NE																9	3.3	4/2
Humboldt				24	7.3	3/6				22	8.2	3/20						
"										7	3.0	3/21						
Humboldt, 3 N																7	3.1	3/29
"																T	T	4/1
Huron, 9 W	9	2.3	2/26															
Interior	3	0.4	2/21															
Interior, 3 NE	5	0.5	2/28															
Ipswich													5	1.8	3/28			
Iroquois													11	4.5	3/28			
Kadoka	9	0.8	2/21															
Kadoka, 7 W	3	0.8	2/27															
Kennebec	6	1.5	2/28	4	1.3	3/7	4	1.5	3/14									
Kimball, 2 S	8	2.5	2/26															
Lake Andes	5	2.3	2/26															
Lake Norden, 5 E																12	3.8	3/30
" "																9	3.4	4/2
Lane, 2 W	9	2.6	2/26															
Lead, 1 SE	2	0.2	2/21															
"	2	0.3	2/28															

TABLE 11.—*Depth of snow on ground and water equivalent, in inches, for South Dakota.*—Continued

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Lemmon	12	2.5	2/26	18	1.2	3/7	11	1.5	3/14	4	1.1	3/21						
Lemmon	12	2.1	2/28															
Leola	14	3.8	2/25															
Madison	32	8.6	2/28	31	9.0	3/7	30	9.2	3/14	23	7.3	3/21	18	6.0	3/28	11	4.2	3/30
"																9	3.5	4/2
Madison																7	2.4	4/3
Madison, 9 S																10	4.4	3/30
"																8	4.3	4/1
Madison, 18 S																6	3.2	4/3
"																14	4.5	3/30
Madison, 18 S																T	T	4/1
"																10	4.3	4/3
Marcus, 8 NNW	11	1.6	2/21	12	2.2	3/7	11	2.2	3/14									
"	12	2.1	2/28															
Marion	34	5.5	2/21	28	7.1	3/6	27	6.0	3/14	19	6.7	3/21	15	2.8	3/28			
Marion	28	7.2	2/28	26	6.9	3/7												
Martin	6	1.0	2/21	4	0.7	3/7	4	0.4	3/14									
"	2	0.6	2.28															
McIntosh	15	3.9	2/21	19	4.8	3/7	19	4.8	3/14	7	2.5	3/21	4	1.9	3/28			
"	14	2.9	2/26															
McIntosh	19	4.8	2/28															
McLaughlin	23	3.5	2/28	25	4.0	3/7	29	4.5	3/14									
Meadow, 2 E	9	2.5	2/26															
Mellette	13	4.6	2/28				15	3.2	3/14	13	3.2	3/21	9	2.8	3/28			
Mellette, 10 W				20	4.7	3/5												
Menno	29	5.8	2/21	22	5.9	3/7	21	5.9	3/14	16	5.2	3/21	12	4.6	3/28			
"	24	6.1	2/28															
Milbank	22	5.3	2/6	21	5.5	3/7	21	5.5	3/14	17	2.1	3/21						
Milbank, 4 W	13	3.7	2/25							11	3.8	3/21						
Milesville, 5 NE	7	1.3	2/21	8	1.4	3/7	10	1.6	3/14									
Milesville, 5 NE	7	1.4	2/28															
Miller	17	2.6	2/28	15	2.5	3/7	14	2.5	3/14	8	2.6	3/28	2	0.6	3/28			
Miller, 4 S	8	2.6	2/25															
Mission	3	1.6	2/27	4	0.3	3/7	4	0.6	3/14									
"	3	0.2	2/28															
Mission, 14 SSE	16	5.0	2/28	18	5.2	3/7	22	5.9	3/14	10	3.5	3/21	4	1.0	3/28			
Mission, 22 S	9	2.7	2/27															
Mitchell, 2 N	18	4.7	2/25															
Mitchell, 2 SSE	23	5.2	2/21															
Mobridge	13	2.9	2/21	15	3.5	3/7	12	2.9	3/14	5	1.8	3/21	2	1.0	3/28			
Mobridge	9	2.1	2/26															
"	16	3.4	2/28															
Montrose				20	6.5	3/6												
Mound City, 3 N	10	2.5	2/25															
Newell, 2 NW	4	0.6	2/28	4	0.7	3/7	4	0.6	3/14									
Northville													16	6.2	3/28			
Oahe Dam	7	1.1	2/25															
Parkston	15	4.2	2/25															
Parkston, 5 E	28	9.6	2/28	26	7.4	3/7	25	7.1	3/14	18	7.0	3/21	16	5.6	3/28			
Pickstown	20	4.6	2/21	9	3.4	3/5	10	3.3	3/14	6	2.2	3/21	2	0.7	3/28			
Pickstown	18	4.5	2/25	11	3.6	3/7												
"	16	4.2	2/28															
Pierpont	20	5.0	2/7										9	3.4	3/28			
Pierre	9	2.3	2/25	4	1.2	3/7	5	1.1	3/14									
"	7	1.6	2/28															
Platte	14	3.5	2/21	15	4.1	3/7	15	3.8	3/14	5	1.8	3/21						
"	20	4.3	2/28															
Platte, 10 W	8	3.0	2/26															
Presho	10	2.3	2/25															
Ramona													16	6.0	3/28			
Rapid City	3	2.9	2/21	2	0.3	3/7	2	0.3	3/14									
" "	2	0.3	2/28															
Ravinia, 2 E	13	3.9	2/26															
Raymond, 3 NE	13	3.9	2/26										11	4.1	3/28			
Redfield	16	2.7	2/21	17	4.1	3/7	17	3.6	3/14	10	4.1	3/21	6	2.3	3/28	2	0.9	4/3
Redfield	20	3.5	2/28															
Redfield, 6 E				24	6.6	3/7	22	4.0	3/14	14	3.5	3/21	12	3.5	3/28			
Richland													5	3.2	3/27			
Rockham				23	6.3	3/5												
Rowena, 2 E	13	3.9	2/26										12	5.0	3/22	12	5.2	3/29

TABLE 11.—*Depth of snow on ground and water equivalent, in inches, for South Dakota.*—Continued

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/3		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Rowena, 2 E																9	4.8	4/1
Salem	21	4.1	2/28	22	4.7	3/7				15	6.3	3/21	9	3.3	3/28			
Salem, 2 S	10	3.1	2/26							10	4.1	3/21				7	3.0	3/29
"																T	T	4/3
Shadehill Dam	20	1.8	2/21	14	2.4	3/7	17	2.5	3/14									
Shadehill Dam	14	1.8	2/28															
Selby	15	1.5	2/21	17	2.0	3/7	18	1.8	3/14									
"	9	2.7	2/25															
"	18	2.2	2/28															
Sioux Falls, 17 W				24	7.2	3/6												
Sisseton	31	6.7	2/28															
Sisseton, 1 E	18	4.9	2/6															
Spearfish	2	0.3	2/28	4	0.3	3/7	2	0.2	2/14									
Spink, 1 N													6	2.7	3/27			
Stephan, 1 ENE										-	0.3	3/21						
Summit	45	7.0	2/21	46	7.0	3/7	46	7.0	3/14	34	5.5	3/21	27	5.3	3/28	15	4.0	4/3
"	45	7.1	2/28															
Timber Lake	18	2.8	2/28	19	2.8	3/7												
Toronto, 3 NW										10	3.8	3/21				10	3.5	3/31
"																8	3.3	4/2
Trent, 1 S													17	6.6	3/22			
Tulare													12	4.2	3/28			
Tuthill, 4 N	2	0.5	2/27															
Tyndall	23	3.7	2/21	15	4.1	3/7	15	4.7	3/14	4	2.2	3/21						
"	17	4.9	2/28															
Victor	24	6.6	2/6															
Victor, 1 ESE	42	7.8	2/21	36	6.8	3/7	34	8.7	3/14	14	5.6	3/21	10	4.1	3/28			
"	41	9.0	2/28															
Vivian	8	2.0	2/21	7	1.4	3/7	7	1.4	3/14									
Volga, 2 NW													23	7.9	3/22			
Wagner	21	4.5	2/21										-	3.0	3/21			
"	14	4.9	2/28															
Watertown	28	7.8	2/21				21	6.0	3/14	20	5.5	3/21	15	4.7	3/28	8	2.9	4/3
"	32	8.1	2/28															
Waubay Natl. Wildlife	33	5.6	2/21				27	7.0	3/14	21	7.0	3/21	12	4.8	3/28			
Webster	22	4.6	2/7													8	2.8	3/30
Webster, 3 W	10	2.3	2/25							9	3.1	3/21				8	2.7	3/30
Wentworth	30	6.9	2/21							15	5.3	3/20	16	6.0	3/28	12	4.6	3/29
"	27	7.5	2/28													10	5.1	4/2
"																7	3.3	4/3
Wentworth, 5 W										27	5.1	3/20						
Wessington							16	4.3	3/14				6	4.1	3/28			
Wessington, 5 S				16	3.9	3/5												
Wessington Springs	15	3.8	2/21	21	4.6	3/5												
Wessington Springs, 9 SW	30	6.0	2/21															
Wessington Springs, 9 SW	25	7.0	2/28															
Wewela	14	2.1	2/28															
White Lake	20	4.2	2/21	20	4.0	3/7	20	3.6	3/14	14	2.8	3/21	10	2.1	3/28			
" "	26	4.1	2/28															
Willow Lake													18	5.9	3/28			
Wilmot	30	6.6	2/6															
Wilmot, 1 ENE							35	4.3	3/14	30	3.8	3/21	30	3.5	3/28	11	2.5	4/3
Winfred													15	5.5	3/20			
Winner	7	1.2	2/28	6	1.0	3/7	5	0.8	3/14									
Wolsey	16	2.5	2/21				17	5.2	3/14				8	3.3	3/28			
Yankton							13	5.3	3/14									
Yankton, 3 N	26	5.8	2/21				13	5.3	3/14				4	1.8	3/28			
"	16	6.4	2/28															

TABLE 12.—*Depth of snow on ground and water equivalent, in inches, for Wisconsin.*

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Abbotsford, 12 E							18	4.9	3/9									
Alma	22	5.9	2/4															
"	18	4.1	2/18															
"	15	3.6	2/25															
Antigo	18	5.6	2/18	17	4.9	3/4	16	4.8	3/11	14	4.8	3/18	8	3.1	3/25	7	2.5	4/1
Antigo	18	5.5	2/25							10	4.4	3/21	7	2.5	3/28	4	1.5	4/4
Arkdale, 4 E							17	5.5	3/9									
Arpin	22	4.0	1/31															
"	19	5.0	2/28															
Ashland							25	8.1	3/11									
Baldwin	22	6.0	2/18	15	4.6	3/4	14	4.4	3/11	14	4.3	3/18	6	2.9	3/25	5	1.5	4/1
"	18	5.2	2/25															
Baldwin, 1 S							17	5.4	3/8									
Big Falls	23	5.6	2/11							17	5.5	3/21	13	5.0	3/25	11	4.0	4/1
" "	21	5.6	2/18										13	4.7	3/28	9	3.9	4/4
Big Falls	19	5.4	2/25													3	1.4	4/8
Black River Falls							17	5.3	3/9									
Blair	18	5.0	2/18	14	4.9	3/4	13	3.9	3/11	10	3.8	3/18						
"	17	4.9	2/25							4	1.6	3/21						
Bloomer							15	6.3	3/9									
Bloomer, 1 NE				18	6.1	3/7												
Breed	21	6.0	2/11	19	6.1	3/4	18	5.7	3/11	16	4.7	3/18	8	2.9	3/25	8	2.6	4/1
"	21	6.0	2/18															
"	20	6.0	2/25															
Bruce				18	5.1	3/6												
Brule							23	6.2	3/11									
Brule, 1 S				26	7.4	3/4	23	6.2	3/11									
Burnt Rollway	22	4.5	1/9															
" "	23	4.9	2/7															
Cadott, 2 E							19	4.9	3/8									
Cashton							12	5.0	3/8									
Cedar Falls	23	5.8	1/31	19	3.7	3/1												
Clam Lake, 5 SW				28	8.0	3/5												
Clam Lake, 15 SW				23	6.4	3/5												
Colby, 1 S							11	3.6	3/8									
Cornell							15	4.7	3/9									
Couderay, 8 NW				21	5.5	3/6												
Cumberland	24	6.7	2/11	17	5.9	3/4	15	5.0	3/11	13	3.9	3/18	5	2.0	3/25	13	1.3	4/1
"	20	6.7	2/25													2	0.8	4/4
Cumberland, 1 SW				18	5.3	3/6												
Danbury	30	6.7	2/11				26	8.4	3/11									
Drummond							26	7.2	3/11									
Drummond, 3 W				25	6.4	3/4												
Eagle River							20	5.1	3/10									
Eau Claire							15	5.0	3/9									
Eau Pleine	20	4.1	2/5	16	4.0	3/1												
Fifield							25	4.9	3/10									
Fifield, 20 E				22	6.0	3/5												
Flambeau Dam, 3 W				24	6.5	3/4												
Fountain City	18	5.9	2/4															
Fountain City	16	5.5	2/18															
" "	14	5.0	2/25															
Gays Mills							4		3/11	6	2.3	3/18	T	T	3/25			
Genoa	18	6.8	2/4															
"	10	4.5	2/18															
Genoa	6	3.2	2/25															
Glidden, 4 NW				22	6.4	3/5												
Grantsburg							20	6.0	3/11							10	4.0	4/4
Grantsburg, 1 W																10	4.0	4/3
Greenwood, 2 S							14	3.9	3/8									
Gurney	25	6.9	2/18	25	5.7	3/4	27	7.4	3/11	22	7.4	3/18	18	7.2	3/25	17	7.4	4/1
"	26	7.0	2/25							23	7.4	3/21	19	6.9	3/28	16	7.2	4/4
Halcombe, 2 N				18	5.0	3/7												
Hawkins							20	5.8	3/10									
Hawkins, 1 W				19	5.3	3/6												
Hayward							21	6.4	3/10									
Hayward, 3 SW				23	6.4	3/5												
Hillsboro							9	4.6	3/8									
Holcombe				18	5.0	3/7												
Hurley, 4 SW				28	8.3	3/4												

TABLE 12.—*Depth of snow on ground and water equivalent, in inches, for Wisconsin.*—Continued

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Jump River, 7 E				17	4.9	3/7												
Ladysmith	22	5.7	2/18				18	6.1	3/10									
La Farge	13	4.1	2/11				8	2.8	3/11	4	2.0	3/18	3	0.3	3/28			
" "	13	4.2	2/18															
" "	9	3.5	2/25															
Lynxville	14	4.2	2/4															
"	14	4.4	2/18															
Marshfield							19	5.0	3/9									
Medford, 1 S				14	4.2	3/7												
Mellen							30	8.5	3/11									
Mellen, 2 NW				22	6.4	3/4												
Menomonie, 10 E							17	4.9	3/8									
Mercer				24	6.5	3/5												
Merrill							21	6.4	3/10									
Mosinee							18	5.0	3/9									
Neillsville	30	6.6	2/11				15	6.2	3/9	12	47	3/18	3	-	3/25			
"	18	7.2	2/25															
Nekoosa							17	5.5	3/9									
New London							13	5.8	3/8									
Ontario	15	3.7	2/11	12	3.4	3/4	13	3.4	3/11	11	3.2	3/18	5	1.8	3/25	5	0.4	4/1
Ontario	24	3.5	2/18							8	2.6	3/21						
"	14	3.5	2/25															
Ontario, 3 S							9	2.8	3/11									
Ontario, 2 W							13	3.0	3/11									
Osseo							13	4.3	3/9									
Owen	25	5.5	2/11	13	3.9	3/4	13	3.8	3/11	10	3.2	3/18	9	2.7	3/25	10	2.5	4/1
"	20	4.7	2/18							12	3.4	3/21	10	2.8	3/28	6	1.8	4/4
"	26	5.8	2/25															
Park Falls	21	6.9	2/7															
Park Falls, 3 N				20	5.3	3/5												
Portage	10	4.3	2/11				8	3.6	3/9				2	0.1	3/25			
"							8	3.1	3/11									
Prairie Du Chien	8	2.1	2/11	2	1.1	3/4							1	0.2	3/25			
" " "	6	2.0	2/18															
" " "	4	1.8	2/25															
Prentice							23	6.6	3/10									
Prentice, 2 W				19	5.9	3/6												
Rainbow Res.	26	5.5	2/3	25	5.8	3/3												
Readstown	13	3.3	2/11	8	2.9	3/4	6	1.8	3/11	5	2.6	3/18	2	0.3	3/28	3	-	4/1
"	12	3.7	2/18															
Readstown (Nr.)	11	5.7	2/25				7	4.1	3/8									
Reedsburg	17	4.2	2/11	10	3.1	3/4												
"	16	5.1	2/18															
"	14	3.7	2/25															
Rhinelander							22	5.4	3/10									
Rice Lake							16	5.3	3/10									
Rice Lake, 3 W				13	4.4	3/6												
Ridgeland, 6 N				17	5.1	3/7												
Ridgeland, 7 SE				21	6.0	3/7												
Ridgeland, 2 S				20	5.1	3/7												
Saint Croix Falls							12	4.9	3/12									
Sanborn				22	6.7	3/4												
Soldiers Grove							4	-	3/11									
Solon Springs	31	7.7	2/11	28	7.7	3/4	30	9.2	3/11	25	7.6	3/18	19	6.6	3/25	15	5.8	4/4
" "	32	8.6	2/25							24	7.2	3/21	21	6.5	3/28			
Solon Springs				32	8.6	3/4												
Sparta	22	5.8	2/11				15	4.5	3/8	12	3.1	3/18	4	1.2	3/25	5	1.6	4/1
"	20	5.5	2/18							6	2.9	3/21	10	2.3	3/28			
"	20	5.5	2/25															
Spencer, 1 W							15	3.9	3/8									
Spooner				16	4.9	3/4	19	5.5	3/10									
Spooner, 1 N				16	4.8	3.5												
Spirit Dam													12	3.1	3/25			
Springbrook, 2 SW				21	6.1	3/5												
Stanley, 1 SW							16	5.4	3/8									
Stone Lake							18	5.3	3/10									
Steuben							13	4.0	3/11									
Stevens Point							15	5.1	3/9									
Tomah							16	5.0	3/8									
Tomahawk							17	5.8	3/10									

TABLE 12.—*Depth of snow on ground and water equivalent, in inches, for Wisconsin.*—Continued

Location	Prior to 3/1			3/1-7			3/8-14			3/15-21			3/22-28			3/29-4/8		
	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date	SOG	WE	Date
Trempealeau	18	5.2	2/4															
"	17	5.1	2/18															
"	14	4.4	2/25															
Viroqua	13	4.0	2/11	10	4.5	3/4	8	3.7	3/11	6	3.5	3/18	4	1.4	3/25			
"	12	4.0	2/18															
Viroqua	11	4.3	2/25															
Wentworth				24	7.0	3/4												
Westboro, 3 S				19	5.5	3/7												
Westboro, 8 W				16	4.1	3/7												
Westby	12	4.0	2/18	11	-	3/4	9	2.9	3/11	6	2.3	3/18	4	0.5	3/20			
Westby, 4 NE							13	3.0	3/11									
West Salem							12	4.5	3/8									
Winter	25	4.8	2/11				20	4.8	3/10	18	6.4	3/18	16	6.0	3/25	10	3.7	4/4
"	14	4.8	2/18				20	6.2	3/11	17	6.2	3/21						
"	11	4.2	2/25															
Winter, 5 N				21	5.5	3/6												
Winter, 21 SE				21	5.3	3/6												
Wisconsin Dells	15	5.1	2/11	6	2.4	3/4	12	5.3	3/9	2	1.0	3/18	2	1.2	3/25	2	0.4	4/1
" "	9	6.3	2/25				10	3.1	3/11									
Withee							14	4.5	3/9									
Withee, 1 SW							17	5.3	3/8									
Woodruff							22	6.0	3/10									

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